

Decision Memorandum to Support Emergency Activities for:
Fuels Reduction Efforts to Protect Sequoia Groves in Sequoia and Kings Canyon National Parks from the Devastating Effects of High-Intensity Fire

U.S. Department of the Interior
National Park Service
Sequoia and Kings Canyon National Parks
Tulare and Fresno Counties, California

Introduction

The National Park Service (NPS) is requesting alternative arrangements for National Environmental Policy Act (NEPA) compliance pursuant to 43 CFR 46.150(c).¹ As described below, there is an urgent need to reduce fuel loads within and adjacent to the following eleven sequoia groves within Sequoia and Kings Canyon National Parks (Parks) in order to minimize the likelihood of losing portions, if not the entirety, of these eleven thousands-year-old giant sequoia groves to the threat of high-intensity fire: Granite Creek Grove, Redwood Meadow Grove, Little Redwood Meadow Grove, Lost Grove, East Fork Grove, Cahoon Grove, Horse Creek Grove, Atwell Grove, Big Stump Grove, Sequoia Creek Grove, and General Grant Grove.² As more fully discussed under “Plan Conformance” on page 3, the NPS has previously relied on the Parks’ Fire and Fuels Management Plan and associated Environmental Assessment (EA) and FONSI (2003) to implement fuels reduction projects over the last 19 years; however, emergency action is needed beyond the scope of this original plan, particularly in light of the dramatic and unprecedented loss of up to 19% of all giant sequoias from high-severity fire effects in the last two years alone—effects that were likely preventable had the groves and surrounding forests been restored to a more natural fire regime—to prevent further loss of this species that is the namesake of Sequoia National Park and the primary driving force behind Congressional designation of these lands as national parks. Although the NPS is concurrently taking steps to initiate planning and environmental compliance on a new Sequoia and Kings Canyon National Parks Fire and Fuels Management Plan, the nature and scope of actions related to this emergency are needed imminently and prior to the NPS’ ability to complete a NEPA process for actions within these eleven groves.

Given recent fire effects to giant sequoia and sequoia groves across the species’ range which have resulted in a loss of close to a fifth of all sequoias in the matter of only two years, it is apparent that the giant sequoia (*Sequoiadendron giganteum*) is at imminent threat from high intensity wildfire and subsequent high-severity fire effects, which could strike the groves or

¹ “If the Responsible Official finds that the nature and scope of the subsequent actions related to the emergency require taking such proposed actions prior to completing an environmental assessment and a finding of no significant impact, the Responsible Official shall consult with the Office of Environmental Policy and Compliance about alternative arrangements for NEPA compliance. The Assistant Secretary, Policy Management and Budget or his/her designee may grant an alternative arrangement. Any alternative arrangement must be documented. Consultation with the Department must be coordinated through the appropriate bureau headquarters.”

² Notably, Sequoia and Kings Canyon National Parks have identified 14 groves that are at risk of loss from high intensity fire (across 2,700 acres or 27% of all grove acreage within the Parks); the eleven groves that will be treated under this emergency action represent the remaining groves that are most at threat and where action can feasibly be initiated in the immediate future.

surrounding forest at any time of the year, most notably between April/May/June (depending on winter precipitation and fuel moistures) and the end of October.³ A combination of over 100 years of fire suppression, ten years of persistent drought, increased insect infestations and disease within and surrounding these eleven sequoia groves, and increasing temperatures throughout California, have resulted in an unprecedented high density of surface fuel accumulations, standing ladder fuels, and particularly low fuels moisture within these eleven groves and surrounding forests. The key data to indicate how conditions have changed for giant sequoias and fire, however, is not these meteorological and other indicators, but rather the observed fire effects to individual sequoias and sequoia groves since 2015. Although the conditions and trends described above have been concerning to the NPS for decades, sequoias were broadly seen as resilient to fire effects; despite fires, droughts, and insect infestations over the centuries, individual trees have lived over 3,000 years, and very few losses of monarch sequoias to natural causes have ever been documented. This perception of sequoia resiliency began to shift however in 2015, when multiple trees were killed by high-intensity fire. Over the next few years, 207 trees were documented as fatalities of high-severity fire, but in 2020 and 2021, the number of fatalities grew astronomically. Between fall 2020 and fall 2021, an estimated 9,760 to 14,237 large giant sequoias were outright killed by or are otherwise dying from high-intensity fire (accounting for 13-19% of the total population of large sequoias). During this time, fire burned through 28 of the 37 sequoia groves within Sequoia and Kings Canyon National Parks—killing large portions of groves that had little to no recent fire history; groves with less fuels accumulation and recent natural or prescribed fire on the landscape were largely unscathed. As clearly demonstrated by this unprecedented loss of sequoias in the last two years alone, functionally irreplaceable thousand-year-old giant sequoias are at high risk of loss. The existing conditions within these eleven groves—which will only worsen over time if action is not taken—are ripe conditions for a fire to burn fast, hot, and high such that the fire can become incredibly dangerous, if not impossible, to control and few resources within the burn perimeter may survive, even species like sequoias which have otherwise demonstrated resiliency to low- and moderate-intensity fire. Without imminent action, significant loss within these groves and the resources therein is probable; entire loss of groves is possible. Furthermore, manual fuels reduction (i.e., the manual removal of brush, small trees, and other ladder fuels) and the use of prescribed fire are effective tools to minimize wildland fire severity and restore forests to a more natural fire regime. Groves with a recent history of prescribed fire in the Parks and elsewhere in the species' range had much fewer sequoia losses than unburned groves during recent wildfires. See Appendix B for additional information.

Given the above, Sequoia and Kings Canyon National Parks are proposing emergency fuels reduction via manual thinning and/or prescribed fire within eleven groves to protect individual monarch sequoias, the groves themselves, and the other natural and cultural resources therein from the devastating effects of high-intensity fire. This emergency action (consisting of the suite of actions described under the “Emergency Action” heading below) will also mitigate risk to visitors, park residents and employees, and surrounding communities from the threat of wildland fire. Specifically, the parks will manually remove surface and ladder fuels within Sequoia Creek and General Grant Groves; manually thin, pile burn, and introduce prescribed fire within Big Stump, Granite Creek, Redwood Meadow, Little Redwood Meadow, Lost, and Atwell Groves; and introduce prescribed fire (with some manual preparation such as snag

³ Though the fire season in California is typically considered to be late spring-October, the Parks have seen fires burn through the winter in the last two years.

removal and hand line construction) to reduce fuels within East Fork, Cahoon, and Horse Creek Groves.

Work will be initiated as soon as possible and will continue as quickly as possible, as conditions permit, until treatments are completed in order to mitigate the risk of high-severity fire and its potentially devastating effects to Sequoia National Park's namesake. This said, the emergency action is inherently dangerous work and the treatment period is dependent on site and weather conditions that could delay implementation. These conditions include: winter weather; timing considerations for the protection of sensitive species (e.g., fisher); the need for coordination with contractors and others for implementation and activities such as on-site monitoring; the loss of workers to firefighting duties; air quality, fuels moisture levels, and other weather conditions at the time of pile and prescribed burning;⁴ and the millions of visitors coming to the Parks every year, particularly during the summer. For these reasons, the emergency action, as described below, will be immediately initiated, opportunistically implemented in line with project mitigations, and will cease upon completion of an updated Sequoia and Kings Canyon National Parks Fire and Fuels Management Plan and associated NEPA analysis, which is proceeding concurrently.

Consistent with guidance from the Council on Environmental Quality (Emergencies and the National Environmental Policy Act Guidance 2020), the information contained herein and the efforts that will be taken in the future regarding emergency fuels reduction within these groves, the Parks propose to comply with the regulatory requirements for EA content, interagency coordination, and public involvement to the extent practicable. The identified actions above are not likely to have significant environmental impacts based on preliminary analysis and experience implementing similar projects within the Parks over the past 50+ years. As stated previously, the Parks are concurrently taking action to initiate planning and environmental compliance on a Fire and Fuels Management Plan that will include specific measures to address threats to sequoias and the surrounding mixed conifer forests and will consider the impacts associated with any actions taken under these alternative arrangements, as appropriate.

Purpose and Need for the Action

The purpose of the emergency action is to reduce the threat of high-severity fire to eleven at risk giant sequoia groves within Sequoia and Kings Canyon National Parks and to restore wildfire resilience to these groves after a long period of fire suppression and drought. These actions will protect not only thousands-of-years-old giant sequoias (irreplaceable within several human lifetimes) but will also protect important wildlife habitat, cultural resources, and tribal resources within these areas and mitigate the danger to the Parks and surrounding communities from catastrophic wildfires which have become an extreme threat in recent years.

⁴ Prescribed burning requires a "prescription" of weather and other on-site conditions to be able to implement safely and ensure fire effects remain in the low to moderate ranges of severity. There have been multiple occasions over the last 20 years of implementing the Park's FMP where all planning and compliance have been completed and permits obtained to implement a prescribed burn, and the conditions on site at the time of planned action were not sufficient to enable implementation. These factors, which are beyond the control of the NPS, can result in delays of months if not an entire year or more.

Plan Conformance

The emergency action, described below, was designed in conformance with all bureau standards and incorporates appropriate guidelines for specific required and desired conditions relevant to project activities. Most importantly, the giant sequoia (*Sequoiadendron giganteum*) is the namesake of Sequoia National Park and is specifically called out for protection within the legislative history and/or enabling legislation for both Parks. For that reason, giant sequoias are a key component of the Parks' purpose and need statement and statement of significance and are identified as one of the Parks' key fundamental resources and values within the Park's Foundation Document (NPS 2016). Additionally, the action is consistent with the Sequoia and Kings Canyon National Resource Stewardship Strategy (2017) as well as the desired conditions and selected alternatives outlined in the Sequoia and Kings Canyon National Parks General Management Plan (2007) and Wilderness Stewardship Plan (2015) as well as its accompanying Wilderness Character Assessment (2014). See Appendix C for specific guidance within these larger Parks-specific plans.

The action is furthermore broadly consistent with the goals and methods outlined in the Sequoia and Kings Canyon National Parks Fire and Fuels Management Plan (2003) but expands the use of manual thinning into designated wilderness and increases the intensity (e.g., acres treated) of manual thinning and prescribed burning beyond what was originally anticipated within the plan. Notably, all aforementioned park plans fully acknowledge the need and identify goals to restore a natural fire regime to the landscape, but implementation of actions to meet those goals and objectives have not kept pace with the worsening conditions on the ground (e.g., the death of millions of trees in the Sierra Nevada during the course of the last ten years of drought), and the original constraints the NPS placed on the proposed actions within the FMP (e.g., no manual thinning within wilderness) are no longer understood to be sufficient to meet the purpose and need for action. Namely, the parks have been able to reduce fuels in a portion of ten of the Parks' 37 groves over the last few decades, but other fuels treatments have been needed elsewhere in the Parks to address other priorities, such as the protection of surrounding communities, including those within the Parks. The overall capacity to implement all fuel treatments within the Parks—whether for the protection of sequoias or not—has not kept pace with the need due to administrative, funding, and logistical challenges (such as losing staff to respond to wildfires throughout the state and nation). Although the Parks began seeking funding for and completing surveys within a portion of the groves included within this emergency action several years ago with the intention of implementing fuels treatments in the near future, the dramatic and unprecedented fire effects particularly to sequoias in the last two years have highlighted the present risks to this iconic species, the need for immediate emergency action, and the need to develop a broader plan for the protection of the giant sequoia. For these reasons, the Parks are initiating a planning and environmental compliance process to develop an updated Fire and Fuels Management Plan concurrently with this emergency action which are intended to be completed within two and a half years. Notably, the Parks are also expecting to initiate an EA to consider restoration within sequoia groves that experienced high fatality rates during the last two wildfire seasons and are likely to experience type-conversion without intervention. The proposed actions within that restoration plan, though potentially urgent, are not considered an emergency action and are not included within the scope of this request for alternative arrangements.

The emergency action is also consistent with the National Fire Plan; is in keeping with the Sierra Nevada Ecoregional Plan; and runs parallel to plans and actions on surrounding Federal (USFS

and BLM) and tribal lands, including the Management Plan and Final Environmental Impact Statement for Giant Sequoia National Monument (2003) and the Sierra Nevada Forest Plan Amendment (2001).

This emergency action would also be implemented in accordance with the National Historic Preservation Act, Endangered Species Act, Migratory Bird Treaty Act, the Bald and Golden Eagle Protection Act, and Wilderness Act. Consultation on some portions of the emergency action has been completed and consultation on the remainder of the overall action is underway with the California State Historic Preservation Officer, with participation from the Advisory Council on Historic Preservation; work will not begin until consultations are complete. The NPS has also initiated consultation with tribal partners and will continue consultation throughout implementation to identify resources that may be present and ways to mitigate if not avoid impacts to these resources. Similarly, the Parks will implement the US Fish and Wildlife Service national conservation measures to avoid direct impacts to migratory birds and bald and golden eagles. The Parks have also reached out to the US Fish and Wildlife Service in accordance with the Endangered Species Act. Consultation on some portions of the action is already completed, and consultation will be initiated and completed for any other portions of the action that may affect a federally listed species or migratory bird; work that may affect a listed species will not begin until consultations are complete. Finally, the Parks have determined that this emergency action in wilderness is necessary to administer the area as wilderness and will further document analyses in line with the provisions of the Wilderness Act for any action that would otherwise be prohibited by the Act prior to taking that action. All consultations and analyses have the potential to modify the action as described below in order to minimize if not avoid impacts to resources; mitigations as they are identified in the future will be incorporated into the emergency action. See “Coordination with Affected Agencies” on page 27 for additional information.

Compliance with the National Environmental Policy Act

The actions outlined below combine to form one emergency action that is implemented in accordance with 43 CFR 46.150 and 516 DM 2.8 in that it is necessary to mitigate harm to eleven sequoia groves and the natural and cultural resources therein as well as associated threats to life and property from high severity, catastrophic fire. Although the NPS is concurrently taking steps to initiate planning and environmental compliance on a Sequoia and Kings Canyon National Parks Fire and Fuels Management Plan, the nature and scope of actions related to this emergency are needed imminently and prior to the NPS’ ability to complete a NEPA process for actions within these eleven groves.

The emergency action is appropriate in this situation because without human intervention, eleven groves in the Parks—equating to 9% of all sequoia acreage and 14% of all sequoia groves in the world—and the natural and cultural resources therein, could be largely or entirely lost to high severity fire—whenever it may hit—given the high level of fuels within these eleven groves and surrounding forests (due in large to past agency fire suppression around these groves) and documented increases in the length of fire seasons, wildfire sizes, and fire intensity in the Sierra Nevada and the State of California in recent years (which increases the exposure time of these groves to wildfire). Already, an estimated 13-19% of all sequoias range-wide—a fundamental resource and value to Sequoia and Kings Canyon National Parks—are dead or dying from fire in the last 24 months alone, and this action would provide protection for 9% of all sequoia acres in the world. Given that wildfire could strike these groves at any time, expedient actions are

required to reduce fuel loading and thereby minimize the potential for high intensity fire and anticipated subsequent, and potentially permanent, loss of these ancient groves and the other natural and cultural resources therein.

In identifying the actions outlined below, and as additional or more specific actions are identified throughout the response to this emergency, the planning team has and will continue to consider the following:

- The importance of sequoias within the Park’s legislative history;
- The lack of recent fire and existing fuels conditions within part or all of these eleven groves;
- The risks associated with taking no action, including assumed loss of sequoias if impacted by high-severity fire and potential type conversion of the surrounding forest;
- The demonstrated success of previous fuels treatments within the Parks over the last 60 years;
- The understood impacts associated with implementing fuels treatments within the Parks over the last 60 years;
- The safety of crews implementing the action;
- The feasibility of taking action and the probability with which the action may reduce threat to sequoia groves;
- The availability of physical resources with which to implement the emergency action;
- The ability to minimize impacts to natural and cultural resources from implementing the emergency action.

Emergency Action

Treatments

The emergency action is a sequence of fuels reduction treatments within and around eleven sequoia groves—some of which will be treated as one unit or separated into two treatment units. Table 1 below outlines each treatment unit, the grove(s) within the unit, the types of treatments that will be implemented within each unit, and the acreage or number of miles associated with each specific treatment. See attached maps in Appendix A.

Notably, not all fuels treatments are appropriate within each treatment unit or grove and the acreage of each treatment unit does not necessarily align with the grove acreage due to factors such as need, access, practicality, feasibility, and risk (including safety) associated with the type of treatment needed in each unit. For example, the prescribed burn around East Fork, Cahoon, and Horse Creek Groves is substantially larger than the groves themselves due to the lack of natural barriers and recent burn scars that could otherwise limit the size of a prescribed burn.

Similarly, the intensity of action and degree of impacts within each treatment unit (e.g., point protection, manual thinning, and pile burning) are directly commensurate with the amount of surface and ladder fuels on the ground. Some treatment units have more fuels to remove and will therefore require more work to meet the conditions described below. For this reason, the currently planned treatments described herein are representative and fully inclusive of the treatments that will be implemented. However, adjustments to planned treatments will be made consistent with current conditions at the time of implementation or other site-specific information that is gained in the final planning stages. Descriptions of each type of fuels treatment follow in Table 1.

Table 1: Summary of Proposed Fuels Treatments and Associated Acreage by Treatment Unit

| Treatment Unit | Grove | Treatment Type | | | | |
|----------------|-----------------------------|------------------|-------------|-----------|----------------|---------------------------------|
| | | Point Protection | Manual Thin | Pile Burn | Perimeter Prep | Prescribed Burn (total acreage) |
| Big Stump East | Big Stump Grove (portion) | - | - | 117 acres | 0.6 miles | 117 acres |
| Big Stump West | Big Stump Grove (portion) | - | - | 80 acres | - | - |
| General Grant | General Grant Grove | 168 acres | 168 acres | - | - | - |
| Sequoia Creek | Sequoia Creek Grove | 38 acres | 38 acres | - | - | - |
| Redwood Meadow | Redwood Meadow Grove | 353 acres | 353 acres | 0 miles | 3,445 acres | |
| | Little Redwood Meadow Grove | 62 acres | 62 acres | | | |
| | Granite Creek Grove | 7 acres | 7 acres | | | |
| Lost | Lost Grove | 7 acres | 7 acres | 2.7 miles | 669 acres | |
| Atwell | Atwell Grove | 450 acres | 450 acres | 4.5 miles | 1,459 acres | |
| Deer Creek | East Fork Grove (Portion) | - | - | 1.2 miles | 940 acres | |
| East Fork | East Fork Grove (Portion) | - | - | 4.9 miles | 14,079 acres | |
| | Cahoon Grove | | | | | |
| | Horse Creek Grove | | | | | |

Point Protection around Most Vulnerable Resources (See column 3, Point Protection in Table 1)

Within the General Grant, Sequoia Creek, Redwood Meadow, Lost, and Atwell Treatment Units (total of 1,085 acres across 7 groves), the NPS plans to manually thin surface fuels and understory small trees and shrubs immediately around monarch sequoias to protect these trees from high-intensity fire leading to high-severity fire effects. As early as October 2022, one to three crews of 12-14 people within each of these treatment units will rake fine fuels, remove logs, and cut and remove dead trees and small diameter living trees that could serve as ladder fuels from the base of individual sequoias and within the dripline of the canopy.

The planned acres treated via point protection are outlined in Table 1 above. Notably, these action areas include primarily the groves and 300-foot buffer downslope and 100-foot buffer upslope around the groves to account for fire behavior, which travels faster upslope. This action is expected to last approximately 21 days in each unit and should be completed in October and November 2022. However, should implementation be cut short in 2022, any point protection work not completed this fall will be resumed and completed as soon as possible, likely in spring 2023 as soon as weather conditions permit.

Manual Thinning and Pile Burning (See columns 4 and 5, Manual Thin and Pile Burn, in Table 1)

Within the General Grant, Sequoia Creek, Redwood Meadow, Lost, and Atwell Treatment Units (total of 1,085 acres across 7 groves), the NPS will manually thin surface fuels and understory small trees and shrubs to modify fire behavior and reduce the likelihood of a surface fire escalating in intensity to prevent high-severity fire effects. As early as October 2022, one to three crews of 12-14 people per treatment area will fall small diameter trees and limb larger trees such that a maximum of 25 trees less than 40 feet in height will be left per acre and all live trees over 40 feet tall will remain. These larger trees that will remain standing will be limbed up to at least 6 feet above ground. In addition to tree removal, up to 50% of larger brush patches will be cut to create a mosaic pattern.

