



Midpeninsula Regional Open Space District Prescribed Fire Plan

November 2022



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Fire Consulting Services LLC



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TABLE OF CONTENTS

Table of Contents

1	Introduction	1
1.1	Wildland Fire Resiliency Program	1
1.2	Overview of Prescribed Burning	3
1.3	Purpose and Need	3
2	Fire History and Prescribed Fire	5
2.1	Historic and Current Vegetation Management and Fire History	5
2.2	Use and Benefits of Prescribed Fire	6
2.3	Prescribed Fire on Midpen Lands	8
3	Prescribed Fire Planning	9
3.1	Overview	9
3.2	Prescribed Fire Types and Objectives.....	9
3.3	Delineation of Potential Burn Units.....	10
3.4	Requirements for Identification of Suitable Burn Units.....	11
3.5	Considerations for Prioritization of Burn Units.....	12
3.6	Required Plans	15
3.7	Stakeholder, Public Outreach, and Notification	18
4	Burn Unit Preparation for Prescribed Fire	21
4.1	Mechanical Pre-Treatment.....	21
4.2	Creation and Maintenance of Control Lines.....	22
5	Prescribed Fire Implementation	23
5.1	Overview	23
5.2	Equipment and Personnel.....	23
5.3	Safety Precautions	24
5.4	Prescribed Burn.....	24
5.5	Schedule and Timing for Prescribed Burn Program Implementation	25
6	Monitoring and Adaptive Management	26
7	References	28

TABLE OF CONTENTS

List of Tables

Table 3-1	Requirement Checklist.....	11
Table 3-2	Potential Burn Unit Prioritization Criteria	12
Table 3-3	Notification Checklist.....	19

List of Figures

Figure 1-1	Midpen Lands.....	2
Figure 2-1	Example of Vegetation After Prescribed Burning	7
Figure 3-1	Relationship Between Burn Objectives and Potential Prioritization Criteria	14
Figure 6-1	Monitoring and Adaptive Management Framework.....	27

List of Appendices

Appendix A	Vegetation Departure from Historic Vegetation on Midpen Lands
Appendix B	Historic Fire Regimes on Midpen Lands

TABLE OF CONTENTS

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PRESCRIBED FIRE PLAN

1 Introduction

1.1 Wildland Fire Resiliency Program

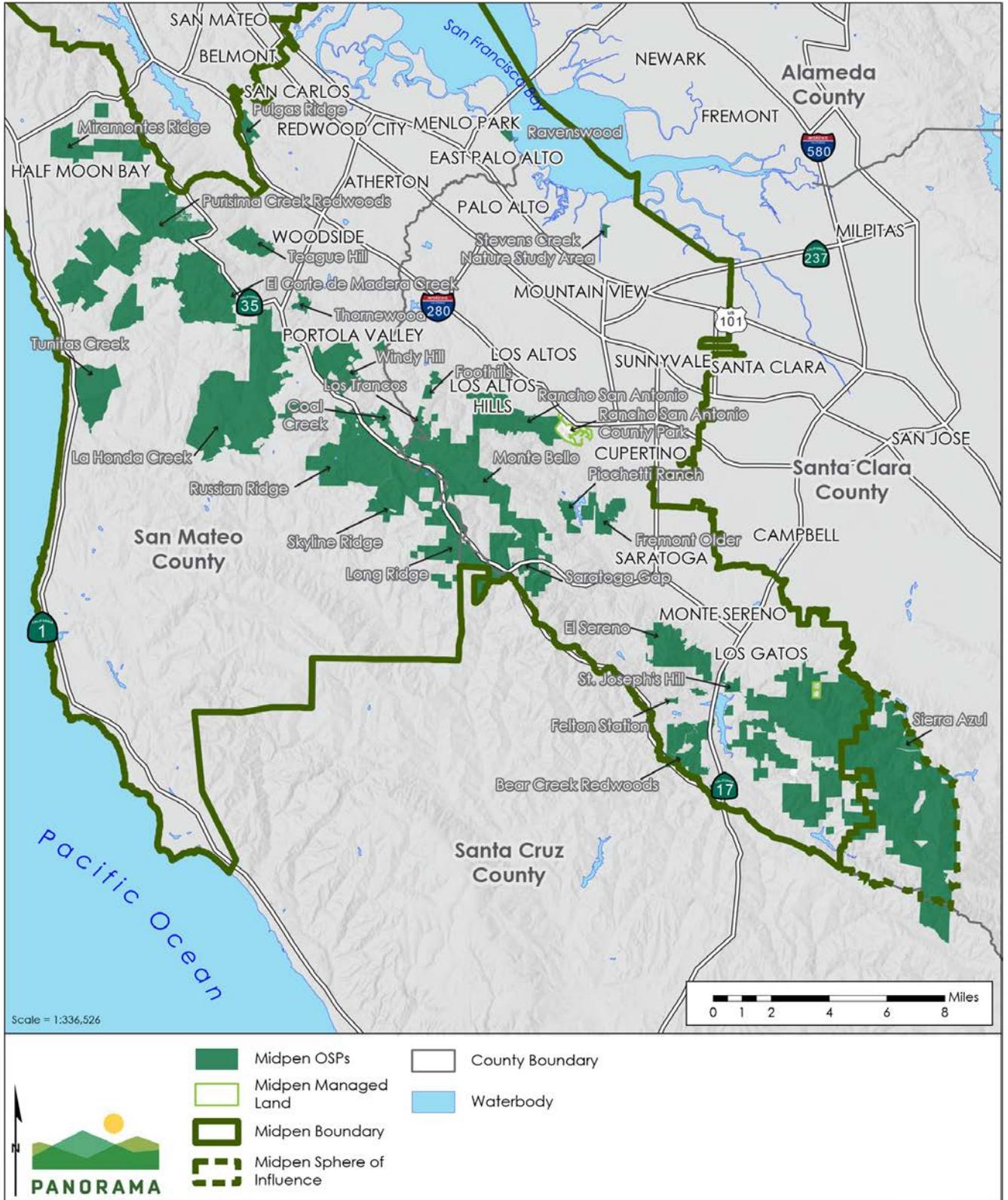
The Midpeninsula Regional Open Space District (Midpen) is a public agency formed by voter initiative in 1972. Midpen's purpose is to acquire and permanently protect a regional greenbelt of open space lands, preserve and restore wildlife habitat, watersheds, viewsheds, and fragile ecosystems, and provide opportunities for low-intensity recreation and environmental education. Midpen's lands are located within the Santa Cruz Mountain Region and include the San Francisco Peninsula between the Pacific Ocean and the San Francisco Bay (Figure 1-1). Midpen's boundary extends from San Carlos in San Mateo County in the north to the unincorporated Santa Clara County area located south of Los Gatos in the south. Midpen prepared and adopted the Wildland Fire Resiliency Program (Program) in May 2021, which addresses wildland fire management across all Midpen- owned and managed lands (Midpen, 2021).

The Program was comprised of four primary plans:

- **Vegetation Management Plan (VMP):** On a project-level, addresses creation and maintenance of fuelbreaks, fuel management zones, and defensible space zones using vegetation management techniques addressed in Midpen's Integrated Pest Management Program (IPMP);
- **Prescribed Fire Plan (PFP):** Programmatically addresses the methods and implementation of prescribed fire to manage fuel and improve ecosystem health;
- **Wildland Fire Pre-Plan/Resource Advisor Maps:** Describes the creation of Resource Advisor maps for each open space preserve (OSP) and other managed land (or groups of managed lands) that will include information on existing conditions, infrastructure, and resources constraints that can aid fire suppression activities and locate sensitive resource areas that merit protection from potential damage due to fire or fire suppression activities; and
- **Monitoring Plan:** Provides a framework for recording pre-project conditions, vegetation treatment response, and fuels inventories to inform future adaptive management techniques.

