

**National Park Service
U.S. Department of the Interior**



**Channel Islands National Park
Interior Regions 8, 9, 10, and 12**

Fire Management Plan Environmental Assessment

September 2022



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DEPARTMENT OF THE INTERIOR

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ON THE COVER

Existing vegetation debris pile on Channel Islands National Park.
Photo by Mediterranean Coast Network Fire Management Staff, National Park Service

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Chapter 1: Purpose and Need

Introduction

Channel Islands National Park (Channel Islands NP or park) consists of five islands located off the coast of Southern California—Anacapa, Santa Cruz, Santa Rosa, San Miguel, and Santa Barbara— all within Ventura and Santa Barbara counties (Figure 1). The Park encompasses submerged lands and waters within one nautical mile of each island and provides a diverse marine environment that protects a rich array of natural and cultural resources. The Park includes a mosaic of vegetation types, with each island being unique and having its own vegetative fuels management needs. The islands encompass private property, other federally owned and operated lands, state marine reserves and conservation areas, and a national marine sanctuary. The Channel Islands National Marine Sanctuary includes all five islands and encompasses 1,470 square miles of ocean around the islands to protect endangered species, sensitive habitats, historic shipwrecks, and cultural resources.

As part of its mission to protect and restore native plant and wildlife communities, the National Park Service initiated removing exotic eucalyptus groves followed by prescribed pile burning in 2006 to reduce hazard fuels and to restore native plant species and freshwater available for streams and wetlands. Debris generated from eucalyptus treatments, routine maintenance from vegetation cutting, and construction have been piled and left to dry to prepare for pile burning. Currently, about 85 vegetative debris piles from recent projects are still waiting to be burned because the categorical exclusion based on the Healthy Forest Initiative that authorized prescribed pile burning is no longer valid in the 9th Circuit Court, which includes California. The current Channel Islands NP fire management plan may be found at [NPS | 2006 CHIS FMP](#). The wildland fire program at the park is facilitated by the fire staff of the NPS Mediterranean Coast Network and cooperative or assistance agreements with the Los Padres National Forest, The Nature Conservancy (TNC), the park’s tribal partners, the U.S. Navy and Coast Guard, Island Packers (the park concessionaire), and other organizations.

The National Park Service (NPS) is proposing to update the Wildland Fire Management Plan (FMP) to replace the 2006 FMP that Channel Islands NP currently uses to suppress wildfires. This Environmental Assessment (EA) evaluates two alternatives for fire and fuels management activities at the park. This EA assesses the impacts that could result from continuing current fire management (No-Action Alternative) or implementation of the Proposed Action Alternative. This EA has been prepared in accordance with the National Environmental Policy Act (NEPA), NPS Director’s Order 12, and 2015 NPS NEPA Handbook.

Purpose of and Need for Action

Purpose

The purpose of a revised and updated Channel Islands Wildland Fire Management Plan is to comply with Director’s Order 18 (DO-18; NPS 2008) and Reference Manual-18 (RM-18), which state that “all parks with burnable vegetation must have an approved fire management plan.” Additionally, an updated FMP would be consistent with and support current park planning documents and NPS agency direction.

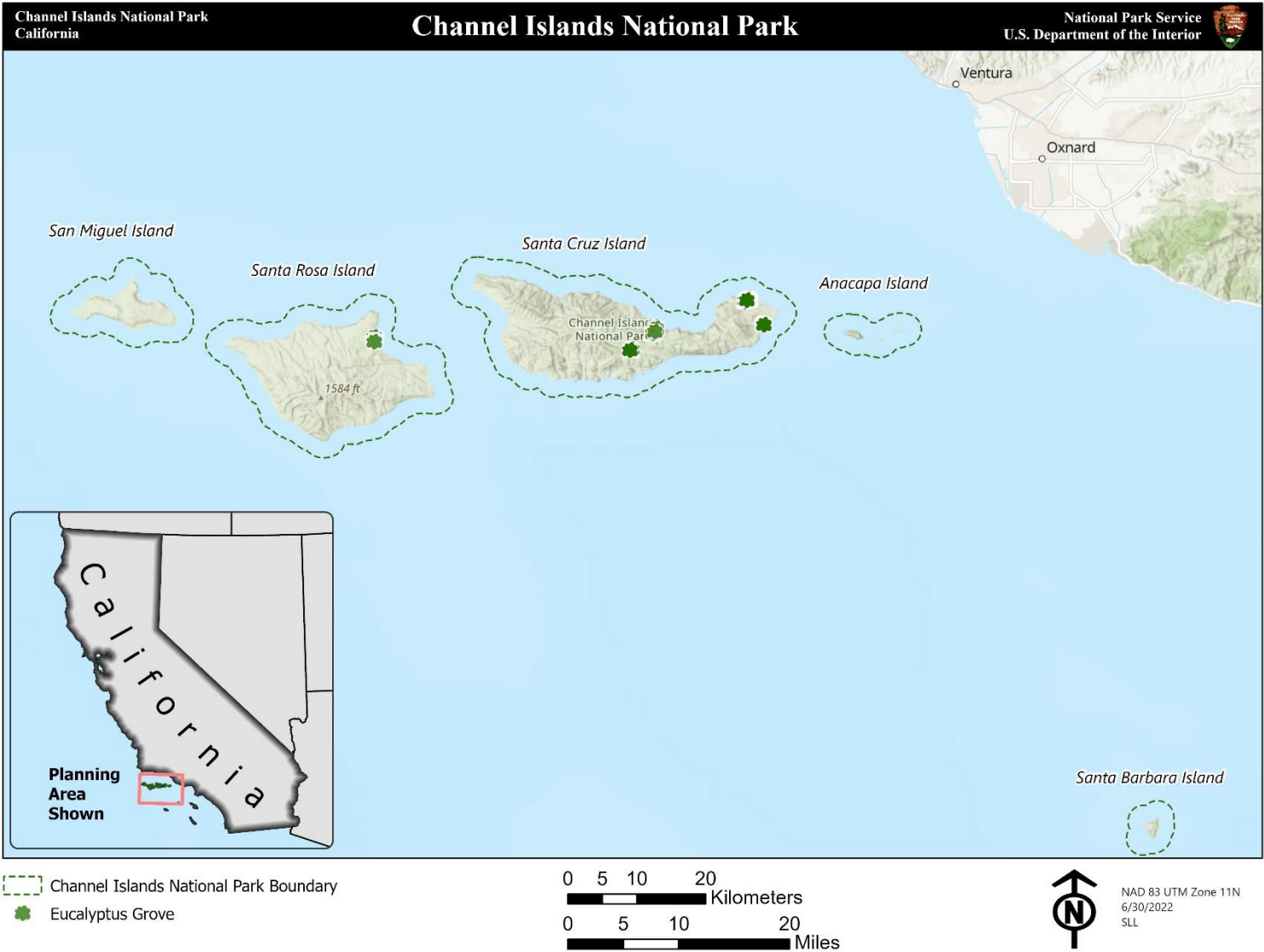


Figure 1. Channel Islands National Park Vicinity Map

Need for Action

An updated FMP is needed to reduce threats to human life and property and to park natural and cultural resources from wildfire. Historically, wildfires on the Channel Islands have been rare events, primarily due to maritime conditions (high humidity). Currently, changes in fuel conditions and increased human activities have increased wildfire risk on the islands. Non-native blue (*Eucalyptus globulus*) and red gum eucalyptus (*E. camaldulensis*) were planted in the 1880s for shade, fuel, and building projects. These trees have invaded riparian areas and pose safety hazards in developed areas (e.g., risk of hazard trees and limbs falling on public, structures, and in recreation areas). Flammable non-native grasses have increased the volatility of island vegetation since grazing was terminated. Climate change has also increased potential for wildfires due to vegetation drying out and increased flammability in longer periods of reduced rainfall.

Over the past century, the annual average temperature of Channel Islands NP area has increased annually by $1.8 \pm 0.4^\circ\text{F}$ (Gonzales 2020). Climate changes for the region are primarily attributed to anthropogenic causes including sea level rise, sea surface temperature increases, ocean acidity level increases, and dissolved oxygen reductions in the northern Pacific Ocean (Gonzales 2020). The hotter temperatures of anthropogenic climate change and increased aridity of vegetation may increase fire frequency and burned area across much of California (Mann et al. 2016, Westerling 2018, Gonzales 2020).

The Intergovernmental Panel on Climate Change projected an annual average temperature increase in the park of $6.3 \pm 1.4^\circ\text{F}$ from 2000 to 2100 (Gonzales 2020). Two-thirds of climate models project increases in total annual precipitation and one-third project decreases, although higher temperatures would tend to increase aridity. A combination of projected sea level rise, daily tidal range, and storm surge could raise sea level during the worst storms to 3.5 meters above the 2000 level by 2100. Continued climate change could increase numerous risks to park resources, including increased wildfire frequency, tree mortality, growth of invasive plant species, damage to marine life from hotter temperatures, and damage to cultural resources from erosion. One fire model projects increased wildfire potential on the northwestern third of Santa Rosa Island and on the eastern third of Santa Cruz Island (Mann et al. 2016). The model only provides a rough estimate of the fire return interval (FRI—the period between large wildfires), which showed a decrease of the FRI by approximately 50 years on Santa Cruz Island and 150 years on Santa Rosa Island by 2050. In other words, wildfire frequency would likely increase. The models project no increase in potential wildfire on the smaller islands in of Channel Islands National Park. The higher temperature could increase the intensity of future wildfires.

NPS Objectives in Taking Action

Objectives are purpose statements that describe what should be accomplished for the action to be considered successful (NPS 2011). Based on consideration for the purpose and need for action, the park's enabling legislation, other park planning documents, and the NPS mission and policy guidance, the following fire management objectives were developed with park staff during internal scoping:

1. Prioritize protection of firefighters, staff, and the public in all fire management activities.

2. Suppress wildfires, regardless of ignition source, to protect the public, private property, island infrastructure, and natural and cultural resources of the park.
3. Manage wildland fires in concert with federal, state, and local air quality regulations.
4. Facilitate reciprocal fire management activities through the development and maintenance of cooperative agreements and working relationships with pertinent fire management entities.
5. Reduce wildfire hazard around developed areas and areas adjacent to cultural and historic sites.
6. Utilize the fire management program to help manage island vegetation in accordance with park and resource management objectives.
7. Educate staff and the public about the scope and effect of wildland fire management, including fuels management, resource protection, fire prevention, hazard/risk assessment, mitigation and rehabilitation, and fire's role in ecosystem management.
8. Continue research into uses of fire to help control non-native plant species and restoration of island ecosystems.

Issues

Issues Retained for Detailed Analysis

This section identifies the issues that could be affected by the alternatives. Issues were identified during internal and public scoping. When determining whether to retain an issue for more detailed analysis in this EA, the interdisciplinary team considered, among other things, whether or not:

- the environmental impacts associated with the issue are central to development of a fire management plan or are of critical importance;
- a detailed analysis of environmental impacts related to the issue is necessary to make a reasoned choice between alternatives;
- the environmental impacts associated with the issue are a big point of contention among the public or other agencies; or
- there are potentially significant impacts to resources associated with the issue.

The issues carried forward for analysis in Chapter 4 in this EA include:

Air quality: Smoke production and emissions generated from burning of piles could impact local air quality conditions.

Soils: Prescribed pile burning would remove vegetation under the pile, which could temporarily increase soil erosion of pile burn areas until revegetation occurs. Pile burning could also leave ash concentrations. Use of heavy equipment for mechanical fuel treatments could damage soils by exposing soils from vegetation removal, compaction, or rutting.

Vegetation: Mechanical treatments would decrease non-native Eucalyptus density and abundance, benefitting native vegetation communities.

Water Resources: Ash and nutrients produced from prescribed burning of piles could impact adjacent drainages and waterbodies. Removal of eucalyptus could increase water quantity available to waterbodies.

Wildlife and Special Status Species: Pile burning could impact endemic wildlife including special status species utilizing the pile burn areas. Human presence and noise during fuel and fire treatments could also temporarily displace wildlife species including special status species near treatment areas.

Cultural Resources: Fire and fuel management activities would cause ground disturbance that could impact cultural resources.

Cultural Landscapes: Prescribed pile burning, eucalyptus cutting, and defensible space work could visually impact the setting of cultural landscape and historic districts.

Museum Collections: Fuel and fire treatments would reduce adjacent hazard fuels around the contact stations housing the museum collections on Santa Cruz and Anacapa islands, increasing protection of the museum collections from potential wildfires. Post-fire archeological site protection may involve collection of at-risk artifacts, which would increase the volume of museum collections.

Visitor Use and Experience: During prescribed pile burning or mechanical treatments, temporary closures of nearby trails and campgrounds could disrupt visitor use and experiences of the park. Noise from equipment used for mechanical treatments could also disrupt visitor experience in nearby visitor use areas.

Human Health and Safety: Prescribed pile burning could impact health and safety of firefighters, staff, residents, and visitors from smoke inhalation. In addition, proposed fuel and fire treatments could impact firefighter health and safety from exposure to fire and using equipment.

Issues Considered and Dismissed from Further Analysis

Using the same considerations noted previously, the following issues were initially considered but were subsequently dismissed from analysis.

Soundscape: The NPS 2006 Management Policies and Director’s Order 47 states the preservation of natural soundscapes associated with National Park units as an important component of NPS’s mission. The natural ambient soundscape is the aggregate of all the natural sounds that occur in park units, together with the physical capacity for transmitting natural sounds. Although local soundscapes may be temporarily affected by vehicles, equipment, and aircraft during fuel and fire management activities, these effects are expected to be temporary and minimal and not impact the overall tranquility and solitude associated with the park.

Wilderness. The proposed fuel and fire treatments are outside of proposed wilderness lands and would not impact proposed wilderness resources.

Indian Trust Resources: Executive Order 13175 requires early consultation if a proposal is to have a substantial direct impact on Indian Trust Resources. The NPS consulted with the affiliated Native American tribes to determine whether any trust resources could be impacted by updating the FMP at the park. There are no Indian Trust Resources that would be affected by fuel and fire management activities. The park would continue to consult with the Tribes that have cultural ties to the islands.

Environmental Justice: Executive Order 12898 requires all federal agencies to identify and address disproportionately high and adverse human health or environmental effects of their programs and policies on minorities and low-income populations and communities. The proposed updated FMP would not result in disproportionately high direct or indirect adverse effects on minority or low-income populations or communities.

Socioeconomics: The NPS is directed to collaborate with community and tourism professionals to promote sustainable and informed tourism that incorporates socioeconomic and ecological concerns and supports long-term preservation of park resources and quality visitor experiences. The proposed updated FMP and associated fuel and fire management actions is not expected to significantly impact the local or regional population, income, or employment, nor impact tourism.

Chapter 2: Alternatives

This section describes the two alternatives, No-action Alternative and Proposed Action Alternative (updated fire management plan), that the NPS is considering for wildland fire and fuels management in Channel Islands NP. Alternatives represent different means for meeting the purpose, need, and objectives described in Chapter 1. A range of alternatives were developed that includes a set of reasonable alternatives as well as other alternatives considered but eliminated from detailed analysis. A reasonable alternative is one that is technically and economically feasible as well as meets the project's purpose and need.

Alternative A: No-action Alternative

The Channel Islands NP would be limited to wildfire suppression activities allowed under NPS Wildland Fire Management: Reference Manual 18 (RM-18), and the Interagency Standards for Fire and Fire Aviation Operations (Red Book), which summarize actions allowed under federal fire management policy. The 2006 FMP for Channel Islands NP and associated fuels/vegetation management activities was authorized under the Healthy Forest Initiative Categorical Exclusion which can no longer be utilized in 9th Circuit Court states, including California. Wildfire management activities would be restricted to wildfire suppression using appropriate strategies and tactics.

No fire related fuels management activities would be implemented, leading to increased buildup of hazardous fuels, even in developed areas, as there would be no way to dispose of vegetative debris safely. Minor limited landscaping vegetation work related to infrastructure and public use allowed under the NPS categorical exclusions may continue. However, the debris generated from routine maintenance activities would be left in piles to decompose over long periods creating concentrations of hazard fuels. This alternative would not allow proactive fuels management work to reduce wildfire risk in developed areas and adjacent to park natural and cultural resources by the NPS fire management staff and is inconsistent with NPS policy and does not meet the Purpose and Need (see Chapter 1).

All wildfires would be suppressed as soon as possible and suppressing the fire at the smallest possible size, while considering firefighter and public safety, and minimizing impacts to park natural and cultural resources. Tactics would include but are not limited to the use of natural barriers, roads, and trails for firelines, but new fireline construction would be allowed if that were the appropriate tactic to suppress the wildfire.

All wildfires would receive a suppression response and are primarily contained and controlled for protection objectives. These objectives include, but are not limited to firefighter and public safety, minimizing costs commensurate with values at risk, and protecting values-at-risk (e.g., structures, private property, cultural sites, threatened and endangered species habitat). Objectives also depend on the location of the fire (i.e., fuel types, topography), its projected movement, and weather/fire behavior conditions. When suppressing a wildfire, a variety of tactics and strategies may be used on different sections of the same fire. For example, one flank may be actively suppressed where it approaches infrastructure, whereas another flank may not receive active suppression action where it is confined by a natural barrier such as a beach or cliff. Tactics could

also involve the use of natural barriers, roads, and trails for firelines, but new fireline construction would be allowed if that were the appropriate tactic to suppress the wildfire.

Wildfire management and suppression tactics that are allowed under National Fire Policy may include but are not limited to the following:

- Application of water, foam and/or retardant by ground equipment or aircraft (Superintendent approval required to use foam and retardant).
- Use of motorized equipment such as chainsaws, leaf blowers, portable pumps would be allowed, except in sensitive areas or other special management areas.
- Use of hand tools such as shovels, pulaskis, flappers, pruners
- Off-road use of utility task vehicles outfitted with pumps, hoses and fire support tools and equipment (Superintendent approval required). Utility task vehicles could also be used on closed roads with Superintendent approval.
- Use of wildland fire engines; cutting of vegetation in advance of the fire front by chainsaws and/or tracked/wheeled equipment (mowers, masticators) to construct firelines or create point protection of values-at-risk.
- Potential use of heavy equipment, such as bulldozers, with Superintendent approval.
- “Burning out” from firelines, natural barriers, or roads

Indirect and direct attack methods would be used to suppress wildfires, dependent on conditions and resources available. Direct attack methods would include dropping aerial retardant on the burning edge of the fire, building hand lines against the hot edge of the fire, and extinguishment of the fire edge with water from engines or portable pump and hose lay set-ups. Resource Advisors (READs/REAFs) would provide advice on these actions to prevent damage to park resources. Indirect attack methods may include mowing around structures before the fire arrives to help provide point protection and reduce fire intensity near values-at-risk, or intentionally burning out vegetation along selected roads or other barriers in advance of the fire front to reduce fuels and fire intensity near the fireline. Applying foam or water adjacent to cultural or other park infrastructure sites would also provide point protection and reduce flammability in advance of the fire’s arrival.

Routine Maintenance Activities

Routine vegetation management is allowed under an NPS approved categorical exclusion at Channel Islands NP for park operational reasons and is performed regularly as needed by park staff. This work may contribute to fire management readiness by helping create defensible space. Examples include mowing for landscape and park visitation usage, which may also contribute to wildfire defensible space protection, cutting of hazard trees along roadsides and in visitor use areas, and removal of fallen trees and debris in developed areas or on trails. These activities occur around buildings, infrastructure, and campgrounds; along roadsides, pier access areas, interpretive viewing areas, hiking trails, fences, and boundaries; and on primitive roads used for firelines or administrative access. The generated debris would be left in piles to decompose over long periods creating concentrations of hazard fuels.