The planned acres treated via manual thinning and pile burning are outlined in Table 1 above. Notably, these action areas are within the same acres treated for point protection above and is primarily an extension of point protection efforts.

Species anticipated for thinning include: White fir (*Abies concolor*), red fir (*Abies magnifica*), incense cedar (*Calocedrus decurrens*), sugar pine (*Pinus lambertiana*), Jeffrey pine (*Pinus jeffreyi*), and ponderosa pine (*Pinus ponderosa*). Small (10 inches dbh or smaller) sequoia (*Sequoiadendron giganteum*) may also be removed in areas of dense reproduction in General Grant Grove and Sequoia Creek Grove where these trees would likely be killed in a fire while also creating ladder fuels for more mature trees.

All stumps will be flush cut at ground level, and felled trees and snags and other dead and down logs and additional woody material up to 18 inches in diameter will be lopped and scattered or gathered, cut into logs, and piled for burning later. Logs larger than 18 inches in diameter will be left for wildlife habitat, unless they pose a fire hazard to adjacent structures, giant sequoias, historic stumps, and logs of special interest. If so, they will be piled away from these resources. Any created piles for pile burning will be located at least 15 feet from any remaining residual green tree in the downhill or sidehill direction of the pile, and at least 20 feet from any residual green tree upslope of the pile. Piles may be covered with Clean Burn Kraft Paper to keep moisture out of the center until ignitions take place.

Once manual thinning has been completed and as soon as conditions allow, the NPS will burn all piles that were created during manual thinning within these treatment units as well as the piles that were previously created in Big Stump West and Big Stump East Treatment Units for a total of 1,282 acres of piles across 8 groves. Pile burning will be completed in accordance with the parkwide burn plan. This specific treatment will begin in fall 2022 and spring 2023 in the Big Stump Treatment Units and could extend beyond fall 2023 in other treatment units if conditions do not permit pile burning sooner.

Perimeter Preparedness and Broadcast/Prescribed Burns (See columns 6 and 7, Perimeter Prep and Prescribed Burn in Table 1)

As early as October 2022, the NPS will complete perimeter preparedness around the units identified for prescribed burns in Table 1, including: Big Stump East, Redwood Meadow, Lost Grove, Atwell, Deer Creek, and East Fork for a total of 13.9 miles of perimeter prep across 6 treatment units. Specific perimeter treatments are outlined in Table 2 on page 9 but generally include snag removal, trail preparation, and the construction of minimum impact handlines

along the perimeter of burn units where natural or other constructed features do not currently exist. **Trail preparation specifically includes** (1) raking debris from the trail, (2) snag removal in areas where they may present holding and/or safety hazards, and (3) potential low intensity fire ignitions along the trail to blacken vegetation in the area. No expansion of any existing trails will be required. **Hand line construction** will be implemented using minimum impact techniques; line width will be no more than necessary to hold a low intensity backing fire, typically 12-24 inches in width. Snags that pose immediate threats to personnel or holding will be felled. Preparedness could occur at any time of year when snow is not on the ground and is expected to take between 2-14 days per treatment area.

Following perimeter preparedness in the respective treatment/burn units and as soon as conditions allow, the NPS will ignite the following six prescribed burns which are identified in Table 1 above and described further below: Big Stump East, Redwood Meadow, Lost Grove, Atwell, Deer Creek, and East Fork for a planned total of 20,709 acres burned in low to moderate intensity fire. At least one of these prescribed burns is expected to be ignited in fall 2022 (likely Deer Creek), but it is likely that other prescribed burns will not be implemented until Spring or Fall 2023 or even 2024 if the initial treatments cannot be completed or conditions on site, such as sufficient fuels moisture, prohibit the prescription from being implemented. The larger prescribed burn areas are delineated by considerations such as natural fire breaks to best ensure agency ability to manage the prescribed burn and its perimeter.

- a. *Big Stump (117 acres)*: Big Stump prescribed fire treatment is a 117-acre fuels restoration treatment in the Big Stump area of Grant Grove in Kings Canyon National Park. The project area is bound to the north by Highway 180, to the south by 0.6 miles of minimum impact handline, to the east by the Generals Highway, and to the west by the Big Stump loop trail (East of Highway 180). This treatment is part of the ongoing effort to restore the fire cycle and provide protection to developments in the Grant Grove peninsula and a portion of Big Stump Grove.
- b. *Lost Grove (649 acres)*: A first entry prescribed fire treatment, Lost Grove's 649-acre treatment area is primarily defined by three geographic features: the NPS/USFS boundary on the north-west edge, the Generals Highway on the south edge, and Cabin Creek on the east edge. The north-west edge is nearly 2.5 miles in length and is primarily defined by the boundary of the Sequoia National Forest and the Jenny Lake Wilderness. While there is a small portion of the boundary that follows the Jennie Lake Trail, the edge is primarily without any improvements beyond the NPS/ USFS ownership signs. The southern edge is 1.85 miles in length and is clearly defined by the Generals Highway beginning at the agency boundary line and ending at Cabin Creek. The east edge is 2.5 miles long. Beginning at the administrative access road, the edge primarily follows Cabin Creek until the creek moves eastward. The edge then follows a granite face for 0.65 miles and connects with the Jennie Lake trail and the NPS/USFS boundary.

Table 2: Perimeter Treatments and Locations by Treatment/Burn Unit

| Treatment/ Burn Unit | Perimeter Prep Details | | Prescribed Fire Details | |
|--------------------------------|------------------------|--|---------------------------------|---|
| | Duration | Location of Treatment Along Perimeter | Timing/ Duration | Type of Ignition |
| Big Stump East Burn Unit | 2 days | - Minimum impact handlines: 0.6 miles of minimum impact handline will be cut along the south boundary | Spring or Fall 2 days | Ignition of the unit during the broadcast burn will be done by hand using drip torches, with the option of small-scale aerial firing from a UAS (unmanned aircraft system) platform. |
| Redwood Meadow Burn Unit | 10-14 days | - Minimum impact handlines: Less than 1/10 th of a mile surrounding the historic cabin | Spring or Fall 5-7 days | Some hand firing around the groves may be necessary, especially if implemented prior to pile burning accumulated fuels in the groves. Ignition will primarily involve aerial firing. |
| Lost Grove Burn Unit | 5 days | - Minimum impact handlines: o 1.8 miles of line on NPS / USFS boundary from Generals Highway to the northeast corner of unit o 0.7 miles along the upper east flank from Cabin Creek up to the northeast corner of unit o 0.2 miles of thinning will also be done around NPS improvements on the southern edge of the unit, anchoring off and tying into either the access road or Cabin Creek. | Spring or Fall 5 days | Ignitions will be composed of both hand lighting and aerial lightning. |
| Atwell Burn Unit | 14 days | - Minimum impact handlines: 3.9 miles along Paradise Ridge, starting from Mineral King Road (just east of Cabin Cove) and following a broad ridge uphill to intersect with Paradise Ridge. Line will continue out Paradise Ridge (west) and tie in with the 2021 KNP Complex fire scar. - Trails: 0.6 miles of the Atwell Hocket Trail | Fall 5 days | Ignition will be done by hand using drip torches along the perimeters. Interior portions will be ignited by aerial firing using plastic spheres delivered by helicopter or unmanned aircraft systems (UAS). |
| Deer Creek Burn Unit | 7 days | - Minimum impact handlines: Potentially constructed to supplement the two creeks serving as the west and east flanks if water levels and topography aren't sufficient for holding - Trail: 1.2 miles of the Tar Gap Trail | Fall 17 days | Ignition operations will begin first by hand crews burning from the constructed hand lines. This operation could take place a year in advance of ignition of the interior portion of the unit. The remaining interior portion of the unit will be ignited using aerial ignition (PSD) from helicopter or UAS. |

Table 2: Perimeter Treatments and Locations by Treatment/Burn Unit

| Treatment/ Burn Unit | - Perimeter Prep Details | | Prescribed Fire Details | |
|-------------------------|--------------------------|---|--------------------------|---|
| | Duration | Location of Treatment Along Perimeter | Timing/ Duration | Type of Ignition |
| East Fork Burn Unit | 14 days | <ul style="list-style-type: none"> - Minimum impact handlines: <ul style="list-style-type: none"> o The east / west oriented ridge bounded on the north by Horse Creek and on the South by Whitman Creek. This is approximately 1.2 miles o Starting at approximately 36.3883, -118.7219 and working north down the ridge to tie in with an existing granite slab feature at 36.4006, -118.7145. This is approximately 1.6 miles. o The east side of the burn unit near the junction with the Deer Creek Burn Unit. This is approximately 0.5 miles. - Trail: 2.6 miles of the Cahoon Rock Trail (from the junction of the Atwell Hocket Trail to its terminus) | Spring or Fall, 5-7 days | Ignition operations will begin first by hand crews burning from the constructed hand lines, anchoring in to the 2021 KNP Complex Fire scar, working east to intersect with the line that follows a broad ridge downhill towards the Mineral King Road. Hand firing will be followed by Aerial Ignition using either helicopter or UAS. Fire will be backed through the unit and grove working from the highest points downhill towards Mineral King Road. |

- c. *Redwood Meadow Burn Unit (3,285 acres)*: This 3,285-acre prescribed burn project utilizes existing barriers and natural features, including Cliff and Granite Creeks for containment and completes the prescription needed to protect Granite Creek, Redwood Meadow, and Little Redwood Meadow Groves. The KNP complex burn scar to the west eliminates much of the risk of the fire moving down canyon and impacting park infrastructure.
- d. *Atwell Burn Unit (1,459 acres)*: The 1,459-acre Atwell Burn Unit uses the same footprint as the 2003 Atwood Prescribed Fire; portions of this unit and the Atwell Grove that burned in the 2021 KNP Complex. Burning the remaining unburned portion of the unit will protect the rest of the unburned Atwell Sequoia Grove.
- e. *Deer Creek Burn Unit (941 acres)*: This 941-acre prescribed burn is required to enable a successful prescribed burn across the remainder of East Fork Grove as well as Cahoon and Horse Creek Groves. The burn unit is bound to the north by the East Fork of the Kaweah River, to the west by Deer Creek, to the south by the Tar Gap Trail, and to the east by an unnamed creek. Approximately 730 acres of the project footprint was burned in the Deer Creek lightning-caused wildfire in 1991. This area will be considered a maintenance burn, with the remaining 211 acres considered restoration. The footprint of the burn will treat a large portion of the East Fork Grove.
- f. *East Fork Burn Unit (14,079 acres)*: The proposed footprint of 14,079 acres has a recent prescribed fire to the east, a managed fire to the west (Eden), and two large wildfire scars to the north (KNP Complex) and to the south (SQF Complex), but there are current gaps in these fire scars. This prescribed burn, which is considered a restoration burn, will treat the remainder of the East Fork Grove and the entirety of Horse Creek and Cahoon Groves.

Broadcast prescribed burning will occur in the spring or fall and are estimated to take between 2 and 17 days to implement, depending on the size of the treatment/burn unit. Ignition will primarily begin at high points to enable the fire to slowly back downhill and will target burning between 500 and 1000 acres per day to help regulate fire intensity and minimize smoke impacts to surrounding communities. The methods for ignition are outlined in Table 2 above and include the following tools, alone or in combination: drip torches, aerial firing by helicopter, and/or aerial firing by unmanned aircraft systems (UAS). UAS will also be used for aerial reconnaissance to scout project progress, fire effects, and for detecting containment problems. While aerial ignitions are being conducted, helicopters will typically be in the air for 30 minutes at a time and will then land at the closest existing helispot to let the ignitions develop. Subsequent passes will be required to complete ignition of the entire unit and intermittent reconnaissance flights will be required.

All trails within the burn units and those sections used for perimeter protection described below will need to be closed during and immediately following prescribed burns. This includes Tar Gap, Middle Fork Cut Off, Redwood Meadow Cutoff, Paradise Ridge Trail, Cliff Creek Trail, Redwood Meadow Bear Paw Trail, Granite Creek, Atwell Hockett, Cahoon Rock, and Evelyn Lake Trail.

All handlines and other impacts will be rehabbed to the specifications in the SEKI Fire and Fuels Management Plan following the completion of these prescriptions.

Timing

Work in all treatment units will be initiated as soon as possible and will continue as quickly as possible, as conditions permit, until treatments are completed in order to mitigate the risk of high severity fire and its potentially devastating effects to Sequoia National Park's namesake. Should funding be available and agreements in place to hire crews, as expected, all point protection actions are expected to be completed in fall 2022. Similarly, manual thinning in all groves identified for treatment will be initiated in fall 2022 and will extend into the winter as long as possible, though it is likely that crews will need to begin the effort again in spring 2023 following snowmelt. Piles in Big Stump are expected to be treated in fall 2022, and the perimeter preparation and prescribed burn in Deer Creek could be implemented in Fall 2022 if the unit comes into prescription. All other project work will be completed as quickly as conditions allow on the ground, in order of the treatments identified per unit.

Although implementation will be initiated immediately and continuously as weather and other conditions permit, the emergency action is inherently dangerous work⁵ and is dependent on site and weather conditions which could delay implementation. These conditions include: winter weather; timing considerations for the protection of sensitive species (e.g., fisher); the need for coordination with contractors and others for implementation and activities like on-site monitoring; the loss of workers to firefighting duties; air quality, fuels moisture levels, and other weather conditions at the time of pile and prescribed burning;⁶ and the millions of visitors coming to the Parks every year, particularly during the summer. For these reasons, the emergency action as described above will be immediately initiated, opportunistically implemented in line with project mitigations, and will cease upon completion of an updated Sequoia and Kings Canyon National Parks Fire and Fuels Management Plan and associated NEPA analysis, which is proceeding concurrently.

Access and Staging

Personnel will utilize existing roads and trails, without modification, whenever feasible to access treatment areas. Personnel and equipment for all treatments may also be staged at campgrounds and in developed areas in close proximity to treatment areas during project implementation.

Crews will also spike camp near the Redwood Meadow Burn Unit, East Fork Burn Unit, and Atwell Burn Unit during all treatments in these units, and crews will be logistically supported by either stock, if feasible, or helicopter sling loads. These crews will likely require gear insertion on the first day of work with back haul and resupply every 2-7 days, and gear extraction on the last day of work. Insertion of gear and potentially crews will take multiple flights on the first and last workday. The distance from trail heads to work areas may also necessitate that crews be

⁵ Tree felling is consistently one of the top five most dangerous jobs in America (BLS 2020). Firefighting is also conventionally considered dangerous work.

⁶ Prescribed burning requires a "prescription" of weather and other on-site conditions to be able to implement safely and ensure fire effects remain in the low to moderate ranges of severity. There have been multiple occasions over the last 20 years of implementing the Park's FMP where all planning and compliance have been completed and permits obtained to implement a prescribed burn, and the conditions on site at the time of planned action are not sufficient to enable implementation. These factors, which are beyond the control of the NPS, can result in delays of months if not an entire year or more.

flown into locations nearby the proposed work sites in which case movement of gear from one location to another may be required as work progresses.

Tools

But for helicopter transport, no heavy equipment will be utilized off road during treatments. Chainsaws and hand tools will be used to remove snags, fall trees, cut brush, build piles, construct handline, and complete other perimeter prep activities. Drip torches, UAS, and helicopters may be used for ignition. Stock or helicopter will be used to transport equipment and resupply crews during implementation.

Pre and Post Treatment Monitoring

In order to evaluate treatment effectiveness in meeting project goals (fuel reduction, restoration of wildfire resilience, protection of giant sequoia trees) two metrics will be tracked pre- and post- treatment. Fuel loads will be assessed before treatments using stratified fuel plots that will be measured before and after treatment. Since giant sequoias are a focus of this work, the NPS will also assess impacts to giant sequoias from all treatments. Giant sequoia impacts will be assessed using the parks' Sequoia Tree Inventory which mapped all large sequoia trees in these parks during the 1960's. This previous accounting allows us to reinventory sequoia trees and update their condition assessments in terms of crown health, bark damage, and living versus dead. This assessment goes beyond fuel conditions to the health of sequoia trees themselves.

Alternatives Considered but Dismissed

No Action

This alternative does not address the purpose and need for action. Without human intervention, whenever wildfire strikes these areas or the surrounding forest, these groves may burn at high severity given the large amount of surface and ladder fuels present and the low likelihood of ideal weather conditions which may otherwise slow a fire's progression (i.e., even if fire struck a nearby forest, it would likely travel to these groves with little opportunity to effectively control or suppress these fires). Most trees – sequoias and other species – within the area may, therefore, be killed by fire, and the existing forest would likely type convert to shrubs. This alternative was therefore dismissed from further consideration.

Do Not Thin; Prescribed Burn Only

The NPS has tried this alternative in other groves, and prescribed fire treatments alone, where fuels have accumulated for years without fire, were found to have too high of potential to impact giant sequoias in areas where the prescribed burning is considered "first-entry." This alternative is therefore only considered in situations where manual thinning is not possible and prescribed fire is the only option, such as within the East Fork, Cahoon, and Horse Creek Groves. These groves are too remote and the ground too steep to enable foot access and be able to safely complete any fuels reduction work by hand. This alternative was otherwise dismissed in areas where manual thinning can be completed in order to change fuel conditions prior to burning and afford a higher level of protection to giant sequoia trees.

Use Heavy Equipment to Remove Existing Fuels

Although heavy equipment would likely be more efficient in removing fuels, this tool is impractical in much of the groves identified for treatment and would cause greater impacts than anticipated from the emergency action. These 11 groves are either too remote or are otherwise too steep to access with heavy equipment and/or the proposed methods are expected to be just as effective as the heavy equipment, without the negative impacts associated with this type of tool, such as vegetation clearance along access routes and soil disturbance associated with the presence and transport of this equipment. Many of the groves and associated treatment units are also within wilderness where motorized equipment and mechanized transport are prohibited unless administratively necessary to manage the area as wilderness.

Potential Environmental Consequences

Air Quality

Localized emissions of low to moderate quantities of smoke would be produced; increasing PM 2.5 during firing and burn down, estimated at approximately a month for each of the six prescribed burns. There is potential for impacts during these times to all areas adjacent to the project sites including sensitive receptors in Wilsonia, Grant Grove, Wuksachi, Lodgepole, Ash Mountain, Silver City, and Mineral King (NPS, 2021). Degree of impacts to sensitive receptors is site specific and dependent upon burn down time, topography, and weather as further detailed below.

For the prescribed burn in the Big Stump East Burn Unit, daytime smoke may impact Grant Grove and Wilsonia Village, as well as the campgrounds in the area. Depending on dispersion, daytime drift smoke may be present along the Generals Highway and Kings Canyon road near the Big Stump entrance station and the Wye. Nighttime smoke and morning smoke may be present near Sequoia Lake, residential areas in Eshom Valley and Dry Creek, and the community of Three Rivers.

For the prescribed burn in the Redwood Meadow Burn Unit, smoke will be visible from the Generals Highway and surrounding areas during burning activities. Nighttime and early morning smoke are anticipated to be present in the community of Three Rivers as well as the Lodgepole and Wuksachi areas of Sequoia National Park if diurnal winds do not push the smoke downslope.

For the prescribed burn in the Lost Grove Burn Unit, the treatment will be visible from the Generals Highway and smoke will be visible from the surrounding areas during burning activities. A minimal amount of daytime smoke will be present along the highway as the smoke is expected to lift and move away from the road. Nighttime smoke is likely as the smoke settles and the diurnal winds move downslope. Smoke is expected along the highway and in Dorst campground.

For the prescribed burns in the Deer Creek and East Fork Burn Units, there may be daytime smoke present in the Mineral King area, Cabin Cove, and Silver City. The Cold Springs and Atwell Mill campgrounds may also experience daytime smoke. Nighttime smoke may be present in Cabin Cove, Silver City, and Atwell Mill Campground. The Mineral King Road may

experience day and nighttime smoke, and the community of Three Rivers may experience nighttime and early morning smoke impacts.