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Figure 1-1 Midpen Lands



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1.2 Overview of Prescribed Burning

Prescribed fire (also referred to as prescribed burning) is a powerful land management tool that can be used to:

- Return fire to the landscape, simulating prior natural processes;
- Reduce unnaturally high accumulations of vegetation;
- Decrease the potential impact and severity of unwanted wildland fires in the future;
- Lessen the potential loss of life and property;
- Control undesirable plant species, plant diseases, and pest insects;
- Create and enhance wildlife habitat and increase availability of forage;
- Promote the growth of fire-adapted or fire-dependent native trees, wildflowers, and other plants;
- Facilitate plant and tree regeneration; and
- Recycle plant nutrients back to the soil.

Prescribed fire activities are implemented in accordance with a pre-written plan (Burn Plan) that identifies land management goals and burn objectives, with prior approval by the applicable regulatory agencies. Burn Plans address characteristics of the land being treated (like topography and vegetation type) and include carefully defined and required parameters to initiate a prescribed fire such as temperature, humidity, wind, moisture of the vegetation, and conditions for the dispersal of smoke. Burn Plans also specify how fire will be applied, by whom, and what fire control people and equipment must be on-scene before the burn can commence. After the Burn Plan is complete and conditions are optimal, a prescribed burn can proceed under the supervision of a qualified Burn Boss. Fire is applied to selectively burn fuels like dead wood, brush, forest understories, and grassland.

The smoke from a prescribed fire can be a nuisance, but when prescribed fire is planned and executed by fire professionals in conjunction with air quality professionals, smoke impacts can be greatly reduced. Prescribed fire is an important wildland fuel treatment method. It is often compatible with environmental goals and is a cost-effective alternative to more labor intensive and time-consuming methods like mechanical or hand-clearing of vegetation (City of Austin and Travis County, 2014).

1.3 Purpose and Need

The PFP included in the Program provided a high-level framework for prescribed fire on Midpen lands. This refined PFP expands upon the programmatic PFP and provides a more detailed framework for Midpen to use for implementation of prescribed fire. The PFP integrates with the VMP and other ongoing Midpen treatment activities on Midpen owned and managed lands.

The purpose of this PFP is to define the activities that Midpen will implement to reinstate prescribed fire practices on its lands to preserve and restore biodiversity, enhance habitat, and

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minimize potential effects should a wildland fire occur on the environment, while also reducing fuel loads and wildland fire risks. This PFP identifies the following:

- Historic regional vegetation and general fire regimes;
- History of prescribed burning on OSPs;
- Considerations for prioritization for prescribed fire projects;
- Planning process for undertaking prescribed fire projects;
- Methods for creating, implementing, and maintaining prescribed fire projects and areas treated with fire; and
- Potential best management and environmental protection measures to consider when preparing a Burn Plan for prescribed fire projects.

This PFP focuses on prescribed fire to restore natural ecological processes in OSPs and to reduce fuel loads. Another component of the PFP will be the use of traditional ecological knowledge burns in coordination with Native American Tribes.

The primary need for the PFP is to reintroduce fire as an ecological process that can reduce potential wildland fire risk, thus enhancing public safety, and restore ecological function and resiliency, particularly for fire adapted species. Secondly, the PFP is needed to reduce live and dead fuels, particularly in areas where mechanical treatments are not feasible or effective due to access and vegetation types.

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2 Fire History and Prescribed Fire

2.1 Historic and Current Vegetation Management and Fire History

Periodic fires historically were a part of natural ecological processes on Midpen lands; as a result, many species evolved with fire adaptations and need periodic fire for renewal. Fire opens forests to new generations of younger trees, preserves open grasslands by reducing the spread of encroaching shrubs and/or trees, and stimulates seed germination and shoot growth in chaparral. Without periodic fire, fire-adapted communities are eventually lost, resulting in a reduction of biodiversity and habitat complexity. Fuel in unburned areas can build up to such a high level that when a wildland fire occurs, it can have devastating effects.

Many Native American tribes used fire to shape the natural environment and to clear underbrush and create meadow areas attractive to deer and other animals. Open meadows improved visibility for hunting and encouraged the growth of acorn oaks and other edible plants. Subsequent implementation of fire suppression policies eliminated these benefits, reversing their positive environmental effects.

Impacts of fire suppression continue to reduce biodiversity in Midpen lands. Grasslands and oak woodlands are decreasing in extent due to invading brush and forest species. Stands of coastal scrub and chaparral have aged and are not being renewed. Dense tangles of brush and young trees have largely replaced the park-like understory beneath redwood and Douglas fir forests and mature oak woodlands described by early European explorers.

Changing climatic conditions, past land uses, and years of fire suppression have increased fuel loads and fire-prone conditions that could contribute to larger more intense wildland fires. Prescribed fire helps to restore ecosystems closer to pre-fire suppression conditions through the removal of dead and accumulated vegetation and treatment of forest disease and invasive species. Prior to the mid to late 20th century, landscapes in the San Francisco Bay Area were either managed through natural fire or through Native American practices of prescribed burning that kept fuel loads down. Prior to European contact, the spread of invasive species that alter ecosystems and increases fire risks was also much less of a concern.

More details on the historical and current vegetation management and fire history are described in the VMP, Section 4.2.1 of the Program. Today, in the absence of fire for decades, both live and dead fuels have accumulated, creating higher surface fuel loads, vegetation density, and different species composition from what was seen before European contact.

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2.2 Use and Benefits of Prescribed Fire

Prescribed burns are carefully planned with consideration for various factors, including those that affect fire behavior, specifically weather, topography, vegetation types, and historic fire regimes, as well as natural and anthropogenic resources. A critical difference between wildland fire and prescribed fire is that wildland fire behavior is driven by environmental conditions that favor high-intensity, rapid, and uncontrollable fire spread. Contrastingly, prescribed fire is ignited under conditions that favor lower-intensity, slower, and more controllable fire spread. This fact correlates directly to why impacts on resources and communities are generally less for prescribed fire compared to a similarly sized wildland fire.

Prescribed burns are implemented under conditions that ensure the fire burns at low severity, leaving trees and large shrubs alive but burning the surface fuels (e.g., litter, duff, low vegetation), which limits air quality and smoke issues for neighboring communities as well as ensures firefighters can maintain control. In general, two to four times more fuel is consumed during a wildland fire compared to a prescribed fire (Ottmar, 2013). During a wildland fire, fuels are generally drier, tree crowns are typically ignited, much or all of the fuel load present in an area (including live vegetation) may be consumed, and ignition generally occurs during very windy periods. Prescribed burns, however, are typically lower intensity fires that burn less of the fuel load available, typically dead, and low-lying vegetation. Regular, low-intensity prescribed burns can reduce fuel loads that could otherwise contribute to the intensity and spread of a wildland fire (CNRA, 2018).