Alternative B: Proposed Action

Alternative B would continue to suppress all wildfires as described for the No Action Alternative but would also include fire and fuels management activities described below to reduce hazardous fuels. The Proposed Action Alternative would integrate more proactive resource protection activities into the Wildland Fire Management Program. The park is not proposing landscape-scale prescribed fires (broadcast burning), or allowing wildfires to burn solely for resource objectives, because vegetation is still recovering from a century of grazing, and current research shows that natural fire was infrequent on the islands (NPS 2019).

Mechanical Treatments

Channel Islands NP proposes to continue using mechanical treatments to reduce hazard fuels, create defensible space, and promote native vegetation recovery. Hazard fuels at Channel Islands NP are typically managed through mowing, cutting, raking, piling and burning, and chipping woody vegetation. Mechanical fuel treatments could use wheeled and tracked equipment (i.e., industrial mowers, large trucks, trailer or truck mounted chippers, tractors, front end loaders), handheld motorized equipment (e.g., chainsaws, hand-held brush cutters, leaf blowers, etc.), or hand tools. Tracked and wheeled equipment would only be used off roads under conditions that would minimize the disturbance of soils and vegetation, provide for recovery of native species, and include other protections for adjacent natural, cultural, and visitor resources under an approved fuels treatment plan approved by the Superintendent. Mechanical treatments would include:

- Pruning, limbing, and/or removal of hazard trees to minimize falling branches and decadent tree hazards around facilities and park visitor use areas on Santa Cruz and Santa Rosa islands.
- Cutting vegetation around park structures, infrastructure and cultural resource sites to create and maintain defensible space to protect them from wildfires on all islands.
- Continue removal of some non-native eucalyptus groves on Santa Cruz Island, after appropriate site-specific cultural and natural resource compliance is complete. Eucalyptus trees or groves would be managed in a manner to control the spread of these non-native trees, and many would likely be retained as an important aspect of the historic district's setting.
- Chipping smaller branches and limbs and hauling material to island use sites. Logs could be repurposed for park uses, or piled and burned, or transported to an island air curtain burner location for more efficient burning. Any remaining vegetative debris would be piled and burned (see piling and burning of vegetative debris below).

Piling and Burning of Vegetative Debris

Vegetation debris from cutting treatments must be disposed of so hazardous fuel loading does not increase wildland fire risk. Hazardous fuel debris also needs to be managed to avoid negative impacts to natural and cultural resources. The cut vegetation from eucalyptus groves on Santa Cruz Island would require burning and disposal in the grove areas due to the volume of debris generated from these treatments. These cutting and burning activities would occur over several decades depending on funding, staffing, and burn windows. All disturbed areas would be rehabilitated to promote native vegetation recovery, once the project is completed. In addition, the NPS would continue to maintain five additional burn pile areas on Santa Cruz and Santa

Rosa islands where vegetative debris would be periodically burned as debris from park maintenance, defensible space, or routine tree work accumulate in the years ahead. Pile burns would be utilized repeatedly in these pre-identified sites to minimize impacts on the landscape, and thus the sites would not be rehabilitated. None of the other islands have identified burn pile needs.

In order to increase the efficiency of eucalyptus removal, logs generated from mechanical treatments could be cut up on the ground before transporting to preapproved locations (e.g., barren beach). A ground crew could hook up log(s) to a choker (strong steel cable) then hook the choker to a hook and long cable suspended from a helicopter, where the logs would be safely flown to the preapproved location(s). A large Type 1 helicopter could be used to transport the eucalyptus logs to the preapproved locations where they would be cut into smaller pieces for burning in an air curtain burner. An air curtain burner is an enclosed forced air burner that contains the open flame area, speeds consumption of burned materials, and minimizes emissions due to the high burning temperatures. The air curtain burner would be transported to Santa Cruz Island. A front end loader would be used to load the cut-up log chunks into the air curtain burner.

Vegetation debris generated from mechanical treatments, resource management, and park maintenance activities would be chipped whenever possible and hauled to island use sites. The remaining debris would be arranged into piles to dry. The vegetation piles would be burned later following protocols outlined in a prescribed burn plan approved by the Park Superintendent. A prescribed burn plan would be written for each project area well in advance of burning to ensure pile burning is done safely and well contained, and that smoke is minimized. There are currently about 85 piles that are available to be burned from past cutting and accumulation activities and are considered hazardous fuels. Piles would be ignited with ignition devices, such as hand-held drip torches, under carefully prescribed conditions such as burning during nights in the winter with firefighters and control equipment on scene. Ventilation fans and leaf blowers could also be utilized under appropriate conditions to speed up the consumption of the piles; they also assist in burning efficiency which reduces smoke.

Burning of debris piles would be implemented at times and situations when the environmental conditions (i.e., fuel moisture and weather conditions) are appropriate to meet containment and park natural and cultural resource objectives. The written prescribed fire plan for each project area would also address the details of the prescribed fire prescription, safety issues, smoke, resource requirements, mandatory notifications, and contingency actions.

Defensible Space

Defensible space is a buffer zone of reduced flammable vegetation around the value-at-risk (e.g., administrative and visitor structures, buildings, historic structures, other sensitive cultural sites, The Nature Conservancy facilities, water facilities, weather stations) where nearby vegetation has been removed or reduced to protect the value during a wildfire. It also provides space for firefighters to safely work during a wildfire to protect the value from the fire. Defensible space work could include removing, trimming, mowing, or pruning accumulated dead or live fuels that could be easily ignited and hauling them away from that area. Defensible space zones typically vary from 50 to 200 feet but may differ by sensitivity of the infrastructure to fire, type of vegetation, aspect, prevailing wind direction, and slope. Defensible space could be created using wheeled or tracked equipment (e.g., mowers, masticators, tractors), or handheld motorized

equipment (e.g., brush cutters, trimmers). Typically the defensible space is more actively cleared near the structure (0–50 feet), while certain vegetation may be retained further from the structure. Most Channel Islands NP structures already have defensible space in place, but it requires periodic maintenance as vegetation regrows.

Alternatives Considered but Dismissed

Alternatives and alternative elements may be dismissed for the following reasons:

- technical or economic infeasibility. This means the alternative could not be implemented if it were selected or would be unreasonably expensive;
- inability to resolve the purpose and need for taking action, to a large degree;
- duplication with other, less environmentally damaging, or less expensive alternatives;
- the alternative conflicts with an up-to-date and valid park plan, statement of purpose and significance, or other policy, such that a major change in the plan or policy would be needed.
- the alternative would require a major change to a law, regulation, or policy;
- too great of an environmental impact;
- the alternative addresses issues beyond the scope of the NEPA review; and
- if the alternative would not be allowed by another agency from which a permit is required, it should be eliminated as “environmentally infeasible.” (NPS NEPA Handbook 2015)

The alternative elements below were dismissed because they would have too great of an environmental impact on the native plant communities on Channel Island NP.

Widespread broadcast burning—Widespread broadcast burning means to implement human ignited prescribed fires on a large or landscape scale. Broadcast burning for resource objectives was mentioned in the 2006 Channel Islands NP FMP but was later discontinued because prescribed broadcast burns implemented on the island were shown to negatively impact native plant species recovering from past grazing, and the burns promoted non-native, more flammable grasses (Kathryn McEachern, USGS Research Ecologist, personal communication 2022). Additionally, fire history studies have not been done to determine fire history for each Channel Island due to the small number of wildfires and restricted sampling possibilities; however, fire history research on Santa Cruz and Santa Rosa islands indicates that the historic fire return interval prior to the Spanish expansion period was 500–1,000 years, which is much different from similar ecosystems on the mainland.

Managing wildfires solely for resource objectives (such as allowing fires to burn to “return fire to the ecosystem”) —Management of wildfires for resource objectives is not desirable as the native plant communities on the Channel Islands are not fire dependent for reproduction and growth, and wildfires have not been shown to be a frequent natural disturbance. As noted above historic fire return intervals on Santa Cruz and Santa Rosa islands was 500 to 1,000 years prior to the Spanish expansion period. Furthermore, resource managers and scientists consider the remaining native island vegetation to still be recovering from over a hundred years of over-grazing, and wildfires would set-back this recovery process and promote non-native vegetation.

Best Management Practices

The following best management practices (BMPs) would minimize the degree and/or severity of adverse effects to Channel Islands NP during fuel and fire management activities specified under the Proposed Action alternative. Wildfire suppression BMPs would be utilized under both alternatives, although their influence may differ depending on which alternative is selected. The fuel treatment BMPs would only be implemented under the Proposed Action Alternative.

Wildfire Suppression BMPs

- Prevention of human-caused wildfires is essential based on extended response times and the complex nature of logistics to mobilize resources to a wildfire on the islands. The park would develop a menu of prevention actions related to reducing the risk of ignitions by island staff and visitors.
- Use of Minimum Impact Strategy and Tactics (MIST) would occur on all Channel Islands NP wildfires but would not compromise human safety priorities. MIST procedures would be listed in the new FMP.
- The Fire Management Officer (FMO) and Chief Ranger monitor fire risk during the year and could recommend additional restrictions to the Superintendent to help prevent wildfires as fuels and fire weather conditions develop. The Superintendent could authorize temporary restrictions or closures to park visitors if necessary.
- After all wildfires, post-fire response monitoring and implementation actions would be utilized to minimize fire suppression effects and post-fire damages of park resources. These responses include suppression repair, emergency stabilization, rehabilitation, and restoration programs as determined by fire staff, park resource specialists, and regional office program coordinators.
- Park abandoned/closed roads could be temporarily re-opened for use as firelines or to provide access to minimize risk to firefighters, only with permission of the Superintendent. If opened, work done on such roads would be at minimum levels to make the firelines effective control or emergency transport features. Park resource advisors (READ/REAFs) would be on scene to advise on construction of safety zones if needed. These temporarily reopened roads, if utilized, would be closed and rehabilitated after the wildfire with guidance from park resource staff.
- Helicopter aviation drops of seawater, and seawater pumping into land hose or tank systems, would be considered upon approval of park resource advisors (READ/REAFs). A resource protection objective for seawater use would be to avoid salinity damage to seeps, arroyos, wells, streams, and wetlands. Seawater would not be used on mapped locations of state or federally listed plant species, or other rare or unique plants.
- Low level aviation activities for fire and fuel treatments would be avoided within 1,000 feet of known active eagle or raptor nests, sea bird colonies, rookeries, pinniped haul outs, or other sensitive activity areas; locations to be provided by park resource advisors (READ/REAFs). Low-level hovering and flights would be minimized to lower the risk of bird collisions, and wildlife disturbance.
- Helicopters should avoid operations within ½ mile of known active Peregrine Falcon nests.

Fuel Treatment BMPs

- During removal of eucalyptus or any other tree species, chipping of smaller branches and other woody vegetation would occur whenever feasible to decrease the amount of biomass needing pile burning. Chips would be hauled to approved park areas for productive use.
- Helicopter transport of large logs to centralized areas for more efficient disposal or other uses would be considered to minimize long duration pile burning. Project would be coordinated with resource managers to minimize impacts during wildlife sensitive periods.
- When disposing of vegetation, the park would consider use of supplemental burning equipment such as ventilation fans and air curtain burner (with transport of large logs). This would assist in more efficient burning and reduced emissions.
- If an air curtain burner is utilized for burning eucalyptus logs, the park would designate areas for ash distribution and disposal that avoids resource damage. This would be described in the fuel treatment project plan.
- Accelerated mop-up of burn piles would be used when feasible to minimize smoldering and reduce combustion/smoke periods.
- Pile burning would be conducted when pile fuel moistures are relatively low to provide better combustion, less residual burning, and better transport and lofting of smoke.
- Timing and methods of ignitions on pile burning would be regularly assessed and reviewed to minimize smoke impacts.
- Vegetation piles created from fuel treatments would use pre-identified established burn pile sites, when possible, to minimize disturbance of new areas
- Vegetation hazards along primary evacuation routes to piers, boat landings, airstrips, and helispots would be examined on a recurring basis to determine viability as evacuation routes during wildfires. If eucalyptus treatment areas are located near important routes, they could be identified as priority for pile burning if they could impair a primary route.
- As terrain allows, piles would be constructed and burned away from stream courses as feasible. If ash accumulations remain after burning near stream courses, they would be manually or mechanically removed to prevent ash from washing into stream courses.
- Following pile burning, restoration activities would occur at pile burn locations that would no longer be used. Rehabilitation actions would seek to improve soil structure to promote growth of native plants. Planting, and seeding of native plants would be considered.
- Park and fire staffs would coordinate to monitor fuels treatment activities. Monitoring could occur before, during, and after fuel treatments to help determine park resource effects, and progress towards treatment objectives
- Interpretive signage or posting of temporary notices could be considered in fuel treatment areas to explain long term treatment projects and resource objectives to park visitors.
- Mechanical equipment used to move logs and build piles would consider ceasing operations to prevent rutting and compaction when treatment area soils are wet/saturated from rainfall.

Chapter 3: Affected Environment and Environmental Consequences

Methodology for Analyzing Impacts

The impact analysis evaluates the expected changes to the current condition (as described in Affected Environment) of the resources carried forward for detailed analysis from the actions proposed in the various alternatives. Descriptions of both the direct and indirect impacts provide the reader with an understanding of how the condition of a resource would change as a result of implementing either of the alternatives. Alternative A (No Action) includes impacts that would occur if current wildfire suppression would continue. Alternative B (Proposed Action) includes impacts that would result from implementing fuel and fire management activities to reduce hazard fuels and promote native vegetation. General definitions for potential impacts are described as follows:

Direct: An effect that is caused by a proposed action and occurs in the same time and place of implementation (40 CFR 1508.8).

Indirect: An effect that is caused by a proposed action but is later in time or farther removed in distance from the action (40 CFR 1508.8).

Cumulative Impacts Analysis

The analysis of potential cumulative impacts describes the incremental effect contributed by the direct and indirect impacts of the NPS actions considered in this EA when added to the impacts of past, present, and reasonably foreseeable future actions. To be considered under the cumulative analysis section of the EA, past actions would have ongoing impacts that are presently occurring. Reasonably foreseeable future actions include those federal and non-federal activities not yet undertaken, but reasonably likely to occur. The direct, indirect, and cumulative analysis takes into account the potential for both adverse and beneficial effects and considers the context of the resource impact (e.g., how the current condition of a resource might change relative to the state of the resource at differing scales, examples include: nationally, the affected region, the affected interests, and the locality) when assessing the severity or magnitude of an impact. Past, present, and reasonably foreseeable actions that could contribute to cumulative impacts include:

- Past livestock and non-native ungulate grazing
- Past agricultural and ranch land uses
- Past development of buildings, roads, and military infrastructure
- Present and future maintenance of facilities and recreational activities
- Past, present, and future watershed and wetland restoration efforts

Air Quality

Affected Environment

The park is classified as a Class II area under the 1977 amendments to the Clean Air Act (42 U.S.C. 7401 et seq.). While Class II areas are allowed to increase emissions of particulate matter so long as National Ambient Air Quality Standards (NAAQS) established by the Environmental

Protection Agency are not exceeded, the NPS seeks to perpetuate the best possible air quality in parks and promotes measures to avoid emission increases. The NAAQS identified six criteria pollutants: particulate matter (PM₁₀ and PM_{2.5}), ozone (O₃), sulfur dioxide (SO₂), nitrogen dioxide (NO₂), carbon monoxide (CO), and lead (Pb). Air quality impacts are a concern and occur in the park due primarily to external sources. On most days, sea breezes from the south and west push mainland air pollutants away and keep air pollutants at low levels on the Channel Islands. However, periodic strong east winds, referred to locally as “Santa Anas,” can carry pollutants several hundred miles offshore and have the potential to greatly affect air quality on the islands. Other atmospheric patterns, such as “Catalina eddies” and eastern Pacific high-pressure systems, also can introduce air pollutants from the Los Angeles basin onto the islands. Marine vessels constitute the largest sources of mobile-source emissions in the Channel Islands and include nearby recreational and fishing boats. Minor air pollution sources within the park and elsewhere on the islands include stationary sources such as furnaces, boilers, and generators. A few motor vehicles operated by the NPS, TNC, and US Navy are mobile air pollutant sources on the islands and emissions primarily include carbon monoxide, nitrogen oxides, and hydrocarbons (or volatile organic compounds). The South-Central Coast Air Basin, which includes the park, is classified by the California Air Resources Board as being in nonattainment for ozone and particulate matter for Santa Barbara and San Luis Obispo on the mainland.

The park is in Ventura and Santa Barbara counties, which are a part of the South-Central Coast Air Basin. The regulatory agencies responsible for overseeing air quality for stationary resources are the Ventura County and Santa Barbara County Air Pollution Control districts. The California Air Resources Board is responsible for overseeing air quality standards and emissions from motor vehicles, fuels and consumer products, and airborne toxic control measures. Title 17 of the California Code of Regulations, titled Smoke Management Guidelines for Agricultural and Prescribed Burning, provides direction to air pollution control and air quality management districts (air districts) for the regulation and control of agricultural burning, including prescribed burning.

Overall air quality is fair for Channel Islands NP with a declining trend due to particulate matter concentrations at the park degrading from 2011–2020 (NPS 2020). Particulate matter are small particles and liquid droplets, 2.5 and 10 micrometers in diameter, that are suspended in the air. These include but are not limited to acids, such as nitrates and sulfates, soil or dust particles, organic chemicals, and allergens. The particulate matter declining trend is based on data collected at air quality monitoring site 061113001 in Ventura, CA; the islands do not have an air quality monitor. The annual mean particulate matter (PM) concentration remained unchanged but the PM_{2.5} concentration was 22.7 microns/m³, and PM₁₀ concentration was 162 microns/m³ (NPS 2020). The PM_{2.5} concentration is moving towards poor (35.5 microns/m³ threshold), and PM₁₀ concentration is rated as poor (155 microns/m³ threshold for poor). However, air quality on the Channel Islands is generally good with sea breezes from the south and west pushing mainland air pollutants away and keeping air pollutants at low levels.

Impact Analysis

Alternative A: No Action

The CHIS fire program would continue to coordinate fire suppression activities under their 2006 FMP and federal wildland fire policies. No prescribed pile burning of vegetation debris would

occur. Therefore, the only anticipated impacts to air quality would occur from wildfires. Existing vegetation debris piles would remain as concentrated hazard fuels leading to increased wildfire risk, which could increase the size and intensity of wildfires that involve the existing vegetation debris piles. The resulting smoke would be expected to degrade air quality at Channel Islands NP and the surrounding area, with exposure period depending on the wind and atmospheric conditions. The lack of hazard fuel reduction activities would not reduce threats to human life and property and to park natural and cultural resources from wildfire.