Overall, project related reductions in air quality are typically local but may influence regional scale air quality at certain times of day and atmospheric conditions. All impacts are anticipated to dissipate within one month of burn operations within each treatment unit.

Carbon Storage/Carbon Sequestration

Healthy, mature forests mitigate the rate and impacts of climate change by absorbing greenhouse gases and storing atmospheric carbon. Forests remove carbon from the atmosphere and store that carbon as above-ground and below-ground organic matter. Mature/Old-growth forests accumulate atmospheric carbon for centuries, which, when disturbed by fire, can release large quantities of CO₂ (e.g. “black carbon”) back to the atmosphere. It was formerly thought that only young forests sequestered carbon from the atmosphere, and that mature forests simply stored carbon (Cox, et al. 2021). However, recent studies demonstrate that functionally intact mature forests like Sierra Nevada Mixed Conifer forests, intermingled with giant sequoia in the Parks, actually take up large quantities of carbon from the atmosphere (Lutz, et al. 2017). Carbon uptake by trees continuously increases with their size because the overall leaf area increases as they grow. Thus, bigger trees absorb more carbon, and the oldest trees in a forest capture the most carbon from the atmosphere. This is relevant for protecting groves of sequoia in the Parks because giant sequoias are the biggest trees by volume in the world, and they are also extremely long-lived. Many of the largest trees in California’s sequoia groves are more than 3,000 years old. And, as previously described, Lutz, et al. (2017) estimated that aboveground carbon stored in forests in the Parks (all tree species) was ~20 Tg C (Lutz, et al. 2017), and giant sequoia accounted for 10-17% of this total tree C (2-3.4 Tg C).

These data suggest that although pile burning and the six prescribed burns will release carbon into the air during these events, in reducing the likelihood of high severity fire effects, particularly to large monarch sequoias, these forests will retain a high capacity for carbon storage and sequestration into the future.

Cultural Resources

Historic structures and archeological sites are at greatest risk of severe disturbance during wildfires due to the intensity of fires and the implementation of extreme emergency suppression actions. In the past two wildfire seasons, several historic properties have been destroyed by high intensity fires within the parks and high severity fire effects. In contrast, targeted manual thinning and pile burning and broadcast prescribed burning serves to reduce the risk of catastrophic fire in the vicinity; promote the stability of a healthy, fire-dependent ecosystem; and, ultimately, help to protect historic properties if appropriate mitigations are carried out.

That said, cultural resources are at risk of being impacted by both fire and suppression and rehabilitation actions. The primary source of potential effect is exposure of cultural material to direct fire. The prescribed burn would be ignited when conditions are conducive to low severity burning to remove duff and ladder fuels, although some patchy, moderate severity burning is expected. Studies have shown that cultural material in direct contact with flames or heat can undergo significant changes if not treated properly. Obsidian hydration bands can be altered by temperatures of as little as 200°C, while glass, ceramic, and metal materials generally do not have

detectable changes below about 600°C. Typically, prescribed burns in forest settings are described as burning slow and cool with surface temperatures usually reaching 200-600°C, suggesting low potential to impact resources. However, fire is a variable phenomenon, and areas containing vulnerable cultural resources will be subjected to fuels reduction treatments to lessen fire intensity and duration. With fuels reduction treatments in place prior to ignition, it is expected that there will be no adverse effect to historic properties, particularly given the long history of low to moderate severity that has already affected these landscapes for the past several thousand years (thus most if not all prehistoric sites have already burned many times and historic sites will be protected through line and fuel reduction treatments). Conditions have furthermore been identified to prevent piles from being placed on top of archeological sites and to wrap historic structures to avoid any impacts from prescribed fire.

Conditions have furthermore been added to the emergency action to further identify and avoid cultural resources in areas where previous identification efforts have not been completed, where conditions suggest some probability of resources on site, and where emergency action (i.e., constructing handline or intense manual thinning) could otherwise impact historic properties. These conditions provide cultural resources in the project area such that no adverse impacts to these resources are anticipated.

Vegetation

Point protection, manual thinning, and prescribed burning will directly remove or burn brush and standing small diameter vegetation, including young sequoias, within the treatment area. Notably, only young sequoias would be impacted and only in areas where they are present, which is primarily in groves that have had prescribed fire or wildfire within the last several decades since giant sequoias need fire to reproduce. Despite these perceived negative impacts, the proposed treatments will overall restore the conditions and processes to which giant sequoias are adapted—moderate severity fire and low stand density—and will remove excessive accumulation of fuels caused by fire suppression and drought. While some younger individual sequoia trees may die as a result of these treatments, these deaths will be far less than the losses seen in untreated groves and are consistent with the life history of giant sequoias and expected outcomes of fires before fire suppression and climate change.

Western North American forests have long been shaped by wildfire, and most tree species, including giant sequoia, exhibit fire-adaptive traits that confer individual-level resistance to fire-caused mortality (thick, fire-resistant bark), and population-level mechanisms that promote postfire regeneration (serotinous cones and/or other adaptations to mixed severity frequent fire). Together, these processes confer ecological resilience, defined as the capacity to absorb disturbance and recover toward prior composition, structure, and function (Coop, et al. 2020). Active fire suppression beginning early in the 20th Century contributed, albeit gradually, to Sierra Nevada forest ecosystems becoming less resistant to periodic wildfires because the increased density of understory trees and shrubs combined with buildup of surface fuels produced higher severity, and more frequent large fires, resulting in increased mortality. Moreover, climate warming is creating postfire environmental conditions which fall outside of the regeneration niche of many Sierra Nevada Mixed Conifer tree species, resulting in burned forest landscapes with postfire vegetation that diverges considerably from its pre-fire state (Stevens-Rumann, et al. 2018; Davis, et al. 2019). As a result, natural succession processes are unable to recover forests back to the prior state, and resilience is compromised or lost. The consequence can be that forests are unable to naturally regenerate without aid by active and

timely postfire restoration due to loss of mature trees and any remaining seed sources in close enough proximity to establish natural regeneration in areas of high severity fire (Coop, et al. 2020).

Recent research using long term datasets from wilderness areas managed for wildfire in Sequoia, Kings Canyon, and Yosemite National Parks has demonstrated that conifer forests exposed to naturally occurring periodic wildfire in the low to moderate intensity ranges are able to maintain resistance to disturbance, as well as ecosystem and hydrological function (measured by biodiversity and water quantity/quality (Stephens, et al. 2021). By completing fuels reduction in and near sequoia groves intermingled in Sierra Nevada Mixed Conifer forests, this emergency action will create conditions which will sustain low to moderate-intensity wildfire and prevent high-severity wildfire which could result in complete loss of most standing trees in these forests and the subsequent anticipated type conversion should wildfire strike these areas.

Foxtail Pine

Foxtail Pine, another rare long-lived conifer tree species (1,000 to 2,000 year plus age range) within the Parks, is located within the upper elevations of the East Fork Treatment Unit and the Redwood Meadows Treatment Unit, to a lesser extent. Unlike most conifer forests in the Parks, foxtail is not considered a fire tolerant or fire adapted species as fires that do start within this forest type are almost always small and fire intervals, if they occur are all, are very long (500 year plus range). The bark of a foxtail pine is thin, and the wood contains large amounts of flammable resin. Prescribed fire on the landscape could therefore locally impact this rare species. In fact, fire, as opposed to other factors, appears to largely control the lower distributional limit of the species.

Potential prescribed burn impacts to foxtail pine have been identified by the Parks in the past, specifically in the East Fork (Tar Gap burns in 1999-2001), and impacts were easily and successfully mitigated. Active ignitions were kept out of any foxtail stands (particularly stands in isolated pockets where fire would not spread naturally), and below any of the foxtail, usually at an elevation of ~9,200 to 9,600 feet where there is a break point in fuels in red fir stands as they transition to subalpine tree species. In some of these instances, fire entered some of the lower elevation foxtail but did not carry far because of limited fuels and broken terrain. Given that foxtail pine stands are often found in areas of low productivity, with low and scattered fuels, mitigations have been incorporated within this emergency action that have demonstrated success in avoiding impacts to this species, the NPS does not anticipate the loss of foxtail pine from implementing the emergency action.

Special Status Plants

There are no state- or federally- listed plants known to occur in or near these areas. *Carex tompkinsii* (CA rare) has a slight but unlikely potential to occur within the General Grant Grove treatment area, which is located beyond the southern extent for this species and is at the upper limit of its elevational range (420 to 1830 m).

Special status plants listed by the California Rare Plant Inventory (CNPS 2022) have been documented to occur within all of the burn units and within all restorative treatment areas except Sequoia Creek, Little Redwood Meadow, and Granite Creek. Across all treatment areas, these include: *Angelica callii* (CA RPR 4.3), *Claytonia palustris* (CA RPR 4.3), *Cinna bolanderi*

(CA RPR 1B.2), *Cordylanthus rigidus* ssp. *brevibracteatus* (CA RPR 4.3), *Cryptantha glomerifolia* (CA RPR 4.3), *Dicentra nevadensis* (CA RPR 4.3), *Eriophyllum lanatum* var. *obovatum* (CA RPR 4.3), *Lupinus lepidus* var. *culbertsonii* (CA RPR 1B.3), *Petradoria pumilia* ssp. *pumila* (CA RPR 4.3), *Phacelia orogenes* (CA RPR 4.3), *Pityopus californicus* (CA RPR 4.2), *Silene aperta* (CA RPR 4.3), and *Silene occidentalis* ssp. *occidentalis* (CA RPR 4.3). Additional special status species have been documented to occur nearby or have the potential to occur in these areas.

Ground disturbance related to the creation of burn piles and handlines have the potential to adversely impact undiscovered special status plants that might be present in the same locations. Given the use of natural barriers and trails for the majority of holding perimeters for fire containment, and minimal impact hand line construction techniques, no significant impacts from line construction are anticipated, even if any of these species are present. Potential impacts from burn piles are also unlikely to be of such a degree as to result in a change in status or listing for these species. Mitigations will be followed that will further reduce the potential impact of burn piles and hand lines on special status plants.

Low to moderate intensity prescribed fire within the natural range of variability is unlikely to negatively affect and likely to benefit these species through restoration of habitat, including reduction of litter and duff and reduction of the risk of high severity fire which could burn deeper into the soil and destroy plants, roots, and seed banks. Fire outside of the natural range of variability for these native species—which is anticipated to be prevented through these emergency actions—may otherwise have negative effects such as destroying both above and below ground plant parts and/or destroying seed banks so that plants are lost all together.

Non-Native, Invasive Plants

Because non-native species tend to follow disturbance, restoring prescribed fire to these areas may increase the potential for non-native/invasive species to be introduced and spread, especially for those species that are enhanced by fire, such as cheatgrass (*Bromus tectorum*), bull thistle (*Cirsium vulgare*), and velvetgrass (*Holcus lanatus*), which are known to occur within several of the burn units. However, limiting the area disturbed by high-intensity wildland fire and reducing the need for extensive emergency fire suppression actions is expected to limit the potential spread of invasive species overall by reducing the degree, scope, and scale of disturbance. Further, mitigations have been identified to reduce the potential for introducing or spreading invasive species.

Soils

Short-term impacts on soil resources will occur most likely following the prescribed burns as a result of increased sediment transport associated with a decrease in vegetation and subsequent erosion. However, these treatments will overall maintain natural erosion processes and properties resulting in long term soil benefits.

Wildlife

Mature/old growth forests often have a complex structure of multiple layers and age classes of trees, with canopy gaps that create a varied ecosystem which in turn creates high species diversity of nesting and foraging habitat for many birds, mammals, and amphibians, such that the Sierra Nevada supports over 450 species of vertebrate animals (USFS 2004). Vertebrate

species that are partly or completely dependent on mature forests for nesting/denning and foraging habitats in California include northern goshawks, fisher (*Pekania pennanti*), Sierra marten (*Martes caurina sierra*), California spotted owl, and pileated woodpecker (*Dryocopus pileatus*), among others.

Noise associated with the transport of materials to each treatment area (i.e., use of helicopters), presence of crews on the ground, use of chainsaws to fall and buck materials and create minimal impact handlines, and the piling of woody debris into piles for future pile burning may interfere with rearing of dependent young or foraging for individuals of a number of mammalian species. These activities may also cause individual wildlife to vacate the treatment areas during project implementation. Similarly, removal of surface fuels will remove some of the cover along travel corridors that wildlife currently utilizes, and removal of small trees and snags could reduce the density and number of options for nest/den sites in these forests which are notably assumed to be high under existing conditions.

Although displacement could occur and wildlife habitat will be modified, there is an abundance of comparable wildlife habitat in close proximity to each treatment area such that individuals are not expected to have to travel far to find suitable habitat for rearing young or foraging. As activity in each treatment area ceases, wildlife is expected to return to treatment areas. The overall habitat complexity, quality, and quantity with treatment areas is also expected to remain high despite fuels reduction actions. Noise impacts are expected to be intermittent in treatment areas but will extend no longer than a total of three months over the course of the next two to three years.

Some loss of individual animals may also occur in areas of pile burning and prescribed fire; however, long term reproductive impacts are not anticipated to be measurable at a population level. Rather, because native wildlife populations have evolved in the presence of fire, the maintenance of the fire regime through pile burning and prescribed burns are expected to improve wildlife biodiversity at a landscape scale, benefitting wildlife populations as a whole.

Overall, by completing fuels reduction in and near sequoia groves intermingled in Sierra Nevada Mixed Conifer forests, this emergency action will prevent further loss of habitat for wildlife species by reducing the fire severity in future wildfires.

Wildlife – Migratory Birds

The emergency action is not expected to impact migratory birds or nests so long as mitigation measures to survey and avoid action surrounding nests can be successfully implemented.

Special Status Wildlife – Bighorn Sheep

Bighorn sheep are not likely to occur near the project areas. However, low level flights accessing project areas may interfere with lambing activities such that mitigations have been identified to avoid these areas during critical lambing activities and thereby avoid impacts to this species.

Special Status Wildlife – Fisher

The treatment units together comprise close to 22,000 acres of mixed conifer forest dominated by giant sequoia, white and red fir, sugar pine, incense cedar, sugar pine, Jeffrey pine, and

ponderosa pine—much of which is modeled as moderate if not high-quality fisher reproductive habitat. While some of the project activities can be implemented without having any effects to the fisher, some project activities, particularly if implemented during the fisher denning season, may affect the species.

Through previous consultations with the United States Fish and Wildlife Service (FWS), the NPS and FWS have concurred that the proposed actions within and around Big Stump, Lost Grove, and Deer Creek Burn Units may affect, but are not likely to adversely affect the fisher. These assessment of effects are based on several factors including: (1) project activities will occur primarily outside the fisher denning period to avoid disturbing denning fishers and kits; (2) the proposed activities include design criteria and conservation measures that will minimize disturbance to fishers and limit short-term negative impacts to the habitat to a level where adverse effects will not occur; (3) the proposed activities will occur in a relatively small portion of suitable fisher habitat in the broader areas surrounding treatment areas, so foraging opportunities will not be limited during project implementation; (4) any fishers occupying the treatment areas pre-project will continue to be able to utilize the habitat in the same manner post-project; and (5) the proposed activities will provide an overall benefit to the fisher by maintaining habitat resilience and heterogeneity, decreasing the risk of large wildfires, and enhancing habitat features required by fishers.

The NPS anticipates similar impacts from the proposed actions in the treatment areas for Sequoia Creek, Grant Grove, Redwood Meadow, Atwell, and East Fork and will continue to consult with FWS and incorporate appropriate conservation measures should additional impacts be anticipated as project implementation progresses and the timing of actions further unfolds.

Soundscales

High decibel and low frequency noise generated by chainsaws, helicopters, and other tools may temporarily disturb wildlife and reduce the natural ambient soundscape during work activities. Natural soundscales from 1/4 mile to 2 miles of all treatment areas could be affected by an increase in natural ambient sound levels from 20-40 dB to up to 100-115 dB during approximately one week to two months of chainsaw activities, some of which could occur for up to 10 hours per day during weekdays for several weeks at a time. It is anticipated that any negative effects will be temporary and will not have significant impacts given the relatively short duration of work and thereby short duration of impacts. It is expected that soundscales will return to pre-project levels when chainsaw use and other use, such as helicopter transport, ceases.

Water Quality

A moderate increase in run-off yield is expected downstream of each prescribed burn for several years following implementation due to the reduction of vegetation within the various units, but standard resource- protection measures as listed in NPS Stormwater Pollution Plan and in the mitigations under “Water Quality” will be implemented to prevent run-off into water bodies.

Functionally intact mature forests in the Sierra Nevada also provide downstream municipalities with high quality water for drinking and agriculture. This emergency action will aid in protecting close to 22,000 acres of watershed area from high-severity fire and postfire soil

erosion and debris flow. Watersheds from most of the impacted groves drain into the North, Middle, and East forks of the Kaweah River, which flow into Kaweah Lake for use by Visalia and agriculture in the San Joaquin Valley. Specifically, some 56% of the San Joaquin Valley water supply is derived from such local sources (i.e., local headwaters). This emergency action will protect the montane forests of upper watersheds and directly contribute to the water security of the foothills and valley communities. Negative impacts, such as increased turbidity and changes in flow patterns on water resources from catastrophic wildfire will otherwise directly affect the water resources available to the downstream communities of the San Joaquin Valley.

Human Health and Safety

Project-related smoke can adversely affect human health, including that of both visitors and employees. The potential for negative effects is anticipated to be limited to the areas where project-related smoke is expected and will be most pronounced when particulate levels reach levels that are unhealthy for sensitive groups or unhealthy. Impacts could last for up to one month following each prescribed burn. Impacts to human health and safety from smoke can be partially mitigated in that particulate matter from smoke (PM 2.5) is monitored at several locations in the Parks and in surrounding communities and current and projected PM 2.5 are widely shared with the public so they can in turn adjust outdoor activities if smoke levels are predicted to enter unhealthy levels.

While smoke impacts may have temporary potential negative effects on human health and safety during prescribed burns, smoke levels can be reduced as much as possible with the manual reduction of fuel loads prior to burning. In contrast, the potential smoke impacts during a high severity wildfire event where fuels have not been reduced prior to ignition have much more extreme PM 2.5 levels and for a much longer duration. Hazardous smoke levels can persist for many months during a high severity wildfire event, lasting until a large precipitation event occurs or full suppression efforts succeed in full containment.

Visitor Use and Experience

Several trails will be closed during prescribed burns for visitor safety. This includes Tar Gap, Middle Fork Cut Off, Redwood Meadow Cutoff, Paradise Ridge Trail, Cliff Creek Trail, Redwood Meadow Bear Paw Trail, Granite Creek, Atwell Hockett, Cahoon Rock, and Evelyn Lake Trail. Although detours around these burns could change a visitor's itinerary, the number of visitors impacted by these closures is expected to be very low because the timing of prescribed burns falls outside the high visitor use season and wilderness permit reservation system; the duration of the administrative closure is expected to be no longer than two months, and because many of these trails are already low use. There are also a plethora of other high quality trails throughout the Parks' that will provide a similar experience. Notably, the Parks do not anticipate closing all of these trails at once given different needs and timings of prescribed burns.

The presence of smoke can also impact visibility along roads within and surrounding the Parks which could result in the need for traffic management to safely escort vehicles through low visibility conditions. This traffic management could range from no action needed, to additional signage along the roads, to escorting vehicles through low visibility conditions. While the likelihood of smoke impacts and subsequent traffic control is very unlikely during pile burns,

broadcast burns at Big Stump East, Atwell, and Lost Grove could result in traffic management. At no time would the roads be closed to through traffic. Therefore, impacts to visitors would rise to potential delays and annoyance, but would not result in a loss of access. A traffic management plan would be implemented as indicated in the mitigation section.

Beyond potential impacts to access, manual thinning, pile burning, and prescribed burning can impact the visitor experience, but the degree to which these actions do so is dependent upon the individual and driven in part by visitor expectations and perceptions of forest density, manual thinning work, and prescribed fire. Adverse effects on visitor experience, if they do occur, will be limited to those visitors recreating in or traveling through areas where smoke is expected to be present or specifically within the groves and forests where action is taken. While smoke impacts from prescribed fire are expected to dissipate within one to two months, the restoration of the fire regime within these forests and associated impacts to the visitor experience will be long term – though notably qualitative and subjective in nature.