Many studies have been conducted on the efficacy of prescribed burns to reduce the risks associated with and that alter the behavior of subsequent wildland fire. Studies point to a short-lived effect of prescribed burning on rate of wildland fire spread generally disappearing as soon as the fuel complex regains its pre-burn structure (generally within 2 to 5 years in grassland or shrub ecosystems after prescribed fire). The overall benefits of prescribed burning in forest and woodland ecosystems, namely in avoiding crown fire or substantially reducing the potential for its occurrence, should persist for longer periods since the understory vegetation layer revegetates at a lower rate. Studies have found evidence that wildland fires were stopped or slowed by previous prescribed fires, improved fire control operations due to the existence of fuel-reduced areas and reduced fireline intensity, effective protection of assets, and less overall demand for firefighting resources extended through 5 years after prescribed fire treatments. Fuel reduction burning in the last 10 years can still influence fire behavior and assist in fire suppression, even if the most observable benefits, including wildland fire propagation and fire suppression, were studied to occur within 2 to 5 years after the treatment (Fernandes & Botelho, 2003).

Wildland fires result in greater carbon loss per acre, higher particulate matter emissions rates, and burn an order of magnitude more land than prescribed burning (CARB, 2017; Liu, et al., 2017). One study found that implementation of prescribed burning in forest classes that historically had relatively frequent fire intervals and were determined to be amendable for burning was modeled to reduce GHG emissions by 18 to 25 percent in statewide emissions in

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the western U.S. compared to wildland fires (Wiedinmyer & Hurteau, 2010). Emissions modeling conducted for mixed conifer forests found that the ignition of a wildland fire in an untreated area resulted in higher mean emissions for all air pollutants compared to a prescribed fire conducted or a wildland fire ignited in an area after mechanical fuel treatment (Hyde & Strand, 2019). Although emissions from all the mechanical pre-treatment plus prescribed burn emissions with a post-treatment wildland fire were found to equal the emissions from a pre-treatment wildland fire (Hyde & Strand, 2019). Notably, these emissions are staggered, and due to the ability to plan the prescribed fire during optimal weather conditions, air quality-sensitive (human) communities will not necessarily experience the same level of smoke and air quality effects compared to a wildland fire in an untreated area.

Vegetation communities and special-status species respond differently to fire, with some communities and species benefitting and others experiencing adverse effects or mortality. Even for species and communities that benefit, such as chaparral and coastal scrub communities (Keeley, 2008) or San Mateo woolly sunflower (*Eriophyllum latilobum*), extreme wildland fire behavior and temperatures could damage the seedbank or cause mortality. Prescribed burning can be planned for and conducted during the optimal time of year and in suitable locations to benefit species and communities that may benefit from burning (refer to Figure 2-1 for a photo of wildflowers growing after a prescribed burn).

Figure 2-1 Example of Vegetation After Prescribed Burning



Vegetation regrowth at Russian Ridge OSP in spring 2008 after a prescribed burn.

The passage of a fire may directly or indirectly impact cultural resources. Direct or first order impacts include the effects of heat; the deposition of combustion products (e.g., tars, soot and ash); and the exposure of cultural resources to discovery. Indirect or second order effects include the destruction or redistribution of artifacts due to accelerated erosion of the burned site. In addition to prescribed burning occurring during lower temperature days, the lower fireline intensity associated with a surface fire, such as during a prescribed fire, compared to a catastrophic fire, which extends into tree crowns, will reduce vegetation mortality and damage

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to cultural resources, if present. If a wildland fire ignites following prescribed fire treatment, the fire may be easier to contain and suppress. The fireline intensity may be reduced, as discussed under wildland fire risk, which will minimize effects on biological as well as cultural resources present.

2.3 Prescribed Fire on Midpen Lands

Between the 1990s and 2009, Midpen utilized prescribed fire as a vegetation management tool, primarily in grasslands. Prescribed burns were conducted for training and ecological purposes at Sierra Azul and Russian Ridge OSPs. These prescribed fires occurred primarily in annual grasslands with relatively well-developed road access and boundaries. Midpen has not conducted a prescribed burn within the last 10 years.

3 Prescribed Fire Planning

3.1 Overview

This section describes the planning process for prescribed burns, including the different objectives, how a burn unit is identified, how Midpen prioritizes burns, considerations in the development of the Burn Plan and Smoke Management Plan (SMP) (refer to Section 3.6), and Midpen's public outreach and notification procedures.

3.2 Prescribed Fire Types and Objectives

3.2.1 Overview

All types of prescribed burns involve the use of fire at varying times of the year, ignition patterns, weather conditions, and fuel moistures. While there will be an overlap between these types of burns, the general burn types and overall objectives for each type are described below. A prescribed burn typically meets more than one objective.

3.2.2 Ecosystem Restoration Burns

Generally, all prescribed burns will provide ecosystem restoration benefits. Specifically, burns conducted for ecosystem restoration are utilized to improve regeneration, resilience, or restoration of fire-dependent plant species and ecotypes that have not experienced a fire in recent times. In cases where small areas may not passively revegetate, these sites may be seeded with native species under the advice of a Midpen Resource Advisor.

3.2.3 Fuel Reduction Burns

These burns are primarily implemented to reduce dead surface and fine fuels such as litter, duff, branches, and logs. This material is consumed in a prescribed fire, to reduce potential wildland fire behavior and severity, in the event of an unplanned ignition in the same area.

3.2.4 Traditional Ecological Knowledge Burns

Traditional ecological knowledge resource burns may be conducted to protect, restore, or facilitate improved production or collection of specific plants, trees, or seeds. The use of prescribed burning for cultural resources should be planned and implemented in collaboration with local Tribal Representatives.

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3.2.5 Training Burns

Prescribed burns may be used for training by Midpen employees and cooperating agencies. Training burns can be conducted without ignitions (i.e., “mock burns”), allowing personnel to coordinate under a unified command, test communications, equipment interoperability, and contingency response before conducting live burn activities. Live burn activities train personnel on wildland fire suppression tactics. Training burns are conducted under the direction of the Burn Boss with the primary objective of providing training opportunities or integrated into burns that also meet ecological, cultural, or fuels reduction goals.

3.2.6 Prioritization of Multiple Unplanned Ignitions

In the case of multiple ignitions, Midpen may need to work with an incident management team to provide recommendations that could be used to prioritize fire suppression activities on Midpen lands. Ultimately, the tactics used to suppress wildfire are at the discretion of the Incident Commander (IC). If requested by the IC, Midpen is prepared to help designate natural areas where a resource could benefit from fire, suppression efforts may be aided by allowing the wildland fire to burn through these areas allowing firefighters to make tactical decisions such as lighting backfires or choosing a better location for a control line. Limited equipment, aircraft, and crews can be deployed to stop a wildland fire at the best locations to protect public safety rather than trying to protect natural areas that will benefit from a fire. This type of burn will never dictate suppression tactics but only identify areas that may be lower priority from the perspective of Midpen for suppression when resources are limited or when requested by the IC.

3.3 Delineation of Potential Burn Units

3.3.1 Overview

Burn units are discrete units of land that will be treated under a single prescribed Burn Plan. Prescribed fire burn units will generally consist of continuous vegetation types or multiple vegetation types that can be burned simultaneously (e.g., grassland under live oak forest). Units are sized to allow a prescribed fire to be implemented in one operational period (typically defined as an 8- to 12-hour shift of active fire, with follow up patrol and mop up as needed). Unit boundaries will tend to follow existing infrastructure (roads, trails, and disclines) where feasible and will generally be dominated by one vegetation type (e.g., grasslands, shrublands, oak woodlands). In some cases, multiple vegetation types may be burned within the same unit where control line construction, topography, vegetation boundaries, and access constrain burning a single vegetation type.

