Midpeninsula Regional
Open Space District

R-26-39
Meeting 26-09
March 25, 2026

AGENDA ITEM 6

AGENDA ITEM

Integrated Pest Management Program 10-Year Update

GENERAL MANAGER'S RECOMMENDATION(S)

Review the proposed revisions to the Integrated Pest Management (IPM) Program as part of the 2025 Update and consider ratifying these revisions by:

1. Adopting a resolution approving an addendum to the IPM Program Final Environmental Impact Report that analyzes these revisions; and
2. Approving the 2025 IPM Program revisions.

SUMMARY

The General Manager recommends that the Board of Directors (Board) for the Midpeninsula Regional Open Space District (District) approve the 10-year update and revisions to the IPM Program, inclusive of minor modifications, and adopt a resolution approving an addendum to the certified Final Environmental Impact Report (EIR) for these IPM Program revisions.

DISCUSSION

The District's IPM Program provides a structured approach to preventing, detecting, and managing invasive plants and other pests on District lands while protecting natural resources and supporting safe public access. On December 10, 2014, the Board certified the Final EIR for the IPM Program and adopted Findings of Fact and a Mitigation Monitoring and Reporting Program (MMRP), and approved the District's IPM Policy. On February 27, 2019, the Board adopted a resolution approving an addendum to the certified Final EIR for the IPM Program and related minor project modifications.

This new, 2025 10-year update is intended to keep the Program current with evolving best practices, operational needs, regulatory listings, and the District's broader stewardship and resource protection priorities, while maintaining the underlying Program purpose and overall approach previously reviewed by the Board.

The 10-year update maintains the IPM framework and management categories, but refines elements of how the Program is implemented. The proposed minor modifications include updates to the tools and methods available under the Program (including refinements to treatment actions for certain pest types), updates to the pesticide list and related application parameters used to implement the IPM approach, clarifications to program implementation measures, and updates to reflect current conditions and related District programs that intersect with pest management. The update also clarifies program protections for additional Special-Status Species that have been listed since certification of the 2014 EIR and adoption of the 2019 addendum, without changing the Program's core mitigation approach or adopted mitigation measures. See Attachment 2: Change Analysis Report and Attachment 3: IPM Guidance Manual for more details.

An addendum under CEQA is used when changes to a previously approved project are minor and do not require major revisions to the prior environmental document. The addendum evaluates the potential environmental consequences across the relevant CEQA issue areas and compares the potential for impacts associated with the proposed update and minor modifications incorporated into the 10-year Program update against the analysis and conclusions in the certified 2014 EIR and the 2019 addendum. The addendum concludes that the proposed minor modifications would not result in new significant environmental effects or a substantial increase in the severity of previously identified significant effects.

In the second quarter of this fiscal year, staff solicited and received stakeholder feedback related to invasive species management and prioritization. Comments generally supported the importance of addressing invasive species and offered recommendations on implementation priorities. Key themes included minimizing herbicide use where feasible and emphasizing manual or non-chemical approaches, and being mindful of soil stability, erosion potential, and hydrologic function during vegetation management. Staff will continue to incorporate these themes through program implementation, consistent with the IPM framework's emphasis on prevention, least impact methods when effective, and appropriate resource protection measures, while balancing operational feasibility, treatment effectiveness, and site-specific conditions.

The Board's action is limited to approving the CEQA addendum documenting environmental review for the 10-year update and approval of the minor Program modifications. Approval does not change the District's commitment to the mitigation measures and resource protection measures adopted with the 2014 EIR and 2019 addendum and reflected in the MMRP. As with prior implementation, day-to-day execution of the IPM Program will continue to rely on site-specific planning, professional judgment, and continued review of emerging research and best available information to support safe and effective pest management on District lands.

FISCAL IMPACT

None

PRIOR BOARD AND COMMITTEE REVIEW

February 27, 2019 – The Board of Directors (Board) adopted a resolution approving an addendum to the certified Final Environmental Impact Report for the Integrated Pest Management (IPM) Program and related minor project modifications (R-19-11,Minutes).

December 10, 2014 – The Board adopted a resolution certifying the Final Environmental Impact Report and adopting Findings of Fact and a Mitigation Monitoring and Reporting Program (MMRP), in accordance with CEQA, for the IPM Program, and approved the IPM Policy (R-14-148, minutes).

PUBLIC NOTICE

Public notice was provided as required by the Brown Act. In addition, public email notices were sent to the Natural Resource Management interested parties list.

CEQA COMPLIANCE

The District certified a Final Environmental Impact Report (EIR) for the IPM Program in 2014, and the Board previously approved an addendum in 2019. An addendum to the certified 2014 EIR has been prepared to evaluate the potential environmental effects of minor modifications to the IPM Program pursuant to CEQA.

The proposed minor modifications would not alter any of the conclusions of the 2014 EIR or the 2019 addendum. The addendum concludes that no new significant environmental effects and no substantial increase in the severity of previously identified significant effects would result from the project modifications. The addendum also evaluates the IPM Program and proposed modifications in relation to additional Special-Status Species and concludes the Program, together with the proposed modifications, would not result in new significant impacts to those species.

The proposed minor modifications would not substantially change the mitigation measures adopted as part of the 2014 EIR, including their feasibility or implementation, as reflected in the MMRP. Mitigation Measures 4.2-1a through 4.2-1c have been revised to broadly address special-status amphibian, reptile, fish, and invertebrate species. This clarification does not reflect newly identified significant impacts, does not add new mitigation, and does not substantially change the IPM Program or the proposed minor Program modifications.

In accordance with CEQA Guidelines sections 15162 and 15164, the District concludes that an addendum is the appropriate CEQA document because the project modifications constitute minor technical changes to the previously approved Project and do not require major revisions to the 2014 EIR. The addendum, considered together with the 2014 EIR, the MMRP, and the 2019 addendum, provides sufficient environmental documentation for the proposed minor modifications, and no Supplemental or Subsequent EIR is required.

NEXT STEPS

If approved, the District will file a Notice of Determination with the Santa Clara, San Mateo, and Santa Cruz County Clerk-Recorder's Offices, which initiates a 30-day public notification period. Staff will also file a Notice of Determination with the State Clearinghouse within five (5) days of Board action. The EIR Addendum will be available for public review at the District's Administrative Office and will be posted on the District's website. Staff will implement the minor technical modifications to the Project and Natural Resources staff will continue to review and incorporate relevant new research on human and environmental health as it relates to implementation of the Integrated Pest Management Program.

Attachments

1. Resolution adopting Addendum to the IPM Program EIR
2. Change Analysis Report
3. IPM Guidance Manual, Red-Lined

Responsible Department Head:
Kirk Lenington, Natural Resources

Prepared by:
Coty Sifuentes-Winter, Senior Resource Management Specialist, Natural Resources

Contact person:
Miranda Melen, Resource Management Specialist III, Natural Resources

RESOLUTION NO. 26-X

RESOLUTION OF THE BOARD OF DIRECTORS OF THE MIDPENINSULA REGIONAL OPEN SPACE DISTRICT APPROVING AN ADDENDUM TO THE ENVIRONMENTAL IMPACT REPORT FOR THE INTEGRATED PEST MANAGEMENT PROGRAM

WHEREAS, pursuant to the California Environmental Quality Act (Public Resources Code § 21000 *et seq.*) ("CEQA"), the Midpeninsula Regional Open Space District (the "District") is the lead agency for environmental review of the Integrated Pest Management Program ("IPM Program"); and

WHEREAS, on December 10, 2014, the District's Board of Directors (the "Board") certified the Environmental Impact Report ("EIR"), made certain findings of fact, approved a Statement of Overriding Considerations and a Mitigation Monitoring and Reporting Plan ("MMRP"), and approved the IPM Program by adopting Resolution No. 14-37, and Addenda thereto; and

WHEREAS, the EIR evaluated the IPM Program pursuant to CEQA; and

WHEREAS, subsequent to the certification of the EIR, the District identified certain modifications to the previously approved IPM Program, including the addition of three new pesticides, two new pesticide application methods, consideration of two new species of special concern, and clarification of Best Management Practices and one mitigation measure from the EIR ("2019 Modifications"); and

WHEREAS, on February 27, 2019, the Board approved an addendum to the EIR incorporating the 2019 Modifications into the IPM Program ("2019 Addendum") by adopting Resolution No. 19-05; and

WHEREAS, the District has identified certain additional minor modifications to the IPM Program, including updates to available tools and methods, updates to the pesticide list and related application parameters, clarifications of program protections for additional special-status species listed since the 2019 Modifications, and other minor updates and clarifying revisions (the "2026 Modifications"); and

WHEREAS, the 2026 Modifications are desirable to the District because they keep the IPM Program current with evolving best practices, operational needs, and regulatory listings, while maintaining consistency with the IPM Program's purpose; and

WHEREAS, the District has prepared an addendum to the EIR in accordance with CEQA Guidelines section 15164 to describe the 2026 Modifications, which is attached hereto and incorporated herein by this reference (the "2026 Addendum"); and

WHEREAS, the 2026 Modifications constitute minor technical changes and would not alter any of the conclusions in the EIR, or result in new significant impacts to the environment, there is no substantial increase in the severity of previously identified impacts, and no new mitigation measures are required.

NOW, THEREFORE, BE IT RESOLVED AND APPROVED by the Board of Directors as follows:

1. The 2026 Addendum to the EIR fully describes the proposed minor changes to the IPM Program and has been prepared in compliance with CEQA (Cal. Public Resources Code section 21000 et seq.) and the CEQA Guidelines (Cal. Code of Regs. section 15000 et seq.)
2. The 2026 Addendum reflects the Board's independent judgment and analysis.
3. In accordance with CEQA Guidelines section 15164, the 2026 Addendum, considered together with the EIR, 2019 Addendum, statement of overriding considerations and the MMRP, adequately addresses the potential environmental impacts associated with the 2026 Modifications.
4. The documents and other materials constituting the administrative record of the proceedings upon which the Board's decision is based are located at the Midpeninsula Regional Open Space District, Administration Office, 5050 El Camino Real, Los Altos, CA 94022.
5. The 2026 Addendum is hereby approved by the Board and shall be considered a part of the District's environmental review of the IPM Program.

* *

PASSED AND ADOPTED by the Board of Directors of the Midpeninsula Regional Open Space District on March __, 2026, at a Regular Meeting thereof, by the following vote:

AYES:
NOES:
ABSTAIN:
ABSENT:

ATTEST:

____
Margaret MacNiven, Secretary
Board of Directors

APPROVED:

____
Zoe Kersteen-Tucker, President
Board of Directors

APPROVED AS TO FORM:

____
Hilary Stevenson, General Counsel

I, the District Clerk of the Midpeninsula Regional Open Space District, hereby certify that the above is a true and correct copy of a resolution duly adopted by the Board of Directors of the Midpeninsula Regional Open Space District by the above vote at a meeting thereof duly held and called on the above day.

____

Maria Soria, District Clerk

Exhibit A: 2026 Addendum to the IPM Program EIR

EXHIBIT A

Midpeninsula Regional Open Space District
Addendum to the Integrated Pest Management Program 2014 Environmental Impact Report
State Clearinghouse No. 2013092033

March 2026

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PANORAMA
ENVIRONMENTAL, INC.

EXHIBIT A

Midpeninsula Regional Open Space District

Addendum to the Integrated Pest Management Program 2014 Environmental Impact Report

March 2026

Prepared for:

Midpeninsula Regional Open Space District

5050 El Camino Real

Los Altos, CA 94022-1404

Prepared by:

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PANORAMA ENVIRONMENTAL, INC.

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Acronyms

2025 IPMP or 10-year Program update	2025 Program
APE	Alkylphenol ethoxylate
BAAD	Bay Area Air District
BAAQMD	Bay Area Air Quality Management District
BEE	butoxyethyl ester
BMP	best management practices
BTI	Bacillus thuringiensis var. israelensis
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
DC	direct current
DDAC	Dodecyl Dimethyl Ammonium Chloride
DE	Diatomaceous earth
DEET	N,N-diethyl-meta-toluamide
DOT	Disodium octaborate tetrahydrate
EDRR	Early Detection and Rapid Response
EIR	Environmental Impact Report
GHG	greenhouse gas
GIS	geographic information systems
IPA	Isopropylamine
IPM	Integrated Pest Management
IPMP or Program	Integrated Pest Management Program
K	Potassium
MEA	Monoethanolamine
Midpen or District	Midpeninsula Regional Open Space District
NA	Not applicable
NMFS	National Marine Fisheries Service
OSMRP	Open Space Maintenance and Restoration Program
OSP or preserves	Open space preserves
oz	Ounce
QAC/QAL	California licensed Qualified Applicator
SCUBA	Self-contained underwater breathing apparatus
SOD	Sudden oak death
SPCA	Structural Pest Control Applicator
TIPA	Triisopropanolamine
Triclopyr BEE	Triclopyr-2-butoxyethyl ester
Triclopyr TEA	Triclopyr triethylamine
US EPA	U.S. Environmental Protection Agency

ACRONYMS

USFWS	U.S. Fish & Wildlife Service
WFRP	Wildland Fire Resiliency Program

1 Project Description

1.1 Introduction

1.1.1 Overview

Midpeninsula Regional Open Space District ("Midpen" or "District") proposes to update its Integrated Pest Management Program (IPMP) or "Program", which comprehensively directs management of pests on District properties. The original IPMP Guidance Manual was adopted by the Board of Directors in 2014, with the intention to revise and update the Program every 10 years. The updated 2025 Program (also referred to as the "2025 IPMP" and "10-year Program update") incorporates new pesticide formulations, acreage changes to Midpen lands, provides changes to and incorporates new treatment actions, includes minor changes to address the current regulatory and physical environmental conditions, and incorporates adaptive management recommendations and improvements from lessons learned over the last decade of implementation. The updated 2025 Program is in compliance with other existing Midpen plans and programs including the Service Plan for the San Mateo Coastal Annexation Area.

Midpen's Board of Directors certified an Environmental Impact Report (EIR) for the IPMP in 2014, referred to as the 2014 EIR henceforth. In January 2019, Midpen approved an addendum to the 2014 EIR, which included IPMP refinements. This 2025 addendum to the 2014 EIR is prepared in accordance with the California Environmental Quality Act (CEQA) to assess the environmental effects of the 2025 Program.

1.1.2 Integrated Pest Management

Integrated Pest Management (IPM) is a process for efficiently managing pests while protecting human health and environmental quality. IPM is a long-term, science-based, decision-making system that uses a specific methodology to manage pests. IPM requires monitoring site conditions before, during, and after treatment to determine if objectives are being met and if the methods need to be revised or modified. IPM requires that non-chemical methods be considered in addition to chemical methods (i.e., pesticides).

1.1.3 Midpen's IPMP Guidance Manual

Midpen developed an IPMP Guidance Manual in 2014 that documents the methods for implementing the Program. The IPMP Guidance Manual identifies specific pest management actions including preventative and maintenance measures; damage assessment procedures; tolerance levels and thresholds for action; and treatment options. Tolerance levels and treatment actions for invasive species are based on the potential of the invasive species to degrade wildlife habitat and other natural resource values to a degree where the long-term stability and resilience of its natural areas are compromised. The IPMP Guidance Manual directs management of invasive animals and vegetation on preserves, and rodents and insects in District-owned buildings.

Within the District, the situations that trigger the need for pest control fall into four distinct pest management categories: (1) buildings; (2) recreational facilities; (3) rangelands and agriculture properties; and (4) natural areas[1] as discussed in Section 1.3.1. The IPMP Guidance Manual serves to guide careful management of pests throughout the District's open space preserves (OSPs or preserves) while protecting natural resources and public health. Specific pest control strategies used by the District vary by management category and include a combination of treatment types and methods, specifically mechanical (e.g., mowing, pulling, discing, physical barriers), cultural (e.g., sanitation, prevention, mulching), and biological controls (e.g., hairy weevil, bacterial pathogens), and, as needed, chemical controls (i.e., pesticides). Whenever possible, the least harmful method(s) to control identified pests are used. For example, if chemical methods are necessary to meet a pest control objective, the potential for harm to the public and workers are carefully considered, as are effects on the environment, and then the least toxic and most effective, efficient, and target-specific method is chosen. If pesticides are deemed necessary to meet a pest control objective, products are applied according to label instructions and all necessary measures are taken to protect the environment, the health and safety of visitors, employees, neighbors, and the surrounding natural areas, including water and soil resources.

The IPMP is and must remain consistent with the District's mission to acquire and preserve a regional greenbelt of open space land in perpetuity, protect and restore the natural environment, and provide opportunities for ecologically sensitive public enjoyment and education. The overall methods of the IPMP include correct identification of the pest and understanding of the life cycle; determining the extent of the problem or infestations; evaluating site conditions; establishing the tolerance level for control actions; utilizing the least toxic suite of treatment methods to control the pest at vulnerable stages of its life cycle; and monitoring of pest populations and effectiveness of treatment methods.

1.1.4 Program Updates

Since adoption in 2014, Midpen has made several updates to the Program to address the evolving needs of the District. In 2015, a project ranking and submission system was introduced to evaluate and prioritize new pest control projects. Midpen also developed a pest control submission process utilizing a standardized form. In 2018, Midpen added three insect repellents for staff and volunteer protection. In 2019, Midpen released an addendum to the 2014 EIR, which introduced new pesticides, protections for two new species of special concern, updated treatment methods, and reallocated the amount of treated acreage among IPM categories, which is now being reallocated back to their original categories as part of the 10-year Program update.

[1] Previously, Fire Management was included in the IPMP until the District created a standalone program.

In 2020, Midpen added a disinfectant (Waxie 730 with the active ingredient of hydrogen peroxide) to the Program, and in 2023, Midpen adopted the Wildland Fire Resiliency Program (WFRP), which shifted fuel management responsibilities from the IPMP to the WFRP to better address wildfire risks and climate change impacts. These changes reflect the District's adaptive management approach, with the 10-year update aiming to align the IPMP with current environmental and regulatory conditions.

1.2 Program Information

1.2.1 District Mission

Midpen is a public agency formed by a voter initiative in 1972. Midpen's mission 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. In 2004, the District was expanded to protect the San Mateo County Coast. Reflecting the interests of Coastside residents, Midpen's mission on the San Mateo County Coastside includes preserving the rural character and agricultural heritage of the Coastside and encouraging viable agricultural use of land resources. Midpen's mission outlines the critical functions of the agency, balancing the preservation of open space with active land restoration, low-intensity public recreation, and viable agricultural use. The IPMP supports Midpen's mission by allowing Midpen to control damage from pests, protect and restore the natural environment, and provide for human safety and enjoyment while visiting and working on District lands and facilities, which is discussed further in Section 1.4.

1.2.2 Program Area

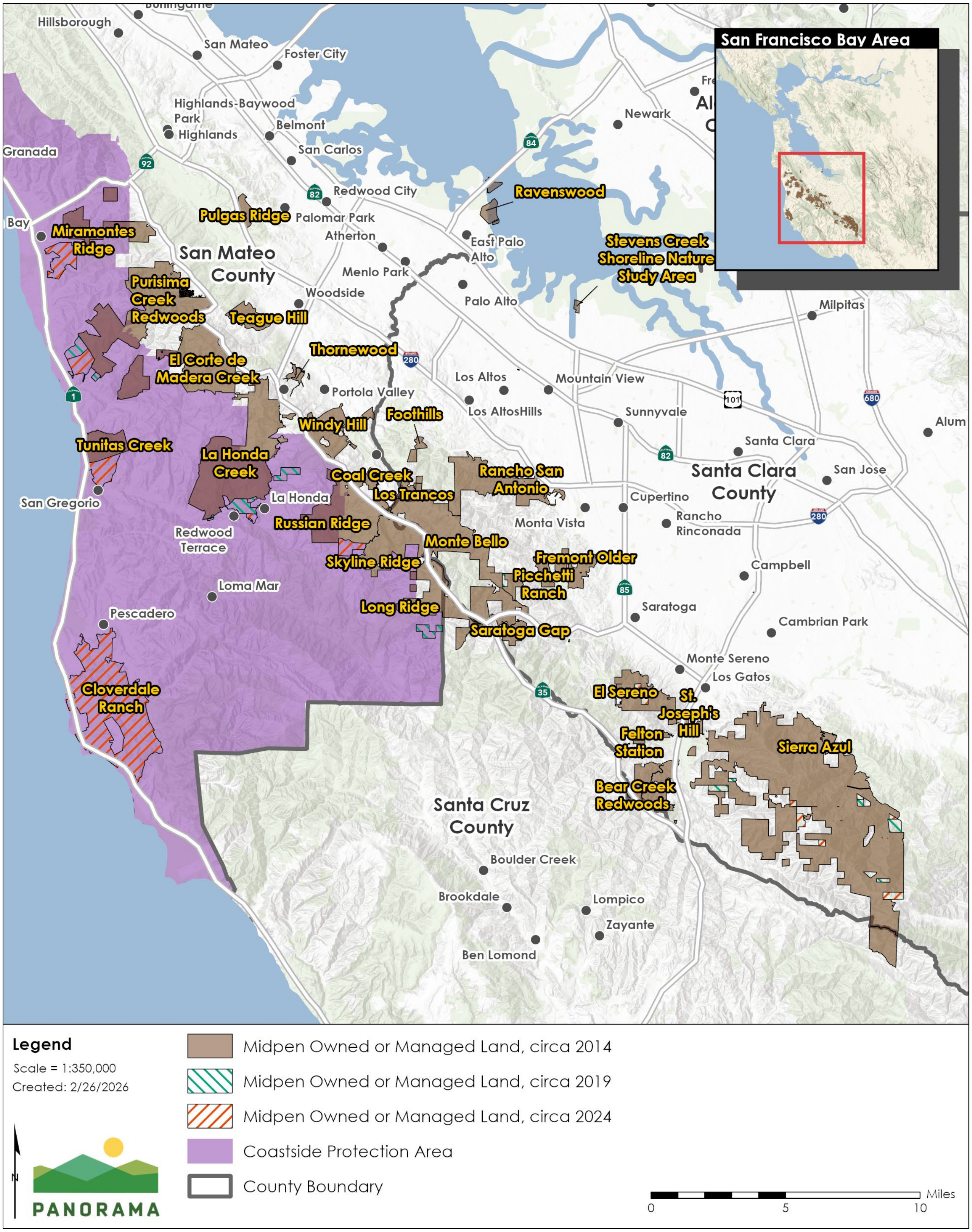
Midpen has preserved a regional greenbelt system of over 72,000 acres of public land and manages 27 OSPs, a nature study area, and other land under management agreements, referred to as "Midpen lands" throughout this document. At the time of the 2014 IPMP, the Program covered approximately 61,186 acres of land, and currently the District manages approximately 72,099 acres. Table 1-1 includes the acres managed by the District included in each preserve, including those acquired since the publication of the 2014 EIR and 2019 addendum. As District managed lands have expanded since the 2014 IPMP, the 10-year update revises the projected scale of pesticide use under the IPMP to account for increased treatment demand and coverage requirements. Figure 1-1 depicts the Program location and changes to District managed lands since 2014. Since 2014, Midpen has acquired additional properties, classified as buildings, which include residences, carports, sheds, stalls, storage facilities, barns, workshops, and other various structure types. As of 2025, Midpen manages approximately 330 buildings, and approximately 518 miles of access roads and trails, which is addressed further in Section 1.5.4.

Table 1-1 District Managed Lands by Year of Program Update (Approximate Acres)

Preserve/Study Area	2014	2019	2025
Bear Creek Redwoods	1,386.9	1,386.9	1,386.9
Cloverdale Ranch	--	--	6,207.3
Coal Creek	494.7	494.7	494.7
El Corte de Madera Creek	2,776.9	2,778.6	2,778.6
El Sereno	1,421.9	1,434.3	1,653.1
Felton Station	44.4	44.4	44.4
Foothills	225.3	225.3	225.3
Fremont Older	735	735	735
La Honda Creek	5,678.2	6,220.2	6,369.4
Long Ridge	1,997.9	2,188.5	2,188.5
Los Trancos	272.4	272.4	272.4
Miramontes Ridge	1,620.7	1,620.7	2,265.4
Monte Bello	3,438.6	3,591.8	3,591.8
Picchetti Ranch	293.4	293.4	293.4
Pulgas Ridge	369.8	369.8	370.4
Purisima Creek Redwoods	4,622.9	4,943.1	5,339.6
Rancho San Antonio	3,887.7	3,943	3,944.6
Ravenswood	383	384.2	384.2
Russian Ridge	3,123.6	3,477.8	3,755.9
Saratoga Gap	1,643.7	1,648.9	1,648.9
Sierra Azul	18,631	19,085.2	19,449.8
Skyline Ridge	2,115.3	2,115.3	2,115.3
St Joseph's Hill	284.4	284.4	284.4
Steven's Creek Shoreline Nature Study Area	55.5	55.5	55.5
Teague Hill	620.5	620.5	621.6
Thornewood	172.5	172.5	172.5
Tunitas Creek	1,622.4	1,622.4	2,175
Windy Hill	1,400.1	1,400.1	1,400.1
Other Managed Lands (11 areas managed as part of an easement)	1,867.3	1,874.6	1,874.6
Total	**61,185.8**	**63,283.4**	**72,098.8**

Note:
Increases in acres since the 2014 EIR and 2019 Addendum are identified by underline and highlighted in gray.

Figure 1-1 Program Location and District Managed Lands



1.2.3 Nearby Communities and Development

Midpen's jurisdiction encompasses 19 cities (Atherton, Cupertino, East Palo Alto, Half Moon Bay, Los Altos, Los Altos Hills, Los Gatos, Menlo Park, Monte Sereno, Mountain View, Palo Alto, Pescadero, Portola Valley, Redwood City, San Carlos, San Gregario, Saratoga, Sunnyvale, and Woodside) and unincorporated areas in San Mateo, Santa Clara, and northern Santa Cruz counties with a combined population of approximately 700,000 residents. Although land uses within OSPs are predominantly natural open space and agriculture (primarily conservation grazing), many of the OSPs abut areas of low-density residential development.

1.3 Background and History of Integrated Pest Management on Midpen Lands

1.3.1 District IPMP Historical Context

The history of IPM in California began in the early to mid-20th century. Notably, one of the earliest occurrences of widespread IPM in the state occurred when integrated control measures were released for the spotted alfalfa aphid in the 1950s. IPM in California began in earnest after World War II. Treatments at the time resulted in the development of pest populations resistant to pesticides, the rapid resurgence of pest populations following treatment, and outbreaks of secondary pests, which required new and differing methods of IPM (Smith 1978). In 2004, the District performed a study that identified numerous species of invasive plants present on District lands. Specifically, 75 invasive plant species were observed.

In September 2014, the District developed its current Program. The District produced and released an IPMP Guidance Manual following the release of the 2014 EIR. The IPMP Guidance Manual included several proposed program policies and identified specific pest management actions including preventative and maintenance measures, damage assessment procedures, tolerance levels and thresholds for action, and treatment options. The proposed IPM policy statements presented in the 2014 IPMP Guidance Manual have since been adopted and are currently included in the District's Resource Management Policies, published in May of 2022.

Midpen released an Addendum to the 2014 EIR in January of 2019, which included proposed modifications to the previously approved 2014 Program, as described in Section 1.1.4. The following pesticides were added to the List of Approved Pesticides for the Program as part of the 2019 addendum: 1) Garlon® 4 Ultra [triclopyr-2-butoxyethyl ester (triclopyr BEE)] and 2) Capstone® [triclopyr triethylamine (TEA) salt and aminopyralid triisopropanolamine (TIPA) salt] for the control of broadleaf weeds and woody plants, and 3) PT® Wasp-Freeze® II (prallethrin) for the control of wasps and hornets. Additionally, the 2019 addendum included protections for two new species of special concern (California giant salamander [*Dicamptodon ensatus*] and the Santa Cruz black salamander [*Aneides niger*]).

Since publication of the 2014 EIR and 2019 addendum, Midpen adopted the WFRP (2023), which focuses on preventing, preparing for, and responding to wildfires, including addressing flammable vegetation near facilities, as a key part of the District's land stewardship. In response to increasingly intense fire seasons driven by dense forest regrowth, historical fire suppression, and climate change, the WFRP promotes environmentally sensitive vegetation management. The WFRP includes goals for reducing wildfire risks, enhancing fire response and safety, supporting healthy, fire-adapted ecosystems, incorporating Native American land management practices, and establishing an adaptive framework to adjust strategies based on evolving climate conditions, knowledge, and technology. The 2014 IPMP included a fuel management category, which addressed staff selection of options for required and ongoing maintenance of fuel management activities in relation to IPM; however, after approval of Midpen's WFRP, the dedicated fuel management category has been removed from the IPMP and incorporated into the WFRP.

1.3.2 Open Space Maintenance and Restoration Program

Midpen adheres to its Open Space Maintenance and Restoration Program (OSMRP), which was approved in 2021 and first implemented in 2022. The OSMRP streamlines the permitting process and allows for an integrated approach to (1) routine maintenance, (2) small-scale facility improvements, and (3) restoration and enhancement projects. The OSMRP's programmatic permits authorize IPM work in jurisdictional areas, as it is considered routine maintenance.

1.3.3 Annual Reports and District Pesticide Treatments from 2015 through 2024

The IPM Coordinator and the IPM Coordination Team prepare an Annual IPM Work Plan each year that describes planned pest control projects in the upcoming year. Working through department supervisors, staff provide the IPM Coordinator with a standardized spreadsheet or similar summary form describing upcoming pest control for the following basic types of activities:

- routine minor pest control actions;
- ongoing pest control projects; and
- new pest control projects.

Using this staff information, the Annual IPM Work Plan is prepared by the IPM Coordinator, then reviewed and approved by the IPM Coordination Team. Information in the Annual IPM Work Plan is also used to inform the Annual IPM Report. The Annual IPM Work Plan includes the following basic information:

- summary (e.g., Excel spreadsheet) of routine minor and ongoing pest control projects;
- detailed descriptions of new pest control projects;
- projected amounts of pest control in the next year (acres, hours, acres treated per gallon, total gallons used); and
- any new approaches to be implemented as a result of the adaptive management review in the Annual IPM Report of the preceding year.

The District prepares and releases the Annual IPM Report, which presents the results of the preceding year's pest management activities and outcomes, including a pesticide use summary. Refer to Table 1-2 for a summary of Midpen pesticide use between 2015 and 2024. Notably, District use of glyphosate has reduced significantly since 2014 primarily due to glyphosate being added to the Proposition 65 List of Carcinogens or Reproductive Toxicants in 2017.

1.4 10-Year Program Update Purpose, Need, and Objectives

1.4.1 10-Year Program Update Purpose and Need

The primary purpose of Midpen's IPMP is to control pests through consistent implementation of IPM principles to protect and restore the natural environment and provide for human safety and enjoyment while visiting and working on Midpen lands. Controlling and preventing pests allows Midpen to better achieve its overall mission of preserving a regional greenbelt of open space lands in perpetuity, protecting and restoring the natural environment, and providing opportunities for ecologically sensitive public enjoyment and education. The purpose of this 10-year Program update is to bring the IPMP up to date with the current regulatory and physical environmental conditions and incorporate adaptive management recommendations and improvements into the Program, including accounting for any lessons learned during the past 10 years of Program implementation, as discussed in Section 1.1.4.

1.4.2 Objectives of the 10-Year Program Update

The primary objective of the 10-year Program update is to bring the IPMP up to date to continue to support Midpen's mission, which is discussed in Section 1.2.1 above. Specific objectives of the proposed 2025 IPMP match those outlined in the 2014 Guidance Manual. Additional objectives specific to the 2025 IPMP include the following:

- Continue to standardize pest management and IPM procedures on District lands;
- Incorporate appropriate revisions to the IPM strategies and priorities consistent with the four pest management categories identified in the IPMP Guidance Manual[2];
- Incorporate revisions and additional strategies, such as the inclusion of new methods of termite control, into the Program's pest management categories, to prevent the introduction of new pest species into District preserves; and
- Reduce the use of glyphosate, where feasible, using other approved and proposed pesticides.

[2] After implementation of Midpen's WFRP, the dedicated fuel management category is no longer needed as part of the Midpen IPMP (since it is included in the WFRP) and as result it is not proposed under the 10-year Program update.

Table 1-2 Midpen Annual Pesticide Use Summary

Pesticide Category	Pesticide		2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Fungicide	Potassium salts or phosphorus acid	Amount Used (oz):	5,062.4	5,011.2	4,841.9	None	6,608	None	None	None	None	Pending
		Acres Treated:	22.6	22.6	22.6	N/A	N/A	N/A	N/A	N/A	N/A	Pending
Herbicide	Aminopyralid	Amount Used (oz):	61.5	9.07	17.8	21.4	None	3.2	27.6	33.4	362.5	Pending
		Acres Treated:	15.4	26.4	147.3	25.3	N/A	2.1	1.6	6.8	2.8	Pending
	Clethodim	Amount Used (oz):	None	None	None	None	None	None	None	None	9	Pending
		Acres Treated:	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1.1	Pending
	Clopyralid	Amount Used (oz):	None	3.08	12.5	None	14	None	None	None	None	Pending
		Acres Treated:	N/A	1.9	5.3	N/A	10.8	N/A	N/A	N/A	N/A	Pending
	Glyphosate	Amount Used (oz):	2,975	3,677.1	2,181.6	785.0	87.5	162.8	458	621.8	529.5	Pending
		Acres Treated:	225.5	N/A	172.9	8.7	84.3	7.4	19.2	22.7	35.2	Pending
	Imazapyr	Amount Used (oz):	None	243.3	None	None	59.5	0.3	None	0.25	None	Pending

Pesticide Category	Pesticide		2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
		Acres Treated:	N/A	15.1	N/A	N/A	44.7	15.2	N/A	1.4	N/A	Pending
	Triclopyr and aminopyralid	Amount Used (oz):	--	--	--	--	94	None	None	None	16	Pending
		Acres Treated:	--	--	--	--	1.05	N/A	N/A	N/A	0.3	Pending
	Triclopyr	Amount Used (oz):	--	--	--	--	2	3	17.7	17.7	3	Pending
		Acres Treated:	--	--	--	--	trace	1.7	9.1	9.1	0.06	Pending
Virucide	Didecyl dimethyl ammonium chloride	Amount Used (oz):	--	--	--	--	--	55.5	7	N/A	N/A	Pending
		Acres Treated:	--	--	--	--	--	N/A	N/A	N/A	N/A	N/A
	Hydrogen peroxide	Amount Used (oz):	--	--	--	--	--	None	None	None	None	Pending
		Acres Treated:	--	--	--	--	--	N/A	N/A	N/A	N/A	N/A
Insecticide	Pyrethrin	Amount Used (oz):	420	420	72	--	--	--	--	--	--	--
		Acres Treated:	N/A	N/A	N/A	--	--	--	--	--	--	--
	Prallethrin	Amount Used (oz):	--	--	--	72	113.5	122.5	84.5	141	None	Pending

Pesticide Category	Pesticide		2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
		Acres Treated:	--	--	--	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Rodenticide	Cholecalciferol	Amount Used (oz):	None	None	None	None	None	None	None	None	None	Pending
		Acres Treated:	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Notes:

"NA" means 'not applicable' and indicates that either the treatment action was likely spot treatment and did not occur on open lands or the pesticide was not used for a given year.

'--' indicates a given pesticide was not included in Midpen's annual reporting for a given year

1.5 Description of the 10-Year Program Update

1.5.1 Overview of 10-Year Program Update Components

Under the IPMP, situations that trigger the need for pest control within District lands fall into the four distinct management categories: (1) buildings; (2) recreational facilities; (3) rangelands and agriculture properties; and (4) natural areas. The specifics of each category are largely unchanged since the 2014 IPMP. The four categories are then further broken down by identifying specific approaches to pest management including: preventative and maintenance actions; damage assessment procedures; tolerance levels and thresholds for action; and treatment options. The Guidance Manual 10-year update will identify and detail specific pest management actions for each management category that are accomplished through implementation of specific treatment types and methods. Table 1-5 and Table 1-9 include an overview of these treatment types and methods, which mirror the 2014 IPMP, and detail which information is changing under the 10-year Program update. Additionally, a description of the typical treatment actions and methods, including specifics regarding treatment action options for each management category, are provided in the subsections that follow, to provide clarity to the method of application detailed in Table 1-4.

This section provides detail on what Program changes are proposed as part of the 10-year update, including acreage changes to District lands, changes to treatment actions and methods, additional treatment actions, inclusion of the maximum annual allowable pesticide application for each pesticide, and overall changes to allowable pesticides included under the Program, including new herbicides, pesticides for structural pests, disinfectants, and repellents.

1.5.2 Program Area Update

At the time of publication of the 2014 Guidance Manual, the Program covered approximately 61,186 acres of land. In 2019, the Program was amended and District lands had expanded to approximately 63,283 acres. As of 2025, Midpen lands cover approximately 72,099 acres, which is a net gain of approximately 10,913 acres between implementation of the original 2014 Program and the 10-year Program update. The 10-year Program update addresses integrated pest management across all current and future acres of Midpen owned and managed lands. As Midpen continues to expand its District properties[3], the amount of integrated pest management work conducted under the Program is also expected to increase. For the purposes of the CEQA analysis, an up to 20 percent increase in Program area is assessed above the 2025 acreage baseline to account for foreseeable expansion of District-owned and managed lands and associated IPM activities. Midpen lands depicted on Figure 1-1 represent the conditions at the time of preparation of this document and are subject to change as District properties expand.

[3] This includes land, buildings, structures, and managed assets, such as field offices and residences.

1.5.3 Treatment Actions and Methods

Overview

The four primary treatment types first identified in the 2014 IPMP are included in the 10-year Program update; manual and mechanical (e.g., physical barriers, pulling, mowing), cultural (e.g., sanitation, prevention, education), biological controls (e.g., hairy weevil, bacterial pathogens), and, as needed, chemical controls (i.e., pesticides).

Biological and cultural treatment types, including habitat modifications, have also been included within the manual treatment control category. However, while biological and cultural treatment controls are physical activities (e.g., hairy weevil release, picking up trash, installing educational signs, and installing fly traps), these activities have limited physical environmental disturbances compared to the more active pulling, digging, and mowing activities described below. These activities are considered for the purposes of CEQA to be included under the manual control category, as detailed in Table 1-4.

Manual and Mechanical Control Treatments

Manual control treatments consist of pulling and digging, and mechanical control treatments include motorized mowing and cutting, which is generally unchanged since the 2014 Program. Manual and mechanical control methods are effective for the removal of small pest populations, individual occurrences, and pest populations that occur near special-status species and their habitat or sensitive natural communities. These methods are often used as a follow-up treatment in areas where larger pest populations have been sprayed with herbicide. The following is a summary of types of manual and mechanical control treatments used by the District as part of the IPMP, which were included in the 2014 Program and 2019 addendum.

- *Pull:* Depending on the size of the plants, the stem of the target plant would be grasped by hand or with the assistance of a weed wrench and the entire plant, including the roots, would be pulled out of the ground. A weed wrench is a lever-type tool that is used to pull up invasive plants that are between 1 and 6 feet tall with roots that penetrate more than a few inches into the soil; usually shrubs such as French broom (*Genista monspessulana*) are ideal candidates for a weed wrench. Pulling is not suitable in areas where there is steep terrain, where the operator cannot gain a firm stance, or where the activity may lead to disruptive erosion.
- *Dig*: For small infestations, this would be completed by using a shovel, Pulaski, or similar hand-operated digging tool to loosen the soil around the roots of a plant several inches below the surface and then lifting out the entire plant. The amount of root that must be removed varies by species.
- *Mow/Cut:* A brushcutter or other motorized cutting machine would be selected for mowing weeds based on the size of the infestation. Most species would require repeated cutting throughout the growing season (generally late spring through mid-summer) or they could re-sprout from their base and continue to grow, flower, and produce seed. Mowing would need to be carefully timed according to the phenology of each plant species to minimize the amount of re-sprouting and to

avoid spreading ripe seed. Mowing is a temporary measure that controls reproductive spread and can eventually reduce populations of annual plants, but other subsequent treatments (e.g., pulling, herbicide) would be necessary to eradicate perennial plants. Mowing cannot be used on steep slopes or in locations with desirable native plants unless the timing of the mowing can be selected to affect only target plants.

- *Green Flaming:* Specially designed small, hand-held propane torches would be used in small areas to kill dense and newly emerged green seedlings. Green flaming would usually be conducted during light rains or on wet days when forest litter or grassland thatch is not likely to catch fire and additional precautions are implemented at the time of use including bringing truck-mounted or backpack water tanks and operating with more than one person onsite. This method works well on newly emerged broom seedlings.

Chemical Treatment

Definitions

The definitions outlined in the 2014 Guidance Manual for pesticides, insecticides, rodenticides, herbicides, fungicides, and surfactants or adjuvants remain consistent with the Program and will not change under the 2025 Program update. The following definitions for disinfectants and repellents are proposed for incorporation into the Program as part of the 2025 update:

- *Disinfectants*, such as quaternary Ammonium solutions, are used to decontaminate all equipment, including but not limited to, wading, dive, and sampling equipment (e.g., water quality probes, nets, seines, buckets, substrate samples, etc.); fishing gear; boots; and watercraft. Disinfectants are considered pesticides because they are intended to kill pests, specifically microorganisms including pathogens (US EPA 2020).
- *Repellents* are not substances used to eliminate pests, rather, they are designed to dissuade pests. Repellents are considered pesticides as the definition of a pesticide includes any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any pest. For example, in the case of the skin-applied repellents, the product makes people less attractive to the pest (US EPA 2024).

Personnel and Qualifications

Midpen staff and contractors adhere to all appropriate laws and regulations pertaining to the use of pesticides and safety standards for employees and the public, as governed by the U.S. Environmental Protection Agency (US EPA), the California Department of Pesticide Regulation, and local jurisdictions. Pesticides are applied in all areas by or under the supervision of a California licensed Qualified Applicator (QAC/QAL) who will be licensed in categories relevant to the type of pest control work, except application in and around buildings, which have different requirements. The QAC/QAL are responsible for pesticide use records, work hours, and compliance with the Annual IPM Work Plan. They review pesticide labels and any Individual Pest Management Plans that are typically required when Midpen acquires new properties or discovers new pests of high priority that were not included in the Annual IPM Work Plan. Staff prepare Individual Pest Management Plans after determining if a certain treatment action can be accomplished by existing staff and budgets and overall are technically feasible. Qualified applicators may include District field staff, contractors, and farmer/rancher tenants. Non-QAC or QAL certified District staff can apply pesticides, but only under direct supervision of the QAC or QAL and after completing the District's annual pesticide safety training. District staff coordinate with the County Agricultural Commissioners, and ensure that all required licenses and permits are obtained prior to pesticide application. Additionally, as required by regulations of the California Department of Pesticide Regulation (California Code of Regulations, Title 3, Division 6), the District or its contractors will continue to report all pesticide use on a monthly basis to the County Agriculture Departments (San Mateo, Santa Clara, and Santa Cruz Counties); would obtain Pest Control Recommendations from a licensed Pest Control Advisor on an annual basis; would renew the District's Operator Identification with the County Agriculture Departments; and would require key employees to obtain either a Qualified Applicator License or a Qualified Applicator Certificate.

Household and structural pesticides are applied under the supervision of a California licensed Branch I, II, or III Structural Pest Control Applicator (SPCA). SPCAs will be responsible for pesticide use records, work hours, and compliance with written recommendations in the approved Annual Work Plan, Individual Pest Management Plans, and compliance with pesticide labeling instructions. SPCAs may include a combination of District field staff and contractors. No unlicensed staff, contractors, volunteers, or tenants will perform structural or household pest control except for the limited use of District-approved ant/roach bait stations.

Structural pesticide applications made on District property by an outside vendor are by a registered structural pest control company in accordance with the state of California's Structural Pest Control Act dated April 2025 (Structural Pest Control Board 2025). Structural pesticide applications made by District staff will be carried out by trained applicators under the supervision of the IPM Coordinator or designated field supervisors. All applications on District property are made in compliance with the Annual Work Plan, Individual Pest Management Plans, and pesticide labeling instructions. All applications shall adhere to label directions for application rates and methods, storage, transportation, mixing, and container disposal. No untrained staff, volunteers, or tenants will make structural pesticide applications.

Pesticide Active Ingredients and Formulations

A list of pesticides was originally selected in 2014 as part of the original Program and was modified in 2019 to include additional pesticides; this list of pesticides was selected to support the IPM approach for the District. Additional pesticides are proposed as part of the 10-year Program update and are identified in Table 1-3 and Table 1-4. Each chemical (active ingredient or product) was reviewed and evaluated for its reported fate and transport in the environment and toxicity to humans and non-target wildlife and vegetation in a detailed toxicological analysis. For the full toxicological analysis for each newly proposed pesticide selected to support the District's IPM approach under the 10-year Program update, refer to Appendix B1, Pesticide Technical Background Information, of the 2025 IPMP Guidance Manual.

Grouped by pesticide category (e.g., herbicides, fungicide, rodenticide, insecticide), Table 1-3 provides the District's full pesticide list and includes active ingredient, product formulations, mode of action, and pesticide purpose, including those included under the 2014 Program and 2019 addendum, and new pesticides that are proposed for inclusion under the 2025 Program. This list of pesticides is intended only for use on the pests, environment, and microclimates of properties and buildings managed by the District and would not be used on other lands without additional analysis. Each product on this list has been, and newly proposed pesticides would be:

- screened for human toxicology, ecological toxicity environmental fate and transport, and proven efficacy against target pests;
- reviewed annually by the District's IPM Coordinator and IPM Coordination Team;
- reviewed and approved by the Board of Directors;
- presented for public comments at public hearings; and
- included in the environmental documentation and public notification procedures that are being prepared for the project (i.e., the list is adopted as part of environmental review and approval process).

This list encompasses mostly products already in use by the District, as well as three new herbicide control products, additional structural pest products, and the suite of repellants and disinfectants. Products on this list were reviewed by the District's Pest Control Advisor for human and environmental safety and efficacy on the District's target pest species.

Please refer to Table 1-4 for method of chemical application associated with each IPM management category. Consistent with types of chemical application methods currently used on District lands, the following methods would be used under the 10-year Program update:

- *Cut-stump application:* Under this treatment, the woody plant would be cut close to the ground at a 90-degree or 45-degree angle with a chainsaw or pole saw. Debris would be removed from the cut stump and herbicide immediately applied to the circle of living cells. Cut-stump application would be used to selectively eliminate woody trees and shrubs. Woody plants tend to re-sprout frequently when cut unless treated with herbicide.
- *Spray application:* Depending on the size of the infestation, herbicide would be applied with a 5-gallon backpack sprayer or, for larger areas, a 14-gallon tank mounted on an all-terrain vehicle or 150-gallon truck with a hose that is directly controlled by an operator. All methods of spraying under this program would be selective, that is, the operator (who is trained in identifying plants) would be in direct control of the sprayer, would point the spray tip directly at the target weed or pest, and would manually turn the spray equipment on and off to control the amount and direction of spray.
- *Wipe application*: Under this treatment, herbicide would be applied to the target plant using a sponge for selective treatment. This method generally results in less potential for herbicide drift than spraying, although care must be taken that the

applicator does not drip or overlap onto non-target plants. This method works best on plants that form a basal rosette of leaves.

- *Basal bark*: Using this treatment method, an oil mixture containing herbicide would be applied to the lower 12 to 15 inches of brush and tree trunks (including the entire stem, root collar area, and exposed roots) via low-pressure backpack sprayer. This method would be used to selectively control woody plants with basal stems less than six inches in diameter.
- *Frill/injection*: A drill or sharp tool such as a hatchet would be used to create holes or cut through the exterior bark of a tree and into the sapwood. Each penetration point into the sapwood is then filled with the label-recommended amount of concentrated herbicide solution using an injection system, squirt bottle, or brush. This application method is often used for the control of trees that cannot be managed via basal bark application.
- *Wick application*: A wick or rope would be saturated in herbicide and attached to a reservoir containing a concentrated herbicide solution. The wick or rope is used to wipe herbicide directly onto target plants, typically weeds that are taller than surrounding non-target plants. Wick applicators may range in size from hand-held to truck-mounted.
- *Tenting*: One additional method of chemical application is proposed under the 10-year Program update and is specific to structural pest management and is relevant to the IPM in the buildings management category. Tenting involves sealing the entire structure with a material that can serve as a secure enclosure and fumigating with sulfuryl fluoride (Vikane). Tear gas (chloropicrin) is incorporated into the fumigant gas to serve as a warning agent for humans and animals, since Vikane gas has no warning properties (e.g., odors, eye irritation).

1.5.4 Management Categories and Treatment Actions

Overview

For each pest management action under the 10-year Program update, the treatment action (e.g., preventive; retrofit; maintenance; cultural control; habitat modification; and manual, mechanical or chemical control) and treatment timing would be site-specific and based on various factors (i.e., infestation size and density, the life cycle of the pest, the type and sensitivity of the site to be treated, the potential for the presence of special-status species habitat to occur in proximity to the treatment site, and the availability of labor), which is consistent with the 2014 Program. Insecticides and rodenticides may also be used after non-chemical methods (e.g., trapping, manual removal), if the insects or rodents cause a human health and safety risk (e.g., occur in high traffic areas).

Table 1-3 Pesticides and Maximum Annual Application

Pesticide Category	Active Ingredient	Product Formulations (Manufacturer)	Mode of Action	Purpose	Maximum Allowable Application [a,c]
Herbicides	Glyphosate isopropylamine (IPA)	Roundup Custom (Monsanto)	Amino acid synthesis inhibitor	Nonselective post-emergent broad-spectrum weed control	5.6 gal
	Glyphosate potassium (K)	Roundup ProMax (Monsanto)	Amino acid synthesis inhibitor	Nonselective post-emergent broad-spectrum weed control	145.3 gal
	Aminopyralid TIPA	Milestone (Dow AgroSciences)	Auxin growth hormone mimic	Nonselective post-emergent broad-spectrum weed control	4.7 gal [b]
	Clopyralid monoethanolamine (MEA)	Transline (Dow AgroSciences)	Auxin growth hormone mimic	Selective broadleaf weed control	4.1 gal
	Imazapyr IPA	Polaris (Nufarm), Stalker (BASF)	Amino acid synthesis inhibitor	Nonselective pre and post-emergent broad-spectrum weed control	0.9 gal
	Clethodim	Envoy Plus (Valent)	Fatty acid synthesis inhibitor	Selective post-emergent grass weed control	4.8 gal
	Triclopyr BEE	Garlon 4 Ultra (Dow AgroSciences)	Auxin growth hormone mimic	Selective post-emergent woody plant broadleaf weed, and tree control	26.2 gal
	Triclopyr TEA	Capstone (DOW AgroSciences)	Auxin growth hormone mimic	Selective post-emergent woody plant broadleaf weed, and tree control	--[b]
	Triclopyr	Choline salt aquatic formulation (Vastlan)	Auxin growth hormone mimic	Selective systemic woody and herbaceous broadleaf plant control	24.6 gal

Pesticide Category	Active Ingredient	Product Formulations (Manufacturer)	Mode of Action	Purpose	Maximum Allowable Application [a,c]
	Imazamox	Aquatic formulation (ClearCast)	Inhibits acetohydroxyacid synthase, also known as acetolactate synthase	Annual and perennial broadleaf weeds and grasses, woody species, and riparian and emergent aquatic weed species control	2.5 gal
	Glufosinate	Lifelife/Cheetah Pro	inhibits glutamine synthetase	Nonselective post-emergent broad-spectrum weed control	6.4 gal
Fungicide	Phosphite K (Salts, mono-/di-)	Agri-Fos (AgBio)	Fungal oxidative phosphorylation inhibitor	Prevents forest pathogens	45 gal concentrate
Rodenticide	Cholecalciferol	Cholecalciferol baits	Calcification of soft tissues	Rodent pest control (e.g., rats, mice)	50 oz over approximately 330 buildings
Insecticides	Prallethrin	PT Wasp-Freeze II (BASF)	Voltage-gated sodium channel interference	Wasp and hornet control	420 oz (24 cans)
	Indoxacarb	Advion Gel Baits (DuPont)	Sodium channel blocker	Structural pest control (e.g., ants, cockroaches)	58 fl oz over 43 applications over approximately 330 buildings
	S-Hydroprene	Gentrol Point Source (Wellmark International)	Juvenile growth hormone mimic	Pest control (e.g., cockroaches, beetles, moths)	15 fl oz over 8 applications over approximately 330 buildings
	Fipronil	Maxforce Bait Stations (Bayer)	Gamma-aminobutyric acid (GABA)-gated chloride channel blocker	Ant control	16 fl oz over 7 applications over approximately 330 buildings

Pesticide Category	Active Ingredient	Product Formulations (Manufacturer)	Mode of Action	Purpose	Maximum Allowable Application [a,c]
	Fipronil	Termidor SC; Termidor HE	GABA-gated chloride channel blocker	Termite control	15 gallons over 1-5 residences
	Sodium tetraborate decahydrate (borax)	Prescription Treatment Baits (BASF), Terro Ant Killer II (Terro)	Water balance disruptor	Ant control	11 fl oz over 17 applications over approximately 330 buildings
	Diatomaceous earth	Diatomaceous earth	Water balance disruptor	Structural pest control (e.g., ants, cockroaches)	Approximately 330 buildings
	Chlorantraniliprole	Altriset	Disrupts normal muscle contraction	Termite control	8.5 gal over 1-5 residences
	Dinotefuran	Alpine Foam	Causes paralysis and mortality of insects	Termite control	14 oz over 1-5 residences
	Sulfuryl fluoride/ chloropicrin	Vikane	Interferes with the metabolism of stored fats and carbohydrates	Termite and wood beetle control	240 oz over 1-5 residences (sulfuryl fluoride) 10 fluid oz over 1-5 residences (chloropicrin)
	d-Limonene	XT-2000 Insecticide	Odorous repellent	Termite and wood beetle control	2 gal over 1-5 residences
	Disodium Octaborate Tetrahydrate	Bora-Care, Tim-Bor	Disrupts the enzyme and digestive systems of insects	Termite, wood beetle, fungus, and dry rot control	5 gal over 1-5 residences

Pesticide Category	Active Ingredient	Product Formulations (Manufacturer)	Mode of Action	Purpose	Maximum Allowable Application [a,c]
	Insecticidal Soap	Various	Disrupts the permeability and structure of insects' cell membranes, killing them through contact.	Ant control	Approximately 330 buildings
	Boric Acid	Various	Disrupts insect nervous system and causes dehydration:	Cockroach control	Approximately 330 buildings
	Bacillus thuringiensis var. israelensis	Various	The proteins are toxic to insect larvae when eaten	Mosquito control	250 discs
Surfactants/Adjuvants	Canola Oil, Ethyl and Methyl Esters	Competitor (Wilbur-Ellis)	Decrease surface tension, increase herbicide uptake, enhance wetting and spreading	Increase delivery and efficacy of pesticides to targets	NDA
	Lecithin	Liberate (Loveland Products, Inc.)	Enhances uptake of herbicides and pesticides	Increase delivery and efficacy of pesticides to targets	NDA
	Alcohol ethoxylates	Liberate (Loveland Products, Inc.)	Enhances uptake of herbicides and pesticides	Increase delivery and efficacy of pesticides to targets	NDA
	Alkylphenol ethoxylate (APE)	Pentra-Bark (Quest)	Enhances uptake of Agri-Fos	Increase delivery of Agri-Fos to trees	NDA

Pesticide Category	Active Ingredient	Product Formulations (Manufacturer)	Mode of Action	Purpose	Maximum Allowable Application [a,c]
Disinfectants	Sodium dichloroisocyanurate dihydrate	Granular Chlorine Bleach (Leslies Chlor Brite, EZ Chlor)	Minimize or eradicate presence of microorganisms	Disinfecting agent	5 kg
	Sodium chloride	Liquid Bleach (Clorox)	Minimize or eradicate presence of microorganisms	Disinfecting agent	16 gal
	Ethanol or Isopropyl Alcohol	Rubbing Alcohol	Minimize or eradicate presence of microorganisms	Disinfecting agent	100 gal
	Dodecyl dimethyl ammonium chloride	Quaternary ammonium compounds (Quat 128 or Physan 20)	Minimize or eradicate presence of microorganisms	Disinfecting agent	5 gal
	Hydrogen peroxide	Various	Minimize or eradicate presence of microorganisms	Disinfecting agent	4 gal (concentrate)
	Sodium hypochlorite	Various	Minimize or eradicate presence of microorganisms	Disinfecting agent	16 gal
Repellents	N,N-diethyl-meta-toluamide (DEET)	Various	Impairs insect's ability to detect target(s)	Repels insects (mosquitoes, ticks, and gnats)	200 cans (6 oz)
	Picaridin	Various	Makes insects less likely to bite	Repels insects (insects, ticks and chiggers)	200 cans oz (5 oz)

Notes:

[a] Refer to Table 1-4 for allowable application rates per acre for each IPM management category. The maximum allowable application data is newly represented in this 2025 Program as a column, however this table largely mirrors the information presented in the 2014 EIR and 2019 addendum. As the District continues to expand District managed lands, the overall scale of pesticide use under the IPMP must also increase as part of the 10-year update to meet the growing treatment and coverage needs to account for foreseeable expansion of District-owned and managed lands and associated IPM activities. Therefore, acreage estimates are excluded and only application values (e.g., ounces, gallons) are presented. Application would occur in accordance with the 2025 Program and IPMP best management practices (BMP).

[b] This maximum allowable application rate is dependent on spot treatment needs and Triclopyr TEA/Aminopyralid TIPA use (which has an estimated maximum annual application of 42.8 gals spread across management categories), as they are indicated to be interchangeable for spot treatments. Refer to rangelands and agricultural properties chemical treatment needs in Table 1-4.

[c] All applications are done under a written Pest Control Recommendation by a state licensed Pest Control Advisor according to product label instructions and may include methods not listed here

NDA: No Data Available

fl= Fluid

oz= Ounce

gal= Gallon

Sources: (NPIC 2009; NPIC 2008; Tu et al. 2001; Massachusetts Department of Agriculture 2014; Minnesota Department of Agriculture n.d.; GardenSafe, n.d.; Native Pest Management, n.d.; Gervais et al. 2022)

The District's management categories and associated treatment types and methods are provided in Table 1-4. Changes in the maximum allowable application of each pesticide are included in Table 1-3. As discussed in Section 1.3, the IPM for fuel management category is now addressed through the implementation of Midpen's WFRP, therefore the 10-year Program update does not include the dedicated fuel management category. Table 1-4 includes each IPM management category and the respective manual, manual and mechanical, mechanical, and chemical treatment actions, including method of application, purpose, and annual application estimates. New or revised portions of the 2025 Program, such as the addition of new pesticides, changes to pesticide quantities, and new or revised methods of application included as part of the 10-year update are included in gray highlighted underline or ~~strikeout~~ in Table 1-4.

The subsections that follow provide simplified information of what was included in the 2014 Program for each management category and is also part of the 2025 Program as well as a summary of what aspects are new or changed.

IPM in Buildings

District properties include approximately 330 buildings and structures, an increase from 103 buildings as of the 2014 Program, which encompasses administrative offices in cities, five field offices (increased from three as of the 2014 Program), a nature center, residences, and numerous outbuildings such as barns, sheds and water tanks in the preserves. Certain animals and plants may be incompatible with human use of these structures or may harm the building itself. For example, rodents, ants, termites, and similar structural pest species are typically controlled in buildings when their population numbers may result in structural damage or health risks to humans. Management of pests in buildings is estimated to occur in all buildings, structures, and vehicles and it may be conducted by District staff, contractors or by residential, commercial or agricultural/rangeland tenants at some level almost every year. Structural pests include common insects, plants and animals that routinely occupy the open interiors and immediate exteriors of buildings. Structural pests were generally included under the 2014 Program, however as part of the 10-year Program update, proposed changes included additional treatment actions for structural pests that live within the soil and wood components of structures, such as termites, wood boring beetles, and wood decaying fungi.

Table 1-5 summarizes treatment actions for insect and wildlife pests covered under the IPMP in buildings management category (new or revised information as part of the 10-year Program update is shown in gray highlighted underline and ~~strikeout~~).