The occurrence of wildfires cannot be predicted and may occur during periods of unfavorable weather conditions with poor smoke dispersion and transport of smoke away from sensitive receptors (i.e., private residents, waterways). Wildfires could affect air quality and visibility within the park and the surrounding area, depending on the fire location, size, fuel type (trees, shrubs), and wind direction. Wildfires generate particulate matter, ozone, nitrogen dioxide, and carbon monoxide (Hyde et al. 2017); all pollutants regulated under the NAAQS. Impacts to air quality from particulate matter (ash) and smoke emissions from wildfires may temporarily exceed air quality standards within and adjacent to the burn area. Because of the negative effects of wildfires on park resources, aggressive suppression strategies would be implemented to reduce air quality impacts. Conversely, and a more likely scenario, the occurrence of any wildfire of significant size would occur during dry periods with elevated wind speeds, both of which should lead to improved smoke dispersal. In addition, fugitive dust could be generated from fire suppression activities and increased vehicle traffic associated with fire crews would temporarily affect air quality. Impacts to air quality from wildfire suppression activities would be limited in scale due to the logistical difficulty of getting vehicles and mechanical equipment to the islands and localized to where the suppression activities were occurring.

Cumulative Impacts

Regional air quality degradation from mobile and stationary sources on mainland California and the increasing occurrence of large and damaging wildfire there contribute to cumulative adverse impacts on air quality. Wildfires in the park have been infrequent and short in duration, contributing little to air quality degradation and cumulative impacts. In summary, Alternative A would have a negligible contribution to cumulative impacts on air quality as most air quality impacts on the islands and the region are from outside sources.

Alternative B: Proposed Action

Impacts would be similar as described for Alternative A for wildfires and attendant suppression response to each, including emission of air pollutants from the operation of firefighting equipment and related visitor and resource protection activities. As noted above, wildfires in the park have been infrequent and short in duration, contributing very little to air quality degradation and potential impacts either locally or within the region.

Smoke emissions from prescribed pile burning would temporarily impact air quality. Impacts would be minimized by following best management practices (see best management section) and coordinating with the Santa Barbara County Air Pollution Control District, who serve as the regulatory entity for reducing unwanted impacts from all stationary sources, including management of ignited pile burning activities. The amount and duration of smoke impacts would be expected to be limited by conducting only during atmospheric conditions that are conducive to good smoke dispersion, by limiting the number of piles burned at one time. Furthermore, the

NPS intends to burn debris piles during periods allowed by CA state air quality regulations to ensure minimal smoke effects on air quality, people and sensitive natural resources. An indirect beneficial effect would be reducing concentrated hazardous fuel areas created by vegetation debris piles, which would help in the control of future wildfires.

Under Alternative B, the mechanical treatments and defensible space work would cause temporary localized impacts to air quality until the work is completed. Air pollutants would occur from emissions of wheeled or tracked equipment, handheld motorized equipment, vehicles, and proposed use of a helicopter to move larger eucalyptus logs. Supplemental burning equipment may be utilized (e.g., air curtain burner) for larger fuels which would produce lower emissions compared to burning these fuels in a pile configuration. The mitigation measures when combined with best management practices (see Chapter 2), would be expected to minimize potential adverse effects, to air quality.

Cumulative Impacts

The cumulative impacts for Alternative B would be similar as described for Alternative A. Alternative B would contribute a marginally higher volume of emissions with the fuel and fire treatment activities but would negligibly contribute to cumulative impacts on air quality as most air quality impacts in the area are from outside sources. and with increased reduction of hazardous fuels, the expected outcome will be to reduce the possibility of widespread and damaging wildfires that could produce local air quality impacts.

Mitigation Measures

- AIR-1** Prescribed fires will be coordinated and permitted through the Santa Barbara County Air Pollution Control District (APCD), using required smoke modeling programs, which predict direction and intensity of smoke. The Prescribed Fire Information Reporting System (PFIRS) will be utilized to facilitate statewide interagency coordination with fire and smoke managers. (2013 CHIS FMP, and CA state smoke regulations)
- AIR-2** Burn piles would only include vegetation; no trash, garbage, metal, carcasses, marine debris, roofing, glass, insulation, hazardous materials, construction materials, plastic or petrochemical products, or other materials not allowed by air regulatory agencies. Piles may include lumber that has not been treated and does not include paint, stain, oils, creosote, glues, plastics, laminates, tar paper or other human made additives. (APCD regulations)

Soils

Affected Environment

In general, soils range from fine sandy loams to clay on the Channel Islands, with the two larger islands, Santa Rosa and Santa Cruz, having more diverse soils (NRCS 2007). Soils on Santa Cruz Island range from shallow to deep, to bedrock, and are loamy to clayey in texture. A soil of particular interest occurs under the oak groves on the isthmus. The extra moisture trapped by the oaks from the foggy conditions has caused those soils to develop a highly leached layer of soil overlying a less permeable clay layer.

Santa Rosa Island soils range in texture from fine sandy loam to clay and are moderately deep to very deep on more level landforms, such as alluvial plains and coastal terraces, with corresponding higher organic matter content. Sandy soils are associated with the dunes of both the east and west ends of the island.

Soils on Anacapa and Santa Barbara islands are thin, clayey, and of low permeability (NPS 2015). Soils on much of San Miguel Island are sandy (the western two-thirds of the island are covered by sand dunes), very deep, and permeable.

Cyanobacterial soil crusts are common on all five islands and once occurred in most of the vegetation types found in the Channel Islands (Belnap 1994). Soil crusts are important for increased soil stability, water infiltration, and fertility of soils. They are very susceptible to surface disturbance, such as grazing, hooved animal and human foot traffic, and off-road vehicles. The absence of soil crusts can lead to increased erosion and disruptions of nutrient cycles.

Available soils data are insufficient to define past trends, but many of the soils on the Channel Islands NP have been altered and disturbed, primarily by past human activities. Soil erosion has occurred on each of the islands as a result of multiple factors including changes in vegetation, grazing by non-native animals, road building, and naturally occurring erosion due to erodible soils (i.e., rugged topography, steep slopes, erosion-prone geologic formations) and wave action. During El Niño driven winter storms in 1997–1998, soil erosion impacts from sheep grazing was demonstrated on Santa Cruz Island where 80% of over 1,900 slope failures across the island occurred in the 10% of the island where sheep grazing occurred (Pinter and Vestel 2005). A soil survey conducted 4 years after sheep were removed from Santa Cruz Island and following heavy winter storms of 2004–2005, found vegetation density increased and soil slippage to be virtually nonexistent in those same areas (Pinter and Vestel 2005). The effects of climate change on Channel Islands NP, with projected annual average temperature increases, could lead to a decrease in soil moisture making topsoil more prone to erosion. In addition, predicted increases in sea level rise and storm surges could cause inundation of lands and increased soil erosion.

Impact Analysis

Alternative A: No Action

The No Action Alternative would not allow vegetative debris pile burning, cutting of certain eucalyptus groves, or proactive defensible space work to protect park infrastructure or resources. Existing vegetation debris piles would be expected to have higher moisture content in soils beneath the piles, as the vegetation debris provides shade helping the soil beneath to remain cooler and retain moisture and nutrients, such as carbon and nitrogen (Harrington et al. 2020). However, if a wildfire were to occur, the existing vegetation debris piles could burn at a higher intensity than the surrounding vegetation due to the concentrated fuel loads from the piles causing soil sterilization and loss of structure. The hydrophobic layers could lead to increased soil erosion from overland flow during heavy rain events following the wildfire. The No Action Alternative would not allow burning the existing piles under prescribed burn conditions (lower intensity than wildfires) which would not protect park natural resources (maintaining soil biodiversity and structure) nor reduce threats to natural resources, soils, from wildfires.

Wildfire suppression actions such as constructing firelines and off-road vehicle use could locally increase erosion and compact soils. Minimum impact strategies and tactics (MIST; e.g., select procedures, strategy, tactics, tools, and equipment that minimizes impacts on the environment, including cultural and natural resources) would continue to be used to reduce suppression operations impacts to soils. Recognizing that the Channel Islands are considered to be erosion sensitive landscapes, wildfires of significant size and/or severity would likely require that the park implement appropriate post-fire activities.

After all wildfires, post-fire response monitoring and implementation actions would be utilized to repair wildfire suppression actions and plan actions to help minimize post-fire damages to park resources. These responses include suppression repair, emergency stabilization, rehabilitation, and restoration programs as determined by fire staff, resource specialists, and regional office program coordinators.

Cumulative Impacts

Natural erosion, changes in vegetation, past livestock grazing activities from ungulates, road development, and agriculture development have contributed to adverse cumulative impacts to soil resources. These past activities have contributed to soil compaction and erosion on the islands. The removal of non-native grazing ungulates from Santa Rosa Island and the elimination of feral pigs on Santa Cruz Island resulted in localized long-term moderate beneficial impact to soils. Removal of non-native eucalyptus trees on Santa Cruz Island to restore wetlands and increase native plant species and habitat diversity disturbed soils in the treatment areas, with increased soil erosion lasting until revegetation of groundcover occurred. Impacts to soils from wildfire suppression actions would be expected to be minor with implementation of best management practices, following MIST procedures, and completing suppression repair actions. Impacts to soils would be site-specific, localized areas where trees or brush are removed or where wildfire suppression actions could have a minor impact on soils. Alternative A would have a minor contribution to adverse cumulative impacts on soils.

Revegetation and soil erosion control efforts would continue on the islands, independent of wildfire suppression, such as efforts to rehabilitate eroding areas on the Smith Highway and Soledad Peak on Santa Rosa Island. These continuing restoration efforts should over time reduce the loss of soil in many problem areas, resulting in a continuing long-term moderate beneficial impact.

Alternative B: Proposed Action

The impacts to soils caused by wildfires and the attendant suppression response would be the same as described for Alternative A.

Defensible space maintenance combined with pile burning and mechanical treatments to remove eucalyptus and reduce hazard fuels would be expected to provide firefighters improved strategic opportunities for indirect fire control efforts during wildfires, such as the burning out of fuels from defensible space or access roads, rather than constructing firelines. The proposed action would also increase infrastructure protection from wildfires.

Prescribed burning of vegetation debris piles would impact soils, primarily as a result of removing protective surface vegetation and litter and organic matter in the soil beneath a pile. Pile burning would result in deeper soil heating and localized impacts. Greater soil heating to the

B horizon could effectively sterilize soils by destroying the microbial populations, organic matter, and seeds stored in the soils and potentially creating hydrophobic characteristics in that layer. Higher soil temperatures occur when debris piles or thick layers of duff burn for long periods of time. Pile burning eucalyptus logs reached 233°F temperatures at 8.5 inches (22 centimeters) below the surface in mineral soils, which is lethal to most living biota (Roberts 1965). Typically, burn piles consisting of large wood would burn longer and produce more heat than piles of smaller diameter wood (Busse et al. 2013, Hubbert et al. 2015). The impacts to soils would depend on duration and intensity of burning materials and the soil and fuel moisture content at the time of burning. An air curtain burner could be used for larger eucalyptus logs on Santa Cruz Island, which would reduce potential impacts to soils compared to pile burning all locations.

The removal of protective surface vegetation and litter, and organic matter in the soil increases the potential for both wind and water erosion. Following a prescribed pile burn, wind erosion may temporarily increase due to exposure to wind shear velocities from the removal of vegetation and plant litter. Past studies showed herbaceous vegetation recovered rapidly without rehabilitation treatments (e.g., organic mulches, soil amendments) of small pile (<5m diameter) burned areas in conifer forests and neither reduce seed availability of altered soil properties hindered revegetation of these small burn scars (Rhoades et al. 2015). Baseline post-burn monitoring results of pile burn scars from the Santa Cruz Island lower Canada del Puerto Creek Restoration project showed about the same number of native seedlings growing in pile burn scars for seeded and unseeded burn plots (Casey 2016). Overall, prescribed burning of debris piles would not be expected to damage soil characteristics on Santa Cruz due to the small footprint associated with debris pile sizes (i.e., 50 feet by 50 feet), not all pile burns would be burned at once with about 30 to 60 piles annually, and the use of an air curtain burner on Santa Cruz Island in lieu of piling some vegetation debris. Santa Rosa Island has one maintenance pile that would have periodic prescribed pile burning of debris.

Mechanical treatments (e.g., defensible space, fuel reduction, non-native eucalyptus grove removal on Santa Cruz Island) would disturb soils from eucalyptus tree removal and the use of tracked and wheeled equipment. Mechanical equipment used to move eucalyptus trees and associated debris could impact soils in localized areas due to increased water and wind erosion in steeper slope areas by removing vegetation. Wheeled or tracked equipment could cause rutting or compaction of soils. Soil impacts would largely be limited to Santa Cruz Island where eucalyptus removal and pile burning would occur. Implementing appropriate best management practices (See Best Management Practices Section) such as using mechanical equipment only when soils are not saturated and using existing trails or roads, when possible, would help to reduce potential impacts to soils. Defensible space work would be expected to have a negligible impact to soils because most buildings already have defensible space and new defensible space zones would typically remove 50 to 200 feet of accumulated dead or live fuels around infrastructure, leaving low growing grass or shrubs.

Cumulative Impacts

The cumulative impacts to soils under Alternative B would be similar to those described under Alternative A for wildfire suppression actions. In the past, soil erosion was a major problem on parts of all the islands. Santa Cruz, Santa Rosa, and San Miguel islands in particular had severe soil erosion due to overgrazing by livestock, removing native vegetation, developing roads, and pig rooting (Santa Cruz Island), causing soil compaction and erosion. The removal of non-native grazing ungulates from Santa Rosa Island and the elimination of feral pigs on Santa Cruz Island provided localized long-term moderate beneficial impacts. Removal of non-native eucalyptus trees on Santa Rosa Island to restore wetlands and increase native plant species and habitat diversity also disturbed soils in the treatment area, contributing to soil erosion until revegetation of groundcover occurs.

The incremental effect on soil from the prescribed pile burning is expected to be relatively minor because these areas of disturbed soil would not all be burned at once with 30 to 60 piles being burned annually and are small in size and dispersed across the Santa Cruz and Santa Rosa islands. A high intensity burn could result in substantial localized soil damage as described above. Pile burning, mechanical treatments, and defensible space work are expected to have a minor contribution to adverse cumulative impacts because impacts would be localized and site-specific, lasting until revegetation of groundcover occurs. The potential use of an air curtain burner on Santa Cruz Island would reduce the total number of piles burned and associated impacts to soils. The proposed action would have a minor contribution to adverse cumulative impacts to soil resources with the implementation of best management practices and the impacts would be localized and site-specific lasting until revegetation occurs.

Water Resources

Affected Environment

Only three of the islands have freshwater water bodies—San Miguel, Santa Cruz, and Santa Rosa. Although water conditions vary among the islands, the freshwater quality of Channel Islands National Park is considered relatively good (NPS 2019). All the islands' freshwaters tend to have a high mineral content, particularly calcium and sodium, due to the natural occurring marine sediments. Additionally, erosion is an issue on the three islands (Engle 2006).

San Miguel Island has many small seeps and springs because of its porous sand blanket and a relatively large groundwater recharge area. However, most of these areas are highly mineralized and often contain high levels of sodium. There are no known major water quality problems on San Miguel.

Most of the drainages on Santa Cruz are intermittent, although the larger watersheds have perennial flows in normal precipitation years. There are also many freshwater seeps and springs throughout the island.

Santa Rosa has perennial springs and seeps that provide pools of water for most of the year. Most of the drainages are deeply incised and are similar to large arroyo systems that commonly occur in California and other areas in the southwestern United States. Greater than 99% of the water flow in Santa Rosa's streams occur during major storm events (NPS 2015).

Marine water quality conditions are believed to be good due to the distance of the islands from the mainland, the size and mixing of the ocean, and the basins near the mainland where most pollutants settle (NPS 2019). Potential water pollution sources that could affect the park’s marine water quality include fecal bacteria at island anchorage sites, agricultural and urban runoff from the mainland that could reach the Channel Islands during storms, and petroleum pollution from natural oil seeps and oil and gas developments. Heavy metals, trace elements, pesticides and other organics have been observed or are elevated in rocky intertidal zones (Engle 2006).

Floodplains

Floodplains are present on Santa Cruz, Santa Rosa, and San Miguel islands where there are perennial and intermittent streams (NPS 2015). Some of the floodplains are quite extensive, such as along Scorpion Creek, but most are fairly confined and are in the lower reaches of the streams, in low gradient coastal areas. Only floodplains along Scorpion Valley and Prisoners Harbor area (mouth of Canada del Puerto) on Santa Cruz Island have been mapped (NPS 2019). The Scorpion Creek floodplain on Santa Cruz Island is of particular concern to park managers because the floodplain is the entire lower valley and poses a threat to people and NPS structures due to flooding.

Wetlands

Santa Cruz, Santa Rosa, and San Miguel islands all have wetlands. Wetlands found on the islands include riverine wetlands, estuarine, intertidal, and emergent wetlands (NPS 2015). Wetlands are found along permanent and intermittent streams, and in the vicinity of seeps and springs, vernal pools, and marshes at the estuaries of several canyons (NPS 2015). The NPS has spent considerable funding and staff time to restore the wetlands at Canada del Puerto which were degraded by past ranching and agricultural related activities. The NPS also began to remove identified eucalyptus groves that are spreading in riparian areas and utilizing scarce stream waters.

Starting in the 1800s, the islands were occupied by ranchers and farmers and used for livestock grazing, which altered land cover and native vegetation communities, causing upland soil erosion, damage to riparian areas, and spread of non-native vegetation. These past activities greatly contributed to soil erosion on the islands with loss of topsoil and resultant increased sedimentation to waterbodies and drainages. The removal of non-native grazing ungulates from Santa Rosa Island and the elimination of feral pigs on Santa Cruz Island improved watershed conditions, vegetation, and soils. Freshwater quality improved with the removal of non-native ungulates on Santa Rosa Island. The Park has also restored and rehabilitated riparian areas on Santa Cruz Island, which improved watershed conditions. Marine water quality has not been intensively studied at the park, but synthetic organic compounds have been found in the milk and blubber of sea lions (Engle 2006). These synthetic organic compounds are believed to originate from fish eaten at polluted sites along the mainland coast (Engle 2006). As stated above, marine water quality conditions are believed to be good due to the distance of the islands from the mainland and the size of the ocean itself. Impacts from climate change could include increased water temperature, which could lead to more harmful algal blooms (Gonzales 2020). Climate change is also expected to increase ocean acidification over time as large precipitation events increase in frequency and intensity, increasing the frequency of incursions of higher-acidity deep waters into upper waters (Gonzales 2020).

Impact Analysis

Alternative A: No Action

The No Action Alternative would not allow vegetative debris pile burning, cutting of some eucalyptus groves, or proactive defensible space work to protect park infrastructure. During a wildfire, the existing vegetation debris piles could burn at a higher intensity than the surrounding vegetation due to the concentrated fuel loads at the piles. This high intensity burning could cause soil sterilization and loss of vegetation. Areas of soil sterilization in wildfire burn scar areas would be expected to lead to reduced vegetation cover of the landscape for a couple of years, causing localized erosion and reduced soil infiltration capacity that could impact adjacent waterbodies. The removal of vegetation increases the possibility of erosion episodes and sediment loading in adjacent drainages and waterbodies during storm and wind events. This could lead to a temporary increase in turbidity and sedimentation of surface waters until regrowth of vegetation cover. Thus, the No Action Alternative would not reduce threats to park natural resources (minimize soil sterilization and burning of surrounding vegetation which leads to erosion and reduced soil infiltration capacity which degrades surface water bodies) from wildfire.