3.3.2 Methods

Midpen lands have been delineated into potential burn areas based on topography, similar vegetation types, and existing infrastructure to the extent available. Refer to Appendices A and B for maps of the delineated potential burn areas in relation to vegetation departure from historical conditions and historical fire regimes (USDA, 2022). The historical fire regime data

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describes the historical fire return interval (number of years between fires) and fire severity (amount of vegetation killed) expected under a pre-European contact fire regime. The vegetation departure describes the relative difference in current vegetation from what historically could have been expected to be present before European contact.

Due to extreme slopes, certain vegetation types, or sensitive resources, not all potential burn areas will be further delineated into burn units for a prescribed burn. Burn units will be identified within the potential burn areas using a combination of local fieldwork, resource and fire management expertise, geospatial analysis, and information from current and/or future local, county, or regional fuels management strategies. Once a burn unit is identified and determined to be a high priority (refer to Sections 3.4 and 3.5 for how this is determined), a Burn Plan will be prepared to describe the prescribed burn procedures to be used for that burn unit (refer to Section 3.6.2 for a description).

3.4 Requirements for Identification of Suitable Burn Units

Before initiating planning for a prescribed burn under the PFP, a critical path item for Midpen is to determine if a Midpen Resource Advisor (also referred to as READ), who has expertise and experience on Midpen resource management goals, policies, and programs, is available to assist in the planning, implementation, and post-prescribed burn activities. The Midpen Resource Advisor(s) will determine which areas on Midpen lands are suitable for prescribed burning in any year by reviewing the following checklist. This checklist was developed to identify which burn unit(s) meet the minimum criteria for burning.

Table 3-1 Requirement Checklist

Requirement	Requirement Met
Step 1, Midpen determines if:	
A Midpen Resource Advisor is available to assist in the planning, implementation, and post-prescribed burn activities.	<input type="checkbox"/>
Step 2, the Midpen Resource Advisor determines whether:	
Relevant partners (e.g., fire agencies, tribes) are supportive and, as appropriate, able to provide resources for the burn unit(s).	<input type="checkbox"/>
The burn unit(s) are covered by an existing Biological Opinion, if needed, based on species present.	<input type="checkbox"/>
Potential adverse effects from fire on sensitive resources in the burn unit(s) can be avoided or minimized.	<input type="checkbox"/>
Adequate resources are available and can be dedicated to conduct post-fire monitoring and response (e.g., erosion control, invasive species).	<input type="checkbox"/>

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Requirement	Requirement Met
The burn unit(s) generally have a moderate or high departure from its historical seral stages, vegetation patterns, and fire regimes (refer to Appendix A for modeled departure) for burns with the primary objective of ecological restoration, fuel reduction, or traditional ecological knowledge.	<input type="checkbox"/>

3.5 Considerations for Prioritization of Burn Units

The prioritization criteria specified by the READ and fire professionals for prescribed burns will be defined in the future as part of each individual Burn Plan, but may include condition of area or burn unit in terms of forest health, presence of invasive species, and extent of fuel loads; location and ability to manage the burn; and type of vegetation with consideration for improvement of ecosystem function through prescribed burning. Initial burns may focus on re-establishing prescribed fire training areas. These areas will be used for interagency training on live fire and simulated fires to improve resource coordination between Midpen and its neighboring local, state, and federal fire agencies that may participate in future burns.

The following considerations for prioritization shown in Table 3-2 will be used by Midpen staff to assist in determining which burn units to undertake in a given year. The criteria considered are not limited to those presented. Burn units will be identified by Midpen staff as important areas based on the primary burn objective. Certain prioritization criteria are associated more closely with a particular primary burn objective. As such, when Midpen identifies a primary burn objective, some associated prioritization criteria shown in Figure 3-1 are likely to be a higher priority than other criteria.

Table 3-2 Potential Burn Unit Prioritization Criteria

Criteria	
Biological Resource Benefits	<ul style="list-style-type: none"> • Maintain wildlife connectivity • Enhance habitats and vegetation communities • Create a mosaic of habitats • Prevent vegetation type conversion and succession • Encourage nutrient cycling • Manage pests and forest pathogens • Increase vegetation, wetland, and forage productivity • Improve forest health and biodiversity
Cultural Resource Benefits	<ul style="list-style-type: none"> • Enhance ethnobotany • Maintain cultural landscape • Encourage cultural burning practices

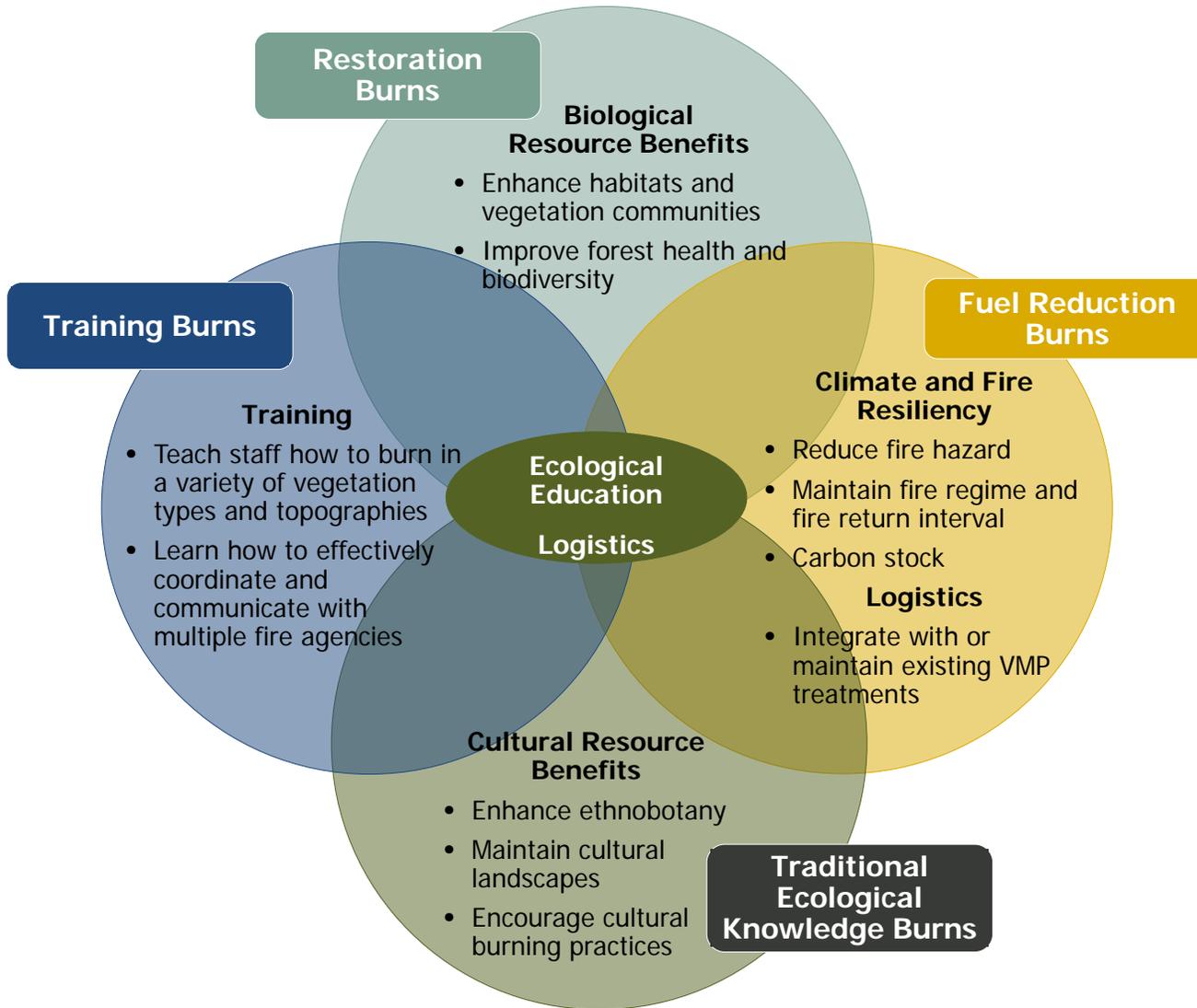
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Criteria	
Climate and Fire Resiliency	<ul style="list-style-type: none"> • Reduce fire hazard and severity • Maintain appropriate fire regime and fire return interval (refer to Appendix B for historic fire regimes) • Address current vegetation departure from modeled historical vegetation class • Stabilize and retain carbon stock • Improve forest resilience to drought, forest pathogens, and insects
Ecological Education	<ul style="list-style-type: none"> • Educate the public on the benefits of burning • Increase public knowledge and comfort associated with fire in the landscape
Training	<ul style="list-style-type: none"> • Teach staff how to burn in a variety of: <ul style="list-style-type: none"> – Vegetation types – Topographies • Learn how to coordinate and communicate with multiple fire agencies effectively • Provide fire suppression experience with live fire for Midpen and fire agency(ies) staff
Logistics	<ul style="list-style-type: none"> • Ease and safety of a burn with consideration for: <ul style="list-style-type: none"> – Access – Size – Existing staging areas and control lines – Presence of infrastructure and adjacent uses – Previous treatments – Vegetation types – Fuel loads – Weather – Time of year, particularly in relation to pre-fire suppression fire season – Opportunities for effective smoke management • Appropriate staffing availability • Adequacy of spatial data and maps • Need for new control lines • Improve connectivity of cross-jurisdiction treatments • Integrate with or maintain existing treatment areas under the VMP or other Midpen programs • Ability to: <ul style="list-style-type: none"> – Retain wildlife refugia – Maintain adequate buffers around protected areas/resources