Wilderness

The parks protect more than 865,964 acres of land, a majority of which (approximately 808,078 acres or 93.3% of the Parks) is designated as wilderness. An additional 29,516 acres are recommended wilderness, and 212 additional acres are potential wilderness (totaling approximately 96.75% of the park acreage). This emergency action would implement fuels reduction work via point protection, manual thinning, and pile burning across less than 1,086 acres in wilderness and fuels reduction work via prescribed fire in approximately 20,592 acres within wilderness (which includes all 1,086 acres treated by manual thinning).⁷ This accounts for 2.3% of all lands that are managed as wilderness within the Parks. Treatment units wholly or partially within wilderness include: Lost, Redwood Meadow, Atwell, Deer Creek, and East Fork.⁸

In evaluating the necessity of this action through the lens of the Wilderness Act, the Parks have determined that this emergency action is necessary to preserve wilderness character. Specifically, action is necessary to prevent high-severity wildfire from killing mature individuals and imperiling populations of a tree species which is integral to the natural quality of the Parks' wilderness character, and to restore natural ecosystem structure and function and fire regimes to park forests. The Parks will further document analyses in line with the provisions of the Wilderness Act for any action that proposes 4c prohibited uses or would otherwise affect the qualities of wilderness character.

Broadly, the NPS determined that the emergency action will result in several long-term beneficial effects as well as temporary or permanent adverse impacts to the quality of wilderness character depending on the nature and duration of work at each project site. These impacts are more specifically identified below, organized by the quality of wilderness character that is impacted.

⁷ A portion of the Lost and Atwell Treatment Units are along roads; therefore approximately 100 feet along the roadways within these treatment units are not within designated wilderness. These non-wilderness acres included in total acres in this paragraph.

⁸ At least a portion of eight of the eleven groves treated via this emergency action are in wilderness.

Trammeling: Trammeling will occur across 20,592 acres of SEKI wilderness, degrading this quality for the duration of the project across less than 2.3% of all wilderness within Sequoia and Kings Canyon National Parks. Furthermore, once fuels are reduced, future natural ignitions are less likely to be suppressed in these areas, which would minimize the potential for future trammeling and associated impacts (such as helicopter use, etc.).

Undeveloped: The undeveloped quality will be temporarily and adversely affected at each project site for the duration of mechanized equipment use and during aerial ignition using helicopters. While the number of saw cuts will be minimized and potentially reduced by prescribed burning, the evidence of human activity (in particular remaining cut stumps) could be present for well over a decade. The debris piles created by the thinning could be present for up to 36 months, based on the need for the material to cure and the historical rate of pile burning in the parks. There will be no permanent degradation to the undeveloped quality of wilderness character.

Natural: The use of chainsaws, helicopter transport, and use of helicopters and / or unmanned aircraft systems for aerial ignition and reconnaissance will affect natural soundscapes in the short term. However, actions proposed would benefit natural quality in the long term.

Some 65% of the area of the parks' sequoia groves lie within designated wilderness, and as such they are an integral attribute of the Parks' natural wilderness quality. Due to fire suppression activities in the past, these groves are currently significantly departed from the natural fire return interval of 6-17 years. The parks' 2014 wilderness character assessment identified loss of the natural fire regime in park wilderness, including Sequoia groves and mixed conifer forests, as contributing to negative status and trends in natural quality.

This action would serve to restore degraded natural quality by reducing unnatural fuel levels, releasing nutrients, and re-opening the canopy to allow more sunlight to penetrate the forest floor. It will also reduce the risk of high-severity fire effects, that often lead to vegetation and habitat type conversion and which have resulted in the death of well over 9,000 large sequoia trees in the previous two years alone. Restoring fire to these groves, thereby increasing sequoia regeneration and preventing the further loss of mature sequoias to catastrophic fire, would reverse long term adverse trends pertaining to these attributes of park wilderness character and lead to a healthier and more resilient forest.

Opportunity for Solitude and Primitive and Unconfined Recreation: The opportunity for solitude around the treatment units will be adversely affected by the noise of chainsaws and helicopters during point protection, manual thinning, and perimeter prep activities, and aerial ignition and reconnaissance. These impacts will be short term and occur primarily over the course of a three-month time frame in each treatment unit. The opportunity for solitude and primitive and unconfined recreation will also be impacted by trail closures during and immediately following the burn as described further under Visitor Use and Experience.

Though both opportunity for solitude and primitive and unconfined recreation will be temporarily reduced, burn execution will take place in the spring or fall, when fewer wilderness users are likely to be affected. After the burns are completed, wilderness users will have greater access to unconfined recreation due to a more open forest in the burn areas, and future access will be more assured given the reduced likelihood of high-severity fire in these areas. Recent

high-severity fire effects in the Parks have resulted in large area closures due to high density of standing snags.

Mitigations or Conditions of Action

Air Quality

- Consult with and obtain burn permits from the San Joaquin Valley Air Pollution Control District (SJVAPCD) when implementing any wildland fire use or prescribed burn project.
- Implement Best Available Control Measures (BACM) to conform with the SJVAPCD Implementation Plan for PM10.
- Implement the Smoke Management Plan (SMP) contained in the Fire and Fuels Management Plan. The SMP implements BACM and contains detailed commitments for smoke modeling, monitoring, public notification, and regulatory oversight by the SJVAPCD.
- As part of the Smoke Management Plan, monitor smoke in sensitive areas and adjust prescribed fire project accomplishments and progress as needed to maintain air quality within published health standards.
- Maximize the benefits of pre-planning and planned ignitions to the extent compatible with land management objectives to burn during the best possible dispersal periods.

Cultural Resources

Please note: the following conditions may be modified through consultation with the State Historic Preservation Officer (SHPO) and additional conditions may be identified through ongoing consultation with tribes. Should these conditions conflict with the conditions identified through consultation, the conditions agreed upon with the SHPO and/or tribes shall prevail.

- During point protection, manual thinning and pile burning, and perimeter preparation actions, known archeological sites (from previous survey work) will be identified in the field and marked by qualified archeological staff. These areas will be avoided during felling, raking, and piling operations and protected during burning as well using appropriate tools. For previously unsurveyed areas, prior to treatment, archeological staff will systematically examine areas and similarly record, mark, and help crews avoid newly discovered sites. Tribal monitoring in areas of concern to tribes has also been offered and will be executed as desired and determined feasible by tribal partners. The proposed measures are frequently used during prescribed fire and thinning and should result in protection of cultural resources present in these areas. Protocols for protection of cultural resources will be shared with work crews prior to work starting, and the lead archeologist will check in with crews during work. These protocols include the following measures:
 - Ensure that fuels reduction—removal of dense brush, downed trees, duff removal—and scratch lines around specific features and sites will be completed per site-specific recommendations.
 - Ensure that slash from fuels reduction will be piled and burned outside of archeological site boundaries or removed from the project area.

- Ensure that any ground-disturbing mop-up activities do not take place within sites.
- If concealed archeological resources are encountered during project activities, ensure protection measures are taken. Initiate consultation with SHPO and traditionally associated tribes, as necessary.
- If additional containment lines become necessary, ensure that archeological sites will be avoided unless previously constructed lines are utilized.
- Integrate cultural resource awareness and protection into daily fire briefings during implementation of the prescribed burns.
- Check each site a day or two before the burn and ensure that no additional hazard fuels have accumulated since the original visit. If present, the fire archaeologist will have hazard fuels removed or another mitigation (e.g., fire exclusion) implemented.
- Conduct post-burn assessments at archeological sites following prescribed burning to document fire effects to cultural resources and assess potential post-fire treatment needs.
- For manual thinning and pile burning treatments in Redwood Meadow Grove: work with tribes to fund and staff a tribal monitor as feasible and necessary as determined by the tribes during thinning and piling for protection of cultural resources that could be uncovered during treatments.
- Cutting of live black oak (*Quercus kelloggii*) will be avoided throughout the project area (Note that black oaks have deciduous leaves and can look dead in spring and fall, even when they are alive; field crews will be trained to identify this species to avoid falling).
- Protection of historic structures will follow established wildland fire structure protection protocols. These protocols include creating a defensible space (consistent with California Public Resources Code 4291) during manual thinning and pile burning. Similarly, historic structures will be wrapped and, to the extent possible, sprinklered during the broadcast burn portion of the proposed action.

Vegetation

- Coordinate with the Fire Ecologist to identify research plots in the East Fork Unit, Deer Creek Unit, and Atwell Unit.
- Use conservative prescriptions to reduce unnatural fuel loads and stem density in areas needing restoration.
- Monitor outcomes of planned fire and mechanical fuels projects.
- Apply minimum impact suppression techniques (MIST) to all fire management actions.
- Extra caution will be exercised when building piles in the vicinity of sugar pines and black oaks to avoid placing piles too close (particularly near trees with basal fire scars/cavities).
- Maps and coordinates of documented locations of special status plants will be provided to operations personnel so piles are not placed in these locations. (There are no known locations of special status plants where handlines are planned).
- If possible, pre-treatment plant surveys will be conducted in order to locate and map additional special status plant locations if found; survey findings will be shared with operations personnel so piles and/or handlines avoid these areas. Treatment areas

expected to have a higher density of piles (Redwood Grove, Little Redwood Grove, and Granite Creek) will be prioritized for surveys.

- Piles will not be placed in mesic or riparian areas which will reduce potential impacts to special status species that occur in these habitats.
- Before entering wildland areas and while deployed, inspect, remove, and properly dispose of invasive plant seed and plant parts found on clothing, boots, tools, and camping equipment. Disposal consists of removing the seed and plant parts from clothing and equipment at a spot near the infestation or bagging the seeds and plant parts and disposing in bagged garbage.
- Because foxtail pine is a long-lived fire intolerant species, keep active ignitions out of any foxtail stands (particularly stands in isolated pockets where fire would not spread naturally, and below any of the foxtail, usually at an elevation of approximately 9,200 to 9,600 feet where there is a break point in fuels in a transition from red fir to higher elevation subalpine forest. Fire spread on its own above 9,600 feet from the lower elevation active ignitions is not likely to irreparably harm this species, so no on-the-ground suppression activity to limit fire spread would be needed.
- Coordinate with Restoration Ecologist to survey areas following project implementation to detect new/expanded invasive plant populations and to perform control as needed.
- Take reasonable efforts to “prep” an area before a prescribed fire (if possible, if time allows, if safe to do so) to mitigate the risk to vulnerable trees from fire. Prep work around trees may include raking or otherwise removing fuels immediately adjacent to the trees and away from vulnerable basal fire scars.

Soils

- Use MIST on all actions to minimize soil disturbance.

Wildlife - General

- Use conservative prescriptions to reduce unnatural fuel loads and stem density in areas needing restoration.
- Field crew training will be required. Field crews will meet with SEKI Wildlife Biologist to discuss potential impacts to birds, bats, and fisher. Steps will be taken to reduce impacts on birds, bats, and fisher. Park Wildlife Biologists may also use local and/or recent data to provide additional suggestions on site.

Wildlife – Birds and Bats

- While most work is expected to occur in the fall, some work is likely to occur during raptors and bird nesting seasons. For work implemented during that time, the following measures will be implemented as feasible to minimize potential impacts migratory birds. If not feasible, the Parks will work with NPS biologists and others to identify sufficient avoidance measures to protect sensitive species and avoid impacts to nesting bird populations.
 - Nesting surveys will be conducted before any activity occurs within 500 feet of suitable nesting habitat.
 - Surveys shall be timed to maximize potential to detect special-status nesting birds and should be repeated within 5 days of the start of project-related activity.

- A minimum 500-foot buffer will be implemented around any identified active special-status species nest.
- If an active bird nest of other bird species is found, an appropriate no-disturbance buffer shall be determined by the park terrestrial ecologist based on site-specific conditions, the species of nesting bird, nature of the project activity, noise level of the project activity, visibility of the disturbance from the nest site, and other relevant circumstances.
- Monitoring of active nests by the park terrestrial ecologist, or experienced designee, during activities will be required. If activities cause the nesting bird to vocalize, make defensive flights at intruders, get up from a brooding position, or fly off the nest, then the no-disturbance buffer shall be increased until the agitated behavior ceases. The exclusionary buffer will remain in place until the chicks have fledged or as otherwise determined by the park terrestrial ecologist.
- Nests protected under the Endangered Species Act, or the Bald and Golden Eagle Protection Act will not be removed.
- Do not collect birds or their parts (feathers).
- Report any incidental take of a migratory bird to the parks' wildlife biologist.
- The treatment area surrounds historic nesting locations for CA spotted owl. CA spotted owl mitigations include the following:
 - If possible, prior to treatment the area will be surveyed and if active nest sites are located, the field crews will consult with the Wildlife Biologist for further guidance. Mitigation will depend on the nest location, nest tree species, reproductive status, and project start date.
 - If occupied nests occur near treatment areas, the recommended Limited Operating Period is March 1 to August 15. If this can't be followed, the Wildlife Biologist will be contacted for further guidance.
 - Recent acoustic and survey data will be collected concurrent with project activities. When known, field crews will be notified when a nest is in or near a project area. If possible, work will be avoided near nest trees or stopped within 0.25 mi of an active nest.
- UAS pilots will scout the project area for raptor nests during pre-project surveys, during test flights, and during live flights using visual observers and aircraft cameras. If raptor nests are observed, the UAS will clear the airspace, and the nesting area will be avoided.
- While most work is expected to occur in the fall, some work is likely occur during bat maternity and pup season. Field crews will receive training on roost and pup identification. If bats are detected within trees or emerging from trees, the wildlife biologist will be contacted for guidance. If a maternity colony is detected, a 50-foot buffer around the roost is recommended. Limbs without roost features may be trimmed first to encourage bats to vacate on their own. If a crevice or crack is identified in a tree or snag larger than 8 inches dbh, create a vibration on the tree for 15 minutes.

Wildlife - Rare, Threatened & Endangered Species, Fisher

The Endangered Southern Sierra Nevada Fisher (*Pekania pennanti*) distinct population segment occurs in the area and the following mitigation measures have been developed in consultation with the U.S. Fish and Wildlife Service:

- Maintain high-quality fisher trees to the extent feasible, understanding that a maximum of 25 trees less than 40 feet in height will be left per acre, post- thinning. High quality fisher trees are trees with broken tops, cavities, large branches, or other deformities that occur in high quality habitat, especially live hardwoods >20 inches dbh, live conifers >30 inches dbh, dead hardwoods >27 inches dbh, and dead conifers >35 inches dbh. Note that large diameter California black oaks, white firs, and incense cedars with cavities are most often used during reproduction, and thus are some of the most important trees to maintain for fisher.
- Endeavor to complete all work in the late summer/fall outside of the denning Limited Operating Period (LOP) of March 1 to June 30. Specifically,
 - In the Lost Grove Unit, no burning will occur between March 1 and April 30 and no burn unit preparation vegetation management activities will be conducted March 1 to June 30 within the Lost Grove Unit.
 - In the Big Stump Units, no pile burns will occur from March 15 through April 30 to avoid the most critical part of the denning period when kits are immobile and are highly sensitive to smoke, and tree-cutting activities will not occur between March 1 and June 30 to avoid the period that adult females and their kits are most sensitive to noise disturbance.
 - In the Deer Creek Unit, no understory burning will be completed between March 1 and April 30 to avoid the most critical part of the denning period when kits are immobile and highly sensitive to smoke, and tree-cutting activities will not occur between March 1 and June 30 to avoid the period that adult females and their kits are most sensitive to noise disturbance.
 - Furthermore, if imperative for some activities to proceed in spring, efforts will be made to avoid the early denning period March 15 to April 30 when young kits are most vulnerable and mating for the subsequent year also occurs. Park Wildlife Biologist may be able to use detection data and/or habitat maps or models to help identify areas where impacts will be limited or, conversely, which will be best avoided until later.
- In treatment units where manual thinning will occur, the NPS will actively create a multilayered, heterogeneous habitat mosaic that will ensure retention of adequate cover habitat by cutting no more than 50% of larger brush patches and leaving large downed logs.
- Work crews will be taught how to identify a fisher and potential den trees before work begins. They will be instructed to contact the Park Wildlife Biologist immediately if a fisher is seen in or near the project site.
 - If a fisher is spotted moving on the ground within a project site area, work will cease until the animal moves on without harassment and a Park Wildlife Biologist confirms that the fisher will not be adversely affected.
 - If a fisher is spotted in a potential denning or resting tree, work within 500m will cease until a Wildlife Biologist confirms that the fisher will not be adversely affected.
 - In the very unlikely case that a female fisher is observed in spring moving a kit down/up a tree or carrying it on the ground (kit will be carried in the mouth), work should cease immediately within 500m to allow her to safely transport the kit to a new den and possibly return for other kits. Work will not resume within the vicinity until a Wildlife Biologist confirms that the fisher will not be adversely affected.

- Project will actively create a multi-layered, heterogeneous habitat mosaic within and among core habitat areas. Up to 50% of larger brush patches will be cut to create a mosaic pattern.
- Downed logs larger than 18 inches in diameter will be left for fisher cover and foraging habitat unless they pose a fire hazard to adjacent structures or exposed giant sequoia burn scars.
- Piles will be burned outside of the pile burning LOP of March 15 to April 30 within Lost Grove Treatment Unit and Big Stump West and East Treatment Areas.
- Piles will be covered with paper to reduce use by wildlife and will be burned with low intensity to minimize smoke disturbance.

Wildlife - Rare, Threatened & Endangered Species, Big Horn Sheep

- The number of flights and flight paths will be shared with the wildlife biologist to assess likely disturbance for lambing sheep during the Spring months. If disturbance is likely to occur, a modified flight path will be implemented to avoid lambing areas.

Human Health and Safety

- Make firefighter and public safety the highest priority during all fire management actions.
- Implement local closures or restrictions as needed to prevent direct injury from fire.
- Implement road visibility standards contained in the FAMOG. Implement BACM for smoke management and monitoring as specified in the Smoke Management Plan.
- Follow all guidelines regarding firefighter safety as specified by the National Wildland Coordinating Group, including mandatory safety training, consistent use of personal protective equipment, adherence to standard firefighting orders, and other guidance. Make firefighter and public safety the highest priority during all fire management actions.
- Notify the public prior to ignition of the prescribed burn of any predicted closures, smoke impacts, and/or additional recommended safety measures.
- Monitor PM2.5 and provide smoke outlook and periods of poor smoke to employees and the public.

Aquatic Resources and Water Quality

- Trees will be felled directionally away from waterways to the maximum extent feasible.
- Ensure that spill plans are up to date.
- Prohibit storage of fuels or refueling in drainages and riparian areas.
- Debris treatment activities will not occur within 100 feet of riparian zones.
- Piles will be located at least 30 feet away from any riparian area or meadow.
- No direct ignition of fire will occur in riparian areas; backing fires only within riparian areas.
- Personnel will take care not to impact wet areas of the meadow during the operation in Big Stump East and West.

- Emphasize conservation, protective management, and improvement of water/riparian associated wildlife resources.
- Ensure that culverts or other stream crossings do not create barriers to upstream or downstream passage of amphibians/aquatic species. Locate water drafting sites to avoid adverse effects on stream flows and depletion of pool habitat.

Visitor Use and Experience

- Minimize the time and extent of trail and facility closures and other restrictions consistent with firefighter and public safety.
- Coordinate with Fire Information Officer and/or Public Affairs Officer to distribute information about project activities to the public.
- Provide interpretive signs and information within areas affected by smoke during prescribed burns.
- Share air quality monitoring information with the public before and during pile and prescribed burning activities so as to empower the public to adjust outdoor activities if smoke levels are predicted to enter unhealthy levels.
- A traffic plan will be in place and will be implemented if smoke obscures visibility on the Highway 180, the Generals Highway or other public roads within the Parks.
- Signs will be in place to restrict access in areas closed to the public during prescribed fires as advised by the fire information officer and district ranger.