Wildfire suppression actions such as constructing firelines with mechanical equipment and limited off-road vehicle use (limited by terrain) could compact soils and increase sediment loading into adjacent waterbodies. The use of equipment or utility task vehicles for off-road travel or operation on closed/abandoned ranch roads would require Superintendent approval, and prompt rehabilitation of any damaged stream bank crossings utilizing READs would occur as soon as possible. Minimum impact strategies and tactics (e.g., select procedures, strategy, tactics, tools, and equipment that minimizes impacts on the environment) and implementing best management practices would continue to be used to reduce suppression operational impacts to water quality.

The use of fire retardants or foams by helicopter or fixed winged aircraft could also temporarily alter the water quality of surface waters if misapplied or mishandled (i.e., a drop too close to a stream). These fire suppression chemical agents contain detergents, dyes, or fertilizer type chemicals that temporarily change the water quality. The degree of impact would depend on the amount of foam or retardant dropped into or near the water body, the size of the water body, and the flow/recharge volume. Superintendent approval would be required for use of retardant or foam. Mitigation measures would limit the use, type, and proximity to water bodies (no use within 300 feet of surface waters) making potential impacts to water quality minimal. In addition, firefighters utilizing seawater for helicopter drops or in pump/hose systems would avoid using near to seeps, arroyos, wells, streams, and wetlands to prevent salinity damage.

Cumulative Impacts

Natural erosion, past livestock and non-native ungulate grazing, and agricultural and ranching activities have contributed to adverse cumulative impacts to water quality. These past activities have greatly contributed to soil erosion on the islands with loss of topsoil and resultant increased sedimentation to waterbodies and drainages. Runoff during storm events temporarily decreases water quality as native vegetation continues to recover from past erosion and vegetation community changes. The removal of non-native grazing ungulates from Santa Rosa Island and the elimination of feral pigs on Santa Cruz Island resulted in localized long-term moderate

beneficial impact to watershed conditions, vegetation, and soils. In addition, past ocean dumping, pollutants from the mainland, changes in vegetation, oil and gas development in the ocean, and petroleum pollution have contributed to adverse cumulative impacts to water quality. These past activities have contributed to reduced marine water quality by reducing oxygen levels and introduction of chemicals into the waters that surround the islands.

Impacts from wildfires are as described above with impacts to water resources depending on the intensity and size of the wildfire. Impacts to water quality from wildfire suppression actions would be expected to be minor with implementation of best management practices, following MIST procedures, and completing suppression repair actions. Wildfire suppression actions in combination with past, present, and future activities would have a negligible contribution to adverse cumulative impacts on water quality with implementation of best management practices, MIST procedures, and completing suppression repair actions.

Alternative B: Proposed Action

The impacts to water quality caused by wildfires and the attendant suppression response would be the same as described for Alternative A.

Prescribed burning of vegetation debris piles would impact soils, primarily as a result of burning protective surface vegetation, litter, and organic matter, and leaving bare disturbed areas with ash accumulation. The removal of protective surface vegetation and litter, and organic matter also increases the potential for both wind and water erosion and sedimentation loading to adjacent waterbodies. Increased sedimentation rates would be expected to last until vegetation regrows, which would aid in the interception and infiltration of water during precipitation events. A past study showed that pile burning regardless of fuel composition had a limited effect to water quality downslope, with concentrations of nitrate, phosphate, and sulfate declining downslope from the pile edge (Hubbert et al. 2015). The intensity and duration of impacts to water quality from the temporary influx of nutrients to waterbodies would depend on debris pile location, the fire intensity, amount and frequency of precipitation events following pile burning, and the ability of the remaining or new vegetation to act as a sediment filter to adjacent waterbodies. Overall, prescribed burning of debris piles would be expected to have a negligible impact on water quality because not all pile burns would be burned at once with about 30 to 60 piles burned annually, best management practices would be implemented, and the use of an air curtain burner on Santa Cruz Island in lieu of piling vegetation debris would reduce the size and number of piles, thus, reduce the amount of disturbed bare soil areas that could increase sediment transportation to adjacent waterbodies.

Mechanical treatments (e.g., defensible space, fuel reduction, non-native eucalyptus grove removal on Santa Cruz Island) would disturb soils from eucalyptus tree removal and the use of tracked and wheeled equipment. Mechanical equipment used to move eucalyptus trees and associated debris could impact soils in localized areas resulting in increased erosion and sediment transportation to adjacent waterbodies from vegetation removal. Wheeled or tracked equipment could cause rutting or compaction of soils. Soil impacts would largely be limited to Santa Cruz Island where eucalyptus removal and pile burning would occur. Implementing appropriate best management practices (See Best Management Practices Section) such as using mechanical equipment when soils are not saturated and using existing trails or roads, when

possible, would help to reduce potential impacts to soils that could indirectly impact water quality from increased sedimentation rates.

The removal of eucalyptus groves on Santa Cruz Island would be expected to result in increased groundwater availability to adjacent streams and downstream wetlands. Eucalyptus trees reduce the amount of groundwater available for wetlands and streams (NPS 2010). Eucalyptus trees have the adaptability to expand their root systems during stress situations to increase groundwater uptake (Joshi and Palanisami 2011). A past study in Pakistan found direct evidence that eucalyptus plantations were depleting ground water resources, resulting in water wells drying up (Joshi and Palanisami 2011).

Cumulative Impacts

The cumulative impacts to water quality would be similar to those described under Alternative A for wildfire suppression actions.

In the past, soil erosion was a major problem on parts of all the islands. Santa Cruz, Santa Rosa, and San Miguel islands had severe soil erosion and resultant watershed degradation due to overgrazing by livestock and non-native ungulates and native vegetation removal from developing roads and ranching structures. The removal of non-native grazing ungulates from Santa Rosa Island, elimination of feral pigs on Santa Cruz Island, and removal of livestock from all islands provided localized long-term moderate beneficial impacts. Removal of selected non-native eucalyptus trees on Santa Cruz Island to restore streams and wetlands and increase native plant species and habitat diversity also disturbed soils in the treatment area, contributing to soil erosion and potential sediment transport to adjacent waterbodies until revegetation of groundcover occurs. The removal of eucalyptus trees on Santa Cruz Island also contributed to beneficial cumulative impacts to water resources by increasing groundwater availability to freshwater streams and wetlands.

The incremental effect on water quality from the prescribed pile burning is expected to be relatively minor because these areas of disturbed soil would not all be burned at once with 30 to 60 piles being burned annually and are relatively small in size, implementing best management practices to reduce impacts to water quality, and the use of an air curtain burner to burn vegetation debris on Santa Cruz Island. Overall, pile burning, mechanical treatments, and defensible space work impacts to water resources would be localized and site-specific, lasting until revegetation of groundcover occurs. The proposed action would have a minor contribution to adverse cumulative impacts to water resources with the implementation of best management practices and the impacts would be localized and site-specific lasting until revegetation occurs.

Vegetation

Affected Environment

The Channel Islands support diverse vegetation communities that includes remnants of the coastal Mediterranean-type ecosystem and endemic plant species. Each island supports unique plant communities, which differ in response to soils, geology, topography, climate, and land use history. Plant communities on the islands have been altered by human occupation and the introduction of non-native species, with vegetation communities still recovering from past grazing.

The Channel Islands primarily consist of grasslands (18,937 acres; 36% of land cover) followed by shrublands (13,518 acres; 26% of land cover) and woodlands (12,894 acres; 25% of land cover) (LANDFIRE 2022; Table 1). The major vegetative community types on the islands include coastal dune, coastal bluff, coastal sage scrub, grasslands, chaparral, island oak woodlands, mixed hardwood woodlands, pine stands, and riparian areas. The most extensive vegetation communities on the islands are grassland and coastal sage scrub with significant areas of chaparral on Santa Cruz Island, and to a lesser degree, on Santa Rosa Island. Mixed broadleaf woodland stands, oak woodlands, and pine stands are scattered throughout the islands on sheltered slopes and canyons, or on ridges exposed to frequent moist fogs. More detailed information on each island's vegetation communities is available in the 2019 [CHIS Natural Resource Condition Assessment](#).

The Channel Islands have over 60 plant species that are endemic to the park and over 40 endemic plant species found on more than one island (NPS 2019). Some of these plants are relicts of plant communities found on the mainland when climates resembled the maritime climate found on the islands today. The coastal bluff, chaparral coastal sage scrub, and mixed woodland plant communities support the most endemic plant taxa on the islands (NPS 2019).

Overall, vegetation across the islands has an improving trend due to the removal of non-native herbivores introduced during the ranching-era. Natural recovery of vegetation has occurred on all islands except Santa Barbara Island (NPS 2019). Recovery on Santa Barbara Island is slower because shrub establishment is limited by competition from annual grasses and arid conditions (NPS 2019). Vegetation recovery is uneven across each island, largely limited to mesic areas, such as north facing slopes, and will likely require some assisted recovery efforts for areas at risk of erosion, isolated, lacking native seed banks, and plagued with high competition of non-native grasses and other invasive plants. A consistent theme across all islands is that natural recovery is much lower in drier locations more prone to drought conditions and where soil water absorption is limited, such as along south facing and steep slopes. Climate change may make natural recovery of these locations even more challenging, as the climate continues to become warmer and drier. Moderate drought stress and high heat stress could impact individual plant survival and favor spread of non-native grass species that are more heat and drought tolerant (Gonzales 2020).

Approximately 25% of the Channel Island's vegetation communities are non-native plant species (Handley et al. 2016). All the islands have non-native species, ranging from 38 species on Santa Barbara (33% of the total flora on the island) to about 170 species on Santa Cruz (about 28% of the total flora). Eleven of Santa Cruz Island's 88 plant families and 82 of its 348 plant genera are represented exclusively by non-native taxa (NPS 2019). In addition, fennel (*Foeniculum vulgare*) dominates formerly plowed and heavily grazed areas in the Central Valley, Christy Ranch and in other areas. Scattered non-native eucalyptus stands that were planted have invaded riparian woodlands and drainages on Santa Cruz Island. On Santa Rosa Island fewer eucalyptus were planted for wind breaks near the historic ranch at Bechers Bay. The NPS continues to take actions to control or limit the spread of non-native plant species on the islands.

Santa Cruz, Santa Rosa, and San Miguel islands have experienced a number of wildland fires in the past century (Figure 2). Lightning-caused fires are considered rare on Channel Islands. Research indicates most fires were likely human caused for the last 7,000 years, with a decrease

in fires occurring with the introduction of heavy grazing in the mid-1800s (Anderson et al. 2010).

Table 1. Existing Vegetation on Channel Islands National Park

Existing Vegetation	Acres ¹	Percentage
Agriculture	63	0
Conifer	2,679	2.1
Hardwood	3,424	2.7
Shrubland	82,529	65.9
Grassland	444	0.4
Riparian	1,449	1.2
Sparsely Vegetated	4,778	3.8
Exotic Herbaceous	18,710	14.9
Exotic Tree-Shrub	9,719	7.8
Developed Areas	1,451	1.2
Total	125,245	100

¹Acres calculated using Landfire 2022 Existing Vegetation Type GIS Data

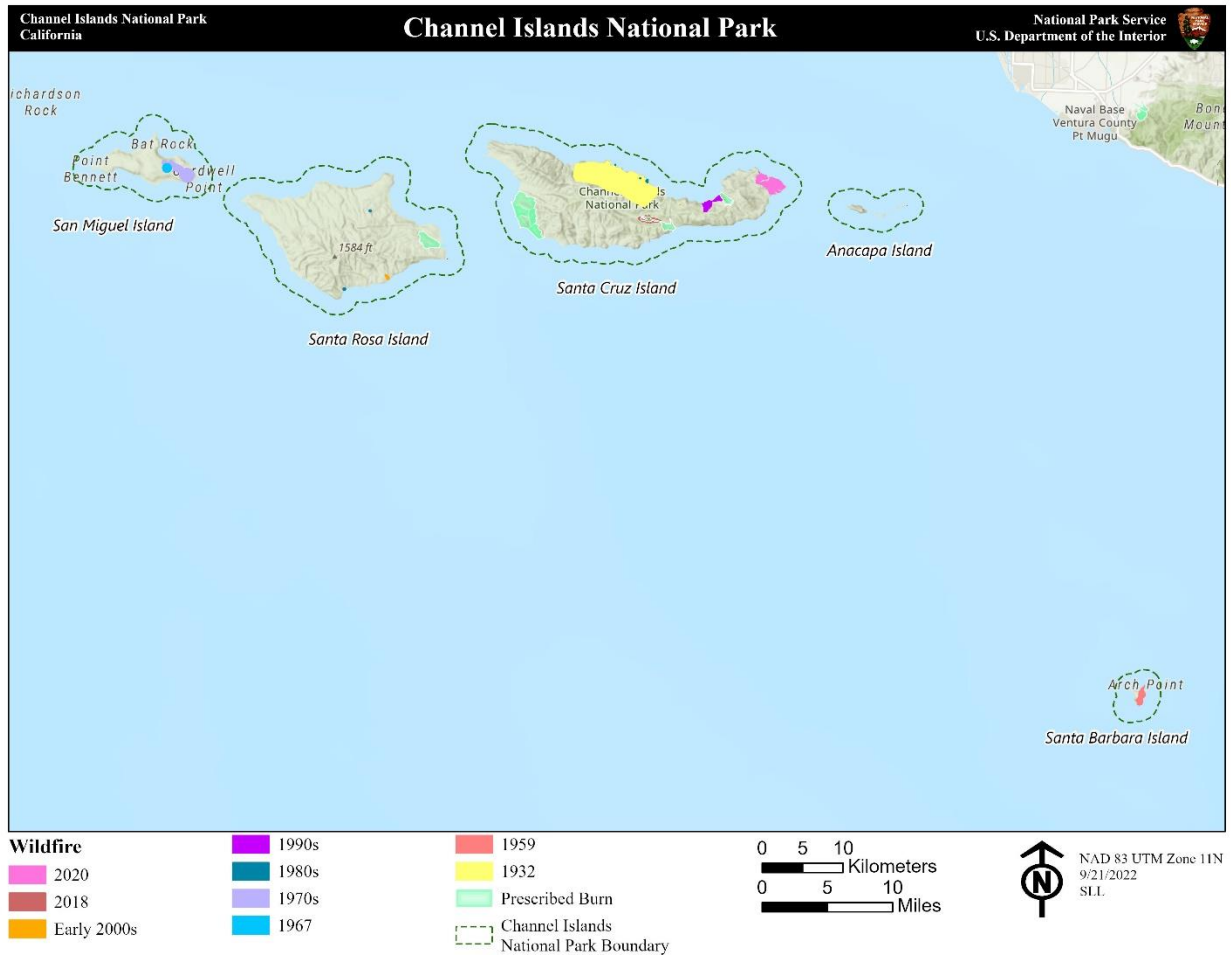


Figure 2. Fire History on Channel Island NP. Source: CAL FIRE 2022 Fire Perimeters GIS Data

Impact Analysis

Alternative A: No Action

The No Action Alternative would not allow vegetative debris pile burning, cutting of some eucalyptus groves, or proactive defensible space work to protect park infrastructure. Existing vegetation debris piles would provide concentrated hazardous fuel loads for future wildfires. The existing debris piles are located in about 7 areas on Santa Cruz Island and 1 area on Santa Rosa Island. The non-native eucalyptus groves on Santa Cruz Island could also provide a local concentrated hazard fuel load. These piles and groves could burn at higher intensities scorching and sterilizing the soil and possibly causing temporary loss of soil fertility leading to lack of vegetation regrowth. The concentrated fuels would locally increase the intensity and potential for wildfires to exceed initial attack efforts. The decreased ability to suppress wildfires in those local areas would increase the potential to adversely impact adjacent native vegetation communities that are still recovering from past grazing. The magnitude of impacts to native vegetation communities would be dependent upon the characteristics of the fire, such as size, location, fuel composition, closeness of native vegetation, and soil moisture. The No Action Alternative would not protect park resources nor reduce threats to park natural and cultural resources from wildfire.

Potential spread of invasive, non-native plants and seeds could occur from equipment used by fire crews on wildland fire suppression efforts (e.g., fireline construction equipment) and naturally distributed by wind or animals. Soil disturbance and bare areas from fireline construction could lead to increased opportunities for establishment and/or spread of invasive, non-native plant species. The scale of disturbance by firefighters would be expected to be much smaller compared to disturbance from a wildfire. Best management practices and mitigation measures would be implemented such as, cleaning gear and equipment before transport to the islands, firelines re-contoured and covered with cut vegetation debris, and vegetation monitoring after fires for non-native plants to minimize potential impacts.

Cumulative Impacts

Past grazing by livestock and non-native ungulates, ranching and agricultural land uses, road and infrastructure development, and military activities have contributed to adverse cumulative impacts to vegetation communities in Channel Islands NP. These past activities introduced and spread non-native plant species. Ranching converted native shrublands to grasslands dominated by non-native grasses. Agricultural crops as well as development of military facilities and roads also removed native vegetation communities on the islands. The removal of non-native grazing ungulates from Santa Rosa, San Miguel, Santa Barbara, and Anacapa islands and the elimination of feral pigs on Santa Cruz Island resulted in localized long-term moderate beneficial impacts to native vegetation communities. Past removal of some non-native eucalyptus trees on Santa Cruz Island helped to restore wetlands and increase native plant species and habitat diversity.

Impacts to vegetation communities from a wildfire are described above with the degree of impacts depending on the behavior of the wildfire. Wildfire suppression actions in combination with past, present, and future activities would have a negligible contribution to adverse cumulative impacts on vegetation communities with implementation of best management practices and mitigation measures, MIST procedures, and completing suppression repair actions.

Alternative B: Proposed Action

The impacts to native vegetation communities caused by wildfires and the attendant suppression response would be the same as described for Alternative A.

Impacts from prescribed burning of vegetation debris piles would depend on the environmental conditions present at the time of burning, such as soil and duff moisture, plant vigor, phenological state (e.g., dormant; flowering; releasing seed) at time of burning, and fire severity. Smaller branches from mechanical work (e.g., hazard fuel reduction, eucalyptus grove removal) could be chipped and hauled to island use sites, reducing the remaining vegetation needing burned. Typically, burn piles consisting of large wood, such as eucalyptus logs, would burn longer and produce more heat than piles of smaller diameter wood (Busse et al. 2013, Hubbert et al. 2015). The longer burning duration and higher heat levels generated by the fuels in the piles would be expected to have a greater detrimental effect to any vegetation, seeds, and roots remaining under the piles and in a small zone around each pile. The zone of damage around an individual burn pile would vary according to several factors related to how hot the pile burns, wind direction, and if the fire creeps around in the ground fuels adjacent to the pile. Overall, prescribed burning of debris piles would be expected to have a negligible impact on native vegetation because the pile burn would be contained, pile burn scars would be small in scale, best management practices and mitigation measures would be implemented, and the use of an air curtain burner on Santa Cruz Island in lieu of creating and burning additional vegetation piles would avoid creating as many burn piles. Ash generated from burning debris piles could be up to a foot in depth and alkaline in nature for large piles, which would prevent most native plants from immediately growing post fire. Following prescribed pile burning, soil and native plant remediation measures would be implemented on the disturbed ground and burn areas to promote native plant growth and reduce potential for weed invasion or expansion.

Defensible space work using hand tools and mechanical equipment around park infrastructure would remove small areas of selected vegetation (i.e., fuel reduction and 50-to-200-foot buffer for defensible space) not entire plant communities. Vegetation within and adjacent to the defensible space zone around buildings are or have been disturbed in the past by landscaping, infrastructure development, public visitation and use, and daily staff activities. Many of the structures have already been treated, so maintenance of those areas is expected to have little to no additional impacts to vegetation.