Note: Criteria presented are not in a specific hierarchy of importance.

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Figure 3-1 Relationship Between Burn Objectives and Potential Prioritization Criteria



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3.6 Required Plans

3.6.1 Overview

An approved Burn Plan and SMP, and as appropriate a burn permit, are required before ignition of a prescribed burn. Additionally, the Bay Area Air Quality Management District (BAAQMD), Monterey Bay Air Resource District (MBARD), or other approving entity must be notified of the proposed prescribed burn with appropriate documentation submitted (e.g., Prescribed Burning Smoke Management Plan (Form Rx-1) form, Smoke Management Permit).

3.6.2 Burn Plan Preparation

Burn Plans typically specify the burn unit-level approach that is within the responsibility of the Burn Boss to know and implement. A Burn Plan generally outlines burn unit level information as follows:

- how a burn will be conducted
- resource needs
- burn prescriptions
- potential resources of concern (e.g., communities, biological)
- burn-specific measures
- public outreach and notification
- weather parameters for burning
- burn team communication protocols
- personnel and equipment needed for implementation/mop up/patrol
- contingency strategies to address unanticipated changes during the burn
- general smoke management controls and considerations
- post-burn monitoring

Burn Plans are prepared using a process and template that is followed by the burn plan preparer. Generally, the process for preparing Burn Plans on federal lands is specified by the National Wildfire Coordination Work Group (NWGC), and the process for preparing plans on private lands in California is overseen by CAL FIRE. Both entities provide a Burn Plan preparation guide and template, which may be updated and distributed as burn planning requirements change. The latest NWGC prescribed fire template is available at this [link](#) and the most recent CAL FIRE prescribed fire guidebook, which includes a template, is available at this [link](#) (NWCG, 2022; CAL FIRE, 2019).

Burn Plans are prepared by a qualified burn plan preparer, who is either a qualified prescribed fire Burn Boss or competent trainee under the direct supervision of a qualified Burn Boss. The Burn Plan then undergoes technical review by a qualified Burn Boss with local knowledge and experience. The Burn Boss then approves the Burn Plan. Finally, the Burn Plan is provided to the appropriate approving entity prior to the prescribed burn for review, which include entities such as CAL FIRE, local, or county fire departments, and BAAQMD and MBARD.

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3.6.3 Burn Planning and Design Requirements and Potential Measures

Prescribed burns are required to adhere to regulations and any Midpen-specific permits and environmental compliance, which will be noted in the Burn Plan. All stipulations relevant to prescribed burning in the latest Native Endangered and Threatened Species Recovery Permit (Recovery Permit) for California red-legged frog (CRLF) or San Francisco garter snake (SFGS) issued by the U.S. Fish and Wildlife Service (USFWS) are relevant. Relevant stipulations include but are not limited to required burn windows¹ when conducting a prescribed burn in suitable CRLF and SFGS habitat, reasonable attempts to leave refugia, and notification of USFWS prior to a burn. Midpen certified the Program Environmental Impact Report (PEIR) for the Program, which included the programmatic PFP, in May 2021 (Midpen, 2021). The certified PEIR consists of a variety of mitigation measures and Midpen best management practices relevant to burning that must be adhered to.

Burn Plans may incorporate additional unit-level best management practices (BMPs) as needed to address local resource protection or other concerns at the unit level. These BMPs include specific precautionary actions to minimize the potential for erosion following a burn, reduce smoke during a burn, control the burn, and preserve important ecological layers that exist at and below the ground surface. The following prescribed fire BMPs are examples that could be included in a Burn Plan (USEPA, 2019):

- Develop and implement a smoke management plan in accordance with current relevant local, CAL FIRE, and BAAQMD or MBARD guidelines;
- Develop and implement a firing plan that best meets unit-level resource objectives for vegetative cover;
- Utilize existing roads and trails for firebreaks where safe and feasible;
- Build waterbars and stabilize constructed control lines as needed to reduce direct erosion into streams;
- Limit the use of mechanical equipment for control line construction in riparian areas;
- Protect against excessive erosion or sedimentation to the extent practicable;
- Carefully handle and dispose of oil and fuel for equipment and vehicles. Spills, leaks, empty containers, and filters are potential sources of soil and water contamination if improperly managed;
- Develop and implement a spill contingency plan identifying all actions to be taken in the event of a chemical spill, including phone numbers for federal, state, and local agencies that must be notified; and
- Avoid constructing waterbars in control lines that divert surface runoff directly into streams.

¹ Burn windows are described as the period of time during which a prescribed burn may be scheduled for ignition.