Wilderness

- All proposed aircraft landings, motorized vehicle use, mechanized transport, motorized equipment use, and placement of structures or installations shall be approved only if determined to be the minimum requirement for accomplishing the emergency action. Timing, duration, and location of the use of various tools will take into account preservation of wilderness values.
- Minimize the time and extent of closures and other restrictions consistent with firefighter and public safety.
- Apply MIST firefighting techniques to all operations. Rehabilitate all firelines, camps, and other operational areas to natural appearance using MIST standards within the same season if consistent with fire control objectives, or as soon as practical in the subsequent season.
- Timing of operations will fully consider opportunities to minimize noise, closures, placement of fire camps, and other temporary intrusions into the wilderness that may affect visitor use. Travel routes for helicopters and packstock used to support fire operations will be planned to minimize impacts on visitor use and enjoyment of the wilderness. Pack stock, where used, will conform to existing regulations regarding party size and grazing restrictions.

Park Infrastructure

- Piles shall not be located directly under power or phone lines.
- Piles shall be located a minimum of 50 feet from private property and/or structures, and at least 30 feet away from any riparian area, meadow, trail, or campground.

- Coordinate with staff in charge of projects with the same implementation schedule and/or similar locations to reduce potential for conflicted usage of staging areas and potential to adversely impact park visitors.
- Coordinate with utilities staff to locate and protect park infrastructure.

Coordination with Affected Agencies

Tribal Partners

Sequoia and Kings Canyon National Parks meet regularly with tribal partners to discuss upcoming projects and get input regarding tribal concerns, priorities, and opportunities for shared stewardship. The Parks hold tribal forums twice a year that are open to all interested parties. With respect to wildfire, prescribed fire, and forest management, the Parks have a long history of close coordination with tribes. For a list of recent consultations with Tribes related to fire and forest management outside this precise emergency action, please see Appendix D, but in sum, these relationships involve direct partnership opportunities to introduce fire on the landscape (implementation of cultural burning projects), hiring tribal monitors, field trips, tribal forum presentations, presentations to tribal councils, emails, phone calls, and formal letters, among others. In the Parks' decades of close consultations with tribal partners related to fire, the Parks have never been asked by tribes to not burn any of our prescribed fire units. Rather, the Parks have been encouraged by tribes, such as the North Fork Mono Tribe and the Tule River Tribe, to take a more hands on approach to forest management, including fuels reduction.

For this specific action, the NPS conducted Tribal consultation with 14 federally recognized traditionally associated Native American communities as well as 46 individuals and non-federally recognized tribal partners regarding the proposed action at Big Stump in August of 2021.

For all other actions proposed within this broader emergency action, the Parks sent an email to all tribal contacts on September 9, 2022. This email gave tribes a brief description of the proposed work and project area and let them know that a formal consultation letter would be coming on September 14th but that they could reach out earlier if they had questions or concerns.

The letter initiating formal consultation with tribal partners for this emergency action was formally sent to tribes on September 14, 2022. Follow-up calls to tribal partners were initiated the week of September 19th and will continue through October 10th, with additional informal and formal consultation following as the emergency action is implemented over time.

Thus far, the Parks have heard from the Bishop Paiute Tribe, showing broad interest in the emergency action. The Parks also previously received a letter from the North Fork Mono Tribe that voiced support for thinning, pile burning, and broadcast burning Redwood Meadow, Little Redwood Meadow, and Granite Creek groves. Similarly, the Tule River Tribe has been actively engaged with the Parks in recent years since the inception of the Giant Sequoia Lands Coalition, and following the KNP Complex Wildfire of 2021, the Tribe participated in a joint press conference with the NPS, publicly stating that sequoia groves have sacred value to their people and need active stewardship for their preservation, as the Tribe has been doing for millennia – thinning, burning, and planting in the groves that they manage. The Tule River Tribe also hosted the Giant Sequoia Lands Coalition in February 2022 for a two-day meeting where the Coalition

discussed all the groves that needed treatment, including the eleven proposed for treatment within this emergency action. Furthermore, the Tule River Tribe, along with the ten other agency representatives of all giant sequoia groves under Tribal or public management, signed a charter for the Coalition in 2022, stating as core tenets, the need for prescribed fire and manual fuel treatments to mitigate threats to giant sequoias.

The Parks are also actively identifying ways in which to ensure the protection of known cultural resources during implementation of this emergency action. Overall, the proposed treatments are in line with the scope of numerous, previous projects on which tribal consultation has been completed, and it aligns with the Park's understanding of tribal goals for maintaining healthy Sequoia forests, based on previous consultations.

State Historic Preservation Officer

The NPS initiated consulted with the CA SHPO on the proposed actions at Big Stump on August 23, 2021 and received a letter from the SHPO on October 11, 2021 stating no objections to the NPS Finding of No Adverse Effect for the undertaking. The NPS has also determined that no historic properties will be affected by actions at Lost Grove and has reported to the CA SHPO that the proposed work in this area is consistent with the streamlined review as outlined by the *2008 Programmatic Agreement among the National Park Service, the Advisory Council On Historic Preservation, and the National Conference Of State Historic Preservation Officers for Compliance with Section 106 of the National Historic Preservation Act*.

For the remainder of the proposed actions, the NPS sent a consultation letter to the CA SHPO on September 14, 2022, and followed up with a meeting with the SHPO on September 20, 2022. The SHPO voiced overall support of the proposed actions and tentatively concurred with the NPS determination of effect to historic properties of No Adverse Effect with Conditions. SHPO formally responded to the NPS' initiating letter on September 15, 2022, requesting some reorganization of the materials and some additional information. The NPS responded to these requests with a second letter on October 5, 2022. The NPS will not take action prior to formally hearing back from the SHPO and finalizing the consultation process.

US Fish and Wildlife Service

The endangered Southern Sierra Nevada Distinct Population Segment of fisher which was listed as endangered May 15, 2020 (*Pekania pennanti*) occurs in the project area. The NPS prepared and submitted a Programmatic Biological Assessment analyzing the effects of NPS activities on the Fisher on May 15, 2020 on which the U.S. Fish and Wildlife Service (FWS) issued their Biological Opinion (BO - 08ESMF00-2020-F-2011-1) on June 12, 2020.

In accordance with the process described in the BO, the NPS consulted FWS on the project activities at Deer Creek on August 7, 2020, and FWS concurred with NPS' analysis that the project was Not Likely to Adversely Affect the fisher on August 19, 2020. The NPS also consulted FWS on the project activities at Lost Grove on April 5, 2021. The FWS concurred with NPS' analysis that the project was Not Likely to Adversely Affect the fisher due to factors listed in the concurrence memo on August 6, 2021 (08ESMF00-2021-I-2480). Finally, the NPS consulted FWS on the project activities at Big Stump on August 9, 2021. The FWS concurred with NPS' analysis that the project was Not Likely to Adversely Affect the fisher on September

20, 2021 (Service File 08ESMF00-2021-I-2772). All conservation measures within the BO and previous concurrence letters from USFWS have been incorporated into the project.

For all other aspects of the project, the NPS has determined that all activities in fall 2022 will have no effect on fisher or other listed species but could impact fisher should project activities extend into the fisher denning period (March 1 – June 30). For this reason, the NPS is preparing an analysis of potential effects to the species and will initiate and complete any necessary consultation with FWS prior to taking action that may affect the species.

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Approval

Submitted

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Regional Director
National Park Service, Interior Regions 8, 9, 10 & 12

Date

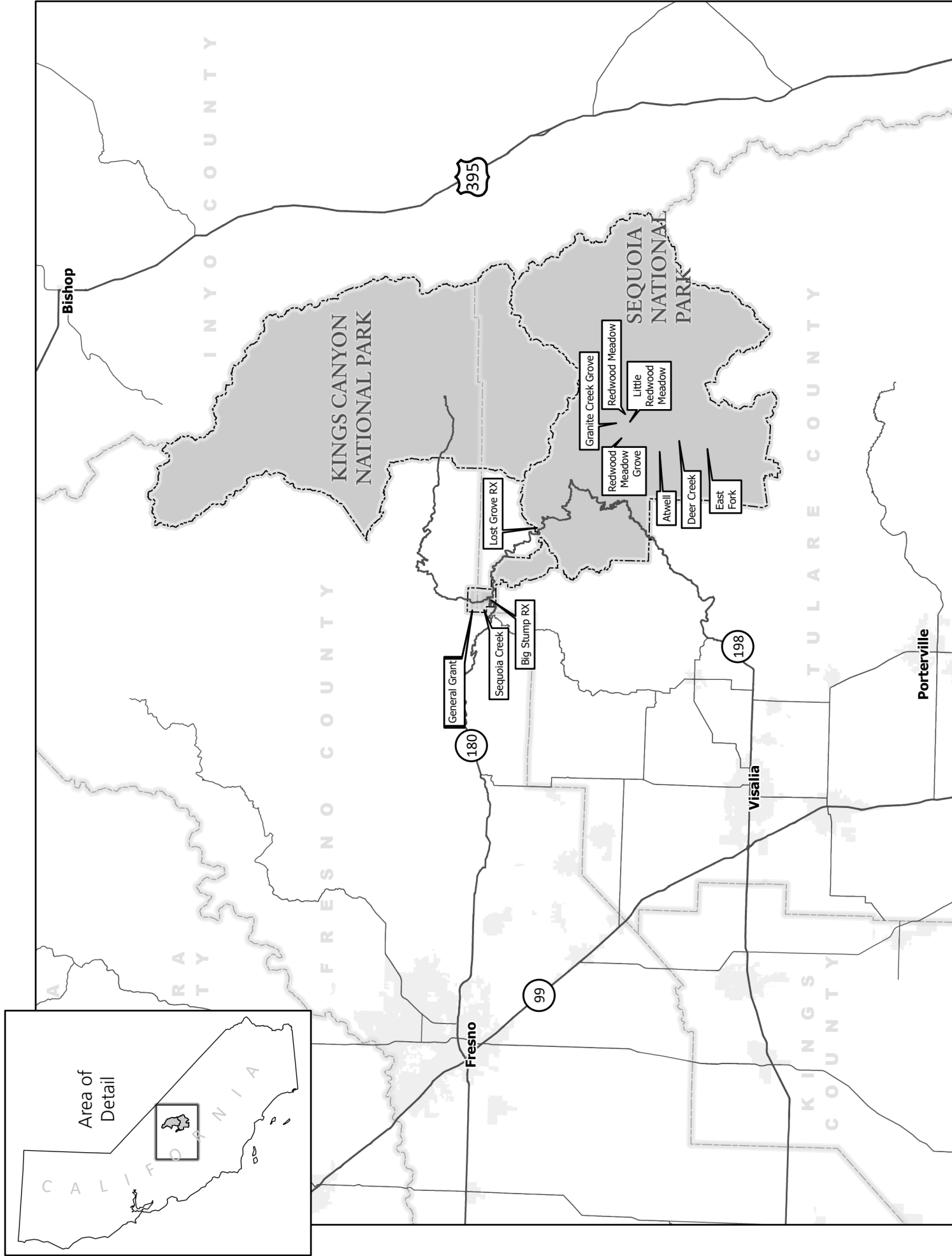
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Joan M. Mooney
Principal Deputy Assistant Secretary for Policy Management and Budget (PMB) exercising delegated
authorities of Assistant Secretary PMB
Department of the Interior

Date

Appendix A: Maps

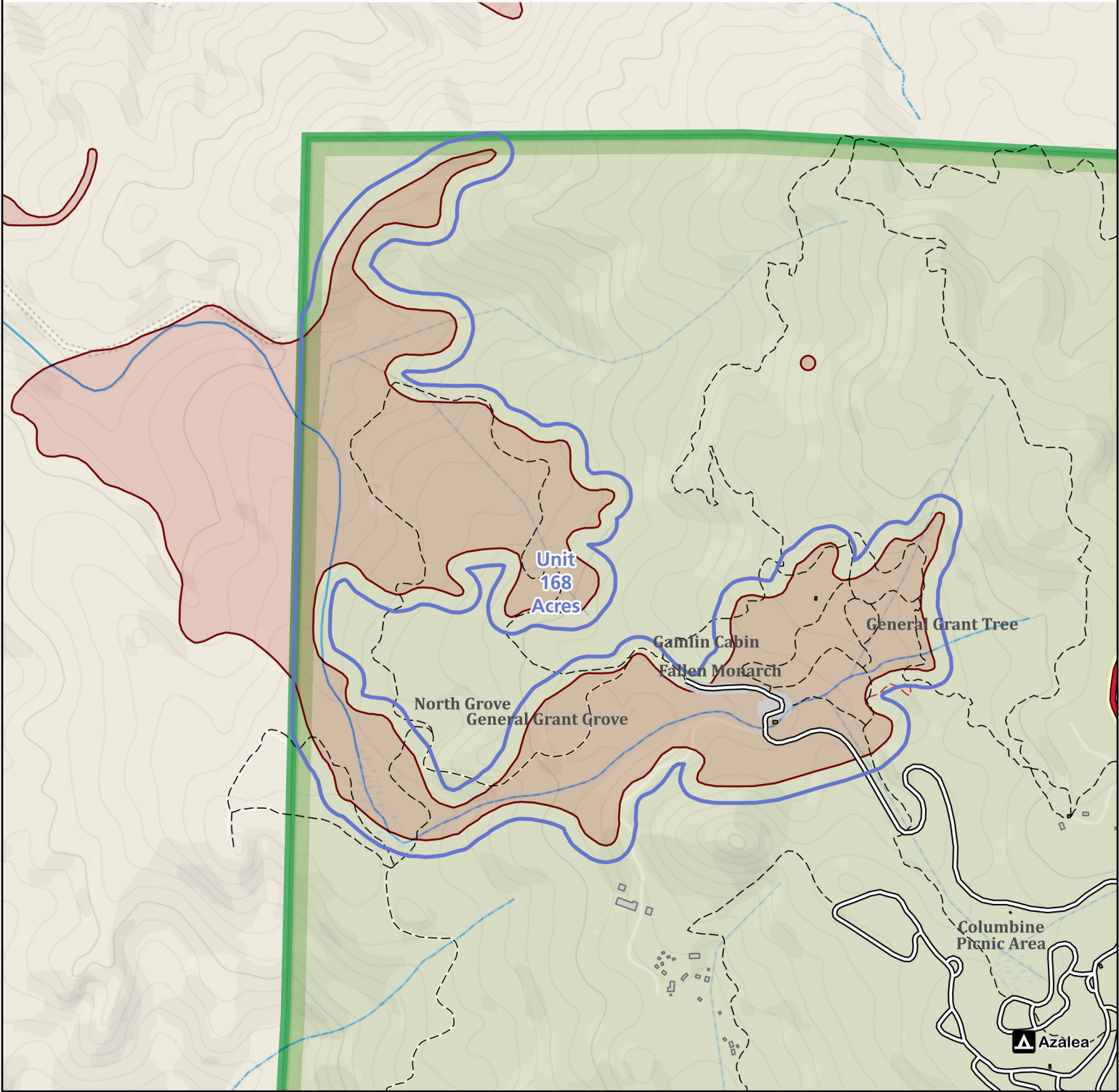


Sequoia Grove Treatments

Sequoia and Kings Canyon National Parks
National Park Service
U.S. Department of the Interior



Grant Grove



- | | |
|----------------------------|---------------------|
| Sequoia Groves | ROADS |
| Sequoia Treatment Units | Public Roads |
| Prescribed Fire | Primary |
| Restorative Thinning | Paved |
| Proposed Fire Lines | TRAILS |
| Handline | Maintained Trails |
| Trail Improvement | Unmaintained Trails |

Produced by: NPS, SEKI GIS; 9/13/2022

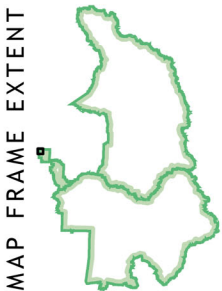
This map shows giant sequoia groves selected for emergency action treatments and the boundaries for the emergency action treatments. Treatments are divided by type: prescribed fire or restorative thinning.

North

0 0.2 Km

0 0.1 Mi

SCALE 1:10,000 Where 1 inch equals 0.16 miles
NAD 1983 UTM Zone 11N

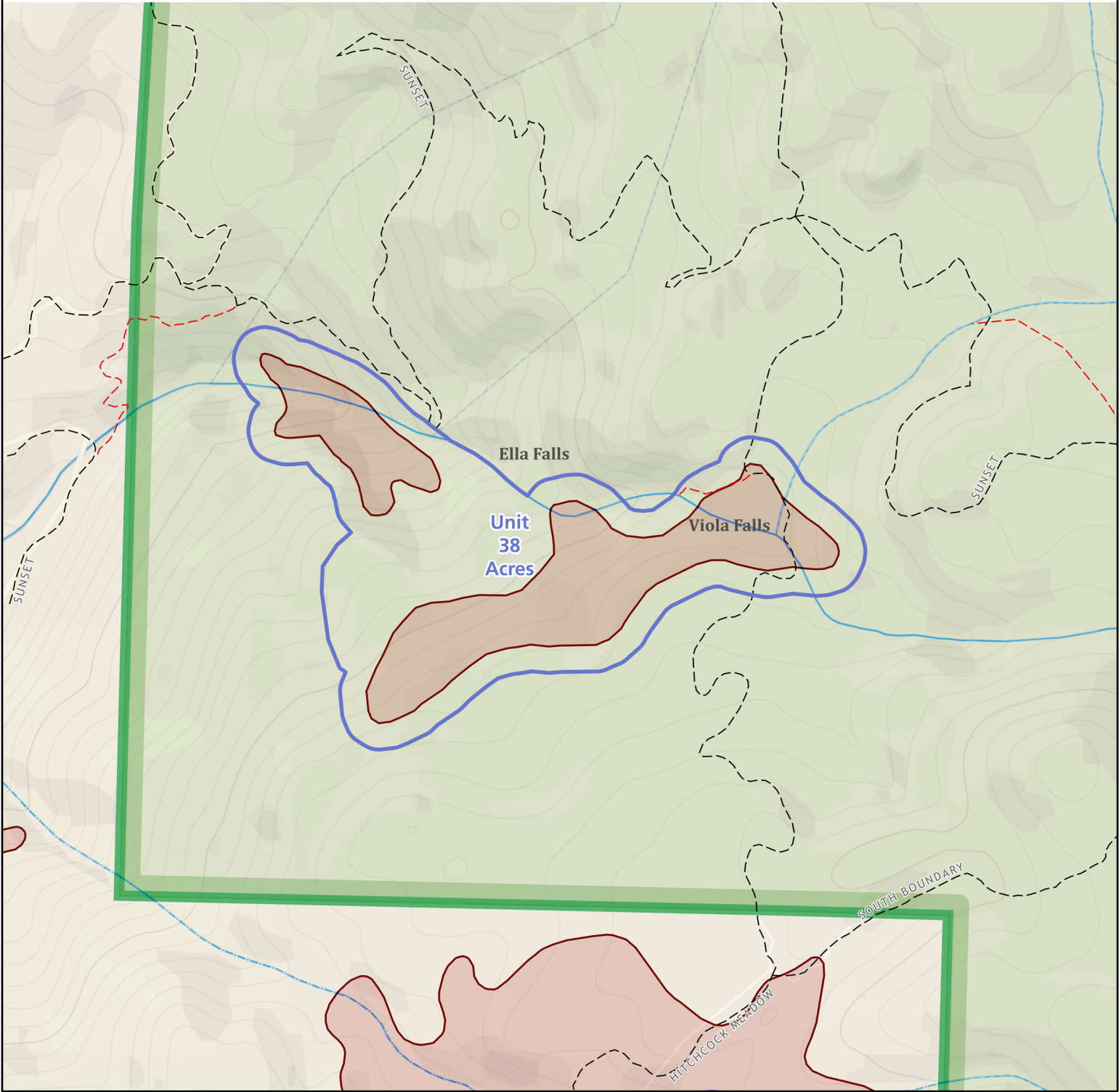


Sequoia Grove Treatments

Sequoia and Kings Canyon National Parks
National Park Service
U.S. Department of the Interior



Sequoia Creek



- Sequoia Groves

Sequoia Treatment Units

Prescribed Fire

Restorative Thinning

Proposed Fire Lines

Handline

Trail Improvement
- TRAILS

Maintained Trails

Unmaintained Trails

Produced by: NPS, SEKI GIS; 9/13/2022

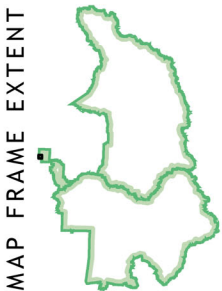
This map shows giant sequoia groves selected for emergency action treatments and the boundaries for the emergency action treatments. Treatments are divided by type: prescribed fire or restorative thinning.