Table 1-4 District Management Categories and Treatment Actions

IPM Management Categories	Treatment Type	Treatment Method	Method of Application [b]	Purpose	Annual Application [c]	Timing of work [d]	Frequency of Work[e]
Buildings	Manual	Sanitation	--	Structural pests, feral ~~stray~~ wildlife, pets	Approximately 330 ~~103~~ buildings	--	--
		Habitat modification	--	Structural pests, feral ~~stray~~ wildlife, pets	Approximately 330 ~~103~~ buildings	--	--
		Physical barriers	--	Structural pests, feral ~~stray~~ wildlife, pets	Approximately 330 ~~103~~ buildings	--	--
		Traps	Sticky, electric, snap, box, ~~glue boards,~~ water, lures	Structural pests, feral ~~stray~~ wildlife, pets	Approximately 330 ~~103~~ buildings	--	--
		Building retrofits	--	Structural pests, feral ~~stray~~ wildlife, pets	--	Spring/ summer/ fall	--
		Prevention	--	Structural pests, feral ~~stray~~ wildlife, pets	--	--	--
	Chemicals	Insecticidal soap	Spray	Structural pests	Approximately 330 ~~103~~ buildings	Spring/ summer/ fall	--
		Diatomaceous earth	Crack & crevice	Structural pests	Approximately 330 ~~103~~ buildings	Spring/ summer/ fall	--
		Boric acid	Crack & crevice	Structural pests	Approximately 330 ~~103~~ buildings	Spring/ summer/ fall	--

IPM Management Categories	Treatment Type	Treatment Method	Method of Application [b]	Purpose	Annual Application [c]	Timing of work [d]	Frequency of Work[e]
		S-Hydroprene	Impregnated disc	Structural pests	15 fl oz over 8 applications over ~~103~~ approximately 330 buildings	Spring/ summer/ fall	--
		Indoxacarb (0.1%)	Crack & crevice	Structural pests	7 fl oz over 20 applications over ~~103~~ approximately 330 buildings	Spring/ summer/ fall	--
		Indoxacarb (0.5%)	Crack & crevice	Structural pests	51 fl oz over 23 applications over ~~103~~ approximately 330 buildings	Spring/ summer/ fall	--
		Sodium tetraborate decahydrate	Bait station	Structural pests	11 fl oz over 17 applications over ~~103~~ approximately 330 buildings	Spring/ summer/ fall	--
		Fipronil	Bait station	Structural pests	16 fl oz over 7 applications over ~~103~~ approximately 330 buildings	Spring/ summer/ fall	--
		Fipronil	Spot treatment	Termites	5 gallons over 1-5 residences	--	1x per year
		Cholecalciferol	Bait station	Vertebrate pests	50 oz over ~~103~~ approximately 330 buildings	Spring/ summer/ fall	--
		Prallethrin	Spray	Stinging insects	70 oz (4 cans of spray)	Spring/ summer/ fall	--

IPM Management Categories	Treatment Type	Treatment Method	Method of Application [b]	Purpose	Annual Application [c]	Timing of work [d]	Frequency of Work[e]
		Chlorantraniliprole	Perimeter	Structural pests, termites	8.5 gallons over 1-5 residences	--	1x per year
		Dinotefuran	Perimeter	Structural pests, termites	14 ounces over 1-5 residences	--	1x per year
		Sulfuryl fluoride/ chloropicrin	Tenting	Structural pests, termites	240 ounces over 1-5 residences (sulfuryl fluoride) 10 fluid oz over 1-5 residences (chloropicrin)	--	1x per year
		d-Limonene	Spot treatment, prevention	Structural pests, termite	2 gallons over 1-5 residences	--	1x per year
		Disodium Octaborate Tetrahydrate	Spot treatment, prevention	Structural pests, fungus & dry rot, termite	5 gallons over 1-5 residences	--	1x per year
Recreational Facilities	Manual	Sanitation	--	Stinging insects	--	Spring/ summer/ fall	--
		Habitat modification	--	Stinging insects, mosquitoes, feral ~~stray~~ wildlife, pets	--	Spring/ summer/ fall	--
		Traps	Water/lure	Stinging insects, mosquitoes, feral ~~stray~~ wildlife, pets	--	Spring/ summer/ fall	--
		Nest removal	--	Stinging insects	--	Summer	--

IPM Management Categories	Treatment Type	Treatment Method	Method of Application [b]	Purpose	Annual Application [c]	Timing of work [d]	Frequency of Work[e]
	Manual and Mechanical	Digging & mowing	Hand shovels, brushcutters (manual method in creeks with salmonids)	Ponds, bridges, culverts	<2 acres ~~1 acre~~	--	1x per year
	Mechanical	Mowing	Tractors	Roads & road-width trails, facilities	696 acres ~~580 acres~~	May through August	1.5x per year
			Brushcutters	Single track trails	102 acres ~~85 acres~~	May through August	1.5x per year
		Clearing and grubbing	Loppers, hand saws, bladed tools	Vegetation management along trails	153 miles; ~186 acres	--	---
		Cutting	Chainsaws	Hazard & downed tree removal	50 to 150 trees	--	--
			Chippers	Hazard & downed tree removal	50 to 150 trees	--	--
	Manual: Biological	Bacterial pathogens	*Bacillus thuringiensis* var. *israelensis*	Mosquitoes	250 discs	May through September	1 disc per 30 days
	Chemical	Prallethrin	Spray	Stinging insects	350 oz (20 cans of spray)	Spring/ summer/ fall	--
		Glyphosate IPA	Cut-stump, spot spray, wick, frill/injection	Dam faces, parking lots, gates & stiles, facilities	3.4 gal ~~over 40 acres~~	Spring/ summer/ fall	1x per year

IPM Management Categories	Treatment Type	Treatment Method	Method of Application [b]	Purpose	Annual Application [c]	Timing of work [d]	Frequency of Work[e]
		Glyphosate K	Cut-stump, spot spray, wick, frill/injection	Roads, trails, parking lots, gates & stiles, facilities	1.1 gal ~~over 54.6 acres~~	Spring/ summer/ fall	1x per year
		Clopyralid MEA	Spot spray, cut-stump, frill/injection	Parking lots, gates & stiles, facilities	0.4 ~~0.3~~ gal ~~over 22.9 acres~~	May through August	1x per year
		Imazapyr IPA	Cut-stump, spot spray, frill/injection	Roads, trails, parking lots, gates & stiles, facilities	0.5 gal ~~over 54.6 acre~~	Spring/ summer/ fall	--
		Triclopyr	Spot spray, basal bark	Invasive plant control in aquatic and riparian weeds.	0.6 gal	Spring/ summer/ fall	1x per year
~~Fuel Management~~	~~Manual and Mechanical~~	~~Mowing & cutting~~	~~Tractors, brushcutters, pole pruner, chainsaws, chippers, masticators, jawz implement~~	~~Defensible space, fuel break, emergency helicopter landing zones~~	~~140 acres~~	~~--~~	~~1x per year~~
		~~Discing & cutting~~	~~Tractor-pulled instrument, pole pruner~~	~~Disc lines~~	~~75 acres~~	~~April through May~~	~~1x per year~~
	~~Chemical~~	~~Glyphosate K~~	~~Cut-stump, spot spray, wick, frill/injection~~	~~Defensible space, disc lines, fuel break~~	~~3.6 gal over 14 acres~~	~~April through June~~	~~1x per year~~

IPM Management Categories	Treatment Type	Treatment Method	Method of Application [b]	Purpose	Annual Application [c]	Timing of work [d]	Frequency of Work[e]
		~~Triclopyr BEE~~	~~Spot spray, cut-stump, basal bark~~	~~Defensible space, disc lines, fuel break~~	~~3.6 gal over 14 acres~~	~~Summer/fall~~	~~1x per year~~
Rangelands and Agricultural Properties	Manual	Weeding, weedmats, crop rotation, mulching	Hand tools	Agricultural weeds	432 acres ~~360 acres~~	Spring/ summer	1x per year
		Sanitation, physical barriers, traps	Snap, box traps	Vertebrate pests	432 acres ~~360 acres~~	--	--
	Mechanical	Mowing, ~~discing,~~ cutting, flaming	Tractors, brushcutters, brushrakes, flame equipment	Rangeland weeds, agricultural weeds, brush control	432 acres ~~725 acres~~	Spring/ summer/fall	1x per year
	Chemical	Aminopyralid TIPA	Spot spray, cut-stump, basal bark, wick, frill/injection	Rangeland weeds, invasive plant control	2.4 ~~2.1~~ gal ~~over 174 acres~~	--	1x per year
		Clopyralid MEA	Spot spray, cut-stump, frill/injection	Rangeland weeds, invasive plant control	1.8 ~~1.6~~ gal ~~over 174 acres~~	Spring/ summer	1x per year
		Glyphosate IPA	Spot spray, cut-stump, wick, frill/injection	Rangeland weeds, brush control, agricultural weeds, invasive plant control	1.1 ~~1~~ gal ~~over 100 acres~~	Spring/ summer	1x per year

IPM Management Categories	Treatment Type	Treatment Method	Method of Application [b]	Purpose	Annual Application [c]	Timing of work [d]	Frequency of Work[e]
		Glyphosate K	Spot spray, cut-stump, wick, frill/injection	Rangeland weeds, brush control, agricultural weeds, invasive plant control	66.7 ~~57.6~~ gal ~~over 154 acres~~	Spring/ summer	1x per year
		Triclopyr BEE	Spot spray, cut-stump, basal bark	Rangeland weeds, brush control, agricultural weeds, invasive plant control	3.4 ~~6.6~~ gal ~~over 154 acres~~	Spring/ summer/ fall	1x per year
		Triclopyr TEA/ Aminopyralid TIPA	Spot spray, cut-stump, frill/injection	Rangeland weeds, invasive plant control	22.8 ~~20~~ gal ~~over 154 acres~~	--	1x per year
		Clethodim	Spot spray	Invasive plant control	2.8 gal	Winter/ spring/ summer	1x per year
		Triclopyr	Spot spray, basal bark	Invasive plant control in aquatic and riparian weeds.	4 gal	Spring/ summer /fall	1x per year
		Imazamox	Spot spray aquatic/riparian	Invasive plant control. Riparian and terrestrial weed control.	0.5 gal	Spring/ summer/ fall	1x per year
		Glufosinate	Spot spray	Invasive plant control. Early season annual plant control.	3.2 gal	Spring	2x per year

IPM Management Categories	Treatment Type	Treatment Method	Method of Application [b]	Purpose	Annual Application [c]	Timing of work [d]	Frequency of Work[e]
Natural Lands	Manual	Digging, hoeing, hand pulling	Weed wrenches, Rootslayers, hand saws, clippers, pole pruner	Invasive plant control	300 acres ~~250 acres~~	--	1x per year
		Sanitation	--	Invasive plant control	--	--	--
		Prevention	--	Invasive plant control	--	--	--
		Habitat modification	--	Invasive plant control	--	--	--
		Traps	--	Invasive animal control	--	--	--
	Manual: Biological	Biocontrol insects	Hairy weevils	Invasive plant control	960 acres ~~800 acres~~	--	1x per year
	Mechanical	Cutting/Digging /Pulling	Pole pruner, chainsaws, chippers, masticators, jawz implement	Sudden oak death, invasive plant control	24 acres ~~20 acres~~	--	1x per year
		Flaming	--	Invasive plant control	<3 acres ~~2 acres~~	Winter/ spring	--
		Mowing	Tractors, mowers, brushcutters	Invasive plant control	120 acres ~~100 acres~~	Spring/ summer	4x per year

IPM Management Categories	Treatment Type	Treatment Method	Method of Application [b]	Purpose	Annual Application [c]	Timing of work [d]	Frequency of Work[e]
	Chemical	Glyphosate IPA	Spot spray, cut-stump, wick, frill/injection	Invasive plant control	1.1 ~~1~~ gal ~~over 100 acres~~	Spring/ summer	1x per year
		Glyphosate K	Spot spray, cut-stump, wick, frill/injection	Invasive plant control, sudden oak death	81.5 ~~71.5~~ gal ~~over 955 acres~~	Spring/ summer	1x per year
		Clethodim	Spot spray	Invasive plant control	2 ~~1.8~~ gal ~~over 243 acres~~	Spring/ summer	1x per year
		Aminopyralid TIPA	Spot spray, cut-stump, basal bark, wick, frill/injection	Invasive plant control	2.3 ~~2~~ gal ~~over 174 acres~~	--	1x per year
		Clopyralid MEA	Spot spray, cut-stump, frill/injection	Invasive plant control	1.9 ~~1.7~~ gal ~~over 164 acres~~	Spring/ summer	1x per year
		Imazapyr IPA	Spot spray, cut-stump, frill/injection	Invasive plant control, sudden oak death	0.40 ~~0.35~~ gal ~~over 8 acres~~	Spring/ summer	1x per year
		Phosphite K (Salts, mono-/di-)	Spray, inject	Pathogen	45 gallons concentrate ~~over 30 acres~~	April/ May or October/ November	1x per year
		Triclopyr BEE	Spot spray, cut-stump, basal bark	Invasive plant control	22.8 ~~20~~ gal ~~over 1,000 acres~~	Spring/ summer/ fall	1x per year

IPM Management Categories	Treatment Type	Treatment Method	Method of Application [b]	Purpose	Annual Application [c]	Timing of work [d]	Frequency of Work[e]
		Triclopyr TEA/ Aminopyralid TIPA	Spot spray, cut-stump, frill/injection	Invasive plant control	20 ~~17.5~~ gal ~~over 164 acres~~	--	1x per year
		Triclopyr	Spot spray, basal bark	Invasive plant control	20 gal	Spring/ summer/ fall	1x per year
		Imazamox	Spot spray aquatic/ riparian	Invasive plant control	2 gal	Spring/ summer/ fall	1x per year
		Glufosinate	Spot spray	Invasive plant control, early season annual plant control	3.2 gal	Spring	2x per year
General [f]	Surfactants/ Adjuvants	Canola Oil, Ethyl and Methyl Esters	Spot spray	Increase delivery and efficacy of pesticides to targets	--	--	--
		Lecithin	Spot spray	Increase delivery and efficacy of pesticides to targets	--	--	--
		Alcohol ethoxylates	Spot spray	Increase delivery and efficacy of pesticides to targets	--	--	--
		Alkylphenol ethoxylate (APE)	Spot spray	Increase delivery of Agri-Fos to trees	--	--	--

IPM Management Categories	Treatment Type	Treatment Method	Method of Application [b]	Purpose	Annual Application [c]	Timing of work [d]	Frequency of Work[e]
	Chemical (Disinfectant)	Sodium dichloroisocyan-urate dihydrate	Spot spray/water additive	Disinfect equipment, water bodies and surfaces	5 kg	--	--
		Sodium chloride	Spot spray	Disinfect equipment	16 gal	--	--
		Ethanol or isopropyl alcohol	Spot spray	Disinfect equipment	100 gal	--	--
		Dodecyl dimethyl ammonium chloride	Spot spray	Disinfect equipment	5 gal	--	--
	Chemical (Repellents)	N,N-diethyl-meta-toluamide (DEET)	Spot spray	Impairs insect's ability to detect target(s)	200 cans (6 ounces)	--	--
		Picaridin	Spot spray	Makes insects less likely to bite	200 cans (5 ounces)	--	--

Notes:

[a] This table is a combination of information presented in the 2014 EIR and 2019 Addendum. New or changed information proposed as part of the 2025 IPMP 10-year update are shown in underline or strikeout and highlighted in gray. For the purposes of this addendum, the acres of manual and mechanical treatment are assumed to increase approximately 20 percent in accordance with the Program area increase to account for foreseeable expansion of District-owned and managed lands and associated IPM activities.

[b] All applications are done under a written Pest Control Recommendation by a state licensed Pest Control Advisor according to product label instructions and may include methods not listed here.

[c] Herbicide quantities are expressed as volume of concentrate, i.e. volume of undiluted product. As the District continues to expand District managed lands, the overall scale of pesticide use under the IPMP must also increase as part of the 10-year update to meet the growing treatment and coverage

needs, therefore acreage estimates are excluded and only application values (e.g., ounces, gallons) are presented. Application would occur in accordance with the 2025 Program and IPMP BMPs.

[d] No value indicates treatment method may be applied anytime during the year.

[e] No value indicates treatment method may be applied multiple times throughout the year as needed.

[f] The general category is included to indicate that disinfectants and chemical repellents are used under all management categories. Refer to Section 1.5.5 for a description of how disinfectants and repellents will be utilized under the 2025 Program. Additionally, information regarding disinfectants and repellents as incorporated into the specific management categories is included throughout Section 1.5.4.

fl= Fluid

oz= Ounce

gal= Gallon

Sources: (Yun Cang, n.d.; Midpen 2018)

Table 1-5 Building Management Category and Treatment Actions

Pest Category	Treatment Action
Structural Pests (overall)	Prevention (cultural and manual control treatments): • Check for proper ventilation of crawl spaces; add vapor barriers in crawl spaces. • Ensure appropriate slopes and drainage next to structures. • Downspouts and gutters should discharge at least one foot away from walls; splash guards, rain barrels, or gutter extensions may be added to reduce accumulation of moisture near structural walls. • Ensure that landscape irrigation does not introduce moisture to foundations – use drip irrigation and position sprinklers to avoid structures. • Prune vines, shrubs, and trees at least six feet away from roofs and exterior walls, as rodents can use these for access into buildings and shelter next to foundations. • Remove and avoid planting Algerian or English ivy, star jasmine, or honeysuckle vines, which provide shelter and food sources for rats and other urban pests. Remove and avoid planting bamboo, cherry laurel, fig, pine, and roses near buildings, which encourage scale, aphid, and ant populations. • Clear landscaping away from vent openings to crawlspaces to prevent moisture buildup. • Remove plants and wood mulch within several inches of foundations to minimize ants and other nests. A gravel strip around foundations at least two feet wide and 0.5 feet deep of one-inch gravel or larger discourages rodent burrowing and other insect nesting. • Select plants that attract beneficial insects such as parasitic wasps, native bees, and ladybugs. • Store compost and trash bins away from structures, as these can attract rodents, insects, and other nuisance pests.

Pest Category	Treatment Action
	• Store wood piles and debris away from structures to prevent rodent, beetle, and termite infestation. • Seal off openings. • Inspect openings to crawlspaces and other ventilation features to ensure screens are intact. • Inspect, maintain, and use elastomeric sealant, polyurethane foam, and weather-stripping to seal all small cracks in structures, around countertops and windows, pipe breaks, and areas where pipes enter walls. Use stainless steel wool and mesh and fire block foam to re-seal larger openings in buildings and below decks. • Add door sweeps or high-density pest brushes to seal gaps greater than 0.25 inch below doors. • In areas with Norway rats or other rodent issues, various items can be installed to prevent the rodents from climbing downspouts and pipes, including flap valves or screens in downspouts, 12-inch-diameter downward-facing cones or 18-inch-diameter discs, or a 12-inch band of glossy paint on exterior vertical pipes. • Add bird exclusion materials to lighting and other horizontal surfaces. • Bird spikes, wires, netting, or similar materials should be installed to prevent birds from roosting or nesting on structures or on light poles. • Reduce or move exterior lighting. Exterior lighting may encourage insects to gather near doors and windows. • Timers and motion detectors can be installed to minimize unnecessary lighting. • Use reflected light instead of direct light to illuminate entryways, as insects are more attracted to direct light. • Use yellow (sodium) bulbs to reduce insect attraction in exterior areas. • Enclose refuse and recycling areas with metal, concrete, or similar materials to prevent wildlife from climbing, burrowing, or chewing into the enclosure. Do not plant ivy around the enclosure. • Use refuse containers that are heavy duty, rust resistant, rat and damage resistant, and equipped with tight-fitting lids. • In the event that repeated attempts of removal of non-native rodents are not successful in a human occupied structure, lethal removal may be required as a control method.
Stinging Insects (Nests)	Chemical control: • Use of **Pyrethrin Aerosol Sprays.** Pyrethrin-type aerosol sprays containing prallethrin, and phenothrin are only recommended where immediate threats exist to human health and safety. These aerosol sprays are extremely effective at immediately eliminating single, problem wasp nests that threaten District staff or visitors.[a]

Pest Category	Treatment Action
Structural Pests (Subterranean termites, drywood termites, wood beetle, fungus/dry rot)	Physical control (manual control treatments): • Treat the full perimeter of the home and any additional entry points by, and not limited to, trenching and/or rodding soil adjacent to the foundation, drilling through concrete/veneer surfaces abutting the foundation, trenching around pier blocks and plumbing pipes in the subarea. • Remove or destroy accessible subterranean termite tubes/tunnels. • Seal drill holes and back fill trenches, if applicable. • Prior to tenting (discussed above), the District will remove all plants, as feasible, and rake back all rock and debris along the foundation (8-10 inches) to create a proper seal for chemical work. Contractor would follow tenting instructions and requirements. • Patch all injection holes, cover, or remove accessible termite evidence.
Structural Pests (Subterranean termites, drywood termites, wood beetle, fungus/dry rot)	Chemical control: • Spot Treatment (subterranean termites): Treat the affected area with Termidor SC (fipronil). Drill into concrete if/as needed. Fill holes with concrete sealer. Treat all probable access points as needed. Remove accessible termite tubes. • Spot Treatment (drywood termite, ground and wood beetle): Exterminate the drywood termites by drilling small holes into the infested wood member and injecting XT-2000 Insecticide (Active Ingredient: d-Limonene) and/or Tim-bor (Active ingredient: Disodium Octaborate Tetrahydrate) and/or Termidor SC (Active ingredient: fipronil) and/or Bora-Care (Active ingredient: Disodium Octaborate Tetrahydrate) into the termite channels. • Full perimeter (subterranean termite): Treat the infested area with Termidor HE (active ingredient: fipronil) and/or Altriset (active ingredient: Chlorantraniliprole) and/or Alpine Foam (active ingredient: Dinotefuran) for the control of subterranean termites. • Tenting (drywood termite and wood beetle): The entire structure will be sealed and fumigate with Sulfuryl Fluoride (Vikane). Tear gas (Chloropicrin) would be used as a warning agent. • Prevention (drywood termite and wood beetle): Apply Tim-bor (Active ingredient: Disodium Octaborate Tetrahydrate) and/or Bora-Care (Active ingredient: Disodium Octaborate Tetrahydrate) to accessible exposed wood members of the attic. • Fungus/dry rot: After wire brushing or scraping the infected area, treat the infected area with Tim-Bor (Active ingredient: Disodium Octaborate Tetrahydrate) and/or Bora-Care (Active ingredient: Disodium Octaborate Tetrahydrate).
Ant	Physical control (manual control treatments): • Clean up of ant trails with soapy water or sticky lint rollers. • Use of caulking, silicone, or expanding foam to fill cracks, holes, or other entry points where ant trails originate. If multiple entry points are suspected, diatomaceous earth dust could be injected into cracks before sealing (discussed below under chemical options).

Pest Category	Treatment Action
	• Pruning of outside vegetation that is touching structures if it attracts ants. Some species, such as citrus, are especially susceptible to sucking Homopteran insects that in turn attract ants. District may consider replacing these species of plants if adjacent to buildings and creating ant infestations. • Removal of debris such as pieces of wood or masonry that that act as cover for ants nesting next to structures should be removed. • Elimination of water leaks in, under or around structures that will attract ants or other pests.
Ant	Chemical control: • Insecticidal soap spray: When used for ant control, soaps are most effective in controlling the Homopteran insects (aphids, etc.) on plants that attract and sustain ant colonies. • Boric acid bait: Baits use low concentrations of boric acid in the range of 0.5 – 5 percent to allow for ants to ingest the bait and take it back to the colony to share with other workers before there is a lethal effect. • Fipronil: Fipronil is a broad-spectrum insecticide common in household cockroach/ant baits and flea sprays for pets. When used as ant bait, it is toxic through ingestion where it blocks chloride channels in the central nervous system resulting in excess neuronal stimulation and death. • Diatomaceous earth (DE): DE is non-selective so it must be used only in specific areas where the target pests travel. The dusts are not eaten – so must be applied in areas where it would make contact with the bodies of insect pests. For ant control, it is often applied to cracks and crevices and may also be used in conjunction with caulks and foams to fill problem areas.
Cockroaches	Physical control (manual control treatments): • Use of caulking, silicone, or expanding foam to fill cracks, holes, or other entry points where cockroaches are known to hide or enter structures. If multiple entry points are suspected, diatomaceous earth dust could be injected into cracks before sealing. • Use of a sticky-trap monitoring program to determine where in the building roaches are hiding. • Removal of interior and exterior clutter and/or organic waste that create harborage and/or food for cockroaches. • Ensuring there are no water leaks in, under or around structures that will create conducive conditions for cockroaches.
Cockroaches	Chemical control: • Boric acid dusts: They are practically non-detectible to cockroaches, so unlike many other chemical products that cockroaches can detect and avoid, they offer one of the more effective methods for cockroach control (Gore and Schel 2004). Because they have such a long service life, they are effectively applied inside building walls, plenum (false) ceilings, crawlspaces and other relatively inaccessible areas where cockroaches can occur.

Pest Category	Treatment Action
	• Hydroprene: Hydroprene is a synthetic insect growth regulator that mimics juvenile insect hormones to regulate insect pest populations. Although it does not poison an insect directly to cause a lethal effect, it does interrupt the development cycle of juvenile cockroaches so they do not reach a reproductive stage. • Fipronil insecticidal baits: see description above in relation to ant chemical control. • Indoxacarb insecticidal baits: when used as cockroach bait, it is toxic to insects through ingestion where it blocks sodium channels in the central nervous system resulting in paralysis and elimination of the target insect pest.
Flies	Physical control (manual control treatments): • Use of caulking, silicone, or expanding foam to fill cracks, holes, or other entry points in building exteriors where flies can gain entry. • Use of sticky fly traps to capture excess adult flies and remove them from building interiors. • Use of baited electric traps for problem outside areas such as picnic grounds, barns, or livestock areas. • Abate larval development sites. Identification of the fly species and larval food source is key to fly control; removal of decaying organic matter in and around structures and keeping lids on trashcans is essential in a fly management program. • Install/repair functional screens on doors and windows. • Inspect attic spaces and substructures for animal droppings or corpses if metallic colored flies are present. • No chemical methods are approved for control of flies.
House and Deer Mice	Physical control (manual control treatments): • Install snap traps (i.e. basic hardware store mouse traps) for mouse population control. • Install box traps that are capable of trapping multiple individuals per trapping event. • ~~Install glue boards (i.e., sticky boards). These are effective for supplementing other trapping methods in challenging areas (i.e., where other traps cannot be easily placed) or for trapping individuals that are trap shy. Glue traps are most effective when placed in a box or other cover to keep dust and debris from coating the surface, and can only be used inside buildings~~. • Removal of food, water, and harborage for rodents in and immediately around structures. • Install rodent proofing of structures to prevent rodent infestation.
House and Deer Mice	Chemical control: Chemical control of mice are not considered except under very severe human health and safety considerations. In the unlikely event that chemical control of mice is deemed necessary, refer to the Chemical Control section for rats, below.
Roof, Norway, and woodrats	Physical control (manual control treatments):

Pest Category	Treatment Action
	• Complete an inspection to identify the rodent species, find rodent entry points (holes 0.25 inch or larger), and identify other conditions conducive to rodent infestation. Note: If woodrats are found to infest the structure, California Department of Fish and Wildlife should be contacted. • Removal of food, water and harborage for rodents in and immediately around structures. If woodrat nests need to be moved away from structures to either reduce infestation of buildings or reduce wildfire hazard, California Department of Fish and Wildlife would be contacted. • Install rodent proofing of structures to prevent rodent infestation. • Install snap traps (see description above). ~~• Install glue boards (see description above).~~
Roof, Norway, and woodrats	Chemical control: • The only rodenticide that is approved for structural rodent control on District lands under the IPM is cholecalciferol. This rodenticide is only used in cases where the infestation level is posing a risk to human health especially if non-chemical methods have been found to be ineffective. Rodenticides are only used inside buildings and in bait formulations enclosed in anchored and tamper-proof stations. Tenants are not allowed to use rodenticides; only trained District staff or licensed contractors are allowed to use rodenticides in District managed buildings. The District's IPM Coordinator determines rodenticide usage based on the proximity to urban areas, concerns for wildlife, and resistance management. No anticoagulant rodenticides (i.e., first generation anticoagulants: diphacinone, chlorophacinone or second generation anticoagulants: brodifacoum, bromadiolone, difenacoum or difethialone) are allowed for use on District lands under the IPMP.
Skunks, opossums, raccoons, and bats	Physical control (manual control treatments): • Install one-way door, live box, or cage traps. Trap design varies but solid wall traps are preferred for skunks to shield the trapper from skunk spray during the control operation. The use of live trapping methods ensures that non-target animals can be released unharmed. Current California Department of Fish and Wildlife (CDFW) trapping regulations require that trapped animals are either released immediately or euthanized, live animals may not be relocated without a permit from CDFW. • Place 0.5-inch or smaller welded wire mesh over chimney tops (check with your fire department for local regulations on spark arresters) and install a tighter-fitting screen. Bats can enter through open doors or windows or exterior openings over ¼" in diameter. Other common entry points include chimneys that don't have grates and doors with loose-fitting screens. Conduct a room-by-room search for other points of entry, and seal holes that are more than ½ inch in diameter or cracks that are ¼ by 1½ inches or larger. Close openings around plumbing pipes by using steel wool or other suitable material (UC IPM Pest Notes). Install one-way openings to allow bats to leave the structure after sealing is complete. Smoke pens may be permitted in structures with a verified absence of bats. Bat exclusion requires CDFW approval. Avoid bat exclusion work during the winter torpor period (November 15 through February 15) and summer maternity roosting season (April 15 through August 31).

Pest Category	Treatment Action
Skunks, opossums, raccoons, and bats	Chemical control: Chemical control of skunks, opossums, raccoons, and bats are not considered except under very severe human health and safety considerations. In the unlikely event that chemical control of skunks, opossums, raccoons, and bats is deemed necessary, refer to the Chemical Control section for rats, above.
Feral pets	Physical control (manual control treatments): Utilize catch pole or otherwise trap dogs, cats, turtles, rabbits and other domesticated animals found escaped or released in the preserves and return them to their owners or turn them over to local animal control departments or animal shelters.

IPM for Recreational Facilities

Human use is typically concentrated on preserves at the recreational facilities provided by the District. Recreational facilities within District preserves currently include approximately 518 miles of access roads and trails, an increase compared to the 479 miles as of the 2014 Program, as well as associated infrastructure (i.e., bridges, culverts, drainage ditches, boardwalks, parking lots, gates, stiles, restrooms, fencing, signage and sign boards), picnic areas, one campground, off-leash dog area, landscaped recreation areas, pond viewing and dam areas, and Deer Hollow Farm. Nuisance pests in and around recreational facilities include plants, stinging insects and wildlife that can temporarily affect the District's visitor experience in a negative manner. Sometimes, nuisance pests at recreational facilities become problematic when there are extra resources readily available (e.g., food, water, shelter) and therefore can be managed through physical control options (e.g., leave no trace policy, maintaining crumb-free picnic and camping areas). The purpose of pest control in and around recreational facilities is to provide for human enjoyment of the natural and scenic qualities of the preserves while also minimizing human exposure to pests. The majority of IPM activity associated with recreational facilities is annual brushing (i.e., pruning of vegetation along roads and trails), which keeps them open for vehicular, horse, bicycle and human foot traffic, and furthermore provides a buffer area to separate humans from pests like ticks, rattlesnakes, and poison oak. Mowers and saws may be used by District staff to maintain grass and shrubs near roads and trails in short stature, limb up overhanging tree branches, and remove dead or decadent vegetation. Wider strips of brushing occur along certain roads to provide access for emergency vehicles.

Table 1-6 summarizes treatment actions for plants, insect, and wildlife pests covered under the IPM in recreational facilities management category (new or revised information as part of the 10-year Program update is shown in gray highlighted underline and ~~strikeout~~).

Table 1-6 Recreational Facilities Management Category and Treatment Actions

Pest Category	Treatment Action
Mosquitoes	Chemical control: • Where chemical control is determined to be the only viable treatment option to address the specific infestation of concern in and around recreational facilities, the District would contact the appropriate county Mosquito and Vector Control District for assistance and would comply with legal requirements to control mosquitoes for human health and safety. • Repellents (active ingredient: DEET or picaridin) can be applied to the skin or clothing, to dissuade insect pests, including mosquitoes, from attacking District staff or workers. Use of repellents will be limited and infrequent.
Mosquitoes	Biological control (manual control treatments): • *Bacillus thuringiensis var. israelensis* (BTI), in the form of small discs, are placed in watering troughs throughout the preserves to control mosquitoes. BTI is a specific type of bacteria that prevent mosquito larvae from developing.
Mosquitoes	Physical control (manual control treatments): • Train staff to protect themselves from exposure by wearing long-sleeved clothing, tucking pant legs into socks and/or taping pant cuffs close to the body.
Stinging Insects	Chemical control: • Pyrethrin aerosol sprays containing d-trans allethrin and phenothrin would only be used in areas where immediate threats exist to human health and safety. These aerosol sprays are extremely effective at immediately eliminating single, problem wasp nests that threaten District staff or visitors.
Stinging Insects	Physical control (manual control treatments): • Install baited non-toxic water traps in late winter and early spring to reduce queens in problem areas where wasps are known to be regularly problematic. • Install pesticide-free lure traps set approximately 200 feet apart in outside problem areas where human/wasp conflicts are known to occur (e.g., picnic areas). • Remove problem wasp nests with water jets or by digging them out of underground locations.
Ticks	Physical control (manual control treatments): • Train staff to protect themselves from tick exposure and posting of educational signs to help inform visitors of tick prevention and detection strategies. • Chemical control of ticks is not approved; however, repellents (active ingredient: DEET or picaridin) can be applied to the skin or clothing, to dissuade ticks from attacking District staff or workers. Use of repellents will be limited and infrequent.
Rattlesnakes	Physical control (manual control treatments):

Pest Category	Treatment Action
	• Eliminate hiding places for snakes by trailheads and parking areas with brushing, removing rock and brush piles near busy human use areas especially those with children, and filling cracks and holes in publicly accessible buildings. • Use snake tongs, snake hooks, or shovels to capture and relocate rattlesnakes that occur near people. Rattlesnakes are the only venomous snakes that can cause significant harm to humans that occur in the District preserves. Captured rattlesnakes can be placed in a secure container for relocation in the preserve to suitable habitat away from people. Occasionally, due to site conditions or the urgency of the situation, a staff member or tenant may need to kill a rattlesnake with a shovel. • Chemical control of rattlesnakes is not approved.
Vegetation	Chemical control: • Maintenance of required clear zones next to trails and related recreational facilities is primarily done with manual and mechanical methods as described above. Broadcast application of herbicides would not be used for this purpose. However, selective application of herbicides next to trails is sometimes used to control problematic vegetation (e.g., stands of poison oak and efficient control of woody plants in narrow zones). • Chemical control active ingredient options include the approved glyphosate, approved imazapyr, and the proposed triclopyr, and glufosinate. Refer to Table 1-4.
Vegetation	Physical control (manual control treatments): • Road and trail brushing: Mechanical mowing is used to prevent nuisance vegetation from impeding roads and trails. Vegetation along approximately ~~479~~ 518 miles of trail and road edges (counting both sides of trails and roads) is cut back to maintain an open corridor for trail and road use. This work is primarily mechanical work done with brushcutters (a.k.a. weed-whips), chainsaws, poles saws, chippers, and tractor-operated mowers (mowing decks either pulled by a tractor or attached to the tractor as part of an articulated arm). All roads are mowed one to four times per year depending on the rainfall/vegetation growth in any one year. • Parking lots, gates, and stiles: On an annual basis, a strip of land around ~~13~~ approximately 50 parking lots and ~~213~~ between 200-300 gates and stiles in the preserves are sprayed to maintain an open area for parking and visibility. A few of the locations are brushcut or mowed instead if they are large grassy areas or if there is water too close to allow spraying. Islands in the middle of parking lots or parking lots with narrow grassy edges and bioretention basins are mowed. • Miscellaneous recreational areas: A few miscellaneous recreational areas are mowed one to five times a year with a tractor pulling a mowing deck. • Campsite: The Black Mountain campsite is mowed once a year to provide a comfortable camping experience and to reduce the risk of wildfire encroaching either into or out of the campground. • Pond viewing areas and boardwalks: At some ponds and boardwalks, aquatic and terrestrial vegetation is managed at viewing areas and on dams. Windows of cattails and other tall wetland vegetation are removed in small select areas to allow public viewing of these water bodies.

Pest Category	Treatment Action
	• Streambed alteration: The District follows conditions of an annual routine maintenance Streambed Alteration Agreement from CDFW for manual and mechanical vegetation management activities located within CDFW's jurisdiction. • Hazard and downed trees: Removal of downed trees, as appropriate. An estimated 50 to 150 standing trees are limbed or removed every year with chainsaws, pole saws and chippers because they are blocking roads, trails and parking lots or are otherwise hazardous to visitors, staff, tenants or contractors. These trees may be alive or dead. Stumps of live trees may be treated with herbicide to prevent re-growth.

IPM for Rangelands and Agricultural Properties

Consistent with the 2014 Program, some District lands encompass rangelands, crop fields, and orchards that are actively managed as grazing or agricultural operations. Rangeland and agriculture activities on District preserves are primarily managed by lessees who typically operate under an Agricultural Management Plan, which includes Rangeland Management Plans, that are attached to their lease. These site-specific management plans guide the rangeland and agricultural activities to ensure compatibility with natural resource protection and low-intensity public recreation. The IPMP does not replace the requirements of the individual range or agricultural management plans, nor does it present the full range of agricultural or range management options. Rather, it seeks to provide staff with tools that are consistent with IPM principles to select the safest, least harmful, and most effective treatment options for rangeland and agricultural pests. Insect management in field crops is very specific to the type of crop grown. Because the District has few properties that currently support row crops, agriculture insect pest management for agricultural fields is not covered under the IPMP but would be covered in future Agriculture Management Plans. Future plans would be required to be consistent with the IPMP.

The purpose of IPM in rangelands and on agricultural properties is to manage pests to maintain the specific land uses (e.g., livestock grazing, crop production), while also providing natural resource protection and visitor access. Rangeland and agricultural pests that may be encountered include weeds, pathogens, and insects in croplands; rodents in farm fields and buildings; and weeds poisonous to livestock or otherwise detrimental to productive pastures, primarily thistles and brush. IPM in rangelands and agricultural properties focuses on maintaining land uses (e.g., grazing, agricultural crop production) while also managing for the long-term functioning and stability of high value natural resources (e.g., grasslands, creeks) that surround the rangelands and agriculture. This requires landscape level monitoring to determine when pests such as agricultural pests and invasive plants are present in sufficient numbers to reduce the intended land uses or quality of the managed habitats. No changes are proposed to the Rangelands and Agricultural Properties category as part of the 10-year Program update, however properties managed under the Districts Conservation Grazing Program have changed since implementation of the 2014 Program, as outlined in Table 1-7. The District first established its Conservation Grazing Program in February 2007 with the goal of managing District land with livestock grazing that is protective of natural resources, compatible with public access, maintaining or enhancing the diversity of native plant and animal communities, managing vegetation fuel for fire protection, helping to sustain the local agricultural economy, and preserve or foster appreciation for the region’s rural agricultural heritage.

Table 1-7 District Properties Currently Managed Under the District's Conservation Grazing Program

Property[b]	Preserve	Years First Grazed Under District Management	Acres as of 2014	Acres as of 2025
Apple Orchard Grazing Unit	La Honda	2013	N/A	298
Big Dipper-Mindego Grazing Unit	Russian Ridge OSP/Skyline Ridge OSP	2007-2015	Big Dipper: 955 Mindego Hill: 1,047	2,027
Bluebrush Canyon[c]	Purisima Creek Redwoods OSP	2009	302	273
Lobitos Grazing Unit (now includes the Elkus Ranch Uplands)	Purisima Creek Redwoods OSP	2009-2010	Lobitos: 389 Elkus Ranch Uplands: 450	1,210
October Farm Grazing Unit	Purisima Creek Redwoods OSP	2012	270	280
Gordon Ridge Grazing Unit	Tunitas Creek OSP	2020	NA	545
Toto Ranch Grazing Unit[d]	Tunitas Creek OSP	2012	952	903
Tunitas Creek Grazing Unit	Tunitas Creek OSP	2008	707	703
Harrington Grazing Unit (formerly known as Driscoll Ranch)	La Honda Creek OSP	2006	3,700	3,595
Lone Madrone Grazing Unit (formerly known as McDonald Ranch)	La Honda Creek OSP	2014	2,060	1,076
Butano Farms Grazing Unit	Cloverdale Ranch OSP	2023[a]	NA	783
Cloverdale Ranch Grazing Unit	Cloverdale Ranch OSP	2023-2024	NA	3,375
Johnston Ranch Grazing Unit	Miramontes Ridge OSP	2021[a]	NA	412

Property[b]	Preserve	Years First Grazed Under District Management	Acres as of 2014	Acres as of 2025
Total			**10,832**	**15,480**

Notes:

[a] Indicates this was the first year the District managed grazing, prior to full ownership.

[b] All properties, except Big Dipper-Mindego Grazing Unit, are within the Service Plan for the San Mateo Coastal Annexation Area.

[c] The area of grazing decreased due to a reevaluation of grazeable areas.

[d] The area of grazing decreased due to removal of the agricultural lease area from the overall grazeable area.

NA – Not applicable.

Typical vegetation pests on rangelands include thistles, harding and velvet grass, poison hemlock and encroaching brush. Consistent with management plans for tenants leasing land, through existing Agricultural Management Plans, grazing tenants are allowed to control pests through grazing, mowing, pulling and careful application of District approved herbicides. Brush, commonly the native coyote brush, limits the available forage for livestock, reduces grassland habitat areas and creates an increased wildfire fuel load. Grazing tenants typically treat brush encroachment with herbicide and then use a tractor and drag bar to break up dead vegetation in the following season. Table 1-8 summarizes treatment actions for forest pathogens, invasive species, wildlife, and insects covered under the IPMP in rangelands and agricultural properties management category (new or revised information as part of the 10-year Program update is shown in gray highlighted underline and ~~strikeout~~).

IPM for Natural Lands

Natural areas make up the majority of District lands and typically experience minimal levels of human use. The purpose of IPM in natural areas is to preserve and restore natural resources while also maintaining safe and enjoyable human access for visitors and staff. IPM in the District's natural areas focuses primarily on the control of pests that threaten the long-term viability of natural resources on District preserves. Pests that are commonly encountered on natural areas include invasive plants and invasive animals, including regulated species (i.e., plants and wildlife that are regulated under state and federal law or California Code) and feral pets. The District spends the majority of its IPM management efforts in natural areas on control of invasive plants. Table 1-9 summarizes treatment actions for forest pathogen, plant, insect, and wildlife pests covered under the IPMP in natural lands management category (new or revised information as part of the 10-year Program update is shown in gray highlighted underline and ~~strikeout~~).

Table 1-8 Rangelands and Agricultural Properties Management Category and Treatment Actions

Pest Category	Treatment Action
Forest Pathogens	Chemical control: • Disinfectants outlined in Table 1-4 would be utilized to kill or inactivate pathogens (e.g., *Phytophthora*), before plant infection may occur through the decontamination of tools, equipment, vehicles, and footwear in accordance with the latest Guidelines for Minimizing *Phytophthora* Contamination at Midpeninsula Regional Open Space District Preserves.
Aquatic invasive species and pathogens	Chemical control: • Disinfectants outlined in Table 1-4 would be utilized to prevent the spread of invasive aquatic species, such as small invasive aquatic snails (e.g., New Zealand mudsnail), and pathogens to sensitive aquatic species, particularly amphibians (e.g., chytridiomycosis disease). • Disinfectants are used to decontaminate equipment, boots, and clothing before and after entering a waterbody, as appropriate. The CDFW aquatic invasive species decontamination protocol provides details on the procedures and best practices.
Rangelands and Agricultural Lands	Chemical control: • Thistle, brush, and weeds. Any of the herbicides approved under the IPM Program may be used to treat weeds on rangelands or agricultural fields if cultural or mechanical methods are not effective. Refer to Table 1-4 for a list of applicable pesticides. • Rodents. For rodents in farm buildings or crop fields, refer to the procedures for controlling rodents under the Buildings section above. • Insects. Insect management in field crops is very specific to the type of crop grown. Because the District has few properties that currently support row crops, agriculture insect pest management for agricultural fields is not covered under the IPMP. If any new pesticides are proposed for control of insects in agricultural fields, these would be evaluated in future Agriculture Management Plans, an environmental review may be required, and then the IPMP would be revised to add the new pesticide and new activity.
Rangelands	Physical control (manual control treatments): • Mow/Cut. A brushcutter, ~~disc,~~ brushrake, or other motorized cutting machine would be selected for mowing of weeds and cutting of brush based on the size of the infestation.
Agricultural Lands	Physical control (manual control treatments): • Cultural weed control. Cultural weed control includes crop rotations, water and nutrient management, late-season planting, and cover/smothering crops (Smith et al. 2000; Gunsolus et al. 2010). Cultural methods are the first line of defense in weed management on cropland.

Pest Category	Treatment Action
	• Mechanical weed control. Mechanical weed control is the most widely used weed control method for agriculture fields and can occur before, during, and after the crop is planted. This method includes primary tillage, row crop cultivating tillage, use of mulches (i.e., plastic sheeting, straw, wood chips, and sawdust), and/or soil sterilization techniques which use heat to kill weeds and weed seeds in soil. • Manual weed treatment. Specific manual weed treatment methods allowed under the Lobitos Agricultural Management plan are mowing, pulling, flaming, mowing, mulching, weedmats, and hoeing.

Table 1-9 Natural Lands Management Category and Treatment Actions

Pest Category	Treatment Action
Forest pathogens ~~Sudden Oak Death (SOD)~~	Physical control (manual control treatments): • Sudden oak death (SOD; *Phytophthora ramorum*) work includes removal of California bay trees or their branches within 15 feet of the trunks of high value oaks. Ongoing research at the District and other locations in the state are evaluating whether bay removal is effective for managing larger stands or forests infested with SOD or to prevent or slow down the spread of SOD. • Treatments would be used to remediate *Phytophthora* that is found in soils.
Forest pathogens	Chemical control: • Disinfectants outlined in Table 1-4 would be utilized to kill or inactivate pathogens (e.g., *Phytophthora*), before plant infection may occur through the decontamination of tools, equipment, vehicles, and footwear in accordance with the latest Guidelines for Minimizing *Phytophthora* Contamination at Midpeninsula Regional Open Space District Preserves.
Aquatic invasive animals and pathogens	Chemical control: • Disinfectants outlined in Table 1-4 would be utilized to prevent the spread of invasive aquatic animals, such as small invasive aquatic snails (e.g., New Zealand mud snail), and pathogens to sensitive aquatic species, particularly amphibians (e.g., chytridiomycosis disease). • Disinfectants are used to decontaminate equipment, boots, and clothing before and after entering a waterbody, as appropriate. The CDFW aquatic invasive species decontamination protocol provides details on the procedures and best practices.
Bullfrogs, non-native fish, and turtle	Physical control (manual control treatments): • Gigging or shooting: Gigging or shooting American bullfrogs (a pest species not native to California that can threaten rare native California red-legged frogs, northern western pond turtles, and San Francisco garter snake)

Pest Category	Treatment Action
	is sometimes implemented with small caliber rifles and lead-free ammunition to eliminate individual adult bullfrogs. Gigging is the targeted spearing of fish or frogs with barbed tines mounted on a long pole. • Submerged funnel traps: Funnel traps designed for catching baitfish can be used to live capture bullfrog tadpoles and small non-native fish. Floating cage traps would be used to catch adult frogs. Specially designed traps and netting can be used to collect and remove snapping, slider and other non-native turtles. • Electrical currents: Use of electrical currents to temporary disable frogs and non-native fish in netting and gigging operations is sometimes implemented on District lands. 12 volt direct current (DC) electroshockers would be mounted on small boats or backpacks, and then the electroshock current would be applied to the surface of the wetland. • Habitat manipulation: Pond draining may be implemented as a method for bullfrog, non-native fish (bass, bluegill, catfish, mosquitofish), and turtle control in areas where protected species may be present (i.e., native California red-legged frog). • ~~Exclusionary fencing: The District may install exclusionary fencing to keep bullfrogs from entering non-infested wetlands as a temporary preventive tool for use while other control methods are applied concurrently.~~
Feral pigs	Physical control (manual control treatments): • Feral Pig Management Program: The District has conducted a feral pig management program since 2000. Feral pigs are not native to California, compete with native wildlife for food, and their destructive rooting activities disturb vegetation, wildlife habitat, and cause erosion and sedimentation into streams and wetlands. Under the direction of the California Department of Fish and Wildlife, the District has developed a management program to capture feral pigs using baited traps and humane termination (shooting).
Feral pets	Physical control (manual control treatments): • Utilize catch pole or otherwise trap dogs, cats, turtles, rabbits and other domesticated animals found escaped or released in the preserves and return them to their owners or turn them over to local animal control departments or animal shelters.
Skunks, opossums, and raccoons	Physical control (manual control treatments): • Install one-way door, live box, or cage traps. Trap design varies but solid wall traps are preferred for skunks to shield the trapper from skunk spray during the control operation. The use of live trapping methods ensures that non-target animals can be released unharmed. Current CDFW trapping regulations require that trapped animals are either released immediately or euthanized, live animals may not be relocated without a permit from CDFW.
Skunks, opossums, and raccoons	Chemical control:

Pest Category	Treatment Action
	• Chemical control of skunks, opossums, raccoons, and bats are not considered except under very severe human health and safety considerations. In the unlikely event that chemical control of skunks, opossums, and raccoons is deemed necessary, refer to the Chemical Control section for rats, above.
Argentine ants	Physical control (manual control treatments): • Refer to the ant provisions under the Buildings section.
Invasive plants	Physical control (manual control treatments): • Biological control: Release of approximately 20,000 hairy weevils (*Eustenopus villosus*) on approximately 800 acres per year at select preserves. This form of biocontrol is intended to control seed production of yellow starthistle. • Pull: Pulling of individual plants by hand before flowering and seed development. Given the stout taproot of many annuals and biennials, hand removal would occur after regular periods of rain when the soil is moist and the entire taproot can be easily removed. Digging tools may be used to loosen the root out of the soil. • Cut: Cutting plants below the root crown with a pick or shovel before flowering or seed set (to be applied only to crown-sprouting plant species). Perennial invasive plants with large amounts of vegetative material are often easier to control once the mass of above-ground vegetation is cut to near-ground level (e.g., large perennial grasses and shrubs) to improve access to the root system. For plants that can regenerate from underground root fragments, root and/or stem material would be carefully collected, then disposed of in compost or garbage off-site or completely covered (composted, solarized) onsite to prevent it from re-establishing onsite. • Mow: Mowing of late season annuals/biennials when a very small percentage of plants are beginning to flower. These plants would be mowed as close to the ground as is safe (hitting rocks with mowing equipment may cause sparks and risk starting a fire). Follow-up mowing may be required at 4- to 6-week intervals. • Green-flaming: Green-flaming of young seedlings with a hot propane flame immediately following germination on some species of non-fire adapted herbaceous and shrub species (dicots). This method would be applied in early winter and during or immediately after a rain event to reduce potential for wildfires. • Selective grazing: Implementation of selective grazing to remove or suppress some species when grazing is timed for periods when the plants are both palatable to the selected type of livestock (e.g., goats for brush, cattle or sheep for grasses) and susceptible to grazing effects (i.e., when plants are very young and do not have substantial underground energy reserves built up to support re-sprouting). • Hand removal: Hand removal of small insipient populations to control most perennial invasive plants. Hand-removal of mature plant parts would be done with the help of a weed wrench or by digging up individual plants to get as much of the root system as possible. Multiple re-treatments would be required for the control of most invasive perennials, because their root systems are often large and challenging to pull manually and many

Pest Category	Treatment Action
	species have regenerating roots, stolons, and rhizomes that can break off during the removal effort and regrow. Digging can also promote soil disturbance, a secondary effect that can promote the germination of new seedlings in disturbed soils areas. • Burn: After large stands of broom are pulled, the green plants would be stacked in piles no greater than six feet by six feet to dry out. The piles would be located on mineral soils with a 4-inch by 12-foot wide trench to catch debris and would not be located under the drip line of trees. Brush piles would be burned during the wet season on days that the Bay Area Air District (BAAD; formerly the Bay Area Air Quality Management District or BAAQMD) designates as "open burn status" and the piles would be monitored to ensure that all combustible material is consumed before leaving the site. Notification ~~Form C for Hazard Reduction Fires~~ would be filed with the BAAD ~~BAAQMD~~, and all conditions of Hazard Reduction Fires per BAAD ~~BAAQMD~~ regulations would be followed. • Jawz: Jawz is a hydraulic implement mounted onto an excavator or other tractor. Opposing jaws pinch the stalk of the plant and the arm of the excavator pulls the plant out by its roots and then drops it in a pile for future burning, chipping, or composting.
Invasive plants	Chemical controls: • Chemical control of annual and biennial weeds includes two strategies to treat different life stages: 1) post-emergent (i.e., direct application of herbicide to eliminate the plant), and 2) pre-emergent (i.e., treatment to prevent the germination of seeds). Herbicides are also classified as either selective or non-selective. Selective herbicides control plants in specific plant families or life stages, while allowing other plants to survive uninjured. Utilizing selective herbicides can be a powerful tool in balancing active management with protecting desirable, native vegetation types. Non-selective herbicides and application methods injure all plant species that are directly exposed to treatment, so should be directed only to the target species. Selectivity may be based on either the chemistry of the herbicide, but can change with the timing of the application. Refer to Table 1-4 for a list of applicable pesticides.
Aquatic invasive plants	Physical control (manual control treatments): • Pull: Similar to pulling terrestrial weeds, control of aquatic invasive plants requires removing the entire plant (i.e., leaves, stems, and roots) and disposing of the material away from the shoreline. In wetlands and shallow water, less than three feet deep, no special tools are required. Deeper water may require Self-contained underwater breathing apparatus (SCUBA) divers equipped with mesh bags to collect plant fragments as they work. • Harvest: The District may use specialized equipment to excavate or 'harvest' floating or submerged aquatic vegetation. These types of control efforts seek to clear waterways for adequate water flow or boat access rather than completely eliminate the problem plant and can be effective tools for the removal of biomass from flood control channels and navigable waterways.

Pest Category	Treatment Action
	• Pond Draining: Pond draining may be implemented for small water bodies to eliminate invasive aquatic plants and invasive animals such as bullfrogs concurrently. Some plants have propagules that can remain viable during dry periods, so this method would only be effective on aquatic plant species that do not have propagules.
Aquatic invasive plants	Chemical controls: • Among the herbicides included in the IPM program are some that are formulated for use in and near aquatic habitats (Roundup CustomTM for example mixed with a specific surfactant suitable for aquatic areas). These formulations are sometimes also useful in upland areas because special surfactants can be added that are better at adhering to certain plant species than the surfactants included in non-aquatic formulations. The District on rare occasions may need to use chemical treatments within or very near to aquatic habitats such as treatments on seasonal wetlands (during the dry season) to control aquatic pest plant species and treatments on streambanks to control slender false brome or other target pest species. Pesticides used include glyphosate and imazapyr, refer to Table 1-4 for a list of applicable pesticides.

1.5.5 Disinfectants and Repellents

Disinfectants and repellents are being proposed for inclusion under the 10-year Program update, which were not included under the 2014 Program or 2019 addendum. Disinfectant and repellent use is part of Midpen's standard practices and these methods have been used throughout the life of the Program, such as for disinfecting equipment and tools, however standardized processes and specifics are now proposed as part of the 10-year Program update to formalize their inclusion. Midpen staff will follow relevant disinfectant use guidelines for any activity that contacts soil, water or plants on a known *Phytophthora*-contaminated site, on a formerly planted site, on a site with rare plants, or when preparing or planting a new restoration site to prevent contamination via equipment or footwear. Repellents would be applied to the skin, or otherwise placed in a specific location, to dissuade pests, namely insects. Use of repellents would be limited and infrequent. Use of repellents and disinfectants generally apply to all Midpen management categories, however Table 1-8 and Table 1-9 outline specific uses related to disinfectants under the 10-year Program update. The specific proposed disinfectants and repellents are included in Table 1-3 and Table 1-4.

1.5.6 Site Access

Access via vehicles, including all-terrain vehicles and utility task vehicles in addition to standard vehicles, and equipment to conduct Program activities would typically be entirely from existing roads and trails. Access to work sites, in some cases, would not be directly from maintained trails and roads and would be achieved by using foot trails or former trails that have grown over and can be cleared. No new access roads or changes to site access are proposed as part of the 10-year Program update.

1.5.7 Program Implementation

An IPM Implementation Plan was developed in 2014 to accompany the 2014 Guidance Manual. The purpose of the Implementation Plan was to systematically develop larger tasks (i.e., prevention and monitoring) and integrate them into the Annual IPM Work Plan, the goals of which were achieved throughout the 10-year life of the 2014 IPMP.

As part of the 2025 IPMP 10-year update, the District proposes to revise its pesticide prioritization system for IPM on rangeland, agricultural lands, and natural lands in relation to weed control. The prioritization framework includes a structured yet adaptable approach to managing invasive pest species and focuses efforts based on ecological benefit. Midpen's approach would utilize geographic information systems (GIS) to integrate ecological value, species risk, and management feasibility into management activities. Midpen regularly reviews any new data, emerging threats, and on-the-ground lessons are incorporated into the prioritization approach. Midpen would continue to implement the Early Detection and Rapid Response (EDRR) Program as part of the 2025 IPMP. The goal of EDRR is to detect new populations of invasive plants while populations are still small, and eradication is achievable. The key components of the EDRR program are prioritizing areas to be surveyed, performing surveys to identify new populations and inventory existing populations, and rapid response treatments to any significant discoveries.

1.5.8 Program Best Management Practices

The District originally developed BMPs as part of the 2014 Program, which were updated in 2019. These BMPs consisted of management actions that the District incorporated into IPM proposals and projects for the purpose of protecting human health and preventing environmental effects, per the 2014 IPMP EIR. The 2014 BMPs were developed in conformance with District policies, based on the District's existing BMPs, and addressing relevant regulations. Some of the 2014 BMPs have been adapted from publications of the California Invasive Plant Council and were originally developed by a technical advisory team made up of experts in California with experience in invasive plant control and land management. The list of BMPs included under the 10-year Program update are similar to those included in the 2014 IPMP and 2019 addendum, however changes to the existing BMPs and additional BMPs are proposed for inclusion under the 10-year Program update. Additions and revisions to the BMPs were made for consistency and clarity, and to address changes to the regulatory environment. The District would implement the following BMPs as an element of individual IPMP projects District-wide, as required and relevant. New or revised District BMPs incorporated into the 2025 IPMP are presented in Appendix C. The applicable OSMRP BMPs would be implemented when and where appropriate, in accordance with the programmatic permits. Midpen also implements the WFRP, as previously discussed. Vegetation is managed primarily manually, mechanically, with prescribed herbivory (using goats, sheep, or other livestock to reduce fuels in a specific area), and to a limited extent, herbicides. Invasive species are prioritized over removal of native species. Midpen employs a series of BMPs for each management activity.

1.5.9 Adaptive Use Management Strategy

The IPMP includes adaptive use management to monitor and correct, if necessary, natural resource and natural systems issues. Adaptive strategies are commonly included in projects affecting natural resources and natural systems, where conditions and effects can change over time, such as ecosystem restoration projects, water resources projects, or, in this case, projects involving IPM in natural settings.

Given the types and rates of change observed on District preserves resulting from global, regional, and local factors (many of which are beyond the District's control), adaptive management is an important tool to help the District implement IPM in the face of change and uncertainty. To assess the effectiveness of the IPMP, adaptive management procedures under the IPMP would include establishing monitoring protocols, conducting program monitoring, evaluating the program, and undertaking program modifications to make the program safer, more effective, and efficient. Monitoring protocols are intended to quantitatively and qualitatively measure and evaluate changes in the IPMP over time. Using the monitoring protocol, District staff would monitor pest control projects and tally quantitative and qualitative results on an annual basis to evaluate the overall safety, effectiveness, and purpose of the IPMP.

The EDRR Program, was an important outcome of the ongoing adaptive use management strategy included in the 2014 IPMP.

The results of the evaluation are presented to the Board in the Annual IPM Report. The Board-approved Annual IPM Report would be the basis for making changes to the Guidance Manual, including modification of any IPM procedures or changes to the List of Approved Pesticides. Each year following Board review of the Annual IPM Report, the IPM Coordinator would implement recommended changes to the Guidance Manual and IPMP, as needed, and consider these changes for the upcoming Annual IPM Work Plan (discussed in Section 1.3.3). The adaptive use management strategy would remain as a generally unchanged and important component of the IPMP.