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3.6.4 Smoke Management Plan

Smoke management is an important component of the planning process. The California Air Resources Board (CARB) has adopted Smoke Management Guidelines, which will be used to create the SMP. The SMP specifies the “smoke prescription” for a specific burn, which is an assessment of the air quality, meteorological, and fuel conditions of the proposed burn in greater detail and with a broader scope than what is addressed in the Burn Plan. Depending on the size and complexity of the burn, the SMP will contain some or all of the following types of information:

- Burner name and contact information
- Burn method
- Fuel type and moisture levels
- Meteorological parameters (e.g., wind vector, temperature)
- Nearby population centers
- Planned burn time
- Acceptable burn ignition conditions
- Contingency planning for smoke management
- Burn monitoring procedures
- Location and size of the burn
- Expected pollutant emissions
- Smoke travel projections, including maps
- Duration of the burn
- Smoke minimization techniques
- Description of alternatives to burning
- Public notification procedures

A Burn Plan will be drafted and may be reviewed by the appropriate fire agency that has jurisdiction (e.g., CAL FIRE, local fire agency). During certain times of the year, a burn permit will be issued by the relevant fire authority. A permit to burn will always be required by BAAQMD or MBARD and may require submittal of an SMP to be approved.

Midpen will organize the resources needed to conduct the burn, notifying the public and adjacent neighbors about the planned timing and specifics of the burn and obtaining final BAAQMD or MBARD authorization to conduct the burn following the prior approved Burn Plan. BAAQMD or MBARD will be notified of the proposed prescribed burn by submitting a smoke management plan via the online program Prescribed Fire Information Reporting System (PFIRS). Midpen will contact BAAQMD or MBARD up to 96 hours prior to the desired burn time to obtain a forecast of the meteorology and air quality needed to conduct the burn safely. Midpen will continue to work with BAAQMD or MBARD, and CARB until the day of the burn to update the forecast information.

BAAQMD or MBARD authorization to conduct a prescribed burn is provided for no more than 24 hours prior to the burn. The individual granted the authority to burn (Burn Boss) is responsible for assuring that all conditions in the approved SMP and burn permit are met

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throughout the burn. Once the fire has been ignited, Midpen and participating firefighting agencies must make all reasonable efforts to ensure the burn stays within the approved SMP prescription. If a burn goes out of its prescription or adverse smoke impacts are observed, the Burn Boss will implement smoke mitigation measures as described in the SMP (CARB, 2019). BAAQMD, MBARD, CARB, or other regulatory entities may update these SMP procedures over time.

3.7 Stakeholder, Public Outreach, and Notification

3.7.1 Overview

Ensuring key stakeholders and the public are educated about the burn goals and objectives, location, and timing is a key component of successful burn implementation. Midpen will determine the extent of the public outreach and notification, depending upon the burn scope and location. These outreach and notification guidelines were developed based on successful prescribed burns in the Santa Cruz Mountain region.

3.7.2 Method and Timing of Outreach

Key stakeholder engagement, including outreach to local Town and City staff/elected bodies, will normally start prior to the finalization of a burn plan. During the planning phase, key stakeholders will be provided an opportunity to provide input into the plan within their area of expertise or purview and as appropriate. Inclusion of any input into a burn plan is at the sole discretion of the burn boss, who is the final authority to approve and amend a burn plan, with concurrence from the District.

The notification process to remind and inform the community about scheduled burns starts once the District's Resource Advisor has identified a potential location(s), objective(s), fire agency partner(s), and burn window. The District would implement several notification methods during public outreach and notification for all future burns.

Under the advisement of or in consultation with the local emergency services and fire agencies, the District may conduct expanded notification to the community using local and regional communication tools and methods (e.g., local and regional social media channels, including requesting support from surrounding Cities and Towns to transmit notifications via their communications channels). This may also involve requesting assistance from local partner agencies (e.g., California Department of Transportation for roadside signs, transmitting notifications via local CalFire/emergency response communications channels) to support additional outreach leading up to and including the day of a prescribed fire.

The public is additionally encouraged to sign up for the appropriate interested parties list (e.g., Wildland Fire) to stay informed of upcoming activities, including prescribed burns. The public can visit <https://www.openspace.org/opt-in> to be added to the appropriate list.

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3.7.3 Content of Outreach

Midpen will determine the specific content of the outreach notifications for each burn to tailor the information, as appropriate. The notices that Midpen disseminates will include the following information, at a minimum, in addition to any specifics that Midpen determines relevant or as required per the individual Burn Plan:

- Location (including the preserve and major intersection(s))
- Objective(s) of the burn
- Fire agency partner(s) involved
- Potential burn window
- Current contact number(s) for the burn coordinator

Table 3-3 Notification Checklist

Notification Method	Completed?
Notification for Which Midpen will be Responsible	
<i>Within 3 Months Leading up to the Proposed Burn Window:</i>	
Update Midpen’s website with information	<input type="checkbox"/>
Provide notifications to Key Stakeholders	<input type="checkbox"/>
<i>Within a Reasonable Period of Time in Advance of the Burn Day (e.g., One Week):</i>	
Install signage at the relevant preserve	<input type="checkbox"/>
Update Midpen’s website with information	<input type="checkbox"/>
Notify adjacent neighbors/homeowner’s associations	<input type="checkbox"/>
Provide notifications to key stakeholders and the relevant public	<input type="checkbox"/>
<i>At Least Two Days Prior to the Burn Day:</i>	
For a less than 50-acre burn: ^a	<input type="checkbox"/>
<ul style="list-style-type: none"> • Notify individuals and jurisdictions within 1 mile, and • Install notices at trailheads and access roads leading to the burn unit 	
For a 50-acre burn or larger: ^a	
<ul style="list-style-type: none"> • Notify a larger region, determined by Midpen 	
Notification Under the Discretion of Other Agencies/Partners	
<i>Within 3 Months Leading up to the Potential Burn Window:</i>	
Engage with partners who may amplify Midpen’s messages to their audiences	<input type="checkbox"/>
<i>Day of the Burn:</i>	
When relevant, install road signs on adjacent major thoroughfares ^b	<input type="checkbox"/>
Use relevant county push notification	<input type="checkbox"/>

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Notification Method	Completed?
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Notes:

- ^a Required per Mitigation Measure Air Quality-2 of the PEIR.
 - ^b Mitigation Measure Hazards-3 of the PEIR has certain stipulations that when met require signage along adjacent roads.
-

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4 Burn Unit Preparation for Prescribed Fire

4.1 Mechanical Pre-Treatment

Burn units may receive limited mechanical pre-treatment to improve or install control lines for operational safety. Treatments may include, but are not limited to mowing, mastication, chipping, falling of snags, and brushing of roads, and could encompass:

- Removal of live limbs of trees up to 10 feet above the ground to minimize the potential for fire to spread to the canopy;
- Scattering and/or mastication of the accumulated dead and decadent woody brush;
- Top-cutting and on-site scattering of green brush (particularly broom) a minimum of 60 days before the burn event to cure, which facilitates horizontal fire spread during the event and reduces smoke production; and
- Installation of control lines (refer below) where natural control lines such as roads, trails, or water bodies are unavailable.

The pre-treatments will generally follow those described in Chapter 4: Vegetation Management Plan of the Program. Limbing, scattering, and masticating dead material and top-cutting of green material may occur many months to days prior to the burn event, depending on the larger project goals and site conditions. The work is accomplished using heavy equipment, power tools, and/or hand tools.

Pile burning may be used to remove the cut or dead vegetative material where chipping, hauling, or decomposition are not feasible. Piles can be constructed of vegetative material, covered (to keep dry) and burned when conditions are wet. Pile burning can impact soils directly underneath the pile due to excessive heating. Depending on the surrounding vegetation and under the advice of a Midpen Resource Advisor, the charred remains may be raked out and the site will be allowed to passively revegetate and/or directly seeded with native Santa Cruz Mountain plants.