Some of the non-native eucalyptus groves on Santa Cruz Island have impaired riparian functions by drawing large amounts of groundwater, introducing chemicals in the soil that inhibit growth of native plants, and competition for resources with native plants. Eucalyptus trees typically form monotypic stands due to these factors that allows them to displace native vegetation communities over time. The removal of some non-native eucalyptus groves on Santa Cruz Island would be expected to help restore native plant communities (e.g., oak woodland, wetlands, riparian areas) by increasing water, nutrient, and light available to native plant species. Vegetation monitoring of eucalyptus grove removal areas at Prisoners Harbor has shown native plant communities, such as willows, oak woodland, and sticky baccharis, growing on the treatment areas (NPS 2018). Wheeled or tracked equipment used to remove eucalyptus groves could impact native vegetation if present in the understory. However, impacts would be expected to be temporary until revegetation occurs and would be limited to Santa Cruz Island where removal of non-native eucalyptus groves would occur. In addition to native vegetation community restoration, removal

of some eucalyptus groves on Santa Cruz Island would reduce potential fuel hazards by removing the dense litter layer underneath the groves. The dry, scaly bark and dead, dry, oily leaves do not easily decompose and create dense litter that has the potential to carry fire up into the canopy (NPS 2007). Live eucalyptus trees are relatively flammable due to the volatile oils in their wood and leaves.

Eucalyptus groves that are left as part of the historical landscape would require periodic maintenance. Groves visited by the public or Channel Islands NP staff would have dead and hazardous branches trimmed to prevent safety hazards from falling branches. The trimming and pruning could also increase light available to native plant species in the understory; the trimmed debris would be chipped or burned in the nearest maintenance pile.

Cumulative Impacts

The cumulative impacts to vegetation would be similar to those described under Alternative A for past actions and wildfire suppression actions. In the past, livestock grazing was a major problem on parts of all the islands. Santa Cruz, Santa Rosa, and San Miguel islands had severe impacts to native vegetation communities due to overgrazing by livestock and native vegetation removal from developing roads, agricultural fields, ranching structures, and military facilities. The removal of non-native grazing ungulates from Santa Rosa Island and the elimination of feral pigs on Santa Cruz Island provided localized long-term moderate beneficial impacts to native vegetation communities. Removal of some non-native eucalyptus trees on Santa Cruz Island would provide the opportunity to restore native plant species and diversity. The removal of eucalyptus trees on Santa Cruz Island also would contribute to beneficial cumulative impacts to native vegetation communities by removing competition for groundwater, nutrients, and light with non-native eucalyptus.

The incremental effects on native vegetation from prescribed pile burning used to reduce local hazardous fuel loads, mechanical treatments, and defensible space work are expected to have a negligible contribution to adverse cumulative impacts because impacts would be localized and site-specific, lasting until revegetation of groundcover occurs. A high intensity pile burn could result in localized vegetation removal as described above. Alternative B would contribute negligibly to adverse cumulative impacts on vegetation resources with the implementation of best management practices and mitigation measures and impacts would be local and site specific. Prescribed pile burning and mechanical treatments would contribute to beneficial cumulative impacts by reducing local hazard fuel loads and providing an opportunity for native vegetation recovery in treated areas.

Mitigation Measures

Biosecurity (NPS Management Policies 2006 and NPS 2015 Channel Islands NP GMP)

- BIO-1** Tree pruning and cutting equipment must be disinfected prior to transport per Channel Islands NP procedures to prevent the introduction of the polyphagous shot hole borer; all other equipment and personal gear must be clean and free of plant material, seeds, soil, insects, and other threats.
- BIO-2** The park's Biosecurity procedures on wildfires and fuels treatment projects would be coordinated/supervised by the Channel Islands NP Biosecurity Manager and/or park

- trained resource advisors (READ/REAFs), or other personnel trained to park standards.
- BIO-3** Eucalyptus pile burn areas, where burning has been completed, would have soil and native plant remediation measures implemented on the disturbed ground and burn areas, as coordinated by park resource staff.
- BIO-4** All water dropping aviation assets will adhere to interagency bucket and tank protocols. (PMS 444 Guide to Preventing Aquatic Invasive Species Transport by Wildland Fire Operations)
- BIO-5** The park would develop pre-departure processes/procedures to apply to initial attack, extended attack, and fuels treatment to prevent the spread of non-native invasive species, vegetation/seeds, diseases, fungi, and insects. All footwear, clothing, packs, tools, and equipment would be inspected and cleaned prior to being transported to the islands
- BIO-6** Larger firefighting equipment and vehicles are not expected to be utilized in island wildfires but could be contracted for fuels treatments. If needed, they must be thoroughly cleaned (pressure washed) and inspected per park protocols before going to docks for island transport. They must be free of soil, mud, dirt, seeds, leaves, other plant material, insects, spider webs, and other potentially harmful biological materials.
- BIO-7** Corrugated cardboard boxes carrying firefighting or fuels treatment supplies can only be transported to the islands if the boxes are solid cardboard, are new corrugated cardboard that has not been in the field or have factory sealed corrugations. Regional or national fire cache items are usually disinfected and packed in new boxes. “Action Packers” or other tightly sealed containers are an acceptable alternative.

Wildlife

Affected Environment

Native Terrestrial Species

As a result of isolation from the mainland, the Channel Islands support fewer native animal species than similar habitats on mainland California. A total of 68 native terrestrial vertebrate species have been recorded in the park, including 3 amphibian, 6 reptile, 2 rodent, 2 carnivore, 11 bat, and 46 breeding landbird species (NPS 2019). Table 2 shows how many native terrestrial species are known to occur on each island. Over time some vertebrate species have evolved into distinct subspecies on the islands. For example, the deer mouse is recognized as distinct subspecies on their respective islands. A total of 23 endemic terrestrial animals have been identified in the Channel Islands, including 11 landbirds, that are subspecies or races. More detailed information on each island’s wildlife species is available in the 2019 [CHIS Natural Resource Condition Assessment](#).

Table 2. Native Terrestrial Wildlife Species of Channel Islands NP.

Category	SBI	AI	SCI	SRI	SMI
Amphibians	—	1	3	2	1
Reptiles	1	2	6	3	2
Mammals	2	1	15	3	2
Landbirds	11	18	43	34	18
Total	14	22	67	42	23

SBI = Santa Barbara Island; AI = Anacapa Island; SCI = Santa Cruz Island; SRI = Santa Rosa Island; SMI = San Miguel Island.

The Channel Islands, especially Santa Rosa Island, are important wintering areas and stopover areas during migration, with 30 species recorded (NPS 2019). In addition, nine raptor species live in the park and are seen on Santa Cruz and Santa Rosa islands. Hawks and owls have also been observed frequently on Anacapa, San Miguel, and Santa Barbara islands.

Radio collared island spotted skunk (*Spilogale gracilis amphiala*), an endemic subspecies to Santa Cruz and Santa Rosa islands, have been observed using existing debris piles at Scorpion Ranch Campground area (Annie Little, Channel Islands NP biologist, personal communication 2022). There is also an active Townsend’s western big-eared bat (*Corynorhinus townsendii townsendii*) maternity colony in an abandoned historic building near the Scorpion Ranch Campground debris pile area (Annie Little, Channel Islands NP biologist, personal communication 2022) that could be impacted by smoke from debris burning.

In general, terrestrial wildlife populations are relatively robust and have increased with the removal of non-native herbivores, ranching activities, and non-native predators (i.e., rats). There is high potential for additional recovery to pre-ranching era conditions as native vegetation communities continue to recover (NPS 2019). Landbird abundance has increased overall on the islands, evidenced by breeding pairs of new species, bushtit (*Psaltriparus minimus*) and acorn woodpeckers (*Melanerpes formicivorus*), on Santa Rosa Island (NPS 2019). In addition, both native deer mice and harvest mice have increased their distributions (NPS 2019). Habitat generalists like the Island spotted skunk have remained stable which is likely because their population dynamics are not strongly tied to the habitat conditions. Island spotted skunk population numbers fluctuate inversely with the increase of Island fox populations, which is shown with the density of skunks on Santa Rosa Island decreasing as foxes increased (Coonan et al. 2015). Bats make up about 78% of the native mammals on the Channel Islands and 5 species of bats have confirmed breeding on Santa Cruz Island and one species on Santa Rosa Island (Brown and Rainey 2018).

Seabirds

Channel Islands NP is recognized as a significant breeding and resting area, with at least 15 species breeding on the islands. The Channel Islands constitute a major seabird breeding area in the eastern north Pacific, the largest such area in the United States south of the Farallon Islands (NPS 2019). The most abundant breeding species on the Channel Islands is the western gulls (*Larus occidentalis*), followed by brown pelican (*Pelecanus occidentalis*), Brandt’s cormorant (*Phalacrocrax penicillatus*), Scripps’s murrelets (*Synthliboramphus scrippsi*), and Cassin’s auklet (*Ptychoramphus aleuticus*) (NPS 2019). The Channel Islands represent the most important seabird colonies in southern California (NPS 2019).

Although the number of seabird nests documented at Channel Islands NP varies annually, the general trend is seabird populations are increasing with the removal of ranching and non-native herbivores and banning of DDT. Abundant breeding seabird species, such as western gulls have more than 15,000 nesting pairs followed by Brand’s cormorant with about 4,200 pairs, Scripps’s murrelet with 850 to 2,450 pairs, and Cassin’s auklet about 12,600 pairs (NPS 2019). Brown pelicans only breed on West Anacapa and Santa Barbara islands (NPS 2019). The breeding colonies on Santa Barbara and West Anacapa islands almost disappeared due to DDT related eggshell thinning in the 70s. However, the park’s breeding populations have increased since 1980 and are fairly stable, with about 3,600 and 770 nests per year on West Anacapa and Santa Barbara islands, respectively (NPS 2019).

Seals and Sea Lions

Channel Islands NP supports a large and varied population of seals and sea lions. Four species breed on the Channel Islands and a fifth, the Guadalupe fur seal (*Arctostephalus townsendii*), hauls out but does not regularly breed in the park (NPS 2019). The California sea lion (*Zalophus californianus*) is the most common species that has established breeding colonies or haul-outs on all five islands (NPS 2019).

Sea lion numbers have generally increased throughout the Channel Islands since the 1970s (Lowry and Maravilla-Chavez 2003, Lowery et al. 2021), though the population experienced low reproductive success throughout the Channel Islands in 2013 to 2015 (Lowry et al. 2021). Elephant seal numbers in the park increased steadily from the 1960s through 2010. Numbers of elephant seals hauling out on San Miguel Island leveled off starting in the 1990s, when numbers began to increase rapidly on Santa Rosa Island (Lowry et al. 2014). Harbor seals (*Phoca vitulina*) are also common and breed on all of the islands. Harbor seal numbers on the Channel Islands have fluctuated between 2,000–4,000 over the past 25 years, about 70% of which use Santa Cruz, Santa Rosa, and San Miguel islands (Lowry et al. 2008). Northern fur seal colony on San Miguel Island has increased since 1968 except for El Niño years where numbers declined (NMFS 2015). Northern fur seals number around 13,400 on San Miguel Island (NMFS 2015). Climate change could add more stress to seals and sea lions through higher water temperatures and increasing sea level rise during storms and high tides, which could cause inundation of low-lying coastal habitat used by marine mammals and seabirds (Gonzales 2020). Only about two-thirds of San Miguel Island and Sandy Point and Skunk Point sections on Santa Rosa Island are highly vulnerable to the predicted increased sea level rise and high waves along exposed sandy stretches (Gonzales 2020).

Impact Analysis

Alternative A: No Action

The No Action Alternative would not allow vegetative debris pile burning, cutting of some eucalyptus groves, or proactive defensible space work to protect park infrastructure. The threat to wildlife species and their habitats from wildfire would not be reduced because hazard fuel concentrations would remain. Existing vegetation debris piles would provide concentrated hazardous fuel loads for future wildfires; debris piles are located in about 7 areas on Santa Cruz Island and 1 area on Santa Rosa Island. The non-native eucalyptus groves on Santa Cruz Island also provide a local concentrated hazard fuel load. These areas could burn at higher intensities potentially removing adjacent tracts of native vegetation and wildlife habitat. The concentrated

fuels would locally increase the intensity and potential for wildfires to exceed initial attack efforts. The decreased ability to suppress wildfires in these local areas would increase the potential to adversely impact wildlife or their habitat. The degree of impacts to wildlife species and their habitat would depend on fire behavior characteristics such as, time of year, weather behavior, fire size, location, fuel composition, and soil moisture. Indirect effects to wildlife habitat due to increased potential for locally severe wildfires could include physical alteration of vegetation structure, composition, and function, resulting in degradation of wildlife habitat quality.

Wildland fire suppression tactics would temporarily increase disturbance to individual animals within and near the burn area due to noise from firefighter and equipment presence, smoke, fire itself, and vegetation removal. Temporary displacement and loss of habitat may occur for individuals within the burn area until regrowth of vegetation occurs. Disturbances to wildlife within a wildfire area could also result from helicopters transporting fire personnel, low-level aircraft with water and retardant drops used for fire suppression actions. The duration of this disturbance would be temporary lasting until wildfire suppression activities are completed. In addition, reproduction and survival for individuals could be impacted from increased stress and loss of foraging opportunities and destruction of nest and den sites from removal of vegetation after a high intensity wildfire. Mortality to small and less mobile wildlife species, such as lizards, snakes, and small mammals, may also occur from wildfires, while larger wildlife species may not always be able to move out of the fire path in time.

Cumulative Impacts

Past grazing, introduction of non-native animals, and conversion of native vegetation for agricultural crops, ranch and military structures, and roads, establishment of non-native species such as eucalyptus trees have all altered native wildlife habitat. Native wildlife habitat was destroyed or altered from overgrazing, spread of non-native plants such as eucalyptus and fennel, and conversion of native woodlands and shrublands to non-native grasslands for grazing and agriculture crops. Present and future actions that could impact native wildlife include recreational activities and maintenance of facilities. Public visitation and use of Channel Islands NP has increased over the years, providing day use and overnight activities (e.g., fishing, wildlife viewing, historic building viewing, water sports, and backpacking). Wildlife would be expected to be temporarily displaced from human presence in areas.

Impacts to wildlife species from wildfires are as described above with the degree of impacts depending on fire behavior characteristics such as, time of year, weather behavior, fire size, location, fuel composition, and soil moisture. Incremental impacts associated with the No Action Alternative as described above and combined with past, present, and foreseeable future actions would contribute negligibly to adverse cumulative impacts to native wildlife species and their habitats.

Alternative B: Proposed Action

The impacts caused by wildfires to wildlife and their habitats under Alternative B would be the same as described for Alternative A.

In general, prescribed pile burning, mechanical treatments, and defensible space work would temporarily displace individual wildlife species within and near the treatment areas due to human

and equipment presence and noise. Displacement would be expected to last until the treatments were completed as treatments are site-specific and small in size and surrounding native vegetation would provide suitable habitat. Fuel and fire treatments would occur outside critical use periods for wildlife species (e.g., avian nesting periods). Prescribed pile burning could directly impact reptiles that are using them. Piles would be lit on one side to allow reptiles within the pile time to escape.

Temporary impacts to freshwater streams on Santa Cruz Island could occur from prescribed pile burns as a result of removing adjacent protective surface vegetation, litter, and organic matter and leaving bare disturbed areas after the piles burn. The removal of protective surface vegetation and litter, and organic matter in the soil increases the potential for both wind and water erosion and sedimentation loading to adjacent waterbodies. Prescribed pile burning could also generate ash up to a foot in depth, which could increase sediment loads to adjacent water bodies if not removed. Increased sedimentation rates would be expected to last until remediation measures occur or vegetation regrows, which helps hold soils in position and would aid in the interception and infiltration of water during precipitation events. The intensity and duration of impacts to riparian habitats and aquatic species from the temporary influx of nutrients to waterbodies would depend on debris pile location, the fire intensity, amount and frequency of precipitation events following pile burning, the rate of vegetation regrowth, and the ability of the remaining or new vegetation to act as a sediment filter to adjacent waterbodies. Removal of ash piles near streams would decrease the flow of undesirable ash and nutrients to the stream courses. Overall, prescribed burning of debris piles are small areas compared to the scale of the island watersheds, and would be expected to have a negligible impact on water quality, thus riparian habitats and aquatic species, because not all pile burns would be burned at once with about 30 to 60 piles burned annually. Best management practices would be implemented, and the use of an air curtain burner on Santa Cruz Island would reduce the number of vegetation debris piles burned in groves within or adjacent to riparian areas. This would reduce the number of bare soil areas that could increase sediment transported to adjacent waterbodies.

Existing eucalyptus groves on Santa Cruz Island could continue to suppress the growth of native vegetation by shading out the soil surface, heavy litter accumulation, introducing growth inhibiting chemicals into the soils, and competition for water and nutrients (NPS 2010, Casey 2016). Eucalyptus trees typically form monotypic stands due to these factors that allow them to displace native vegetation communities over time, reducing habitat quality for native wildlife species, such as Island Scrub-Jay (*Aphelocoma insularis*) and black-bellied salamander (*Batrachoseps nigriventris*). Eucalyptus has displaced native vegetation on Santa Cruz Island, such as oak chaparral that support Island Scrub-Jays, endemic to the island, as well as oak-woodland riparian habitats and wetlands. The removal of some eucalyptus groves on Santa Cruz Island would promote the restoration of native plant communities, especially riparian habitat that is relatively rare and important to native wildlife species on the island. Fewer eucalyptus trees allow restoration and improvement of native wildlife habitat by increasing stream flows, forage, and cover availability.

Island Spotted Skunk

Prescribed pile burning could impact endemic island spotted skunks that are using the existing piles. The island spotted skunks have multiple den sites and appear to be using several piles as den sites. Mitigation measures would be implemented to minimize impacts to skunks such as

conducting presence surveys prior to pile burning, burning only at night when skunks leave their dens, burning outside breeding and pupping season, and using burn pile ignition techniques that do not trap skunks. Permanent impacts to island spotted skunk populations and habitat from prescribed pile burning would not be expected because the surrounding vegetation would provide forage and escape cover for skunks that are using the existing debris piles.

Small Mammals

Deer mice have likely burrowed tunnels in the soil underneath existing debris piles. Small mammals like the deer mouse retreat to adjacent underground burrows in unburned areas to escape the heat of the localized prescribed pile burn. Some tunnels could be deep enough to escape the heat of the fire if in use at the time of the prescribed burn. Direct mortality could occur to small mammals that do not leave the existing burn pile burn area as heat builds after ignition. Impacts to small mammal habitat from prescribed pile burning would not be expected, because the piles are relatively small, the surrounding area would have additional tunnelling areas, and vegetation would remain to provide forage and escape cover for small mammals that could be using the existing debris piles.

Townsend's western big-eared bat

The Townsend's western big-eared bat colony located near existing debris piles located in the lower Scorpion eucalyptus grove could be impacted by smoke inhalation or noise from human presence and mechanical equipment. However, remaining fuel and fire treatments would be located as far away from the lower Scorpion eucalyptus grove area as possible, and fuel activities would be conducted outside the bat breeding and pupping season to avoid impacts to the maternity colony (see mitigation measure WILD-6 below). The colony is located in a historic structure which would not be impacted from the proposed pile burning or mechanical treatments. The historic structure could have maintenance for the existing defensible space buffer zone, improving protection from a future wildland fire. Defensible space work would follow the same best management practices and mitigation measures mentioned above to minimize impact on the bats.