North

0 0.1 Km

0 0.1 Mi

SCALE 1:6,327 Where 1 inch equals 0.1 miles
NAD 1983 UTM Zone 11N

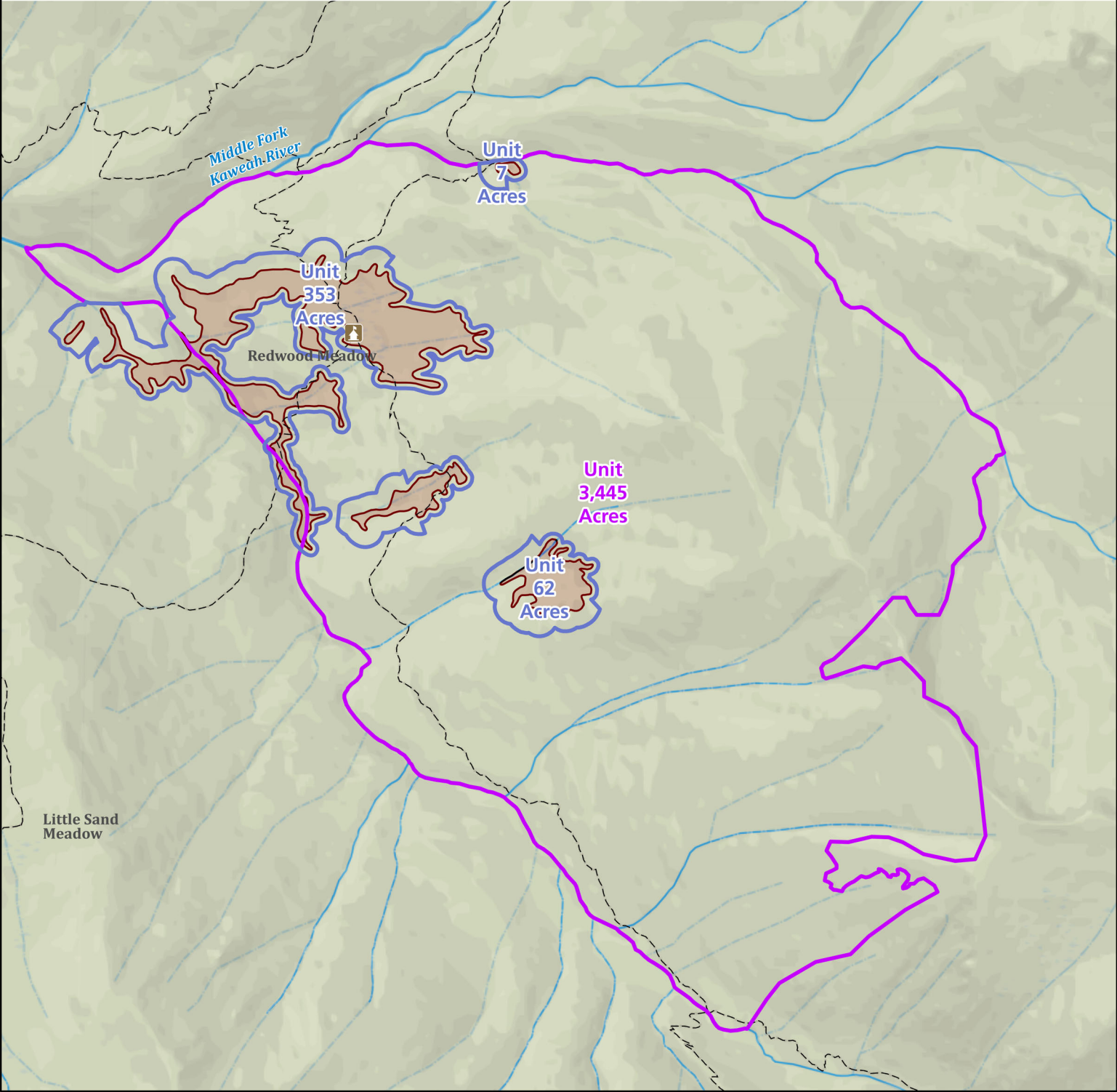


Sequoia Grove Treatments

Sequoia and Kings Canyon National Parks
National Park Service
U.S. Department of the Interior



Redwood Meadow Rx



- Sequoia Groves

Sequoia Treatment Units

Prescribed Fire

Restorative Thinning

Proposed Fire Lines

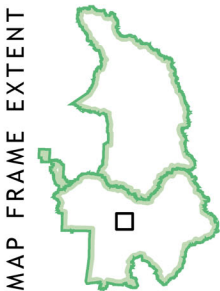
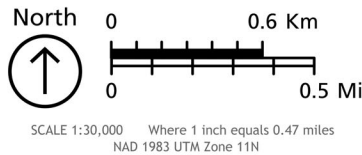
Handline

Trail Improvement
- TRAILS

Maintained Trails

Produced by: NPS, SEKI GIS; 9/13/2022

This map shows giant sequoia groves selected for emergency action treatments and the boundaries for the emergency action treatments. Treatments are divided by type: prescribed fire or restorative thinning.

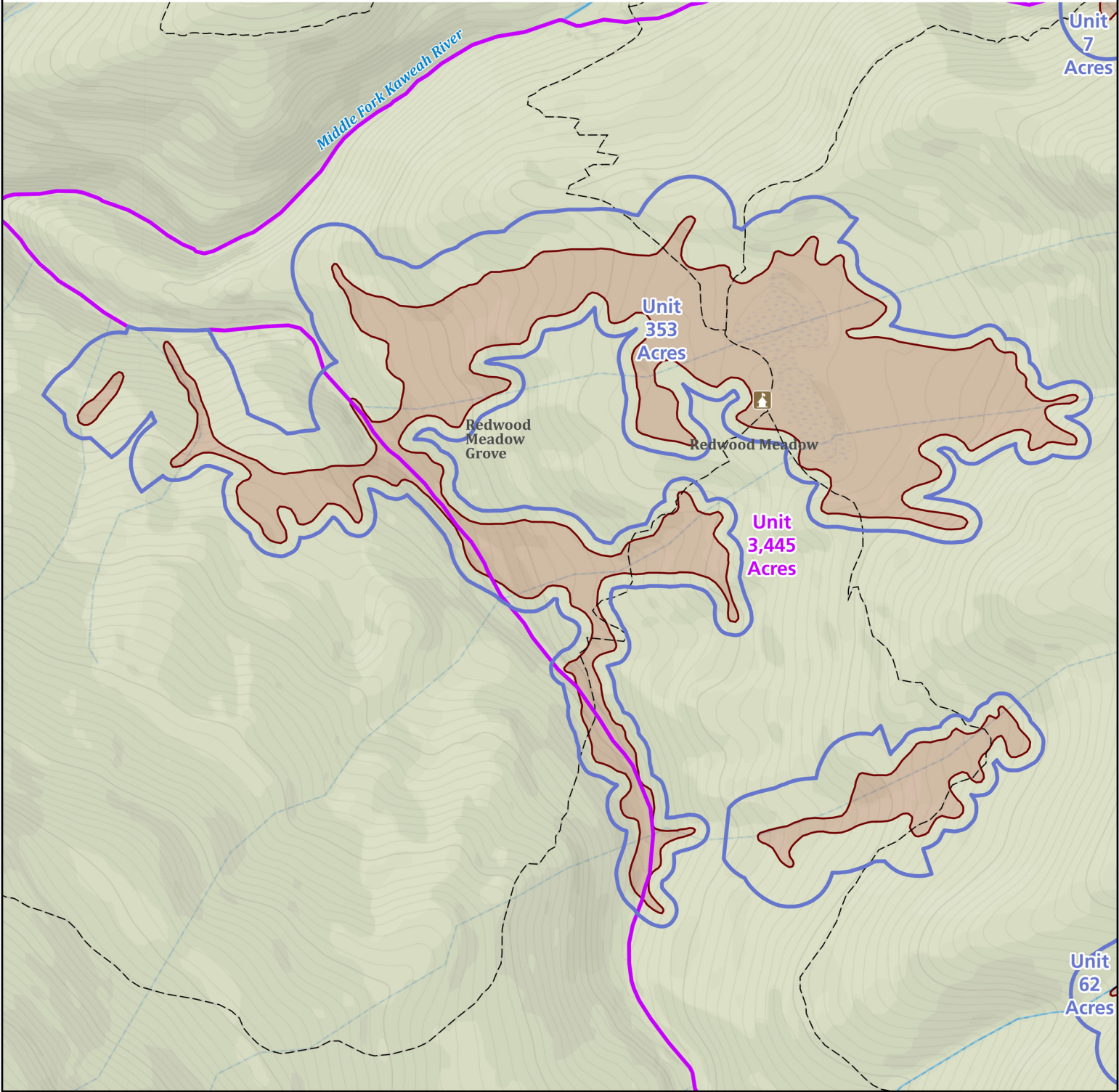


Sequoia Grove Treatments

Sequoia and Kings Canyon National Parks
National Park Service
U.S. Department of the Interior



Redwood Meadow



- Sequoia Groves

Sequoia Treatment Units

Prescribed Fire

Restorative Thinning

Proposed Fire Lines

Handline

Trail Improvement
- TRAILS

Maintained Trails

Produced by: NPS, SEKI GIS; 9/13/2022

This map shows giant sequoia groves selected for emergency action treatments and the boundaries for the emergency action treatments. Treatments are divided by type: prescribed fire or restorative thinning.

North

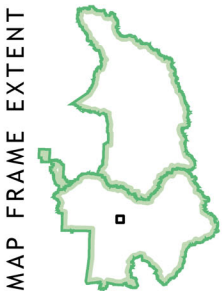
0

0.2 Km

0

0.2 Mi

SCALE 1:12,653 Where 1 inch equals 0.2 miles
NAD 1983 UTM Zone 11N

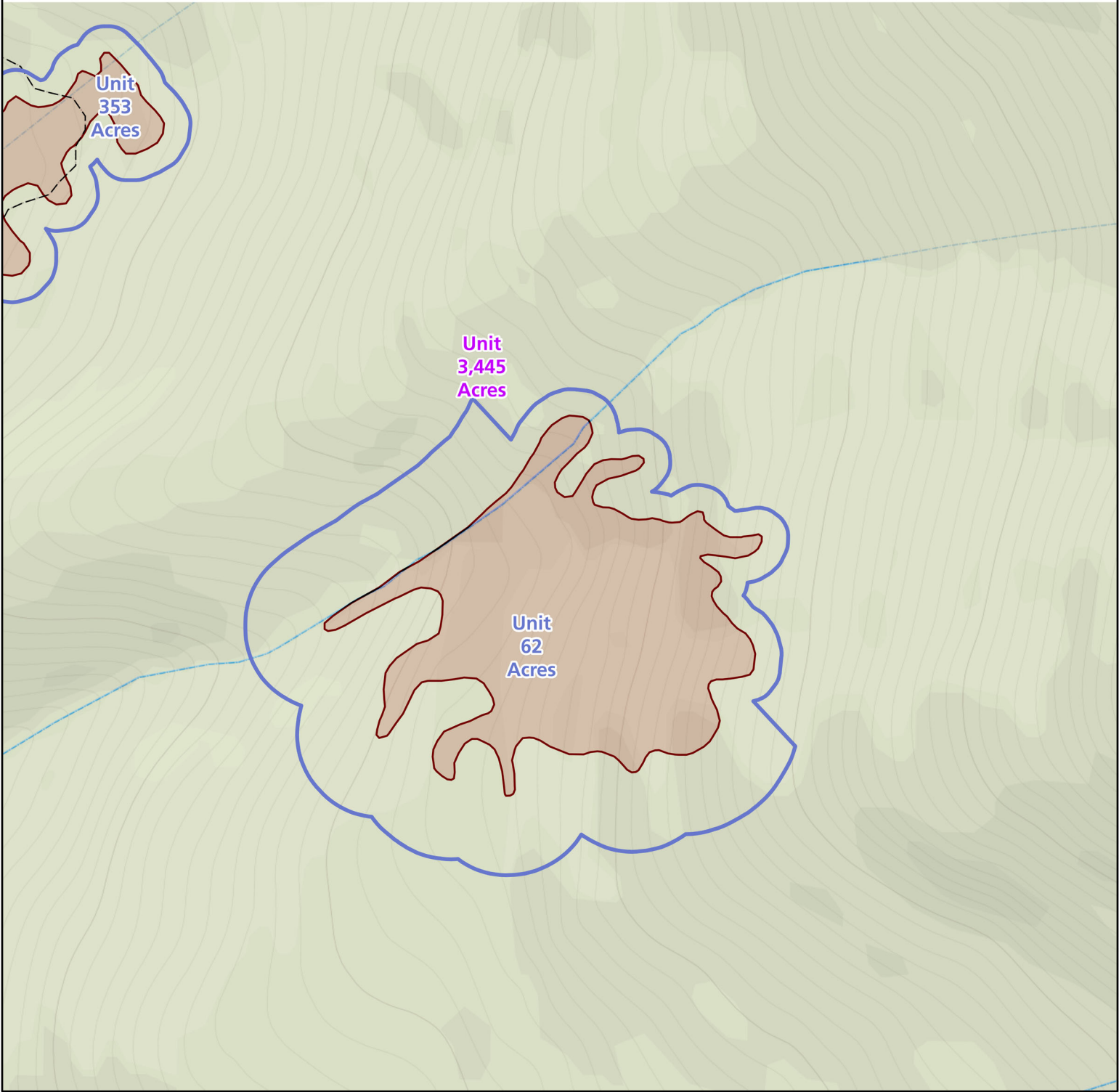


Sequoia Grove Treatments

Sequoia and Kings Canyon National Parks
National Park Service
U.S. Department of the Interior



Little Redwood Meadow



- Sequoia Groves

Sequoia Treatment Units

Prescribed Fire

Restorative Thinning

Proposed Fire Lines

Handline

Trail Improvement
- TRAILS

Maintained Trails

Produced by: NPS, SEKI GIS; 9/13/2022

This map shows giant sequoia groves selected for emergency action treatments and the boundaries for the emergency action treatments. Treatments are divided by type: prescribed fire or restorative thinning.

North

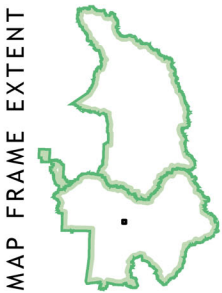
0

0.1 Km

0

0.1 Mi

SCALE 1:6,327 Where 1 inch equals 0.1 miles
NAD 1983 UTM Zone 11N

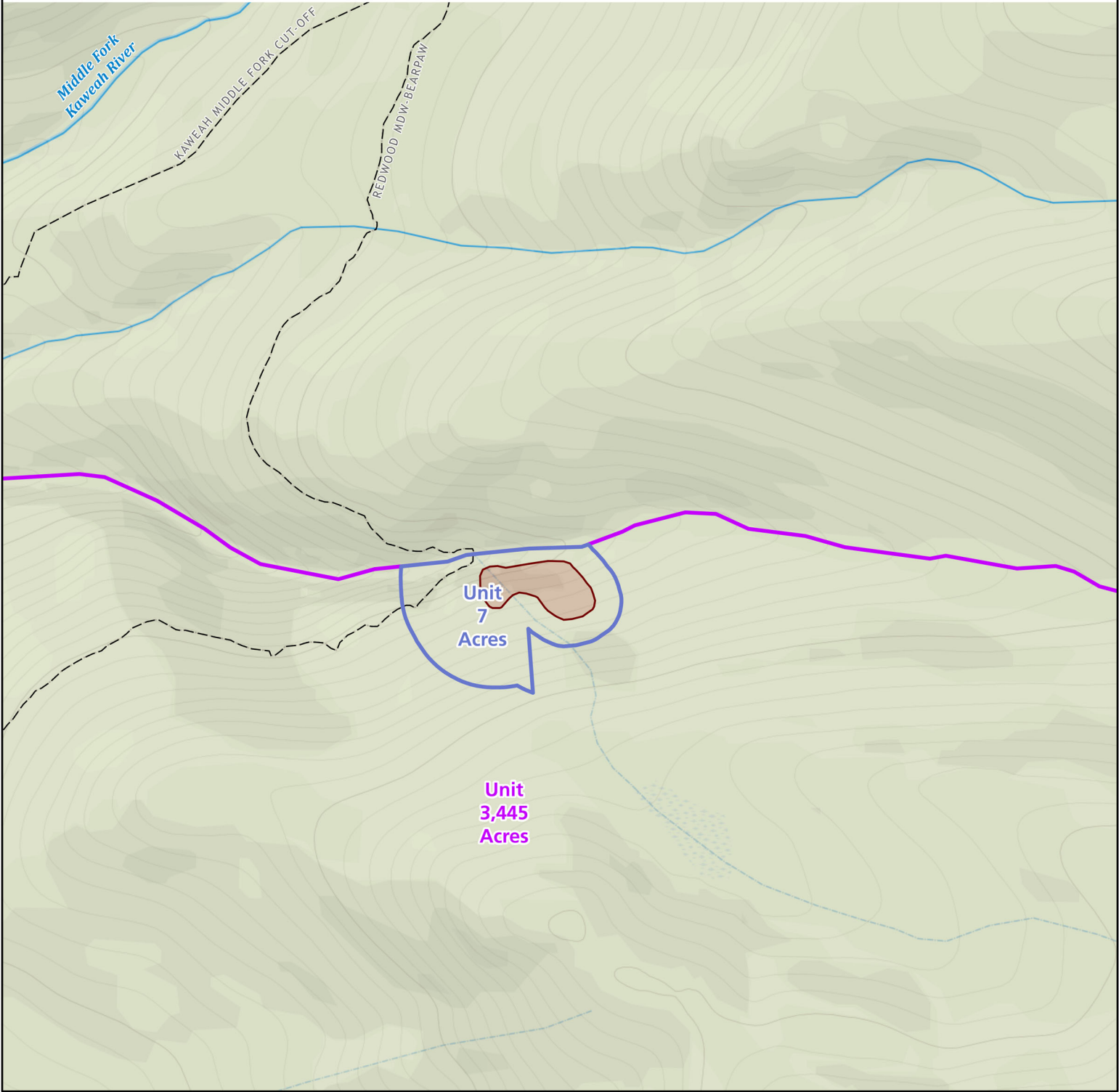


Sequoia Grove Treatments

Sequoia and Kings Canyon National Parks
National Park Service
U.S. Department of the Interior



Granite Creek



- Sequoia Groves

Sequoia Treatment Units

Prescribed Fire

Restorative Thinning

Proposed Fire Lines

Handline

Trail Improvement
- TRAILS

 Maintained Trails

Produced by: NPS, SEKI GIS; 9/13/2022

This map shows giant sequoia groves selected for emergency action treatments and the boundaries for the emergency action treatments. Treatments are divided by type: prescribed fire or restorative thinning.