Pile burning is a method of biomass disposal that uses fire to eliminate piles of dried plant material. Piles vary in size from 5 to 10 feet in diameter and 4 to 6 feet in height. Piles are constructed in concert with brush or weed removal and are placed in openings away from power lines and tree canopies to allow for safe ignition at a later date. The composition of piles varies with vegetation type, and could consist of chaparral species, broom, as well as hardwoods and conifer limbs. The total volume of material allowed to be pile burned in a year is addressed under the VMP in the overall Program.

Pile burning occurs under the direction of Midpen employees on days when weather and fuel conditions meet the specifications of the BAAQMD and MBARD. Multiple piles may be burned

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on a single day. Drip torches are used to start ignitions, with fuel use limited to 10-gallons or less per day. Midpen employees remain on-site with fire suppression equipment, including a water supply (e.g., tender), to ensure safety and to extinguish embers by each workday's end.

4.2 Creation and Maintenance of Control Lines

Where feasible and effective, Midpen will utilize existing control lines (also known as firelines), including paved roads, dirt roads, trails, and disclines. These existing lines may be improved by clearing accumulated vegetation on or near the lines; removing dead trees that may fall on, near, or across lines; blacklining; and widening. Blacklining involves the pre-burning of fuels adjacent to a control line before igniting a prescribed burn. Blacklining is usually done adjacent to a control line during periods of low fire danger prior to the prescribed burn to reduce heat on holding crews and lessen chances for spotting across the control line during the main burn. In fire suppression, a blackline denotes a condition where there is no unburned material between the control lines and the fire edge.

Control line installation occurs within a few weeks or days of the burn event and may be accomplished with heavy equipment or hand tools. A new control line may be installed through mowing, mastication, scraping, or wetting. The method and width of a new control line, if needed, will be determined by Midpen in coordination with the Burn Boss and then detailed in the Burn Plan. New control lines will be constructed to standards described in the Burn Plan but will generally be 1.5 times as wide as the height of the fuel that will carry the fire, depending on location, vegetation type, and type of equipment used to construct the line. The fuel that will carry the fire refers to what will burn during a prescribed burn rather than all fuels present. For example, the fuel in a forest consists of leaf litter and understory vegetation, not the tree canopy. In grasslands, a control line may involve mowing a swath up to 10 feet wide. Control lines in shrub communities may need to be up to 30 feet wide. Forest communities may need a control line up to 10 feet wide.

Hose lays may be used along control lines at the discretion of the Burn Boss or as described in the unit-level Burn Plan. Temporary control lines will be rehabilitated as needed once the Burn Boss declares the prescribed fire out.

5 Prescribed Fire Implementation

5.1 Overview

This section describes how prescribed burns are carried out, including equipment, personnel, burn ignition, mop up, rehabilitation and schedules.

5.2 Equipment and Personnel

The unit-level Burn Plan and Incident Action Plan (IAP) will describe the specific equipment and personnel needed to conduct a burn. The Burn Plan describes the firing, holding, patrol, mop up, and monitoring staff needs and qualifications needed to implement an individual burn based in part on that burn's individual complexity rating and IC discretion. A typical IAP contains the incident objectives, the organizational structure, the division-specific assignments, the communication plan, and the medical plan. Depending on the project's complexity, additional elements can be added to the IAP.

While Midpen employees will take the lead on defining the location, objectives, goals, and monitoring of the prescribed fire, CAL FIRE, another local fire agency, and/or contractors will take the lead role in approving, conducting, and supervising all operational activities. Typically, designated Midpen employees are trained to provide a discrete supporting role during prescribed burns, such as suppression or holding staff or Resource Advisors.

Prescribed burns are generally staffed with the personnel and equipment needed to implement and monitor the burn. The staffing level can vary by the burn's complexity rating (e.g., size, fuel types) and burn window weather conditions. For example, a 100-acre burn in timber understory under cool

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Agency Administrator - Authorizes the prescribed fire and assigns Burn Boss to execute prescribed fire under predefined conditions.

Burn Boss - Ensures that all prescribed fire plan specifications are met before, during, and after a prescribed fire. Supervises all prescribed fire resources and is responsible for the safe and effective implementation of the prescribed fire.

Firing Boss - Leads ground ignition operations and is responsible for the safety and coordination of assigned resources on prescribed fire and wildfire incidents. Reports to the Burn Boss and coordinates with the Holding Specialist.

Holding Specialist - Supervises all resources that are responsible for ensuring the prescribed fire stays within the burn unit boundaries. Reports to the Burn Boss and coordinates with Firing Boss.

Resource Advisor - Provides professional knowledge and expertise for the protection of natural, cultural, and other resources within an incident environment.

Fire Effects Monitor - Responsible for collecting incident status information and providing this information to the Burn Boss. The information may include fire perimeter location, onsite weather, fire behavior, fuel conditions, smoke, and fire effects information needed to assess firefighter safety and whether the fire is achieving established incident objectives and requirements.

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conditions may require 25 firefighting staff, versus the same burn unit under hot conditions may require 60 firefighting staff.

General types of equipment needed during burn implementation will be similar to those already listed for vegetation management activities within Chapter 4: Vegetation Management Plan of the Program and may include fire engines of different sizes (depending on the cooperating agency or contractor equipment), fire hose, hand tools, chainsaws, and approved ignition devices. In some cases, contingency equipment may include a bulldozer, additional fire engines, and additional personnel. Additional aerial equipment may include helicopters of different sizes if needed for implementation or contingency.

5.3 Safety Precautions

The unit-level Burn Plan will describe burn unit safety, including potential hazards and mitigations. These precautions can include, but are not limited to, managing individual firefighter safety through proper command structure, personal protective equipment, training, and hydration. Mitigating risks of potential falling live and dead trees or managing vehicle and human traffic within the proximity of the burn will be considered. In addition, contingency planning for excessive smoke production and a wildfire declaration element are a part of every Burn Plan, which describes how the Burn Boss and staffing resources will regain control of the fire should it move outside of established control lines.

5.4 Prescribed Burn

5.4.1 Prescribed Burn Ignitions and Implementation

The prescribed fire will be ignited in the planned burn units using approved ignition devices, which in most cases will be a drip torch, but may include other equipment such as hand-held flares (“fusee”), hand launched devices, or similar methods or potentially aerial ignitions via a helicopter or unmanned aerial vehicle (UAV) for dangerous or difficult to access locations. Aerial ignitions often use a Plastic Sphere Dispenser, but may include helitorch operations. The Burn Plan will describe the general ignition pattern such as a strip head fire, dot ignition, or other, with discretion given to the Burn Boss to use the pattern they deem most appropriate given local vegetation and weather conditions. The prescribed fire is allowed to burn to the control lines that define the burn unit. Areas that do not burn during a prescribed burn can serve as refugia to give wildlife a place to safely retreat to during burning.

5.4.2 Physical Control During the Burn

The prescribed fire will be controlled using methods and resources described in the unit-level Burn Plan under the direction of the Burn Boss. Control will be accomplished by or with hand crews, fire engines, hose lays, portable pumps, backpack pumps, and hand tools. Aerial support via helicopter or UAV on more complex burns may be utilized as well.