Cumulative Impacts

Cumulative impacts to wildlife and their habitat would be similar to those described under Alternative A for past actions and wildfire suppression actions. Almost all native habitats on the islands have been altered to some degree by human land use practices, a situation that in turn affected native wildlife that evolved in the absence of these impacts. Beginning in the 19th century, humans introduced a variety of non-native animal species to the islands including rabbits, cats, burros, horses, goats, pigs, sheep, and cattle. These species dominated the islands' fauna and had a major impact on the natural vegetative communities. The non-native species caused the disappearance of several native species, as well as the reduction in numbers of other native animals. The removal of non-native grazing ungulates from Santa Rosa Island and the elimination of feral pigs on Santa Cruz Island provided localized long-term moderate beneficial impacts to native vegetation communities, thus wildlife habitat. Removal of some non-native eucalyptus trees on Santa Cruz Island provided the opportunity to restore wetlands and other native wildlife habitat areas. The removal of eucalyptus trees on Santa Cruz Island also contributed to beneficial cumulative impacts to native wildlife and their habitat by restoring stream flows and native plant species by opening the areas to sunlight and litter accumulation removal.

The incremental effects on native wildlife from prescribed pile burning, mechanical treatments, and defensible space work are expected to have a negligible contribution to adverse cumulative impacts because impacts would be localized and site-specific, displacement lasting until treatments were completed. Alternative B would contribute negligibly to adverse cumulative impacts on wildlife and their habitat with the implementation of best management practices and mitigation measures and impacts would be local and site specific. Prescribed pile burning and mechanical treatments would contribute to beneficial cumulative impacts by improving wildlife habitat by helping to restore native plant communities in treated areas.

Mitigation Measures

- WILD-1** Fuels project work, such as mastication, mowing, brush cutting, equipment use, pile burning, and other fuels treatment activities may be curtailed at times to minimize disturbances during wildlife breeding, pupping, nesting, or other sensitive periods. Noise restrictions may be implemented. (NPS Management Policies 2006 and NPS 2015 Channel Islands NP GMP)
- WILD-2** Mechanical treatments and burning of burn piles would avoid bird breeding, nesting, and fledging season, typically February 1 to August 31, depending on location and species involved, as identified by park resource management survey and monitoring actions. (Migratory Bird Treaty Act)
- WILD-3** Air operations should be avoided within 1,000 feet of observed marine mammals or sea turtles. The best practice is to fill buckets in deeper water areas relatively devoid of marine life and hazards but avoid filling in state Marine Reserves and Marine Conservation Areas. (NOAA Fisheries Regulations)
- WILD-4** Fire and fuels personnel would be reminded that feeding foxes, ravens, skunks, and other wildlife is not allowed at any time. (Title 36, Code of Federal Regulations)
- WILD-5** All NPS staff and contractors working on pile burns must abide by the following for Island spotted skunks (NPS Management Policies 2006 and NPS 2015 Channel Islands NP GMP):
- Piles would be surveyed before burning to determine presence of spotted skunks.
 - Existing burn piles would not be added to with mechanical equipment during the spotted skunk pupping season, but new piles could be created.
 - Avoid burning piles during the breeding and pupping season (March–May). Young are typically born in April and May.
 - Piles would be burned at night when skunks leave dens to forage.
 - Initial firing patterns on pile burns would be utilized that allow escape routes for skunks utilizing the piles (i.e., no ring firing).
- WILD-6** All NPS staff and contractors working on fuel and fire treatment projects near lower Scorpion eucalyptus grove must abide by the following for Townsend’s big-eared bat (NPS Management Policies 2006 and NPS 2015 Channel Islands NP GMP):
- Avoid noise/mechanical equipment use (and burning/smoke) in the lower Scorpion eucalyptus grove area from March 1 to October 1 due to the bat’s extended breeding season.

- Fire staff would prioritize defensible space work in the vicinity of the building that houses the bat colony to provide point protection from wildfires. Any work also needs to avoid the March 1 to November 1 bird breeding/nesting seasons.

WILD-7 For all fuel management activities, park and fire staff would select tools, procedures, and equipment that avoid or minimize impacts to natural resources, as well as the general undeveloped character of the park. (2006 Channel Islands NP FMP, DO-18, and RM-18)

Special Status Species

Affected Environment

Special status species are species that are considered sufficiently rare and require special consideration and/or protection and have been listed as a candidate, threatened, or endangered species by the Federal or State governments. Under the Endangered Species Act (ESA), the NPS has the responsibility to address impacts to federally listed threatened or endangered species. A list of threatened and endangered species for the proposed action was acquired from the USFWS Information for Planning and Consultation tool (IPaC) on June 24, 2022 (Project Code: 2022-0057751). The USFWS identified one federally threatened animal, fifteen listed plant species, and one candidate insect species that could occur within the Channel Islands (Table 3). Fifteen of the seventeen species identified in **Error! Reference source not found.** are unlikely to be impacted by the proposed action and will not be carried forward for analysis in this EA. In addition, the island fox, endemic to three of the islands, was delisted from the ESA in 2016, but is still listed as a state threatened species and will be carried forward for analysis in this EA. Both the monarch butterfly and island fox will be carried forward for further analysis.

There is designated critical habitat for the western snowy plover (*Charadrius alexandrinus nivosus*) on approximately 586 acres along the beaches on Santa Rosa Island. However, the proposed fuel treatments would not occur within designated critical habitat areas and the closest pile burn is approximately 3 miles from Skunk Point.

Table 3. Special Status Species that Could Occur on Channel Islands NP.

Species	Federal Status*	State Status	Endemic
Mammals			
Island Fox (<i>Urocyon littoralis</i>)	—	T	Channel Islands
Birds			
Short-tailed Albatross (<i>Phoebastria (=Diomedea) albatrus</i>)	E	—	—
Insects			
Monarch Butterfly (<i>Danaus plexippus</i>)	C	—	—
Plants			
Hoffmann's Rock-cress	E	—	Channel Islands

Species	Federal Status*	State Status	Endemic
<i>(Boechnera hoffmannii)</i>			
Hoffmann's Slender-flowered Gilia <i>(Gilia tenuiflora ssp. hoffmannii)</i>	E	—	Channel Islands
Island Barberry <i>(Berberis pinnata ssp. insularis)</i>	E	E	Channel Islands
Island Bedstraw <i>(Galium buxifolium)</i>	E	—	Channel Islands
Island Malacothrix <i>(Malacothrix squalida)</i>	E	—	Channel Islands
Island Phacelia <i>(Phacelia insularis var. insularis)</i>	E	—	Channel Islands
Island Rush-rose <i>(Helianthemum greenei)</i>	T	—	Channel Islands
Santa Cruz Island Bush-mallow <i>(Malacothamnus fasciculatus var. nesioticus)</i>	E	E	Santa Cruz
Santa Cruz Island Dudleya <i>(Dudleya nesiotica)</i>	T	—	Santa Cruz
Santa Cruz Island Fringepod <i>(Thysanocarpus conchuliferus)</i>	E	—	Santa Cruz
Santa Cruz Island Malacothrix <i>(Malacothrix indecora)</i>	E	—	Channel Islands
Santa Cruz Island Rockcress <i>(Sibara filifolia)</i>	E	—	Channel Islands
Santa Rosa Island Manzanita <i>(Arctostaphylos confertiflora)</i>	E	—	Santa Rosa
Soft-leaved Paintbrush <i>(Castilleja mollis)</i>	E	—	Santa Rosa

*C = candidate, E = endangered, and T = threatened

Island Fox

Three subspecies of the island fox live in Channel Islands NP—Santa Cruz Island fox (*U. l. sanatacruzae*), Santa Rosa Island fox (*U. l. sanatarosae*), and San Miguel Island fox (*U. l. littoralis*). In 2004, the USFWS listed the Island fox as endangered due to population declines in the mid- to late-1990s from high levels of predations by golden eagles that moved to the islands when bald eagle populations declined due to eggshell thinning associated with DDT. Fox populations on San Miguel Island declined from an estimated 450 adults in 1994 to 15 in 1999 (Coonan et al. 2015). Island foxes on Santa Rosa Island declined from more than 1,500 adults in 1994 to 15 animals by 2000 (Coonan and Rutz 2001). The Santa Cruz Island population declined from as many as 2,000 adults in 1994 to 50 to 60 adults in 2000 (Coonan et al. 2010). The removal of non-native ungulates, pigs and mule deer, and golden eagles from the islands increased native vegetation, and in combination with the recovery of bald eagles on the islands and captive breeding success led to increase the island fox populations on the three islands. Island foxes have recovered from the decline in the mid-1990s, and in 2015 numbered above 600 individuals on San Miguel Island, a population level greater than before the decline, and over 200 individuals on Santa Rosa Island (Coonan et al. 2015). The Santa Cruz island-wide population of adult foxes increased from 497 in 2008 to 1,437 in 2017 (CADFW 2016). In 2016,

the USFWS removed the Island fox from the Federal List of Endangered and Threatened Wildlife.

The island fox, a state threatened species, is a generalist and occurs in every habitat type on the three islands (NPS 2019). Island foxes are unlikely to be using existing debris piles as den sites on Santa Cruz Island because they typically have young in more open, brushy areas, such as chaparral, coastal scrub, or oak woodlands (Annie Little, Channel Islands NP biologist, personal communication 2022). The island foxes are likely using the existing debris piles as foraging areas for small rodents and insects.

Monarch Butterfly

A subpopulation of monarch butterflies migrates to coastal California to overwinter along a 620-mile stretch extending from Mendocino County to Baja California, Mexico (Xerces Society 2016). Overwintering habitat along the coast has been lost to development and the senescence of groves. Annual Western Monarch Thanksgiving Counts show overwintering monarch populations have declined from over 1.2 million in 1997 to 292,674 in 2015 (Xerces Society 2016). However, overwintering western monarch populations are recently increasing with over 247,000 butterflies recorded in the 2021 counts an increase by 2,000 butterflies over 2020 (Kimbrough 2022, Xerces Society 2022).

Monarch butterflies are known to overwinter in California along the coast near the Pacific Ocean or San Francisco Bay (Xerces Society 2016). One of the most common roost trees for overwintering sites is the non-native blue gum eucalyptus (Xerces Society 2016), which are present on Santa Cruz and Santa Rosa islands. Monarch butterflies overwinter in California from October through February in a roost tree that is surrounded by a larger grove and provides wind protection and a microclimate of stable temperature, sunlight, and humidity (Xerces Society 2016). Monarch butterflies have been shown to use multiple trees during the winter season, with monarchs switching from eucalyptus trees to native conifer trees in the middle or end of winter (Griffiths 2014, Xerces Society 2016). Eucalyptus trees on Santa Cruz Island have not been observed to provide roost trees, but they could potentially provide suitable overwintering sites for monarch butterflies. Scattered monarchs have been observed resting on eucalyptus trees and native vegetation (Annie Little, Channel Islands NP biologist, personal communication 2022).

Impact Analysis

Alternative A: No Action

The No Action Alternative would not allow vegetative debris pile burning, cutting of some eucalyptus groves, or proactive defensible space work to protect park infrastructure. The threat to special status species and their habitats from wildfire would not be reduced because hazard fuel concentrations would remain. Existing vegetation debris piles would provide concentrated hazardous fuel loads for future wildfires. These local areas could burn at higher intensities during a wildfire and remove adjacent tracts of native vegetation, causing habitat loss and temporary displacement of Island foxes and monarch butterflies. The concentrated fuels would locally increase the intensity and potential for wildfires to exceed initial attack efforts. The degree of impacts to special status species and their habitat would depend on fire behavior characteristics such as, time of year, weather behavior, fire size, location, fuel composition, and soil moisture. Both island foxes and monarch butterflies are mobile species that would be expected to evacuate

a wildfire area upon experiencing smoke and/or heat from the fire. Monarch butterflies could have trouble flying in strong winds. Indirect effects to wildlife habitat due to increased potential for locally severe wildfires could include physical alteration of vegetation structure, composition, and function, resulting in degradation of habitat quality for special status species. For example, an intense, large wildfire could remove vegetation cover that provides escape cover for foxes, or eucalyptus trees suitable as resting spots or overwintering roost trees could be lost.

Impacts to the Island fox and monarch butterfly from wildfire suppression activities would be the same as described for wildlife species in the Wildlife Section. Island foxes and monarch butterflies within wildfire areas could be temporarily displaced due to wildland fire suppression tactics from firefighter and equipment presence, smoke, fire itself, and vegetation removal. Firefighters would be briefed on proper food storage and trash security to prevent Island foxes from eating food that is not a part of their natural diet.

Cumulative Impacts

Past grazing, introduction of non-native animals, and conversion of native vegetation for agricultural crops, ranch and military structures, and roads, establishment of non-native species such as eucalyptus trees have all altered habitat for special status species. Native vegetation communities used by island foxes was destroyed or altered from overgrazing, spread of non-native plants such as eucalyptus and fennel, and conversion of native woodlands and shrublands to non-native grasslands for grazing and agriculture crops. The removal of non-native wildlife species (i.e., ungulates, golden eagles) in combination with captive breeding success and increased native vegetation following removal of grazing, all led to increase the island fox populations on the three islands. Present and future actions that could impact special status species include recreational activities and maintenance of facilities. Public visitation and use of Channel Islands NP has increased over the years with day use and overnight activities (e.g., fishing, wildlife viewing, historic building viewing, water sports, and backpacking). Island foxes could be temporarily displaced from human presence in these areas, although they are curious and seem attracted to human use areas. Recreational use of overwintering sites could occasionally disturb monarch butterflies; monarchs have been observed resting on trees in the Scorpion Campground.

Impacts to wildlife species from wildfires would be as described above with the degree of impacts depending on fire behavior characteristics such as, time of year, weather behavior, fire size, location, fuel composition, and soil moisture. The number of firefighters assigned to a wildfire and their lodging/camping situation could also impact wildlife species adjacent to a camp location. Incremental impacts associated with the No Action Alternative as described above and combined with past, present, and foreseeable future actions would contribute negligibly to adverse cumulative impacts to special status species and their habitats as long as best management practices and mitigation measures are followed.

Section 7 Determination of Effect. Based on the analysis under Alternative A, wildfire suppression actions may affect but is not likely to adversely affect the Monarch butterfly. Concurrence in this determination will be sought from the U.S. Fish and Wildlife Service under Section 7 of the Endangered Species Act.

Alternative B: Proposed Action

Impacts to Island foxes and monarch butterflies from wildfire suppression action would be the same as described for Alternative A. Impacts to Island fox, state threatened species, and monarch butterfly, federal candidate species, from proposed fuel and fire treatments are expected to be negligible.

Island Fox

Prescribed pile burning could impact endemic island foxes by changing their foraging patterns to unburned areas from existing piles as they are burned. Mitigation measures would be implemented to minimize impacts to island foxes such as burning outside breeding and kit season and conducting presence surveys prior to pile burning. Permanent impacts to island fox populations and habitat from prescribed pile burning would not be expected because the surrounding vegetation would provide forage and suitable habitat for foxes that were foraging in existing debris piles. Island foxes would be expected to leave treatment areas when prescribed pile burning is initiated and move to adjacent vegetation that would provide adequate escape cover.

Mechanical treatments and defensible space work could displace foxes within and near the treatment areas due to additional human presence and noise. Island foxes would be expected to leave treatment areas when mechanical equipment use is initiated and move to adjacent vegetation that would provide adequate escape cover. Displacement would be expected to last until the treatments were completed as treatments are site-specific and small in size. Removal of some eucalyptus groves on Santa Cruz Island would be expected to improve habitat for prey species such as mice, by promoting restoration of native vegetation species that provide foraging habitat (e.g., seed producing plants). Removal of eucalyptus groves within and adjacent to riparian areas and wetlands would also be expected to increase water available for island foxes and other wildlife species.

Monarch Butterfly

There are no known wintering colonies on the Channel Islands NP but there could be scattered individuals during winter migration using eucalyptus groves as a resting place for stopovers (Annie Little, Channel Islands NP biologist, personal communication 2022). Removal of some eucalyptus groves on Santa Cruz Island would not be expected to impact overwintering populations of monarch butterflies because remaining eucalyptus groves and native vegetation areas would be left uncut and would provide alternative suitable habitat. In addition, eucalyptus trees and groves to be cut in the winter and prescribed pile burning in the winter adjacent to groves would be surveyed by park staff or firefighters trained to identify Monarchs. If butterflies are present, they would be “shooed” away from the cutting or pile burning area before work began and would be expected to find resting places on other suitable trees in the area. There would be no impacts to the Monarch butterfly overwintering populations from prescribed pile burning or mechanical treatments on Santa Cruz Island with eucalyptus groves and native vegetation remaining that could provide suitable resting stopover and future overwintering habitat.

Cumulative Impacts

Cumulative impacts to special status species would be similar to those described under Alternative A for past actions and wildfire suppression actions. Almost all native vegetation

communities on the islands have been altered to some degree by human land use practices, affecting special status species that evolved in the absence of these impacts. Beginning in the 19th century, humans introduced a variety of non-native animal species to the islands including rabbits, cats, burros, horses, goats, pigs, sheep, and cattle. These species dominated the islands' fauna and had a major impact on the natural vegetative communities. The elimination of non-native feral pigs and re-introduction of bald eagles on Santa Cruz Island provided localized long-term moderate beneficial impacts to island foxes by removing the year-round prey species that attracted golden eagles to the islands and replacing golden eagles with bald eagles. Removing grazing was moderately beneficial to Island foxes by restoring native habitats. Removal of some non-native eucalyptus trees on Santa Cruz Island provided the opportunity to restore wetlands, native habitats including habitat for prey species of the fox and made more water available for special status species.

The incremental effects on island foxes and monarch butterflies from prescribed pile burning, mechanical treatments, and defensible space work are expected to have a negligible contribution to adverse cumulative impacts because impacts would be localized and site-specific, displacement lasting until treatments were completed. Alternative B would contribute negligibly to adverse cumulative impacts on special status species with the implementation of best management practices and mitigation measures and impacts would be temporary, local and site specific. Prescribed pile burning and mechanical treatments would contribute to beneficial cumulative impacts by helping to restore native plant communities in treated areas, thus improving special status species habitat.

Mitigation Measures

SS-1 All NPS staff and contractors working on pile burns must abide by the following for island foxes:

- Piles would be surveyed before burning to determine presence of island foxes; den use has not been observed in piles, but they may forage in pile areas.
- Avoid mechanical equipment use and burning of piles during breeding and kit season (February 1–July 1) in occupied or potential habitat.
- Initial firing patterns on pile burns would be utilized that allow escape routes in case any foxes are utilizing the piles (i.e., no ring firing).

SS-2 All NPS staff and contractors working on fuel and fire treatment projects must abide by the following for Monarch butterfly:

- Monarch butterflies may rest and forage among eucalyptus trees during the winter season. If cutting of trees is to occur in the winter, trees to be cut or moved should be surveyed by park staff or firefighters trained to identify Monarchs. If butterflies are present, they should be “shooed” away from the cutting or pile burning area before work begins.
- If a Monarch roost tree is discovered in a treatment area, it would be protected from cutting and treatment activities during overwintering season (October to February). A NPS biologist would monitor the tree and determine if it should be conserved for future use in consultation with a monarch specialist.