1.6 CEQA Guidance

Several aspects of the IPMP have been refined from what was analyzed in the certified 2014 EIR and 2019 addendum, as described above. Pursuant to Section 15164 of the CEQA guidelines, an addendum to an adopted EIR shall be prepared if only minor technical changes or additions are necessary and none of the conditions described in Sections 15162 and 15163 of the CEQA Guidelines have occurred that call for preparation of a subsequent or supplemental EIR. As described in Section 15162(a), a subsequent or supplemental EIR would be required if substantial changes occur to the project or substantial changes to the circumstances under which the project is undertaken occur that would involve either (a) a new significant environmental effect or (b) a substantial increase in the severity of a previously identified significant effect.

This 2025 addendum describes the changes and additions to the 2014 IPMP that are encompassed in the 2025 Program and includes consideration of the revisions to Appendix G under CEQA that have occurred since 2014. This addendum finds that the revisions to the 2014 EIR would not result in new significant impacts nor would they substantially increase the severity of previously identified significant impacts (CEQA Guidelines Section 15162), concluding that an addendum is the appropriate approach to document the changes since certification of the Final EIR. No new information of substantial importance has been identified, and none of the conditions described in Sections 15162 and 15163 of the CEQA Guidelines that call for preparation of a subsequent CEQA document are present. The mitigation measures adopted as part of the 2014 EIR and updates to mitigation measures as part of the 2025 Program are presented in Appendix A. These updated mitigation measures will not result in new significant impacts or more severe significant impacts than those impacts analyzed in the EIR. Based upon the above and pursuant to CEQA Guidelines Section 15162, there is no need for a supplemental or subsequent EIR. Section 15164(c) of the CEQA Guidelines states that "[a]n addendum need not be circulated for public review but can be included in or attached to the Final EIR or adopted negative declaration." Because the impact determinations in the certified 2014 EIR have not changed, additional circulation and review of public comments are not required.

2 Summary of 10-Year Program Update

Table 2-1 presents a comparison of changes between the approved IPMP, incorporating the 2019 refinements, which was originally analyzed under the certified 2014 EIR and 2019 Addendum, and the 2025 Program. The 2025 Program is incorporated here by reference.

Table 2-1 Comparison of 2025 Program Updates to the Approved 2014/2019 IPMP

Topic	Subtopic	Approved 2014/2019 IPMP	Proposed 2025 Program Updates
Program Area		• District managed lands cover approximately 61,185 acres.	District managed lands increased to cover approximately 72,099 acres. For the purposes of the analysis, the Program Area assessed, is assumed to represent an estimated 20 percent increase in acreage.
Pesticide Types	Chemical	The Approved Pesticide list includes: • Eight (8) herbicides, one (1) fungicide, one (1) rodenticide, ten (10) insecticides, and four (4) surfactants/adjuvants.	Expanded Approved Pesticide list to include: • Three (3) new herbicides including Triclopyr, Imazamox, and Glufosinate and five (5) new insecticides including Chlorantraniliprole, Dinotefuran, Sulfuryl fluoride/ chloropicrin, d-Limonene, and Disodium Octaborate Tetrahydrate. • Six (6) disinfectants including Sodium dichloroisocyanurate dihydrate, Sodium chloride, ethanol or isopropyl alcohol, Dodecyl dimethyl ammonium chloride, Hydrogen peroxide, and Sodium hypochlorite. • Two (2) repellents including DEET and Picaridin.
Pest Control Methods and Treatment Actions	Manual	Sticky and glue traps for rodents were included as an application method under the IPM management category Buildings.	Sticky and glue traps for rodents are removed as an approved method of application.

Topic	Subtopic	Approved 2014/2019 IPMP	Proposed 2025 Program Updates
	Mechanical	Discing was included as an application method under the IPM management categories of Fuel Management and Rangeland and Agricultural Properties.	Discing is removed as an application method under the IPM management category of Rangeland and Agricultural Properties. Discing is included in the WFRP, which replaced the IPM Fuel Management category.
	Chemical	Disinfectants have been used by Midpen since the implementation of the IPMP in accordance with the IPMP BMPs and Midpen pathogen protocols but were not formally included.	Disinfectant and repellant pest control methods are included in relevant management categories.
	Chemical	--	• Pest control actions associated with the new pesticides are included in relevant management categories. • Tenting is proposed as a chemical application method for Sulfuryl fluoride/chloropicrin and described in the treatment actions.
Annual Application		• Annual application quantities were set by the average of District managed lands and total properties, as well as pesticide use labels.	• Annual application quantities are adjusted and generally increased across all pesticide types based on the increase in District managed lands and properties, updates to pesticide use, and Midpen processes. • For the purposes of the CEQA analysis, annual treatment acres for manual and mechanical methods are assumed to increase 20 percent, commensurate with the increase in land acreage and to account for foreseeable expansion of District-owned and managed lands and associated IPM activities.

2. SUMMARY OF 10-YEAR PROGRAM UPDATE

Topic	Subtopic	Approved 2014/2019 IPMP	Proposed 2025 Program Updates
Management Categories	IPM in Buildings	District properties included 103 buildings. Seven (7) pest categories included.	District properties increased to approximately 330 buildings. New pest categories: • Stinging Insects (Nests) • Structural Pests (Subterranean termites, drywood termites, wood beetle, fungus/dry rot) • Feral Pets
	IPM in Recreational Facilities	• Social Wasps included as a pest category. • Recreational facilities and associated infrastructure within District preserves included approximately 479 miles of access roads and trails. • The number of parking lots and gates and stiles within District preserves was 13 parking lots and 213 gates and stiles.	• Revision of the pest category Social Wasps to Stinging Insects. • Recreational facilities and associated infrastructure within District preserves are expanded to include approximately 518 miles of access roads and trails. • Updates to number of parking lots, gates, and stiles to approximately 50 parking lots and between 200-300 gates and stiles.
	IPM in Fuel Management	Fuel management category included in IPM management categories.	Removal of the fuel management category as it is covered now under the WFRP.
	IPM in Rangelands and Agricultural Properties	Properties managed under the Districts Conservation Grazing Program were approximately 10,832 acres. Three (3) pest categories included. Discing was included as an approved tool under the physical control (manual control treatment) category, mow/cut.	Properties managed under the Districts Conservation Grazing Program has increased to approximately 15,480 acres. Pest categories are expanded to include: • Forest pathogens • Aquatic invasive animals and pathogens Discing is removed as an approved tool under the physical control (manual control treatment) “Mow/Cut” category and is instead covered under the WFRP.

2. SUMMARY OF 10-YEAR PROGRAM UPDATE

Topic	Subtopic	Approved 2014/2019 IPMP	Proposed 2025 Program Updates
	IPM in Natural Lands	Seven (7) pest categories included.	Pest categories are expanded to include: • Aquatic invasive animals and pathogens • Skunks, opossums, and raccoons The SOD pest category is revised to Forest Pathogens. Exclusionary fencing for bullfrogs is removed as a pest control action due to inadvertent impacts to native species.
IPMP Best Management Practices (BMP)		IPMP BMPs were incorporated into IPM proposals and projects for the purpose of protecting human health and preventing environmental effects. The IPMP BMPs included: • Specific training and qualification requirements. • Special-status species, habitat, and environmental protection requirements. • Inspections, site monitoring, and surveys requirements. • Requirements for site access controls and restrictions and notifications. • Sanitation and prevention of contamination requirements. • Erosion and site stabilization measures.	See Appendix C for the IPMP list of BMPs and detailed 2025 Program updates. Updates to the IPMP BMPs include: • General revisions to clarify existing language; better reflect District processes, regulatory requirements, US EPA findings; and improve consistency with the District's Open Space Maintenance and Restoration Program (OSMRP). • Training and qualification requirements revised (2025 BMPs #4, 5, 13, 16, 20). • Special-status species, habitat, and environmental protections requirements revised (2025 BMPs #6, 14, 15, and 17). • Inspections, site monitoring, and surveys requirements updated (2025 BMPs #11, 22, and 24). • Requirements for access controls, site restrictions, and notifications revised (2025 BMPs #8, 9, and 13). • Sanitation and prevention of contamination requirements updated to specify forest pathogens (2025 BMP #21). • Updated erosion and site stabilization measures to specify use of approved, biodegradable erosion control measures and non-filament-based geotextiles (2025 BMP #23).

3 Evaluation of 2025 Program Update

3.1 Overview

This addendum is intended to provide CEQA compliance for the proposed modifications and changed circumstances related to the project evaluated in the certified 2014 EIR and 2019 addendum. This addendum is organized by environmental issue area and is intended to consider all environmental topic areas that could be affected by the modifications to the 2014 IPMP reflected in the 2025 Program and/or any changes in circumstances, since the 2014 EIR and 2019 addendum, such as changes to Appendix G of the CEQA guidelines, and determine whether such modifications/changes would result in new or significant impacts.

The purpose of this discussion below is to evaluate the environmental issue areas in terms of any changed condition (i.e., changed circumstances, project changes, or new information of substantial importance) that may result in a different environmental impact significance conclusion from the certified 2014 EIR and 2019 addendum. Each resource issue area is addressed below.

Since publication of the 2014 EIR and 2019 addendum, Midpen certified the WFRP EIR and adopted the WFRP in 2023, which focuses on preventing, preparing for, and responding to wildfires, including addressing flammable vegetation near facilities, as a key part of the District's land stewardship. The 2014 IPMP included a fuel management category, which addressed staff selection of options for required and ongoing maintenance of fuel management activities in relation to IPM; however, after approval of Midpen's WFRP, the dedicated fuel management category has been removed from the IPMP and incorporated into the WFRP, which was analyzed in the WFRP EIR. This change included in the 2025 Program is not analyzed further.

3.2 Aesthetics

The 2014 EIR and 2019 addendum analyses identified less than significant impacts associated with impacts on scenic vistas, changes in visual character, and damage to scenic resources within a state scenic highway corridor from the implementation of the IPMP (Midpeninsula Regional Open Space District 2014; 2019).

The 2014 EIR identified no impacts associated with nighttime lighting. The 2025 Program does not include nighttime work and would not create any new impacts associated with nighttime lighting.

Tenting to control structural pests is proposed under the 2025 Program and would take place at infested buildings or structures. Tenting would require the structures to be completely sealed with material, which would be highly visible to the public, if present in the vicinity; however, tenting would occur in a minimal number of locations (a maximum of five residences a year) and would be temporary, similar to previously analyzed visual impacts.

Application of new pesticide types proposed under the 2025 Program would be of a similar general type as other IPM methods analyzed in the 2014 EIR and 2019 addendum. The scale of pesticide application would be proportionally increased due to the expansion of land managed by Midpen and would follow pesticide labels for proper application and IPMP BMPs. Similar visual impacts could occur as previously analyzed, including temporary changes to the visual character from areas with increased invasive species mortality. The increased scale of pesticide application would cover more acreage, but the application rates in any one location would be similar to those that were previously assessed, as the rates were in accordance with the pest control recommendation prepared by the Pest Control Advisor. This process outlined in the 2025 Program is the same as in the previously approved IPMP. The changes in the 2025 Program would not create changes that detract from scenic vistas or substantially alter the landscape but could increase the accessibility and views of scenic vistas through the expansion of public lands and trails open to the public. Additionally, the use of pesticides to control vegetation could benefit visual resources in some areas by eliminating invasive vegetation that encroaches on recreational facilities and detracts from natural landscapes. IPMP BMPs would continue to be implemented, such as to minimize the potential for treatments to cause erosion on slopes that could detract from scenic vistas (2025 BMP #23).

Based on the above discussion, the types of visual impacts associated with the modifications included in the 2025 Program are consistent with the IPMP as previously assessed in the 2014 EIR and 2019 addendum. Impacts would remain less than significant.

3.3 Agriculture and Forestry Resources

The 2014 EIR and 2019 addendum analyses concluded less than significant impacts on agriculture and forestry resources from implementation of the IPMP (Midpeninsula Regional Open Space District 2014; 2019).

Similar to the actions analyzed in the 2014 EIR and 2019 addendum, the pest management actions that would result from implementation of the 2025 Program on District lands would not result in conversion of important farmland to non-agricultural uses or cause changes that would result in the conversion of important farmland. Farmlands that are currently managed and leased by the District would continue similar operations in compliance with the Service Plan and with implementation of the 2025 Program. Additionally, the modifications to the IPMP reflected in the 2025 Program would not result in the loss of forest land or convert forestry land to non-forestry use.

Additional changes to the 2025 Program include the use of disinfectants. Disinfectants would be used to sanitize equipment and clothing in between uses. The added use of disinfectants has the potential to minimize the transmission of pathogens that impact trees on forest lands by decreasing the possible spread through tools used during Midpen activities.

Based on the above discussion, the types of agricultural and forestry impacts associated with the modifications included in the 2025 Program are consistent with the IPMP as previously assessed in the 2014 EIR and 2019 addendum. Impacts would remain less than significant.

3.4 Air Quality and Greenhouse Gas Emissions

The 2014 EIR and 2019 addendum analyses concluded less than significant impacts on air quality and greenhouse gas (GHG) emissions from the implementation of the IPMP (Midpeninsula Regional Open Space District 2014; 2019). Similar to the approved IPMP, no new construction activities are proposed in the 2025 Program and therefore, would not result in any short-term construction-related emissions of criteria air pollutants and precursors of GHGs.

The 2025 Program would increase the use of manual and mechanical IPM methods in recreational facilities management areas from 479 miles of access roads and trails to approximately 518 miles. Additionally, there would be an increase in the acres of land managed by Midpen under the 2025 Program, which would proportionally increase the use of manual and mechanical equipment across the Program area.

No new manual or mechanical equipment types are proposed under any management category; therefore, the power tools described in the 2014 EIR and 2019 addendum (e.g., mowers, brushcutters, chainsaws) and larger equipment (i.e. tractors, masticators, chippers) would be the same under the 2025 Program. The 2014 EIR and 2019 addendum found that the use of these types of equipment would not result in significant impacts on air quality. While the potential treatment areas are assumed to increase by approximately 20 percent or 300 acres, this would total less than 1,600 acres of total mechanical equipment treatment area. Midpen has conducted quantitative emission calculations for use of similar mechanical equipment and associated worker vehicle trips for up to 1,737 acres of new treatment areas and determined that the emissions were substantially below emission thresholds (Midpeninsula Regional Open Space District 2022). Accordingly, the small increase in mechanical treatment area would not result in new significant impacts on air quality.

The 2025 Program represents a minor increase in overall emissions in relation to Midpen's increased Program area under the 2025 Program. The 2025 Program would require increased use of small power tools in recreational areas and additional worker trips to provide IPM services to all Midpen lands. No new or more severe impacts to air quality and GHGs are anticipated under the 2025 Program from the increase in Program area as the required increase in use of small power tools and worker trips would be a minor increase. The 2025 Program would not involve any new stationary sources that could generate air pollutant emissions.

One new chemical application method, tenting, is proposed for use with the chemical sulfuryl fluoride/chloropicrin and is not anticipated to have adverse impacts on air quality, as tenting would be temporary, occurring a maximum of 5 times in a year, would be contained to buildings or structures to reduce the potential for environmental transport, and would be similar to previously analyzed air quality impacts. No new or more severe impacts to air quality are anticipated under the 2025 Program from tenting.

The 2014 IPMP included a fuel management category, which included manual and mechanical activities as part of ongoing maintenance of fuel management. Since publication of the 2014 EIR and 2019 addendum, Midpen has adopted the WFRP and accompanying WFRP EIR, which focuses on preventing, preparing for, and responding to wildfires, including addressing flammable vegetation near facilities, as a key part of the District's land stewardship (Midpeninsula Regional Open Space District 2022). Accordingly, the fuel management category of the IPMP is proposed for removal, since these activities are incorporated in the WFRP. This would involve a reduction in analyzed emissions and emissions sources in the 2014 EIR associated with the fuel management category treatment.

The 2025 Program would not result in new impacts to air quality or GHG emissions because there are no construction activities proposed and treatment activities are the same as those being performed under the approved IPMP and would not lead to a meaningful increase in the extent or intensity of emission-generating activities as the activities would be scaled to the increase in the Program area. The use of tenting for application of the proposed pesticide, sulfuryl fluoride/chloropicrin, would be contained to buildings or structures to reduce the potential for environmental transport.

Based on the above discussion, the types of air quality and GHG emissions impacts associated with the modifications included in the 2025 Program are similar to previously analyzed impacts of the IPMP as previously assessed in the 2014 EIR and 2019 addendum. Impacts would remain less than significant.

3.5 Biological Resources

3.5.1 Changes to Special-Status Plant Listings

Since the 2014 EIR and 2019 addendum, the list of special-status species relevant to the Program area has been updated to include additional species and remove species, as well as to account for changes to species listings (see Appendix B).

Fifteen additional special-status plant species were identified and included in the 2025 Program (see Appendix B). 2025 BMP #11 mandates that special-status plant species would be surveyed before implementation of any IPM treatment and avoided if found. The 2025 Program would not adversely affect special-status plant species since surveys and avoidance of special-status plant species would occur for each area treated under the IPMP. The incorporation of weed control 2025 BMPs #21 through 22 would ensure that treatment activities would not result in weed propagation and dispersal and that no indirect impact to special-status plant species would occur. Similar to the previously analyzed impacts to special-status plant species, no significant impacts are anticipated with implementation of IPMP BMPs.

3.5.2 Changes to Special-Status Animal Listings

One additional special-status amphibian species, four additional bird species, two additional invertebrate species, one additional fish species, and one additional mammal species were identified for this assessment of the 2025 Program (see Appendix B).

The 2014 EIR and 2019 addendum identified potentially significant impacts to special-status wildlife species as a result of the IPMP (Midpeninsula Regional Open Space District 2014; 2019). Manual, mechanical, or chemical treatments could result in direct mortality of special-status amphibian, reptile or fish species, or impacts to their federally designated critical habitat. These impacts on special-status amphibians, reptiles, fish, invertebrates, and bats would be reduced to less than significant with the implementation of Mitigation Measures 4.2-1a through 4.2-1d. Mitigation Measures 4.2-1a through 4.2-1d require additional protection for special-status species including pre-treatment surveys and consultation with U.S. Fish & Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), and CDFW, as appropriate. These mitigation measures are intended to apply to all species that were listed and/or of special concern at the time of the 2014 EIR. The language in Mitigation Measures 4.2-1a through 4.2-1c has been updated to more broadly address all potential special-status amphibians, reptiles, fish, and invertebrates, which accounts for the changes to the special-status species to date and possible future changes (Appendix A). These changes are minor and do not constitute significant new information.

Manual, mechanical, and chemical treatments may directly or indirectly affect species that breed or live in aquatic habitats, including, the newly listed red-bellied newt (*Taricha rivularis*) and the longfin smelt (*Spirinchus thaleichthys*). The loss of freshwater habitat would impact both species (NatureServe Explorer, n.d.; California Department of Fish and Wildlife 2018). The 2014 EIR and 2019 addendum analyzed potentially significant impacts on special-status amphibians and fish and identified mitigation measures to reduce the impact.

Implementation of 2025 BMP #23 requires erosion control and restoration of disturbed soils near aquatic features and would limit the discharge of sediment to waterways that provide habitat for amphibian, reptile, and fish species from upland land disturbing activities (i.e., vegetation removal). Direct impacts due to mechanical treatments in upland areas are not anticipated as vegetation removal would occur in a limited area. 2025 BMP #11 requires pre-surveys of brush removal work on rangelands, and if any special-status species are discovered, the brush removal would be changed in season or location to avoid habitat of special-status species. Additionally, 2025 BMP #11 would require the District to conduct site surveys for aquatic features before implementation of IPM activities and would require the District to not conduct the work within 15 feet of aquatic habitats. It is anticipated that special-status species would move out of the treatment area during treatment, and treatment would not result in a permanently changed habitat. Rather, the natural habitat would be enhanced by the removal of pest species. 2025 BMP #20 would prevent pesticide contamination in habitats. Mitigation Measures 4.2-1a and 4.2-1b would further minimize impacts to the red-bellied newt and the longfin smelt. Similar to the conclusions of the 2014 EIR and 2019 addendum for previously analyzed special-status amphibians and fish, implementation of IPMP BMPs and Mitigation Measures 4.2-1a and 4.2-1b would result in no significant impacts on the red-bellied newt and the longfin smelt.

Manual, mechanical, and chemical treatments may directly or indirectly affect newly listed special-status bird species including the California Ridgway's rail (*Rallus obsoletus obsoletus*), American goshawk (*Accipiter atricapillus*), bank swallow (*Riparia riparia*), and yellow rail (*Coturnicops noveboracensis*) that potentially live, breed, or feed in the treatment areas. Implementation of IPMP BMPs (#12 and 20) would avoid impacts to special-status bird species. 2025 BMP #12 would require sites to be surveyed by a District-approved qualified biologist or biological monitor within 15 days prior to treatment to assess nesting activity and 2025 BMP #20 would prevent pesticide contamination to habitats. Similar to the conclusions of the 2014 EIR and 2019 addendum, implementation of IPMP BMPs would result in no significant impacts on the California Ridgway's rail, American goshawk, bank swallow, and yellow rail.

The 2014 EIR and 2019 addendum found that manual, mechanical, and chemical treatments for recreational facilities, in rangelands and agricultural properties, and in natural lands could result in the loss of host plants, and the direct mortality of larva and individuals and would result in a potentially significant impact to identified special-status invertebrates, which mitigation would reduce to less than significant. Similar to impacts on special-status invertebrates identified in the previous analysis, the monarch butterfly (*Danaus plexippus Plexippus*) and Crotch's bumble bee (*Bombus crotchii*) could be directly impacted by the IPMP.

2025 BMP #11 would require the District to conduct site surveys prior to implementation of IPM activities. It is anticipated that individual butterflies and bees would move out of the treatment area during treatment, and treatment would not result in loss of habitat. Rather, the natural habitat would be enhanced by the removal of pest species. 2025 BMP #20 would prevent pesticide contamination before, during, and after use of pesticides to avoid impacts to special-status species. Mitigation Measure 4.2-1c would be implemented to avoid impacts to special-status invertebrates from pyrethrin spray. This mitigation measure requires all District staff and contractors using pyrethrin spray to be trained in the identification of problem wasps and special-status invertebrates to ensure that proper species are being targeted and if special-status invertebrates are observed, pyrethrin treatment will not be used in these areas. As previously analyzed for other special-status butterfly species, in accordance with Mitigation Measure 4.2-1c, surveys for milkweed, the host plant for the monarch, would occur and occupied plants would not be treated. Additionally, the OSMRP includes a mitigation measure for Program activities that could impact overwintering monarch habitat (MM BIO-1), to avoid loss of occupied overwintering sites. Similar to the conclusions of the 2014 EIR and 2019 addendum, implementation of IPMP BMPs, Mitigation Measure 4.2-1c, and OSMRP mitigation measures

(MM BIO-1) would result in no significant impacts on the monarch butterfly or Crotch's bumble bee.

Special-status mammals similar to the newly listed species, the mountain lion (*Puma concolor*), were not identified or analyzed in detail in the 2014 EIR and 2019 addendum. It is anticipated that mountain lions would move out of the treatment area during treatment, and treatment would not result in loss of habitat. Rather, the natural habitat would be enhanced by the removal of pest species. 2025 BMP #20 would prevent pesticide contamination before, during, and after use of pesticides to avoid impacts to mountain lions. Field and contractor crews would receive training on how to respond in the event that a sensitive species is encountered, such as an active mountain lion den (2025 BMP #10). Implementation of IPMP BMPs (#10, 11, and 20) would avoid impacts to the mountain lion.

The 2014 EIR and 2019 addendum found that with implementation of mitigation measures and IPMP BMPs, there would be no significant impacts on special-status species. IPM methods included in the 2025 Program are similar to the methods in the approved IPMP, which were previously analyzed. Impacts on newly listed special-status species would remain less than significant with mitigation.

3.5.3 Changes to Manual and Mechanical Treatment Methods

Special-Status Species

The 2014 EIR analysis concluded potentially significant impacts to special-status species related to manual and mechanical treatment methods and use of pesticides from the implementation of the IPMP; however, impacts would be reduced to less than significant with the implementation of Mitigation Measures 4.2-1a through 4.2-1e (Midpeninsula Regional Open Space District 2014). The 2019 addendum analysis concluded that the changes to the IPMP would not result in new or more severe impacts on special-status species or other biological resources with continued implementation of mitigation measures (Midpeninsula Regional Open Space District 2019).

No new manual or mechanical treatments were included in the 2025 Program that would cause potentially significant impacts. Manual treatment options were revised to remove the use of sticky or glue traps for rodents in the 2025 Program, which would minimally reduce the potential for small special-status species, such as rodents and lizards, to be inadvertently harmed. Discing is proposed for removal as a mechanical treatment method in the 2025 Program, which would reduce the potential for habitat disruption.

The scale of manual and mechanical treatments would be proportionally increased due to the expansion of land managed by Midpen and would follow the 2025 BMP #11, which requires pre-treatment surveys and buffers for sensitive species, and 2025 BMP #12, which requires buffers for nesting birds. Similar impacts to special-status species would be avoided through the implementation of IPMP BMPs and mitigation measures as previously analyzed. The increased scale of manual and mechanical treatments would cover more acreage, but the application rates in any one location would be similar to those that were previously assessed in the 2014 EIR and 2019 addendum.

One new chemical application method, tenting, is proposed and is not anticipated to have adverse impacts on biological resources, as tenting would occur a maximum of 5 times in a year and would be temporary at any building or structure. Proper fumigation safety protocols would be followed as stated on the pesticide label (2025 BMP #4) to avoid impacts. Impacts on special-status species from the changes to manual and mechanical treatment methods under the 2025 Program would be similar to previously analyzed biological impacts in the 2014 EIR and 2019 addendum.

Wetlands

The 2014 EIR analysis concluded potentially significant impacts to federally protected wetlands related to hydrological alterations to ponds, wetland type, and acreage, and discharge of pollutants (sediment and herbicides) to wetlands (Midpeninsula Regional Open Space District 2014). Impacts would be reduced to less than significant with the implementation of Mitigation Measure 4.2-3. 2025 BMP #11, which requires pre-treatment surveys to identify wetlands and riparian habitat prior to District activities, would continue to be implemented. The 2019 addendum analysis concluded no new or more severe impacts on wetlands with continued implementation of mitigation measures (Midpeninsula Regional Open Space District 2019). The 2025 Program would not result in impacts that would alter the conclusions of the 2014 EIR and 2019 addendum as mitigation measures would continue to be implemented (Mitigation Measure 4.2-3). Impacts on wetlands from the changes to manual and mechanical treatment methods under the 2025 Program would be similar to previously analyzed biological impacts in the 2014 EIR and 2019 addendum.

Sensitive Habitats and Migration Corridors

The 2014 EIR analysis concluded less than significant impacts to riparian habitats or sensitive natural communities and movement of resident or migratory fish and wildlife; and no conflict with local policies or ordinances or habitat management plans (Midpeninsula Regional Open Space District 2014). The 2019 addendum analysis concluded no new or more severe impacts (Midpeninsula Regional Open Space District 2019). The changes to manual and mechanical treatment types included in the 2025 Program would not result in new significant impacts on sensitive habitats that were not previously analyzed. Impacts would remain less than significant.

3.5.4 Changes to Chemical Treatment Types

The 2014 EIR found that with implementation of IPMP BMPs and mitigation measures, including pre-treatment surveys and buffers for sensitive species and nesting birds, there would be no significant impacts to biological species (Midpeninsula Regional Open Space District 2014). The 2014 EIR anticipated the need for future expansion and the 2019 addendum included additional District-managed lands in its analysis. The 2019 addendum concluded that no new or substantially different impacts from the use of the new pesticides and application methods would occur (Midpeninsula Regional Open Space District 2019).

3. EVALUATION OF 2025 PROGRAM UPDATE

With the increase in land managed by the District in the 2025 Program, the use of previously approved pesticides and the overall pesticide application area would be scaled up to effectively address pest management. The scale of pesticide application would be proportionally increased and would follow pesticide labels for proper application (2025 BMP #4). Application of new pesticide types proposed under the 2025 Program would be of a similar general type as other IPM methods analyzed in the 2014 EIR and 2019 addendum. Similar impacts from chemical treatments could occur as previously analyzed, including loss of host plants, direct mortality to individuals of different species, but would be mitigated through the implementation of mitigation measures (Mitigation Measures 4.2-1a through 4.2-1e) and IPMP BMPs. The increased scale of pesticide application would cover more acreage, but the application rates in any one location would be similar to those that were previously assessed as the rates were in accordance with the pest control recommendation prepared by the Pest Control Advisor. This process outlined in the 2025 Program is the same as the approved IPMP. Impacts from the increased use of previously approved pesticides under the 2025 Program would be similar to previously analyzed biological impacts in the 2014 EIR and 2019 addendum.

The 2025 Program proposes the use of three new herbicides, five new insecticides, five disinfectants, and two repellents, and one additional chemical application method: tenting. Table 3-1 summarizes the potential biological hazards of the pesticides proposed as part of the 2025 Program. The proposed pesticides in the 2025 Program and changed circumstances since the 2014 EIR and 2019 addendum were evaluated in a Toxicological Assessment of Pesticides and in a regulatory and literature review of previously approved pesticides (Stantec Consulting Services 2025b; 2025a).

Table 3-1 identifies the proposed pesticides and the specific precautions and measures needed for safe application.

Table 3-1 2025 Program Proposed New Pesticides – Biological Hazards

Proposed Pesticide	Description
	Herbicides
Triclopyr (Choline Salt)	Triclopyr BEE and triclopyr TEA were previously evaluated and approved for Midpen use. The 2025 Program proposed the use of triclopyr (choline salt) and is included in the toxicological assessment. Triclopyr is highly toxic to terrestrial and aquatic plants; however, it is an herbicide and is designed to kill invasive plant species. Toxicity to other ecological receptors is generally low.
Imazamox	Imazamox is highly toxic to terrestrial and aquatic plants at low concentration, consistent with its intended use as an herbicide under the 2025 Program. Toxicity to other ecological receptors was classified as practically non-toxic.

Proposed Pesticide	Description
Glufosinate	Glufosinate is highly toxic to terrestrial and semi-aquatic plants, consistent with its intended use as an herbicide. It was classified as practically non-toxic to other ecological receptors.
Insecticides	
Chlorantraniliprole	Chlorantraniliprole poses low risk to plants but may affect bee larvae. Chlorantraniliprole is considered highly toxic to freshwater invertebrates.
Dinotefuran	Dinotefuran has the potential to be highly toxic to bees and moderately toxic to aquatic invertebrates, while other receptors exhibit low sensitivity.
Sulfuryl fluoride/chloropicrin	Sulfuryl fluoride/chloropicrin (Vikane) exposure to other receptors is expected to be minimal due to the application method of tenting. Due to its high vapor pressure and long atmospheric half-life, sulfuryl fluoride primarily remains in the air compartment and is capable of long-range atmospheric transport.
d-Limonene	d-Limonene is practically nontoxic to bees, birds, amphibians, reptiles, mammals, fish, and aquatic invertebrates, and is classified as slightly toxic to freshwater fish and invertebrates.
Disodium octaborate tetrahydrate (DOT)	DOT is not expected to impact terrestrial and aquatic plants or bees. DOT is practically nontoxic to amphibians, reptiles, birds, mammals, and fish.
Disinfectants	
Hydrogen peroxide[a]	Hydrogen peroxide is slightly toxic to aquatic organisms, including aquatic invertebrates and fish, but poses minimal risk to terrestrial species, including birds and mammals. Ecological exposure is expected to be limited under normal use conditions, which application under the 2025 Program and IPMP BMPs prescribe.
Sodium dichloroisocyanurate dihydrate	Sodium dichloroisocyanurate dihydrate is highly toxic to aquatic organisms, including aquatic plants, but poses minimal risk to terrestrial species, including birds and mammals.
Sodium hypochlorite	Sodium hypochlorite is highly toxic to freshwater fish and invertebrates and marine organisms, but poses minimal risk to terrestrial species. The EPA stated that risks to aquatic species were mitigated by adequate precautionary labeling and permit requirements, which implementation under the 2025 Program and IPMP BMPs prescribe. Additionally, based on the expected use, sodium hypochlorite is not anticipated to create a significant risk to ecological receptors.

Proposed Pesticide	Description
Isopropyl alcohol or ethanol	Isopropyl alcohol and ethanol pose minimal risk to ecological receptors based on the intended use of the products, as the 2025 Program and IPMP BMPs prescribe.
Dodecyl Dimethyl Ammonium Chloride (DDAC)	DDAC is highly toxic to aquatic organisms, including aquatic plants, but poses minimal risk to terrestrial species. Based on application of the product, it is not expected to impact aquatic organisms.
Repellents	
N,N-diethyl-meta-toluamide (DEET)	DEET poses minimal risk to non-target organisms, and no significant effects have been reported under typical use conditions.
Picaridin	Picaridin is practically nontoxic to ecological receptors and no adverse effects are anticipated under labeled use conditions, as the 2025 Program and IPMP BMPs prescribe.

Note:

[a] Hydrogen peroxide was not evaluated in the Toxicological Assessment of Pesticides.

Sources: (Stantec Consulting Services 2025b; U.S. Department of Agriculture 2015)

The Toxicological Assessment of Pesticides assessed the (1) human health endpoints (acute/short-term toxicity, subchronic/chronic toxicity, carcinogenicity and genotoxicity, developmental and reproductive toxicity, endocrine disruption, sensitization and irritation, neurotoxicity, and immunotoxicity); (2) ecological toxicity (across plants, bees, amphibians, reptiles, birds, mammals, and aquatic organisms); and (3) environmental fate for each of the 15 new active ingredients proposed for inclusion in the 2025 Program.

This evaluation included findings from US EPA reviews and registration documents. Additional authoritative sources were consulted as needed, including the California Department of Pesticide Regulation, University of California IPM resources, EXTOXNET, European Chemicals Agency dossiers, US EPA ECOTOX Knowledgebase, and peer-reviewed scientific literature (Stantec Consulting Services 2025b). Available data was synthesized to conduct qualitative risk assessments for each active ingredient.

For ecological risk, toxicity thresholds were compiled for plants, pollinators, amphibians, reptiles, birds, mammals, and aquatic organisms. US EPA categories of toxicity were applied where available, and risks were described qualitatively (e.g., “practically nontoxic to fish” or “highly toxic to aquatic plants”). Environmental fate assessments considered physicochemical properties, mobility, persistence, degradation pathways, and potential for bioaccumulation. The District’s IPMP BMPs would continue to ensure that all pesticides are used in a manner that is protective of biological resources. Specifically, 2025 BMPs #14 through 16 directly address protections for special-status species including the California red-legged frog, San Francisco dusky-footed woodrat, and Santa Cruz kangaroo rat when applying pesticides (see Appendix

C). The protections afforded in these BMPs include pesticide application requirements, such as consistency with applicable permit requirements and the creation of buffers to ensure species protection, and pesticide application restrictions, such as avoidance of San Francisco dusky-footed woodrat and Santa Cruz kangaroo rat nests. Additionally, the newly proposed pesticides under the 2025 Program would adhere to Mitigation Measures 4.2-1a through 4.2-1e and 4.2-3, which afford protections to special-status amphibian, reptile, fish, invertebrates, and bat species, alongside protections for the San Francisco dusky-footed woodrat and Santa Cruz kangaroo rat and wetlands. Therefore, pesticide application of the newly proposed pesticides under the 2025 Program, in accordance with the 2025 Program and IPMP BMPs, would not cause new or substantially increased significant impacts.

For the regulatory and literature review, available data including Midpen pesticide use reports, US EPA reports, and peer-reviewed literature relevant to the previously approved pesticides were reviewed to determine whether there were any changes to the general toxicological findings of effects on humans, wildlife, and plants that were used as the basis for the environmental assessments conducted in 2014 and 2019 (Stantec Consulting Services 2025a).

Based on the materials reviewed, it was determined that the general toxicological findings in the 2014 EIR and 2019 addendum remain accurate for the previously approved pesticides (Stantec Consulting Services 2025a). Among the pesticides reviewed, glyphosate safety remains a topic of scientific debate. A new assessment from the US EPA on glyphosate is anticipated in 2026. The literature review determined that Midpen's continued use of glyphosate is not anticipated to pose risks, but it would be important to continue educational engagement with Midpen personnel applying glyphosate to ensure that it is used per label and with appropriate personal protective equipment (Stantec Consulting Services 2025a). As part of the previously analyzed IPMP, BMPs and Mitigation Measures 4.2-1a through 4.2-1e were developed and implemented to avoid and minimize potential impacts from the implementation of the IPMP. The 2025 Program would continue the implementation of IPMP BMPs and mitigation measures, which would reduce impacts to biological resources, as previously analyzed. 2025 BMP #2 would continue to be implemented to reduce the use of glyphosate and applicators would continue to follow all pesticide label requirements as required by 2025 BMP #4 (see Appendix C). Therefore, pesticide application of the previously approved pesticides under the 2025 Program would not cause new or substantially increased significant impacts.

Based on the above discussion, the types of biological impacts associated with the modifications included in the 2025 Program are similar to previously analyzed impacts of the IPMP as assessed in the 2014 EIR and 2019 addendum. Impacts would remain less than significant with mitigation.

3.6 Cultural and Tribal Cultural Resources

The 2014 EIR and 2019 addendum concluded impacts to be less than significant or less than significant with mitigation incorporated with the implementation of the IPMP (Midpeninsula

Regional Open Space District 2014; 2019). The District maintains in-house records regarding the confidential locations of all known cultural resources within its boundaries. The District has compiled this information over time through direct information provided by qualified archaeologists as well as a variety of reports and record searches that have been performed for many projects throughout the District.

The pesticide application techniques have remained the same as those examined in the 2014 EIR and the 2019 addendum, with the exception of tenting. As with other application techniques, tenting itself does not include any ground disturbing activities. Preparation for tenting would involve removing vegetation, as feasible, and raking debris from the base of structures that are being treated to ensure a complete seal. Areas surrounding structures are already disturbed, so there would be no new impacts caused by preparation for or tenting to cultural resources and would be similar to previously analyzed impacts in the 2014 EIR and 2019 addendum.

In the 2025 Program, District managed lands and properties have increased. The increase in area and properties designated for manual and mechanical IPM treatments are in the buildings and natural lands IPM management categories and would include the same types of activities previously analyzed in the 2014 EIR and the 2019 addendum. Digging and pulling activities in the natural lands IPM management categories were added to the mechanical treatment type but were previously analyzed under the manual treatment type, therefore impacts would be identical to those analyzed in the 2014 EIR and 2019 addendum. Under the 2025 Program, eradicating structural pests may require drilling through surfaces and foundations and trenching and the removal and replacement of areas affected by dry-rot may be necessary to prevent reoccurrence and spread, all of which have the potential to unearth cultural resources; however, mitigation measures would continue to be utilized to further reduce impacts on cultural resources under the 2025 Program. Specifically, Mitigation Measure 4.3-1 requires built environment surveys prior to implementation of building retrofits or barriers that are visible on the exterior and not consistent with the vernacular nature of rural buildings and historic-age (50 years) structures will be surveyed by an architectural historian who meets the Secretary of the Interior's Standards. Implementation of mitigation would reduce potential impacts to less than significant as previously assessed.

The IPMP BMPs would continue to be implemented as part of the 2025 Program. 2025 BMP #13 would require District staff to provide instruction to protect and report any cultural artifacts that might be uncovered and if highly sensitive sites are known within or near the treatment site (e.g., burials or significant midden sites, which have a high potential for burials), the nature of the site would not be disclosed to volunteers or contractors, except that it is sensitive and must be avoided (or treated only with appropriate methods) (see Appendix C).

Based on the above discussion, the types of cultural impacts associated with the modifications included in the 2025 Program are consistent with the IPMP as previously assessed in the 2014 EIR and 2019 addendum. Impacts would remain less than significant.

3.7 Energy

The 2014 EIR and 2019 addendum were not previously required to analyze energy resources. Energy use is anticipated to incrementally increase from 2014 and 2019 as a result of the increase in District managed properties and lands; however, the continued implementation of the IPMP would minimize risks to structures, recreational facilities, rangelands and agricultural properties, and natural lands. Energy use would be considered beneficial, necessary, and not wasteful. The incremental increase would not create an additional demand for energy in California or substantially affect energy supply. The 2025 Program would not result in an impact on energy related to a state or local plan because no state or local plans for renewable or energy efficiency apply to the IPMP. Therefore, there would be no new significant impacts to energy. Impacts would remain less than significant.

3.8 Geology and Soils

The 2014 EIR and 2019 addendum analyses concluded less than significant impacts on geology and soils since the IPMP did not include any ground disturbing work on steep hillsides, or the construction of new structures, or other grading activities that would be subject to seismic hazards, unstable geologic conditions, or expansive soils. The IPMP also includes 2025 BMP #25 which addresses erosion control for sites with loose or unstable soils, steep slopes (greater than 30 percent), where a large percentage of the groundcover will be removed, or near aquatic features that could be adversely affected by an influx of sediment. The 2025 Program would not result in ground disturbing work on steep hillsides, construction of new structures, or other grading activities.

Based on the above discussion, the types of geology and soils impacts associated with the modifications included in the 2025 Program are consistent with the IPMP as previously assessed in the 2014 EIR and 2019 addendum. Impacts would remain less than significant.

3.9 Hazards and Hazardous Materials

The 2014 EIR and 2019 addendum analyses concluded less than significant impacts related to exposure (to mixer/loader/applicator, or general public) to existing hazardous materials use, storage, and disposal during manual, mechanical, and pesticide application control methods. Impacts from the use of pesticides relating to biological resources are included in Section 3.5 and impacts relating to hydrology and water quality are described in Section 3.10.

No new manual or mechanical treatment methods are proposed for inclusion in the 2025 Program that would cause potentially significant impacts. One chemical application method, tenting, is proposed and is not anticipated to have adverse impacts, as tenting would occur a maximum of five times in a year and would be short-term, similar to previously analyzed visual impacts. Additionally, proper fumigation safety protocols would be followed as stated on the pesticide label (2025 BMP #4) to avoid impacts. No new or more severe impacts from exposure to hazards and hazardous materials are anticipated under the 2025 Program from manual, mechanical, or chemical treatment methods.

With the increase in land managed by the District in the 2025 Program, the use of previously approved pesticides and the overall pesticide application area would be scaled up to effectively address pest management. The scale of pesticide application would be proportionally increased and would follow pesticide labels for proper application (2025 BMP #4). Application of new pesticide types proposed under the 2025 Program would be of a similar general type as other IPM methods analyzed in the 2014 EIR and 2019 addendum. Similar impacts from chemical treatments could occur as previously analyzed, including spills and accidents involving hazardous materials and unwanted adverse impacts to non-target species (e.g., humans) but would be avoided through the implementation of IPMP BMPs. The increased scale of pesticide application would cover more acreage, but the application rates in any one location would be similar to those that were previously assessed as the rates were in accordance with the pest control recommendation prepared by the Pest Control Advisor. This process outlined in the 2025 Program is the same as the approved IPMP. This increased use of previously approved pesticides would not cause new or substantially different impacts from those identified in the 2014 EIR and 2019 addendum.

The 2025 Program proposes the use of three new herbicides, five new insecticides, five disinfectants, and two repellents. The proposed pesticides in the 2025 Program and changed circumstances since the 2014 EIR and 2019 addendum were evaluated in a Toxicological Assessment of Pesticides and in a regulatory and literature review of previously approved pesticides (Stantec Consulting Services 2025b; 2025a). Table 3-2 summarizes the potential human hazards associated with the new pesticides proposed as part of the 2025 Program.

For human health, risk potential was derived from the chemical doses/concentrations causing acute and short-term toxicity, subchronic and chronic toxicity, carcinogenicity and genotoxicity, developmental and reproductive toxicity, endocrine disruption, and/or sensitization in animal studies. The IPMP BMPs would continue to ensure that all pesticides are used in a manner that would not cause unsafe exposure to hazards and hazardous materials. 2025 BMPs #4 through 10 directly address protections for use of pesticides that would reduce exposure and protect human health including following pesticide label recommendations, pesticide certification and supervision, pesticide storage and use, use of herbicide dyes, public notification of pesticide application, closures, and crew training (see Appendix C).

Based on the above discussion, the types of hazards and hazardous material impacts associated with the modifications included in the 2025 Program, in accordance with the 2025 Program and IPMP BMPs, would not cause new or substantially increased significant impacts than those analyzed in the 2014 EIR and 2019 addendum. Impacts would remain less than significant.

Table 3-2 2025 Addendum Proposed New Pesticides – Human Hazards

Proposed Pesticide	Description
Herbicides	
Triclopyr (Choline Salt)	Triclopyr BEE and triclopyr TEA were previously evaluated and approved for Midpen use. The 2025 Program proposed the use of triclopyr (choline salt) and is included in the toxicological assessment. Triclopyr (choline salt) exhibits low acute and chronic toxicity to humans, with no evidence of carcinogenicity, genotoxicity, or endocrine disruption, and developmental or reproductive effects. Eye irritation and skin sensitization were identified as the primary human hazards.
Imazamox	Imazamox demonstrates very low acute toxicity to humans and no evidence of carcinogenicity, genotoxicity, endocrine disruption, or developmental and reproductive toxicity. It is not a skin sensitizer and poses minimal irritation risk.
Glufosinate	Glufosinate shows low acute toxicity to humans and no evidence of carcinogenicity or genotoxicity. No developmental neurotoxicity has been observed in humans though developmental neurotoxicity has been observed at high dose in studies with young animals.
Insecticides	
Chlorantraniliprole	Chlorantraniliprole exhibits very low acute and chronic toxicity to humans, with no evidence of carcinogenicity, genotoxicity, endocrine disruption, or neurotoxicity, and is not a skin sensitizer.
Dinotefuran	Dinotefuran has low acute toxicity to humans and no evidence of carcinogenicity, genotoxicity, or endocrine disruption, and is not a skin sensitizer. Neurotoxicity occurs only at high doses.
Sulfuryl fluoride/chloropicrin	Sulfuryl fluoride/chloropicrin (Vikane) presents high inhalation toxicity to humans and may cause neurotoxic effects at high concentrations, though no evidence of carcinogenicity or endocrine disruption has been observed. Sulfuryl fluoride is not a skin sensitizer, and chloropicrin is a possible skin sensitizer.
d-Limonene	d-Limonene exhibits low acute toxicity to humans and no evidence of carcinogenicity, genotoxicity, developmental and reproductive toxicity, endocrine disruption, and neurotoxicity, but is classified as a skin irritant and sensitizer.
Disodium octaborate tetrahydrate (DOT)	DOT shows low acute toxicity to humans, with eye irritation as the primary hazard, and chronic effects only at high doses. It is not a skin sensitizer and under the anticipated exposure scenarios, has no evidence of carcinogenicity, genotoxicity, developmental and reproductive toxicity, endocrine disruption, and neurotoxicity.

Proposed Pesticide	Description
Disinfectants	
Hydrogen peroxide[a]	Hydrogen peroxide shows low acute toxicity to humans but can cause skin irritation, stinging in the eyes, and temporary bleaching of skin. It shows no evidence of developmental and reproductive toxicity and there was inadequate evidence of carcinogenicity.
Sodium dichloroisocyanurate dihydrate	Sodium dichloroisocyanurate dihydrate has low acute toxicity to humans but can cause eye irritation and inhalation hazards. It shows no evidence of carcinogenicity and developmental and reproductive toxicity. There was no available information regarding endocrine disruption, neurotoxicity, or immunotoxicity.
Sodium hypochlorite	Sodium hypochlorite exhibits very low acute toxicity to humans but is corrosive to eyes and skin. It shows no evidence of carcinogenicity, developmental and reproductive toxicity, endocrine disruption. No information was available regarding neurotoxicity.
Isopropyl alcohol or ethanol	Isopropyl alcohol and ethanol have low acute toxicity to humans. Evidence of carcinogenicity, developmental and reproductive toxicity, endocrine disruption, and neurotoxicity were not found or are not expected based on the registered use of isopropyl alcohol and ethanol. They may cause mild irritation but are not skin sensitizers.
Dodecyl Dimethyl Ammonium Chloride (DDAC)	DDAC exhibits moderate acute toxicity to humans and causes eye irritation but shows no evidence of carcinogenicity, developmental and reproductive toxicity, endocrine disruption, and neurotoxicity.
Repellents	
N,N-diethyl-meta-toluamide (DEET)	DEET exhibits low acute and chronic toxicity to humans, with no evidence of carcinogenicity, genotoxicity, endocrine disruption, or developmental and reproductive toxicity at labeled use rates. It is not considered a skin sensitizer, though mild eye irritation may occur.
Picaridin	Picaridin has low acute and chronic toxicity to humans, with no evidence of carcinogenicity, genotoxicity, endocrine disruption, or developmental and reproductive toxicity at labeled use rates. It is not a skin sensitizer and poses minimal irritation risk.

Note:

[a] Hydrogen peroxide was not evaluated in the Toxicological Assessment of Pesticides.

Sources: (Stantec Consulting Services 2025b; U.S. Department of Agriculture 2015)

3.10 Hydrology and Water Quality

The 2014 EIR analysis concluded potentially significant impacts on water quality standards or waste discharge requirements related to chemical treatments from the implementation of the IPMP (Midpeninsula Regional Open Space District 2014). These impacts would be reduced to a less than significant impact with the implementation of Mitigation Measure 4.2-3 which requires the District to obtain a National Pollutant Discharge Elimination System (NPDES) permit and comply with design and operational IPMP BMPs required under the permit. The 2014 EIR concluded less than significant impacts on flooding of on- or off-site areas (Midpeninsula Regional Open Space District 2014). The 2019 addendum analysis concluded no new or more severe impacts on hydrology and water quality (Midpeninsula Regional Open Space District 2019).

No new manual or mechanical treatments were included in the 2025 Program that would cause potentially significant impacts. While the 2025 Program has expanded the annual treatment area, no new mechanical vegetation management, earthmoving, or recontouring activity is proposed. Continued implementation of 2025 BMP #28, which requires placement of ground cover, or seeding of native perennial grasses and pasture grasses to occur after herbicide use or manual or mechanical treatment, and appropriate timing of herbicide use treatment not to coincide with the rainy season, would ensure ongoing avoidance of potentially significant erosion or siltation impacts (see Appendix C). No new or more severe impacts to hydrology and water quality are anticipated under the 2025 Program from changes in the manual or mechanical treatment methods.

One new chemical application method, tenting, is proposed for use with the chemical sulfuryl fluoride/chloropicrin and is not anticipated to have adverse impacts on water quality, as tenting would be temporary, occurring a maximum of 5 times in a year, and would be contained to buildings or structures to reduce the potential for environmental transport. Additionally, proper fumigation safety protocols would be followed as stated on the pesticide label (2025 BMP #4) to avoid impacts.

Sulfuryl fluoride/chloropicrin has low mobility in soil, reducing the potential for groundwater contamination, although surface water contamination via runoff remains a possibility (Stantec Consulting Services 2025b). 2025 BMP #19, which minimizes pesticide and sediment runoff, would continue to be implemented to avoid impacts on surface and groundwater from the application of pesticides. No new or more severe impacts to hydrology and water quality are anticipated under the 2025 Program from tenting.

The 2025 Program proposes the use of three new herbicides, five new insecticides, and the addition of five disinfectants and two repellents. The proposed new pesticides in the 2025 Program and changed circumstances since the 2014 EIR and 2019 addendum were evaluated in a Toxicological Assessment of Pesticides and in a regulatory and literature review of previously approved pesticides (Stantec Consulting Services 2025b; 2025a). 2025 BMP #19 would continue to be implemented to avoid impacts on surface and groundwater from the application of pesticides.

None of the proposed pesticide uses would result in the alteration of drainage patterns or stream courses. While the 2025 Program has expanded the annual treatment area, no new mechanical vegetation management, earthmoving, or recontouring activity is proposed. Continued implementation of 2025 BMP #28, which requires placement of ground cover, or seeding of native perennial grasses and pasture grasses to occur after herbicide use or manual or mechanical treatment, and appropriate timing of herbicide use treatment not to coincide with the rainy season, would limit erosion or siltation (see Appendix C).

The 2025 Program would not result in an increase in runoff that would result in flooding. As analyzed in the 2014 EIR, the use of herbicides on rare occasions in wetlands (dry season) and along stream banks has the potential to result in discharge to Waters of the United States. Continued implementation of 2025 BMPs #19, 20, and 32 would avoid impacts to hydrology and water quality. 2025 BMPs #19, 20, and 32 mandate that no IPM activities occur within 15 feet of aquatic resources and if IPM activities must occur within 15 feet of aquatic resources, only pesticides and adjuvants approved for aquatic use can be used (see Appendix C).

Based on the above discussion, the types of hydrology and water quality impacts associated with the modifications included in the 2025 Program are consistent with the IPMP as previously assessed in the 2014 EIR and 2019 addendum. Impacts would remain less than significant.

3.11 Land Use and Planning

As described in the 2014 EIR and 2019 addendum, land use and planning impacts would occur if the IPMP would physically divide an established community (e.g., a freeway dividing a populated residential community), if it would conflict with a land use policy adopted for the purpose of avoiding an environmental impact, or if it would conflict with an applicable habitat conservation plan or natural community conservation plan. The 2014 EIR and 2019 addendum concluded less than significant impacts from implementation of the IPMP (Midpeninsula Regional Open Space District 2014; 2019).

There are no approved habitat conservation plans or natural community conservation plans that apply to District lands, nor have any plans been adopted since 2014 that would apply to the 2025 Program. Implementation of the 2025 Program would not involve any new development that would physically divide a community. Additionally, actions covered under the 2025 Program would not change the overall natural landscape of the Program area; therefore, no impacts would occur.

Based on the above discussion, the types of land use and planning impacts associated with the modifications included in the 2025 Program are consistent with the IPMP as previously assessed in the 2014 EIR and 2019 addendum. Impacts would remain less than significant.

3.12 Mineral Resources

As discussed in the 2014 EIR and 2019 addendum, there are no known mineral resource recovery sites on District lands (Midpeninsula Regional Open Space District 2014; 2019). The additional lands and properties included in the 2025 Program do not have any known mineral resource recovery sites. The 2025 Program is not anticipated to alter the availability of any economic mineral resources.

There are no impacts associated with the 2025 Program, consistent with the IPMP as assessed in the 2014 EIR and 2019 addendum. Impacts would remain less than significant.

3.13 Noise

The 2014 EIR and 2019 addendum analyses concluded less than significant noise impacts from implementation of the IPMP (Midpeninsula Regional Open Space District 2014; 2019). The 2014 EIR found that any noise impacts resulting from the IPMP would be avoided by the implementation of 2025 BMP #17, which requires that any noise generating equipment would need to abide by local noise ordinances if activities would be audible to any receptors. Additionally, 2025 BMP #12 would prevent disturbance of nesting birds by requiring nesting bird surveys prior to treatment, establishment of nest buffers during nesting bird season, and nest monitoring by a District biologist during and after treatment activities if the activity has potential to adversely affect the nest (see Appendix C).

Generally, District properties are in rural parts of their respective counties and are not in close proximity to sensitive receptors. Noise-sensitive receptors on or adjacent to District preserves would include recreational visitors and occupied residences, although the latter are scattered in low-density development patterns, primarily along State Route 35.

The 2025 Program does not introduce any additional sources, noise, or increase the possibility of any impacts to sensitive receptors. Noise-generating equipment that may be used under the proposed pesticide application modifications (trucks, ATVs, pumps, etc.) would be similar or identical to those already used in the IPMP and would not generate increased noise in comparison to the approved IPMP.

Based on the above discussion, the types of noise impacts associated with the modifications included in the 2025 Program are consistent with the IPMP as previously assessed in the 2014 EIR and 2019 addendum. Impacts would remain less than significant.

3.14 Population and Housing

The 2014 EIR and 2019 addendum analyses concluded no impacts from the implementation of the IPMP on population and housing (Midpeninsula Regional Open Space District 2014; 2019).

No construction activities or addition of residences are part of the 2025 Program. The 2025 Program does not induce population growth because it does not involve any alteration of existing land uses or the introduction of new land uses associated with population increases (e.g., housing, employment centers). Additionally, the 2025 Program does not involve new infrastructure or services that would draw new residents to the area. Any increase in workers associated with implementation of the 2025 Program is assumed to be sourced from existing and projected population in the region. The 2025 Program would not necessitate the construction of replacement housing. Population and housing would not be directly or indirectly induced.

Based on the above discussion, the types of population and housing impacts associated with the modifications included in the 2025 Program are consistent with the IPMP as previously assessed in the 2014 EIR and 2019 addendum. Impacts would remain less than significant.

3.15 Public Services and Utilities

The 2014 EIR and 2019 addendum concluded that the implementation of the IPMP would result in no significant impacts to public services (Midpeninsula Regional Open Space District 2014; 2019). The previous analyses concluded that actions under the IPMP would not result in an increase in District employees or the number of visitors at District preserves. Further, the analyses determined that the IPMP would not result in the construction of additional housing, commercial, or industrial development, nor would the IPMP directly or indirectly increase the local population; therefore, no new or altered governmental facilities would be needed to provide public services as a result of the IPMP, nor would the IPMP result in increased demand for public services.

There would be no impacts to utilities from the implementation of the 2025 Program and no change in the level of solid waste generated at a District preserve is anticipated. The 2025 Program would not affect permitted capacity of local or regional solid waste disposal services serving the District lands. Additionally, District facilities are not typically served by municipal storm drain facilities, so there would be no increased demand for storm water facilities.

The 2025 Program would similarly not result in any increases in District employees or visitors on District lands, nor would it result in the construction of housing, commercial, or industrial development. Due to the increase in the Program area, additional workers and an increased use of pesticides would likely be required to treat the Program area. This increase would not create a new substantial impact on public services and utilities.

In addition, there would be no increased levels of solid waste or other utility services. Solid waste would continue to be properly disposed of at designated facilities. No significant increase in utility services is anticipated and would be similar to those previously analyzed in the 2014 EIR and 2019 addendum.

Based on the above discussion, the types of public service and utilities impacts associated with the modifications included in the 2025 Program are consistent with the IPMP as previously assessed in the 2014 EIR and 2019 addendum. Impacts would remain less than significant.

3.16 Recreation

The 2014 EIR and 2019 addendum concluded that the implementation of the IPMP would result in no significant impacts to recreation (Midpeninsula Regional Open Space District 2014; 2019). Recreation was not included as a resource topic in the 2014 EIR but was discussed under Land Use and Planning.

Recreation is one of the predominant land uses on District preserves and the IPMP is designed to include a long-term, science-based decision-making system that uses a specific methodology to manage damage from pests. The IPMP was developed in accordance with the missions of the District including acquiring and preserving a regional greenbelt of open space land in perpetuity, protecting and restoring the natural environment, and providing opportunities for ecologically sensitive public enjoyment and education.

The 2025 Program accounts for the expansion of District lands to include additional recreation opportunities. The changes included in the 2025 Program are similarly designed to manage pests and invasive species, consistent with the District's goals of enhancing and persevering recreational opportunities on lands managed by the District.

Based on the above discussion, the types of recreation impacts associated with the modifications included in the 2025 Program are consistent with the IPMP as previously assessed in the 2014 EIR and 2019 addendum. Impacts would remain less than significant.

3.17 Traffic and Transportation

The 2014 EIR and 2019 addendum concluded that the implementation of the IPMP would result in no significant impacts to traffic and transportation as the IPMP describes pest management activities (Midpeninsula Regional Open Space District 2014; 2019). The 2014 EIR found that IPMP activities were consistent with existing levels of operation and maintenance activities and would not substantially increase throughout the duration of the Program and therefore would not result in any significant increases to traffic from the implementation of the IPMP.

Since the 2014 EIR, the CEQA Guidelines pertaining to traffic and transportation were revised to no longer require an assessment of automobile delay and transitioned to an analysis of vehicle miles traveled associated with a project (CEQA Guidelines § 15064.3). The 2025 Program includes an increase in the Program area, which may result in an increase in workers, both staff and contractors, traveling to treatment areas. This increase would be minor and would not result in a significant increase to vehicle miles traveled by workers compared to the current IPMP, as analyzed in the 2014 EIR.

The 2025 Program would not create changes in air traffic patterns, result in population increases that could adversely affect area traffic, or alter the level of emergency access. No oversized equipment would be used requiring special transport precautions on local streets, roads, or highways. No changes to access points or roadway design would occur with implementation of the 2025 Program and there are no policies or plans within the District preserves that pertain to public transit, bicycle, or pedestrian facilities. All of the vehicle types that would be used as part of the 2025 Program are already in use on District facilities and were previously analyzed in the 2014 EIR.