North

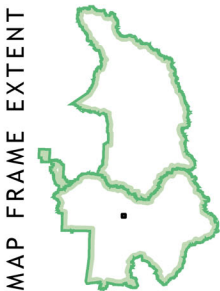
0

0.1 Km

0

0.1 Mi

SCALE 1:6,327 Where 1 inch equals 0.1 miles
NAD 1983 UTM Zone 11N

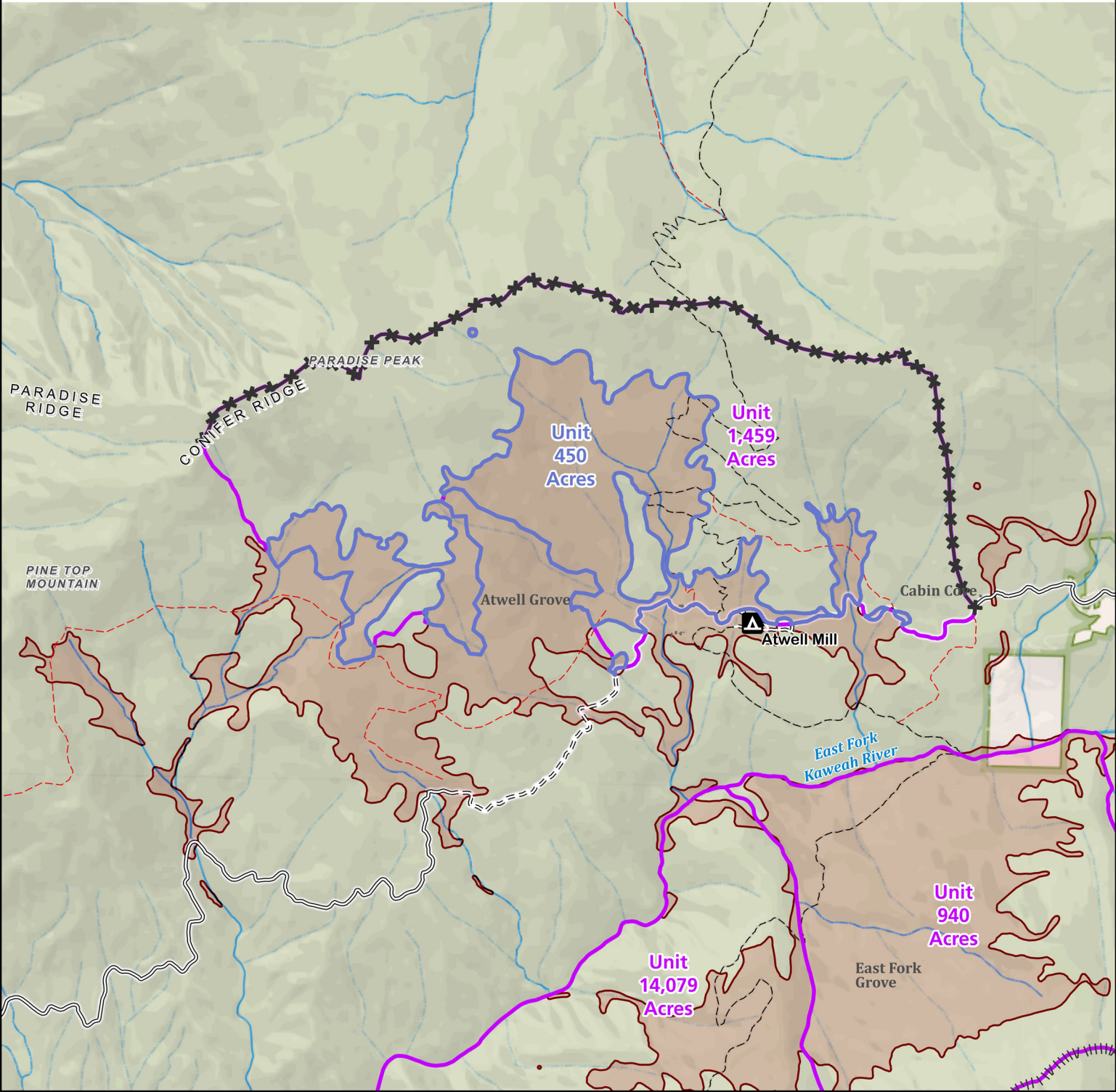


Sequoia Grove Treatments

Sequoia and Kings Canyon National Parks
National Park Service
U.S. Department of the Interior



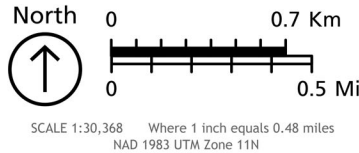
Atwell



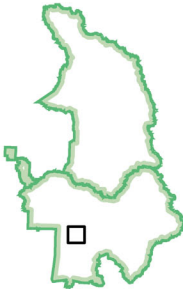
- | | |
|--------------------------------|---------------------|
| Sequoia Groves | ROADS |
| Sequoia Treatment Units | Public Roads |
| Prescribed Fire | Paved |
| Restorative Thinning | Unpaved |
| Proposed Fire Lines | TRAILS |
| Handline | Maintained Trails |
| Trail Improvement | Unmaintained Trails |

Produced by: NPS, SEKI GIS; 9/13/2022

This map shows giant sequoia groves selected for emergency action treatments and the boundaries for the emergency action treatments. Treatments are divided by type: prescribed fire or restorative thinning.



MAP FRAME EXTENT

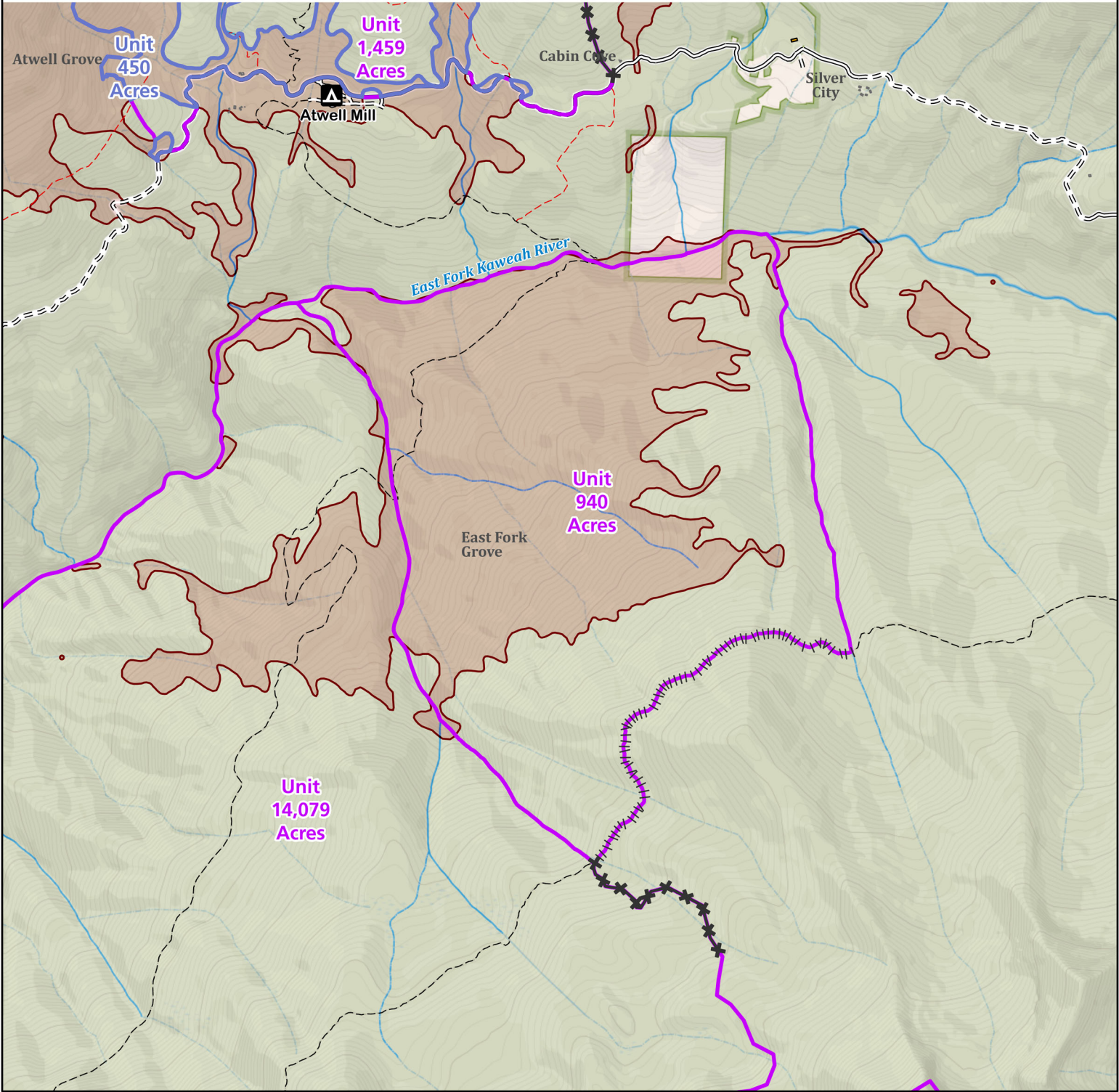


Sequoia Grove Treatments

Sequoia and Kings Canyon National Parks
National Park Service
U.S. Department of the Interior



East Fork Rx



- | | |
|----------------------------|---------------------|
| Sequoia Groves | ROADS |
| Sequoia Treatment Units | Public Roads |
| Prescribed Fire | Paved |
| Restorative Thinning | Unpaved |
| Proposed Fire Lines | TRAILS |
| Handline | Maintained Trails |
| Trail Improvement | Unmaintained Trails |

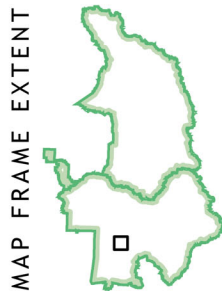
Produced by: NPS, SEKI GIS; 9/13/2022

This map shows giant sequoia groves selected for emergency action treatments and the boundaries for the emergency action treatments. Treatments are divided by type: prescribed fire or restorative thinning.

North

0 0.5 Km
0 0.4 Mi

SCALE 1:24,000 Where 1 inch equals 0.38 miles
NAD 1983 UTM Zone 11N

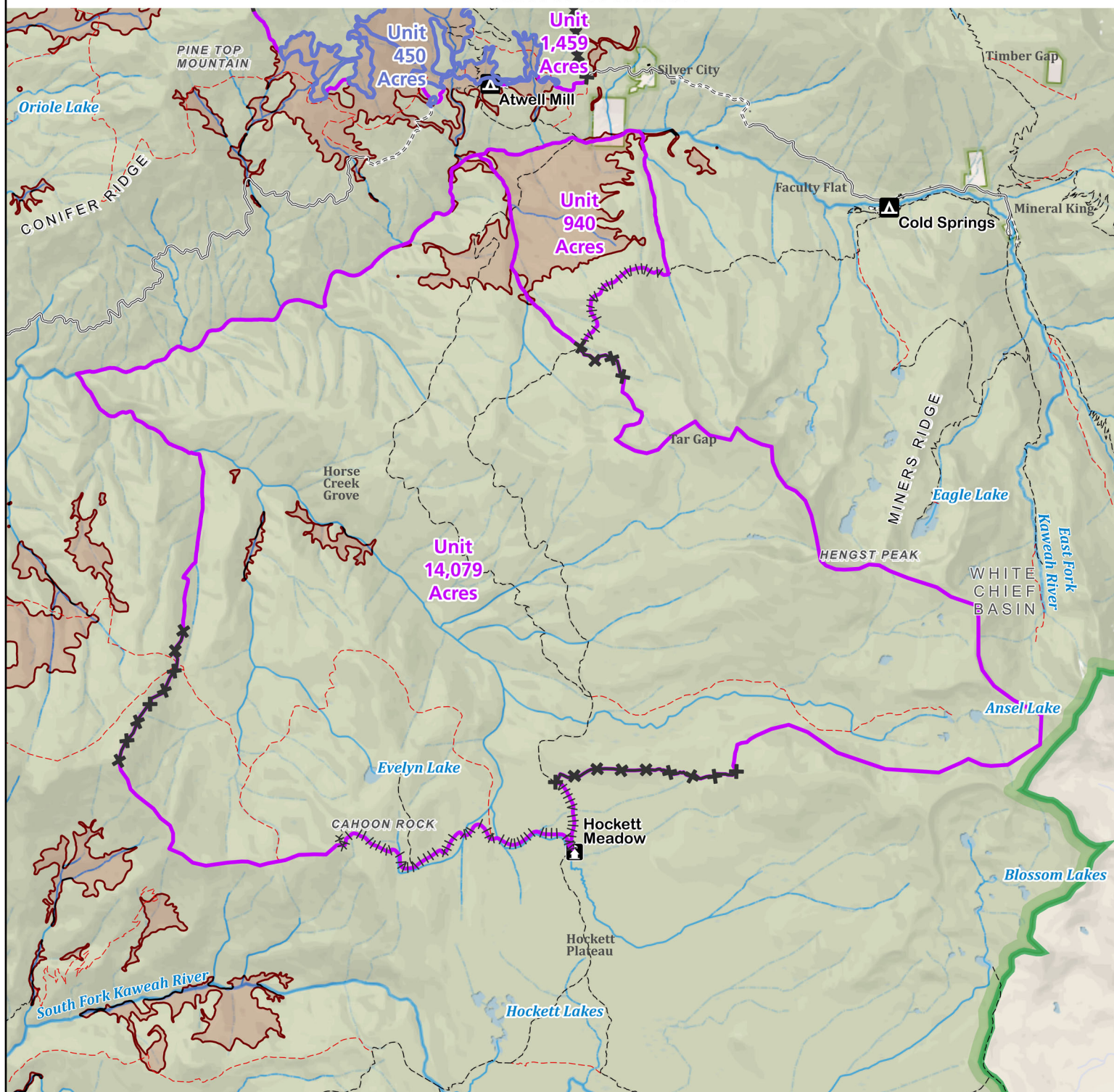


Sequoia Grove Treatments

Sequoia and Kings Canyon National Parks
National Park Service
U.S. Department of the Interior



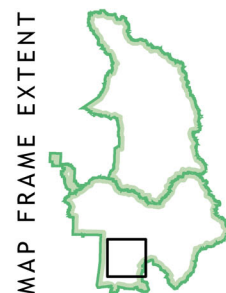
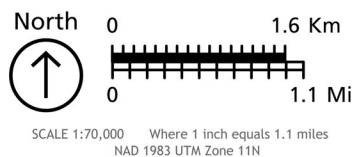
Horse Creek Rx



- | | |
|--------------------------------|---------------------|
| Sequoia Groves | ROADS |
| Sequoia Treatment Units | Public Roads |
| Prescribed Fire | Paved |
| Restorative Thinning | Unpaved |
| Proposed Fire Lines | TRAILS |
| Handline | Maintained Trails |
| Trail Improvement | Unmaintained Trails |

Produced by: NPS, SEKI GIS; 9/13/2022

This map shows giant sequoia groves selected for emergency action treatments and the boundaries for the emergency action treatments. Treatments are divided by type: prescribed fire or restorative thinning.



Appendix B: Background and Context for Emergency Action

Notably, it is the giant sequoia (*Sequoiadendron giganteum*) and a grassroots movement around it that led to the creation of Sequoia National Park—the nation’s second national park—in 1890, and it remains to this day not only the Park’s namesake but a symbol of the much larger National Park Service. The sequoia cone is featured on the NPS uniform belt and hat band, and the sequoia tree represents vegetation in the national park system on the NPS arrowhead. It is therefore of no surprise that the species is specifically called out within the Parks’ enabling legislation and is thereby a key component of the Parks’ purpose and need statement and statement of significance and is identified as one of the Parks’ key fundamental resource and value (NPS 2016).

The species itself, with current living trees that date back over 3,000 years, are endemic to the western slopes of the Sierra Nevada, with a range now limited to approximately 78 groves. The total range area for this megaflore is ~25,943 acres, of which about 39% (10,200 acres) is within Sequoia and Kings Canyon National Parks (Stephenson and Brigham 2021). Prior to 2015, large sequoias (larger than 4-5 ft base diameter) were seldom killed by wildfire, attesting to their longevity and multiple fire adaptations, including thick bark that can insulate the base of the tree from fire-generated heat and high foliage that can escape flames on the forest floor. In fact, despite the short to moderate natural fire return intervals of 6-17 years throughout mixed conifer forests in the Parks, individual existing Sequoias have survived for centuries, and notably, within forests that have been regularly cleared of downed fuels and smaller vegetation due in large part to this natural fire regime of regular low to moderate intensity wildfire.

However, in the last twenty-four months alone, 13-19% of the total population of large sequoias were killed outright or are dying as high-severity fire burned through acres of Sierran Mixed Conifer forests, where California’s iconic giant sequoia are found—close to one-fifth of the entire population gone in two years.

In 2015, the Rough Fire killed an unprecedented 97 large sequoias. Two different fires in 2017, the Railroad Fire (Sierra National Forest) and the Pier Fire (Sequoia National Forest), burned through multiple groves of giant sequoia at uncharacteristic high severity, causing 75% to 100% mortality to large sequoias in those areas (Stephenson and Brigham 2021). Though disconcerting, both fires collectively killed an additional 110 large sequoias. The scale of the threat to giant sequoias, though, was only realized as recently as the 2020 fire season when the Castle Fire burned 171,000 acres within primarily the Sequoia National Forest and extending into Sequoia National Park (19,279 acres burned within the park). The Castle Fire burned through 9,531 acres of sequoia groves and killed an estimated 7,500 to 10,600 large sequoias (Stephenson and Brigham 2021). Finally, in the 2021 fire season, the KNP Complex Fire and Windy Fire burned an additional 186,900 acres of forest lands in Sequoia and Kings Canyon National Parks and the Sequoia National Forest; approximately 78,675 acres of which burned within these two units of the National Park Service. The NPS estimates that approximately 6,109 acres of sequoia grove area burned in these two fires alone, and an additional 2,260 to 3,637 large sequoias were killed (Shrive et al. 2021).

In sum, an estimated 15,640 acres of giant sequoia groves were burned by wildfires in the last twenty-four months (54% of all sequoia grove area in the Sierra Nevada), and an estimated 9,760 to 14,237 large giant sequoias were outright killed or will soon be dead (as indicated from prior sequoia post-fire survey work from 2015 on applied to our recent fires) (up to approximately

19% of the total population of large sequoias). These fire effects are undoubtedly unprecedented and reflect untenable conditions for this iconic species.

The reason behind these recent fire effects is understood to be two-fold: (1) there has been a dramatic escalation in fire size, intensity, and frequency throughout California in recent years, tied in large part to the last ten years of persistent drought and increasing temperatures throughout the State, and (2) fire exclusion over the last 150 years—combined with the death of millions of trees throughout the Sierra Nevada during the recent drought—and the resulting increased understory tree density and surface fuel accumulations create ideal conditions for high severity fire effects, which were uncommon prior to recent history (Keeley and Syphard 2021, Steel et al. 2015).

Specifically, all eleven groves (or at least portions thereof) that will be treated under this emergency action have limited fire history within the last 100 years that would have otherwise regularly cleared the forest floor and thinned the forest canopy, and all groves have been significantly hit by the last 10 years of drought and increased insect infestations that have killed millions of trees throughout the Parks. These factors have cumulatively resulted in unnaturally heavy loads of downed woody debris, thick understory, and dense standing snags and living ladder fuels within and surrounding the groves—conditions that, particularly in combination, make these areas extremely susceptible to high-intensity fire. The images below show the existing fuels accumulation within Redwood Meadow Grove as but one example of current conditions within these eleven groves. Should fire touch any of these groves or surrounding forests without fuels reduction—a threat that is a real possibility during an increasingly large portion of the year—the fire intensity within these groves would be much higher than what these forests have naturally evolved to sustain. The density of existing surface fuels would allow fire to travel quickly and unchecked through these forests; so even if lighting did not strike a grove directly, it could easily reach a grove in short order.⁹ The amount of surface fuels would



Photo of existing conditions at Redwood Meadow Grove, showing large amounts of surface fuels accumulations. NPS photo.



Photo of existing conditions at Redwood Meadow Grove, showing large amounts of ladder fuels that would easily carry flames into the foliage of more mature trees, including sequoias. NPS photo.

⁹ Recent fires in California have travelled miles within just a few hours under the right conditions.

increase the temperature by which the fire would burn which weakens one of a sequoia's natural defenses against fire—its thick, insulating bark. And the number and density of ladder fuels (i.e., standing trees and snags that carry flames to higher branches) would yield a likelihood that the fire would reach the higher branches of monarch sequoias which would otherwise largely escape the flames of a low or moderate-intensity fire. In these situations, fire would travel to the crown of the forest; and would thereby be extremely difficult to manage, particularly without more drastic measures such as bulldozer lines installed with heavy equipment. This risk of high-severity fire effects is even more concerning considering the remote locations of and steep slopes within much of these groves as wildfire travels uphill more quickly and is more challenging to suppress, contain, or otherwise manage.