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5.4.3 Mop Up

Mop up is the process by which the prescribed fire is safely put out. Mop up is when firefighters extinguish or remove burning material near the control lines. Select snags or trees may need to be taken down because of fire inside their trunk. Logs may need to be trenched to prevent rolling after an area has burned. Putting out any flames or stirring up a hot spot that is smoking is also done. The work starts along the back or cooler sides of an active fire as soon as possible. Depending upon multiple factors (e.g., fire behavior, weather forecast), some crew members may remain on site for extended periods (overnight). Mop up work is generally performed all the way around a fire's edge. Mop up will be conducted using hand crews, equipment, hose lays, or other methods as described in the unit-level Burn Plan.

5.4.4 Rehabilitation

Rehabilitation consists of the decommissioning of control lines as well as follow-up weed control after a prescribed fire. Proposed rehabilitation activities must be approved by the READ, such as the spreading of procured native seed or planting of nursery stock. Control line decommissioning is generally limited to the manual re-distribution of duff and brush back into the previously cleared lines. This spreads native seed back into the lines to facilitate natural revegetation. It also provides erosion control and discourages the formation of social trails. Because some weed seeds are stimulated by fire or become readily established in post-fire settings, Midpen Early Detection Rapid Response (EDRR) crews will patrol prescribed burn sites for 1 to 5 years as needed following a burn event to identify the need for weeding or additional restoration work.

5.5 Schedule and Timing for Prescribed Burn Program Implementation

Midpen anticipates conducting one to three prescribed burns annually during the first three to five years of the Program. Individual burns in the first few years are expected to be lower complexity burns of a smaller size. Annual burning during the first several years is expected to average up to 100 acres, but depending upon crew availability and burn conditions could be as much as 500 acres. In the longer term, high complexity and larger individual burns, in terms of size (e.g., up to 100 acres) and duration, may be implemented depending on capacity, local fuel, and weather conditions. After three to five years, Midpen may implement as much as three burns a year or more. Annual acreage burned under this program will not exceed 500 acres per year.

Prescribed burns typically occur from June through November, but other times of year may also be considered. The timing of a prescribed burn depends on a set of conditions that considers the safety of the public, fire staff, and probability of meeting the burn objectives. Environmental conditions considered include but are not limited to, windspeed, fuel moisture levels, air temperature, and relative humidity. Other considerations could include natural and cultural resource protection requirements and permitting restrictions.

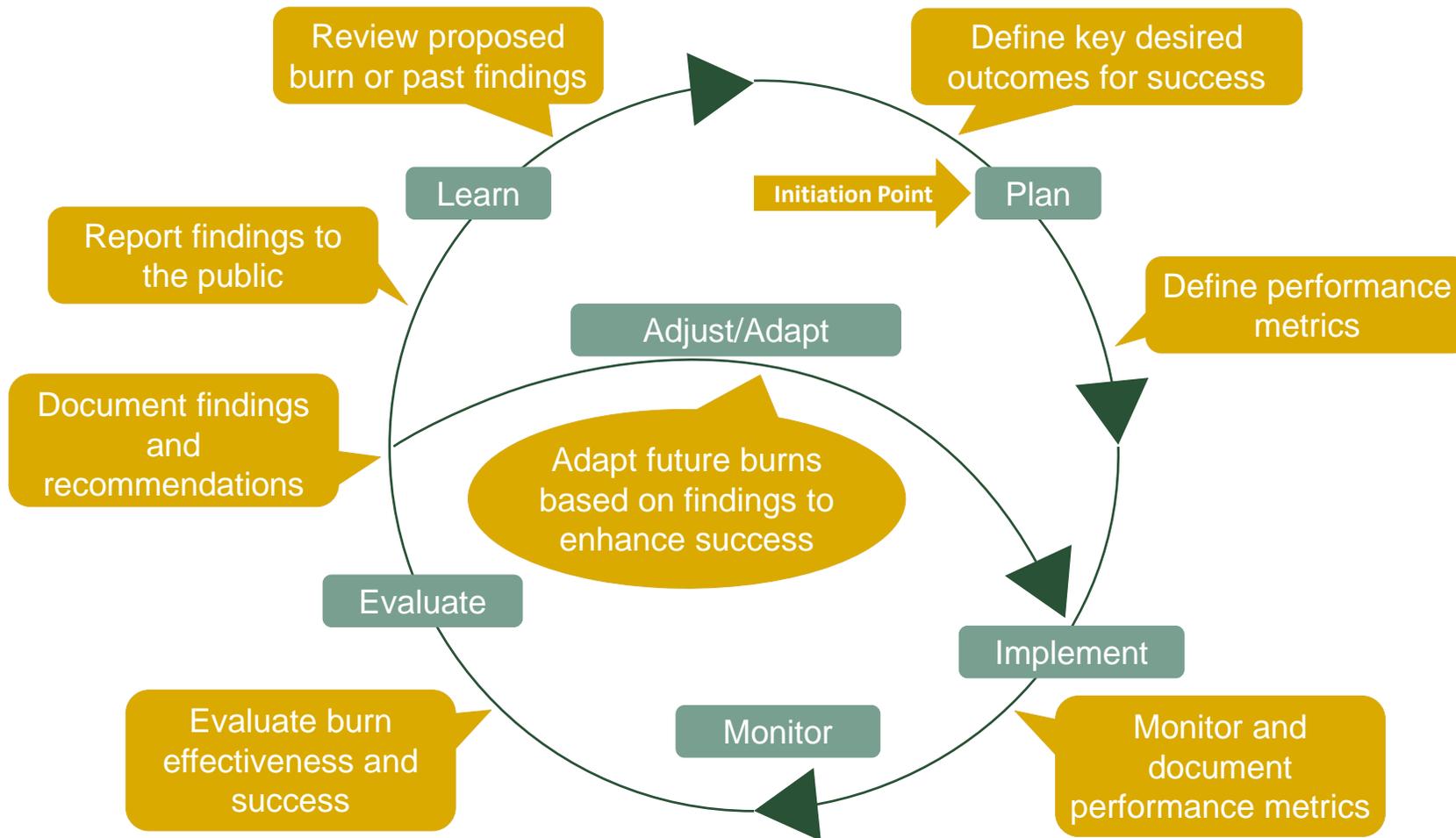
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6 Monitoring and Adaptive Management

Midpen has an extensive Monitoring Plan (Chapter 7 of the Program) that describes a range of monitoring methods that can be used to assess vegetation, wildlife, weather, and other natural resources. Prescribed burns may have multiple aspects to monitor prior to, during, and for a specific period after the burn. These parameters can include changes in fuel load, vegetation cover, or the presence of wildlife. Individual burn units will be monitored for resources described in the unit Burn Plan and consistent with the Monitoring Plan detailed in the Program. It should be noted that monitoring methods may evolve from the current Monitoring Plan as new technologies or scientifically acceptable methods become available in the future. Monitoring of prescribed burns may provide opportunities for student and professional research on fire ecology, where appropriate. Information learned from burn unit monitoring can be used to modify or improve management approach for future prescribed burns using the adaptive management framework (refer to Figure 6-1).

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Figure 6-1 Monitoring and Adaptive Management Framework



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**APPENDIX A VEGETATION DEPARTURE FROM HISTORIC
VEGETATION ON MIDPEN LANDS**

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**APPENDIX B HISTORIC FIRE REGIMES ON MIDPEN LANDS POLICY
REPORT**