Based on the above discussion, the types of traffic and transportation impacts associated with the modifications included in the 2025 Program are consistent with the IPMP as previously assessed in the 2014 EIR and 2019 addendum. Impacts would remain less than significant.

3.18 Wildfire

At the time of the 2014 EIR and 2019 addendum, there was not a separate wildfire analysis, but potential effects associated with wildfire hazards were analyzed as part of the hazards, hazardous materials, and public health analyses. The 2014 EIR analysis concluded that impacts from the implementation of the IPMP related to wildland fire hazards would be less than significant (Midpeninsula Regional Open Space District 2014).

All regulatory requirements for local and state fire codes would be followed to reduce the potential for wildfires. Within the District, fire protection services are provided by local fire departments and volunteer fire companies, as well as the California Department of Forestry and Fire Protection, which provides fire protection in the rural areas the majority of land in the District).

Manual, mechanical, and chemical treatment methods associated with the IPMP would result in activities that would require the transportation, use, and storage of pesticides and the transportation and use of mechanical equipment. Heat or sparks from mechanical equipment during treatment activities have the potential to ignite dry vegetation and cause a fire. Midpen implements strict procedures for operation of equipment and trains staff and volunteers in fire suppression techniques in the event operation of equipment results in inadvertent fire ignition. Appropriate fire suppression equipment (e.g., extinguishers) would be provided at work sites in accordance with the Midpen Safety Manual requirements (Midpeninsula Regional Open Space District 2014).

Flammable materials, including pesticides, have the potential to increase fire ignition hazards when in use during chemical treatment activities; however, the IPMP would result in an overall reduction in fuel loads through the removal of pest species from District lands using manual, mechanical, and chemical treatment methods and the implementation of IPMP BMPs further would avoid impacts.

Based on the above discussion, the types of wildfire impacts associated with the modifications included in the 2025 Program are consistent with the IPMP as previously assessed in the 2014 EIR and 2019 addendum. Impacts would remain less than significant.

3.19 Summary of Cumulative Impacts

The geographic area considered in the analysis of cumulative impacts is generally limited to Santa Clara County, San Mateo County, and Santa Cruz County. However, within those counties, the geographic area that could be affected by the IPMP varies depending upon the resource being considered. In addition to the District, there are a number of other agencies, special districts, and other organizations located within cumulative impact study area that acquire and manage open space lands. These parks and open space managers direct management of pests on their lands using similar treatment options in restoration and maintenance activities.

As described in this addendum, the analysis conducted for this document determined that the impacts associated with the changes to the IPMP included in the 2025 Program would not result in significant impacts on several resources, as previously analyzed in the 2014 EIR and 2019 addendum, and therefore, those effects would not need detailed cumulative discussion. Effects on resource areas found not to be significant, for which the 2025 Program would make no contribution or a less than considerable contribution to significant cumulative impacts are agriculture and forestry, air quality and GHGs, geology and soils, land use, mineral resources, noise, population and housing, public services and utilities, and traffic and transportation. This addendum examines the potential for the 2025 Program to contribute to significant cumulative impacts related to aesthetic resources, biological resources, cultural resources, hazards and hazardous materials, and hydrology and water quality.

The cumulative impact analysis presented in Chapter 5 of the 2014 EIR concluded that with the implementation of IPMP BMPs, and implementation of biological and cultural resource mitigation measures, the IPMP would not make a considerable contribution to any identified significant cumulative impact (Midpeninsula Regional Open Space District 2014). The modifications included in the 2025 Program have the potential to result in significant impacts on biological resources including newly listed special-status species as well as public health, particularly from inclusion of new pesticides, expansion of the Program area, potential increase in treatments, and the inclusion of tenting as a chemical application. As assessed in previous sections, effects from the changes associated with the 2025 Program compared to the previously assessed IPMP, would be similar or the same to the impacts previously identified. The cumulative analysis conclusions in the 2014 EIR and 2019 addendum would remain unchanged by modifications included in the 2025 Program and assessed in this addendum as no new or substantially greater significant impacts were identified.

Mitigation Measures 4.2-1a through 4.2-1d include provisions to reduce, avoid, and/or compensate for impacts in accordance with the requirements of ESA and CESA and other regulatory programs that protect habitats and special-status species. Cultural resources Mitigation Measures 4.3-1 and 4.3-2 include provisions for a built environment survey prior to implementation of building retrofits or barriers, for structures of historic-age (50 years), and require cessation of ground disturbing activities if human remains are encountered. Therefore, the 2025 Program would not result in a substantial contribution to any significant cumulative impacts and would have less than significant cumulative impacts with mitigation, which is unchanged from the conclusions of the 2014 EIR and 2019 addendum.

3.20 Other CEQA Topics

3.20.1 Changes in Land Use that Commit Future Generations

The 2025 Program would not result in a change to the zoning or land use designations. The 2025 Program would not commit future generations to significant changes in land use. All impacts are consistent with those analyzed in the 2014 EIR and 2019 addendum.

3.20.2 Consumption of Non-Renewable Resources

Non-renewable resources include mineral resources, groundwater, and fossil fuels. Similar to the adopted IPMP, the 2025 Program would not involve any activities that would permanently impede mineral recovery and would not require the use of substantial groundwater from the District area.

The 2025 Program would require the use of fossil fuels for management activities, including the use of mechanical tools and equipment. The use of fossil fuels would be needed for vehicles and equipment during these activities and to reach project sites. The 2025 Program would use fossil fuels intermittently throughout the year but would not require continuous use. In addition, the use of fossil fuels would be considered beneficial, necessary, and not wasteful as discussed in Section 3.7, Energy.

3.20.3 Irreversible Damage from Environmental Accidents

Action proposed under the 2025 Program would involve use of equipment and vehicles, which could result in an accidental spill of hazardous materials such as diesel and gasoline, similar to the adopted IPMP. The 2025 Program would not change the types of management activities that were allowed under the adopted IPMP and would continue to adhere to Mitigation Measure 4.5-1 which addresses exposing the public or environment to hazardous materials. Additionally, IPMP BMPs would be in place to further minimize the potential for unwanted adverse impacts to non-target species; therefore, the 2025 Program would not result in irreversible damage from environmental accidents.

3.20.4 Growth-Inducing Impacts

Similar to the adopted IPMP and as analyzed under the 2014 EIR, the 2025 Program does not involve the construction of housing and would not directly contribute to population growth in the area. In addition, the 2025 Program does not involve the expansion of infrastructure, such as roadways or sewer lines and does not involve the construction of a new facility that would indirectly induce population growth. Therefore, the 2025 Program would not result in new or substantially more severe significant impacts related to growth-inducing impacts than those analyzed in the 2014 EIR and 2019 addendum.

4 Determination

The 2025 Program proposes the use of three new herbicides, five new insecticides, six disinfectants, two repellents, and tenting as a new chemical application method. The 2025 Program also includes the increase in District managed land and properties. A detailed comparison of changes between the IPMP analyzed in the 2014 EIR and 2019 addendum and the 2025 Program are included in Table 2-1. The 2025 Program also 1) provides a revised list of IPMP BMPs that clarify existing language; 2) better reflects District processes, regulatory requirements, and EPA findings; and 3) improves consistency with the District's OSMRP (refer to Appendix C for the revised IPMP BMPs). These revisions are not a result of newly identified adverse impacts.

No new or substantially more severe significant impacts would occur as a result of the 2025 Program and none of the conclusions in the 2014 EIR and 2019 addendum would be altered. No new or substantial changes would occur with respect to the circumstances under which the 2025 Program would be undertaken.

The mitigation measures and determination of significance for impacts included in the certified 2014 EIR and 2019 addendum would continue to be valid. The additions also would not affect any of the mitigation measures, including their feasibility or implementation, although language in the Mitigation Measures 4.2-1a through 4.2-1c has been revised to broadly address special-status amphibian, reptile, fish, and invertebrate species. These revisions are not a result of newly identified adverse impacts and do not substantially affect the current IPMP or modifications included in the 2025 Program.

As mentioned above, none of the conditions listed in section 15162 of the CEQA Guidelines exist for the 2025 Program described herein. Therefore, pursuant to section 15164 of the CEQA Guidelines, the differences between the approved IPMP described in the 2014 EIR and the 2025 Program as currently proposed and described in this addendum are minor and this addendum provides sufficient environmental documentation. No subsequent or supplemental MND or EIR is needed to address the IPMP updates and changes included in the 2025 Program.

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APPENDIX A

Integrated Pest Management Program EIR Mitigation Measures

APPENDIX A: INTEGRATED PEST MANAGEMENT PROGRAM EIR MITIGATION MEASURES

New or revised text compared to the mitigation measures included in the 2014 EIR and 2019 Addendum is shown in gray highlighted underline or ~~strikeout~~.

Integrated Pest Management Program EIR Mitigation Measures

Mitigation Measure
Mitigation Measure 4.2-1a: Mitigation for impacts to special-status amphibian and reptile species ~~(California red-legged frog, foothill yellow-legged frog, northern western pond turtle, San Francisco gartersnake, California tiger salamander, California giant salamander, Santa Cruz black salamander)~~. • Prior to conducting any mechanical or chemical IPM treatments in an area that is both federally designated critical habitat and suitable aquatic habitat for special-status amphibian and reptile species ~~California red-legged frog, foothill yellow-legged frog, northern western pond turtle, San Francisco gartersnake, or California tiger salamander~~, the District will consult with the USFWS and CDFW as appropriate pursuant to ESA/CESA. Appropriate measures will be developed in consultation with USFWS and CDFW to ensure there is no loss of critical habitat for these species, or that unavoidable loss of critical habitat will be replaced through habitat enhancement or restoration. Such measures may include ~~may include~~ avoidance of breeding habitat, limiting activities to manual removal of vegetation, conducting activities outside the breeding season, or relocation and mitigation per permit conditions. • Prior to conducting any mechanical or chemical IPM treatments within 15 feet of occupied habitat for special-status amphibian or reptile species ~~California red-legged frog, foothill yellowlegged frog, northern western pond turtle, San Francisco gartersnake, California tiger salamander, California giant salamander, or Santa Cruz black salamander~~, the District will consult with USFWS and CDFW. Appropriate measures will be developed in consultation with USFWS and CDFW to ensure there is no take of these species, or that unavoidable take is fully compensated for through for through habitat enhancement or restoration activities, or purchase of mitigation credits. Shooting, trapping, and gigging of aquatic species will be conducted only by a qualified biologist with experience in the identification of ~~frog~~ amphibian and turtle species. Inadvertently trapped special-status amphibians, ~~California red-legged frogs, foothill yellow-legged frogs or northern western pond turtles~~ will be released immediately upon discovery. • If permanent loss of federally designated critical habitat cannot be avoided, compensation will be provided through protection and enhancement of habitat within the District open space, purchase of offsite mitigation credits, and/or contribution to regional conservation and recovery efforts for the species as determined in consultation with the USFWS and CDFW.
Mitigation Measure 4.2-1b. Mitigation for impacts to special-status fish ~~(tidewater goby, central California coast coho salmon, central California coast steelhead)~~. • All mechanical or chemical IPM treatments will be avoided within estuarine marshes, lagoons, or adjacent stream reaches that provide suitable habitat for tidewater goby. If manual, mechanical, or chemical IPM treatments are required in areas where suitable habitat for tidewater goby is present, the District will conduct protocol level surveys for tidewater goby before implementation of IPM such treatments. If tidewater goby is identified during these surveys only manual IPM treatments will be implemented. Manual IPM treatments will not occur during the tidewater goby spawning period (spring through summer). • Prior to conducting any mechanical or chemical IPM treatments in an area that is federally designated critical habitat for central California coast coho salmon or central California coast steelhead, the District will consult with the USFWS, NMFS, and CDFW as appropriate pursuant to ESA/CESA. • Prior to conducting any mechanical or chemical IPM treatments in occupied habitat of central California coast coho salmon or central California coast steelhead, the District will consult with USFWS, NMFS, and CDFW.

APPENDIX A: INTEGRATED PEST MANAGEMENT PROGRAM EIR MITIGATION MEASURES

Mitigation Measure
• If permanent loss of federally designated, critical habitat, or occupied habitat outside of federally designated critical habitat, cannot be avoided, compensation will be provided through protection and enhancement of habitat within the District open space, purchase of offsite mitigation credits, and/or contribution to regional conservation and recovery efforts for the species as determined in consultation with the USFWS, NMFS, and CDFW.
Mitigation Measure 4.2-1c: Mitigation for impacts to special-status invertebrates. • To avoid impacts to special-status invertebrates from pyrethrin spray, all District staff and contractors using pyrethrin spray will be trained in the identification of problem wasps and special-status invertebrates to ensure that proper species are being targeted. If special-status invertebrates are observed, pyrethrin treatment will not be used in these areas. • Prior to conducting any manual, mechanical, or chemical IPM treatment in serpentine habitats surveys will be conducted for dwarf plantain (*Plantago erecta*), purple owl's clover (*Castilleja densiflora*), and exserted paintbrush (*Castilleja exserta*) during the appropriate blooming period and host plants containing eggs, larva, or pupa of bay checkerspot butterfly will not be treated. • Prior to conducting any manual, mechanical, or chemical IPM treatment that has the potential to damage milkweed species, surveys will be conducted for (narrowleaf milkweed (*Asclepias fascicularis*) and showy milkweed (*Asclepias speciosa*)) from February to October, when monarch could be breeding, and host plants containing eggs, larva, or pupa of monarch butterfly will not be treated. • Prior to conducting any manual, mechanical, or chemical IPM treatment in suitable dune habitats, surveys will be conducted for host buckwheats (*Eriogonum latifolium* and *Eriogonum parvifolium*) during the appropriate blooming period, and host plants containing eggs, larva, or pupa of Smith's blue butterfly will not be treated. • Prior to conducting any manual, mechanical, or chemical IPM treatment in Zayante sandhills, surveys will be conducted for Zayante band-winged grasshopper and they will be avoided by treatments.
Mitigation Measure 4.2-1d: Mitigation for impacts to special-status bats. To mitigate for IPM activities to remove roosting bats in buildings: • If removal of bats is necessary in a human-occupied building or prior to demolition or major renovation of a building in which signs of bats are evident, a qualified biologist will conduct surveys for roosting bats. Surveys will consist of daytime pedestrian surveys to look for visual signs of bats (e.g., guano), and if determined necessary, evening emergence surveys to note the presence or absence of bats. If evidence of bat roosting is found, the number and species of roosting bats will be determined. If no evidence of bat roosts is found, then no further study will be required. • When bat roosting sites are located in buildings, exclusion of bats from the building will occur outside of the April through August nursery season. • If roosts of special-status bats are determined to be present and must be removed, a bat exclusion plan will be prepared and submitted to CDFW. The exclusion plan will describe the method of exclusion, which may include the use of one-way doors at roost entrances (bats may leave but not re-enter), or sealing roost entrances when the site can be confirmed by a bat expert to contain no bats. No bats will be excluded until the plan is approved by CDFW and alternative roosting habitat is available. The bats will be excluded from the roosting site before the site is closed. To mitigate for removal of large trees during the April through August nursery season to tree roosting bats: • Avoid removal of trees greater than sixteen inches dbh during the April through August nursery season when possible. • If removal of trees greater than sixteen inches dbh during the April through August nursery season cannot be avoided, a qualified biologist will conduct surveys for roosting bats where suitable large trees are to be removed. Surveys will consist of daytime pedestrian surveys to look for visual signs of bats

Mitigation Measure
(e.g., guano), and if determined necessary, evening emergence surveys to note the presence or absence of bats. If evidence of roosting bats is found, the number and species of roosting bats will be determined. If no evidence of bat roosts is found, then no further study will be required. • If bat roosting sites are located in trees to be removed, such removal will occur outside of the April through August nursery season if possible. • If roosts of special-status bats are determined to be present and must be removed during the April through August nursery season, a bat exclusion plan shall be prepared and submitted to CDFW. The exclusion plan will describe the method of exclusion, which may include the use of one-way doors at roost entrances (bats may leave but not re-enter), or sealing roost entrances when the site can be confirmed by a bat expert to contain no bats. No bats will be excluded until the plan is approved by CDFW and alternative roosting habitat is available. The bats will be excluded from the roosting site before the site is closed.
Mitigation Measure 4.2-1e: Mitigation for Impacts to San Francisco dusky-footed woodrat and Santa Cruz kangaroo rat. The District will consult with CDFW in areas where IPM treatments require removal of San Francisco dusky-footed woodrats occupying buildings or require removal of woodrat nests located within 100 feet of buildings. Consultation will occur prior to removal of woodrats or their nests. Management actions will be determined in consultation with CDFW and may include the live capture and relocation of woodrats to suitable adjacent habitats, and removal of nesting sites within buildings. Nest middens will be dismantled by hand under the supervision of a biologist. If young are encountered during the dismantling process, the material will be placed back on the nest, and the nest will remain undisturbed for two to three weeks in order to give the young enough time to mature and leave the nest on their own accord. After two to three weeks, the empty nest can be dismantled. Nest material will be moved to suitable adjacent areas within the mixed oak woodland that will not be disturbed. As woodrats exhibit high site fidelity, buildings with previous woodrat nests will be regularly inspected for potential intrusion to prevent infestation. The District will consult with CDFW on management in areas where Santa Cruz kangaroo rat is found occupying buildings, or nests located within 100 feet of buildings must be removed, prior to nest removal occurring. Management actions will be determined in consultation with agencies.
Mitigation Measure 4.2-3: Mitigation for impacts to federally protected wetlands. When seeking a change in habitat type from stock pond to ephemeral wetland to control bull frogs and non-native fishes, the District will implement the following measures to compensate for the loss of wetlands and other waters of the United States: • The District will prepare a wetland delineation and will determine the exact acreage of waters of the United States and waters of the state that would be affected as a result of project implementation. • The District will replace on a "no net loss" basis (minimum 1:1 ratio) (in accordance with USACE and/or RWQCB) the acreage and function of all wetlands and other waters that would be permanently removed, lost, or degraded as a result of project implementation. Wetland habitat will be replaced at an acreage and location agreeable to USACE and the RWQCB and as determined during the Section 401 and Section 404 permitting processes. Compensatory mitigation will be approved by USACE and RWQCB. • The District will obtain a USACE Section 404 Permit and RWQCB Section 401 certification before fill or dredge of wetlands or water of the United States. The District will implement all permit conditions. When conducting manual and mechanical treatments within waters, the District will implement the following measures to compensate for the loss of wetlands and other waters of the United States:

APPENDIX A: INTEGRATED PEST MANAGEMENT PROGRAM EIR MITIGATION MEASURES

Mitigation Measure
• The District will estimate the quantity of dredge or fill material that may be discharged incidental to these activities and coordinate permitting with the USACE, including application for coverage under the Nationwide Permit program as appropriate. • If activities will result in permanent impacts to waters, the District will replace or restore on a "no net loss" basis (minimum 1:1 ratio) (in accordance with USACE and/or RWQCB) the acreage and function of all wetlands and other waters that would be removed, lost, or degraded as a result of project implementation. Wetland habitat will be replaced at an acreage and location agreeable to USACE and the RWQCB and as determined during the Section 401 and Section 404 permitting processes. Compensatory mitigation will be approved by USACE and RWQCB. When conducting chemical treatments within or with potential to affect waters and with the potential to discharge directly or indirectly to waters of the United States, the District will implement the following measures to compensate for the loss of wetlands and other waters of the United States: • The District must consult with the San Francisco Bay RWQCB which may require the District to submit a Notice of Intent to Discharge, develop an Aquatic Pesticide Application Plan. The permit includes design and operational BMPs that must be implemented to reduce the level of contaminated runoff, including monitoring and reporting to document and minimize pollutant discharge and ensure pollutants do not adversely affect waters. If pollutants are found to be exceeding water quality standards application must stop, or additional BMPs must be developed to bring the activities into compliance.
Mitigation Measure 4.3-1: Built-environment survey. Prior to implementation of building retrofits or barriers that are visible on the exterior and not consistent with the vernacular nature of rural buildings, historic-age (50 years) structures will be surveyed by an architectural historian who meets the Secretary of the Interior's Standards. The structure will be evaluated for eligibility for listing on the California Register of Historic Resources. If structures are determined to be eligible for the California Register of Historic Resources, building retrofits or barriers will follow the Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings, or the Secretary of the Interior's Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings.
Mitigation Measure 4.3-3: Halt ground-disturbing activity. If human remains are encountered, all work within 100 feet of the remains will cease immediately. The District will contact the appropriate county coroner (San Mateo County, Santa Clara County, or Santa Cruz County) to evaluate the remains, and follow the procedures and protocols set forth in §15064.5(e) of the CEQA Guidelines. No further disturbance of the site or any nearby area reasonably suspected to overlie adjacent remains will occur until the County Coroner has made a determination of origin and disposition, which will be made within two working days from the time the Coroner is notified of the discovery, pursuant to State Health and Safety Code Section 7050.5 and Public Resources Code Section 5097.98. If the remains are determined to be Native American, the Coroner will notify the Native American Heritage Commission (NAHC) within 24 hours, which will determine and notify the Most Likely Descendant (MLD). The MLD may recommend within 48 hours of their notification by the NAHC the means of treating or disposing of, with appropriate dignity, the human remains and grave goods. In the event of difficulty locating a MLD or failure of the MLD to make a timely recommendation, the human remains and grave goods shall be reburied with appropriate dignity on the property in a location not subject to further subsurface disturbance

APPENDIX B

Comparison of Special-Status Species Lists and Methodology (2025)

APPENDIX B: COMPARISON OF SPECIAL-STATUS SPECIES LISTS AND METHODOLOGY

1.1 Introduction

Since adoption of the 2014 EIR and preparation of the 2019 addendum, the regulatory status of certain plant and animal species has been updated under the California Rare Plant Rank (CRPR) system, the federal Endangered Species Act (ESA), and the California Endangered Species Act (CESA). These status changes are based on updated scientific information, including revised understanding of species distributions, habitat conditions, and threats to species persistence, and are summarized in the species list below.

In addition, the acreage of lands owned or managed by Midpen has expanded over time. At the time preparation of the 2014 EIR, Midpen managed approximately 63,000 acres, including lands held in fee title, conservation easements, and properties under active management agreements, which increased at the time of the 2019 Addendum, adding new species to this list. Since the release of the 2019 Addendum, preserve boundaries and other lands managed by Midpen have expanded by approximately 7,000 acres, for a total of about 70,000 acres as of 2025. Species that were not identified in the 2014 EIR or 2019 addendum, but now have the potential to occur within these managed lands, are also listed in species table and were considered when updating the IPMP.

1.2 Methodology

The Midpen plant species database, which includes Calflora rare and listed plant species data, was searched by Panorama GIS. The search covered all preserves, including leased and managed lands. Additionally, California Natural Diversity Database (CNDDB) records were searched for the same areas (preserves plus additional or leased lands) and included a 5-mile buffer around each preserve/managed land. GIS selected each buffer by preserve or easement name, merged the buffers into a single element, and intersected with CNDDB animal and plant data. The USFWS Information for Planning and Consultation (IPaC) species database was also queried for the same preserve areas. Species queries also included the Sphere of Influence at the southern end of Midpen lands.

Data generated from the above database queries were checked against the 2014 EIR/2019 addendum species lists. Any species not found on original 2014/2019 lists were evaluated for the following criteria:

- Suitable habitat for plant species was evaluated using California Native Plant Society online maps, California Department of Fish and Wildlife's (CDFW) Biogeographic Information and Observation System (BIOS) vegetation mapping, United Sates Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI), United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Web Soil Survey data, and Google Earth Pro aerial imagery.

- Suitable habitat for animal species was evaluated using the California Department of Fish and Wildlife's (CDFW) California Wildlife Habitat Relationships System (CWHRS), United Sates Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) data, the National Oceanic and Atmospheric Administration (NOAA) Fisheries online, the Cornell Lab online, Calherps online, and Google Earth Pro aerial imagery.
- Occurrence dates (older less reliable dates greater than 20 years old), were given less weight since older data is assumed to be less reliable and relevant and/or based on plant or animal species habitat requirements or known range). In select cases, distance between the preserve and the species occurrence record was also taken into consideration.
- Based on available data in the record and online (as needed), species with lower than moderate potential to occur were omitted from further evaluation. Animal species on the original 2014 list were not omitted based on lower rank or lower or no listing status.
- All newly identified plants with California Native Plant Society Rare Plant Rank of 4 and higher were considered for evaluation.
- Critical habitat was evaluated per the IPAC data which provides information for overlap between the project areas (i.e., preserves) and critical habitat areas that are either proposed or final for federally listed animal species.

Species in the original 2014 and 2019 lists were not re-evaluated for potential to occur. It is assumed that the original consultant used a certain set of methods to determine whether or not to include species in the 2014/2019 lists, and Midpen vetted those original species lists, and species—even with no listing status—were included in those lists for valid reasons.

APPENDIX B: COMPARISON OF SPECIAL-STATUS SPECIES LISTS AND METHODOLOGY

Comparison of Special-Status Species Lists between the Conditions at the Time of the 2014 EIR/2019 Addendum and the 2025 Addendum

Species	Species Listing as of 2014 EIR and/or 2019 Addendum (Federal/State, Other Listing)	Species Listing as of 2025 (Federal/State, Other Listing)
Plants		
Sanford's arrowhead *Sagittaria sanfordii*	N/A	--/--, 1B.2
Marsh microseris *Microseris paludosa*	N/A	--/--,1B.2
Scouler's catchfly *Silene scouleri ssp. scouleri*	N/A	--/--, 2B.2
Rock sanicle *Sanicula saxatilis*	N/A	--/SR, 1B.2
Coyote ceanothus *Ceanothus ferrisiae*	N/A	FE/--, 1B.1
Ben Lomond spineflower *Chorizanthe pungens var. hartwegiana*	N/A	FE/--,1B.1
Monterey spineflower *Chorizanthe pungens var. pungens*	N/A	FT/--, 1B.2
Scotts Valley spineflower *Chorizanthe robusta var. hartwegii*	N/A	FE/--, 1B.1
Santa Cruz cypress *Hesperocyparis abramsiana var. abramsiana*	N/A	FT/SE, 1B.2
Santa Cruz tarplant *Holocarpha macradenia*	N/A	FT/SE, 1B.1

APPENDIX B: COMPARISON OF SPECIAL-STATUS SPECIES LISTS AND METHODOLOGY

Species	Species Listing as of 2014 EIR and/or 2019 Addendum (Federal/State, Other Listing)	Species Listing as of 2025 (Federal/State, Other Listing)
California seablite *Suaeda californica*	N/A	FE/--, 1B.1
Two-fork clover *Trifolium amoenum*	N/A	FE/--, 1B.1
Blasdale's bent grass *Agrostis blasdalei*	N/A	--/--, 1B.2
Robbins' broomrape *Aphyllon robbinsii*	N/A	--/-- ,1B.1
Jepson's coyote-thistle *Eryngium jepsonii*	N/A	--/-- ,1B.2
Hillsborough chocolate lily *Fritillaria biflora var. ineziana*	N/A	--/--,1B.1
Vaginulate grimmia *Grimmia vaginulata*	N/A	--/--,1B.1
Kellogg's horkelia *Horkelia cuneata var. sericea*	N/A	--/--,1B.1
Point Reyes meadowfoam *Limnanthes douglasii ssp. sulphurea*	N/A	--/SE, 1B.2
coast iris *Iris longipetala*	N/A	--/--, 4.2
Mexican mosquito fern *Azolla microphylla*	N/A	--/--, 4.2

APPENDIX B: COMPARISON OF SPECIAL-STATUS SPECIES LISTS AND METHODOLOGY

Species	Species Listing as of 2014 EIR and/or 2019 Addendum (Federal/State, Other Listing)	Species Listing as of 2025 (Federal/State, Other Listing)
San Mateo tree lupine ***Lupinus arboreus var. eximius***	N/A	--/--, 3.2
serpentine leptosiphon ***Leptosiphon ambiguus***	N/A	--/--, 4.2
Methuselah's beard lichen ***Usnea longissima***	N/A	--/--, 4.2
slender silver moss ***Anomobryum julaceum***	N/A	--/--, 4.2
Abrams' woollystar *Eriastrum abramsii*	--/--, MROSD	--/--, MROSD
Anderson's manzanita *Arctostaphylos andersonii*	--/--, 1B.2	--/--,1B.2
arcuate bush-mallow *Malacothamnus arcuatus var. arcuatus*	--/--, 1B.2	-/--,1B.2
Ben Lomond buckwheat *Eriogonum nudum var. decurrens*	--/--, 1B.1	--/--, 1B.1
bent-flowered fiddleneck *Amsinckia lunaris*	--/--, 1B.2	--/--, 1B.2
big-scale balsamroot *Balsamorhiza macrolepis var. macrolepis*	--/--, 1B.2	--/--, 1B.2
California bottle-brush grass *Elymus californicus*	--/--, 4.3	--/--, 4.3

APPENDIX B: COMPARISON OF SPECIAL-STATUS SPECIES LISTS AND METHODOLOGY

Species	Species Listing as of 2014 EIR and/or 2019 Addendum (Federal/State, Other Listing)	Species Listing as of 2025 (Federal/State, Other Listing)
California Gairdner's yampah *Perideridia gairdneri ssp. gairdneri*	--/--, 4.2	--/--, 4.2
Choris' popcornflower *Plagiobothrys chorisianus var. chorisianus*	--/--, 1B.2	--/--,1B.2
coastal marsh milk-vetch *Astragalus pycnostachyus var. pycnostachyus*	--/--, 1B.2	--/--, 1B.2
Congdon's tarplant *Centromadia parryi ssp. congdonii*	--/--, 1B.1	--/--,1B.1
Crystal Springs fountain thistle *Cirsium fontinale var. fontinale*	FE/CE, 1B.1	FE/SE, 1B.1
Crystal Springs lessingia *Lessingia arachnoidea*	--/--, 1B.2	--/--, 1B.2
Davidson's bush-mallow *Malacothamnus davidsonii*	--/--, 1B.2	--/--, 1B.2
Diablo helianthella *Helianthella castanea*	--/--, 1B.2	--/--, 1B.2
Dudley's lousewort *Pedicularis dudleyi*	--/CR, 1B.2	--/CR, 1B.2
fragrant fritillary *Fritillaria liliacea*	--/--, 1B.2	--/--,1B.2
Franciscan onion *Allium peninsulare var. franciscanum*	--/--, 1B.2	--/--, 1B.2

APPENDIX B: COMPARISON OF SPECIAL-STATUS SPECIES LISTS AND METHODOLOGY

Species	Species Listing as of 2014 EIR and/or 2019 Addendum (Federal/State, Other Listing)	Species Listing as of 2025 (Federal/State, Other Listing)
hairless popcornflower *Plagiobothrys glaber*	--/--, 1A	--/--, 1A
Hickman's popcornflower *Plagiobothrys chorisianus var. hickmanii*	--/--, 4.2	--/--, 4.2
Hospital Canyon larkspur *Delphinium californicum ssp. interius*	--/--, 1B.2	--/--, 1B.2
Indian Valley bush-mallow *Malacothamnus aboriginum*	--/--, 1B.2	--/--, 1B.2
Jepson's woolly sunflower *Eriophyllum jepsonii*	--/--, 4.3	--/--, 4.3
Kings Mountain manzanita *Arctostaphylos regismontana*	--/--, 1B.2	--/--, 1B.2
legenere *Legenere limosa*	--/--, 1B.1	--/--, 1B.1
Loma Prieta hoita *Hoita strobilina*	--/--, 1B.1	--/--, 1B.1
Marin western flax *Hesperolinon congestum*	FT/CT, 1B.1	FT/ST, 1B.1
minute pocket moss *Fissidens pauperculus*	--/--, 1B.2	--/--, 1B.2
Montara manzanita *Arctostaphylos montaraensis*	--/--, 1B.2	--/--, 1B.2

APPENDIX B: COMPARISON OF SPECIAL-STATUS SPECIES LISTS AND METHODOLOGY

Species	Species Listing as of 2014 EIR and/or 2019 Addendum (Federal/State, Other Listing)	Species Listing as of 2025 (Federal/State, Other Listing)
Monterey Coast paintbrush *Castilleja latifolia*	--/--, 4.3	--/--, 4.3
most beautiful jewelflower *Streptanthus albidus ssp. peramoenus*	--/--, 1B.2	--/--, 1B.2
Mt. Hamilton fountain thistle *Cirsium fontinale var. campylon*	--/--, 1B.2	--/--, 1B.2
Pajaro Manzanita *Arctostaphylos pajaroensis*	--/--, 1B.1	--/--, 1B.1
Point Reyes bird's-beak *Chloropyron maritimum ssp. palustre*	--/--, 1B.2	--/--, 1B.2
robust spine flower *Chorizanthe robusta var. robusta*	FE/--, 1B.1	FE/--, 1B.1
San Francisco campion *Silene verecunda ssp. verecunda*	--/--, 1B.2	--/--, 1B.2
San Francisco collinsia *Collinsia multicolor*	--/--, 1B.2	--/--, 1B.2
San Francisco popcornflower *Plagiobothrys diffusus*	--/CE, 1B.1	--/SE, 1B.1
San Mateo thorn-mint *Acanthomintha duttonii*	FE/CE, 1B.1	FE/SE, 1B.1
San Mateo woolly sunflower *Eriophyllum latilobum*	FE/CE, 1B.1	FE/SE, 1B.1
Santa Clara red ribbons *Clarkia concinna ssp. automixa*	--/--, 4.3	--/--, 4.3

APPENDIX B: COMPARISON OF SPECIAL-STATUS SPECIES LISTS AND METHODOLOGY

Species	Species Listing as of 2014 EIR and/or 2019 Addendum (Federal/State, Other Listing)	Species Listing as of 2025 (Federal/State, Other Listing)
Santa Clara Valley dudleya *Dudleya abramsii ssp. setchellii*	FE/--, 1B.1	FE/--, 1B.1
Santa Cruz clover *Trifolium buckwestiorum*	--/--, 1B.1	--/--, 1B.1
Santa Cruz Mountain pussypaws *Calyptridium parryi var. hesseae*	--/--, 1B.1	--/--, 1B.1
Santa Cruz Mountains beardtongue *Penstemon rattanii var. kleei*	--/--, 1B.2	--/--, 1B.2
smooth lessingia *Lessingia micradenia var. glabrata*	--/--, 1B.2	--/--, 1B.2
Toren's grimmia *Grimmia torenii*	--/--, 1B.3	--/--, 1B.3
western leatherwood *Dirca occidentalis*	--/--, 1B.2	--/--, 1B.2
white-flowered rein orchid *Piperia candida*	--/--, 1B.2	--/--, 1B.2
white-rayed pentachaeta *Pentachaeta bellidiflora*	FE/CE, 1B.1	FE/SE, 1B.1
woodland woollythreads *Monolopia gracilens*	--/--, 1B.2	--/--, 1B.2
round-leaved filaree *Erodium macrophyllum*	--/--, 1B.1	N/A
Amphibians		
California tiger salamander *Ambystoma californiense*	FT/CT, SSC	FE/ST (DPS3), None

APPENDIX B: COMPARISON OF SPECIAL-STATUS SPECIES LISTS AND METHODOLOGY

Species	Species Listing as of 2014 EIR and/or 2019 Addendum (Federal/State, Other Listing)	Species Listing as of 2025 (Federal/State, Other Listing)
California red-legged frog *Rana draytonii*	FT/--, SSC	FT/--, SSC
foothill yellow-legged frog *Rana boylii*	--/--, SSC	FT/SE (DPS4), None
Northwestern pond turtle[a] *Actinemys marmorata*	--/--, SSC	FPT/--, SSC
Southwestern pond turtle[a] *Actinemys pallida*	--/--, SSC	FPT/--, SSC
Coast horned lizard *Phrynosoma blainvillii*	--/--, SSC	--/--, SSC
San Francisco gartersnake *Thamnophis sirtalis tetrataenia*	FE/CE, FP	FE/SE, FP
California giant salamander *Dicamptodon ensatus*	--/--, SSC	--/--, SSC
Santa Cruz black salamander *Aneides niger*	--/--, SSC	--/--, SSC
red-bellied newt ***Taricha rivularis***	N/A	--/--, SSC
Birds		
American peregrine falcon *Falco peregrinus anatum*	--/--, FP	Federally Delisted/State Delisted
Alameda song sparrow Melospiza melodia pusillula"	--/--, SSC, BCC	--/--, SSC, BCC

APPENDIX B: COMPARISON OF SPECIAL-STATUS SPECIES LISTS AND METHODOLOGY

Species	Species Listing as of 2014 EIR and/or 2019 Addendum (Federal/State, Other Listing)	Species Listing as of 2025 (Federal/State, Other Listing)
American white pelican *Pelecanus erythrorhynchos*	--/--, SSC	--/--, SSC, BCC
American yellow warbler *Setophaga petechia*	--/--, SSC, BCC	--/--, SSC
Allen's hummingbird *Selasphorus sasin*	--/--, BCC	--/--, None
bald eagle *Haliaeetus leucocephalus*	--/CE, FP, BCC	Delisted/SE, FP
black swift *Cypseloides niger*	--/--, SSC, BCC	--/--, SSC, BCC
Bryant's savannah sparrow *Passerculus sandwichensis alaudinus*	--/--, SSC	--/--, SSC
California black rail *Laterallus jamaicensis coturniculus*	--/CT, FP, BCC	--/ST, FP
Burrowing owl *Athene cunicularia*	--/--, SCC	--/SCE, SSC
California brown pelican *Pelecanus occidentalis californicus*	--/--, FP	Federally Delisted/State Delisted
California clapper rail *Rallus longirostris obsoletus*	FE/SE, FP	NA
California gull *Larus californicus*	--/--, MROSD	--/--, MROSD
California horned lark *Eremophila alpestris actia*	--/--, MROSD	--/--, MROSD

APPENDIX B: COMPARISON OF SPECIAL-STATUS SPECIES LISTS AND METHODOLOGY

Species	Species Listing as of 2014 EIR and/or 2019 Addendum (Federal/State, Other Listing)	Species Listing as of 2025 (Federal/State, Other Listing)
California least tern *Sternula antillarum browni*	FE/CE, FP	FE/SE, FP
double-crested cormorant *Nannopterum auritum*	--/--, MROSD	--/--, MROSD
elegant tern *Thalasseus elegans*	--/--, MROSD	--/--, BCC, MROSD
ferruginous hawk *Buteo regalis*	--/--, BCC	--/--, None
golden eagle *Aquila chrysaetos*	--/--, FP, BCC	--/--, FP
grasshopper sparrow *Ammodramus savannarum*	--/--, SSC	--/--, SSC
Lawrence's goldfinch *Spinus lawrencei*	--/--, BCC	--/--, BCC
least Bell's vireo *Vireo bellii pusillus*	FE/CE, None	FE/SE, None
least bittern *Ixobrychus exilis*	--/--, SSC, BCC	--/--, SSC
loggerhead shrike *Lanius ludovicianus*	--/--, SSC, BCC	--/--, SSC
long-billed curlew *Numenius americanus*	--/--, BCC	--/--, None
long-eared owl *Asio otus*	--/--, SSC	--/--, SSC, BCC
marbled murrelet *Brachyramphus marmoratus*	FT/CE, None	FT/SE, None

APPENDIX B: COMPARISON OF SPECIAL-STATUS SPECIES LISTS AND METHODOLOGY

Species	Species Listing as of 2014 EIR and/or 2019 Addendum (Federal/State, Other Listing)	Species Listing as of 2025 (Federal/State, Other Listing)
merlin *Falco columbarius*	--/--, MROSD	--/--, MROSD
northern goshawk *Accipiter gentilis*	--/--. SSC	N/A
northern harrier *Circus hudsonius*	--/--, SSC	--/--, SSC, BCC
Nuttall's woodpecker *Picoides nuttallii*	--/--, BCC	--/--, None
olive-sided flycatcher *Contopus cooperi*	--/--, SCC, BCC	--/--, SSC, BCC
osprey *Pandion haliaetus*	--, MROSD	--/--, MROSD
purple martin *Progne subis*	--/--, SSC	--/--, SSC
California Ridgway's rail ***Rallus obsoletus obsoletus***	N/A	FE/SE, FP
rufous hummingbird *Selasphorus rufus*	--/--, BCC	--/--, BCC
American goshawk ***Accipiter atricapillus***	N/A	--/--, SSC
San Francisco common yellowthroat *Geothlypis trichas sinuosa*	--/--, SSC	--/--, SSC, BCC
sharp-shinned hawk *Accipiter striatus*	--/--, MROSD	--/--, MROSD

APPENDIX B: COMPARISON OF SPECIAL-STATUS SPECIES LISTS AND METHODOLOGY

Species	Species Listing as of 2014 EIR and/or 2019 Addendum (Federal/State, Other Listing)	Species Listing as of 2025 (Federal/State, Other Listing)
short-eared owl *Asio flammeus*	--/--, SSC	--/--, SSC, BCC
Swainson's hawk *Buteo swainsoni*	--/CT, BCC	--/ST, None
Vaux's swift *Chaetura vauxi*	--/--, SSC	--/--, SSC, BCC
western snowy plover *Charadrius nivosus nivosus*	FT/--, SSC, BCC	FT/--, SSC
white-tailed kite *Elanus leucurus*	--/--, FP	--/--, FP
willow flycatcher *Pidonax traillii*	--/CE, BCC	--/SE, None
yellow-breasted chat *Icteria virens*	--/--,SSC	--/--, SSC
tricolored blackbird *Agelaius tricolor*	--/--, SSC	--/ST, SSC
bank swallow ***Riparia riparia***	N/A	--/CT, None
yellow rail ***Coturnicops noveboracensis***	N/A	--/-- SSC, BCC
Invertebrates		
Bay checkerspot butterfly *Euphydryas editha bayensis*	FT/--, None	FT/--, None

APPENDIX B: COMPARISON OF SPECIAL-STATUS SPECIES LISTS AND METHODOLOGY

Species	Species Listing as of 2014 EIR and/or 2019 Addendum (Federal/State, Other Listing)	Species Listing as of 2025 (Federal/State, Other Listing)
callippe silverspot butterfly *Speyeria callippe callippe*	FE/--, None	FE/--, None
Smith's blue butterfly *Euphilotes enoptes smithi*	FE/--, None	FE/--, None
Zayante band-winged grasshopper *Trimerotropis infantilis*	FE/--, None	FE/--, None
Monarch butterfly - California overwintering population ***Danaus plexippus plexippus pop. 1***	N/A	FPT/--, None
Crotch's bumble bee ***Bombus crotchii***	N/A	--/SCE, None
Fish		
coho salmon- central California coast ESU *Oncorhynchus kisutch pop. 4*	FE/CE, None	FE/SE, None
tidewater goby *Eucyclogobius newberryi*	FE/--, SSC	FE/--, SSC
Steelhead - central California coast DPS *Oncorhynchus mykiss irideus*	FT/--, None	FT/--, SSC
longfin smelt ***Spirinchus thaleichthys***	N/A	--/ST, None
Mammals		
ring-tailed cat *Bassariscus astutus*	--/--, SSC	--/--, FP

APPENDIX B: COMPARISON OF SPECIAL-STATUS SPECIES LISTS AND METHODOLOGY

Species	Species Listing as of 2014 EIR and/or 2019 Addendum (Federal/State, Other Listing)	Species Listing as of 2025 (Federal/State, Other Listing)
Townsend's big-eared bat *Corynorhinus townsendii*	--/SCT, SSC	--/--, SSC
Mountain lion ***Puma concolor***	--/--, None	--/--, SPC
American badger *Taxidea taxus*	--/--,SSC	--/--, SSC
fringed myotis *Myotis thysanodes*	--/--, MROSD	--/--, MROSD
hoary bat *Lasiurus cinereus*	--/--, MROSD	--/--, MROSD
long-eared myotis *Myotis evotis*	--/--, MROSD	--/--, MROSD
long-legged myotis *Myotis volans*	--/--, MROSD	--/--, MROSD
pallid bat *Antrozous pallidus*	--/--, SSC	--/--, SSC
salt-marsh harvest mouse *Reithrodontomys raviventris*	FE/CE, FP	FE/SE, FP
salt-marsh wandering shrew *Sorex vagrans halicoetes*	--/--, SSC	--/--, SSC
San Francisco dusky-footed woodrat *Neotoma fuscipes annectens*	--/--, SSC	--/--, SSC
Santa Cruz kangaroo rat *Dipodomys venustus venustus*	--/--, MROSD	--/--, MROSD
western red bat *Lasiurus frantzii*	--/--, SSC	--/--, SSC

Notes:

N/A indicates a particular species was not included under the 2014 EIR and 2019 Addendum

Bold indicates that the species is newly listed since the 2014 EIR and 2019 Addendum and previously was not listed.

[a] The western pond turtle (analyzed in the 2014 EIR) was split into two separate species, the northwestern pond turtle (*Actinemys marmorata*) and southwestern pond turtle (Actinemys pallida).

California Rare Plant Rank (CRPR):

1A: Plants presumed extirpated in California and either rare or extinct elsewhere

1B: Plants rare, threatened, or endangered in California or elsewhere

2B: Plants rare, threatened, or endangered in California but more common elsewhere

3: Plants about which more information is needed

4: Plants of limited distribution

0.1: Seriously threatened in California

0.2: Moderately threatened in California

0.3: Not very threatened in California

CBR: Considered But Not Recognized

Federal Endangered Species Act (ESA):

FE = Endangered

FT = Threatened

FPT = Federally Proposed Threatened, FPE = Federally Proposed Endangered

SE = State Endangered, ST = State Threatened, SCT = State Candidate Threatened, SCE = State Candidate Endangered, SPC = State Proposed Candidate for Listing under CESA

Other:

SSC = California Species of Special Concern by CDFW (no formal protection other than CEQA consideration), FP = California Fully Protected (legally protected under Fish and Game Code), DPS = Distinct Population Segment, ESU = Evolutionarily Significant Unit

California Endangered Species Act (CESA):

APPENDIX C

Integrated Pest Management Program Best Management Practices (2025)

APPENDIX C: INTEGRATED PEST MANAGEMENT PROGRAM BEST MANAGEMENT PRACTICES (2025)

New or revised text compared to the best management practices included in the approved Integrated Pest Management Program is shown in underline or ~~strikeout~~ and highlighted in gray.

2025 Integrated Pest Management Program Best Management Practices

#	BMP	Functional Groups	Responsible Party	Timing
1.	**Annual Pesticide Literature Review** ~~To inform updates to the Program, the District shall c~~Conduct an annual ~~pesticide literature~~ review of all newly published toxicological, regulatory, and efficacy information relevant to products on the ~~research and court proceedings related to pesticides io the~~ “Approved Pesticide List.”	Administrative	IPM Coordinator	Annual planning; Prior to treatment
2.	**Glyphosate Use Reduction** Where feasible, the District shall reduce the use of glyphosate in its preserves ~~For IPM projects currently utilizing glyphosate as a management tool, the District shall identify suitable sites to implement alternative treatment methods. The District shall seek to replace~~ by replacing glyphosate use with the safest ~~available~~ effective alternative ~~broad-spectrum, post-emergent herbicide with minimal residual soil activity.~~	Administrative	District staff	Annual planning; Prior to treatment
3.	**Pest Control Recommendation** All pesticides and adjuvants ~~use~~ shall be ~~implemented~~ used consistently with written Pest Control Recommendations prepared annually by a licensed Pest Control Advisor. ~~The Pest Control Adviser shall ensure that a~~ All pesticide applications are to be performed at the time of year and phenological window for maximum effectiveness, thereby increasing treatment efficacy and reducing the need for follow-up applications, unless constraints limit application at the optimal time. ~~Adjuvants shall be used and applied consistent with the District's Pest Control Recommendations.~~ ~~All appropriate laws and regulations pertaining to the use of pesticides and safety standards for employees and the public, as governed by the U.S. Environmental Protection Agency, the California Department of Pesticide Regulation, and local jurisdictions shall be followed. All applications shall adhere to label directions for application rates and methods, storage, transportation,~~	Administrative	Licensed pest control advisor	Prior to treatment; During treatment

#	BMP	Functional Groups	Responsible Party	Timing
	~~mixing, and container disposal. All contracted applicators shall be appropriately licensed by the state. District staff shall coordinate with the County Agricultural Commissioners, and all required licenses and permits shall be obtained prior to pesticide application.~~			
4.	**Pesticide Label** Applicators shall follow all pesticide label requirements and refer to all ~~other~~ relevant IPMP BMPs regarding mandatory measures to protect sensitive resources, and employee and public health during pesticide application. Some herbicides, such as Envoy, Milestone, Transline, and Capstone, contain specific label language restrictions that shall be adhered to, such as those pertaining to when to use in grazed rangelands. ~~All District field crew who perform herbicide treatments shall have specialized experience and training in pesticide safety, IPM principles, and special status species.~~ ~~Grazing Animals - Some herbicides, such as Milestone, Transline, and Capstone contain label language restricting grazing and/or use of compost. Always read and follow label directions.~~	District staff/ Contractor	Pesticide applicator (qualified District staff/ contractor)	Prior to treatment; During treatment
5.	**Pesticide Certification and Supervision** ~~Pesticide applicators shall have or work under the direction of a person with a Qualified Applicator License (QAL) or Qualified Applicator Certificate (QAC). As appropriate, the District shall implement QAC certification requirements for additional field staff to enhance field crew training. Contractors and grazing and agricultural tenants may apply approved pesticides after review and approval by the District and under the direction of QAL/QAC field supervisors. After review and approval by the District and under the direction of QAL/QAC, contractors may apply approved fungicides to District preserves for the research and control of Sudden Oak Death (SOD). As needed for the control of mosquitos, cattle grazing rangers may apply District approved bacterial pathogens to water troughs in District preserves. Employees, contractors and tenants may install approved ant and roach bait stations inside buildings in tamper-proof containers without review by a QAL/QAC. Tenants may not use rodenticides; only qualified District staff or District contractors may use approved rodenticides and these should only be used in the event of an urgent human health issue, in a manner~~	District staff/ Contractor	Pesticide applicator (qualified District staff/ contractor)	Prior to treatment

APPENDIX C: INTEGRATED PEST MANAGEMENT PROGRAM BEST MANAGEMENT PRACTICES (2025)

#	BMP	Functional Groups	Responsible Party	Timing
	~~consistent with the product label, and in anchored, tamper-proof containers inside buildings.~~ Pesticide applicators must hold or operate under a Qualified Applicator License (QAL) or Qualified Applicator Certificate (QAC). Contractors and agricultural tenants may apply District-approved pesticides with District approval and QAL/QAC supervision. District-approved rodenticides may only be used by qualified contractors, and only for urgent human health concerns, following label guidelines and placed indoors in anchored, tamper-proof containers. Termiticides must be applied by applicators licensed by the Structural Pest Control Board. Employees, contractors, and tenants may install ant and roach bait stations in tamper-proof containers indoors and approved bacterial agents to water troughs for mosquito control without QAL/QAC supervision.			
6.	**Pesticide Storage, Loading, and Mixing** All storage, loading, and mixing of pesticides shall be set back at least 300 feet from any aquatic feature, ~~or~~ known locations of special-status species, occupied or suitable special-status species ~~or their~~ habitat, or sensitive natural communities. Applicators shall use an air gap or antisiphon device to prevent backflow while loading pesticides. All mixing and transferring shall occur within a contained area. Any transfer or mixing on the ground shall be within containment pans or over protective tarps and away from drain inlets, culverts, wells, areas with porous or erosion-prone soil, or other features that may allow for runoff.	District staff/ Contractor	Pesticide applicator (qualified District staff/ contractor)	Prior to treatment
7.	**Uses of Herbicide Dyes** As deemed necessary by the Pest Control Adviser, QAL, or QAC, appropriate, non-toxic colorants or dyes shall be added to the herbicide mixture to determine treated areas and prevent over-spraying, particularly in public areas.	District staff/ Contractor	Pesticide applicator (qualified District staff/ contractor)	Prior to treatment
8.	**Notification of Pesticide Application** Signs stating "Pesticide Use Notification" shall be posted notifying the public, employees, and contractors of the District's use of pesticides. The sign shall consist of the following information: • product name, signal word, and manufacturer, active ingredient, and EPA registration number;	District staff/ Contractor	District staff/ Contractor	Prior to treatment

APPENDIX C: INTEGRATED PEST MANAGEMENT PROGRAM BEST MANAGEMENT PRACTICES (2025)

#	BMP	Functional Groups	Responsible Party	Timing
	• target pest; • preserve name and/or building; • ~~treatment location in preserve;~~ date and time of application; • for buildings, if vacancy is required and duration; • date which notification sign may be removed; and • contact person with telephone number (typically IPM Coordinator). Signs shall be posted in accordance with the following dependent upon the location and urgency: • *Outdoor areas of all District-owned preserves and unoccupied buildings:* posted at each end of the outdoor treatment area and any intersecting trails 24 hours before the start of treatment until 72 hours after the end of treatment • *Occupied buildings:* - notification will be provided to building occupants (employees, visitors, residents) 24 hours before the start of treatment by email, letters or telephone calls - posted at the entrances to the building 24 hours before the start of treatment until 72 hours after the end of treatment (except for approved insecticidal baits in tamper-proof containers) • *Urgent application of pesticides to control stinging insects or immediate public safety concern:* posted at the treatment area until 72 hours after the end of treatment ~~generally be posted 24 hours before the start of treatment and notification shall remain in place for 72 hours after treatment ceases.~~ In no event shall a sign be in place longer than 14 days without dates being updated. See the IPM Guidance Manual for further details ~~on posting locations, posting for pesticide use in buildings~~ and ~~for~~ exceptions.			
9.	**~~Trail~~ Closures** *Parking lots, Trails, and Trailheads.* Establish a minimum 5-ft no-spray buffer from parking lots and trails unless a temporary 24-hour closure is used to prevent visitor exposure ~~To reduce potential staff and visitor exposure to pesticides, no-spray trail buffers shall be established at least 5 feet from any trails, trailheads, or parking lots unless a 24-hour trail closure is observed.~~	District staff/ Contractor	District staff/ Contractor	Prior to treatment

APPENDIX C: INTEGRATED PEST MANAGEMENT PROGRAM BEST MANAGEMENT PRACTICES (2025)

#	BMP	Functional Groups	Responsible Party	Timing
	Building. Buildings shall be closed for the recommended label timeframe (from 24 to 72 hours) when pesticides are used for structural pests (e.g., Vikane). Closures are not required for baiting or perimeter applications.			
10.	**Crew Training ~~to Prevent Spread of Weeds~~** Annual worker environmental awareness training shall be conducted for all treatment field crews (staff and volunteers) and contractor crews, which shall include the following at a minimum:~~.~~ • ~~All staff, contractors, and volunteers shall be properly trained to prevent spreading~~ Preventing the spread of weeds and pests to other sites. • Special-status species and sensitive natural communities that are known to occur or determined to have the potential to occur on the treatment site by a District-~~-~~approved biologist. The education training shall be conducted prior to starting work and upon the arrival of any new. The training shall consist of a brief review of life history, field identification, and habitat requirements for each special-status species, their known or probable locations in the vicinity of the treatment site, potential fines for violations, avoidance measures, and necessary actions if special-status species or sensitive natural communities are encountered. • All District field crews who perform herbicide treatments shall have specialized experience and training in pesticide safety, IPM principles, and special-~~-~~status species. • Identification and protection of sensitive archaeological, paleontological, or historic resources (e.g., projectile points, mortars, midden sites, historic bottles, cans, trash deposits, or structures and structural remnants).	District staff/ Contractor	District staff/ Contractor	Prior to treatment
11.	**Pre-Treatment Surveys** ~~A District-approved biologist shall survey all selected treatment sites shortly before work to determine site conditions and develop any necessary site-specific measures. Treatment sites are defined as areas where IPM activity, including manual, mechanical, and chemical treatment, is expected to occur. In addition, on a repeating basis, grassland~~ Treatment sites shall be surveyed by a District-approved biologist once every ~~five~~ 5 years ~~and brushy and wooded sites shall be surveyed once every five years~~. Treatment sites are defined as areas where IPM activity, including manual, mechanical, and chemical treatment, is	District staff/ Contractor	District-approved biologist or other personnel	Prior to treatment

#	BMP	Functional Groups	Responsible Party	Timing
	expected to occur. Brush removal on rangelands ~~will~~ require biological surveys before work is conducted in any year. Site inspections are to determine existing site conditions ~~shall evaluate existing conditions~~ at a given treatment site including the presence, population size, growth stage, and percent cover of target weeds and pests relative to native plant cover and the presence of special-status species and their habitat, or sensitive natural communities and develop any necessary site-specific measures, such as buffer strips to avoid disturbance of grassland wildlife. *Aquatic Areas* ~~Shortly before treatment, a~~ During the pre-treatment surveys, a District-approved qualified biologist or other District-approved personnel shall survey the treatment sites to determine whether any aquatic features or water-supply infrastructure are located on site. ~~In addition, on a repeating basis, grassland treatment sites shall be surveyed once every five years and brushy and wooded sites shall be surveyed by a District-approved biologist once every five years. Brush removal on rangelands will require biological surveys before work is conducted in any year.~~ Aquatic features are defined by the presence of wetland indicators and/or a defined bed and bank, and can include ~~as~~ any natural or manmade lake, pond, wetland, ~~river, creek~~ stream, ~~drainage way,~~ ditch, spring, saturated soils, or similar feature ~~that holds water at the time of treatment or typically becomes inundated during winter rains~~. Water-supply infrastructure includes spring boxes, wells, troughs, tanks, and water-distribution lines, and other infrastructure necessary to divert, store, or convey water, but does not include fully sealed pipes that are aboveground or underground. ~~Treatment sites are defined as areas where IPM activity, including manual, mechanical, and chemical treatment, is expected to occur.~~ If during the survey it is found that aquatic features or water-supply infrastructure are present within ~~15~~ 30 feet of the proposed treatment area, the District shall either eliminate all treatment activities within ~~15~~ 30 feet of the ~~aquatic~~ features from the project (i.e. do not implement treatment actions in those areas) or if the District chooses to continue treatment actions in these areas, it shall use pesticides and adjuvants in accordance with label requirements (BMP #4) that are~~, be~~ labeled for aquatic use and follow ~~the requirements of the mitigation measure for special-status wildlife species and the CDFW Streambed Alteration Agreement~~ all relevant			

#	BMP	Functional Groups	Responsible Party	Timing
	permit requirements (e.g., CDFW Streambed Alteration Agreement), if appropriate. *Rare Plants* ~~Shortly before treatment, all selected treatment sites shall be surveyed by District-approved personnel with environmental awareness training (BMP #20) prior to work to determine the potential presence of special-status plants. Rare~~ During the pre-treatment surveys, rare plant surveys shall be conducted by a District-approved biologist during the appropriate season to assess the occurrence, if any. If special-status plants are reported, information such as species and location shall be uploaded into an electronic inventory system and a District-approved biological monitor shall be present to oversee the planned IPM treatment. ~~On a repeating basis, grassland treatment sites shall be surveyed by a District-approved biologist once every five years and brushy and wooded sites shall be surveyed once every five years. Brush removal on rangelands will require biological surveys before work is conducted in any year. Treatment sites are defined as areas where IPM activity, including manual, mechanical, and chemical treatment, is expected to occur.~~ A 30-foot buffer shall be established from special-status plants. No application of herbicides shall be allowed within this buffer. Non-herbicide methods can be used within 30 feet of rare plants but they shall be designed to avoid damage to the rare plants (e.g., pulling). ~~In addition, annual worker environmental awareness training shall be conducted for all treatment field crews and contractors for special-status species and sensitive natural communities determined to have the potential to occur on the treatment site by a District approved biologist. The education training shall be conducted prior to starting work at the treatment site and upon the arrival of any new worker onto sites with the potential for special-status species or sensitive natural communities. The training shall consist of a brief review of life history, field identification, and habitat requirements for each special-status species, their known or probable locations in the vicinity of the treatment site, potential fines for violations, avoidance measures, and necessary actions if special-status species or sensitive natural communities are encountered.~~ ~~Mowing Patterns~~			

APPENDIX C: INTEGRATED PEST MANAGEMENT PROGRAM BEST MANAGEMENT PRACTICES (2025)