Section 7 Determination of Effect. Alternative B may affect but is not likely to adversely affect the Monarch butterfly because suitable habitat could be improved through the proposed actions, and mitigation measures would be implemented to avoid adverse impacts resulting from fuel and prescribed pile burn treatments. Concurrence in this determination will be sought from the U.S. Fish and Wildlife Service under Section 7 of the Endangered Species Act.

Cultural Resources

Archeological Sites and Historic Structures

Affected Environment

Archeological resources are of national significance and are a fundamental resource that is specified in the park’s enabling legislation. As such, all five of the islands are designated National Register archeological districts—Santa Barbara, Anacapa, San Miguel, Santa Cruz, and Santa Rosa Island. In addition to the archeological districts, both Santa Cruz and Santa Rosa Islands have been determined eligible as island-wide historic districts in consultation with the California Office of Historic Preservation. A National Register district is defined as a geographically definable area, urban or rural, possessing a significant concentration, linkage, or continuity of sites, buildings, structures, or objects united by past events or aesthetically by plan or physical development that is eligible for listing in the National Register of Historic Places (Little et al. 2000 and <https://www.nps.gov/nationalregister/index.htm>).

Channel Islands NP has more than 2,800 archeological sites recorded on the five islands, consisting of both prehistoric and historic sites (NPS 2021). The cultural resources contained in Channel Islands NP extend from about 13,000 B.P. to the recent past. Early sites date to the Pleistocene and represent some of the earliest documented inhabitants of North America. From then, the islands have likely had relatively continuous occupation up to the present, each period connected with numerous archeological and historic artifacts and sites. Because of the lack of development on the islands, many sites are relatively intact. The sites represent the long occupation period of indigenous coastal peoples such as the Chumash, followed by diverse peoples during the historic period engaged in various pursuits. In addition to the tangible archeological sites, the islands are the sacred homelands of Chumash peoples. Chumash belief is grounded in the fact that all life is sacred. Chumash people originate from the beautiful islands and Chumash life has never been separate from these Islands. Chumash and their ancestors trace their history at least 650 generations, more than 13,000 years, on the northern Channel Islands. Many contemporary descendants trace their lineages directly to named Chumash Island villages that are today part of Channel Islands National Park. The NPS and Chumash work together to protect and provide access to sacred places, landscapes, and highly sensitive cultural sites of the Chumash peoples. The Park maintains government-to-government relationship with the Santa Ynez Band of Chumash Indians. This relationship is founded in mutual trust, meaningful consultation, and ongoing collaboration.

Historic sites representing occupation by Spanish, Anglo-Americans, and various immigrants dominate the historic period. In the mid-1800s until the late 20th century, the islands saw use from various ranching, fishing, hunting, navigation, military, maritime and other purposes. Some of the structures utilized by the NPS, TNC, military, and research establishments today have historic roots as they were constructed in earlier eras. Established as a National Park in 1980,

various park facilities would fall under the general 50-year guidelines to be considered for historic significance within the next decade. Currently, many of the buildings from the historic period have been determined eligible for listing in the National Register (NPS 2021) as part of these historic districts. Out of the historic structures determined eligible for listing, only the buildings that contribute to the Anacapa Island Light Station Historic District are currently listed in the National Register of Historic Places.

Trends in archeological site documentation and preservation are improving. With recently listed districts, all five of the Channel Islands are designated as island-wide archeological districts, providing greater consideration and project-funded support. Enhanced consultation with tribal partners has led to more integrated approaches to understand and protect these resources. Through new project funding, the park will be focusing on adaptations to address anticipated impacts of climate change.

Impact Analysis

Alternative A: No Action

The No Action Alternative would not allow vegetative debris pile burning, cutting of some eucalyptus groves, or proactive defensible space work to protect park infrastructure. The threat to archeological sites and historic structures from wildfire would not be reduced, because the existing vegetation debris piles would provide a concentrated hazard fuel load that could increase the potential for local, intense wildfires. Adjacent cultural resource sites, structures, and objects could be impacted from an intense wildfire. Heat from a high-intensity wildfire could alter surface artifacts or shallow features. Intense wildfires could cause discoloration of surface artifacts and features, burning of perishable materials, checkering or cracking of glass and ceramic artifacts, spalling or smoke damage of pictographs and petroglyphs, melting of metal features and/or artifacts, and distortion of historic structures from expansion of materials (Ryan et al. 2012). Many of the archeological and historic sites are no longer visible to even trained personnel due to dense regrowth of native or non-native vegetation since grazing was terminated. Should the vegetation be burned away, these sites could be subject to damage from burning, erosion, vandalism and unauthorized collection, especially if located in high public visitation areas. Overall impacts from a wildfire would depend on the timing, location, intensity, and extent of the wildfire and the mitigation efforts that could be implemented.

Wildfire suppression activities could result in displacement of cultural material and/or features on the ground surface, exposure of surface materials due to ground disturbance from wildfire suppression activities, or disturbance to cultural material immediately below the surface from vehicles due to earth moving or compaction by heavy equipment. Indirect adverse impacts could include exposure of artifacts and/or features from erosion and loss of vegetation near cultural sites, which could increase looting. Use of fire retardants could damage pictographs and petroglyphs, and alter the soil chemistry at archeological sites, which often provides valuable information from chemical analysis of the soils. Best management practices and mitigation measures would reduce or eliminate many impacts from wildfire suppression actions.

Sacred places, sites, and other highly sensitive cultural areas exist on the islands that may not be recorded or known to the NPS or government agencies. These sites could inadvertently be influenced by wildfire suppression actions. Ongoing coordination with Chumash tribal

representatives who have knowledge of such sites could help determine if additional avoidance or mitigation tactics would be helpful.

Cumulative Impacts

Archeological sites on the Channel Islands have been impacted by natural and past human actions. Wind and water erosion were intensified by livestock grazing denuding the landscape during the ranching era and have been exacerbated by factors related to climate change, including sea cliff retreat. With the removal of non-native species such as cattle, sheep, pigs, and deer, native plants have begun to recover and erosion slowed, but recovery of ecological systems has been slow with native plants still competing for resources with invasive species such as non-native grasses, eucalyptus, and fennel. In addition to natural threats, there are a variety of adverse impacts related to human actions. The historic period involved development and destruction of archeological sites, including looting and excavation of human remains. Today the park service works with tribal partners to facilitate the return and reburial of ancestral remains and associated burial objects. Current threats include park infrastructure maintenance and development, such as buildings and campgrounds, and visitor impacts such as social trails.

Impacts to cultural resources from a wildfire are described above with the degree of impacts depending on the behavior of the wildfire. Wildfire suppression actions in combination with past, present, and future activities would have a negligible contribution to adverse cumulative impacts on cultural resources with implementation of best management practices and mitigation measures, and MIST procedures.

Alternative B: Proposed Action

The impacts to cultural resources caused by wildfires and the attendant suppression response would be the same as described for Alternative A.

Impacts to cultural resources from prescribed pile burning would be negligible because cultural surveys and tribal consultation would be conducted prior to treatments to prevent debris pile burns being placed near known cultural resources. In addition, project-specific compliance may indicate other required mitigating measures, such as incorporating NPS archeologists and/or tribal cultural specialists during heavy equipment use in case previously unknown sites or cultural materials are discovered.

Defensible space work to create and maintain space around cultural resource sites to minimize threats from wildfires on all islands would provide an additional tool to increase the degree and range of protection for cultural resource sites and structures. Defensible space work around cultural resources would primarily use hand tools, chainsaws, or brush cutters. Mowing would continue to trim grasses and weeds in and adjacent to structures in some historic landscapes, providing defensible space protection. Most island infrastructure already has defensible space areas and require periodic maintenance. If new defensible space areas need to be created and would involve ground-disturbing activities, an archeologist would survey the treatment area in advance of the defensible space work and NPS would consult with tribal partners to ensure cultural resources would not be disturbed and the treatment work would be compatible with the cultural landscape.

Mechanical treatments for eucalyptus grove cutting and removal on Santa Cruz Island could result in ground disturbance from vehicle use or compaction, as large logs and branches are cut and need to be moved. Compaction could physically damage, disturb, or expose artifacts and/or features. Erosion and looting of cultural resources could be augmented from the exposure of artifacts in high use public areas. Mechanical treatments could also result in the displacement of cultural resources from their original spatial context. However, when choosing locations for eucalyptus grove removal, piling vegetation debris, log staging areas, and potential helicopter operations, cultural resource surveys and tribal consultation would be conducted in advance to ensure avoidance of any visible cultural sites or artifacts in the treatment areas. Since ground visibility is poor in eucalyptus groves, cultural specialists would be present during heavy equipment work in case of discovery of unknown sites or artifacts. Avoidance of known cultural resources and implementation of best management practices and mitigation measures would minimize potential adverse impacts from planned fuel and fire treatments.

Cumulative Impacts

The cumulative impacts to cultural resource from wildfire suppression actions would be the same as described under Alternative A. Incremental effects on cultural resources from prescribed pile burning, mechanical treatments, and defensible space work are expected to have a negligible contribution to adverse cumulative impacts because unanticipated discoveries during proposed activities would result in work ceasing in the area and a qualified NPS cultural resource specialist would assess conditions and recommend a course of action in consultation with the California State Historic Preservation Officer. Therefore, there would be no cumulative adverse impacts to archeological sites, historic structures, or objects at Channel Islands NP from planned fuel and fire treatments by the NPS. Alternative B would contribute to beneficial cumulative impacts to cultural resources by minimizing the potential for future site damage from severe wildfires as creation and maintenance of defensible space would increase protection to archeological sites, historic structures, and cultural objects.

Mitigation Measures

- CULT-1** Staff would utilize databases and tribal consultation to identify known cultural sites in advance of pile burns, or fuels treatment activities to consider avoidance and mitigation strategies. For all fuel management activities, park and fire staff would select tools, procedures, and equipment that avoid or minimize impacts to cultural resources. (2006 Channel Islands NP FMP, DO-18, and RM-18)
- CULT-2** If new cultural resources are identified while constructing firelines or implementing other fire activities, the READ/REAFs and Chief of Cultural Resource Management would be notified immediately, and appropriate avoidance and protection measures would be taken. Ground disturbance would be stopped in the area of any discovery, protection measures implemented, and the procedures outlined in 36 *Code of Federal Regulations* Part 800 would be followed, as applicable. Associated tribes and the California State Historic Preservation Officer could need to be notified. Adequate mitigation of project impacts (in consultation with tribal entities and appropriate agencies) would occur. Adjustment of hazard fuel reduction projects would take place to avoid or limit the adverse effects on cultural resources.

- CULT-3** In collaboration with cultural resource specialists, fire staff would utilize defensive and point protection tactics to prevent damage to identified threatened and vulnerable historic, cultural, archeological, and ethnographic sites in fuels treatment areas.
- CULT-4** Tribal consultation would be coordinated by CHIS cultural resource staff during wildfires that threaten cultural resources, and during fuels treatments. Tribal representatives could be part of the monitoring support on fuels treatments, but not on wildfires unless they are currently red carded.
- CULT-5** Cultural resources would be avoided in wildfire suppression activities by onsite advice from cultural READs/REAFs if available. The FMO would work with cultural resource specialists for access to cultural digital mapping tools (AGOL layers) to help fire managers pre-plan actions during rapidly developing initial attack wildfires when cultural staff could not be available.

Section 106 Summary. After applying the Advisory Council on Historic Preservation’s criteria of adverse effect (36 CFR part 800.5, *Assessment of Adverse Effects*), the NPS concludes that implementation of Alternative B would generally result in no adverse effect on archeological resources. The NPS will conduct Section 106 review for each fuel management action implemented under the Proposed Action.

Cultural Landscapes

Affected Environment

The NPS defines a cultural landscape as a geographic area, including both cultural and natural resources and the wildlife or domestic animals therein, associated with a historic event, activity, or person, or exhibiting other cultural or aesthetic values (NPS 2006). Channel Islands NP has three cultural landscape historic districts—Anacapa Island Light Station, Santa Cruz Island Ranching Landscape, and the Santa Rosa Island Ranching Landscape (NPS 2021). The Channel Islands NP cultural landscapes represent a rich historic past ranging from prehistoric and historic Chumash occupation to 19th/20th century ranching and agriculture operations on Santa Rosa and Santa Cruz islands, to navigation installations on Anacapa and Santa Rosa islands, and other military, navigation, fishing, and recreational developments (NPS 2021).

Prehistoric and historic Chumash occupation

The cultural resources found in Channel Islands NP extend from at least 13,000 BP to the recent past. Remaining cultural resources, the sites they occupy, and the environment that peoples interacted with has created rich cultural landscapes that have been recognized as essential components of Channel Islands NP. Residents of historic Chumash village sites were forced off the islands during Spanish colonial times; their mainland descendants still maintain important and valued cultural ties to the islands.

Early prehistoric sites date to the Pleistocene and represent some of the earliest known settlements of North America. Since then, the islands likely represent relatively continuous occupation of the Chumash and their ancestors.

Cultural distinctions between early prehistoric sites are difficult to make, but technical and social advancements are apparent. Of the more than 2800 recorded prehistoric sites, shell middens are the most common. Approximate dates for technical and cultural changes include:

- 7600 BP: Permanent settlements and cemeteries
- 4000 BP: Net weights
- 2500 BP: Shellfish hooks
- 1500 BP: Plank canoes, social stratification, hereditary chiefdoms

Temporary historic occupations

Throughout the 18th and 20th centuries, a variety of ethnic groups came to visit the islands, some for religious reasons but most for the purpose of economic exploitation. In the 1780s Spanish (and later, Mexican) missionaries visited the islands. By 1822, the last of the native occupants, the Chumash, had been removed to the mainland.

By the late 18th century and into the beginning of the 20th century, an array of groups temporarily occupied the islands for economic reasons. The earliest of these focused on the trade in sea mammals. These cultural groups included the Spanish, English, Americans, Russians, Aleuts, and Hawaiians.

As sea mammal populations were depleted, the abundance of abalone increased, leading to groups, primarily Chinese and Japanese, who exploited this resource.

Early in the 20th century, the fishing industry also exploited the islands, with both shoreline and offshore fishing.

The last type of temporary occupation of the islands would include scientific research and U.S. military installations, which continues to this day.

Long-term historic occupations

The two primary historic-era long-term uses of the islands include ranching, which began around 1850, and recreation, including the establishment of the area as a national monument and eventually a national park. A significant long-term impact from the ranching period was an era of intense grazing by livestock and imported large mammals which had a substantive influence on wildlife and the vegetated landscape.

Recent increases in project funding and treatment planning will affect the long-term viability of cultural landscapes. Funding to stabilize, maintain, and rehabilitate the built landscape will improve the condition of these resources. New attention to sensitive redevelopment will improve the compatibility of current and existing uses, resulting in enhanced integrity and an overall improving trend for cultural landscapes.

Impact Analysis

Alternative A: No Action

The No Action Alternative would not allow vegetative debris pile burning, cutting of some eucalyptus groves, or proactive defensible space work to protect park infrastructure. The threat to cultural resources from wildfire would not be reduced, because the existing vegetation debris piles would provide a concentrated hazard fuel load that could increase the potential for local, intense wildfires. Adjacent cultural landscapes and contributing elements could be impacted from an intense wildfire. Wildfires under these conditions could remove large tracts of adjacent vegetation which could lead to diminished historical integrity of the setting, feeling and

association of these cultural landscapes. Impacts on contributing elements of the cultural landscapes would be the same as discussed in the Cultural Resources Section. The degree of impacts would depend on the timing, location, intensity, and extent of the wildfire and the mitigation efforts that could be implemented.

Wildland fire suppression actions and tactics would consider type and location of contributing elements to the cultural landscapes to minimize damage or surface disturbance of features that could directly change the cultural landscape. Site disturbance or damage may result in lost information that could help with understanding of cultural landscapes and the various sites within. Most suppression actions for wildfires would allow for protection of contributing elements to the cultural landscape (archaeological sites, historic structures). Wildfires or damage from suppression activities could result in unacceptable changes to character-defining elements of historic districts or structures. Wildfires could also remove important landscape elements, structures, or historic sites, and create large amounts of unsightly burned and scorched vegetation, and un-vegetated areas from intense burning, diminishing the visual integrity of the cultural landscape. Best management practices and mitigation measures would reduce or eliminate many impacts to cultural landscapes and their contributing elements from wildfire suppression actions.

Cumulative Impacts

Natural and past actions that have contributed to cumulative impacts to cultural landscapes would be the same as described for cultural resources. Cultural landscapes are nonrenewable, so damage or loss from any activity would gradually diminish the integrity of the cultural landscape present. In Alternative A, the existing debris piles would remain in the cultural landscapes. Their presence would contribute to adverse cumulative impacts by diminishing the integrity of the historic setting and increased risk for local intense wildfires from existing debris piles within and adjacent to the cultural landscapes and associated vegetation loss and soil or ground disturbance.

Alternative B: Proposed Action

The impacts of wildfires and wildfire suppression actions to cultural landscapes would be the same as described under Alternative A. The proposed prescribed pile burning and reduction of some eucalyptus groves on Santa Cruz Island would locally decrease the potential risk for intense wildfires.

Prescribed pile burning on both Santa Rosa and Santa Cruz islands and removal of some eucalyptus groves on Santa Cruz Island would temporarily impact the viewshed of the cultural landscapes on the islands. While eucalyptus groves are not planned to be removed on Santa Rosa Island, the hazard tree pruning of existing groves and vegetation debris that accumulates from routine NPS maintenance and defensible space activities on the island would be burned in the identified existing vegetative debris pile. The prescribed pile burns would leave small blackened and sometimes denuded areas lasting until soil and vegetation remediation best management practices occurred. Over time, native vegetation would regrow on the treatment areas, helping to restore native plant communities that are unique to the islands and part of the cultural landscapes. The grove treatment areas would remove part or whole eucalyptus groves that are not considered essential to the historic landscapes, while maintaining historic eucalyptus trees that contribute to the historic island-wide ranching era.

Maintenance and creation of defensible space around cultural resources and adjacent historic buildings on the islands would increase the degree and range of protection of cultural landscapes and their contributing elements from wildfires. Most infrastructure already has defensible space that requires periodic maintenance. If defensible space needs to be expanded or created around unprotected infrastructure, then an archeologist would survey the treatment area in advance of the defensible space work to ensure contributing elements of cultural landscapes would not be disturbed.

Cumulative Impacts

The cumulative impacts to cultural landscapes from wildfire suppression actions would be the same as described under Alternative A. Incremental effects on cultural resources from prescribed pile burning, mechanical treatments, and defensible space work are expected to have a negligible contribution to adverse cumulative impacts because unanticipated discoveries during proposed activities would result in work ceasing in the area and a qualified NPS cultural resource specialist assessing conditions and recommending a course of action, in consultation with the California State Historic Preservation Officer. Therefore, there would be no cumulative adverse impacts to cultural landscapes and their contributing elements at Channel Islands NP from planned fuel and pile burn treatments by the NPS. Alternative B would contribute to beneficial cumulative impacts to cultural landscapes and their contributing elements over time by minimizing the potential for future site damage from severe wildfires as creation and maintenance of defensible space would increase protection to cultural landscapes and their contributing elements (e.g., archeological sites, historic structures).