Under these high-intensity fire conditions, it not just the trees that would be lost, but few resources—from soils to any historic properties—would fare well under such fire effects. For context, California's giant sequoia groves are embedded within the Sierra Nevada Mixed Conifer habitat type which supports a large diversity of special status and focal conservation plants and animals, including the Endangered fisher (*Pekania pennanti*; Southern Sierra Nevada Distinct Population Segment) and California spotted owl (*Strix occidentalis occidentalis*) (Bonnicksen and Stone 1980; California State Wildlife Action Plan (SWAP) 2015). Key causes of the decline of mammals, birds, and other vertebrates in the Sierra Nevada include the loss and degradation of diverse old forest habitats including large trees, snags, fallen logs, and layered vegetative structure—all found where sequoia groves intermingle with mixed conifer forest



Photo of live sequoias in the Giant Forest Grove which saw low to moderate intensity fire during the 2021 KNP Wildfire. The grove, which is approximately 5,000 acres in size, has had manual fuels thinning and prescribed burning regularly over the last 20+ years. Despite fire hitting the Grove in 2021, sequoias largely survived the fire. NPS Photo.



Photo of sequoias that were killed by high-intensity fire in Redwood Mountain Grove during the 2021 KNP Wildfire. Prior to the KNP, this grove had little recent fire history and a high density of surface and ladder fuels accumulation. NPS photo.

(SWAP 2015; SNEP 1996). The threat to Sierra Nevada Mixed Conifer forest, and more specifically, sequoia groves is therefore seen as a threat to the wildlife therein.

These forests also include identified and likely unidentified cultural resources which are similarly susceptible to high-severity fire. For example, in the 2020 Castle Fire and 2021 KNP Complex Fire, several identified historic properties and other cultural resources were forever lost to high-severity fire including: Barton's Log, Colony Mill Ranger Station, Liliburn Cabin, an historic restroom near Moro Rock, Superintendent's House, and historic logging cabins in Dillonwood.

Although existing conditions within these eleven groves are alarming and the risk of loss is real and imminent, the Parks have demonstrated success with moderating fire intensity and severity by restoring the natural fire regime to ten groves within the Parks over the last 50+ years, which has included manual thinning and controlled, prescribed burning. Specifically, groves with a recent history of prescribed fire and/or low surface fuel accumulations, such as the Giant Forest, had much fewer sequoia losses than groves with high surface fuel accumulations, such as Redwood Mountain, during recent wildfires. While the KNP killed very few sequoias in the Giant Forest, a large percentage of sequoias were lost in Redwood Mountain Grove, where the KNP burned at high-severity. See images on previous page which show one example of how fire effected the Giant Forest and Redwood Mountain Groves during the 2021 KNP Complex Wildlife.

Appendix C: Consistency with other Plans and Guidance

Sequoia National Park Enabling Legislation (26 Stat. 478, 16 USC 41)(September 25, 1890)

“Whereas, the rapid destruction of timber and ornamental trees in various parts of the United States, some of which trees are the wonders of the world on account of their size and the limited number growing, makes it a matter of importance that at least some of said forests should be preserved: There Be it enacted by the Senate and House of Representative of the United States of America in Congress assemble, That the tract of land in the State of California. . .is hereby reserved and withdrawn from settlement, occupancy, or sale under the laws of the United States, and dedicated and set apart as a public park, or pleasure ground, for the benefit and enjoyment of the people. . .”

Senate Report 1134 on the Creation of Kings Canyon National Park to accompany 54 Stat. 41, 16 USC 80a (March 4, 1940):

The major portion of the privately own lands comprise of the Redwood Mountain Grove of giant sequoias, the finest large grove remaining in private ownership, which the bill would authorize for addition to the park. . .[In 1890], General Grant National Park, only about 2,500 acres in extent, was established to preserve the General Grant grove of sequoia trees. By that time private ownership of some of the sequoia forest lands of importance for park purposes already had been established. . .In 1926 the Kern country and Mount Whitney were added to Sequoia National Park, but there still remained many thousands of the California big trees (*Sequoia gigantea*) in private ownership, subject to destruction by commercial cutting operations”When Sequoia National Park was established in 1890, the boundaries omitted

House Report 98-40 associated with the California Wilderness Action of 1984 (PL 98-425):

"Prescribed burning could prove to be an especially significant fire pre-suppression method, particularly in cases where a history of past fire suppression policies have allowed 'unnatural' accumulations of dead or live fuel...to build up to hazardous levels. Controlled burning...may have the advantage of producing fewer long term adverse impacts (and possibly beneficial impacts) on wilderness values than would the construction of roads or similar intrusions...Obviously, such measures should, to the maximum extent practicable, be implemented consistent with maintaining the wilderness character of areas, while at the same time protecting the public health and safety and protecting private property located immediately adjacent to wilderness areas" (emphasis added).

Sequoia and Kings Canyon National Parks Foundation Document (2016)

The Parks’ purpose and need is identified in this document as the following: “Sequoia and Kings Canyon National Parks preserve and provide for the enjoyment of present and future generations the wonders, curiosities, and evolving ecological processes of the southern Sierra Nevada— including the largest giant sequoia trees in the world, free flowing wild and scenic rivers, and the heart of the vast High Sierra wilderness” (NPS 2016).

Furthermore, giant sequoia trees are identified as a fundamental resource and value of the Parks.

“Giant sequoia trees are endemic to the western slope of the Sierra Nevada and are among the largest and oldest trees on Earth. The protection of giant sequoia trees from logging was

one of the primary forces for the creation of Sequoia National Park. The groves, and the magnificent trees contained therein, have inspired generations of visitors from around the world with a sense of awe. The parks contain 39 giant sequoia groves, which account for roughly 40% of all giant sequoia grove areas in the world, including the largest unlogged giant sequoia grove (Redwood Canyon grove). The four largest giant sequoia trees—by trunk volume—are in these parks (including the General Grant Tree, the nation’s only living war memorial). Giant sequoias are also unique due to their evolutionary adaptations that make them resilient to many stressors. Research into giant sequoias influenced the field of fire ecology and provided the impetus for prescribed fires in the parks” (NPS 2016).

Sequoia and Kings Canyon National Parks Resource Stewardship Strategy (2017)

The Parks’ RSS identified altered fire regimes as one of the primary stressors facing resources within the Parks:

“Fire plays a critical role in Sierra Nevada ecosystems. Changes in fire frequency and severity have occurred due to exclusion of wildfires, absence of Native American burning, and climate change. These changes have led to cascading impacts throughout many ecosystems. Lack of periodic low- and mixed-intensity fire in some lower and middle elevation montane forests has caused increases in overall forest density and fuels and shifts toward more shade-tolerant tree species. These alterations can increase fire hazard while decreasing resistance of the forest to insects, disease, warming temperatures, and drought. In the southern Sierra Nevada, the amount of fire on the landscape (frequency, size, total area) is still considerably less than the conditions prior to about 1850, but these fire regime components have been increasing over the past few decades along with fire severity and coincident with warming temperatures. Fire frequency and severity are projected to continue to increase in future climate change scenarios (NPS 2017, 23).

The RSS furthermore outlines the following goals associated with sequoia protection:

1. Maximize persistence of large, living giant sequoias.
2. Maximize persistence of structurally and compositionally complex giant sequoia groves that are sustainable, resilient (to drought, fire, insects, etc.), and support native biodiversity.
3. Manage for ecological functions essential to giant sequoia groves (fire, hydrology).
4. Prepare for potential shifts in giant sequoia distribution to enable its persistence in the broader Sierra Nevada landscape.
5. Prioritize persistence of giant sequoia in areas of highest social value.

At the time of its writing, the RSS states that only 20% of sequoia groves in the Parks are within desired fire return interval and that small trees are overly dense in most groves. Both of these stressors were identified as moderate concern just five years ago.

Finally, the Parks’ RSS identified such direct management priorities to “. . .include continuing and expanding the use of fire and fuels treatments, reducing other stressors like invasive plants, establishing seed banks, and research with new or expanded treatments that may increase resistance and resilience to climate change, drought, insects, disease, and uncharacteristically severe fires” (NPS 2017, 84).

Sequoia and Kings Canyon National Parks General Management Plan (2007)

Context for the Plan

In writing the GMP, the NPS articulated some of ongoing issues facing the parks, particularly with regards to ecological stressors facing ecosystems, and specifically sequoias and mixed conifer forests, throughout the parks. The two primary issues identified here related to a loss of pre-euro-American fire regimes and rapid anthropogenic climatic change – both of which have significantly contributed to the conditions threatening sequoias today and some of which the NPS states could be mitigated by fuels reduction.

“Between 1891 and 1967 all fires in Sequoia, General Grant, and Kings Canyon national parks were suppressed, which resulted in important ecosystem changes. For example: A buildup of dense vegetation along foothill streams and in their upper catchments reduced annual streamflow in the foothills. Both stream chemistry and streamflow in the mixed-conifer zone were altered, with unknown consequences for aquatic ecosystems. Giant sequoia reproduction, which in the past depended on frequent fires to expose mineral soil and open gaps in the forest canopy, effectively ceased, and the reproduction of other shade-intolerant species was greatly reduced. The accumulation of dead material created an increased hazard of severe wildfires sweeping through the mixed-conifer forests. The lack of fire also reduced habitat critical for certain wildlife species. The parks began an aggressive program in 1968 to reestablish fire in the parks’ ecosystems. This program of prescribed fire has made great progress in the giant sequoia groves and has substantially restored a considerable area of mixedconifer forest. Much, however, remains to be done.” (NPS 2006, 27)

“Average global temperatures have been rising in this century, and global temperatures are projected to rise by another 1.0 to 3.5°C (2 to 6°F) over the next century. It is unknown how global climatic change will manifest itself locally in the Sierra Nevada. Based on paleoecological records, global summertime temperatures 10,000 to 4,500 years ago were perhaps up to 2°C higher than now, with prolonged summer drought in California. The species composition and fire regimes of Sierran forests were quite different from those of today. Increasing average temperatures will probably result in higher snow lines, earlier snowmelt, and prolonged summer droughts, affecting the viability of certain species. Giant sequoia seedlings are highly vulnerable to drought, and drought stress would make mature trees more vulnerable to insects, pathogens, and air pollution. Some Sierran habitats will likely shift to higher elevations. Organisms with limited mobility may become extinct locally, and some habitats, such as high alpine, are likely to disappear entirely, leading to the irreversible loss of some species. Rapid anthropogenic climatic change has the potential to become the greatest stressor on the ecosystems of Sequoia and Kings Canyon National Parks. While there is little that park managers can do to prevent global warming, they can take some steps to mitigate impacts on park ecosystems. For example, the resilience of forests to climatic change and consequent extreme wildfire behavior can be increased by restoring a more open structure to the forests” (NPS 2006, 29).

Desired Conditions

The parks’ GMP identifies the following desired condition as applicable to all management zones:

“The giant sequoia groves — particularly Giant Forest — and the ecosystems they occupy are restored, maintained, and protected. This includes reintroducing and managing natural processes such as frequent low to moderate intensity surface fires and native forest insect outbreaks to preserve the groves’ ecological integrity. Ground and surface water conditions are also significant to the reproduction and maintenance of the sequoia resource and are managed to protect grove hydrology.

The selected alternative in the parks’ GMP includes the following actions related to wildland fire:

“Manage wildland fire to address its profound ecological role in park ecosystems and its potential impacts on public safety, health, well-being, and property. As specified in the Fire and Fuels Management Plan, use prescribed fire and mechanical treatments to enhance ecosystem health while providing for public health, safety, well-being, and property protection. Give prescribed fire a higher priority than mechanical treatments in the Fire and Fuels Management Plan.”

Sequoia and Kings Canyon National Parks Wilderness Character Assessment (2014)

The 2014 Wilderness Character Assessment examined of the characteristics and conditions of designated and proposed wilderness in Sequoia and Kings Canyon National Parks.

The assessment identified giant sequoias as an attribute of natural quality and the loss of natural fire regime, including in sequoia groves, as contributing to diminished naturalness of Park wilderness. As well, the assessment determined that restoration of fire had improved natural quality in some areas.

- “The regional endemics include two very visible and characteristic tree species--*giant sequoias* and foxtail pines. Some 65% of the area of sequoia groves in the parks lie within designated wilderness, as does roughly 20% of the area of all sequoia groves in the world [Citations removed]...*These two globally significant tree taxa form distinctive forests in the parks’ wilderness.*”
- “Human-caused changes in fire regimes have also decreased the natural quality of the parks wilderness, although these changes were more severe in the decades prior to wilderness designation. A century of fire suppression in the mid-elevations of the parks has resulted in unnaturally high fuel loads, which increases the risk of catastrophic fire. In addition, periodic fire is important to the life-cycle of giant sequoia and other organisms. As a result of fire suppression, nearly 79,000 acres of fire-dependent ecosystems in the parks’ wilderness have missed multiple natural fire-return cycles, and sequoia reproduction has decreased [Citations removed].”
- “There have been notable improvements in some factors that increased the natural quality over the past several decades (and since designation in 1984), many of which have been a consequence of NPS intervention.
 - Changes in policy to allow some ignitions to burn, as well as a program of prescribed fire, has improved the natural quality in some parts of the wilderness.”

The assessment also recognized that manipulative actions threatened the untrammeled quality, and that difficult management decisions, as well as curtailment of parks’ authority to allow fires to burn, were likely to contribute to a negative trend in the untrammeled quality.

- “The most widespread and profound interference in disturbance processes within the parks is the management of fire. Periodic fire ignited first by lightning and later by Native Americans, shepherds, and land managers, is an important agent in shaping ecosystems and plays a critical role in the reproduction of giant sequoias and other species, especially in the middle elevations of the park [Citations removed]. However, from 1904 through 1968 NPS policy was to extinguish all fires within the parks [Citations removed].”
- “While law and policy allow wildfires to run their course in wilderness, external factors (such as air-quality issues, boundary concerns, weather conditions, and the availability of firefighter resources) can lead managers to suppress wilderness fires. Both suppression of lightning ignited fires and ignition of prescribed fires contribute to a decrease in the untrammeled quality of the parks’ wilderness.”
- “However, a majority of respondents felt that this (untrammeled) quality has a notable potential to decline due to numerous and important difficult decisions yet to be made by park management on whether or not to intervene in natural systems in order to preserve and provide for resilience and sustainability. Climate change will likely have effects on ecosystems that may compel intervention or manipulation in order to meet agency mandates for preservation of ecosystems and their components [Citations removed].”
- “During periods of poor air quality the parks’ authority to allow naturally ignited fires to burn and to conduct prescribed fires may be curtailed in the interest of public health. The outcome of this on the untrammeled quality would be mixed: suppressing naturally ignited fires is an impact on the untrammeled quality, but so is conducting prescribed fires. The restriction of either naturally ignited or prescribed fires would have a negative effect on efforts to restore fire-adapted ecosystems to improve the natural quality.”

Sequoia and Kings Canyon National Parks Wilderness Stewardship Plan (2015)

The parks’ WSP outlines the following desired conditions:

- “The untrammeled quality of wilderness character will be preserved by limiting deliberate manipulation of ecological systems *except as necessary to promote another quality of wilderness character*” (emphasis added).
- “The natural quality of wilderness will be preserved by mitigating the impacts of modern civilization on ecosystem structure, function, and processes. The NPS aspired to minimize or localize adverse impacts caused by visitor use and administrative activities. In the wilderness, natural process would dominate: *ecosystem structure and function*; native biodiversity; water quality and quantity; decomposition, nutrient cycling, and soil forming processes; meadow and wetland productivity; *fire regimes*; and soundscapes, dark skies, and viewsheds” (emphasis added).

Sequoia and Kings Canyon National Parks Fire and Fuels Management Plan (2003)

The parks’ FFMP outlines three primary goals, the first of which is to “protect and restore the parks’ ecological, cultural, and social values”. The selected action applies a full range of fire management tools: wildland fire suppression (suppression of unwanted ignitions), wildland fire use (managing some lightning ignitions to achieve natural resource benefits), prescribed fire (management-ignited fires), and mechanical fuel reduction.

The primary actions and program elements include:

- Up to 15 mechanical fuel reduction projects per year. Individual project size typically 30 acres.
- Up to 15 prescribed fire projects per year. Individual project size 8,000 acre maximum. Total prescribed fire acres not to exceed maximum expected under natural fire regime.
- Up to 40 wildland fire use projects per year. Individual project size could be up to 20,000 acres, but 90% would be less than 0.1 acre.
- An unknown number of wildland fire suppression actions per acre. Individual project size could be any size.

The FFMP also identifies the minimum tool in wilderness, which could include such motorized equipment as chainsaws, fire pumps, generators, and computers. “There will be limited support by helicopter. Field crews, supplies, and materials transported by ground except when infeasible due to trail conditions, weather conditions, or unavailability of stock or when moving large, fragile, or time-sensitive items that cannot be practically transported otherwise.” The minimum tool is more fully described in Table H-1 of the environmental assessment associated with this plan.

Appendix D: Recent Consultations with Tribes related to fire and forest management outside this Emergency Action

In broad terms, the National Park Service (NPS), Sequoia and Kings Canyon National Parks (SEKI) meets regularly with tribal partners to discuss upcoming projects and get input regarding tribal concerns, priorities, and opportunities for shared stewardship. SEKI holds tribal forums twice a year that are open to all interested parties, and with respect specifically to wildfire, prescribed fire, and forest management, SEKI has a multiple, decadal-long history of close coordination with tribes. The following includes the list of most recent informal and formal consultation activities between tribes and SEKI regarding actions related to fire management.

Since 2016 SEKI has been discussing all prescribed fire projects with tribal partners through a combination of field trips, tribal forum presentations, and formal consultation letters. Specifically, SEKI has formally consulted with tribal partners on approximately 15 fuels treatment projects within the parks since 2015. The tribal community that SEKI works with is generally very supportive of prescribed burning; tribes have never asked SEKI to not complete fuels treatment projects including manual thinning and prescribed fire. One example of this support includes a letter from the North Fork Mono Tribe supporting a proposal to thin and piles burn in Big Stump Grove. This letter specifically supported NPS taking actions to increase fire resilience and remove fuels from in and around sequoia groves.

In 2017 and 2018, SEKI conducted cultural burning projects with tribal partners in the Ash Mountain area of Sequoia National Park. These burns were conducted jointly between National Park Service fire personnel and tribal partners from the North Fork Mono Tribe.

In 2021, SEKI made a presentation on giant sequoias and the need for active management to the Tule River Tribal Council; this presentation was very well received.

In 2021, the Tule River Tribe, along with SEKI, became partners of the Giant Sequoia Lands Coalition, a group of all Tribal and public lands sequoia managers who support each other in efforts to conserve giant sequoias through prescribed fire, managed wildfire, restorative thinning, replanting, research, education, and communication. The actions in this plan are consistent with the core tenets defined in the Coalition charter, signed by the Tribe and all other 11 land managers.

During the 2021 KNP Complex Fire, Dirk Charlie served as the tribal liaison for SEKI and reached out repeatedly during the fire to receive tribal concerns and share updates on firefighting actions and possible impacts of the wildfire and/or firefighting operations to tribal resources. Additionally, SEKI sent out two updates to tribal partners during the fire itself.

Following the 2021 KNP Complex Wildfire, the Tule River Tribe participated in a SEKI-hosted press conference, during which time they stated that sequoia groves have sacred value to their people and need active stewardship for their preservation, as the Tribe has been doing for millennia – thinning, burning, and planting in the groves that they manage.

In early 2022, the Tule River Tribe wrote a letter to SEKI encouraging the parks to take a more hands on approach to forest management and cited the Tribe's own work thinning and replanting in and around sequoia groves.

In February 2022, the Tule River Tribe also hosted the Giant Sequoia Lands Coalition in February 2022 for a two-day meeting where we talked through all the groves that needed treatment and the ways to expedite those treatments before another fire occurred.

SEKI is currently finishing up a two-year effort to create an inadvertent discoveries plan for the parks. During the last round of meetings on this plan in June 2022, SEKI related to tribal partners that due to recent fire impacts to our forests generally—and giant sequoias in particular—the parks were considering more actions to protect groves including more thinning, burning, and replanting. At that time no participants expressed concerns regarding increasing forest management activities.

In summary, over the past seven years alone, SEKI has numerous conversations with many different tribal partners regarding fuels reduction and prescribed fire, and the tribes have been supportive of this work. If anything, the tribes have been informally asking SEKI to do more to restore wildfire resilience and to involve them more in this work. As SEKI looks toward revising the park's Fuels and Fire Management Plan, staff are pulling together plans and procedures to ensure that tribal involvement is integral to identifying a proposed action and preferred alternative, as it was during the development of the previous SEKI Fire Management Plan (2003).