#	BMP	Functional Groups	Responsible Party	Timing
	~~Where appropriate, equipment modifications, mowing patterns, and buffer strips shall be incorporated into manual treatment methods to avoid disturbance of grassland wildlife.~~			
12.	**Nesting Birds** ~~For all IPM activities that could result in potential noise and other land disturbances that could affect nesting birds (e.g., tree removal, mowing during nesting season, mastication, brush removal on rangelands), treatment sites shall be surveyed within two weeks prior to initiating activity to evaluate the potential for nesting birds. Tree removal will be limited, whenever feasible, based on the presence or absence of nesting birds. For all other treatments, if birds exhibiting nesting behavior are found within the treatment sites during the bird nesting season: March 15 - August 30 for smaller bird species such as passerines and February 15 - August 30 for raptors, impacts on nesting birds will be avoided by the establishment of appropriate buffers around active nests. The distance of the protective buffers surrounding each active nest site are: 1,000 feet for large raptors such as buteos, 500 feet for small raptors such as accipiters, and 250 feet for passerines. The size of the buffer may be adjusted by a District biologist in consultation with CDFW and USFWS depending on site specific conditions. Monitoring of the nest by a District biologist during and after treatment activities will be required if the activity has potential to adversely affect the nest. These areas can be subsequently treated after a District biologist or designated biological monitor confirms that the young have fully fledged, are no longer being fed by the parents and have left the nest site. For IPM activities that clearly would not have adverse impacts to nesting birds (e.g. treatments in buildings and spot spraying with herbicides), no survey for nesting birds would be required.~~ For IPM activities that may cause noise or land disturbances affecting nesting birds (e.g., tree removal, mowing during nesting season, mastication, brush removal), sites must be surveyed by a District-approved, qualified biologist or biological monitor within 15 days prior to treatment to assess nesting activity. Tree removal shall be limited when feasible based on nest presence. During nesting season (March 15–August 30 for passerines; February 15–August 30 for raptors), if nesting behavior is observed, appropriate buffers shall be established: 1,000 feet for large raptors (e.g., buteos), 500 feet for small raptors (e.g., accipiters), and 250 feet for passerines. However, buffers may be adjusted by a District-approved	District staff/ Contractor	District-approved qualified biologist or biological monitor	Prior to treatment

#	BMP	Functional Groups	Responsible Party	Timing
	biologist in coordination with CDFW and USFWS based on a number of factors including site conditions, time of year, and type/duration of disturbance. If treatment is therefore allowed to proceed by CDFW/USFWS, the nest must be monitored by a District-approved biologist to confirm that the treatment activities are not negatively affecting bird behavior. If negative effects are observed, treatment activities shall be paused, or substantially modified to avoid the disturbance in further consultation with CDFW/USFWS, and may resume only after fledglings have fully left the nest. IPM activities unlikely to affect nesting birds (e.g., indoor treatments, spot herbicide spraying) do not require a nesting bird survey.			
13.	**Cultural Resources** ~~District staff, volunteer crew leaders, and contractors implementing treatment activities shall receive training on the protection of sensitive archaeological, paleontological, or historic resources (e.g., projectile points, bowls, baskets, historic bottles, cans, trash deposits, or structures). In the event volunteers would be working~~ Where work occurs in locations with potential cultural resources, District staff shall provide instruction to protect and report any ~~previously undiscovered~~ cultural artifacts that might be uncovered during hand-digging activities. If highly sensitive sites are known within or near the treatment site (e.g. burials or significant midden sites, which have a high potential for burials), the nature of the site should not be disclosed to volunteers or contractors, except to state that the site is sensitive and must be avoided (or treated only with appropriate methods). If archaeological or paleontological resources are known or encountered on a treatment site and the treatment method consists of physical disturbance of land surfaces (e.g., mowing, brush cutting, pulling, or digging), work shall avoid these areas or shall not commence until the significance of the find can be evaluated by a qualified archeologist. ~~This measure is consistent with federal guidelines 36 CFR 800.13(a), which protects such resources in the event of unanticipated discovery.~~	District staff/ Contractor	District staff/ Qualified archaeologist	Prior to treatment; During treatment
14.	**Pesticide Application Restrictions in California Red-Legged Frog Habitat**	District staff/ Contractor	Pesticide applicator	Planning prior to treatment;

APPENDIX C: INTEGRATED PEST MANAGEMENT PROGRAM BEST MANAGEMENT PRACTICES (2025)

#	BMP	Functional Groups	Responsible Party	Timing
	Application of glyphosate, triclopyr, and chloropicrin ~~pesticides~~ shall be conducted in accordance with the California Red-Legged Frog Injunction (Center For Biological Diversity v. U.S. Environmental Protection Agency (2006) Case No.: 02-1580JSW) in ~~known or~~ critical habitat or specific sections of non-critical habitat ~~potential~~ for California red-legged frog habitat specifically by complying with all of the following: • only using the amine formulation of triclopyr • not applying specified pesticides within 15 feet of aquatic features (including areas that are intermittent creeks, seeps, and springs ~~wet at time of spraying or areas that are dry at time of spraying but subsequently might be wet during the next winter season)~~; • utilizing only localized spot treatment using hand-held devices ~~spot-spraying techniques and equipment~~ by a certified applicator (QAL or QAC) or person working under the direct supervision of a certified applicator; and • not ~~spraying~~ applying during precipitation or if precipitation is forecast to occur within 24 hours before or after the proposed application. Preserves in which these precautions must be undertaken are: Cloverdale Ranch, Coal Creek, El Corte de Madera Creek, La Honda Creek, Miramontes Ridge, Monte Bello, Picchetti Ranch, Purisima Creek Redwoods, Rancho San Antonio, ~~El Corte de Madera, La Honda Creek, Picchetti Ranch,~~ Russian Ridge, Sierra Azul, Skyline Ridge, and Tunitas Creek~~, Skyline Ridge, Rancho San Antonio, Monte Bello and Coal Creek OSP~~ preserves ~~and Toto Ranch~~. Alternatively, as applicable and appropriate, application of glyphosate, triclopyr, and chloropicrin shall be conducted in accordance with the most recent incidental take permit issued by the USFWS (Endangered Species Act section 7(a)(2)).			During treatment
15.	**Fipronil Special-Status Species Buffer Requirements~~Goby-11 Injection~~** In accordance with the 2010 Stipulation Injunction (Center for Biological Diversity v. EPA, Case No. 07-2794-JCS (N.D. Cal.), May 30, 2007), prior to Fipronil pesticide treatment, the following buffer requirements shall be complied with: • *San Francisco Garter snake:* Within Cloverdale Ranch and Russian Ridge OSPs, do not apply Fipronil within 200 feet of fresh-water ponds (including natural or manmade, such as stock ponds), slow moving streams or pools within streams,	District staff/ Contractor	Pesticide applicator	Planning prior to treatment; During treatment

#	BMP	Functional Groups	Responsible Party	Timing
	vernal pools and other ephemeral or permanent water bodies, which typically support inundation during winter rains and hold water for a minimum of 12 weeks in a year of average rainfall. • *Bay checkerspot butterfly:* Do not apply Fipronil within 100 feet of the Bay checkerspot butterfly habitat within Pulgas Ridge OSP, Edgewood County Park, and the Midpen-managed portion of the San Francsico Public Utility Company land at Pulgas Ridge. • *California clapper rail:* Within Ravenswood OSP, do not apply Fipronil within 300 feet of the high water line of salt or brackish water marshes. Also do not apply Fipronil within 200 feet of a cordgrass/pickleweed stand if any part of the stand occurs within 100 feet of the high water line of a salt or brackish water marsh. • *Tidewater goby:* Within Cloverdale Ranch and Tunitas Creek OSPs, do not apply Fipronil within 100 feet of lagoons, estuaries and backwater marshes that are adjacent to the Pacific Ocean; and freshwater streams up-gradient of and tributary to brackish habitats. • *Salt marsh harvest mouse:* Within Stevens Creek Shoreline Nature Study Area and Ravenswood OSP, do not apply Fipronil within 300 feet of the high water line of salt or brackish water marshes. Also, do not apply Fipronil within 200 feet of a cordgrass/pickleweed stand if any part of the stand occurs within 100 feet of the high water line of a salt or brackish water marsh. ~~Application of glyphosate and cholecalciferol shall be conducted in accordance with the Goby -11 Injunction (Center for Biological Diversity v. EPA, Case No. 07-2794-JCS (N.D. Cal.), May 30, 2007) in applicable and relevant habitats for those species named in the Injunction that occur within the District. Applicable habitats for each species named in the Injunction are defined in the 2010 court order for the Center for Biological Diversity v. EPA. Because the interim protective measures (i.e., no-use buffer zones adjacent to certain features within certain geographic areas) established in the 2010 order vary depending on the species at issue and the pesticide being used, the USEPA webpage should be consulted: https://www.epa.gov/endangeredspecies/interim-use-limitations-eleven-threatened-or-endangered-species-san-francisco-bay. In addition, District internal special status species mapping resources, buffer zones established on the CNDDB webpage, and an interactive species location map (https://www.epa.gov/endangered-species/san-francisco-bay-area-map-~~			

#	BMP	Functional Groups	Responsible Party	Timing
	~~toolidentify-interim-pesticide-use-limitations) should be consulted. The interim use limitations remain in effects until USEPA completes effects determinations for four pesticides named under the 2015 revised settlement agreement for the Center for Biological Diversity v. EPA. The effects determinations are expected to be completed by 2020.~~			
16.	**San Francisco Dusky-footed Woodrat and Santa Cruz Kangaroo Rat Restrictions** ~~All District staff, volunteers or contractors who will implement treatment actions shall receive training from a qualified biologist on the identification of dusky-footed woodrat, Santa Cruz kangaroo rat, and their nests or burrows. Generally, all~~ San Francisco dusky footed woodrat and their nests, and Santa Cruz kangaroo rat and their burrows ~~will~~ shall normally be avoided and left undisturbed by proposed work activities. If a nest site or burrow will be affected, the District will consult with CDFW. Rodenticides and snap traps~~, and glue boards~~ shall not be used in buildings within 100 feet of active San Francisco dusky-footed woodrat nests or Santa Cruz kangaroo rat burrows; instead rodent control in these areas ~~will~~ shall be limited to non-lethal exclusion and relocation activities, including relocation of nests if approved by CDFW. ~~Tenants will contact the District for assistance in managing rat populations in buildings and under no circumstances will be allowed to use rodenticides.~~	District staff/ Contractor	Pesticide applicator/ District staff	Planning prior to treatment; During treatment
17.	**~~Operation of Noise-Generating~~ Equipment and Vehicle Operation Restrictions** Operation of noise-generating equipment (e.g., chainsaws, wood chippers, brush-cutters, pick-up trucks) shall abide by the time-of-day restrictions established by the applicable local jurisdiction (i.e., City and/or County) if such noise activities would be audible to sensitive receptors (e.g., residential land uses, schools, hospitals, places of worship) located in the applicable local jurisdiction. ~~If the local, applicable jurisdiction does not have a noise ordinance or policy restricting the time-of-day when noise-generating activity can occur, then the noise generating activity shall be limited to two hours after sunrise and two hours before sunset, generally Monday through Friday.~~ Additionally, if noise-generating activity ~~would take place~~ is planned to occur on a site that spans over multiple jurisdictions, then the most stringent noise restriction, as described in this BMP or in a local noise regulation, would apply. ~~For treatment site where marbled murrelet has the potential to nest, identified in the District's 2014 maps~~	District staff/ Contractor	District staff/ Contractor	During treatment

#	BMP	Functional Groups	Responsible Party	Timing
	~~(see attachment) if noise-generating activities would occur during its breeding season (March 24 to September 15), the IPM activities would be subject to the noise requirements listed in the most current in the CDFW RMA issued to the District (see attachment).~~All relevant permit requirements applicable to noise restrictions and special-status species will be adhered to (e.g., CDFW Streambed Alteration Agreement), if appropriate. All motorized equipment and vehicles shall be shut down when not in use. Idling of equipment and off-highway vehicles idling ~~will~~ shall be limited to 5 minutes.			
18.	**~~Weather~~ Parameters for Pesticide Applications** ~~Application Requirements -~~ The following general application parameters shall be employed during herbicide pesticide application: • Application shall cease when weather parameters exceed label specifications, when wind at site of application exceeds 7 miles per hour (MPH), or when precipitation (rain) occurs or is forecasted with greater than a 40 percent probability in the next 24-hour period to prevent loss of efficacy and lessen the potential for pesticides to enter surface water~~;~~. • All restrictions and limitations, including those on irrigation, cultivation, re-entry, etc., as described on the pesticide product label shall be followed for sites treated with pesticides~~;~~. • Spray nozzles shall be configured to produce a relatively large droplet size~~;~~. • Low nozzle pressures (30-70 pounds per square inch [PSI]) shall be observed~~;~~. • Spray nozzles shall be kept within 24 inches of vegetation during spraying~~;~~. • Application equipment shall be calibrated periodically per manufacturer specifications or frequently enough such that equipment is applying pesticides according to label directions~~;~~. • Drift and overspray avoidance measures shall be used to prevent drift in all locations. Particular attention shall be paid to areas where target weeds and pests are in proximity to special-status species or their habitat. Such measures can consist of, but would not be limited to, the use of plastic shields around target weeds and pests and selecting and using appropriate spray nozzles and pressures. Spray areas may also be limited by using application methods such as spot treatments and thin line treatments of one-inch wide or less.	District staff/ Contractor	Pesticide applicator	During treatment

APPENDIX C: INTEGRATED PEST MANAGEMENT PROGRAM BEST MANAGEMENT PRACTICES (2025)

#	BMP	Functional Groups	Responsible Party	Timing
	Due to the potential presence of temperature inversion layers, no spraying shall be conducted on designated "Spare the Air" days.			
19.	**Surface and Groundwater Protection** ~~Applicators shall use BMPs regarding the prevention of drift, runoff, erosion, and water quality impairment.~~ All ~~work~~ pesticide application shall be in compliance with ~~the~~ regulations (3 CCR § 6800, ~~(~~Groundwater Protection). ~~When~~ Where possible, plant cover~~s~~ ~~such as landscaping~~ shall be established on bare soil and hillsides to minimize pesticide and sediment runoff. Pesticides without an aquatic label shall not be applied ~~to~~: 1) to permeable soils, soils prone to or with evidence of erosion without containment strategies (e.g., vegetative buffers, sediment barriers); or 2) in areas where aquatic ~~habitats~~ features are located within ~~15~~ 30 feet of the application site. In no cases should pesticides be applied to surface water bodies unless in compliance with an existing permit or appropriate permits are obtained.	District staff/ Contractor	Pesticide applicator	During treatment
20.	**Pesticide Contamination Prevention** ~~**Disposal of Pesticide Containers**~~ Cleanup of all pesticide and adjuvant containers shall follow the product label and local waste disposal regulations. This generally consists of triple rinsing with clean water at an approved site and adding the rinsate to the batch tank for application. Used containers shall be punctured on the top and bottom to render them unusable, unless said container ~~are~~ is part of a manufacturer's container recycling program, in which case the manufacturer instructions shall be followed. Disposal of non-recyclable containers shall be at legal dumpsites. Cleaning of e~~E~~quipment ~~shall not be cleaned~~ and ~~personnel~~ worker clothes and boots shall occur where runoff would flow into the sanitary sewer for treatment~~not bathe in a manner that allows contaminated water to directly enter any body of water within the treatment areas or adjacent watersheds~~.	District staff/ Contractor	Pesticide applicator	During treatment
21.	**Pathogen Sanitation and Prevention of Contamination** All personnel working in infested areas shall take appropriate precautions to not carry or spread ~~weed seed or SOD-associated~~ pathogens outside of the infested area by adhering to the *Guidelines for Minimizing Phytophthora Contamination at Midpeninsula Regional Open Space District Preserves*. Such precautions will	District staff/ Contractor	District staff/ Contractor	During treatment; Post treatment

APPENDIX C: INTEGRATED PEST MANAGEMENT PROGRAM BEST MANAGEMENT PRACTICES (2025)

#	BMP	Functional Groups	Responsible Party	Timing
	consist of, as necessary based on site conditions, cleaning of soil and plant materials from tools, equipment, shoes, clothing, or vehicles prior to entering or leaving the site.			
22.	**~~Maintenance of Facilities~~ Invasive Species Spread Prevention** Clothing, footwear, and equipment, including rentals, used during treatments of soil, seeds, vegetative matter, other debris or seed-bearing material, or water (e.g., rivers, streams, creeks, lakes) shall be inspected and cleaned before entering a treatment area or when leaving an area with infestations of invasive plants, noxious weeds, known plant pathogens, or invasive wildlife. District staff shall appropriately maintain facilities where tools, equipment, and vehicles are stored to ensure the area is free from invasive plants. District staff shall ensure that ~~rental equipment and~~ project materials (especially soil, rock, erosion control material, and seed) are free of invasive plant material prior to their use at a worksite. Relevant best practices from the Invasive Species Council of California, University of California Statewide Integrated Pest Management Program, and the California Invasive Plant Council shall also be consulted and implemented, as appropriate.	District staff/ Contractor	District staff/ Contractor	Before Treatment; During treatment; Post treatment
23.	**Erosion Control and Revegetation** For sites with loose or unstable soils, steep slopes (greater than 30 percent), where a large percentage of the groundcover will be removed, or near aquatic features that could be adversely affected by an influx of sediment, approved, biodegradable erosion-control measures and non-filament-based geotextiles ~~erosion control measures~~ shall be implemented before or after treatment as appropriate. These measures could consist of the application of forest duff or mulches, straw bales, straw wattles, other erosion control material, seeding, or planting of appropriate native plant species to control erosion, restore natural areas, and prevent the spread or reestablishment of weeds. Prior to the start of the winter storm season and during storms, if appropriate, these sites shall be inspected to confirm that erosion control techniques are still effective. ~~When~~ Where possible, ~~applicators~~ field workers may select vegetation control techniques to maintain sufficient vegetative cover to mitigate erosion.	District staff/ Contractor	District staff/ Contractor	Prior to treatment; Post treatment

#	BMP	Functional Groups	Responsible Party	Timing
24.	**On-site Disposal** Invasive plant material shall be rendered nonviable ~~when being~~ if retained on site. District s~~S~~taff shall desiccate or decompose plant material until it is nonviable (partially decomposed, very slimy, or brittle). Depending on the type of plant, disposed plant material can be left out in the open as long as roots are not in contact with moist soil, or can be covered with a tarp to prevent material from blowing or washing away. Suitable on-site disposal areas shall be identified and approved by the District's Natural Resources Department to prevent the spread of weed seeds. District staff shall monitor all sites where invasive plant material is disposed on-site and treat any newly emerged invasive plants.	District staff/ Contractor	District staff	Post treatment
25.	**Off-site Disposal** When transporting invasive plant material off-site for disposal, the plant material shall be contained in enclosed bins, heavy-duty bags, or a securely covered truck bed. All vehicles used to transport invasive plant material for disposal shall be cleaned after each use.	District staff/ Contractor	District staff/ Contractor	Post treatment
26.	**Post-Treatment Monitoring** District staff shall normally monitor ~~IPM activities~~ treatment sites within ~~two~~ 2 months after herbicide treatment ~~(except for routine minor maintenance activities, which can be evaluated immediately after treatment)~~ to determine if the target pest or weeds were effectively controlled with minimum ~~effect~~ impact to the environment and non-target organisms. Future treatment methods in the same season or future years shall be designed to respond to changes in site conditions.	District staff/ Contractor	District Staff	Post treatment

ATTACHMENT 2

Midpeninsula Regional Open Space District

Integrated Pest Management Program Change Analysis Report

March 2026

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ENVIRONMENTAL, INC.

ATTACHMENT 2

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Midpeninsula Regional Open Space District
Integrated Pest Management Program Change Analysis Report

March 2026

Prepared for:
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Acronyms

2025 IPMP	10-year Program Update
BAAD	Bay Area Air District
BAAQMD	Bay Area Air Quality Management District
BMP	best management practices
IPMP	Integrated Pest Management Program
GIS	geographic information systems
Midpen or District	Midpeninsula Regional Open Space District
fl	Fluid
OSMRP	Midpen Open Space Maintenance and Restoration Program
oz	Ounce
gal	Gallon
WFRP	Wildland Fire Resiliency Program

1 Introduction

1.1 Purpose of this Document

The Change Analysis Report has been developed to provide a summary of the changes in the Integrated Pest Management Program's ("IPMP" or "Program") 10-year Program Update (also referred to as the "2025 IPMP" and "updated 2025 program"). The updated 2025 program incorporates new pesticide formulations, acreage changes to Midpeninsula Regional Open Space District ("Midpen" or "District") lands, updates information on special-status species and pesticide use, provides changes to and incorporates new treatment actions, includes minor changes to address the current regulatory and physical environmental conditions, and incorporates adaptive management recommendations and improvements from lessons learned over the last decade of implementation. Midpen also proposes to expand the treatment actions within four of the original pest management categories and proposes to remove the fuels management category that was originally included in the 2014 Program, as this work is now separately covered through the Wildland Fire Resiliency Program.

1.2 Summary of Program Modifications

The Guidance Manual 10-year update will identify and detail specific pest management actions for each management category that are accomplished through implementation of specific treatment types and methods. Table 1-5 and Table 1-9 include an overview of these treatment types and methods, which mirror the 2014 IPMP, and detail which information is changing under the 10-year Program update as compared to the 2014 IPMP. Additionally, a description of the typical treatment actions and methods, including specifics regarding treatment action options for each management category, are provided in the subsections that follow.

This section provides an overview of what Program changes are proposed as part of the 10-year update, briefly touched on above, including acreage changes to District lands, additional District facilities, changes and additions to treatment actions and methods, inclusion of the maximum annual allowable pesticide application for each pesticide, and overall changes to allowable pesticides included under the Program, including new herbicides, pesticides for structural pests, disinfectants, and repellents (Table 1-1). As part of the 10-year Program update, the IPM for fuel management category is now addressed through the implementation of Midpen's Wildland Fire Resiliency Program (WFRP); therefore, the 10-year Program update does not include the dedicated fuel management category. Disinfectants have previously been utilized by Midpen since the implementation of the IPMP in 2014 but are being formally included in the 2025 update.

Table 1-1 Overview of 2025 IPMP Updates

Topic	Subtopic	Approved 2014/2019 IPMP	Proposed 2025 Program Updates
Program Area		• District managed lands cover approximately 61,185 acres.	District managed lands increased to cover approximately 72,099 acres. For the purposes of the analysis, the Program Area assessed, is assumed to represent an estimated 20 percent increase in acreage.
Pesticide Types	Chemical	The Approved Pesticide list includes: • Eight (8) herbicides, one (1) fungicide, one (1) rodenticide, ten (10) insecticides, and four (4) surfactants/adjuvants.	Expanded Approved Pesticide list to include: • Three (3) new herbicides including Triclopyr, Imazamox, and Glufosinate and five (5) new insecticides including Chlorantraniliprole, Dinotefuran, Sulfuryl fluoride/ chloropicrin, d-Limonene, and Disodium Octaborate Tetrahydrate. • Six (6) disinfectants including Sodium dichloroisocyanurate dihydrate, Sodium chloride, ethanol or isopropyl alcohol, Dodecyl dimethyl ammonium chloride, Hydrogen peroxide, and Sodium hypochlorite. • Two (2) repellents including DEET and Picaridin.
Pest Control Methods and Treatment Actions	Manual	Sticky and glue traps for rodents were included as an application method under the IPM management category Buildings.	Sticky and glue traps for rodents are removed as an approved method of application.
	Mechanical	Discing was included as an application method under the IPM management categories of Fuel Management and Rangeland and Agricultural Properties.	Discing is removed as an application method under the IPM management category of Rangeland and Agricultural Properties. Discing is included in the WFRP, which replaced the IPM Fuel Management category.
	Chemical	Disinfectants have been used by Midpen since the implementation of the IPMP in accordance with the IPMP BMPs and Midpen pathogen protocols but were not formally included.	Disinfectant and repellant pest control methods are included in relevant management categories.

CHANGE ANALYSIS REPORT

Topic	Subtopic	Approved 2014/2019 IPMP	Proposed 2025 Program Updates
	Chemical	--	• Pest control actions associated with the new pesticides are included in relevant management categories. • Tenting is proposed as a chemical application method for Sulfuryl fluoride/chloropicrin and described in the treatment actions.
Annual Application		Annual application quantities were set by the acreage of District managed lands and total properties, as well as pesticide use labels.	• Annual application quantities are adjusted and generally increased across all pesticide types based on the increase in District managed lands and properties, updates to pesticide use, and Midpen processes. • For the purposes of the CEQA analysis, annual treatment acres for manual and mechanical methods are assumed to increase 20 percent, commensurate with the increase in land acreage and to account for foreseeable expansion of District-owned and managed lands and associated IPM activities.
Management Categories	IPM in Buildings	District properties included 103 buildings. Seven (7) pest categories included.	District properties increased to approximately 330 buildings. New pest categories: • Stinging Insects (Nests) • Structural Pests (Subterranean termites, drywood termites, wood beetle, fungus/dry rot) • Feral Pets
	IPM in Recreational Facilities	• Social Wasps included as a pest category. • Recreational facilities and associated infrastructure within District preserves included approximately 479 miles of access roads and trails. • The number of parking lots and gates and stiles within District preserves was 13 parking lots and 213 gates and stiles.	• Revision of the pest category Social Wasps to Stinging Insects. • Recreational facilities and associated infrastructure within District preserves are expanded to include approximately 518 miles of access roads and trails. • Updates to number of parking lots, gates, and stiles to approximately 50 parking lots and between 200-300 gates and stiles.
	IPM in Fuel Management	Fuel management category included in IPM management categories.	Removal of the fuel management category as it is covered now under the WFRP.

CHANGE ANALYSIS REPORT

Topic	Subtopic	Approved 2014/2019 IPMP	Proposed 2025 Program Updates
	IPM in Rangelands and Agricultural Properties	Properties managed under the Districts Conservation Grazing Program were approximately 10,832 acres. Three (3) pest categories included. Discing was included as an approved tool under the physical control (manual control treatment) category, mow/cut.	Properties managed under the Districts Conservation Grazing Program has increased to approximately 15,480 acres. Pest categories are expanded to include: • Forest pathogens • Aquatic invasive animals and pathogens Discing is removed as an approved tool under the physical control (manual control treatment) "Mow/Cut" category and is instead covered now under the WFRP.
	IPM in Natural Lands	Seven (7) pest categories included.	Pest categories are expanded to include: • Aquatic invasive animals and pathogens • Skunks, opossums, and raccoons The SOD pest category is revised to Forest Pathogens. Exclusionary fencing for bullfrogs is removed as a pest control action due to inadvertent impacts to native species.
IPMP Best Management Practices (BMP)		IPMP BMPs were incorporated into IPM proposals and projects for the purpose of protecting human health and preventing environmental effects. The IPMP BMPs included: • Specific training and qualification requirements. • Special-status species, habitat, and environmental protection requirements. • Inspections, site monitoring, and surveys requirements. • Requirements for site access controls and restrictions and notifications. • Sanitation and prevention of contamination requirements. • Erosion and site stabilization measures.	See Appendix C for the IPMP list of BMPs and detailed 2025 Program updates. Updates to the IPMP BMPs include: • General revisions to clarify existing language; better reflect District processes, regulatory requirements, US EPA findings; and improve consistency with the District's Open Space Maintenance and Restoration Program (OSMRP). • Training and qualification requirements revised (2025 BMPs #4, 5, 13, 16, 20). • Special-status species, habitat, and environmental protections requirements revised (2025 BMPs #6, 14, 15, and 17). • Inspections, site monitoring, and surveys requirements updated (2025 BMPs #11, 22, and 24).

CHANGE ANALYSIS REPORT

Topic	Subtopic	Approved 2014/2019 IPMP	Proposed 2025 Program Updates
			• Requirements for access controls, site restrictions, and notifications revised (2025 BMPs #8, 9, and 13). • Sanitation and prevention of contamination requirements updated to specify forest pathogens (2025 BMP #21). • Updated erosion and site stabilization measures to specify use of approved, biodegradable erosion control measures and non-filament-based geotextiles (2025 BMP #23).

1.2.1 Coverage Area Update

As of 2025, Midpen lands cover approximately 72,099 acres, which is a net gain of approximately 10,913 acres from implementation of the original 2014 Program. Table 1-2 details acreage changes for District managed lands during years of Program updates. Midpen lands depicted on Figure 1-1 represent the conditions at the time of preparation of this document.

Table 1-2 District Managed Lands by Year of Program Update (Approximate Acres)

Preserve/Study Area	2014	2019	2025
Bear Creek Redwoods	1,386.9	1,386.9	1,386.9
Cloverdale Ranch	--	--	6,207.3
Coal Creek	494.7	494.7	494.7
El Corte de Madera Creek	2,776.9	2,778.6	2,778.6
El Sereno	1,421.9	1,434.3	1,653.1
Felton Station	44.4	44.4	44.4
Foothills	225.3	225.3	225.3
Fremont Older	735	735	735
La Honda Creek	5,678.2	6,220.2	6,369.4
Long Ridge	1,997.9	2,188.5	2,188.5
Los Trancos	272.4	272.4	272.4
Miramontes Ridge	1,620.7	1,620.7	2,265.4
Monte Bello	3,438.6	3,591.8	3,591.8
Picchetti Ranch	293.4	293.4	293.4
Pulgas Ridge	369.8	369.8	370.4
Purisima Creek Redwoods	4,622.9	4,943.1	5,339.6
Rancho San Antonio	3,887.7	3,943	3,944.6
Ravenswood	383	384.2	384.2
Russian Ridge	3,123.6	3,477.8	3,755.9
Saratoga Gap	1,643.7	1,648.9	1,648.9
Sierra Azul	18,631	19,085.2	19,449.8
Skyline Ridge	2,115.3	2,115.3	2,115.3
St Joseph's Hill	284.4	284.4	284.4
Steven's Creek Shoreline Nature Study Area	55.5	55.5	55.5
Teague Hill	620.5	620.5	621.6
Thornewood	172.5	172.5	172.5
Tunitas Creek	1,622.4	1,622.4	2,175

Preserve/Study Area	2014	2019	2025
Windy Hill	1,400.1	1,400.1	1,400.1
Other Managed Lands (11 areas managed as part of an easement)	1,867.3	1,874.6	1,874.6
Total	**61,185.8**	**63,283.4**	**72,098.8**

Notes:

Increases in acres since the 2014 Environmental Impact Report (EIR) and 2019 Addendum are identified by underline and highlighted in gray.

1.2.2 Treatment Actions and Methods

The below sections only include information that is new or revised as part of the 10-year Program update.

Manual Treatment

The sticky trap application method was removed from the treatment method category, Traps.

Mechanical Treatment

Discing was removed as a type of mechanical treatment, which is now included in the WFRP.

Chemical Treatment

The following definitions for disinfectants and repellents are proposed for incorporation into the Program as part of the 2025 update:

- *Disinfectants*, such as quaternary ammonium solutions, are used to decontaminate all equipment, including but not limited to, wading, dive, and sampling equipment (e.g., water quality probes, nets, buckets, substrate samples, etc.); fishing gear; and watercraft. Disinfectants are considered pesticides because they are intended to kill pests, specifically microorganisms including pathogens (US EPA 2020).
- *Repellents* are not substances used to eliminate pests, rather, they are designed to dissuade pests. Repellents are considered pesticides as the definition of a pesticide includes any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any pest. For example, in the case of skin-applied repellents, the product makes people less attractive to pests (US EPA 2024).

1.2.3 Pesticide Use and Annual Application

Additional pesticides proposed as part of the 10-year Program update are identified in Table 1-3 and identifies the active ingredients, product formulations, mode of action, and purpose of the pesticides under the 2025 Program. Application of pesticides is only done under a written Pest Control Recommendation by a state licensed Pest Control Advisor at rates not to exceed label requirements. One additional method of chemical application, tenting, is proposed under the 10-year Program update. Tenting is specific to structural pest management and is relevant to the IPM in the buildings management category.

Figure 1-1 Program Location and District Managed Lands

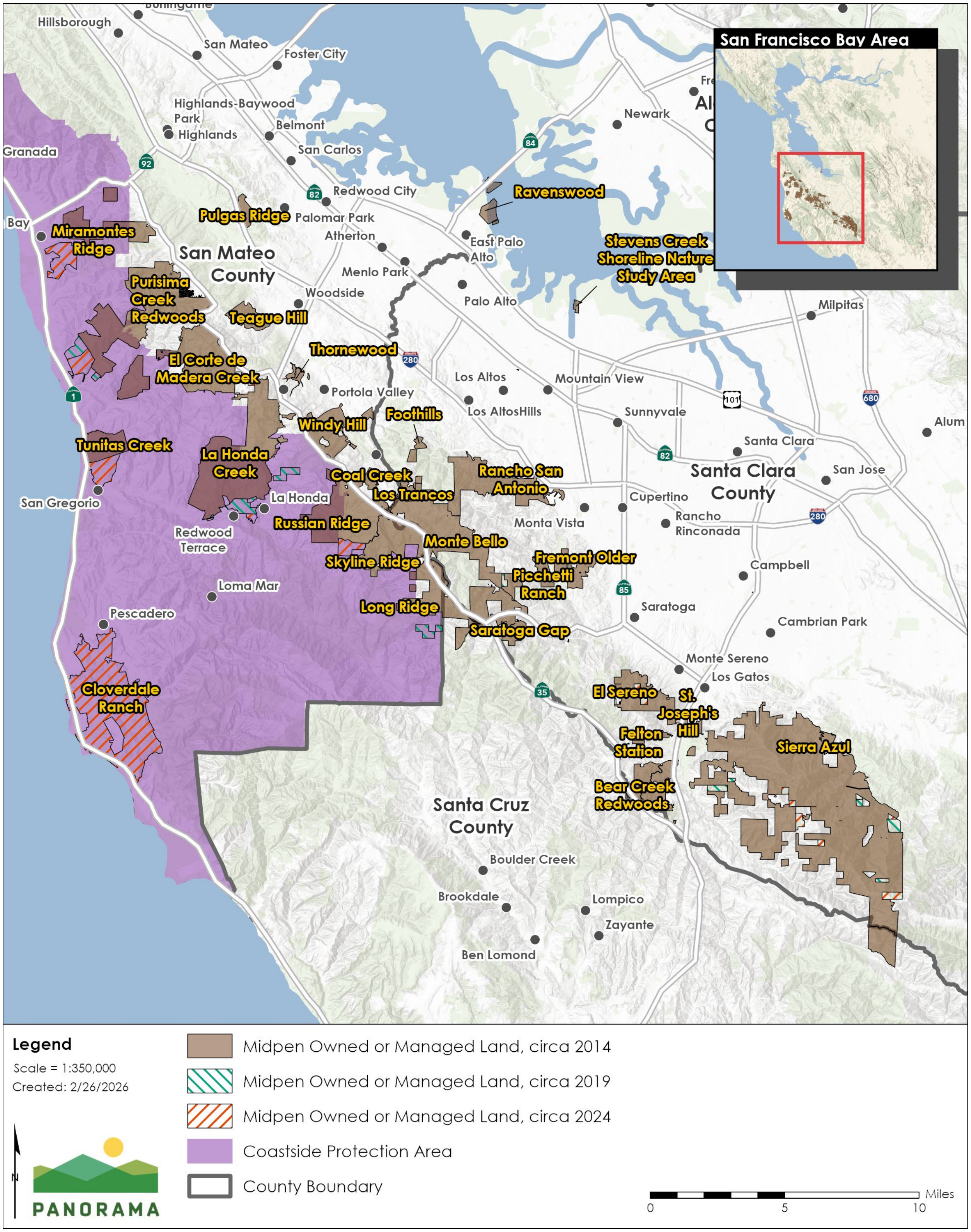

Table 1-3 Pesticides and Maximum Annual Application

IPM Management Category	Active Ingredient/ Formulation	Product Name	Manufacturer	Method of Application	Purpose	Annual Application[a,b]	Timing of work	Frequency of Work
Buildings	Insecticidal soap	Equivalent labeled products containing this active ingredient	Various	Spray	Structural pests	Approximately 330 ~~103~~ buildings	Spring/ summer/ fall	--
	Diatomaceous earth	Diatomaceous Earth	Diatomaceous Earth	Crack & crevice	Structural pests	Approximately 330 ~~103~~ buildings	Spring/ summer/ fall	--
	Boric acid	Equivalent labeled products containing this active ingredient	Various	Crack & crevice	Structural pests	Approximately 330 ~~103~~ buildings	Spring/ summer/ fall	--
	S-Hydroprene	Gentrol Point Source®	Wellmark International	Impregnated disc	Structural pests	15 fl oz over 8 applications over ~~103~~ approximately 330 buildings	Spring/ summer/ fall	--
	Indoxacarb (0.1%)	Advion® Gel Baits	DuPont	Crack & crevice	Structural pests	7 fl oz over 20 applications over ~~103~~ approximately 330 buildings	Spring/ summer/ fall	--
	Indoxacarb (0.5%)	Advion® Gel Baits	DuPont	Crack & crevice	Structural pests	51 fl oz over 23 applications over ~~103~~ approximately 330 buildings	Spring/ summer/ fall	--

CHANGE ANALYSIS REPORT

IPM Management Category	Active Ingredient/ Formulation	Product Name	Manufacturer	Method of Application	Purpose	Annual Application[a,b]	Timing of work	Frequency of Work
	Sodium tetraborate decahydrate	Prescription Treatment Baits, Terro® Ant Killer II	BASF, Terro	Bait station	Structural pests	11 fl oz over 17 applications over ~~103~~ approximately 330 buildings	Spring/ summer/ fall	--
	Fipronil	Maxforce® Bait Stations	Bayer	Bait station	Structural pests	16 fl oz over 7 applications over ~~103~~ approximately 330 buildings	Spring/ summer/ fall	--
	Fipronil	Product as specified in current Pest Control Recommendations	Various	Spot treatment	Termites	5 gallons over 1-5 residences	--	1x per year
	Cholecalciferol	Cholecalciferol baits	Cholecalciferol baits	Bait station	Vertebrate pests	50 oz over ~~103~~ approximately 330 buildings	Spring/ summer/ fall	--
	Prallethrin	PT Wasp-Freeze II	BASF	Spray	Stinging insects	70 oz (4 cans of spray)	Spring/ summer/ fall	--
	Chlorantraniliprole	Product as specified in current Pest Control Recommendations	Various	Perimeter	Structural pests, termites	8.5 gallons over 1-5 residences	--	1x per year
	Dinotefuran	Product as specified in current Pest Control Recommendations	Various	Perimeter	Structural pests, termites	14 ounces over 1-5 residences	--	1x per year

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IPM Management Category	Active Ingredient/ Formulation	Product Name	Manufacturer	Method of Application	Purpose	Annual Application[a,b]	Timing of work	Frequency of Work
	Sulfuryl flouride/ chloropicrin	Product as specified in current Pest Control Recommendations	Various	Tenting	Structural pests, termites	240 ounces over 1-5 residences	--	1x per year
	d-Limonene	Product as specified in current Pest Control Recommendations	Various	Spot treatment	Structural pests, termite	2 gallons over 1-5 residences	--	1x per year
	Disodium Octaborate Tetrahydrate	Product as specified in current Pest Control Recommendations	Various	Spot treatment, prevention	Structural pests, fungus & dry rot, termite	5 gallons over 1-5 residences	--	1x per year
Recreational	Prallethrin	PT Wasp-Freeze II	BASF	Spray	Stinging insects	350 oz (20 cans of spray)	Spring/ summer/ fall	--
	Bacillus thuringiensis var. israelensis	Equivalent labeled products containing this active ingredient	Various	Manual	Mosquitos	250 discs	May through Septemb er	1 disk per 30 days
	Glyphosate isopropylamine (IPA)	Roundup ProMax	Monsanto	Cut-stump, spot spray, wick, frill/injection	Dam faces, parking lots, gates & stiles, facilities	3.4 gal ~~over 40 acres~~	Spring/ summer/ fall	1x per year

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IPM Management Category	Active Ingredient/ Formulation	Product Name	Manufacturer	Method of Application	Purpose	Annual Application[a,b]	Timing of work	Frequency of Work
	Glyphosate potassium (K)	Roundup Custom	Monsanto	Cut-stump, spot spray, wick, frill/injection	Roads, trails, parking lots, gates & stiles, facilities	1.1 gal ~~over 54.6 acres~~	Spring/ summer/ fall	1x per year
	Clopyralid monoethanolamine (MEA)	Transline	Dow AgroSciences	Spot spray, cut-stump, frill/injection	Parking lots, gates & stiles, facilities	0.4 ~~0.3~~ gal ~~over 22.9 acres~~	May through August	1x per year
	Imazapyr IPA	Polaris/Stalker	Nufarm/ BASF	Cut-stump, spot spray, frill/injection	Roads, trails, parking lots, gates & stiles, facilities	0.5 gal ~~over 54.6 acre~~	Spring/ summer/ fall	--
	Triclopyr	Vastlan	Corteva Agriscience	Spot spray, basal bark	Invasive plant control in aquatic and riparian weeds.	0.6 gal	Spring/ summer/ fall	1x per year
~~Fuel Management~~	~~Glyphosate K~~	~~Roundup Custom~~	~~Monsanto~~	~~Cut-stump, spot spray, wick, frill/injection~~	~~Defensible space, disc lines, fuel break~~	~~3.6 gal over 14 acres~~	~~April through June~~	~~1x per year~~
	~~Triclopyr BEE~~	~~Garlon 4 Ultra~~	~~Dow AgroSciences~~	~~Spot spray, cut-stump, basal bark~~	~~Defensible space, disc lines, fuel break~~	~~3.6 gal over 14 acres~~	~~Summer/fall~~	~~1x per year~~

CHANGE ANALYSIS REPORT

IPM Management Category	Active Ingredient/ Formulation	Product Name	Manufacturer	Method of Application	Purpose	Annual Application[a,b]	Timing of work	Frequency of Work
Rangelands and Agricultural Policies	Aminopyralid triisopropanolamine (TIPA)	Milestone	Dow AgroSciences	Spot spray, cut-stump, basal bark, wick, frill/injection	Rangeland weeds, invasive plant control; brush control	2.4 ~~2.1~~ gal ~~over 174 acres~~	--	1x per year
	Clopyralid MEA	Transline	Dow AgroSciences	Spot spray, cut-stump, frill/injection	Rangeland weeds, invasive plant control	1.8 ~~1.6~~ gal ~~over 174 acres~~	Spring/ summer	1x per year
	Glyphosate IPA	Roundup ProMax	Monsanto	Spot spray, cut-stump, wick, frill/injection	Rangeland weeds, brush control, agricultural weeds, invasive plant control	1.1 ~~1~~ gal ~~over 100 acres~~	Spring/ summer	1x per year
	Glyphosate K	Roundup Custom	Monsanto	Spot spray, cut-stump, wick, frill/injection	Rangeland weeds, brush control, agricultural weeds, invasive plant control	66.7 ~~57.6~~ gal ~~over 154 acres~~	Spring/ summer	1x per year

IPM Management Category	Active Ingredient/ Formulation	Product Name	Manufacturer	Method of Application	Purpose	Annual Application[a,b]	Timing of work	Frequency of Work
	Triclopyr butoxyethyl ester (BEE)	Garlon 4 Ultra	Dow AgroSciences	Spot spray, cut-stump, basal bark	Rangeland weeds, brush control, agricultural weeds, invasive plant control	3.4 ~~6.6~~ gal ~~over 154 acres~~	Spring/ summer/ fall	1x per year
	Triclopyr TEA/ Aminopyralid TIPA	Milestone	Dow AgroSciences	Spot spray, cut-stump, frill/injection	Rangeland weeds, invasive plant control; brush control	22.8 ~~20~~ gal ~~over 154 acres~~	--	1x per year
	Clethodim	Envoy Plus	Valent	Spot spray	Invasive plant control	2.8 gal	Winter/ spring/ summer	1x per year
	Triclopyr	Vastlan	Corteva Agriscience	Spot spray, basal bark	Invasive plant control in aquatic and riparian weeds.	4 gal	Spring/ summer /fall	1x per year

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IPM Management Category	Active Ingredient/ Formulation	Product Name	Manufacturer	Method of Application	Purpose	Annual Application[a,b]	Timing of work	Frequency of Work
	Imazamox	ClearCast	SePro	Spot spray aquatic/ riparian	Invasive plant control. Riparian and terrestrial weed control.	0.5 gal	Spring/ summer/ fall	1x per year
	Glufosinate	Lifeline/Cheetah Pro	Nufarm	Spot spray	Invasive plant control. Early season annual plant control.	3.2 gal	Spring	2x per year
Natural Lands	Glyphosate IPA	Roundup ProMax	Monsanto	Spot spray, cut-stump, wick, frill/injection	Invasive plant control; brush control	1.1 ~~1~~ gal ~~over 100 acres~~	Spring/ summer	1x per year
	Glyphosate K	Roundup Custom	Monsanto	Spot spray, cut-stump, wick, frill/injection	Invasive plant control, sudden oak death; brush control	81.5 ~~71.5~~ gal ~~over 955 acres~~	Spring/ summer	1x per year

CHANGE ANALYSIS REPORT

IPM Management Category	Active Ingredient/ Formulation	Product Name	Manufacturer	Method of Application	Purpose	Annual Application[a,b]	Timing of work	Frequency of Work
	Clethodim	Envoy Plus	Valent	Spot spray	Invasive plant control	2 ~~1.8~~ gal ~~over 243 acres~~	Spring/ summer	1x per year
	Aminopyralid TIPA	Milestone	Dow AgroSciences	Spot spray, cut-stump, basal bark, wick, frill/injection	Invasive plant control; brush control	2.3 ~~2~~ gal ~~over 174 acres~~	--	1x per year
	Clopyralid MEA	Transline	Dow AgroSciences	Spot spray, cut-stump, frill/injection	Invasive plant control	1.9 ~~1.7~~ gal ~~over 164 acres~~	Spring/ summer	1x per year
	Imazapyr IPA	Polaris/Stalker	Nufarm/ BASF	Spot spray, cut-stump, frill/injection	Invasive plant control, sudden oak death; brush control	0.40 ~~0.35~~ gal ~~over 8 acres~~	Spring/ summer	1x per year
	Phosphite K (Salts, mono-/di-)	Agri-Fos	AgBio	Spray, inject	Sudden oak death	45 gallons concentrate ~~over 30 acres~~	April/ May or October/ November	1x per year
	Triclopyr BEE	Garlon 4 Ultra	Dow AgroSciences	Spot spray, cut-stump, basal bark	Invasive plant control; brush control	22.8 ~~20~~ gal ~~over 1,000 acres~~	Spring/ summer/ fall	1x per year

IPM Management Category	Active Ingredient/ Formulation	Product Name	Manufacturer	Method of Application	Purpose	Annual Application[a,b]	Timing of work	Frequency of Work
	Triclopyr TEA/ Aminopyralid TIPA	Capstone/ Milestone	Dow AgroSciences	Spot spray, cut-stump, frill/injection	Invasive plant control; brush control	20 ~~17.5~~ gal ~~over 164 acres~~	--	1x per year
	Triclopyr	Vastlan	Corteva Agriscience	Spot spray, basal bark	Invasive plant control; brush control	20 gal	Spring/ summer/ fall	1x per year
	Imazamox	ClearCast	SePro	Spot spray aquatic/riparian	Invasive plant control	2 gal	Spring/ summer/ fall	1x per year
	Glufosinate	Lifeline/Cheetah Pro	Nufarm	Spot spray	Invasive plant control. Early season annual plant control.	3.2 gal	Spring	2x per year
Surfactants/ Adjuvants	Canola Oil, Ethyl and Methyl Esters	Competitor	Wilbur-Ellis	Spot spray	Increase delivery and efficacy of pesticides to targets	--	--	--

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IPM Management Category	Active Ingredient/ Formulation	Product Name	Manufacturer	Method of Application	Purpose	Annual Application[a,b]	Timing of work	Frequency of Work
	Lecithin	Liberate	Loveland Products, Inc.	Spot spray	Increase delivery and efficacy of pesticides to targets	--	--	--
	Alcohol ethoxylates	Liberate	Loveland Products, Inc.	Spot spray	Increase delivery and efficacy of pesticides to targets	--	--	--
	Alkylphenol ethoxylate (APE)	Pentra-Bark	Quest	Spot spray	Increase delivery of Agri-Fos to trees	--	--	--
General Chemical Disinfectants	Sodium dichloroisocyan-urate dihydrate	Equivalent labeled products containing this active ingredient	Various	Spot spray/water additive	Disinfect equipment, water bodies and surfaces	5 kg	--	--
	Sodium chloride	Liquid Bleach	Clorox	Spot spray	Minimize or eradicate presence of microorganisms	16 gal	--	--
	Sodium hypochlorite	Equivalent labeled products containing this active ingredient	Various	Spot spray	Disinfect equipment	16 gal	--	--

CHANGE ANALYSIS REPORT

IPM Management Category	Active Ingredient/ Formulation	Product Name	Manufacturer	Method of Application	Purpose	Annual Application[a,b]	Timing of work	Frequency of Work
	Ethanol or isopropyl alcohol	Equivalent labeled products containing this active ingredient	Various	Spot spray	Disinfect equipment	100 gal	--	--
	Dodecyl dimethyl ammonium chloride	Equivalent labeled products containing this active ingredient	Various	Spot spray	Disinfect equipment	5 gal	--	--
	Hydrogen peroxide	Equivalent labeled products containing this active ingredient	Various	Spot spray	Disinfect equipment	4 gal concentrate	--	--
Chemical Repellant	N,N-diethyl-meta-toluamide (DEET)	Equivalent labeled products containing this active ingredient	Various	Spot spray	Impairs insect's ability to detect target(s)	200 cans (6 oz)	--	--
	Picaridin	Equivalent labeled products containing this active ingredient	Various	Spot spray	Makes insects less likely to bite	200 cans (5 oz)	--	--

Notes:

a This table is a combination of information presented in the 2014 EIR and 2019 Addendum. New or changed information proposed as part of the 2025 IPMP 10-year update are shown in underline or strikeout and highlighted in gray. For the purposes of this addendum, the acres of manual and mechanical treatment are assumed to increase approximately 20 percent in accordance with the Program area increase to account for foreseeable expansion of District-owned and managed lands and associated IPM activities.

b All applications are done under a written Pest Control Recommendation by a state licensed Pest Control Advisor according to product label instructions and may include methods not listed here.

[c] Herbicide quantities are expressed as volume of concentrate, i.e. volume of undiluted product. As the District continues to expand District managed lands, the overall scale of pesticide use under the IPMP must also increase as part of the 10-year update to meet the growing treatment and coverage needs, therefore acreage estimates are excluded and only application values (e.g., ounces, gallons) are presented. Application would occur in accordance with the 2025 Program and IPMP BMPs.

[d] No value indicates treatment method may be applied anytime during the year.

[e] No value indicates treatment method may be applied multiple times throughout the year as needed.

[f] The general category is included to indicate that disinfectants and chemical repellents are used under all management categories. Refer to Section 1.5.5 for a description of how disinfectants and repellents will be utilized under the 2025 Program. Additionally, information regarding disinfectants and repellents as incorporated into the specific management categories is included throughout Section 1.5.4.

fl= Fluid

oz= Ounce

gal= Gallon

Sources: (Yun Cang, n.d.; Midpen 2018)

1.2.4 Management Categories and Treatment Actions

The District's management categories and associated treatment types and methods are provided in Table 1-4. Changes in the allowable application of each pesticide are included in Table 1-3. New or revised portions of the 2025 Program, such as the addition of new pesticides, changes to pesticide quantities, and new or revised methods of application included as part of the 10-year update are included in underline or ~~strikeout~~ and highlighted in gray Table 1-4.

The IPM for the Fuel Management category is now addressed through Midpen's WFRP; therefore, the 10-year Program update does not include a dedicated fuel management category. The subsections that follow provide simplified information of what was included in the 2014 Program for each management category and remains part of the 2025 Program, as well as a summary of what aspects are new or changed.

IPM in Buildings

As of the writing of this 2025 IPM Update, District properties include approximately 330 buildings and structures. Table 1-4 summarizes the proposed changes for the building management category, which include additional treatment actions for structural pests that live within the soil and wood components of structures and feral pets.

Table 1-4 Updates to the Building Management Category and Treatment Actions

Pest Category	2025 Updates
Structural pests, stray wildlife, pets	• Removed the sticky trap method from the treatment method category, Traps. • Added disclosure that lethal removal may be required as a control method.
Stinging Insects (Nests)	• Added the pest category, Stinging Insects (Nests). • Added use of Pyrethrin Aerosol Sprays.
Structural Pests (Subterranean termites, drywood termites, wood beetle, fungus/dry rot)	• Added the pest category, Structural Pests (Subterranean termites, drywood termites, wood beetle, fungus/dry rot). • Added additional physical controls (manual control treatments) and chemical controls to treatment actions. • New physical controls include treating the perimeter of the home and additional entry points, removing or destroying accessible subterranean termite tubes/tunnels, sealing drill holes and backfilling trenches, removing plants (as feasible) and debris from foundation prior to tenting, patching injection holes, and covering/removing accessible termite evidence. • New chemical controls include spot treatment for subterranean termite, drywood termite, and wood beetle; full perimeter chemical treatment for subterranean termite; tenting for drywood termites and wood beetle; prevention for drywood termite and wood beetle; and fungus/dry rot treatment.
House and Deer Mice	• Removed glue boards/sticky board use
Roof, Norway, and woodrats	• Removed glue boards/sticky board use
Skunks, opossums, raccoons, and bats	• Added smoke pens use in verified absence of bats.

Pest Category	2025 Updates
Feral pets	• Added the pest category, Feral Pets. Feral pets is also included in the Natural Lands management category. • Added additional physical controls (manual control treatments) to treatment actions for catching pets.

IPM in Recreational Facilities

Table 1-5 summarizes new or revised information as part of the 10-year Program update for the treatment actions for plants, insect, and wildlife pests covered under the IPM in recreational facilities management category.

Table 1-5 Updates to the Recreational Facilities Management Category and Treatment Actions

Pest Category	2025 Updates
Stinging Insects	• Updated the pest category, Social Wasps to Stinging Insects.
Mosquitos	• Added use of repellants for district staff
Ticks	• Added use of repellants for district staff
Vegetation	• Updates made to physical controls (manual control treatments) and chemical controls treatment actions. • Recreational facilities and associated infrastructure within District preserves have expanded to include approximately 518 miles of access roads and trails, an increase from 479 miles. • Updates to number of parking lots, gates, and stiles. There are approximately 50 parking lots and between 200-300 gates and stiles. • Added additional chemical control active ingredient options including the approved glyphosate, approved imazapyr, and the proposed triclopyr. • Removed the chemical control active ingredient, glufosinate, from the recreational facilities IPM category. • Adding boardwalk provisions.

IPM in Fuel Management

Since publication of the 2014 IPMP and 2019 Addendum, Midpen adopted the WFRP (2023), which focuses on preventing, preparing for, and responding to wildfires, including addressing flammable vegetation near facilities, as a key part of the District's land stewardship. The 2014 IPMP included a fuel management category, which addressed staff selection of options for required and ongoing maintenance of fuel management activities in relation to IPM; however, after approval of Midpen's WFRP, the dedicated fuel management category is no longer needed as part of the Midpen IPMP (since it is incorporated into the WFRP) and as a result, it is not proposed under the 2025 IPMP.

IPM in Rangelands and Agricultural Properties

Properties managed under the District's Conservation Grazing Program have changed since implementation of the 2014 Program, as outlined in Table 1-6 (new or revised information as part of the 10-year Program update is shown in underline and ~~strikeout~~). These changes include the renaming of ranches at La Honda Open Space Preserve to reflect the geographic area rather than past landowners. In addition, some grazing properties were regrouped into larger grazing units to reflect operational realities (e.g. access through a site is through another site, shared infrastructure). Certain grazing units show a slight reduction in acres between 2014 and 2025 due to a few reasons, which are noted in the table. Additionally, Table 1-7 summarizes updates to forest pathogens and aquatic invasive species and pathogens covered under the IPM in rangelands and agricultural properties management category.

Table 1-6 District Properties Currently Managed Under the District's Conservation Grazing Program

Property[b]	Preserve	Years First Grazed Under District Management	Acres as of 2014	Acres as of 2025
Apple Orchard Grazing Unit	La Honda	2013	N/A	298
Big Dipper-Mindego Grazing Unit	Russian Ridge OSP/Skyline Ridge OSP	2007-2015	Big Dipper: 955 Mindego Hill: 1,047	2,027
Bluebrush Canyon[c]	Purisima Creek Redwoods OSP	2009	302	273
Lobitos Grazing Unit (now includes the Elkus Ranch Uplands)	Purisima Creek Redwoods OSP	2009-2010	Lobitos: 389 Elkus Ranch Uplands: 450	1,210
October Farm Grazing Unit	Purisima Creek Redwoods OSP	2012	270	280
Gordon Ridge Grazing Unit	Tunitas Creek OSP	2020	NA	545
Toto Ranch Grazing Unit[d]	Tunitas Creek OSP	2012	952	903
Tunitas Creek Grazing Unit	Tunitas Creek OSP	2008	707	703
Harrington Grazing Unit (formerly known as Driscoll Ranch)	La Honda Creek OSP	2006	3,700	3,595
Lone Madrone Grazing Unit (formerly known as McDonald Ranch)	La Honda Creek OSP	2014	2,060	1,076
Butano Farms Grazing Unit	Cloverdale Ranch OSP	2023[a]	NA	783

Property[b]	Preserve	Years First Grazed Under District Management	Acres as of 2014	Acres as of 2025
Cloverdale Ranch Grazing Unit	Cloverdale Ranch OSP	2023-2024	NA	3,375
Johnston Ranch Grazing Unit	Miramontes Ridge OSP	2021[a]	NA	412
Total			**10,832**	**15,480**

Notes:

NA – Not applicable.

[a] Indicates this was the first year the District managed grazing, prior to full ownership.

[b] All properties, except Big Dipper-Mindego Grazing Unit, are within the Service Plan for the San Mateo Coastal Annexation Area.

[c] The area of grazing decreased due to a reevaluation of grazeable areas.

[d] The area of grazing decreased due to removal of the agricultural lease area from the overall grazeable area.

Table 1-7 Updates to Rangelands and Agricultural Properties Management Category and Treatment Actions

Pest Category	2025 Updates
Forest Pathogens	• Added the pest category, Forest Pathogens. • Added chemical controls including disinfectants.
Aquatic Invasive Species and Pathogens	• Added the pest category, Aquatic Invasive Species and Pathogens. • Added chemical controls including disinfectants.
Rangelands	• Discing was removed as a tool from the physical control (manual control treatments), Mow/Cut.

IPM in Natural Lands

Table 1-8 summarizes updates to treatment actions for Forest Pathogen, Aquatic Invasive Species and Pathogens, and Invasive Plants covered under the IPM in natural lands management category.

Table 1-8 Updates to Natural Lands Management Category and Treatment Actions

Pest Category	2025 Updates
Forest Pathogens	• Updated the name of the pest category from Sudden Oak Death, to Forest Pathogens. • Added chemical controls including disinfectants. • Added treatment to remediate *Phytophthora* that is found in soils to physical control (manual control treatments).
Aquatic Invasive Species and Pathogens	• Added chemical controls including disinfectants.

Pest Category	2025 Updates
Invasive Plants	• Updated the reference to the Bay Area Air Quality Management District (BAAQMD) to Bay Area Air District (BAAD).
Bullfrogs, non-native fish, and turtle	• Removal of exclusionary fencing to reduce impacts to native species.
Skunks, opossums, and raccoons	• Addition of physical controls including box traps • Addition of chemical controls

1.2.5 Program Implementation

As part of the 2025 IPMP 10-year update, the District proposes to revise its brush management prioritization system for IPM on rangeland, agricultural lands, and natural lands in relation to weed control. The prioritization framework includes a structured yet adaptable approach to managing invasive species and focuses efforts based on ecological benefit. Midpen's approach would utilize geographic information systems (GIS) to integrate ecological value, species risk, and management feasibility into management activities. Midpen regularly reviews any new data, emerging threats, and on-the-ground lessons, and these are incorporated into the prioritization approach.

1.2.6 Best Management Practices

The list of BMPs included under the 10-year Program update are similar to those included in the 2014 IPMP and 2019 Addendum, however changes to the existing BMPs and additional BMPs are proposed for inclusion under the 10-year Program update. New or revised District BMPs incorporated into the 2025 IPMP are presented in Table 1-9 (new or revised information as part of the 10-year Program update is shown in underline and ~~strikeout~~ and highlighted in gray). The applicable Midpen Open Space Maintenance and Restoration Program (OSMRP) BMPs would be implemented when and where appropriate, in accordance with the programmatic permits.