Mitigation Measures

- CULT-1** Staff would utilize databases to identify known cultural sites in advance of pile burns, or fuels treatment activities to consider avoidance and mitigation strategies. For all fuel management activities, park and fire staff would select tools, procedures, and equipment that avoid or minimize impacts to cultural resources. (2006 Channel Islands NP FMP, DO-18, and RM-18)
- CULT-2** If new cultural resources are identified while constructing firelines or implementing other fire activities, the READ/REAFs and Chief of Cultural Resource Management would be notified immediately, and appropriate avoidance and protection measures would be taken. Ground disturbance would be stopped in the area of any discovery, protection measures implemented, and the procedures outlined in 36 *Code of Federal Regulations* Part 800 would be followed, as applicable. Associated tribes and the California State Historic Preservation Officer could need to be notified. Adequate mitigation of project impacts (in consultation with appropriate agencies) would occur. Adjustment of hazard fuel reduction projects would take place to avoid or limit the adverse effects on cultural resources.
- CULT-3** In collaboration with cultural resource specialists, fire staff would utilize defensive and point protection tactics to prevent damage to identified threatened and vulnerable historic, cultural, archeological, and ethnographic sites in fuels treatment areas.
- CULT-4** Tribal consultation would be coordinated by CHIS cultural resource staff during wildfires that threaten cultural resources, and during fuels treatments. Tribal

representatives could be part of the monitoring support on fuels treatments, but not on wildfires unless they are currently red carded.

CULT-5 Cultural resources would be avoided in wildfire suppression activities by onsite advice from cultural READs/REAFs if available. The FMO would work with cultural resource specialists for access to cultural digital mapping tools (AGOL layers) to help fire managers pre-plan actions during rapidly developing initial attack wildfires when cultural staff could not be available.

Section 106 Summary. After applying the Advisory Council on Historic Preservation’s criteria of adverse effect (36 CFR part 800.5, *Assessment of Adverse Effects*), the NPS concludes that implementation of Alternative B would generally result in no adverse effect on cultural landscapes. The NPS will conduct Section 106 review for each fuels management action implemented under the Proposed Action.

Museum Collections

Affected Environment

The museum collection consists of specimens, artifacts, data, and archives of investigations conducted on Channel Islands. The National Park has over 607,000 accessioned items of natural and cultural heritage interest. Most of these are housed in off-island sites such as museums, the park headquarters/visitor center, or research institutions. Small on-island collections are located in contact stations on Anacapa (Ranger Station) and Santa Cruz (Scorpion Ranch) islands. Researchers have been collecting important information from the islands in the form of biological, geological, or archeological specimens that could be of use to the scientific community into the indefinite future.

Impact Analysis

Alternative A: No Action

There are no existing debris piles or hazard vegetative fuels immediately adjacent to the contact stations at Scorpion Ranch on Santa Cruz Island or lighthouse/museum complex on Anacapa Island. The eucalyptus groves in the Scorpion Ranch area could provide a concentrated hazard fuel that could increase the potential for local, intense wildfires and ember showers on the contact station. A high-intensity wildfire could destroy the contact station or irreparably damage the small museum collection housed in the building. The No Action Alternative would not reduce threats to human life and property and to park natural and cultural resources from wildfire. Defensible space design and wildfire suppression actions should consider structure or point protection actions to minimize the potential of the structure burning and damage to artifacts in the collection. The vegetative fuels, building construction, and maritime topography on Anacapa Island makes wildfire risk to the lighthouse complex minimal.

Cumulative Impacts

Impacts from an intense wildfire to museum collections are the same as described above. Wildfire suppression actions would not contribute to cumulative impacts on museum collections.

Alternative B: Proposed Action

The impacts of wildfires and wildfire suppression actions would be the same as described under Alternative A.

There would be no impacts from prescribed pile burning or mechanical treatments to museum collections because treatments would not occur within or immediately adjacent to contact stations at Scorpion Ranch or Anacapa ranger station. Defensible space work would be maintained or created around the Anacapa ranger station and Scorpion Ranch buildings that house the museum collections. The contact stations that house the small on-island collections would be analyzed by wildland fire specialists to ensure all reasonable defensible space actions have been completed to minimize the chances of these structures being burned in a wildfire. Creating and maintaining defensible space around park structures would help reduce the likelihood of loss of these small, but invaluable museum collections. In addition, park cultural staff would ensure there is an evacuation plan to remove artifacts in advance of wildfire impacts during prolonged or significant incidents, if there was time for safe removal.

Cumulative Impacts

Cumulative impacts to museum collections would be the same as those described under Alternative A for wildfire suppression actions.

Incremental impacts from defensible space work would contribute to beneficial cumulative impacts to museum collections by improving protection of the buildings from wildfires, thus protecting the museum collections at the island contact stations.

Visitor Use and Experience

Affected Environment

In 2021, Channel Islands National Park reported approximately 319,000 visitors (NPS 2022). Of this number, a substantial percentage entered the visitor center in Ventura. The majority of the people who come to the mainland visitor center never actually visit the islands. About 74,500 visitors went to the islands (NPS 2022). Although visitation varies from year to year, it has generally increased over time on the islands. Visitation is expected to increase as new or replacement island visitor facilities are completed, and the Southern California regional population expands. The five islands receive use year-round, although the greatest number of visitors come between March and October. In recent years, winter use has increased on the islands.

All five park islands are open to visitation and visitors can access the islands using both private and concession-operated boats. Private boats can land in designated areas on all five of the park islands; some areas are subject to seasonal closures to avoid disturbance of wildlife. Two concessioners (one boat and one air service) bring visitors to the islands for both one and multi-day trips. Public air transport is available via a concessioner to Santa Rosa Island. The concession operators can transport a defined number of visitors to the islands each day. The number of visitors varies for each island and is determined in part by the size of the island, the natural and cultural resources, and the infrastructure available to visitors. When venturing on Anacapa, Santa Barbara, or San Miguel islands, visitors must stay on trails at all times for their own safety and to protect vegetation and nesting seabirds. Once on Santa Cruz and Santa Rosa

islands, visitors can explore the islands on foot using both trails and roads. In addition to hiking, recreation activities on the islands include wildlife watching, kayaking, snorkeling/diving, and camping. Backcountry camping is available on Santa Rosa and Santa Cruz islands.

Although all of Santa Cruz Island is within the Channel Island National Park's boundary, 76% of the island is a private inholding, owned by TNC. Use of Santa Cruz lands owned by NPS, the eastern portion of the island, are fully open to visitor access and use, whereas use on TNC lands is limited.

Impact Analysis

Alternative A: No Action

With the low occurrence of wildfires, there would be infrequent and temporary visitor use impacts from wildfires and associated suppression activities, including possible restrictions where wildfires are present. Wildfires could produce smoke, altering or reducing the visibility of scenic views, odors, and limited blackened areas that could affect visitor experience if near the visitor centers, campgrounds, or other high use visitor areas.

In the absence of fuel treatments, there would be no impacts to the visitor experience from mechanized equipment such as chainsaws, chippers, or prescribed pile burns. However, there would be no reduction of wildfire risk resulting from local concentrations of hazardous fuels, such as existing vegetation debris piles or eucalyptus groves, which has the capability of generating significant heat and resistance to wildfire control efforts. The No Action Alternative would not reduce threats to human life and property and to park natural and cultural resources from wildfire.

Cumulative Impacts

Impacts from wildfire suppression would typically be minor and temporary. Nearby activities that could impact visitor use and experience include wildfires occurring on mainland California, noise from vehicles and boats, and maintenance activities within the park. Continued population growth in southern California and the heightened interest in outdoor activities could increase the number of local visitors to the park, but NPS caps on visitation would prevent excessive visitation increases. The cumulative impacts of wildfire suppression activities are likely to be negligible in comparison to normal park operations, including facility and resource management activities within the park. The impacts of Alternative A would contribute negligibly to adverse cumulative impacts to visitor use and experience as the closures would be temporary and site-specific.

Alternative B: Proposed Action

The impacts caused by wildfires to visitor use under Alternative B would be similar as described for Alternative A. Reduction of localized hazardous fuels from prescribed pile burning and ensuring defensible space surrounding NPS infrastructure could enable firefighters to utilize defensible space and nearby features as part of fire control strategy and tactics, reducing the overall suppression complexity. Temporary and localized closures in fuel and fire treatments areas could increase the potential for temporary closures to visitor use areas.

Prescribed pile burning or use of an air curtain burning to dispose of vegetative material would result in temporary and localized impacts to the visitor use experience, primarily from the smell of smoke, blackened areas. Additionally, noise associated with prescribed pile burning, mechanical treatments, and defensible space work could disturb visitor experience temporarily in areas surrounding treatment areas, only lasting until the treatment is completed.

Potentially the greatest impact from the fuel and fire treatments to the visitor use experience would be the use of a helicopter to move the large eucalyptus logs to preapproved locations for disposal. The noise associated with aircraft is generally considered to be unpleasant and distracting to park visitors. However, potential sites identified for receiving these logs are in areas that are normally less frequented by the visiting public. The majority of park visitors could probably hear the helicopter, but that noise would be considerably less than at the project site, which would be closed for small periods when the helicopter work would occur.

Cumulative Impacts

Similar to Alternative A, the cumulative impacts of Alternative B to the visitor use experience would be minor. The intent of a targeted hazard fuel reduction is to provide a greater degree of protection to park infrastructure and native ecosystems from unwanted effects of wildfire. Several structures located on the Channel Islands serve the visiting public, so with enhanced protection, it is less likely that these buildings would be lost to wildfire in the future. With this alternative, the completion of defensible space work around park infrastructure would have a localized affect in reducing the complexity of wildfire suppression as well as providing a higher level of protection to those key assets.

Over time, Alternative B would contribute to beneficial cumulative impacts to visitor use and experience due to the removal of non-native vegetation with increased ability to restore wetlands, riparian areas, and native plant communities, which may enhance wildlife viewing opportunities and experiencing the unique ecosystems found on Channel Islands. Increased visitation during fuel and fire management activities could have beneficial impacts by educating more visitors about fire safe practices and the importance of active resource management.

Mitigation Measures

- PUB-1** Fire staff would ensure public notification procedures occur for all park pile burns and fuel treatments. For long duration wildfires, regular media releases would inform locals and visitors about the expected impacts of the fire, especially related to smoke, closures, and restrictions. Signs or notices may be posted at appropriate places to inform incoming visitors and recreational users of the fire situation. (NWCG Standards for Prescribed Fire Planning and Implementation 2022)
- PUB-2** Fire and park staff would provide pile burn notifications in advance to TNC, U.S. Navy, Coast Guard, concessionaire and special use permittees, island researchers, and other partners and cooperators that may be affected and need to plan special arrangements. (NWCG Standards for Prescribed Fire Planning and Implementation 2022)

Public Health and Safety

Affected Environment

The health and safety of firefighters, visitors, employees, and surrounding neighbors of the park are the highest priority for all fuel and fire management activities. The park neighbors, visitors, and adjacent communities would be notified of all fuel and fire management activities that have the potential to impact them. Fire management activities and wildfires can pose unplanned, unforeseen risks to the public and employees, but firefighters and NPS staff face direct risks when engaged in wildfire suppression-related activities.

The current fire management program in the park has worked to mitigate the long-term threat to the safety of visitors, employees, and surrounding landowners. These actions include removing hazardous fuels using mechanical fuel treatments, prescribed pile burning, defensible space work around park infrastructure, and additional maintenance activities that contribute to creation of defensible space (e.g., mowing and cutting of vegetation, removal of fallen trees and debris in developed areas or on trails).

Climate change impacts to public health and safety may include increased smoke exposure from large mainland wildfires producing smoke plumes that reach Channel Islands NP. Projected increases in mainland wildfires could increase exposure of staff and public in Ventura and the islands, which may cause respiratory problems (Gonzales 2020).

Impact Analysis

Alternative A: No Action

The No Action Alternative would not allow vegetative debris pile burning, cutting of certain eucalyptus groves, or proactive defensible space work to protect park infrastructure. There would be no reduction of wildfire risk presented by localized areas of hazardous fuels, such as existing vegetation debris piles or eucalyptus groves, which have the capability of generating significant heat and resistance to wildfire control efforts. The No Action Alternative could increase wildfire threats to human life and property, with increased risk of hard to control wildfires.

Wildfire suppression is inherently dangerous work and requires that fire managers utilize strategic risk informed decision-making, including selecting tactics used for wildfire control. While keeping firefighter safety is paramount, there would be adverse impacts to firefighter health and safety from wildfire suppression efforts, such as potential intense exposure to heat, smoke inhalation, accidental spills, injuries from the use of firefighting equipment, and in severe cases injuries from wildfires. Impacts to the public could include smoke inhalation, and in rare cases, injuries or fatalities as a result of a wildfire. However, the intent of wildfire suppression is to limit fire spread and extinguish the fire, consistent with firefighter and public safety, and values to be protected. Adherence to policy and standards concerning firefighter qualifications, as well as equipment and procedural guidelines would minimize accidents and possible impacts to human health and safety.

Acute smoke inhalation by firefighters from wildfires often begins with acute eye and respiratory irritation, and then shortness of breath, and may progress into headaches, dizziness, and nausea depending on the duration of exposure. Recommended practices, such as limiting shift lengths,

rotating crews out of heavy smoke areas, and enforcing the National Wildfire Cooperating Group recommended occupational exposure levels (USFS 2013) would be followed to reduce firefighter exposure to wildland smoke emissions.

Smoke on roads, trails, and adjoining marine environments adjacent to the islands poses a visibility concern for traffic on roads and waterways in and adjacent to wildfires. In addition, smoke emissions from wildfires could be an air quality issue to the visiting public, adjoining landowners and employees, and communities on the mainland and is discussed in the above Air Quality section. Accidents and unintended consequences could be more prevalent in chaotic, emergency wildfire situations. For this reason, wildfire areas would be closed to the public; mitigations would be implemented as soon as recognized and practical, such as closures and/or restrictions, and traffic control for smoke impaired visibility.

In terms of public safety, the degree of impacts would vary depending on size of the fire, the location, extent, timing, and other factors. In the event of a potentially severe wildfire on the islands and/or within the park, the fire staff would coordinate public notification, restrictions, closures, and evacuation efforts with park and county law enforcement staff and local emergency response agencies. The extent of public notice would depend on the specific fire situation. Assuring visitor, local residents, and staff safety would take priority over other park activities.

Cumulative Impacts

Actions outside the park that could have an impact on public health and safety include continued wildfire activity on the mainland of California. The absence of a fuels management program would cause hazardous fuel to accumulate, as well as increase the number of resource values and assets considered to be at risk from wildfire, thus increasing the complexity of suppression efforts and hazard level to firefighters and the public in those areas during an intense wildfire. The impacts of Alternative A would have minor contributions to adverse cumulative impacts to human health and safety due to the temporary and localized exposure to associated fire risks (e.g., heat, smoke inhalation).

Alternative B: Proposed Action

Human health and safety impacts from wildfires would be the same as described under Alternative A.

Pile burning, mechanical treatments, and defensible space work would involve pre-planning and be implemented under defined conditions promoting better health and safety protections and precautions compared to wildfire suppression activities. The NPS Mediterranean Coast Network fire staff and cooperators would conduct planned fuel management activities on the islands, helping to ensure fuel and fire treatments are conducted safely. Helicopter use would follow interagency aviation safety policies designed to minimize operational risk. Potential risk to human health and safety from planned fuel management activities would be minimized from implementing best management practices, mitigation measures, and following NPS safety management policies.

Pile burning would reduce concentrated hazardous fuel loads that could reduce potential wildfire risk for the treated area. Mechanical treatments would reduce safety hazards by removing hazard trees in campgrounds and other visitor use areas and would allow cut vegetation to be piled more efficiently. Defensible space work around infrastructure could provide emergency safety zones

for park staff and visitors in the event of a fast-moving wildfire by creating a safe space and reducing wildfire risk to structures.

Cumulative Impacts

As with Alternative A, Actions outside the park that could have an impact on public health and safety include continued wildfire activity on the mainland of California. The addition of fuel and fire treatments would reduce the number of resource values and infrastructure assets considered to be at risk from wildfire, thus decreasing the complexity and hazard level to firefighters and the public in those areas during an intense wildfire. The impacts of Alternative B would serve a key role in decreasing the potential risk to people and structures from potential wildfires. While wildfires could still occur resulting in health and safety impacts, it is expected that over time, the cumulative impacts from Alternative B would be beneficial because the fuel and fire treatments would decrease the complexity of wildfire suppression. Residents, neighbors, employees, and park visitors would have the reassurance that the NPS is conducting active management of wildland fuels intended to reduce hazards to human health and safety.

Mitigation Measures

- SAFE-1** The park would continually emphasize the safety of fire and park staff, other agency or cooperator personnel working on the islands, and the public as the highest priority in all fire management activities. Safety often drives fire-related decision making. (RM-18)
- SAFE-2** If planned aviation activities would occur on the islands (such as eucalyptus log removals), park visitors would be notified in advance and kept out of the flight areas. (NHSO)
- SAFE-3** To prevent exposure to hazards where fire/vegetation management treatment activities are underway, visitors would be kept out of the immediate vicinity of tree trimming or falling, heavy equipment use, low-level aviation operations, pile-burning, or other high-risk activities. A Superintendent’s closure order, signing, or closure personnel may be necessary in busy visitation areas or periods. (NPS Management Policies 2006)
- SAFE-4** An approved prescribed fire burn plan, as outlined in the *Interagency Prescribed Fire Planning and Implementation Procedures Guide (May 2022)*, would be written for each pile burn project area, utilizing the latest risk analysis procedures and tools. The burn plan also ensures that planning occurs for resources, safety, contingencies, and mitigations to prevent damage to park values. (RM-18, Chapter 7)

Chapter 4: Consultation and Coordination

Agency Consultation

In accordance with the ESA, the Park consulted with the U.S. FWS with regards to federally listed species. A copy of the EA will be sent to the U.S. FWS for review along with a request for their concurrence with the determination of effects on the Monarch Butterfly, a federal candidate species, for this EA. The park staff would consult with the U.S. Fish and Wildlife Service, as needed, prior to each project specific implementation to ensure compliance with Section 7 of the Endangered Species Act.

In accordance with Section 106 of the NHPA, as amended in 1992 (54 USC 306108 *et. seq.*), NPS contacted the California Historic Preservation Office (SHPO) by letter dated January 5, 2022, during the public scoping period asking for information concerning cultural resources. A copy of this EA will be sent to California SHPO for review and comment.

American Indian Consultation

The two affiliated American Indian tribes (see list below) were contacted by scoping letter dated January 5, 2022, informing them of the proposed action and soliciting comments. Information from the tribes also was requested to determine if any ethnographic resources are in the project area and if the tribe wanted to be involved in the environmental compliance process. As of the date of this EA, no comments were received. The tribes that are traditionally associated with Channel Islands NP will have an additional opportunity to review and comment on this EA.

- Barbareño/Ventureño Band of Mission Indians
- Santa Ynez Band of Chumash Indians

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Chapter 6: Acronyms

APCD	Air Pollution Control District
DO	Director's Order
EA	Environmental Assessment
ESA	Endangered Species Act
FMO	Fire Management Officer
FMP	Fire Management Plan
FRI	Fire Return Interval
MIST	Minimum Impact Strategy and Tactics
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Protection Act
NPS	National Park Service
READs	Resource Advisors
RM-18	NPS Wildland Fire Management: Reference Manual 18
SHPO	State Historic Preservation Officer
TNC	The Nature Conservancy