1.3 Conclusion

The proposed updates are minor overall and include: new pesticide formulations, acreage changes to District lands, updates to information on special-status species and pesticide use, updates to treatment actions, new treatment actions, minor changes to address current regulatory and physical environmental conditions, expanded treatment actions within four of the five pest management categories outlined in the 2014 IPMP, removal of the fuels management category, and adaptive management recommendations and improvements from lessons learned over the last decade of implementation. A summary of IPMP 2025 updates are included in Table 1-1. The updates to the Program would not result in significant changes to the previously identified mitigation, including their feasibility or implementation. New significant impacts or substantially greater impacts than were analyzed in the 2014 EIR and 2019 Addendum are not anticipated.

Table 1-9 2025 IPMP Best Management Practices

#	BMP	Functional Groups	Responsible Party	Timing
1.	**Annual Pesticide Literature Review** ~~To inform updates to the Program, the District shall c~~Conduct an annual ~~pesticide literature~~ review of all newly published toxicological, regulatory, and efficacy information relevant to products on the ~~research and court proceedings related to pesticides io the~~ “Approved Pesticide List.”	Administrative	IPM Coordinator	Annual planning; Prior to treatment
2.	**Glyphosate Use Reduction** Where feasible, the District shall reduce the use of glyphosate in its preserves ~~For IPM projects currently utilizing glyphosate as a management tool, the District shall identify suitable sites to implement alternative treatment methods. The District shall seek to replace~~ by replacing glyphosate use with the safest ~~available~~ effective alternative ~~broad-spectrum, post-emergent herbicide with minimal residual soil activity.~~	Administrative	District staff	Annual planning; Prior to treatment
3.	**Pest Control Recommendation** All pesticides and adjuvants ~~use~~ shall be ~~implemented~~ used consistently with written Pest Control Recommendations prepared annually by a licensed Pest Control Advisor. ~~The Pest Control Adviser shall ensure that a~~ All pesticide applications are to be performed at the time of year and phenological window for maximum effectiveness, thereby increasing treatment efficacy and reducing the need for follow-up applications, unless constraints limit application at the optimal time. ~~Adjuvants shall be used and applied consistent with the District’s Pest Control Recommendations.~~ ~~All appropriate laws and regulations pertaining to the use of pesticides and safety standards for employees and the public, as governed by the U.S. Environmental Protection Agency, the California Department of Pesticide Regulation, and local jurisdictions shall be followed. All applications shall adhere to label directions for application rates and methods, storage, transportation, mixing, and container disposal. All contracted applicators shall be appropriately licensed by the state. District staff shall coordinate with the County Agricultural~~	Administrative	Licensed pest control advisor	Prior to treatment; During treatment

#	BMP	Functional Groups	Responsible Party	Timing
	~~Commissioners, and all required licenses and permits shall be obtained prior to pesticide application.~~			
4.	**Pesticide Label** Applicators shall follow all pesticide label requirements and refer to all ~~other~~ relevant IPMP BMPs regarding mandatory measures to protect sensitive resources, and employee and public health during pesticide application. Some herbicides, such as Envoy, Milestone, Transline, and Capstone, contain specific label language restrictions that shall be adhered to, such as those pertaining to when to use in grazed rangelands. ~~All District field crew who perform herbicide treatments shall have specialized experience and training in pesticide safety, IPM principles, and special status species.~~ ~~Grazing Animals - Some herbicides, such as Milestone, Transline, and Capstone contain label language restricting grazing and/or use of compost. Always read and follow label directions.~~	District staff/ Contractor	Pesticide applicator (qualified District staff/ contractor)	Prior to treatment; During treatment
5.	**Pesticide Certification and Supervision** ~~Pesticide applicators shall have or work under the direction of a person with a Qualified Applicator License (QAL) or Qualified Applicator Certificate (QAC). As appropriate, the District shall implement QAC certification requirements for additional field staff to enhance field crew training. Contractors and grazing and agricultural tenants may apply approved pesticides after review and approval by the District and under the direction of QAL/QAC field supervisors. After review and approval by the District and under the direction of QAL/QAC, contractors may apply approved fungicides to District preserves for the research and control of Sudden Oak Death (SOD). As needed for the control of mosquitos, cattle grazing rangers may apply District approved bacterial pathogens to water troughs in District preserves. Employees, contractors and tenants may install approved ant and roach bait stations inside buildings in tamper-proof containers without review by a QAL/QAC. Tenants may not use rodenticides; only qualified District staff or District contractors may use approved rodenticides and these should only be used in the event of an urgent human health issue, in a manner consistent with the product label, and in anchored, tamper-proof containers inside buildings.~~ Pesticide applicators must hold or operate under a Qualified	District staff/ Contractor	Pesticide applicator (qualified District staff/ contractor)	Prior to treatment

#	BMP	Functional Groups	Responsible Party	Timing
	Applicator License (QAL) or Qualified Applicator Certificate (QAC). Contractors and agricultural tenants may apply District-approved pesticides with District approval and QAL/QAC supervision. District-approved rodenticides may only be used by qualified contractors, and only for urgent human health concerns, following label guidelines and placed indoors in anchored, tamper-proof containers. Termiticides must be applied by applicators licensed by the Structural Pest Control Board. Employees, contractors, and tenants may install ant and roach bait stations in tamper-proof containers indoors and approved bacterial agents to water troughs for mosquito control without QAL/QAC supervision.			
6.	**Pesticide Storage, Loading, and Mixing** All storage, loading, and mixing of pesticides shall be set back at least 300 feet from any aquatic feature~~, or~~ known locations of special-status species, occupied or suitable special-status species ~~or their~~ habitat, or sensitive natural communities. Applicators shall use an air gap or antisiphon device to prevent backflow while loading pesticides. All mixing and transferring shall occur within a contained area. Any transfer or mixing on the ground shall be within containment pans or over protective tarps and away from drain inlets, culverts, wells, areas with porous or erosion-prone soil, or other features that may allow for runoff.	District staff/ Contractor	Pesticide applicator (qualified District staff/ contractor)	Prior to treatment
7.	**Uses of Herbicide Dyes** As deemed necessary by the Pest Control Adviser, QAL, or QAC, appropriate, non-toxic colorants or dyes shall be added to the herbicide mixture to determine treated areas and prevent over-spraying, particularly in public areas.	District staff/ Contractor	Pesticide applicator (qualified District staff/ contractor)	Prior to treatment
8.	**Notification of Pesticide Application** Signs stating "Pesticide Use Notification" shall be posted notifying the public, employees, and contractors of the District's use of pesticides. The sign shall consist of the following information: • product name, signal word, and manufacturer, active ingredient, and EPA registration number; • target pest;	District staff/ Contractor	District staff/ Contractor	Prior to treatment

#	BMP	Functional Groups	Responsible Party	Timing
	• preserve name and/or building; • ~~treatment location in preserve;~~ date and time of application; • for buildings, if vacancy is required and duration; • date which notification sign may be removed; and • contact person with telephone number (typically IPM Coordinator). Signs shall be posted in accordance with the following dependent upon the location and urgency: • *Outdoor areas of all District-owned preserves and unoccupied buildings:* posted at each end of the outdoor treatment area and any intersecting trails 24 hours before the start of treatment until 72 hours after the end of treatment • *Occupied buildings:* - notification will be provided to building occupants (employees, visitors, residents) 24 hours before the start of treatment by email, letters or telephone calls - posted at the entrances to the building 24 hours before the start of treatment until 72 hours after the end of treatment (except for approved insecticidal baits in tamper-proof containers) • *Urgent application of pesticides to control stinging insects or immediate public safety concern:* posted at the treatment area until 72 hours after the end of treatment ~~generally be posted 24 hours before the start of treatment and notification shall remain in place for 72 hours after treatment ceases.~~ In no event shall a sign be in place longer than 14 days without dates being updated. See the IPM Guidance Manual for further details ~~on posting locations, posting for pesticide use in buildings~~ and ~~for~~ exceptions.			
9.	**~~Trail~~ Closures** *Parking lots, Trails, and Trailheads.* Establish a minimum 5-ft no-spray buffer from parking lots and trails unless a temporary 24-hour closure is used to prevent visitor exposure ~~To reduce potential staff and visitor exposure to pesticides, no-spray trail buffers shall be established at least 5 feet from any trails, trailheads, or parking lots unless a 24-hour trail closure is observed.~~	District staff/ Contractor	District staff/ Contractor	Prior to treatment

#	BMP	Functional Groups	Responsible Party	Timing
	Building. Buildings shall be closed for the recommended label timeframe (from 24 to 72 hours) when pesticides are used for structural pests (e.g., Vikane). Closures are not required for baiting or perimeter applications.			
10.	**Crew Training ~~to Prevent Spread of Weeds~~** Annual worker environmental awareness training shall be conducted for all treatment field crews (staff and volunteers) and contractor crews, which shall include the following at a minimum:~~.~~ • ~~All staff, contractors, and volunteers shall be properly trained to prevent spreading~~ Preventing the spread of weeds and pests to other sites. • Special-status species and sensitive natural communities that are known to occur or determined to have the potential to occur on the treatment site by a District--approved biologist. The education training shall be conducted prior to starting work and upon the arrival of any new. The training shall consist of a brief review of life history, field identification, and habitat requirements for each special-status species, their known or probable locations in the vicinity of the treatment site, potential fines for violations, avoidance measures, and necessary actions if special-status species or sensitive natural communities are encountered. • All District field crews who perform herbicide treatments shall have specialized experience and training in pesticide safety, IPM principles, and special--status species. • Identification and protection of sensitive archaeological, paleontological, or historic resources (e.g., projectile points, mortars, midden sites, historic bottles, cans, trash deposits, or structures and structural remnants).	District staff/ Contractor	District staff/ Contractor	Prior to treatment
11.	**Pre-Treatment Surveys** ~~A District-approved biologist shall survey all selected treatment sites shortly before work to determine site conditions and develop any necessary site-specific measures. Treatment sites are defined as areas where IPM activity, including manual, mechanical, and chemical treatment, is expected to occur. In addition, on a repeating basis, grassland~~ Treatment sites shall be surveyed by a District-approved biologist once every ~~five~~ 5 years ~~and brushy and wooded sites shall be surveyed once every five years~~. Treatment sites are defined as areas	District staff/ Contractor	District-approved biologist or other personnel	Prior to treatment

#	BMP	Functional Groups	Responsible Party	Timing
	where IPM activity, including manual, mechanical, and chemical treatment, is expected to occur. Brush removal on rangelands ~~will~~ require biological surveys before work is conducted in any year. Site inspections are to determine existing site conditions ~~shall evaluate existing conditions~~ at a given treatment site including the presence, population size, growth stage, and percent cover of target weeds and pests relative to native plant cover and the presence of special-status species and their habitat, or sensitive natural communities and develop any necessary site-specific measures, such as buffer strips to avoid disturbance of grassland wildlife. *Aquatic Areas* ~~Shortly before treatment, a~~ During the pre-treatment surveys, a District-approved qualified biologist or other District-approved personnel shall survey the treatment sites to determine whether any aquatic features or water-supply infrastructure are located on site. ~~In addition, on a repeating basis, grassland treatment sites shall be surveyed once every five years and brushy and wooded sites shall be surveyed by a District-approved biologist once every five years. Brush removal on rangelands will require biological surveys before work is conducted in any year.~~ Aquatic features are defined by the presence of wetland indicators and/or a defined bed and bank, and can include ~~as~~ any natural or manmade lake, pond, wetland, ~~river, creek~~ stream, ~~drainage way,~~ ditch, spring, saturated soils, or similar feature ~~that holds water at the time of treatment or typically becomes inundated during winter rains~~. Water-supply infrastructure includes spring boxes, wells, troughs, tanks, and water-distribution lines, and other infrastructure necessary to divert, store, or convey water, but does not include fully sealed pipes that are aboveground or underground. ~~Treatment sites are defined as areas where IPM activity, including manual, mechanical, and chemical treatment, is expected to occur.~~ If during the survey it is found that aquatic features or water-supply infrastructure are present within ~~15~~ 30 feet of the proposed treatment area, the District shall either eliminate all treatment activities within ~~15~~ 30 feet of the ~~aquatic~~ features from the project (i.e. do not implement treatment actions in those areas) or if the District chooses to continue treatment actions in these areas, it shall use pesticides and adjuvants in accordance with label requirements (BMP #4) that are~~, be~~ labeled for aquatic			

#	BMP	Functional Groups	Responsible Party	Timing
	use and follow ~~the requirements of the mitigation measure for special-status wildlife species and the CDFW Streambed Alteration Agreement~~ all relevant permit requirements (e.g., CDFW Streambed Alteration Agreement), if appropriate. *Rare Plants* ~~Shortly before treatment, all selected treatment sites shall be surveyed by District-approved personnel with environmental awareness training (BMP #20) prior to work to determine the potential presence of special-status plants. Rare~~ During the pre-treatment surveys, rare plant surveys shall be conducted by a District-approved biologist during the appropriate season to assess the occurrence, if any. If special-status plants are reported, information such as species and location shall be uploaded into an electronic inventory system and a District-approved biological monitor shall be present to oversee the planned IPM treatment. ~~On a repeating basis, grassland treatment sites shall be surveyed by a District-approved biologist once every five years and brushy and wooded sites shall be surveyed once every five years. Brush removal on rangelands will require biological surveys before work is conducted in any year. Treatment sites are defined as areas where IPM activity, including manual, mechanical, and chemical treatment, is expected to occur.~~ A 30-foot buffer shall be established from special-status plants. No application of herbicides shall be allowed within this buffer. Non-herbicide methods can be used within 30 feet of rare plants but they shall be designed to avoid damage to the rare plants (e.g., pulling). ~~In addition, annual worker environmental awareness training shall be conducted for all treatment field crews and contractors for special-status species and sensitive natural communities determined to have the potential to occur on the treatment site by a District approved biologist. The education training shall be conducted prior to starting work at the treatment site and upon the arrival of any new worker onto sites with the potential for special-status species or sensitive natural communities. The training shall consist of a brief review of life history, field identification, and habitat requirements for each special-status species, their known or probable locations in the vicinity of the treatment site, potential fines for violations, avoidance measures, and necessary actions if special-status species or sensitive natural communities are encountered.~~			

#	BMP	Functional Groups	Responsible Party	Timing
	~~Mowing Patterns~~ ~~Where appropriate, equipment modifications, mowing patterns, and buffer strips shall be incorporated into manual treatment methods to avoid disturbance of grassland wildlife.~~			
12.	**Nesting Birds** ~~For all IPM activities that could result in potential noise and other land disturbances that could affect nesting birds (e.g., tree removal, mowing during nesting season, mastication, brush removal on rangelands), treatment sites shall be surveyed within two weeks prior to initiating activity to evaluate the potential for nesting birds. Tree removal will be limited, whenever feasible, based on the presence or absence of nesting birds. For all other treatments, if birds exhibiting nesting behavior are found within the treatment sites during the bird nesting season: March 15 - August 30 for smaller bird species such as passerines and February 15 - August 30 for raptors, impacts on nesting birds will be avoided by the establishment of appropriate buffers around active nests. The distance of the protective buffers surrounding each active nest site are: 1,000 feet for large raptors such as buteos, 500 feet for small raptors such as accipiters, and 250 feet for passerines. The size of the buffer may be adjusted by a District biologist in consultation with CDFW and USFWS depending on site specific conditions. Monitoring of the nest by a District biologist during and after treatment activities will be required if the activity has potential to adversely affect the nest. These areas can be subsequently treated after a District biologist or designated biological monitor confirms that the young have fully fledged, are no longer being fed by the parents and have left the nest site. For IPM activities that clearly would not have adverse impacts to nesting birds (e.g. treatments in buildings and spot spraying with herbicides), no survey for nesting birds would be required.~~ For IPM activities that may cause noise or land disturbances affecting nesting birds (e.g., tree removal, mowing during nesting season, mastication, brush removal), sites must be surveyed by a District-approved, qualified biologist or biological monitor within 15 days prior to treatment to assess nesting activity. Tree removal shall be limited when feasible based on nest presence. During nesting season (March 15–August 30 for passerines; February 15–August 30 for raptors), if nesting behavior is observed, appropriate buffers shall be established: 1,000 feet	District staff/ Contractor	District-approved qualified biologist or biological monitor	Prior to treatment

#	BMP	Functional Groups	Responsible Party	Timing
	for large raptors (e.g., buteos), 500 feet for small raptors (e.g., accipiters), and 250 feet for passerines. However, buffers may be adjusted by a District-approved biologist in coordination with CDFW and USFWS based on a number of factors including site conditions, time of year, and type/duration of disturbance. If treatment is therefore allowed to proceed by CDFW/USFWS, the nest must be monitored by a District-approved biologist to confirm that the treatment activities are not negatively affecting bird behavior. If negative effects are observed, treatment activities shall be paused, or substantially modified to avoid the disturbance in further consultation with CDFW/USFWS, and may resume only after fledglings have fully left the nest. IPM activities unlikely to affect nesting birds (e.g., indoor treatments, spot herbicide spraying) do not require a nesting bird survey.			
13.	**Cultural Resources** ~~District staff, volunteer crew leaders, and contractors implementing treatment activities shall receive training on the protection of sensitive archaeological, paleontological, or historic resources (e.g., projectile points, bowls, baskets, historic bottles, cans, trash deposits, or structures). In the event volunteers would be working~~ Where work occurs in locations with potential cultural resources, District staff shall provide instruction to protect and report any ~~previously undiscovered~~ cultural artifacts that might be uncovered during hand-digging activities. If highly sensitive sites are known within or near the treatment site (e.g. burials or significant midden sites, which have a high potential for burials), the nature of the site should not be disclosed to volunteers or contractors, except to state that the site is sensitive and must be avoided (or treated only with appropriate methods). If archaeological or paleontological resources are known or encountered on a treatment site and the treatment method consists of physical disturbance of land surfaces (e.g., mowing, brush cutting, pulling, or digging), work shall avoid these areas or shall not commence until the significance of the find can be evaluated by a qualified archeologist. ~~This measure is consistent with federal guidelines 36 CFR 800.13(a), which protects such resources in the event of unanticipated discovery.~~	District staff/ Contractor	District staff/ Qualified archaeologist	Prior to treatment; During treatment

#	BMP	Functional Groups	Responsible Party	Timing
14.	**Pesticide Application Restrictions in California Red-Legged Frog Habitat** Application of glyphosate, triclopyr, and chloropicrin ~~pesticides~~ shall be conducted in accordance with the California Red-Legged Frog Injunction (Center For Biological Diversity v. U.S. Environmental Protection Agency (2006) Case No.: 02-1580JSW) in ~~known or~~ critical habitat or specific sections of non-critical habitat ~~potential~~ for California red-legged frog habitat specifically by complying with all of the following: • only using the amine formulation of triclopyr • not applying specified pesticides within 15 feet of aquatic features (including areas that are intermittent creeks, seeps, and springs ~~wet at time of spraying or areas that are dry at time of spraying but subsequently might be wet during the next winter season~~); • utilizing only localized spot treatment using hand-held devices ~~spot-spraying techniques and equipment~~ by a certified applicator (QAL or QAC) or person working under the direct supervision of a certified applicator; and • not ~~spraying~~ applying during precipitation or if precipitation is forecast to occur within 24 hours before or after the proposed application. Preserves in which these precautions must be undertaken are: Cloverdale Ranch, Coal Creek, El Corte de Madera Creek, La Honda Creek, Miramontes Ridge, Monte Bello, Picchetti Ranch, Purisima Creek Redwoods, Rancho San Antonio, ~~El Corte de Madera, La Honda Creek, Picchetti Ranch,~~ Russian Ridge, Sierra Azul, Skyline Ridge, and Tunitas Creek~~, Skyline Ridge, Rancho San Antonio, Monte Bello and Coal Creek OSP~~ preserves ~~and Toto Ranch~~. Alternatively, as applicable and appropriate, application of glyphosate, triclopyr, and chloropicrin shall be conducted in accordance with the most recent incidental take permit issued by the USFWS (Endangered Species Act section 7(a)(2)).	District staff/ Contractor	Pesticide applicator	Planning prior to treatment; During treatment
15.	**Fipronil Special-Status Species Buffer Requirements~~Goby-11 Injection~~** In accordance with the 2010 Stipulation Injunction (Center for Biological Diversity v. EPA, Case No. 07-2794-JCS (N.D. Cal.), May 30, 2007), prior to Fipronil pesticide treatment, the following buffer requirements shall be complied with:	District staff/ Contractor	Pesticide applicator	Planning prior to treatment; During treatment

#	BMP	Functional Groups	Responsible Party	Timing
	• *San Francisco Garter snake:* Within Cloverdale Ranch and Russian Ridge OSPs, do not apply Fipronil within 200 feet of fresh-water ponds (including natural or manmade, such as stock ponds), slow moving streams or pools within streams, vernal pools and other ephemeral or permanent water bodies, which typically support inundation during winter rains and hold water for a minimum of 12 weeks in a year of average rainfall. • *Bay checkerspot butterfly:* Do not apply Fipronil within 100 feet of the Bay checkerspot butterfly habitat within Pulgas Ridge OSP, Edgewood County Park, and the Midpen-managed portion of the San Francsico Public Utility Company land at Pulgas Ridge. • *California clapper rail:* Within Ravenswood OSP, do not apply Fipronil within 300 feet of the high water line of salt or brackish water marshes. Also do not apply Fipronil within 200 feet of a cordgrass/pickleweed stand if any part of the stand occurs within 100 feet of the high water line of a salt or brackish water marsh. • *Tidewater goby:* Within Cloverdale Ranch and Tunitas Creek OSPs, do not apply Fipronil within 100 feet of lagoons, estuaries and backwater marshes that are adjacent to the Pacific Ocean; and freshwater streams up-gradient of and tributary to brackish habitats. • *Salt marsh harvest mouse:* Within Stevens Creek Shoreline Nature Study Area and Ravenswood OSP, do not apply Fipronil within 300 feet of the high water line of salt or brackish water marshes. Also, do not apply Fipronil within 200 feet of a cordgrass/pickleweed stand if any part of the stand occurs within 100 feet of the high water line of a salt or brackish water marsh. ~~Application of glyphosate and cholecalciferol shall be conducted in accordance with the Goby -11 Injunction (Center for Biological Diversity v. EPA, Case No. 07-2794-JCS (N.D. Cal.), May 30, 2007) in applicable and relevant habitats for those species named in the Injunction that occur within the District. Applicable habitats for each species named in the Injunction are defined in the 2010 court order for the Center for Biological Diversity v. EPA. Because the interim protective measures (i.e., no-use buffer zones adjacent to certain features within certain geographic areas) established in the 2010 order vary depending on the species at issue and the pesticide being used, the USEPA webpage should be consulted: https://www.epa.gov/endangeredspecies/interim-use-limitations-eleven-threatened-or-endangered-species-san-francisco-bay. In addition,~~			

#	BMP	Functional Groups	Responsible Party	Timing
	~~District internal special status species mapping resources, buffer zones established on the CNDDB webpage, and an interactive species location map (https://www.epa.gov/endangered-species/san-francisco-bay-area-map-toolidentify-interim-pesticide-use-limitations) should be consulted. The interim use limitations remain in effects until USEPA completes effects determinations for four pesticides named under the 2015 revised settlement agreement for the Center for Biological Diversity v. EPA. The effects determinations are expected to be completed by 2020.~~			
16.	**San Francisco Dusky-footed Woodrat and Santa Cruz Kangaroo Rat Restrictions** ~~All District staff, volunteers or contractors who will implement treatment actions shall receive training from a qualified biologist on the identification of dusky-footed woodrat, Santa Cruz kangaroo rat, and their nests or burrows. Generally, all~~ San Francisco dusky footed woodrat and their nests, and Santa Cruz kangaroo rat and their burrows ~~will~~ shall normally be avoided and left undisturbed by proposed work activities. If a nest site or burrow will be affected, the District will consult with CDFW. Rodenticides and snap traps~~, and glue boards~~ shall not be used in buildings within 100 feet of active San Francisco dusky-footed woodrat nests or Santa Cruz kangaroo rat burrows; instead rodent control in these areas ~~will~~ shall be limited to non-lethal exclusion and relocation activities, including relocation of nests if approved by CDFW. ~~Tenants will contact the District for assistance in managing rat populations in buildings and under no circumstances will be allowed to use rodenticides.~~	District staff/ Contractor	Pesticide applicator/ District staff	Planning prior to treatment; During treatment
17.	**~~Operation of Noise-Generating~~ Equipment and Vehicle Operation Restrictions** Operation of noise-generating equipment (e.g., chainsaws, wood chippers, brush-cutters, pick-up trucks) shall abide by the time-of-day restrictions established by the applicable local jurisdiction (i.e., City and/or County) if such noise activities would be audible to sensitive receptors (e.g., residential land uses, schools, hospitals, places of worship) located in the applicable local jurisdiction. ~~If the local, applicable jurisdiction does not have a noise ordinance or policy restricting the time-of-day when noise-generating activity can occur, then the noise generating activity shall be limited to two hours after sunrise and two hours before sunset, generally Monday through Friday.~~ Additionally, if noise-	District staff/ Contractor	District staff/ Contractor	During treatment

#	BMP	Functional Groups	Responsible Party	Timing
	generating activity ~~would take place~~ is planned to occur on a site that spans over multiple jurisdictions, then the most stringent noise restriction, as described in this BMP or in a local noise regulation, would apply. ~~For treatment site where marbled murrelet has the potential to nest, identified in the District's 2014 maps (see attachment) if noise-generating activities would occur during its breeding season (March 24 to September 15), the IPM activities would be subject to the noise requirements listed in the most current in the CDFW RMA issued to the District (see attachment).~~All relevant permit requirements applicable to noise restrictions and special-status species will be adhered to (e.g., CDFW Streambed Alteration Agreement), if appropriate. All motorized equipment and vehicles shall be shut down when not in use. Idling of equipment and off-highway vehicles idling ~~will~~ shall be limited to 5 minutes.			
18.	**~~Weather~~ Parameters for Pesticide Applications** ~~Application Requirements –~~ The following general application parameters shall be employed during herbicide pesticide application: • Application shall cease when weather parameters exceed label specifications, when wind at site of application exceeds 7 miles per hour (MPH), or when precipitation (rain) occurs or is forecasted with greater than a 40 percent probability in the next 24-hour period to prevent loss of efficacy and lessen the potential for pesticides to enter surface water~~;~~. • All restrictions and limitations, including those on irrigation, cultivation, re-entry, etc., as described on the pesticide product label shall be followed for sites treated with pesticides~~;~~. • Spray nozzles shall be configured to produce a relatively large droplet size~~;~~. • Low nozzle pressures (30-70 pounds per square inch [PSI]) shall be observed~~;~~. • Spray nozzles shall be kept within 24 inches of vegetation during spraying~~;~~. • Application equipment shall be calibrated periodically per manufacturer specifications or frequently enough such that equipment is applying pesticides according to label directions~~;~~. • Drift and overspray avoidance measures shall be used to prevent drift in all locations. Particular attention shall be paid to areas where target weeds and pests are in proximity to special-status species or their habitat. Such measures	District staff/ Contractor	Pesticide applicator	During treatment

#	BMP	Functional Groups	Responsible Party	Timing
	can consist of, but would not be limited to, the use of plastic shields around target weeds and pests and selecting and using appropriate spray nozzles and pressures. Spray areas may also be limited by using application methods such as spot treatments and thin line treatments of one-inch wide or less. Due to the potential presence of temperature inversion layers, no spraying shall be conducted on designated "Spare the Air" days.			
19.	**Surface and Groundwater Protection** ~~Applicators shall use BMPs regarding the prevention of drift, runoff, erosion, and water quality impairment.~~ All ~~work~~ pesticide application shall be in compliance with ~~the~~ regulations (3 CCR § 6800, ~~(~~Groundwater Protection). ~~When~~ Where possible, plant covers ~~such as landscaping~~ shall be established on bare soil and hillsides to minimize pesticide and sediment runoff. Pesticides without an aquatic label shall not be applied ~~to~~: 1) to permeable soils, soils prone to or with evidence of erosion without containment strategies (e.g., vegetative buffers, sediment barriers); or 2) in areas where aquatic ~~habitats~~ features are located within ~~15~~ 30 feet of the application site. In no cases should pesticides be applied to surface water bodies unless in compliance with an existing permit or appropriate permits are obtained.	District staff/ Contractor	Pesticide applicator	During treatment
20.	**Pesticide Contamination Prevention** ~~**Disposal of Pesticide Containers**~~ Cleanup of all pesticide and adjuvant containers shall follow the product label and local waste disposal regulations. This generally consists of triple rinsing with clean water at an approved site and adding the rinsate to the batch tank for application. Used containers shall be punctured on the top and bottom to render them unusable, unless said container ~~are~~ is part of a manufacturer's container recycling program, in which case the manufacturer instructions shall be followed. Disposal of non-recyclable containers shall be at legal dumpsites. Cleaning of e~~E~~quipment ~~shall not be cleaned~~ and ~~personnel~~ worker clothes and boots shall occur where runoff would flow into the sanitary sewer for treatment~~not bathe in a manner that allows contaminated water to directly enter any body of water within the treatment areas or adjacent watersheds~~.	District staff/ Contractor	Pesticide applicator	During treatment

#	BMP	Functional Groups	Responsible Party	Timing
21.	**Pathogen Sanitation and Prevention of Contamination** All personnel working in infested areas shall take appropriate precautions to not carry or spread ~~weed seed or SOD-associated~~ pathogens outside of the infested area by adhering to the *Guidelines for Minimizing Phytophthora Contamination at Midpeninsula Regional Open Space District Preserves*. Such precautions will consist of, as necessary based on site conditions, cleaning of soil and plant materials from tools, equipment, shoes, clothing, or vehicles prior to entering or leaving the site.	District staff/ Contractor	District staff/ Contractor	During treatment; Post treatment
22.	**~~Maintenance of Facilities~~ Invasive Species Spread Prevention** Clothing, footwear, and equipment, including rentals, used during treatments of soil, seeds, vegetative matter, other debris or seed-bearing material, or water (e.g., rivers, streams, creeks, lakes) shall be inspected and cleaned before entering a treatment area or when leaving an area with infestations of invasive plants, noxious weeds, known plant pathogens, or invasive wildlife. District staff shall appropriately maintain facilities where tools, equipment, and vehicles are stored to ensure the area is free from invasive plants. District staff shall ensure that ~~rental equipment and~~ project materials (especially soil, rock, erosion control material, and seed) are free of invasive plant material prior to their use at a worksite. Relevant best practices from the Invasive Species Council of California, University of California Statewide Integrated Pest Management Program, and the California Invasive Plant Council shall also be consulted and implemented, as appropriate.	District staff/ Contractor	District staff/ Contractor	Before Treatment; During treatment; Post treatment
23.	**Erosion Control and Revegetation** For sites with loose or unstable soils, steep slopes (greater than 30 percent), where a large percentage of the groundcover will be removed, or near aquatic features that could be adversely affected by an influx of sediment, approved, biodegradable erosion-control measures and non-filament-based geotextiles ~~erosion control measures~~ shall be implemented before or after treatment as appropriate. These measures could consist of the application of forest duff or mulches, straw bales, straw wattles, other erosion control material, seeding, or planting of appropriate native plant species to control erosion, restore natural areas, and prevent the spread or reestablishment of weeds. Prior to the start of	District staff/ Contractor	District staff/ Contractor	Prior to treatment; Post treatment

#	BMP	Functional Groups	Responsible Party	Timing
	the winter storm season and during storms, if appropriate, these sites shall be inspected to confirm that erosion control techniques are still effective. ~~When~~ Where possible, ~~applicators~~ field workers may select vegetation control techniques to maintain sufficient vegetative cover to mitigate erosion.			
24.	**On-site Disposal** Invasive plant material shall be rendered nonviable ~~when being~~ if retained on site. District s~~S~~taff shall desiccate or decompose plant material until it is nonviable (partially decomposed, very slimy, or brittle). Depending on the type of plant, disposed plant material can be left out in the open as long as roots are not in contact with moist soil, or can be covered with a tarp to prevent material from blowing or washing away. Suitable on-site disposal areas shall be identified and approved by the District's Natural Resources Department to prevent the spread of weed seeds. District staff shall monitor all sites where invasive plant material is disposed on-site and treat any newly emerged invasive plants.	District staff/ Contractor	District staff	Post treatment
25.	**Off-site Disposal** When transporting invasive plant material off-site for disposal, the plant material shall be contained in enclosed bins, heavy-duty bags, or a securely covered truck bed. All vehicles used to transport invasive plant material for disposal shall be cleaned after each use.	District staff/ Contractor	District staff/ Contractor	Post treatment
26.	**Post-Treatment Monitoring** District staff shall normally monitor ~~IPM activities~~ treatment sites within ~~two~~ 2 months after herbicide treatment ~~(except for routine minor maintenance activities, which can be evaluated immediately after treatment)~~ to determine if the target pest or weeds were effectively controlled with minimum ~~effect~~ impact to the environment and non-target organisms. Future treatment methods in the same season or future years shall be designed to respond to changes in site conditions.	District staff/ Contractor	District Staff	Post treatment

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ATTACHMENT 3


Midpeninsula Regional Open Space District

Integrated Pest Management Program Guidance Manual

~~September 2014~~ March 2026

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ATTACHMENT 3

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Midpeninsula Regional Open Space District

Integrated Pest Management Program Guidance Manual

Prepared September 2014; Revised March 2026 for the 10-Year Update

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ACRONYMS AND ABBREVIATIONS

AHAS	Acetohydroxyacid Synthase
BAEDN	Bay Area Early Detection Network
BMP	Best Management Practice
Cal-IPC	California Invasive Plant Council
CDFA	California Department of Food and Agriculture
CDFW	California Department of Fish and Wildlife (formerly Department of Fish and Game)
CEQA	California Environmental Quality Act
DE	Diatomaceous Earth
DNA	Deoxyribonucleic Acid
EDRR	Early Detection and Rapid Response
EIR	Environmental Impact Report
EPA	Environmental Protection Agency
ESA	Endangered Species Act
GGNRA	Golden Gate National Recreation Area
IGR	Insect Growth Regulator
IPM	Integrated Pest Management
IPMP	Integrated Pest Management Program
MSDS	Material Safety Data Sheets
OSMRP	Open Space Maintenance and Restoration Program
OSP	Open Space Preserve
PCA	Pest Control Advisor
PCR	Pest Control Recommendation

ACRONYMS AND ABBREVIATIONS

PPE	Personal Protective Equipment
PSIS	Pesticide Safety Information Series leaflets
QAC	Qualified Applicator's Certificate
QAL	Qualified Applicator's License
SPCA	Structural Pest Control Applicator
SPCO	Structural Pest Control Operator
SOD	Sudden Oak Death
UC IPM	University of California State Integrated Pest Management Program
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
WFRP	Wildland Fire Resiliency Program

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1 Overview

1.1 Introduction

Integrated Pest Management (IPM) is a process of efficiently managing pests while protecting human health and environmental quality. ~~With this Guidance Manual, the Midpeninsula Regional Open Space District (District) is adopting a~~ In September of 2014, the Midpeninsula Regional Open Space District (District; Midpen) first developed and adopted their IPM Program (Program or IPMP) and released an IPMP Guidance Manual following the release of the 2014 Environmental Impact Report (EIR) for the Program. The IPMP Guidance Manual included several proposed program policies and identified specific pest management actions including preventative and maintenance measures, damage assessment procedures, tolerance levels and thresholds for action, and treatment options. As part of the 10-year Program update, the District is revising their IPM Guidance Manual and adopting a revised comprehensive IPM approach throughout all its preserves, other properties, and associated buildings and facilities in compliance with other existing Midpen plans and programs including the Service Plan for the San Mateo Coastal Annexation Area. The District's definition of IPM ~~and its IPM Policy~~ is described in Chapter 2.

The ~~IPM Policy and this~~ updated 2025 IPMP Guidance Manual will be considered by the Board of Directors for adoption in conjunction with the Addendum to the 2014 EIR addressing the 10-year Program update. Once adopted, the ~~Guidance Manual~~ Program will be updated as ~~needed.~~ necessary through the District's annual reporting process (refer to Section 3.8). The Guidance Manual is intended to have a 10-year planning timeframe before another more comprehensive update is initiated. The Guidance Manual is split into two main sections: chapters that deal with program-wide processes (Chapters 1-4), and chapters that guide individual pest management decisions (Chapters 5-8).

The IPM Coordinator and the IPM Coordination Team will play key roles in reviewing pest management projects for consistency with the Guidance Manual and overseeing licensing, training, and safety (Chapter 3) in carrying out the IPM Program. Other processes undertaken by the IPM Coordinator or staff throughout each year include planning, notification, and monitoring of the projects (Chapters 3 and 4). The Guidance Manual primarily emphasizes the review, prioritization, and approval of pest management activities through the development of an Annual IPM Work Plan (Chapter 3). Any new pest management activities not originally included in the Annual IPM Work Plan will be reviewed on an individual basis throughout the year.

An Annual IPM Report will summarize the work completed in the previous year (Chapter 3), evaluate the program's progress in meeting overall goals, and recommend any modifications (Chapter 4).

To adopt a comprehensive IPM Program~~, especially one~~ that emphasizes prevention and monitoring, the implementation of certain tasks are prioritized and phased. ~~there are certain tasks that are too large to implement all at once. Therefore, an IPM Implementation Plan will be developed in the first year of the program (Chapter 5).~~ Since adoption of the 2014 IPMP, Midpen has modified the Program according to District needs through its annual reporting process, which it will continue to do each year. Specifically, Midpen releases an annual report of pest management activities occurring on District land. These reports present the results of the previous year's pest management activities for the District and identify any changes to the Program that occurred in the given year. This process is discussed in greater detail in Section 3.8.

The most important decisions regarding IPM are made when individual projects are designed. This Guidance Manual identifies specific approaches to pest management including: preventative and maintenance measures; damage assessment procedures; tolerance levels and thresholds for action; and treatment options. Within the District, situations that trigger the need for pest control fall into ~~five~~ four distinct pest management categories. Chapters 6 through 8 guide specific pest management decisions in these four major categories of work:

~~Chapters 6 through 10 guide specific pest management decisions in these five major categories of work:~~

- Buildings (Chapter 5),
- Recreational facilities (Chapter 6),
- ~~Fuel management areas (Chapter 8),~~
- Rangelands and agriculture properties (Chapter 7), and
- Natural areas (Chapter 8).

Human health, environmental quality, and effective and efficient management of District property is a concern across all categories. Pests and treatment options are somewhat unique in each of the ~~five~~ four work categories because each category represents not only a different purpose under the District's mission, but also a different type of environment. In general, the first ~~three~~ two categories represent areas where conditions have been altered to a greater degree for human purposes, are more frequently occupied or visited by humans, and where the District has greater concerns for human safety. The latter two categories are areas in a more natural state and environmental quality is of great importance.

1.2 Background on Changes to the IPMP

Since adoption of the 2014 IPMP, Midpen has modified the Program according to District needs through its annual reporting process. A summary of these changes follows:

- In **2015**, Midpen established a project ranking system to evaluate and prioritize new pest control projects and developed a pest control project submission process utilizing a standardized form.
- In **2018**, Midpen added three insect repellent active ingredients to the List of Approved Pesticides, specifically for staff and volunteer vector protection.
- In **2019**, Midpen released an Addendum to the 2014 EIR, which included the following modifications to the 2014 Program:
  - The following pesticides were added to the List of Approved Pesticides for the Program as analyzed in the 2019 Addendum: 1) Garlon® 4 Ultra [active ingredient: triclopyr-2-butoxyethyl ester (active ingredient: triclopyr BEE)], 2) Capstone® [active ingredient: triclopyr triethylamine (TEA) salt and aminopyralid triisopropanolamine (TIPA) salt] for the control of broadleaf weeds and woody plants, and 3) PT® Wasp-Freeze® II (prallethrin) for the control of wasps and hornets;~~.~~
  - Protections for two new species of special concern (California giant salamander [*Dicamptodon ensatus*] and the Santa Cruz black salamander [*Aneides niger*]);~~.~~
  - New manual and mechanical treatment methods; and
  - A portion of the allowable treated acreage covered under the Recreational Facilities IPM category was reallocated to the Natural Lands and Fuel Management IPM categories to allow greater flexibility in meeting vegetation management objectives, although the total acreage analyzed in the original 2014 EIR was not increased (however, it should be noted that those reallocated acres are now returned to the Recreational Facilities IPM category as part of the 10-year Program update).
- In **2020**, Midpen added Waxie 730 (hydrogen peroxide) to the Approved List of Pesticides specifically for disinfecting surfaces.
- In **2023**, Midpen adopted the Wildland Fire Resiliency Program (WFRP), which focuses on preventing, preparing for, and responding to wildfires, including addressing flammable vegetation near facilities, as a key part of the District's land stewardship. The WFRP promotes environmentally sensitive vegetation management in response to increasingly intense fire seasons driven by dense forest regrowth, historical fire suppression, and climate change. The WFRP includes goals for reducing wildfire risks, enhancing fire response and safety, supporting healthy, fire-adapted ecosystems, incorporating Native American land management practices, and establishing an adaptive framework to adjust strategies based on evolving climate conditions, knowledge, and technology. The 2014 IPMP included a fuel management category, which addressed staff selection of options for required and ongoing maintenance of fuel management activities in relation to IPM. The dedicated fuel management category, however, has been removed from the IPMP and incorporated into the WFRP.

While the Program has developed over time, as discussed, the primary purpose of the 10-year Program update is to bring the 2014 and 2019 amended IPMP up to date with the current regulatory and physical environmental conditions, as well as incorporating adaptive management recommendations and improvements. Additionally, as the District continues to expand its coverage area, the overall scale of pesticide use under the IPMP must also increase to meet the growing treatment and coverage needs.

1.3 The IPM Approach

This IPM Program emphasizes pest prevention as a first approach, followed by actions to discourage or reduce pest populations from reaching levels where active control may be required. Tolerance levels are described to help staff determine when pest populations have reached levels where active pest control should be considered. A wide array of physical (e.g., separation of the pest from the public), biological (e.g., bio-control agents), and cultural (e.g., education and human behavior modification) actions are provided before chemical treatments can be considered. Pest treatment options are provided, including the most effective and least environmentally harmful options, by pest type. Monitoring and adaptive management principles, both on the project level and on the program level, are provided to help ensure improvements in efficiency and effectiveness of pest control over time.

Certain vegetation management projects are primarily undertaken to meet legal requirements ~~(e.g., defensible space regarding wildfire protection)~~ or District-adopted specifications (e.g., clearance adjacent to trails and roads for hikers, bicyclists, equestrians and vehicles), and these types of projects are undertaken on a routine basis at the same locations primarily by mechanical methods without the need to conduct detailed analysis or monitoring of the appropriate treatment method every time.

1.4 Quick Reference to the IPM Guidance Manual by Pest Types

The following provides a quick cross-reference by types of pests to specific sections in the Guidance Manual.

- **Rodents, insects, or other animals in buildings and vehicles** – Chapter 5, Section 5.8.2, Structural Animal Pests.
- **Rattlesnakes or stinging insects outside and near people** – Chapter 6, Section 6.7.4, Nuisance Animals.
- **Invasive animals in natural areas or rangelands** – Chapter 8, Section 8.3.1 Invasive Animals In Natural Lands (cross referenced in Chapter 7, Section 7.2.1- Types of Rangeland Pests).
- **Vegetation encroaching on trails, roads, parking lots, and other outside recreational facilities** – Chapter 6, Section 6.7.5, Vegetation Management of Trails and Other Recreational Facilities
- **Landscaping around buildings** – Chapter 6, Section 6.4.2, Retrofit.

- **Weeds on rangelands or in agriculture fields** – Chapter 7, Sections 7.3, Agricultural Farms and Fields and 7.2 Rangelands (cross referenced to Chapter 8, Section 8.8.2, Invasive Plants in Natural Lands)
- **Invasive plants in natural areas** – Chapter 8, Section 8.8.2, Invasive Plants in Natural Lands.
- **Forest disease**s - Chapter 8, Section 8.8.3, Forest Diseases.

2 IPM Definition and Policy

2.1 Defining IPM and Pests

IPM is a long-term, science-based, decision-making system that uses a specific methodology to manage damage from pests. The District defines pests in its Resource Management Policies as "Animals or plants that proliferate beyond natural control and interfere with the natural processes which would otherwise occur on open space lands," and target pests as "Plant or animal species that have a negative impact on other organisms or the surrounding environment and are targeted for treatment (Midpen 2022)." ~~This IPM Guidance Manual addresses plant, animal and disease pests that occur on~~ This IPM Guidance Manual addresses plant, animal, and disease pests that occur on or in District properties including preserves and buildings or on lands otherwise managed by the District.

IPM requires monitoring site conditions before, during, and after treatment to determine if objectives are being met and if the IPM methods need to be revised. IPM can be used for the control of many types of pests, including invasive species, structural and agricultural pests, and other nuisance species (e.g., rattlesnakes and stinging insects). This IPM methodology includes the following elements:

- Correctly identify the pest and understand its life cycle.
- Determine the extent of the problem or infestation.
- Evaluate the site conditions.
- Establish the tolerance level for control actions.
- Utilize the least harmful suite of treatment methods to control the pest at the most vulnerable stages of its life cycle.
- Monitor pest populations and effectiveness of treatment methods.

IPM requires knowledge of the biology of pests, the available techniques for controlling them, and an understanding of the secondary effects of the control techniques (e.g., soil erosion, pesticide drift, and bioaccumulation). Control of a pest is only undertaken once a "tolerance level" has been exceeded. A tolerance level, also referred to in IPM systems as a "tolerance threshold," is the level below which pests can be present without causing substantial economic damage, degradation of intended uses or human enjoyment of facilities, disturbance of natural processes, or unacceptable human health risks.

The effectiveness, safety, and efficiency of control methods are important considerations as they apply to the specific site conditions and life history of the target pest. IPM requires monitoring site conditions before, during, and after treatment to determine if objectives are being met and if methods need to be revised. IPM requires that non-chemical methods be considered in addition to chemical methods (i.e., pesticides~~, herbicides, insecticides~~).

Pesticides is a broad term defined by the United States Environmental Protection Agency (EPA) as (EPA 2025):

> "Any substance or mixture of substances intended for preventing, destroying, repelling, or ~~controlling~~ mitigating any pest~~, including vectors~~… Any substance or mixture of ~~human or animal disease, and unwanted species of plants or animals …"~~substances intended for use as a plant regulator, defoliant, or desiccant…Any nitrogen stabilizer."

Pesticides include ***insecticides*** (substances intended to control insect pests), ***rodenticides*** (substances intended to control rodents), ***herbicides*** (substances intended to control plant pests), and ***fungicides*** (substances intended to control fungi). Pesticides often include ***surfactants*** or ***adjuvants*** that are substances intended to adhere and spread pesticides on a surface, typically an insect's exoskeleton, a plant's leaf, or dry soil.

Disinfectants, are also considered pesticides because they are intended to kill pests, specifically microorganisms including pathogens (EPA 2020). Disinfectants are used to decontaminate all equipment, including but not limited to, wading, dive, and sampling equipment (e.g., water quality probes, nets, buckets, substrate samples, etc.); fishing gear; and watercraft.

Repellents are not substances used to eliminate pests, but are designed to dissuade or repel pests and are therefore considered pesticides. For example, in the case of skin-applied repellents (e.g., "bug spray"), the product makes people less attractive to the pest (US EPA 2024).

If the use of chemical methods is~~ determined to be~~ necessary to meet a pest control objective, the potential for harm to workers and the public is carefully considered, as are effects on the environment~~, and then the~~. The least harmful and most effective, efficient, and target-specific method is chosen.

IPM was originally developed in the 1960s for agricultural pests and then urban landscapes. Somewhat different approaches are needed when implementing an IPM approach on natural lands. For purposes of managing pests on District land, IPM is:

- An adaptive process that takes into account new science, technology, and understanding of pests and their environment.
- A program to ensure judicious use of pesticides. It is not necessarily intended to eliminate pesticide use; however, well-developed, science-based IPM programs typically reduce pesticide use per acre over time because they employ a wider array of pest management techniques (i.e., physical, biological, and cultural pest control as well as chemical control) that are more effective at eliminating pest issues.
- A decision-making system that adapts to changing conditions. Control methods are determined based on the pest and site-specific conditions, and methods are not universally applied to all pest problems or work categories.

2.2 IPM Policy

The District's ~~proposed~~ IPM Policy, originally adopted in 2009, ~~once adopted, will guide~~ guides staff in defining, preventing, and managing pests on District lands. The IPM goal, policies, and implementation measures were reviewed ~~initially~~ in 2013~~, and will be considered for adoption by the Board of Directors concurrently with this Guidance Manual.~~ and were approved as part of the 2014 Guidance Manual by the Board of Directors. In May of 2022, the District formally published its Resource Management Policies (RMPs), which include the proposed IPM policy statements presented in the 2014 IPMP Guidance Manual. The goal and policies were included in the 2014 IPMP Guidance Manual and remain applicable under the 10-year Program update (refer to Appendix D for the full list of RMPs).

~~2.2.1 GOAL (PROPOSED)~~

~~*Goal IPM* Control pests by consistent implementation of IPM principles to protect and restore the natural environment and provide for human safety and enjoyment while visiting and working on District lands.~~

~~2.2.2 POLICIES (PROPOSED)~~

~~*Policy IPM-1* Develop specific pest management strategies and priorities that address each of the five work categories.~~

1. ~~Manage pests in buildings to support existing uses, while also protecting human health and surrounding natural resources.~~
2. ~~Manage pests and potential human interactions in recreational facilities to minimize conflict, ensure visitor safety and enjoyment, and protect the surrounding natural resources.~~
3. ~~Manage pests in fuel management areas to reduce risk to human life and property, while also protecting natural resources.~~
4. ~~Manage pests in rangelands and on agricultural properties to support existing uses, while also protecting human health and surrounding natural resources.~~
5. ~~Manage invasive species in natural areas and set priorities for their control based on the potential risk to sensitive native species and loss of native biodiversity.~~

~~*Policy IPM-2* Take appropriate actions to prevent the introduction of new pest species to District preserves, especially new invasive plants in natural areas, rangelands, and agricultural properties.~~

~~*Policy IPM-3* Manage pests using the procedures outlined in the following eight implementation measures.~~

1. ~~Develop and implement tolerance levels for pests within each of the Work Categories to determine when to undertake pest control (refer to Chapters 6 through 10 in this Guidance Manual).~~
2. ~~Identify the pest, determine its life cycle and disruptive potential, and identify relevant site conditions prior to implementing a pest control activity. Review pest control objectives for consistency with other site goals and with established tolerance levels that must be exceeded before pest control is undertaken (refer to Chapters 6 through 10 in this Guidance Manual).~~
3. ~~Choose site-specific strategies and times of treatment that provide the best combination of protecting preserve resources, human health, and non-target organisms and that are efficient and cost effective in controlling the target pest. Wherever feasible, direct the control method narrowly at the most vulnerable point in the target organism's life cycle to avoid broad impacts (refer to Chapters 6 through 10 in this Guidance Manual).~~
4. ~~Monitor results and modify control methods over time as site conditions and treatment techniques change and as needed to obtain an effective level of control (refer to Chapters 6 through 10 in this Guidance Manual).~~
5. ~~Use the least harmful method(s) to control identified pests. Where the use of pesticides is necessary, apply according to the label using all safety precautions and take all measures needed to protect the environment, the health and safety of visitors, employees, neighbors, and the surrounding natural areas including water and soil resources (refer to Chapters 6 through 10 in this Guidance Manual).~~
6. ~~Plan for repeat treatments as indicated by the pest's regenerative capabilities.~~
7. ~~Coordinate and cooperate with adjacent landowners, neighbors, and other responsible agencies to control pests and limit secondary effects.~~
8. ~~If eradication of a pest from a distinct location is not feasible, apply measures to achieve containment, sustained control, slow down a pest's rate of spread, or minimize pest damage.~~

~~*Policy IPM-4* Monitor pest occurrences and results of control actions and use adaptive management to improve results.~~

~~*Policy IPM-5* Develop and implement a Guidance Manual to standardize pest management and IPM procedures across all District lands.~~

2.3 IPMP Best Management Practices

The District originally developed IPMP Best Management Practices (BMPs) as part of the 2014 Program, which were updated in 2019. These IPMP BMPs consisted of management actions that the District incorporated into IPM proposals and projects for the purpose of protecting human health and preventing environmental effects. The 2014 IPMP BMPs were developed in conformance with District policies, based on the District's existing BMPs, and addressing relevant regulations. Some of the 2014 IPMP BMPs were adapted from publications of the California Invasive Plant Council and were originally developed by a technical advisory team made up of experts in California with experience in invasive plant control and land management. The list of IPMP BMPs included under the 10-year Program update are similar to those included in the 2014 IPMP and 2019 Addendum; however, changes to the existing BMPs and additional BMPs are included in the 10-year Program update. Additions and revisions to the BMPs were made for consistency and clarity, and to address changes to the regulatory environment. The District implements the IPMP BMPs as part of individual IPMP projects District-wide, as required and relevant, consistent with the current IPMP. The IPMP BMPs incorporated into the 2025 IPMP are included in Appendix C.

Midpen adheres to its Open Space Maintenance and Restoration Program (OSMRP), which was approved in 2021 and first implemented in 2022. The OSMRP streamlines the permitting process and allows for an integrated approach to (1) routine maintenance, (2) small-scale facility improvements, and (3) restoration and enhancement projects. The OSMRP's programmatic permits authorize IPM work in jurisdictional areas, as it is considered routine maintenance. The applicable OSMRP BMPs required as part of permitting processes are implemented when and where appropriate, in accordance with the programmatic permits.

Midpen also implements the WFRP, as previously discussed in Section 1.2. The District prioritizes removal of invasive species over removal of native species during vegetation management. Vegetation is managed primarily manually, mechanically, with prescribed herbivory (using goats, sheep, or other livestock to reduce fuels in a specific area), and to a limited extent, herbicides. Midpen employs a series of BMPs for each management activity. Herbicides allowed are only those identified in the IPMP, which are implemented in accordance with the IPMPs BMPs.

3 The IPM Program

This chapter describes the IPM Program, including roles and responsibilities, management systems, and organizational processes that will be used to implement IPM on District lands. To illustrate this, refer to Figure 3-1 for a diagram of the decision-making process to be used by staff when implementing IPM in various work situations.

3.1 Roles and Responsibilities

3.1.1 Roles

This section describes roles and responsibilities for implementing the IPM P~~p~~rogram. The Board of Directors is responsible for approving the IPM Policy. The General Manager is responsible for ensuring the implementation of the IPM Policy through District managers and supervisors who train all staff on the IPM Guidance Manual and guide its implementation within the departments. The IPM Coordinator implements the District's IPMP.

3.1.2 IPM Coordination Team

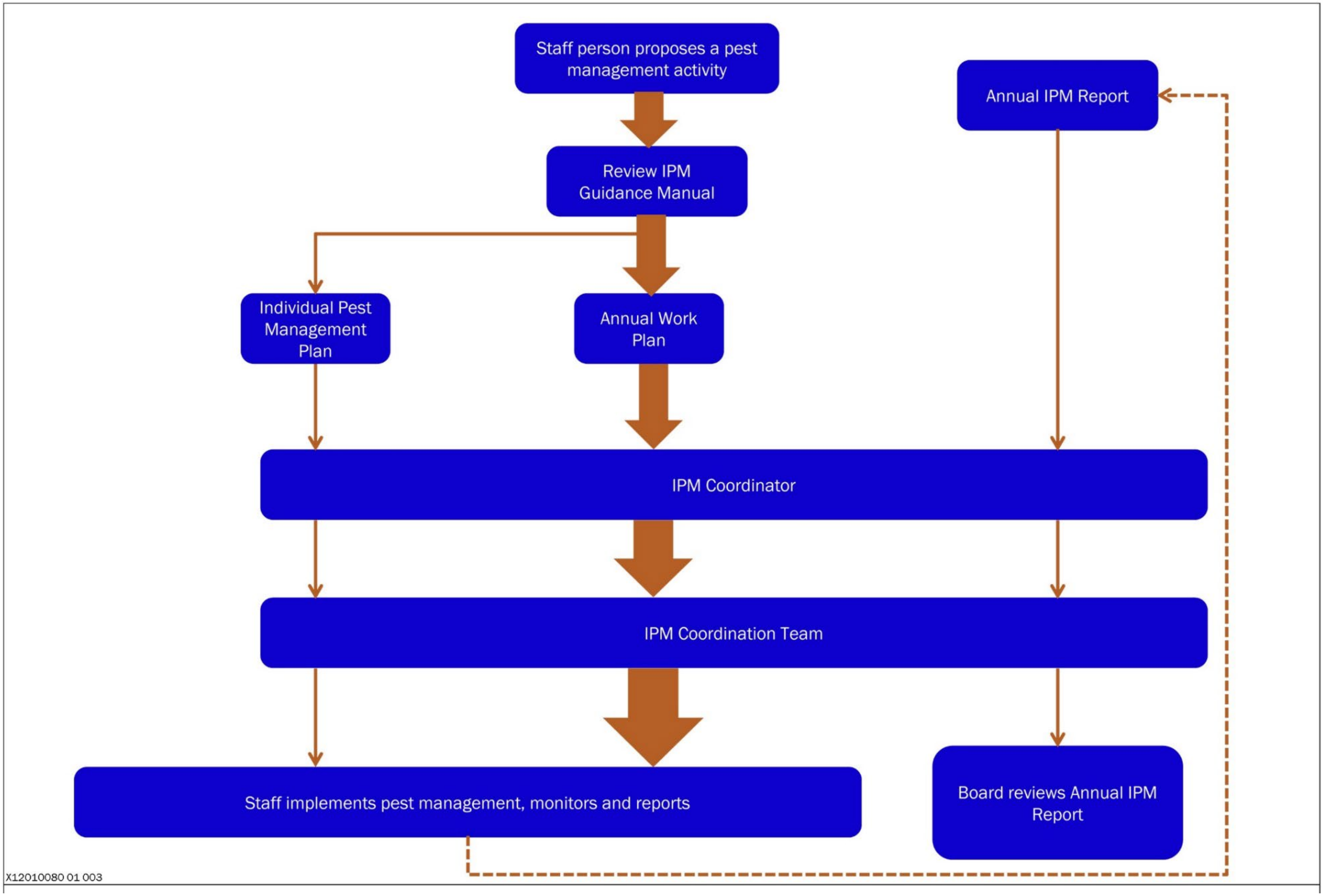
The District will ~~establish~~ continue maintaining an IPM Coordination Team. The team ~~will be made up~~ is comprised of District staff working with the advice of technical pest control experts. At a minimum, the team will include one staff representative from the following Departments: ~~each of the field offices~~ Lands Stewardship & Trails, ~~the~~ Natural Resources, ~~Department, the Real Property Department~~ Fleet & Facilities, and ~~the Volunteer Program~~ Visitor Services. As necessary, the IPM Coordination Team will consult with the Rangeland Ecologist and the Conservation Grazing Manager regarding rangeland and agricultural practices and properties, and with the Planning Department regarding long-range plans and construction and maintenance of capital projects.

The IPM Coordination Team is responsible for the following:

- Review and approve an Annual IPM Work Plan that is consistent with this Guidance Manual, feasible and within the District's projected staff and budget capabilities, and balances the District's pest management and other responsibilities while providing consistency from year-to-year so that effective progress can be made on multi-year projects;
- Provide ongoing expertise and staff assistance to complete tasks outlined in ~~the~~ Annual IPM ~~Implementation~~ Work Plan (refer to Section 3.8) to ensure that the District's approach to IPM principles and processes are continually improved;
- Review and approve Individual Pest Management Plans throughout the year that were not included in the Annual IPM Work Plan;

- Assess the IPM Program for safety and effectiveness on an annual basis or whenever urgent changes are indicated;
- Develop, periodically review, and recommend changes to the District's List of Approved Pesticides (Section 3.10 and Table 3-3) for initial approval by the General Manager; additions to the District's List of Approved Pesticides will be brought to the Planning and Natural Resources Committee before approval by the full Board of Directors;~~.~~
- Investigate lower risk/least hazardous alternatives to current practices described in this Guidance Manual, and make recommendations for revising or updating District procedures as described herein;
- Review the Annual IPM Report to ensure that it accurately represents pest management work completed in the previous year and that any recommendations for change are consistent with the District's adopted IPM Policy; and
- Oversee and peer review the IPM Coordinator position.

Figure 3-1 Flow Chart of the District's IPM Decision-Making Process



3.2 IPM Coordinator

Each District Department will report pesticide use (quantities of each pesticide product per toxicity classification) to the IPM Coordinator. The IPM Coordinator will have day-to-day oversight of the integrated pest management practices at the District, including the following:

- Prepare the Annual Work Plan and Annual IPM Report for review by the IPM Coordination Team;
- Coordinate the meetings and tasks of the IPM Coordination Team;
- Coordinate staff, contractor, and volunteer IPM training;
- Coordinate/implement the ~~pesticide~~ annual safety training program for pesticide handlers;
- Educate and respond to the public;
- Prepare other required reports, such as pesticide use reports to the County Agricultural Commissioner; and
- Undertake~~,~~ tasks outlined in the Annual Work Plan, as required by the ~~IPM Implementation Plan with assistance from~~ District, to assist the IPM Coordination Team~~,~~ and other staff ~~and,~~ contractors, and/or consultants as appropriate.

The IPM Coordinator will report directly to the ~~Natural Resources Manager~~ Senior Resource Management Specialist who leads the IPM Program for the District and who will have the overall responsibility for ensuring that the program guidelines are followed. The District will ~~hire~~ maintain an IPM Coordinator who will need to have experience with pests in natural settings such as invasive plants and animals, insects, and pathogens; and will need to have or gain experience with pest management in agricultural crops, rangelands, forests, park facilities (such as non-crop lawn and landscape areas), rights-of-way, and aquatic environments.

The IPM Coordinator will have either a ~~PCA, QAC, or QAL~~ Pest Control Advisor (PCA), Qualified Applicator's Certificate (QAC), or Qualified Applicator's License (QAL) certification, or will obtain one or more of these certifications within 1~~2~~ year~~s~~ of hire date.

~~The IPM Coordinator must keep records of all pesticide recommendations for a minimum of two years.~~ A PCA will prepare a pest control recommendation (PCR) annually (in accordance with the IPMP BMPs) on the recommended use of pest control products or techniques (refer to Appendix E for a copy of the PCR form). All pesticides and adjuvants will be used consistently with written PCRs. The PCA will ensure that all pesticide applications are performed at the time of year and phenological window for maximum effectiveness, thereby increasing treatment efficacy and reducing the need for follow-up applications, unless constraints limit application at the optimal time (refer to the IPMP BMPs included in Appendix C). The IPM Coordinator must keep records of all pesticide recommendations for a minimum of 2 years. Recommendations may be site-specific or programmatic (cover multiple sites within the same property or preserve). Each written recommendation must include the following information~~:~~ (pesticide application for buildings are addressed separately in Section 3.3):

- Category, active ingredient, pesticide formulation (i.e.~~,~~ brand name or common name) and dosage of each pesticide to be used;
- Identity of each pest to be controlled by a name of common usage;
- Property owner and location on the property that will be treated;
- Description of commodity, crop, or site to be treated. This includes specific crops (e.g., ~~i.e.,~~ wine grapes) or descriptions of non-crop sites such as wildlands, roadsides~~, habitat restoration sites~~, forests, etc.;
- Suggested schedule, time, or conditions for the pesticide application or other control method;
- Any warnings of the possibility of damages by the pesticide application that reasonably should have been known by the ~~agricultural pest control adviser~~ PCA to exist;
- Signature and address of the person making the recommendation, the date, and the name of the business such person represents;
- Total acreage or units to be treated;
- Concentration and volume per acre or other units;
- Worker reentry interval, if one has been established; pre-harvest or pre-slaughter interval, if relevant; and label restrictions on use or disposition of the treated commodity, by-products or treated area;
- Criteria used for determining the need for the recommended treatment (tolerance level or tolerance threshold); and
- Certification that alternatives and ~~mitigation measures~~ BMPs that would substantially lessen any significant adverse impact on the environment have been considered and, if feasible, ~~adopted~~ incorporated during planning and implementation of IPM activities.

3.3 Structural Pest Control Operator

The District will designate an employee with an active California Structural Pest Control Operator (Operator) license, or will retain the services of a licensed Branch I (fumigation), II (General Pest), or III (Wood Destroying Pest and Organisms) Structural Pest Control Operator as needed. The Operator will be responsible for reviewing the Annual Work Plan, Individual Pest Management Plans, and developing guidelines for the control of pests in all buildings within the District. Operator guidelines will be forwarded to the IPM Coordinator for a consistency review with the IPM Program before implementation.

In the event the District engages the services of a structural pest management company to operate in this capacity, the company will be required to comply with all applicable provisions of the state of California's Department of Consumer Affairs Structural Pest Control Act ~~dated October 2013 (available online at http://www.pestboard.ca.gov/ pestlaw/pestact.pdf).~~ and last amended as of July of 2025 or as updated (available online at https://www.pestboard.ca.gov/pestlaw/act.shtml). The

District will require proof of company registration and proof of the companies' qualifying Operators license information before engaging in a contract. The company should be licensed in the applicable Branch of the work being performed (as specified above). The District will monitor the work being done by the company to ensure quality workmanship and compliance with the District's ~~IPM program~~ IPMP.

3.4 Qualified Applicator

Pesticides will be applied in all areas except buildings by or under the supervision of a California licensed Qualified Applicator (QAC/QAL) who will be licensed in categories relevant to the type of pest control work. The QAC/QAL will be responsible for pesticide use records, work hours, and compliance with the Annual IPM Work Plan, Individual Pest Management Plans, and pesticide labels. Qualified applicators may include District field staff, contractors, and farmer/rancher tenants. Non-QAC or QAL certified District staff can apply pesticides, but only under direct supervision of the QAC or QAL and after completing the District's annual ~~pesticide~~ safety training program for pesticide handlers (Section 3.9).

All contract pest control applicators, the IPM Coordinator, and designated field supervisors must have a valid California QAC or QAL license in one or more of the following categories:

- Residential, industrial, institutional (A);
- Landscape maintenance (B);
- Right-of-way (C);
- Plant agriculture (D)[1];
- Aquatic (F); and/or
- Forestry (E)

Field supervisors who hold a QAC/QAL license or another certified trainer must train all staff who apply and handle pesticides on an annual basis as described in the Training section below (see Section 3.9).

3.5 Structural Pest Control Applicator

Household and structural pesticides will be applied under the supervision of a California licensed Branch I, II, or III Structural Pest Control Applicator (SPCA). SPCA's will be responsible for pesticide use records, work hours, and compliance with written recommendations in the approved Annual Work Plan, Individual Pest Management Plans, and compliance with pesticide labeling instructions. SPCA's may include a combination of District field staff and contractors. No unlicensed staff, contractors, volunteers, or tenants will perform structural or household pest control except for the limited use of District approved ant/roach bait stations.

[1] A pest control applicator with a valid California QAC or QAL in the plant agriculture (D) category is authorized to work in all wildland settings.

Structural pesticide applications made on District property by an outside vendor will be by a registered structural pest control company in accordance with the state of California's Structural Pest Control Act ~~dated October 2013.~~, last amended July of 2025 or as updated over the life of this program. Structural pesticide applications made by District staff will be carried out by trained applicators under the supervision of the IPM Coordinator or designated field supervisors. All applications on District property will be made in compliance with the Annual Work Plan, Individual Pest Management Plans, and pesticide labeling instructions. No untrained staff, volunteers, or tenants will make structural pesticide applications.

3.6 Decision-Making and Record-Keeping

This section describes the procedures that the District will follow to make decisions and track pest management throughout its lands and departments. The primary process by which pest management decisions will be made and evaluated is through an Annual IPM Work Plan. Pesticide use record-keeping completed by each department will be kept by the IPM Coordinator, who will be responsible for consolidating this information into the Annual IPM Report, as described below.

3.6.1 Development of the Annual IPM Work Plan

The IPM Coordinator and the IPM Coordination Team will prepare an Annual IPM Work Plan each year that describes planned pest control projects in the upcoming year. Working through department supervisors, staff will provide the IPM Coordinator with a standardized spreadsheet or similar summary form describing upcoming pest control for the following basic types of activities:

- Routine minor pest control actions;
- Ongoing pest control projects; and
- New pest control projects.

Using this staff information, the Annual IPM Work Plan will be prepared by the IPM Coordinator, then reviewed and approved by the IPM Coordination Team. Information in the Annual IPM Work Plan will also be used to inform the Annual IPM Report (described below in Section 3.8.1).

The Annual IPM Work Plan will include the following basic information:

- Summary (e.g., Excel spreadsheet) of routine minor and ongoing pest control projects;
- Detailed descriptions of new pest control projects;
- Projected amounts of pest control in the next year (acres, hours, acres treated per gallon, total gallons used); and
- Any new approaches to be implemented as a result of the adaptive management review in the Annual IPM Report of the preceding year.

These types of pest control activities are described in more detail below. Refer to Appendix ~~B~~E for sample forms.

3.6.2 Early Detection and Rapid Response

An Early Detection and Rapid Response (EDRR) Program is a formalized monitoring program that utilizes active and passive land surveillance as a method to discover and identify new invasive species or their symptoms before they become widely established. This can be accomplished with 1) active detection, 2) passive detection, and 3) syndromic surveillance as defined by the National Invasive Species Working Group (National Invasive Species Council 2003; U.S. Department of the Interior (DOI) 2025)

- **Active Detection:** Active detection programs have structure, staffing, and dedicated funding to accomplish land surveillance (landscape-level invasive plant monitoring). Dedicated staff, volunteers, or contractors under a specific set of goals may run these programs. Active detection programs for invasive species often have limited dedicated resources to conduct the work, so it is important to be focused on high-priority targets, such as high-risk locations, high-value resources, important pathways, and populations and species of concern.
- **Passive Detection:** Passive detection programs have more limited goals and structures that are embedded into existing programs and activities. These programs fortuitously detect invasive species as staff, volunteers, or contractors conduct other activities.
- **Syndromic Surveillance**: Syndromic surveillance uses the analysis of other resource management problems to detect invasive species indirectly through their direct damage or other ecosystem disruption. Detecting the damage associated with invasive species may be the first indication of a new invasion. This is often the case with invasive pathogens and parasites that are difficult to otherwise detect.

Midpen will continue to implement its EDRR Program as part of the 2025 IPMP (refer to Appendix F for the entire EDRR Program). The goal of EDRR is to detect new populations of invasive plants while populations are still small, and eradication is achievable. The key components of the EDRR Program are prioritizing areas to be surveyed, performing surveys to identify new populations and inventory existing populations, and rapid response treatments for any significant discoveries.

The objectives for the District's EDRR Program are to:

1. Identify potential threats in time to control or mitigate;
2. Detect new invasive species in time to allow efficient and safe eradication or control decisions to be made;
3. Respond to invasions effectively to prevent the spread and permanent establishment of invasive species;
4. Educate staff, partners, and the public about emerging threats from invasive species, and encourage public participation in the program; and
5. Adaptively implement early detection and early response strategies over time.

As part of EDRR, Midpen maintains an EDRR Species List, which is designed to be adaptable. The list is revisited and revised regularly by Midpen staff. Maintenance of this list allows the District to easily communicate target species to a wide audience for passive early detection.

Detection Strategies

New invasive species may arrive in the District through sudden, unpredictable pathways (e.g., boots on a traveler) and more constant, predictable pathways (e.g., roads, trails, and/or horticultural escapees from neighboring properties). District lands are scattered throughout the San Francisco Peninsula, with boundaries adjacent to rural private residences and community land uses, county public roadways and two-lane highways, and productive agricultural landscapes including rangelands with pasture grazing cattle, livestock pens, commercial nurseries, orchards, vineyards, and row and cereal crops. Each of these land uses account for possible introductions of invasive species along preserve borders, interior ranch roads, narrow trails, and easements.

The most efficient way to prevent routine introductions of invasive species into District lands is to use vigilant patrol and monitoring protocols along District boundaries. Trails, ranch roads, and waterways intersecting District lands are the most likely routes of invasion for new species. Many of these common pathways have been confirmed through District mapping and planning work (Midpen 2014)~~(District 2004).~~

Modeling Invasive Pathways

The District maintains approximately 518 miles of ranch roads and trails and has a geographic border (not including adjacent District parcels) totaling approximately 436 miles, as of 2025. Not all of these trails, roads, and edges have the same potential to introduce new invasive species into District properties. Locations within the District that receive the most intense impacts from disturbance, visitation, utility maintenance, and neighboring land uses are the most likely sources for new species introductions. Simple models can be used on a local preserve level to analyze probable pathways for key invasive species the District may expect to encounter. The District can identify routine and sporadic activities that have a high probability of introducing invasive species, as well as the types of species anticipated.

Table 3-1 defines a ranking system for the District to identify activities on preserves that are most likely to promote invasive species introductions. Table 3-2 provides a ranking system for monitoring based on suitability for invasion and volume of new plant material (seeds, etc.) likely to be introduced. By understanding both the activities that promote invasions and the candidate species for likely invasion, the District can more successfully plan for prevention, detection, and control activities.

Table 3-1 Ranking of Most Likely Pathways of Invasive Species Introductions (Identification of Areas and Activities to Prioritize for Early Detection Monitoring)

	Ranking of Vectors' Probability to Import/Distribute Invasive Plants
1	Heavy equipment from outside District
2	Topsoil importation for construction
3	Sand or gravel for road construction
4	Work activities along rights-of-way external to District (e.g., PG&E, CalWater)
5	Work activities of District employees or contractors
6	Grazing lessees/livestock grazing
7	Visitor vehicle traffic
8	Wind
9	Visitors hiking
10	Wildlife
11	Water

Table 3-2 Prioritization of Specific Areas for Monitoring Based on Suitability for Invasion and Volume of New Plant Material (Seeds, etc.) likely to be Introduced

	Areas for Monitoring
Very high priority	
1	Construction/maintenance areas
2	District offices, structures
3	Buildings, houses at the urban/rural development interface
4	Paved areas (e.g., roads/parking lots/trailheads)
5	Landscaped areas
6	Disturbance from human intervention (e.g., emergency fuel breaks during fires)
7	Trails
8	Areas of high visitor use
9	Utilities (e.g., cell towers, powerline corridors)
10	Pastures/agricultural areas

Areas for Monitoring	
Medium priority	
11	Riparian areas
12	Natural disturbances with no human intervention (e.g., fire, rockfall)
Low priority	
13	Off-trail wilderness areas

Source: adapted from (Gerlach et al. 2003)

Staff Training

Early detection monitoring can be accomplished by staff, volunteers, preserve visitors, or contractors. The utilization of existing natural resource management and maintenance staff and volunteers provides the best value for the District. With limited training, existing staff resources can be utilized and repurposed for early detection monitoring at minimal additional cost although it will not be a comprehensive effort. Refer to Section 3.6.2 for a more detailed description of planned IPM trainings.

Detecting a new arrival can sometimes be a challenge since very few people have adequate training to identify foreign and unfamiliar species. However, there is potential to train staff and volunteers familiar with District habitats to notice and report when species are found that appear unusual or out-of-place. In addition to new invasive species, other resource management targets such as rare plants and animals may also be discovered through this type of observation.

Rapid Response Strategies

Small infestations of invasive species generally offer the greatest number of treatment method options for successful eradication. Many times, hand removal of individuals is the control method with the greatest selectivity and cost effectiveness, with the least amount of indirect impacts. Individual specimens or small patches identified incidentally or during regular monitoring can often be immediately removed. For vegetation removal, hand digging, cutting, or pulling are all examples of selective hand removal. For vertebrate species, hand removal usually means trapping or shooting. Small-scale removal is most effective on newly-established and small populations with limited distributions.

Pesticides may also be an efficient treatment method for rapid response actions. In some cases, a specific pesticide may be identified to abate an immediate invasive species hazard when it is found. Pesticides may be especially effective for species where hand removal actions are impractical (e.g., steep cliffs) or where hand or mechanical removal methods would risk spread of the species (e.g., plants that can spread from broken root fragments). Herbicides must be on the List of Approved Pesticides (Table 3-3) for expeditious use under rapid response.

In all cases, the District will map the occurrence before control and then revisit the control site several times to ensure full control was achieved. Eradication may require multiple visits in a year, or possibly multiple years of monitoring and treatment.

Individual Pest Management Plans

If a project is proposed during the year ~~which~~ that was not included in the Annual Work Plan, then a description of the project will be prepared for review and approval by the IPM Coordinator and the IPM Coordination Team. Examples of when ~~individual pest management plans~~ Individual Pest Management Plans might be required are when new properties are acquired or new pests of high priority are discovered in the course of a year~~.~~, such as when implementing the EDRR Program (refer to Section 3.6.2).

3.6.3 Routine Minor Pest Control

Routine minor pest control activities include maintenance activities that generally ~~utilize~~ use the same pest control methods at the same site from year to year. These are primarily non-chemical methods, such as brush cutting of trails and mowing~~/discing~~ for fuel management,~~,~~ but also include minor use of pesticides in cut-stump or spot-~~-~~spraying application at recreational facilities and fuel management areas, the use of approved insecticide baits in buildings, or wasp spray for stinging insects in trails or bathrooms.

Staff will provide a brief projection of routine minor pest control activities in a spreadsheet (or similar format) that is included in the Annual Work Plan. This spreadsheet is maintained by the Fleet & Facilities Department.

3.6.4 Ongoing Pest Control Projects

Ongoing pest control projects are existing projects that are expected to have an end date (even if it takes ~~ten~~10 years) such as treatment of brush on rangelands or French broom on natural lands. Because these are ongoing projects, they will have already been surveyed for site conditions and a multiple-year strategy will have been developed. Tracking and monitoring these ongoing projects will be important to determine if treatment is effective and at what stage treatment methods should be adjusted (such as switching from herbicide to pulling when the density of invasive weeds has substantially decreased). Ongoing pest control projects will be summarized in the Annual Work Plan and tracked for staffing, costs, and adaptive management (effectiveness of selected pest control) purposes.

Staff will provide a projection of ongoing pest control projects in a spreadsheet (or similar format) for inclusion in the Annual Work Plan and will specifically note any changes that are to be made to specific ongoing projects in the upcoming year (e.g., change in treatment method, change in level of effort, requirements for periodic pre-treatment surveys).

3.6.5 New Pest Control Projects

New pest control projects will receive a more detailed review and assessment by the IPM Coordinator and IPM Coordination Team. Staff will prepare a description of newly proposed projects for inclusion in the Annual Work Plan and will specifically note how the recommended treatment is consistent with the IPM Guidance Manual, ~~best management practices~~ IPMP BMPs, and mitigation measures. These descriptions will be included in the aforementioned spreadsheet.

Staff proposing new pest control actions will provide the following information as part of the description:

- Name and purpose of the proposed pest control activity;
- Location (i.e., preserve name, building or trail name, or location including map where appropriate);
- Pest identification and the population size, location, life cycle, and density;
- A brief assessment of damage caused by the pest, including the perceived threshold for action (e.g., severity of the infestation/amount and type of damage);
- Site conditions, per the required pre-treatment surveys (refer to Section 2.3 which discusses IPMP BMPs), including the presence of aquatic areas, rare species, steep slopes, access and other environmental conditions that are relevant to the effectiveness of pest control and avoidance of environmental impact;
- A description of prevention, options that were considered/previously implemented before the active pest control project was proposed;
- Proposed pest treatment options (e.g., grazing, brushing, mowing, herbicide application) and amount of each type of treatment (e.g., acres to be treated), project duration, project timing, performance standards, and remedial actions;
- Proposed labor force (staff, contractor, volunteers, or special groups), projected labor hours or special materials or equipment required, and direct costs for the next year.
- If new pest control projects are determined outside of the Annual IPM Work Plan, then an Individual Pest Management Plan will likewise be prepared and reviewed and approved by the IPM Coordinator.

~~3.7 PRIORITIZATION~~

~~One of the most difficult aspects of implementing an IPM program is to develop a consistent, transparent, and replicable decision-making and prioritization system that allows the District, or any other organization, to make informed decisions about which pest control projects out of many potential ones will be funded. The decision- making process must be flexible, so that staff can adjust workloads from year-to year while still resulting in consistent IPM decisions across departments and staff. The prioritization approaches developed by the Golden Gate National Recreation Area and Marin County Open Space District were examined for their advantages and disadvantages since these two organizations are similar in size and mission to the District, and manage diverse resources, interest groups, and stakeholder groups.~~

~~A prioritization system is most useful in determining relative importance of closely related pest management activities. For example, a prioritization system can help staff compare the benefits of treating yellow starthistle in two pastures, one of which is newly invaded with weeds, the other which is an ongoing treatment site.~~

~~Another example would be comparison of treatment of a newly-discovered invasive plant population with treatment of an established population of French broom that is located in a~~

~~sensitive habitat. The District will use the prioritization system for IPM on rangeland, agricultural lands, and natural lands.~~

~~The District will not use the prioritization system for pest control in buildings, recreational facilities, or fuel management because these routine activities are a relatively fixed, constant priority for the District and are primarily undertaken to meet legal requirements (e.g., defensible space for wildfire protection) or District- adopted specifications (e.g., fuel management clearance adjacent to trails and roads for hikers, bicyclists, equestrians and vehicles), or to protect human health in or the structural integrity of a building. Although there is little flexibility in whether to manage pests associated with these routine activities, there is flexibility in deciding what treatment methods to use and how to conduct them.~~

~~The prioritization system will be used mostly when the IPM Coordination Team meets to finalize the Annual IPM Work Plan. This process should be coordinated with the overall staffing, budgeting and objectives of the agency and departments for the year.~~

~~Projects will be given a score within each category depending on how well it addresses the most important criteria (at top of each list) and/or the number of criteria within that category (Table 3-1). The score within each category will be within 0 through 3 points with 3 indicating a higher score. The category scores will be totaled at the bottom of the table to provide an overall project priority score.~~

~~Table 3-3 Sample Project Ranking System~~

~~Category and Criteria~~	~~Ranking~~
~~Assign a score of 0,1,2, or 3 to each of the 5 categories using the criteria shown in each category 0 =does not apply, 1 minimally meets criteria to 3=meets all or most criteria~~	
~~1. Safe~~	
~~Low level of risk (exposure) to human health, the environment and non-target organisms for anticipated result.~~	
~~Nonchemical method provides acceptable level of pest control especially for structures frequently occupied by humans.~~	
~~2. Prevents and Controls Most Destructive Pests~~	
~~Prevents new populations of pest.~~	
~~Activity is early detection of and rapid response to small populations of a new pest species or new occurrences of known pests.~~	
~~Pest has been ranked as or is otherwise known to be highly invasive or destructive.~~	
~~Continues, or completes an ongoing District pest control project or action.~~	
~~Reduces, contains, or eliminates a target pest species.~~	
~~Enhances or encourages natural predation or natural systemic control of pests.~~	
~~3. Protects Biodiversity~~	
~~Results in protection or enhancement of native biodiversity especially for special-status species or sensitive plant communities such as wetlands, serpentine grasslands, and coastal prairies.~~	
~~Contributes to the long-term preservation of natural resources and functioning ecosystems.~~	
~~Reduces spread of plant pathogens that have the potential for large-scale and long-term ecological change such as with Sudden Oak Death.~~	
~~Reduces risk of vegetation converting to less native biological diversity~~	
~~Improves rangeland or natural area health or otherwise provides for ecological resiliency in light of future climate change and wildfire cycles.~~	
~~4. Provides for Public Engagement~~	
~~Has significant public interest and support particularly from collaborating organizations or neighbors.~~	
~~Provides for increased volunteer and/or stewardship opportunities/participation in IPM program.~~	
~~Increases public understanding and support of IPM program~~	
~~5. Feasible and Effective~~	
~~Can be accomplished with existing staffing and funding.~~	

~~Category and Criteria~~	~~Ranking~~
~~Project readiness (i.e., project can be accomplished within projected timeline, including permitting and environmental compliance).~~	
~~High level of anticipated outcome for the staffing and funding (cost/benefit).~~	
~~Selected technique has been shown to be effective in controlling target pest under relevant site conditions within 5 years.~~	
~~Integrates with existing District programs, including grazing leases and approved agricultural land uses.~~	
~~Reduces overall maintenance costs.~~	
~~**TOTAL PROJECT SCORE** (Add scores in each of the 5 categories to get a total scope for the project. Range from 0=low priority to 15=high priority)~~	

3.7 Prioritization

As part of the 10-year Program update, the District has revised the pesticide prioritization system for IPM on rangeland, agricultural lands, and natural lands in relation to weed control. The prioritization framework includes a structured yet adaptable approach to managing pest species and focuses efforts based on ecological benefit. Midpen's approach will use spatial data (i.e.~~,~~ geographic information system (GIS)) to integrate ecological value, species risk, and management feasibility into management activities. Midpen regularly reviews any new data, emerging threats, and on-the-ground lessons for incorporation into the prioritization approach. This approach ensures the District can respond to changing conditions while maintaining focus on the most pressing threats and capturing field efficiencies. Midpen considers the following objectives when prioritizing and scheduling pest species management activities:

- Protect what matters most – priorities are driven by the value of the site's ecological resources.
- Address the greatest threats – species are ranked by ecological impact, spread potential, and risk of irreversible change.
- Adapt to local conditions – adjust ratings to reflect site-specific evidence of pest and elevate EDRR targets as needed (refer to Section 3.6.2)
- Work efficiently – include opportunities to address multiple species during a single site visit when feasible.

The following factors are considered during prioritization: accessibility, ability to contain, treatment timing, non-target impact risk, and relative cost of treatment. When crews are mobilized to treat primary target pest species, they may also address secondary pest species present in the same area if the treatment window overlaps, control methods are compatible, the primary work will not be compromised, and risks to sensitive resources remain acceptable. This approach increases efficiency and ecological benefit by reducing the need for repeated mobilizations. Secondary treatments are chosen based on qualitative assessments of pest species, spread potential, and proximity to high-value resources.

3.8 Reporting

3.8.1 Annual IPM Report

The District will prepare an Annual IPM Report each year that describes past pest control activities (both chemical and non-chemical) on District Lands. The draft Annual IPM Report will be prepared by the IPM Coordinator and reviewed by the IPM Coordination Team. Once approved by the IPM Coordination Team, the final report will be presented to the General Manager for initial approval. The report will then be forwarded to the Board of Directors for review, and where necessary, approval (e.g., changes to the List of Approved Pesticides).

At a minimum, the Annual IPM Report will include the following basic information:

- A change log documenting proposed annual updates or adjustments to the Program.
- A summary of pest problems that the District has encountered during the year, and a comparison to past years.
- A summary of District pest control treatments, presented by type of control (e.g., mowing, herbicide use).
- Wherever possible, a comparison of units treated (e.g., acres, square feet, linear feet or miles) in the current year versus previous years ~~for comparison purposes.~~ with a cost per acre for major pest control treatment types.
- A qualitative assessment of effectiveness of the District's pest control program, and suggestions for increasing future effectiveness (see Chapter 4 for additional details).
- A summary of pesticide use, presented by category (e.g., herbicide, insecticide), active ingredient or formulation (e.g., ~~glyphosate,~~ imazapyr), or ~~pesticide formulation~~ product name (e.g., ~~Roundup ProMax™~~ Stalker™, Polaris™).
- A ~~brief~~ summary of public notifications and public inquiries about IPM on District lands;
- Assessment of compliance with the Guidance Manual including:
  - An evaluation of the effectiveness of any changes in practices that were implemented in the past 12 months.
  - A description of any experimental pest control projects (test studies) and the results, including a cost/benefits analysis.
  - Suggested changes to the IPM Program or the Guidance Manual's pest control practices proposed for adoption included as part of the aforementioned change log within the next 12 months including:
    - Any proposed substitute pesticides to replace phased out pesticides (additions to the List of Approved Pesticides).
    - Any proposed alternative pesticides (additions to the List of Approved Pesticides) or pest control methods proposed for adoption.

3.8.2 District Pesticide Reporting

As required by regulations of the California Department of Pesticide Regulation (California Code of Regulations, Title 3, Division 6), the IPM Coordinator will report all pesticide use on a monthly basis to the County Agriculture Departments (San Mateo, Santa Clara and Santa Cruz Counties); will prepare, or obtain ~~Pest Control Recommendations~~ PCRs from a licensed ~~Pest Control Advisor~~ PCA on an annual basis; will annually renew the District's Operator Identification with the County Agriculture Departments; and will most likely require designated field supervisors to obtain either a ~~Qualified Applicator License or a Qualified Applicator Certificate.~~ QAL or a QAC. The IPM Coordinator will also collect monthly pesticide reporting from its contractors who apply pesticides on District lands (See Section3.8).

3.8.3 Contractor Reporting

The District will ensure that all pest control contractors working on District~~-~~-managed lands comply with the Guidance Manual, including restricting use of pesticides to products on the District's List of Approved Pesticides ~~(Appendix A).~~ (Table 3-3). As required by regulations of the California Department of Pesticide Regulation (California Code of Regulations, Title 3, Division 6), contractors will report all pesticide use on a monthly basis to the County Agriculture Departments (San Mateo, Santa Clara and Santa Cruz Counties); will obtain ~~Pest Control Recommendations~~ PCRs from a licensed Pest Control Advisor (either from the District's IPM Coordinator or from an independent PCA); will renew its Operator Identification with the County Agriculture Departments; and require Contractor's field supervisors to obtain either a QAL or a QAC. The Contractor will provide copies of its reports to the IPM Coordinator.

Contractors who trap certain pest animal species must also obtain and comply with predation permit requirements from ~~CDFW~~ California Department of Fish and Wildlife (CDFW) to record the species, pounds captured, and final destination of the animals (to prove that the species were not transported live or re-released elsewhere in California).

3.9 Training and Safety

3.9.1 Training

The IPM Coordinator is responsible for coordinating staff training across departments, and for overseeing safety procedures. In general, ~~three~~ two types of trainings will be provided:

- Pest identification training (for staff involved in pest control), and
- Annual pesticide safety training (for staff that use/apply pesticides).

Pest Identification Training

The pest identification training will be prepared by District staff, with assistance from the IPM Coordinator, then provided to staff, particularly those who work in natural areas, rangelands, and agricultural properties. This training will most likely be provided on an as needed basis (as determined by the IPM Coordinator and department supervisors).

Pest identification training will include procedures for identifying and reporting pest sightings. Color photographs of several life stages (e.g., seedling, flowering, fruiting stages or larval and adult stages), a brief description and life history of each pest, associated habitat types, map of where the pest is known to be found on District preserves and ~~summary of best management practices~~ summaries of the relevant IPMP BMPs for working in and around infested areas will be covered in this training. It may take several years to comprehensively develop information and train staff on all pests in District preserves. The District's Invasive Plant Control Notebook~~-~~, managed and routinely updated by University of California State Integrated Pest Management Program (UC IPM), already contains information on ~~approximately 150~~ invasive plants of the region and is ~~already~~ used as a key training and identification tool by the staff~~; it will be expanded to include other types of pests.~~.

Annual Pesticide Safety Training

The annual pesticide safety training is intended to help supervisors, managers, and other staff involved in pest control ~~application~~ applications become familiar with non-chemical pest control actions; limit exposure and risk associated with the use of pesticides; and understand ~~Best Management Practices~~ the IPMP BMPs for environmental protection. The District's ~~Annual Pesticide Safety Training~~ annual safety training program for pesticide handlers will also describe regulatory requirements of the California Department of Pesticide Regulation's pesticide application requirements and CDFW's special-status wildlife handling procedures.

The annual pesticide safety training will be performed by the IPM Coordinator (if they are a licensed PCA QAL and/or QAC), or a PCA-, QAL/QAC-licensed contractor who is familiar with District resources, pest management issues, and staff work procedures.

The annual ~~Pesticide~~ pesticide safety training must include the following at a minimum:

- Pesticide product labeling format and meaning of information, such as precautionary statements about human health hazards.
- Hazards of pesticides (acute, chronic, delayed, and sensitization effects) identified in pesticide product labeling, Material Safety Data Sheets (MSDS), or Pesticide Safety Information Series (PSIS) leaflets.
- Pesticide safety requirements and procedures in regulation, PSIS leaflets, MSDS.
- Engineering controls (closed systems, enclosed cabs) for handling, transporting, storing, and disposing of pesticides.
- Environmental concerns (drift, runoff, and endangered species ~~best management practices~~ BMPs to reduce risks to sensitive natural resources).
- Routes by which pesticides can enter the body.
- Common signs/symptoms and emergency first aid for pesticide exposure.
- How to obtain emergency medical care.
- Routine and emergency decontamination procedures, including spill cleanup and the need to thoroughly shower with soap and warm water after the exposure period.
- Use and care of any required personal protective equipment.
- Prevention, recognition, and first aid for heat-related illness.

- Notification requirements.

Records of annual training will be retained by the IPM Coordinator or the District's Training and Safety Specialist and will be kept for ~~two~~ 2 years in a location accessible to employees. Training records must indicate the topics covered during training, the materials used for training, the name and qualifications of the trainer, and the signature and date of all employees who received the training.

~~3.9.2 SAFETY~~

3.9.2 Safety Procedures for Herbicide Application

Section 17.005 of the District's Operations Maintenance Manual provides guidelines to the staff for safely handling and applying pesticides. Upon adoption of the IPM Guidance Manual, those procedures will be updated to be consistent with the IPM Guidance Manual and will be subsequently included herein.

3.10 List of Approved Pesticides

3.10.1 Pesticide List

A List of Approved Pesticides was developed specifically for use on District lands. Refer to ~~Table 1.1 in Appendix A~~ Table 3-3 for ~~the complete~~ a focused list of the approved pesticides~~, as well as detailed toxicological analysis and results presented for each pesticide. This list~~ under the 10-year Program update. Table 3-3 presents pesticides by ***IPM Management Category*** (e.g., IPM in Buildings, IPM in Natural Lands, etc.), ***category*** (e.g., herbicide, insecticide), and~~;~~ ***active ingredient*** (e.g., ~~glyphosate,~~ imazapyr~~); and~~ ~~***pesticide***~~, triclopyr, clopyralid). Refer to Appendix A for the full List of Approved Pesticides, which includes formulation ~~(e.g., Roundup ProMax™) (sometimes referred to as brand~~ information and product name ~~or common name).~~

~~This list of~~ , purpose of respective pesticide, annual application, and timing of application. Refer to Appendix B for a detailed toxicological analysis and results of newly added pesticides under the 10-year Program update.

This List of Approved Pesticides is intended only for use on the pests, environment, and microclimates of properties and buildings managed by the District~~, and would not be used on other lands without additional analysis.~~. Each product on this list has been (and new proposed products ~~would~~ will be):

- Screened for human toxicology, ecological toxicity environmental fate and transport, and proven efficacy against target pests;
- Reviewed for human safety and efficacy;
- Reviewed annually by the District's ~~ipm coordinator and ipm coordination team~~ IPM Coordinator and IPM Coordination Team;
- Reviewed and approved by the Board of Directors;
- Presented for public comments at public hearings; and

- Included in the environmental documentation and public notification procedures that are being prepared for the ~~ipm program~~ IPMP (i.e.~~,~~ the list is adopted as part of environmental review and approval process).

This list encompasses mostly products already in use by the District, as well as a few new pest control products~~. Products on this list were reviewed for human and environmental safety, and efficacy on the District's target pest species.~~ as part of the 2025 IPMP Update. As the District continues to expand its coverage area, the overall scale of pesticide use under the IPMP must also increase to meet the growing treatment and coverage needs. Additional details about the District's screening process are provided below.

3.10.2 Pesticide Screening Process

The District, using toxicologists, its IPM Coordinator, and IPM Coordination Team and other licensed experts, has or will screen ~~proposed~~ pesticides prior to approval by following these three steps:

1. Conduct a toxicological analysis of each pesticide under consideration (Appendix ~~A~~B).
2. Assess the risk to human health and safety of workers and visitors on District lands, as well as the risk to the environment from proposed pesticide use.
3. Review the List of Approved Pesticides and associated background materials, then reject, modify, or adopt the list for use by District staff, contractors, and tenants.

3.10.3 Updating the List of Approved Pesticides

The List of Approved Pesticides is intended to change over time as the science of pest control advances and more effective, safer, and less harmful pesticides are developed; as manufacturers update, discontinue, or substitute products; and as the District's target pests change over time. The process for updating the List of Approved Pesticides is as follows:

- **Product Substitutions**~~. When~~:
  - When a new manufacturer creates the same formulation or manufacturers substitute a product or change a product name or formulation, but when the *active ingredient stays the same*, the new product can be substituted for the old product on the List of Approved Pesticides. In general, this type of change to the list would not trigger a change in condition or result in the need for additional environmental documentation. Therefore, this change typically will require a simple update to the List of Approved Pesticides ~~(Table 1.1 Appendix A)~~ (Table 3-3). Additional environmental review would only be required if the change results in a potentially substantive change in human health exposure, environmental fate, or toxicity.
  - For simple substitutions of products from the List of Approved Pesticides, the IPM Coordinator will, as necessary, seek the advice of technical experts and independent Pest Control Advisors; keep the IPM Coordination Team

informed; and include such changes in the Annual IPM Work Plan, which is approved by the Board of Directors.

- **Product Eliminations:**
  - In instances where products on the list are no longer available from the manufacturer, are found to be ineffective against the District's target pests, or if new risks are discovered that were not previously evaluated by the District (see Table 3-3), a product may be eliminated from the List of Approved Pesticides. This type of change requires an update to the List of Approved Pesticides (Appendix A) but does not require additional environmental review.
  - ~~Approved Pesticides. This type~~ For simple eliminations of ~~change requires an update to~~ products from the List of Approved Pesticides ~~(Table 1.1 Appendix A), but does not require additional environmental review~~, the same process as the substitutions process will be followed and changes will be included in the Annual IPM Work Plan, which is approved by the Board of Directors.
- **Product Additions:**
  - In instances where new products with new active ingredients are found to be safer, more effective, and/or less costly than products on the ~~on the~~ List of Approved Pesticides, the District may elect to add new pesticides. This type of change typically requires additional toxicological review, and depending on the results, may also require additional environmental review.
  - In instances where new pesticide formulations (products) are being recommended for addition to the List of Approved Pesticides, the IPM Coordinator will, with assistance from technical experts such as independent PCAs, conduct the same analysis on the proposed new pesticide formulation as was conducted on the approved pesticide formulation (Appendix A). All new pesticide formulations (products) under consideration will be evaluated using the same standards for human and environmental safety, and efficacy on the District's target pest species (refer to Appendix A).

Based on the results of the processes outlined above, the IPM Coordinator will then present the findings to the IPM Coordination Team, along with a recommendation to add or eliminate the new pesticide formulation from consideration. The IPM Coordinator can also recommend a test study to provide additional information. Based on the information provided by the IPM Coordinator, the IPM Coordination Team will advance the new pesticide formulation (product) plus any required environmental review for consideration by the Board of Directors for approval. The Board ~~who~~ may request additional information or eliminate the new pesticide formulation from consideration. If the IPM Coordination Team recommends advancement, the IPM Coordinator will provide pertinent information about the new pesticide formulation, including a description of why the new pesticide formulation is being considered, risk, efficacy, cost, application standards and limitations for use, results of test studies (where available), and environmental review to the Board of Directors for consideration. Approval of all new pesticide formulations is the responsibility of the Board of Directors. If approved, the new pesticide formulations will be added to the List of Approved Pesticides~~.~~ included in Appendix A, which will be formally revised as part of the Annual IPM Report (refer to Section 3.8.1).

In the event of an emergency situation, such as a human health disease outbreak, pesticides that are not included on the List of Approved Pesticides may be used for short periods of time. In these unusual situations the District will comply with required regulatory procedures, then will evaluate the emergency response pesticide use and determine if its IPM Program needs to be modified to accommodate similar future emergencies.

Table 3-4 List of Approved Pesticides Split by Management Category

IPM Management Category	Active Ingredient/Formulation	Method of Application
Buildings	Insecticidal soap	Spray
	Diatomaceous earth	Crack & crevice
	Boric acid	Crack & crevice
	S-Hydroprene	Impregnated disc
	Indoxacarb (0.1%)	Crack & crevice
	Indoxacarb (0.5%)	Crack & crevice
	Sodium tetraborate decahydrate	Bait station
	Fipronil	Bait station
	Fipronil	Spot treatment
	Cholecalciferol	Bait station
	Prallethrin	Spray
	Chlorantraniliprole[a]	Perimeter
	Dinotefuran[a]	Perimeter
	Sulfuryl flouride/ chloropicrin[a]	Tenting
	d-limonene[a]	Spot treatment
	Disodium octaborate tetrahydrate[a]	Spot treatment, prevention
Recreational	Prallethrin	Spray
	Glyphosate IPA	Cut-stump, spot spray, wick, frill/injection
	Glyphosate K	Cut-stump, spot spray, wick, frill/injection
	Clopyralid MEA	Spot spray, cut-stump, frill/injection
	Imazapyr IPA	Cut-stump, spot spray, frill/injection
	Triclopyr[a]	Spot spray, basal bark

IPM Management Category	Active Ingredient/Formulation	Method of Application
Rangelands and Agricultural Properties	Aminopyralid TIPA	Spot spray, cut-stump, basal bark, wick, frill/injection
	Clopyralid MEA	Spot spray, cut-stump, frill/injection
	Glyphosate IPA	Spot spray, cut-stump, wick, frill/injection
	Glyphosate K	Spot spray, cut-stump, wick, frill/injection
	Triclopyr BEE	Spot spray, cut-stump, basal bark
	Triclopyr TEA/ Aminopyralid TIPA	Spot spray, cut-stump, frill/injection
	Clethodim[a]	Spot spray
	Triclopyr[a]	Spot spray, basal bark
	Imazamox[a]	Spot spray [b]
	Glufosinate[a]	Spot spray
Natural Lands	Glyphosate IPA	Spot spray, cut-stump, wick, frill/injection
	Glyphosate K	Spot spray, cut-stump, wick, frill/injection
	Clethodim	Spot spray
	Aminopyralid TIPA	Spot spray, cut-stump, basal bark, wick, frill/injection
	Clopyralid MEA	Spot spray, cut-stump, frill/injection
	Imazapyr IPA	Spot spray, cut-stump, frill/injection
	Phosphite K Salts, mono-/di-	Spray, inject
	Triclopyr BEE	Spot spray, cut-stump, basal bark
	Triclopyr TEA/ Aminopyralid TIPA	Spot spray, cut-stump, frill/injection
	Triclopyr[a]	Spot spray, basal bark
	Imazamox[a]	Spot spray[b]
	Glufosinate[a]	Spot spray
General Chemical Disinfectants	Sodium dichloroisocyan-urate dihydrate[a]	Spot spray/water additive
	Sodium hypochlorite[a]	Spot spray

IPM Management Category	Active Ingredient/Formulation	Method of Application
	Ethanol or isopropyl alcohol[a]	Spot spray
	Dodecyl dimethyl ammonium chloride[a]	Spot spray
	Hydrogen peroxide[a]	Spot spray
Chemical Repellant	N,N-diethyl-meta-toluamide (DEET)[a]	Spot spray
	Picaridin[a]	Spot spray

Notes:

[a] indicates a pesticide that is newly incorporated as part of the 10-year Program update.

[b] Imazamox is used as a spot spray in aquatic or riparian environments.

Source: (Yun Cang, n.d.; Midpen 2018)

3.11 Notification

The District has developed notification procedures for use of pesticides (Section 17.006 of the District's Maintenance Operations Manual will be updated accordingly). District procedures are summarized below.

Prior, during, and after the application of a pesticide (including herbicides, insecticides, or other types of pesticides) on District preserves, employees or contractors will post signs at the ends of each treatment area notifying the public, employees and contractors of the District's pesticide use ~~of pesticide~~. Posting periods designated below are the minimum requirements; signs may be posted earlier and left in place for longer periods of time if it serves a public purpose or if it provides staff flexibility in accessing remote locations.

- For pesticide application in outdoor areas of all District-owned preserves and in buildings ~~which~~ that are not occupied or are rarely visited (e.g., pump houses), signs will be posted at the treatment areas 24 hours before the start of treatment until 72 hours after the end of treatment. Signs stating "Pesticide Use Notification" will be placed at each end of the outdoor treatment area and any intersecting trails.
- For urgent application of pesticides to control stinging insects, signs will be posted at the treatment area for the 72~~-~~-hour period~~s~~ after the end of treatment, but no pre-treatment posting is required.
- For pesticide applications in occupied buildings such as visitor centers, offices, and residences, notification will be provided to building occupants (employees, visitors, residents) 24 hours before the start of treatment by email, letters or telephone calls. Additionally, for buildings which might be visited by more than just a single family, signs stating "Pesticide Use Notification" will be placed at the entrances to the building 24 hours before the start of treatment and remain in place until 72 hours after the end of treatment. The use of approved insecticidal baits in tamper-proof containers will require notification 24 hours before the start of treatment by email, letters or telephone calls, but will not require posting of signs.

- The information contained in the pesticide application signs will include: product name, EPA registration number, target pest, preserve name and/or building, date and time of application, and contact person with telephone number. The contact person will usually be the IPM Coordinator.
- On lands that the District manages but does not own (e.g., Rancho San Antonio County Park), the District will provide notification of pesticide use in the same manner and applying the same actions as it does with its properties, unless the contracting agencies have adopted more restrictive management standards. In those cases, the more restrictive management standards ~~would be~~ are implemented by the District.
- In the event of an immediate public safety concern, notification will occur at the time of treatment but pre-posting may not be possible.

All contractors and lessees need to also notify the District before application on any property and comply with requirements for notification and posting of signs described above. At the discretion of the District staff and depending on the site conditions, neighboring landowners will be notified if the District is conducting pest management near a property line. At the discretion of the District staff, pest management activities that do not require pesticides (e.g., mowing~~, discing~~) may or may not be posted, depending on the level of visitor use and the potential for conflicts between site uses and planned pest management actions. Additional notification may also be provided in emails, newsletters, and public meetings, depending on the level of public safety concerns, public interest, and the size and duration of the planned pest control action.

4 Assessing the IPM Program and Updating the Guidance Manual

This chapter describes procedures for assessing the effectiveness of the ~~IPM program~~ IPMP as a whole using adaptive management, and the process for updating this Guidance Manual.

Adaptive management is a tool that allows natural resource managers to make good decisions and effective action plans based on limited information, and provides a means of reducing uncertainty over time through assessing the results of an action and changing subsequent actions (The Nature Conservancy 2007). Adaptive management is often described as "learning by doing." Given the types and rates of change observed on District preserves resulting from global, regional, and local factors (many of which are beyond the District's control), adaptive management is an important tool to help the District implement IPM in the face of change and uncertainty.

Adaptive management encompasses the following steps: establishing assessment criteria, collecting information, evaluating the program, and undertaking program modifications to make the program safer, more effective, and efficient.

4.1 Criteria to Assess the IPM Program

These criteria are intended to quantitatively and qualitatively measure and evaluate changes in the District's IPM Program over time:

- **Compliance with the Guidance Manual and List of Approved Pesticides.** The Guidance Manual's procedures are designed to select the least harmful pest control methods. When chemical control is selected, the Guidance Manual requires the selection of the least harmful effective pesticides (through the review and approval process).
- **Demonstrated use of lower pesticide worker health/exposure classifications in buildings and recreational structures** (as measured by totaling use of pesticides using the U.S. EPA Classifications I, II, III, and IV).
- **Reduction of pesticide use in buildings** (i.e., in areas where human use levels are high and the potential for human exposure to pesticides is greater than in other areas). The District will seek to comprehensively oversee all pesticide use in and around District buildings, including use by tenants, which is expected to result in an overall reduction of pesticide use in buildings, and in particular, eliminate use of pesticides not appropriate for use around human occupants or visitors, or which can inadvertently escape into the surrounding wildland environment. Pesticide

use in buildings will be measured in units of product used per treatment area (each building), or by units of product used per total square footage for District buildings.

- **Reduction in per-acre herbicide use at individual sites in natural areas over time.** The District will seek a reduction in per-acre usage of herbicides over time at individual sites, but acknowledges that in some instances, use will initially increase, followed by a reduction in herbicide use when the pest is eliminated or reduced. As an example, as new properties are acquired or new invasive plant infestations are discovered, overall herbicide use may initially go up, however, they are anticipated to drop over time as pests are controlled or eliminated~~ at such sites~~.
- **Preservation of biodiversity and natural resource values** in natural areas, rangelands, and agricultural properties. District staff will provide an annual qualitative assessment of natural resource conditions of IPM projects in natural areas, rangelands, and agricultural properties in the Annual IPM Report.
- **Provide a brief summary of public notifications and responses to inquiries from the public.** District staff will provide a summary of public notifications in the Annual IPM Report. The District will also record public inquiries made by telephone or in person regarding the IPM Program, and will briefly summarize inquiries and its responses to such inquiries on an annual basis.
- **Provide an annual summary of public participation in pest control.** The public is seen as an integral part of the success of the IPM Program. In particular, volunteers who assist with invasive plant identification and control are a valuable asset to the IPM Program. The District will tally volunteer hours spent on invasive plant control, and where possible, will identify future activities for volunteers, and/or new ways that the public can participate in the IPM process.
- **Provide an annual summary of staff training, public outreach, and educational activities related to IPM**. The District will summarize staff trainings, public outreach efforts, and educational outreach efforts such as working with tenants to use appropriate pesticides in structures and rangeland/agricultural areas.

4.2 Tracking the Program

Using the criteria described above, District staff will monitor pest control projects, and tally quantitative and qualitative results on an annual basis. The IPM Coordinator will present results in the Annual IPM Report.

- Each District Department will report pesticide use~~ (quantities of each pesticide product per toxicity classification)~~ to the IPM Coordinator, as described in Section 3.2 of Chapter 3. ~~The IPM Coordinator will present results in the Annual IPM Report.~~
- District staff will regularly update the District's Pest Database, including a summary of District pests of concern, pest control activities, acres treated, and

geographic (mapping information) ~~on~~ treatment locations. The IPM Coordinator will use this information to prepare an annual assessment of units of herbicides per acres treated, as well as non-chemical treatments of pests. ~~The IPM Coordinator will present results in the Annual IPM Report.~~

- The IPM Coordinator will qualitatively describe the condition of natural areas and managed landscape areas, identifying problem pests or areas requiring further investigation or treatment.
- The volunteer coordinators will tally volunteer hours spent on invasive plant control and provide this information to the IPM Coordinator.
- The IPM Coordinator will track and record public inquiries, questions, comments, and concerns about the IPM Program and summarize in the Annual IPM Report.

4.3 Program Evaluation

Using the information described above, the IPM Coordinator, with input from District staff, will evaluate the IPM Program as a whole on the basis of:

- **Safety** (i.e., did the IPM Program reduce risks and help ensure the safety of people and the environment?);
- **Effectiveness** (i.e., were pests controlled or eliminated in a cost effective and safe manner?); and
- **Purpose** (i.e., are District buildings; recreational facilities; and agricultural lands, rangelands, and natural areas functioning as intended?).

The results of the evaluation will be presented in the Annual IPM Report. The Annual IPM Report will be presented to the IPM Coordination Team for review and approval. Using the monitoring protocol described above in Section 4.1, the IPM Coordination Team will assess the effectiveness of the IPM Program, and recommend changes to the program intended to increase effectiveness and efficiency of pest control activities.

The final Annual IPM Report, which will include the IPM Coordination Team recommendations, will then be submitted to the General Manager for initial approval and to the Board of Directors for review and acceptance, including any changes to the Approved Pesticide List.

4.4 Program Modifications

The Annual IPM Report, as approved by the General Manager and accepted/approved by the Board of Directors will be the basis for making changes to the Guidance Manual, including modification of any IPM procedures or changes to the List of Approved Pesticides.

Each year following Board of Directors review of the Annual IPM Report, the IPM Coordinator will implement recommended changes to the Guidance Manual and IPM Program.

4.5 Updating the IPM Guidance Manual

This Guidance Manual is intended to be a "living document," in which minor changes that do not trigger additional environmental effects can be made without needing to complete additional environmental analysis. The document will continue to be updated approximately every 10 years, and as necessary, supplemental CEQA and other environmental analysis will also be prepared ~~in the interim~~ as appropriate. The IPM Coordinator and IPM Coordination Team will review proposed changes to determine if they would result in changes to adopted IPM Policy and guidance procedures (see Section 4.4 above). This review will include assessment of changes to the lists of target pest species, pest control methods, and pesticide use trends.

When changes to the Guidance Manual are required, the IPM Coordinator will initiate a review process to determine whether the proposed changes are minor (as defined under the ~~CEQA~~ CEQA Guidelines Section 15164, the approval process for the project as not resulting in substantial new information or new significant environmental impacts). If the changes are confirmed to be minor, these changes can be addressed through the IPM Coordination Team review and approval process (described above). Examples of minor changes that would not likely trigger a new environmental review include process updates and simple interchangeable product substitutions for products on the District's List of Approved Pesticides (see Section 3.10).

~~IPM PROGRAM IMPLEMENTATION~~

~~An IPM Implementation Plan will be developed in the first year of the program. The purpose of the Implementation Plan is to systematically develop larger tasks (i.e., prevention and monitoring) and integrate them into the Annual IPM Work Plan over a five-year period. Major tasks to be included the IPM Implementation Plan in the first year include:~~

- ~~Designate an IPM Coordinator and an IPM Coordination Team;~~
- ~~Develop an Annual Work Plan;~~
- ~~Develop a comprehensive pest database including forms to allow staff to record and report pests and pesticide use to the IPM Coordinator in a streamlined fashion;~~
- ~~Develop and implement training and safety programs to ensure IPM as described in the Guidance Manual is properly implemented by staff;~~

~~Assess, and as necessary modify, the Guidance Manual (adaptive management) in the Annual IPM Report to the Board of Directors.~~

~~In future years, the following additional steps would be taken to further implement the IPMP:~~

- ~~Test and revise a priority system to rank pest control projects on natural areas, rangelands, and agricultural lands;~~
- ~~Work with tenants to consistently apply IPM practices around people and in natural surroundings;~~
- ~~Develop an early detection rapid response program and related landscape-level monitoring program for all district lands; and~~
- ~~Participate in regional pest management research and monitoring efforts to keep up on the most recent innovations in pest control science, pest control methods, and pests that are detected near district preserves but may not yet be problematic on district lands.~~

5 IPM in Buildings

5.1 Definition and Purpose

District properties include ~~over 182~~ approximately 330 buildings and structures, including ~~an administrative office in a city, three~~ field offices, ~~a nature center,~~ residences, and numerous outbuildings such as barns~~,~~ and sheds~~, and water tanks~~ in the preserves. Certain animals and plants may be incompatible with human use of these structures or may harm the building itself. For example, rodents, ants, and similar structural pest species are typically controlled in buildings when their population numbers may result in structural damage or health risks to humans. Management of pests in buildings ~~is estimated to occur in 103 of the total buildings and it~~ may be conducted by District staff or by residential, commercial, or agricultural/rangeland tenants at some level almost every year. For purposes of this management category, rodent infestation of vehicles that are parked for extended periods of time on District preserves (reported by staff to ~~happen~~ occur regularly in ranger and crew trucks) will be treated similarly to rodent infestations of buildings.

For the purposes of this manual, structural pests include common insects, plants, and animals that routinely occupy the open interiors and immediate exteriors of buildings. Structural pests that live within the soil and wood components of these structures such as termites, wood ~~boring~~ beetles, and wood decaying fungi are ~~not included in the IPM program and will be addressed by the District on a case-by-case basis.~~ included in the IPMP as part of the 10-year Program update. Structural pests were generally included under the 2014 Program; however, as part of the 10-year Program update, the IPMP now includes additional chemical and physical treatment actions for structural pests.

The purpose of pest control in District buildings is to manage pests for human health and safety, and to preserve the intended uses of the building structure. Most structural pests only become problematic when there are extra resources readily available to sustain them (food, water, shelter) in and around the structure. Many of these types of outbreaks can be managed with cultural control options such as changing human behavior (e.g., securing garbage, cleaning up food) or engineered control options within structures (e.g., sealing up entrance area, securing garbage disposal areas).

5.2 Types of Structural Pests

~~This chapter is organized by pest, although many general concepts apply throughout.~~

Organisms of all kinds, whether vertebrate or invertebrate, are living creatures with specific biological needs and behavioral preferences. They all require food, water, safety, and a point of entry to become a structural pest. Cutting off access to any one of these resources can often be sufficient to prevent or reduce a structural pest problem. ~~The prevention methods discussed below aim to reduce the conditions that support structural pests.~~

~~5.2.1 STRUCTURAL PESTS~~

Structural pests include insect, plant, fungi, and animal pests that damage occupied buildings and other structures, or pests that are a health threat to humans working in, living in, or visiting the buildings. Nuisance ~~insects~~ structural pests ~~in buildings~~ addressed within the District's IPMP include ants, cockroaches, flies, mice, rats, skunks, opossums, raccoons, ~~and~~ bats, subterranean termites, drywood termites, wood beetles, stinging insect nests, and fungus/dry rot. These pests may be present throughout District lands, but they may only be incompatible with planned District uses when their proximity or behavior conflict with human uses in buildings. Some structural pests can only survive in a human-modified environment (e.g., German cockroaches) versus others are opportunistic visitors from nearby wildlands (e.g., deer mice).

The definition of a structural pest can be highly variable between individuals and groups of people based on the perception of damage versus any true damage to structures. Care must be exercised when defining tolerance levels for each pest species. One must consider the actual damage potential of the organism, the cultural acceptance of the organism to humans who may have to live and work nearby, and any broader environmental consequences to the natural environment. For example, deer mice may be tolerated if they occupy the exteriors of human-occupied buildings, but once they penetrate the structure and begin to occupy building interiors, they become unacceptable pests~~.~~ for potential damage and threats to human health and safety. The traditional approach to structural pest control is modified in the District's ~~IPM program~~ IPMP because District structures are located in natural areas. Native species (e.g., deer mice) that can move freely between the inside (pest) environment and outside (native/natural) environment must be treated in a manner that achieves control of the pest without compromising the natural resources around the structure. The District's structural IPM decision-making must always balance health and human safety concerns with District's goal of protection of natural resources.

Structural IPM focuses on first modifying the behavior of humans or the structure of our environment to moderate or eliminate pest problems. The District can use familiar planning and building tools to engineer pests out of conflict areas such as structures through the use of physical barriers, materials selection, and site modifications. Tolerance levels for this category of pests take into consideration the risks of economic damage along with the fact that these species will inevitably occur in the built environment.

5.3 Pest Identification

Structural pests are generally identified when routine building inspections are conducted by IPM professionals, but are also commonly identified by the building occupants themselves. Because buildings are much more intensively utilized than the District's surrounding natural areas, structural pests can usually be identified relatively quickly before major infestations become problematic. Visual inspections will focus on identifying conditions where excess food, shelter, and access can support pests (e.g., the break room); signs of pest damage or entry (e.g., holes in the building exterior); or on observations of the pest itself.

Some District buildings could benefit from routine inspections from IPM professionals who have specialized training to find structural pests and their associated damage. Professionals may utilize special monitoring traps for specific organisms to monitor the population thresholds of common pest species (e.g., "sticky" bait traps for ants). These types of monitoring devices are useful in scenarios where the presence of the pest is inevitable, and the pest population must be maintained at an acceptable tolerance level. Other buildings and structures that are less intensively utilized will rely on the observations of the District's employees, tenants, and visitors to identify pests.

Employees, tenants, and visitors will have clear communication pathways to the IPM Coordinator to report structural pest presence and damage in a timely manner. Structural pest problems will be reported to the IPM Coordinator at any time during the year via telephone, email, or meetings; in an Individual Pest Management Plan; or as part of Annual IPM Reporting. The IPM Coordinator can ~~help~~ problem-solve structural pest situations by providing the following types of assistance:

- Assist with the identification of pest type,
- Assist with determining pest control treatment threshold levels,
- Provide recommendations for building or human use modifications to reduce pest problems below threshold levels,
- Review ~~individual pest management plan~~ the Individual Pest Management Plan and facilitate ~~their~~ the implementation by staff or tenants, and/or
- Recommend professional assistance such as use of a structural pest control advisor or structural pest control operator to actively control pests.

5.4 Preventive and General Maintenance Activities

5.4.1 Overview

Modern IPM programs for buildings rely on prevention (i.e., building design and human behavior modification) as the primary structural pest control treatment options to eliminate pest problems. Active pest control is used only as a last resort. Because humans occupy a highly engineered environment, use of such control options as physical barriers, materials selection, and site modifications provide the primary means to eliminate pests from buildings and other structures without the need to use pesticides that cause mortality or other lethal control (e.g., snap traps, bait stations).

If structural pest control in vacant structures is expensive, time-consuming, or otherwise damaging to the surrounding natural environment, demolition of the buildings will be considered as part of the Annual IPM ~~Report~~ Work Plan (See Chapter 3). Demolition activities will be subject to separate permitting processes through respective County planning departments. ~~Modern IPM programs for buildings rely on prevention (i.e., building design and human behavior modification) as the primary structural pest control treatment options) to eliminate pest problems. Therefore, a~~ A discussion of preventive and general maintenance activities is summarized below.

5.4.2 Prevention

Preventing ~~insects~~ structural, insect, and wildlife pests in buildings include general guidelines that promote pest-resistant materials, block common access points to buildings, and promote the modifications of common structures to repel rather than attract common pests. These guidelines may include landscape design practices that can be incorporated at District facilities in natural areas. For example, defensible space around structures should not be planted with dense ground covers and/or climbing vines like ivy that could attract structural pests such as mice and skunks.

Pests need a place to live – or harborage; most prefer a hidden space where they will not be disturbed. Preventing access to hidden spaces can, therefore, assist pest management efforts: cracks, crevices, gaps, holes, loose structural elements, and dense vegetation can all act to hide small pest organisms. In some cases, the materials present in District structures can create ~~a~~ potential harborage, such as when rigid foam insulation - a material that is known to attract termites - is used on the outside of foundations.

Incorporating some preventive measures will be simple, while others (like discontinuing the use of rigid foam insulation) may directly conflict with building codes and other design goals for the structure. Generally, the inclusion of standard pest prevention practices during the building design and construction or retrofit phase can dramatically reduce pest problems in the future while still fulfilling all the requirements for modern building codes. For example, proper placement of exterior lighting can significantly reduce the attraction of night flying insects into the building. Eliminating ledges under roof eaves can discourage pigeons and swallows from taking up residence. Planting and maintaining landscaping so that it does not touch building walls can help reduce the transmission of pests inside the structure. Applying pesticides with the active ingredient of disodium octaborate tetrahydrate to accessible exposed wood members of the attic can help prevent drywood termite and wood beetle infestations. All ~~of~~ these retrofit, design, and construction practices can help prevent the establishment of pests in District structures, thereby reducing the need for pest management.

5.4.3 Retrofit

Architects, planners, and engineers have only recently begun to consider pest control and building maintenance in the design of new structures and within the retrofitting of existing structures. New local green building ordinances and elective building rating systems now incorporate methods for enhancing modern buildings to be more energy efficient and less toxic beyond modern building codes. Reducing the need for toxic pesticides to control structural pests is especially feasible because much of their damage can be prevented by improved design.

Designing pests out of new and existing structures may include structural materials selection and the addition of non-structural components to reduce building access or utilization by pest species. Design guidelines are ~~now~~ available from the International Code Council/San Francisco Department of the Environment (Geiger and Cox 2012). Much of the focus of these guidelines is on the building envelope and the building interface with soil and landscaping. This allows buildings to repel ground-dwelling insects and rodents and significantly reduce their access to the building interior. ~~Other more general guidelines promote pest-resistant materials, block common access points to buildings, and promote the modifications of common structures to repel rather than attract common pests. These guidelines include landscape design practices that can be incorporated at District facilities in natural areas.~~ For example, ~~defensible space around structures should~~ treating the full perimeter of the structure and any additional entry points by, and not ~~be planted with dense ground covers~~ limited to, trenching and/or ~~climbing vines like ivy that could attract structural pests such as mice and skunks.~~ rodding soil adjacent to the foundation, drilling through concrete/veneer surfaces abutting the foundation, trenching around pier blocks and plumbing pipes in the subarea reduces use by pest species. Maintenance practices that can reduce structural pest impacts are summarized in Section 5.5.

5.5 Maintenance Practices to Prevent and Reduce Structural Pests[2]

Pest impacts to wooden structures often result from the introduction of moisture. Subterranean termites, carpenter ants, most wood beetles, and fungal rots only impact wood that is already impacted by moisture. Maintaining structures so they always remain dry, especially in the high humidity of the Santa Cruz Mountains and Central Coast, will reduce the potential for pest outbreaks in the structure. Maintenance of older structures should focus on keeping the building envelope functional to minimize leaks and moisture accumulation.

Other general maintenance practices in and near structures involve general cleanliness and vigilance in preventing access to resources that encourage pests. For example, equipment that attracts rodents or provides harborage should not be left in natural areas for long periods of time. Landscape maintenance should focus on elimination of vegetation touching the building

[2] ~~Recommendations selected from Pest Prevention By Design: Authoritative guidelines for designing pests out of structures (Geiger and Cox 2012).~~ Recommendations selected from 2012 Pest Prevention By Design: Authoritative guidelines for designing pests out of structures, which remains the most current design guideline document (Geiger and Cox 2012).

envelope, or reduction or elimination of the types of landscaping that are known to provide harborage for structural pests.

The following maintenance activities will be undertaken to prevent structural pests, or reduce their presence and thus threats or damage that they can cause:

- **Minimize moisture**. Moisture in and near structures can provide harborage for insect pests such as termites, wood ~~boring~~ beetles, cockroaches, flies, carpenter ants, silverfish, and millipedes. ~~Utilize~~ Use the following procedures to minimize building moisture during construction or general maintenance and repairs:
  - Check for proper ventilation of crawl spaces; add vapor barriers in crawl spaces.
  - Ensure appropriate slopes and drainage next to structures.
  - Downspouts and gutters should discharge at least 1 foot away from walls; splash guards, rain barrels, or gutter extensions may be added to reduce accumulation of moisture near structural walls.
  - Ensure that landscape irrigation does not introduce moisture to foundations – use drip irrigation and position sprinklers to avoid structures.
- **Maintain landscaping** next to structures.
  - Prune vines, shrubs, and trees at least 6 feet away from roofs and exterior walls, as rodents can use these for access into buildings and shelter next to foundations.
  - Remove and avoid planting Algerian or English ivy, star jasmine, or honeysuckle vines, which provide shelter and food sources for rats and other urban pests. Remove and avoid planting bamboo, cherry laurel, fig, pine, and roses near buildings, which encourage scale, aphid, and ant populations.
  - Clear landscaping away from vent openings to crawlspaces to prevent moisture buildup.
  - Remove plants and wood mulch within several inches of foundations to minimize ants and other nests. A gravel strip around foundations at least two feet wide and 0.5 feet deep of one-inch gravel or larger discourages rodent burrowing and other insect nesting.
  - Select plants that attract beneficial insects such as parasitic wasp, native bees, and ladybugs.
- **Move stored materials** away from structures.
  - Store compost and trash bins away from structures, as these can attract rodents, insects, and other nuisance pests.
  - Store woodpiles and debris away from structures to prevent rodent, beetle, and termite infestation.
- **Seal off openings**.
  - Inspect openings to crawlspaces and other ventilation features to ensure screens are intact.

- Inspect, maintain, and use elastomeric sealant, polyurethane foam, and weather-stripping to seal all small cracks in structures, around countertops and windows, pipe breaks, and areas where pipes enter walls. Use stainless steel wool and mesh and fire block foam to re-seal larger openings in buildings and below decks.
- Add door sweeps or high-density pest brushes to seal gaps greater than ¼" below doors.

- **Block access for rodents** to climb pipes and gutters.
  - In areas with Norway rats or other rodent issues, various items can be installed to prevent the rodents from climbing downspouts and pipes, including flap valves or screens in downspouts, 12"-diameter downward-facing cones or 18"-diameter discs, or a 12" band of glossy paint on exterior vertical pipes.
- **Exclude rodents from refuse and recycling areas**.
  - Enclose refuse and recycling areas with metal, concrete, or similar materials to prevent wildlife from climbing, burrowing, or chewing into the enclosure. Do not plant ivy around the enclosure.
  - Use refuse containers that are heavy duty, rust resistant, rat and damage resistant, and equipped with tight-fitting lids.
- **Add bird exclusion materials** to lighting and other horizontal surfaces.
  - Bird spikes, wires, netting, or similar materials should be installed to prevent birds from roosting or nesting on structures or on light poles.
- **Reduce or move exterior lighting**. Exterior lighting may encourage insects to gather near doors and windows.
  - Timers and motion detectors can be installed to minimize unnecessary lighting.
  - Use reflected light instead of direct light to illuminate entryways, as insects are more attracted to direct light.
  - Use yellow (sodium) bulbs to reduce insect attraction in exterior areas.

~~In the same way that buildings can be re-engineered to resist and prevent pests, so can appropriate planning. Architectural standards have long dictated how buildings should be situated in an environment for appropriate function and appeal. In the same way that a subdivision of straw houses is not appropriate for high fire risk areas, appropriate site planning and design can also reduce future pest problems. Better planning for lighting, storage, building use and landscaping around existing buildings can all contribute to fewer pest problems in and around District structures. District staff should assess how existing buildings are being used and how they are arranged together and within the landscape to maximize the reduction of future pest management.~~

~~Pest impacts to wooden structures often result from the introduction of moisture. Subterranean termites, carpenter ants, most wood boring beetles, and fungal rots only impact wood that is already impacted by moisture. Maintaining structures so they remain dry at all times, especially in the high humidity of the Santa Cruz Mountains and Central Coast, will reduce the potential~~

~~for pest outbreaks in the structure. Maintenance of older structures should focus on keeping the building envelope functional to minimize leaks and moisture accumulation.~~

~~Other general maintenance practices in and near structures involve general cleanliness and vigilance in preventing access to resources that encourage pests. For example, equipment that attracts rodents or provides harborage should not be left in natural areas for long periods of time. Landscape maintenance should focus on elimination of vegetation touching the building envelope, or reduction or elimination of the types of landscaping that are known to provide harborage for structural pests.~~

5.6 Sanitation and Waste Management

5.6.1 Overview

Many pest species are present because of improper handling and storage of food and food waste~~,~~ or improperly cleaning up food scraps and dishes. Uncovered garbage containers, both inside and adjacent to buildings can attract rats and other pests. Storing native plant seeds in paper envelopes rather than hard sealed plastic containers may encourage mice to take up residence in storage areas. All ~~of~~ these types of pest attractants can be eliminated with human behavioral modification as a prevention method. Optimally managing human behavior can drastically reduce or even ~~completely~~ eliminate the need for pesticide products in District structures and landscapes.

Recommendations for structural pest prevention measures to be implemented by District staff and volunteers in food and waste storage areas are listed below. If behaviors cannot be easily modified, hire a janitor or cleaning service for common area cleaning.

5.6.2 Additional Residential/Office Unit Prevention Strategies

The following additional measures may be applied in District residential and office buildings:

- Train staff, including building occupants and janitorial staff on safe food and trash handling procedures;
- Store all food and food wastes in sealed containers;
- In communal spaces, provide extra containers, sealed cabinets, or a refrigerator for temporary food storage;
- Do not allow food waste to remain in open areas overnight;
- Regularly clean dishes, floors, and counter tops;
- Use sealed garbage cans, or alternatively place them on a crawling insect-proof platform;
- Rinse out cans and bottles before they are placed in a recycling bin; and
- Do not leave pet food out overnight.

5.6.3 Industrial Unit Prevention Strategies

The following types of additional measures may be applied in District storage buildings, livestock structures such as corrals, and for District projects ~~utilizing~~ using contractors and outside construction materials such as fill dirt or erosion control materials:

- Train staff ~~about~~ in proper storage of work supplies in non-occupied buildings.
  - Store all pet food, animal grains, and other consumable agricultural supplies in sealed containers (metal/plastic).
  - Store plant seeds used for habitat restoration and landscaping in sealed containers.
- Monitor landscaping and rooted plant materials for pests, and treat as necessary to prevent pest outbreaks.
- Position attractive harborage areas, such as rock piles, soil storage piles, hay, and erosion control materials away from buildings.
- Control food waste in contractor work areas, outbuildings, storage areas, and other non-occupied structures.
- Provide sealed garbage containers in or near such areas to prevent inadvertent disposal.
- Reduce, monitor, and where possible, eliminate use and import of natural materials that could introduce pests onto District lands, such as reducing use of ~~offsite~~ off-site fill (soil, gravel, and rock) and livestock feeds (hay) that may contain weed seeds. Where possible, include requirements to ~~utilize~~ use ~~onsite~~ on-site fill, require balanced cut and fill projects on District lands, and require use of certified weed-free erosion control materials for construction projects on District lands.

5.7 Damage Assessment

~~Determine~~ Damage assessments should be undertaken once a pest control problem is identified. The District will determine what, if any, damage to the structure is present. ~~If there is no structural damage, but a pest is present that is in conflict with human use or enjoyment of the structure, determine the tolerance level for each pest species to determine if control is warranted.~~ To the extent possible, quantify the damage (square feet affected or number of occurrences) and qualitatively describe the perceived damage in its context. As an example, a staff person could estimate the square footage of a building affected by ants and evaluate if the ants are always present at observed levels or if the incident is just a temporary outbreak.

5.8 Tolerance Levels/Threshold for Action

If there is no structural damage, but a pest is present that conflicts with human use or enjoyment of the structure, determine the tolerance level for each pest species to assess if control is warranted. Tolerance levels vary greatly for structural pests depending on the true or perceived impact of the pest ~~to~~ on the structure or human experience. Some species, such as cockroaches, are unwelcome guests but present no real damage to either people or structures.

Other species, such as woodrats, can seem more acceptable because they are attractive native animals, but they can also carry deadly, incurable human diseases. The District's IPM approach for structural pest species begins with establishing human and structural tolerance levels that balance human safety, enjoyment, and comfort within the build environment with the ability to conserve natural resources and cost/benefit assessment.

Human safety and enjoyment ~~is~~ are the primary metric for establishing tolerance levels in structures. Although structural pests can be both native, protected species, and non-native invasive species, staff and visitor safety is paramount in regulating treatment actions. Tolerance levels will consider conservation goals and impacts to the larger surrounding natural system in determining treatment actions.

5.8.1 Management Thresholds for Structural Insect Pests

Refer to Table 5-1 for establishing management thresholds and treatment options for nuisance insects in buildings.

Table 5-1 Management Thresholds and Treatment Options for Nuisance Insects in or Around Building

Pest Category	Management Threshold (Population Size/Conditions)	Treatment
Ants	Colonies near structures and occasional trails indoors	Use a combination of the following • Clean up ant trails with soapy water or sticky lint rollers. • Ensure all food sources are in sealed containers. • Fill entry points with caulk, silicone, or expanding foam.
	Heavy invasion, more than occasional seasonal nuisance	Use a combination of the following: • Inject diatomaceous earth dust into cracks before sealing if there are multiple entry points. • Use ~~Boric~~ boric acid bait • Use ~~Fipronil~~ fipronil bait as last resort (extreme infestations, fast control)
	Homopteran insect populations on plants (aphids, etc.) that support ants invading structures	Use a combination of the following: • Prune vegetation that supports ants and/or Homopteran insects away from structures. • Control Homopteran insects by dusting the infested vegetation with diatomaceous earth • Treat the infested vegetation with a soap and water solution.
Cockroaches	Occasional presence indoors in low numbers	Use a combination of the following: • Fill entry points with caulk, silicone, or expanding foam. • Ensure all food and water is unavailable.

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Pest Category	Management Threshold (Population Size/Conditions)	Treatment
	Heavy invasion, more than occasional seasonal nuisance	Use a combination of tools and alternate to avoid resistance: • Inject **diatomaceous earth** dust into cracks before sealing if there are multiple entry points. • Use **~~Boric~~ boric acid** dust in walls, cracks, and other inaccessible areas. • Use **baits**: - Hydropene - Indoxacarb bait - Fipronil bait as last resort
Flies	Heavy invasion, more than occasional individual nuisance indoors or in and/or around picnic areas	Use a combination of the following: • Fill entry points with caulk, silicone, or expanding foam • Install sticky fly traps indoors. • Install baited electric traps outdoors. • Remove food and breeding sources.
Stinging Insects (Nests)	Nest occurrence(s) on buildings or structures that pose threat to humans	Implement the following: • Use of **Pyrethrin Aerosol Sprays** for eliminating single, or problem wasp nests that threaten District staff or visitors.[a]
Subterranean Termites	Moderate or heavy invasion, more than occasional individual nuisance in or adjacent to structures	Use a combination of the following: • Treat the full perimeter of the home and any additional entry points. • Remove or destroy accessible subterranean termite tubes/tunnels. • Seal drill holes and back fill trenches, if applicable. • Prior to tenting, the District will removal all plant and rake back all rock and debris along the foundation (8-10 inches). • Patch all injection holes, cover, or remove accessible termite evidence. • Spot treatment. • Treat the infested area with active ingredient fipronil, chlorantraniliprole, and/or dinotefuran for the control of subterranean termites.
Drywood Termites/ Wood Beetles	Moderate or heavy invasion, more than occasional individual nuisance in structures	Use a combination of the following: • Spot treatment. • The entire structure will be sealed and fumigated with **sulfuryl fluoride. Tear gas** will be used as a warning agent. • Apply **disodium octaborate tetrahydrate** to accessible exposed wood members of the attic.

Pest Category	Management Threshold (Population Size/Conditions)	Treatment
Dry rot/Fungus	First evidence of dry rot/fungus	Use a combination of the following: • Wire brushing or scraping the infected area, • Treat the infected area with disodium octaborate tetrahydrate.

Note:

[a] Use of chemical methods for stinging insect nest control is discussed in detail in Chapter 7.

5.8.2 Structural ~~Wildlife~~ Animal Pests

Refer to Table 5-2 for establishing management thresholds and treatment options for ~~wildlife~~ animal nuisance pests in buildings.

Table 5-2 Management Thresholds and Treatment Options for Nuisance ~~Wildlife~~ Animals in and Around Buildings

Pest Category	Management Threshold (population size/conditions)	Treatment
Mice & rats	Occasional presence indoors in low numbers (< 10 individuals)	Use a combination of the following tools and alternate to avoid resistance: • Snap traps 6 feet apart for initial population control and maintenance. Prebait for up to several weeks for rats. • Box traps for mice – inspect daily. • ~~Glue boards – supplemental control.~~
	Moderate to Heavy infestation (~~-~~ > 10 individuals of house mice, Norway rats, or roof rats ONLY) AND infestations posing risk to human health that do not respond to preventative and non-chemical methods	Use a combination of the tools and alternate to avoid resistance: • Tools listed above for occasional presence. • **Cholecalciferol** – during instances when human health and safety are in jeopardy.
	Moderate to Heavy infestation (> 10 individuals) of ~~Dusky~~ dusky- footed woodrats	Use exclusion methods to prevent entry of native rats into structures.
Skunks, opossums & raccoons	Individual animals invading structures	Implement trapping. Animals must be released or euthanized immediately. Relocation requires a permit from CDFW.
Feral Pets	Aggressive animals or resident populations that cause nuisance or impede resource protection goals	Implement live trapping with city or county animal control departments or animal shelters.

Pest Category	Management Threshold (population size/conditions)	Treatment
Bats	Roosting in structures that allows access to human-occupied rooms	Use a combination of the following: • Implement strategic exclusion. • Block entry to spaces where roosting causes conflict with human health and safety.

5.9 Active Pest Control Treatment Options

When thorough prevention measures have been undertaken and human health and safety dictates, District staff may determine active pest control is required in buildings. The basic steps for planning active pest control in buildings include:

- Identification of a potential pest problem by trained professionals, staff, or tenants;
- Inspections to establish pest activity and treatment options;
- Identifying a preferred pest control approach;
- Implementing the selected pest control;
- Monitoring the results of pest control; and
- Reviewing results to inform and improve future pest control actions (adaptive management). Some pest management options include:
  - Indoor monitoring/trapping stations (non-chemical options such as snap traps ~~and glue traps~~ are preferred over other chemical control options);
  - Natural pest controls (e.g., diatomaceous earth); and/or
  - Other active IPM controls (as described above in Table 5-1 and Table 5-2).

Where pesticide use is determined to be the only viable treatment option to address the specific infestation of concern, selection of least harmful products is required. Only pesticides on the District's List of Approved Pesticides ~~(Table 1.1, Appendix A)~~ (Table 3-3) may be ~~utilized~~ used. As an example, structural pest infestation that poses an immediate threat to human health or public safety would exceed District tolerance levels and warrant use of pesticides if non-chemical control could not protect the public. The chemical control options presented in this Chapter represent the least harmful, most efficient treatment methods for controlling structural pests. For example, a wasp nest in a public restroom may require use of a pyrethroid wasp spray to immediately eliminate the hazard of wasp injury to visitors. The inclusion of a variety of pest treatment method ~~options~~ in the IPM Program allows the District to respond with the necessary tools based on actual risk to the District, its visitors, workers, structures, and lands.

5.9.1 Insects

Overview

Structural insects found on District lands include ants, cockroaches, flies, subterranean termites, drywood termites, wood beetles, and wasps/stinging insects. As described above, these species can be deterred from establishing in District structures through design, maintenance, and behavioral modifications. However, some structural and nuisance pests may exceed tolerance levels for their presence in buildings. The following section discusses treatment methods for populations that exceed tolerance levels.

The presence of insects in buildings is very unappealing to most facility users. Their occurrence tends to suggest unsanitary conditions or deferred maintenance. Though these insect species usually do not pose a threat of direct harm to humans, their presence is almost always deemed to be unacceptable in our homes and landscapes. In the absence of immediate public health and safety risks, prevention and physical controls are the first treatment methods implemented in an IPM program, and these methods typically provide the most long-~~-~~term effective control. Sanitation and cleanliness are the most effective methods for preventing and managing these insect pests. Chemical treatment methods are generally only used if the other methods prove inadequate to bring the insect pest population to within tolerance levels.

IPM strategies for common insect pests must ~~utilize~~ use a spectrum of different control techniques to avoid problems with pesticide resistance. For example, both Argentine ants and German cockroaches have developed resistance to ~~a number of~~ a few common pesticides. For this reason, no single treatment or product can be recommended for complete control. All products that have chemical modes of action – both natural and synthetic – can promote resistance if used indiscriminately. All chemical products must only be used in the most appropriate and effective manner and in parallel for consistent results.

Ants

The most common nuisance ant species in District structures is the Argentine ant (*Iridomyrmex humilis*). The Argentine ant is a non-native species from South America that likely arrived in California in the early 1900s and quickly spread throughout the state's citrus growing regions. Argentine ants have largely replaced native ant species in the urban environments that they have invaded (Holway 1998). Although the species is usually considered a nuisance pest in structures, the Argentine ant has eliminated nearly all native ant species in natural areas as well. Other native insects and some populations of native birds, lizards, and salamanders may have been similarly affected by the Argentine ant (Randall et al. 2011). Many native plants rely on insect pollination and insect-related seed dispersal; the loss of native insects resulting from the invasion of the Argentine ant has most likely also reduced native plant seed production, dispersal and other mutualistic relationships between insects and their host plants (Gómez et al. 2003; Nygard et al. 2008).

Argentine ants have four life stages: egg, larva, pupa, ~~(cocoon),~~ and adult. ~~They~~ Argentine ants are social insects that live in organized colonies where different adults have specialized duties. ~~and where numerous queens and workers mix freely among spatially separated nests.~~ Unlike native ants, Argentine have numerous queens and worker ants, which mix freely between colonies without any intraspecific competition and thus are capable of reaching unnaturally high population densities compared to native ant species (Silverman and Brightwell 2008). For this reason, eradication of Argentine ant populations is impossible; if a sub-colony collapses, other nearby queens will shift to fill the void. Argentine ants are omnivorous, preferring high protein sources until those resources are exhausted and then shifting to plant and nectar-based resources. They are especially fond of honeydew produced by Homoptera~~e~~n insects (e.g., aphids, scale) and the pest problems of each of these species in gardens and structures are often linked.

Pest Management Strategies for Ants

Prevention

- Clean all kitchen and food storage surfaces regularly; sweep and vacuum kitchen floors daily. Shared-use appliances such as sinks, microwaves, and vending machines should be cleaned regularly to eliminate spills.
- Store all food properly. Argentine ants are especially small creatures that can easily crawl along the threads of a screw-top jar and enter the container if there is no silicone or rubber seal on the lid. Store all food in containers with tight fitting lids, or in the refrigerator or freezer.
- Rinse recycling waste if it is temporarily stored in open bins. Alternatively, store all waste in containers with tight fitting lids/seals or place open bins on insect-proof bases (e.g., Antser™) and always line trash bins with plastic bags. Regularly take out the garbage to an outside storage area/dumpster.
- Do not leave pet food in open bowls overnight. Wash pet food bowls after the pet is done eating.
- Inspect potted plants for ant nests regularly. If ant nests are found, remove the potted plant. If potted plants become a frequent harborage for ant nests, use ant-proof platforms (e.g., Antser™) or use a double saucer system (inside saucer – water – outside saucer – soapy water) for all inside/outside potted plants. Flooding the pot for several days can treat ant-infested potted plants.
- Inspect landscaping for aphids, scale, and other honeydew producing insects. If found, treat plants for insect pests, and manage ants in a coordinated effort to eliminate both problems.

Physical Control

- Clean up ant trails when they are found with soapy water or sticky lint rollers. Note the location the ants were headed and the location where they were coming from. Clean-up whatever ~~was attracting~~ attracts the ants, if possible.
- Use caulking, silicone, or expanding foam to fill cracks, holes, or other entry points where ant trails originate. If multiple entry points are suspected, inject diatomaceous earth dust into cracks before sealing.
- Prune outside vegetation that is touching the structure if it supports ants, aphids, or scale. Some species, such as Citrus, are especially susceptible to sucking Homopteran insects that in turn attract ants. Consider replacing these species of plants with others that do not attract Homopteran pests. Treat infested vegetation by spraying with soapy water or insecticidal soap sprays, dusting with diatomaceous earth, or physically removing insects.

Chemical Control

Chemical control of ants includes two options: 1) direct control using sprays for instant, but temporary knockdown of individual ants and the treatment of Homopteran pests that attract ants, and 2) baits for colony control. Sweet liquid baits are useful throughout the year because adult Argentine ants only feed on sugary liquids. High protein baits are generally only useful to treat colonies during the periods of the year when they are actively expanding because such solid food is typically used by the ants to feed larvae. Baiting is generally a slower process than direct control, but it has a much greater long-term impact on controlling the entire local colony. Baits are taken back to feed larvae and shared with other adults and queens so they potentially can eliminate the entire colony rather than just a few individuals. Modern baits are designed to be extremely host-~~-~~specific compared to generalist insect sprays. Baits target the pest directly, rather than being applied to the environment. Never use direct control (spray) around a bait station, as the spray will impede the bait's ability to attract the target insects. Baits ~~will~~ can only be used indoors in tamper-proof stations.

For the control of insects, multiple baits with different modes of action are recommended to prevent local populations from developing resistance to the pesticide~~s~~. Every structural insect management program should include a few products to use in rotation to prevent resistance.

- **Insecticidal Soap Spray.** Insecticidal soaps are specially designed mixes of fatty acids that are made to penetrate an insect's covering and dissolve its cell membranes causing dehydration and mortality. Generally, the soaps are formulated to not dissolve plant cell membranes, ~~so~~ and therefore are safe to apply directly to plants. Insecticidal soaps are not effective on all insects, but soft bodied insects, such as Homopterans, are highly susceptible. When used for ant control, soaps are most effective in controlling the Homopteran insects on plants that attract and sustain ant colonies.
- **Boric Acid Bait.** Boric acid is a naturally occurring compound found in many fruits and vegetables, but at concentrated doses it can be an effective stomach poison for insects. Baits use low concentrations of boric acid – sodium tetraborate decahydrate – in the range of 0.5 – 5% to allow for ants to ingest the bait and take it back to the colony to share with other workers before there is a lethal effect. Higher concentrations risk killing the individual before it has time to take the bait back to the colony. Studies show that the lowest concentrations (<1%) are optimum for Argentine ant preference (Klotz et al. 2000).
- **Fipronil.** Fipronil is a broad-spectrum insecticide common in household cockroach/ant baits and flea sprays for pets. When used as an ant bait, it is toxic to insects through ingestion where it blocks chloride channels in the central nervous system, resulting in excess neuronal stimulation and death of the target insect pest. It has higher binding affinity in insect receptor sites versus mammalian receptors so it is considered highly selective for insects and safe to use in human environments (Jackson et al. 2009). It is considered one of the most effective baits for colony control of Argentine ants in situations when boric acid-based baits are less effective (Hooper-Bui and Rust 2000; Mathieson et al. 2012). Fipronil is

relatively quick-acting compared to other natural pesticides. It should be used as a last-resort option when extremely high populations of ants must be controlled quickly. Only small amounts of bait are necessary to control ants compared to knockdown sprays, which must be applied more widely in the environment to be effective. Small amounts of fipronil will be used as a last-resort option when extremely high populations of ants must be controlled quickly.

- **Diatomaceous Earth.** Diatomaceous earth (DE) is a silica-based, naturally occurring mineral product that works as a generalist insect pesticide. It is composed of fossilized silica cases of marine diatoms that have been mined from ancient marine sediments. The dust is considered non-toxic, although care should be taken to not inhale large amounts of dust during application as all mineral and wood dusts are considered hazardous in extremely large amounts. Food-grade DE is available to mix directly in human and pet foods to manage pests that occur in bulk food storage. DE works by mechanically abrading an insect's exoskeleton that leads to dehydration and eventual death of the insect. DE is non-selective so it must be used only in specific areas where the target pests travel. The dust ~~s are~~ is not eaten – so must be applied in areas where they will ~~make contact with~~ contact the bodies of insect pests. For ant control, it is often applied to cracks and crevices and may also be used in conjunction with caulks and foams to fill problem areas.

Cockroaches

One of the most common structural nuisance insect pests in North America is the cockroach (Olkowski et al. 1991). Though rarely carrying disease or causing major economic damage to our structures, it is typically considered unacceptable in our homes and workplaces; triggering psychological distress, embarrassment, and general feelings of disgust. Cockroaches do consume human foodstuffs and wastes, and can contaminate them with saliva and excrement. In some cases, they carry disease and may be linked to increased asthma rates ~~(CDC 2013a).~~(CDC 2024).

Cockroaches are scavengers of plant materials, as a result, they prefer carbohydrates over fats and proteins. They consume any human food or food waste that contains significant carbohydrates in addition to materials such as pastes, glues, and soaps. Most common cockroach species can only exist in high humidity and high temperature environments such as those present in human structures.

Several different species of cockroaches occur as pests in Northern California, and each has separate behaviors and habitat preferences that dictate different types of pest management. The non-native German cockroach *(Blatella germanica)* is the most common pest species in the counties in which the District is located. The German cockroach ~~*(Blatella germanica)*~~ is the smallest and most widely spread pest cockroach in North America~~. It~~ and has three life stages: egg, nymph, and adult. German cockroaches prefer dark, warm, and humid hiding places and they are common in basements, kitchens, and bathrooms. They are thigmotactic, meaning they prefer to rest in small cracks where their stomach and back touches surfaces during most of the day, so regular inspection of crack areas can sometimes aid in cockroach detection in buildings.

Unlike ants, they are solitary insects but since preferred habitats are rare in buildings, it is common to find large numbers of cockroaches hiding in the same general areas.

German cockroaches are ubiquitous in human environments that occur in temperate climates, so complete pest eradication is almost never achievable. Cockroaches regularly disperse in cartons, boxes, and other containers coming to and from grocery stores, warehouses, flower shops, and other shipments, and are thus ~~are~~ likely to always be present in human environments. Strategies such as sealing exterior cracks/holes in buildings and strict sanitation measures both inside and out of buildings will help maintain their populations at nearly indiscernible levels which should be sufficient for most District properties.

Pest Management Strategies for Cockroaches

Prevention

- Clean all kitchen and food storage surfaces regularly; sweep and vacuum kitchen floors daily. Shared-use appliances such as sinks, microwaves, and vending machines should be cleaned regularly to eliminate spills.
- Store all food properly. Store all food in containers with tight-fitting lids, or in the refrigerator or freezer.
- Rinse recycling waste if it is temporarily stored in open bins. Alternatively, store all waste in containers with tight fitting lids/seals or place open bins on insect-proof bases (e.g., Antser™ bases) and always line trash bins with plastic bags. Regularly take out the garbage to an outside storage area/dumpster.
- Do not leave pet food in open bowls overnight. Wash pet food bowls after the pet is done eating.
- Ensure all exterior windows that open have insect screens to prevent roaches from ~~gaining entry into~~ entering structures.

Physical Control

- Use caulking, silicone, or expanding foam to fill cracks, holes, or other entry points where cockroaches are known to hide or enter structures. If multiple entry points are suspected, inject diatomaceous earth dust into cracks before sealing.
- If hiding places are unknown, use a sticky-trap monitoring program to determine where in the building roaches are hiding.

Chemical Control

Only bait in tamper-proof stations will be used indoors.

- **Diatomaceous Earth.** ~~Diatomaceous earth (DE)~~As described above, DE is a silica-based, naturally occurring mineral product that works as a generalist insect pesticide. ~~It is composed of the fossilized silica cases of marine diatoms that have been mined from ancient marine sediments. The dusts are considered non-toxic although care should be taken to not inhale large amounts of dust during application as all mineral and wood dusts are considered hazardous in extremely large amounts. Food-grade DE is available to mix directly in human and pet foods to manage pests that occur in bulk food storage. DE works by mechanically~~

~~abrading an insect's exoskeleton that leads to dehydration and eventual death of the insect. DE is non-selective so it must be used only in specific areas where the target pests travel. The dusts are not eaten – so must be applied in areas where they will make contact with the bodies of insect pests.~~ Refer above under "ants" for details regarding DE. For cockroach control, they are often applied to cracks and crevices and may also be used in conjunction with caulks and foams to fill problem areas.

- **Boric Acid Dusts.** Boric acid is a naturally occurring compound found in many fruits and vegetables, but in concentrated doses, can be an effective stomach poison for insects. Boric acid dusts are highly effective for cockroach control when applied to cracks and crevices where cockroaches are known to occur. The dusts (when kept dry) have a long service life and provide control for many years after application. They are practically non-detectible to cockroaches, so unlike many other chemical products that cockroaches can detect and avoid, they offer one of the more effective methods for cockroach control (Gore and Schal 2004). Since they have such a long service life, they are effectively applied inside building walls, plenum (false) ceilings, crawlspaces and other relatively inaccessible areas where cockroaches can occur. Boric acid dusts are relatively slow acting compounds that take up to 10 to 15 days to achieve effective elimination of problem insects so they should generally be used in compliment with a baiting program to achieve full control of cockroach outbreaks.
- **Hydroprene.** Hydroprene is a synthetic insect growth regulator (IGR) that mimics juvenile insect hormones to regulate insect pest populations. Although they do not poison an insect directly to cause a lethal effect, they do interrupt the development cycle of juvenile cockroaches so they do not ever reach a reproductive stage. This mode of action can be important to reduce adult populations by preventing young insects from reaching adulthood and breeding in a long term control strategy. For this same reason, hydroprene is considered highly specific to insect pests and has low toxicity for birds and mammals, species that do not possess these same types of growth hormones. IGRs are not an ideal stand-alone control, but they are effective when used in combination with other methods to reduce populations of troublesome insects.
- **Fipronil insecticidal baits.** ~~Fipronil is a relatively recently developed, broad-spectrum insecticide common in household cockroach/ant baits and flea sprays for pets. When used as cockroach bait, it~~ As described above, fipronil is toxic to insects, including cockroaches, through ingestion where it blocks chloride channels in the central nervous system~~. This results in excess neuronal stimulation and~~ resulting in death of the target insect pest. ~~It has higher binding affinity in insect receptor sites versus mammalian receptors so it is considered highly selective for insects and safe to use in human environments (Jackson et al. 2009). Fipronil is relatively quick acting compared to other natural pesticides.~~ It should be used as a last-resort option when extremely high populations of cockroaches must be controlled quickly. As it is insecticidal bait, only small amounts of bait are

necessary to control cockroaches effectively compared to knockdown sprays that must be applied much more widely in the environment.

- **Indoxacarb insecticidal baits.** Indoxacarb is a synthetic, non-systemic insecticide effective on chewing and sucking insects. When used as cockroach bait, it is toxic ~~to insects~~ through ingestion where it blocks sodium channels in the central nervous system resulting in paralysis and elimination of the target insect pest. It replaces more hazardous organophosphate insecticides while still providing a fast acting, quick knockdown pest control option. Indoxacarb is a quick acting insecticide and offers exceptional German cockroach control potential. In laboratory conditions, small amounts of gel baits can provide several generations of control when the product is re-consumed through feces, regurgitates, and through bodily contact from the primary exposed individual cockroach (Buczkowski et al. 2008). This product is recommended for last-resort options in challenging cockroach pest control scenarios.

Flies

Flying insect pests such as flies can be problematic inside buildings. In ~~our~~ the District's region, the most common pest fly species, also referred to as filth flies, are common house, stable, and greenbottle flies (*Calliphoridae* and *Muscidae* families). Common houseflies and greenbottle flies tend to be the most problematic groups of filth flies that cause pest problems in buildings and other public spaces. The presence of filth flies is generally indicative of unsanitary conditions~~, which makes them undesirable.~~. They can also carry disease pathogens to humans through feces and regurgitation.

Pest flies breed in animal wastes and decaying organic material from which they can pick up bacteria and viruses that may cause human diseases. In addition, adult stable flies feed on mammalian (livestock) blood and can offer a painful bite. All flies undergo complete metamorphosis with egg, larva, pupa, and adult stages in their development. The female fly deposits her eggs in animal waste or moist organic material where the larvae, or "maggots," complete their development, feeding on wastes until they pupate in a dry location.

Pest Management Strategies for Filth Flies

Prevention

- Clean all kitchen and food storage surfaces regularly; sweep and vacuum kitchen floors daily. Shared use items such as sinks, microwaves, and vending machines should be cleaned regularly to eliminate spills.
- Store all food properly. Store all food in containers with tight fitting lids, or in the refrigerator or freezer.
- Rinse recycling waste if it is temporarily stored in open bins. Alternatively, store all waste in containers with tight fitting lids/seals or place open bins on insect-proof bases (e.g., Antser™ bases) and always line trash bins with plastic bags. Regularly take out the garbage to an outside storage area/dumpster.

- Ensure outside garbage cans and dumpsters have tight-fitting lids to prevent flies from completing their life-cycles in waste cans.
- If garbage cans do not have tight fitting lids, use cedar sawdust to layer over wet/organic waste in the trash bins to prevent flies from accessing food waste.
- Clean trash bins regularly with pressure washer or soap/water to ensure no thick layers of organic waste build up in the bottom of cans.
- Ensure all exterior windows that open have tight-fitting insect screens to prevent flies from gaining entry from outside.
- For stables and other livestock areas, remove animal waste on a regular basis and dispose in sealed containers or in managed compost piles.

Physical Control

- Use caulking, silicone, or expanding foam to fill cracks, holes, or other entry points in building exteriors where flies can gain entry.
- In problem areas, use sticky fly traps (ribbons) to capture excess adult flies and remove them from building interiors.
- Use baited electric traps for problem outside areas such as picnic grounds, barns, or livestock areas.

Chemical Control

In most residential and commercial situations, pesticides are not needed or recommended for control of flies, as they are not effective. Sanitation methods along with screens to keep flies out of buildings should be sufficient for nuisance fly control outside of agricultural facilities with livestock. Fly traps and strips used in problem trash areas may be effective in reducing the number of adult flies if proper sanitation practices are followed.

Stinging Insects

Buildings and structures on District lands may attract stinging insects, such as wasps, to form nests on suitable structures. For nest control, pyrethrin-type aerosol sprays containing prallethrin, and phenothrin are recommended where immediate threats exist to human health and safety. These aerosol sprays are extremely effective at immediately eliminating single problem wasp nests that threaten District staff or visitors. The pyrethrin-type sprays work as a contact neuro-poison that results in near immediate mortality of any insect (Jackson et al. 2011). The sprays offer a relatively safe and effective means for rangers and maintenance workers responding to immediate threats of wasp nests. Contact pyrethrins are completely non-selective, so care must be taken to target only the pest wasp and not to impact other beneficial insects. Contact sprays do not offer population-level control for wasps; diligent sanitation and early seasonal queen trapping are the only known methods to effectively reduce populations of stinging wasps in open landscapes.

Subterranean Termites, Drywood Termites, and Wood Beetles

Subterranean termites are common throughout California and tend to infest fallen trees, stumps, or other dead wood, including structural lumber in our houses. Signs of a subterranean termite infestation in buildings include the presence of shelter tubes, and evidence of tunneling in wood. Drywood termites tend to infest dry, sound wood, including structural lumber, dead limbs on trees, utility poles, decks, fences, stored lumber, and furniture. Evidence of drywood termites also includes channels or tunneling in wood structures (UC IPM 2014). Wood beetles invade and damage wood furniture as well as structural and decorative wood inside of buildings. Infestations can occur if beetles or larvae are brought into a building in furniture, firewood, or wooden decorative articles (UC IPM 2010).

Physical Control

- Treat the full perimeter of the home and any additional entry points by, and not limited to, trenching and/or rodding soil adjacent to the foundation, drilling through concrete/veneer surfaces abutting the foundation, trenching around pier blocks and plumbing pipes in the subarea.
- Remove or destroy accessible subterranean termite tubes/tunnels.
- Seal drill holes and back fill trenches, if applicable.
- Prior to tenting, the District will remove all plants, as feasible, and rake back all rock and debris along the foundation (8-10 inches) to create a proper seal for chemical work.
- Patch all injection holes, cover, or remove accessible termite evidence.

Chemical Control

- Spot Treatment (subterranean termites): Treat the affected area with fipronil. Drill into concrete if/as needed. Fill holes with concrete sealer. Treat all probable access points as needed. Remove accessible termite tubes.
- Spot Treatment (drywood termite and wood beetle): Exterminate the drywood termites by drilling small holes into the infested wood member and injecting the appropriate chemical control (e.g., fipronil, d-limonen) into the termite channels.
- Full perimeter (subterranean termite): Treat the infested area with fipronil, chlorantraniliprole, and/or dinotefuran for the control of subterranean termites.
- Tenting (drywood termite and wood beetle): The entire structure will be sealed and fumigate with sulfuryl fluoride (Vikane). Tear gas (Chloropicrin) will be used as a warning agent.
- Prevention (drywood termite and wood beetle): Apply disodium octaborate tetrahydrate to accessible exposed wood members of the attic.

5.9.2 Structural Dry Rot/Fungus

Dry rot is a wood-destroying fungus that attacks and digests the timber in buildings. Dry rot can spread without a moisture source due it its ability to generate moisture through the digestion of timber. Once spread, dry rot damages the structural integrity of buildings (Permagard, n.d.).

Treatment of dry rot includes physical and chemical control measures, which first involves wire brushing or scraping the infected area and then applying a chemical treatment of disodium octaborate tetrahydrate to the affected area. Removal and replacement of affected materials may be necessary to prevent dry rot reoccurrence and spread.

5.9.3 Structural Wildlife Pests

Structural animal pests are a diverse group of native and non-native mammals and reptiles that are especially ~~tolerant, and~~ tolerant and even attracted to human behaviors and structures. This group includes common urban pests such as house mice and roof rats as well as native forest dwellers such as woodrats, deer mice, skunks, raccoons, bats, and rattlesnakes. House mice, roof, and Norway rats typically invade urban structures. More rural, natural areas may be invaded by deer mice and woodrats. Some species (house mice, woodrats) can be controlled relatively easily in single structures as they typically ~~set up~~ establish single, temporary colonies in human structures. Others (roof and Norway rats) can be especially challenging since they have much larger, regional populations that interconnect. In all cases, the presence of increased shelter or food availability derived from the human world attracts these animals to buildings, including residential buildings, offices~~,~~ and landscaped areas where they can be problematic.

District structures have the potential to be invaded by numerous species of rodents – some of which are native species that are naturally occurring in the natural areas surrounding District structures, while others are typical urban pests. Because many of the District properties occur in natural areas, the natural populations of these pest species can reinvade and repopulate the treated areas. Most native wildlife species that are common structural pests are classified as non-game animals in California's Fish and Game Code and can be controlled with any method at any time they are found to be injuring human property. Some wildlife species have special protections and additional regulations covering their management such as game species (e.g., grey squirrels, deer), furbearers (e.g., skunks, raccoons) and ~~threatened and endangered~~ special-status species (e.g., ~~California red-legged frogs~~ San Francisco Dusky-footed woodrat).

The following sections present pest management information by species.

House and Deer Mice

The house mouse (*Mus musculus*) and deer mouse (*Peromyscus* sp.) are both small rodents that readily invade human structures, including vehicles, in search of shelter and food. The house mouse is a widespread species that has been linked to human culture for over 1,000 years (Timm et al. 1994). It is now found on every continent except Antarctica. Deer mice are native to California and most other parts of North America. They are common in nearly every habitat in their range – from deserts to forests, as well as urban and suburban areas that interface with natural areas.

Both types of mice are omnivorous but generally prefer grain, seeds, and nuts. Both are nocturnal, have similar reproductive traits and reside in nests composed of fibrous materials. All mice species that are considered pests are capable of extremely high reproductive rates anytime during the year, making control difficult. House mice are rather plain looking versus deer mice that have light/dark fur color schemes, white feet, large eyes, and large ears.

Mouse damage includes the consumption of human foods, building nests in human structures, defecation, physical gnawing, damage to paper, clothing and other textiles and the vectoring of disease. House mice are known to carry salmonellosis, leptospirosis, and a variety of other diseases but transmission to humans is rare.

Deer mice, on the other hand, frequently carry Hantavirus. Since its first identification in 1993, there have been approximately 70 hantavirus infections in California and about 30 percent of those cases have been fatal (Egel 2017). ~~which has been linked to several human deaths in California in the last decade.~~

~~**Pest Management Strategies for Mice**~~

Prevention

- Ensure outside garbage cans and dumpsters have tight-fitting lids to prevent mice from foraging on human food waste. This is especially important in public gathering areas in parks and open spaces. Cans with domed lids and self-closing, hinged lids are preferred in these outside areas.
- Clean all kitchen and food storage surfaces regularly; sweep and vacuum kitchen floors daily. Shared use items such as sinks, microwaves, and vending machines should be cleaned regularly to eliminate spills.
- Store all food properly, in containers with tight fitting lids, or in the refrigerator or freezer.
- Store native seeds, hay, and other vegetation-based materials that can attract mice properly in sealed containers or designated sealed storage facilities.
- Do not leave pet food in open bowls overnight. Wash pet food bowls immediately after feeding.

Habitat Modification

- Use silicone caulking and stainless steel/bronze mesh to plug/fill cracks and holes greater than ¼" in the exterior of building where mice could gain entry. Focus especially on utility penetrations, as mice are known to travel along pipes/wires. Avoid using carbon steel wool and expandable foams that degrade quickly and require repeat maintenance.
- Ensure all exterior windows that open have tight-fitting insect screens to prevent mice from gaining entry from the outside when windows are opened.
- Use galvanized sheet metal to create climbing barriers and exclude mice from travelling up vertical posts where necessary (pet cages/food storage tables/etc.).
- Mouse-proof storage facilities and seasonal buildings after visitor season ends to reduce possible nesting areas.

Physical Control

- **Box Traps (live trap).** Several types of box traps are available that are capable of trapping multiple individual mice per trapping event. These traps operate on the principle that mice are attracted to small openings and are naturally inquisitive. These traps are most successful for house mouse control. Traps should be inspected daily so live trapped mice can be humanely dispatched. In the event that repeated attempts of removal of non-native mice are not successful in a human occupied structure, lethal removal may be required as a control method.

- **Snap Traps.** Basic hardware store mouse traps offer one of the most effective means for mouse population control when executed with enough preparation, time, and effort. When uncontrolled mouse populations are present, snap traps can be used to "knockdown" large populations and then maintained to keep the population under control. Mice generally travel very short distances throughout their life – space traps approximately every 6 feet where mice are active. Time must be invested in determining where mice are active and then setting traps in appropriate locations. Pre-baiting will help prevent trap shyness and allow for the operator to test appropriate baits. Only highly desired baits should be used in the actual trapping program. Most mice species are not as trap shy as roof and Norway rats.
- ~~**Box Traps.** Several types of box traps are available that are capable of trapping multiple individual mice per trapping event. These traps operate on the principal that mice are attracted to small openings and are naturally inquisitive. These traps are most successful for house mouse control. Traps should be inspected on a daily basis so live trapped mice can be humanely dispatched.~~
- ~~**Glue Boards.** Glue or sticky boards are effective for supplementing other trapping methods in challenging areas. Glue boards work especially well in established runways where other traps cannot be easily placed. If a trapping program fails to trap all individuals that then become trap shy, glue boards are an alternative method that can capture the remaining rogue individuals. Traps should be inspected on a daily basis so live trapped mice can be humanely dispatched. Glue boards will only be used indoors only to prevent incidental catch of other wildlife~~.

Chemical Control

Chemical control of mice should not be considered except under very unusual circumstances (human health and safety considerations). In the unlikely event that chemical control of mice is deemed necessary, refer to the Chemical Control section for ~~rats~~ roof, Norway and woodrats~~,~~ below.

Roof, Norway, and Woodrats

Roof rat (*Rattus rattus*), Norway rat (*Rattus norvegicus*), and Dusky-footed woodrat (*Neotoma fuscipes*) are medium sized rodents that readily invade human structures, including vehicles, in search of shelter and food. With the exception of the native woodrat, rats represent some of the most challenging pest rodents to control in urban environments ~~(Marsh 1994).~~(Timm et al. 1994). Roof and Norway rats can be present in very large numbers in urban areas. Their home ranges are much larger than those of mice so effective treatment is challenging and may require treatment of more than a single structure. Both the roof and Norway rat are a widespread pest species that have co-evolved with humans for thousands of years.

Dusky-footed woodrats are native California mammals that are occasionally considered pests when they invade structures from nearby wildlands. All woodrats found on District lands are the San Francisco Dusky-footed woodrat (*Neotoma fuscipes annectens*), which is a CDFW Species of Special Concern. Control of woodrats, as with all native species, should first focus on prevention instead of physical or chemical control. ~~One exception to this in the event that repeated attempts woodrat are not successful in a human occupied structure, lethal removal may be required as a control method.~~

Like cockroaches, rats trigger general feelings of disgust in humans as they are thought to be representative of dirty living conditions and squalor. They do bite, and many people in the U.S. suffer from rat bites each year. Rats are known to carry diseases that can be transmitted to humans. ~~The majority of~~ Most of the actual rat damage in the United States is ~~due to~~ structural damage~~s~~ caused by burrowing (Norway rats), or ~~defecation and~~ contamination of food products, textiles, and living spaces resulting from ~~by~~ defecation (Norway/roof/wood-rats), and damage to agricultural crops and landscaping (roof rats). Woodrats typically build elaborate nests in wildland areas~~,~~ but can also be nuisance pests in structures where they make nests and cache food. Woodrats also are the only species of rat known to carry Hantavirus and ~~Arena virus~~ Arenavirus in North America, both of which can be deadly to humans ~~(Salmon and Gorenzal, 1994).~~(Timm et al. 1994).

~~**Pest Management Strategies for Rats**~~

Prevention

- Ensure outside garbage cans and dumpsters have tight-fitting lids to prevent rats from foraging on human food waste. This is especially important in public gathering areas in parks and open spaces. Cans with domed lids and self-closing, hinged lids are preferred in these outside areas.
- Clean all kitchen and food storage surfaces regularly; sweep and vacuum kitchen floors daily. Shared use items such as sinks, microwaves, and vending machines should be cleaned regularly to eliminate spills.
- Store all food properly, in containers with tight fitting lids, or in the refrigerator or freezer.
- Do not leave pet food in open bowls overnight. Wash pet food bowls immediately after feeding.

Habitat Modification

- Inspect building exterior for possible rodent entryways. Especially inspect attics for signs of rat occupation and openings or gaps between the structure and roofs or foundations. Use silicone caulking and stainless steel/bronze mesh to plug/fill cracks and holes greater than ½" in the exterior of buildings where rats could gain entry. Focus especially on areas where utilities enter the buildings, as rats are known to travel along pipes/wires. Avoid using carbon steel wool and expandable foam that degrade quickly and require repeated maintenance.
- Ensure all exterior windows that open have tight-fitting insect screens to prevent rats from gaining entry from outside when windows are opened.

- Use galvanized sheet metal to create climbing barriers and exclude rats from travelling up vertical posts where necessary (e.g., utility poles, pet cages, food storage areas, tables).
- Rodent-proof storage facilities and seasonal buildings after visitor use season ends to reduce possible nesting areas.
- If they appear to be a constant source of infestation, woodrat nests within 100 feet of buildings will be moved after consultation with the ~~California Department of Fish and Wildlife~~ CDFW.

Physical Control

- **Box Traps (live trap).** Several types of box traps are available that are capable of trapping multiple individual mice per trapping event. These traps operate on the principle that rats are attracted to small openings and are naturally inquisitive. These traps are most successful for rat control. Traps should be inspected daily so live trapped rats can be humanely dispatched. In the event that repeated attempts of removal of non-native rats are not successful in a human occupied structure, lethal removal may be required as a control method.
- **Snap Traps.** Basic hardware store rat traps offer one of the most effective means for rat population control in small structures with small rodent populations. Where large rat populations are present, snap traps can be used to "knock down" the population size in conjunction with other management techniques (prevention, habitat modification) to keep the population under control. Time must be invested in determining where rats are active and then setting traps in appropriate locations. Roof and Norway rats are inherently wary of new objects in their environment, including rat traps. Pre-baiting is essential to allow rats to associate rat traps with feeding stations, a process that may take several weeks. Only after rats have become used to traps should the trapping portion of the control effort move forward.
- ~~**Glue Boards.** Glue or sticky boards are effective for supplementing other trapping methods in challenging areas. Glue boards work especially well in established rat pathways of travel where other traps cannot be easily placed. If a trapping program fails to trap all individuals that then become trap shy, glue boards are an alternative method that can capture the remaining rogue individuals. Glue boards will only be used indoors and will be checked daily.~~

Chemical Control

The District is aware of the potential for secondary effects of rodenticide use in and near natural lands on native wildlife species, and is committed to strictly regulating rodenticide uses on its lands to the full extent possible. The District intends to use all non-chemical control options before selecting rodenticides as a treatment option, except in instances where rodent infestations are determined to present a public health issue. The District's goal is to reduce all rodenticide use on its lands over time to the full extent possible, while still protecting human health. The following section carefully lays out the effects and limitations of each type of rodenticide product, and provides guidance for ~~District staff~~ selection of the least toxic effective treatment option ~~in the event that~~ if chemical control of rodents must be ~~utilized~~ used.

Primary Versus Secondary Poisoning
Non-target poisoning is divided into two scenarios: 1) a non-target animal intercepts the bait – referred to as "primary exposure"; and 2) a non-target animal ingests a prey species that has been exposed to the toxicant – referred to as "secondary exposure." Rodenticides typically have high degrees of mammalian toxicity compared to other types of pesticides, so it is important to control how these compounds are presented to target rodent pests. Acute toxicant baits can attract non-target mammals and birds so these baits must be presented in environments where only rodents have a chance of encountering them.

Sealed box bait stations are now common for nearly all rodent baits used in structures to prevent pets and people from encountering ~~the~~ baits. Bait stations are usually designed for urban environments and they offer little protection to stronger wildlife species such as raccoons and badgers~~, and bears~~ that can easily open them (Erickson and Urban 2004). To better protect non-target wildlife species in the urban-wildlife interface, custom protective devices can be installed to shield bait stations from non-target wildlife species. Because predators generally prefer to catch and eat live prey, acute toxicants (the products that work quickly on the target animal resulting in a quick mortality) rarely cause secondary exposures to predators and scavengers.

Acute Rodenticide – Cholecalciferol (Vitamin D3)
Cholecalciferol is a natural form of Vitamin D that is industrially synthesized from lanolin (sheep's wool) to produce human dietary supplements and rodent poison. In very high doses, it causes mobilization of calcium from the bone matrix to blood plasma, causing hypercalcemia and death. It is especially toxic to rodents and a single dose of toxicant acts as an acute poison. It is the only current rodenticide in California labeled for organic food production (OMRI 2025). Cholecalciferol is considered a novel mode of action for rodenticides and can be used in urban areas where rodents have developed resistance to other anticoagulants (Marshall 1984). It is considered a low risk for secondary poisoning in wildlife but can be a hazard to non-target pets that directly consume the bait. Rodenticides will only be used inside buildings in tamper-proof anchored containers.

Skunks, Opossums, and Raccoons
Skunks, opossums, and raccoons are native mammals that have the potential to take residence in District structures as unwelcome guests. All these species are exceptionally common on District lands and generally will not bother humans. On rare occasions, they may invade trash cans, open kitchens, or den under and within structures. CDFW regulates these species as nongame or furbearer animals so they all may be controlled without permits if found causing agricultural damage or nuisance problems.

~~Pest Management Strategies for Skunks, Opossums, and Raccoons~~

Prevention

- Ensure outside garbage cans and dumpsters have tight-fitting lids to prevent foraging on human wastes. This is especially important in public gathering areas in parks and open spaces. Cans with domed lids and self-~~-~~closing, hinged lids are preferred in these outside areas.
- Clean all kitchen and food storage surfaces regularly; sweep and vacuum kitchen floors daily. Shared use items such as sinks, microwaves, and vending machines should be cleaned regularly to eliminate spills.
- Do not leave pet food in open bowls overnight. Wash pet food bowls immediately after feeding.

Habitat Modification

- Use stainless steel/bronze mesh or welded wire to plug/fill cracks and holes in the exterior of buildings where large animals could gain entry.
- For larger openings, such as under decks and porches, fully enclose with plywood, concrete, or wire mesh to prevent animals from making dens under structures. If animals are already denning in the area, use one-way, hinged doors to allow them out but preventing them from returning. Confirm there are no juvenile animals in the den before using one-way doors.
- For raccoons in challenging areas, a single electrified strand of wire elevated eight inches from the ground can be used to deter them from entering the area.

Physical Control

- **Box and Cage Traps.** All skunks, opossum, and raccoons are easily trapped with live box or cage traps. Trap design varies but solid wall traps are preferred for skunks to shield the trapper from skunk spray during the control operation. The use of live trapping methods ensures that non-target animals can be released unharmed. Current CDFW trapping regulations require that trapped animals are either released immediately or euthanized; live animals may not be relocated without a permit from CDFW.

Chemical Control

Currently there are no toxicants or fertility control agents available in California for these species.

Bats

Bats are California's only flying mammal. There are a wide variety of bats (more than 16 species) that inhabit all habitats in the Bay Area; some are solitary and others colonial. All California bat species are insectivorous and they provide an ecologically valuable service of consuming vast quantities of insect pests such as mosquitoes (Gannon 2003). Though they generally benefit humans greatly, bats secretive nature, ~~coarse appearance~~ nocturnal habits, ability to fly, and habitation near humans have contributed to folklore, superstition, fear and ultimately persecution.

Some species of colonial bats can become structural pests when they establish colonies in homes or other human structures. Some species prefer dark open spaces, such as attics and basements and others prefer small cracks/crevices, such as between roof tiles/shingles or behind shutters (Greenhall and Frantz 1994). One human structure can ~~actually~~ support a wide diversity of bat species. Though many bat species are tolerant of humans, many humans are not tolerant of bats.

Common damages caused by bats are noise coming from bat roosts, smell~~s coming from~~ of their urine and guano, potential disease such as rabies and histoplasmosis, and discomfort anytime their presence is too close to humans in structures ~~(CDFW 2008).~~(CDFW 2015). Most bat damage can be mitigated with prevention and habitat modification techniques to make human structures less inviting or completely exclude bat roosting.

Prevention and Habitat Modification

- Carefully assess where bats are entering structures and modify the building to exclude future entry. Since bats are extremely small, fly, and can squeeze into very small spaces, assessing bat entry points can be a tedious and challenging exercise. Evaluate spaces during day/nighttime hours; use ~~smoke pens, and~~ infrared cameras to assist in detecting breeches to the building envelope (smoke pens may be permitted in structures with a verified absence of bats). Consult bat exclusion specialists for challenging structural projects.
- Install flashing, screening, or netting in obvious roof/gable areas where bats can roost.
- Caulk cracks in masonry, especially chimneys.
- Use one-way trap doors to allow bats to escape roost areas after exclusionary methods are completed. Bat exclusion requires CDFW approval. Bat exclusion work will be avoided during the winter torpor period (November 15 through February 15) and summer maternity roosting season (April 15 through August 31).

Trapping

Trapping is not recommended as it is more time consuming and less effective than strategic exclusion as discussed above.

Chemical Control

Currently there are no toxicants or fertility control agents available in California acceptable for ~~these~~ use on bat species.

5.9.4 Feral Domestic Pets

Domestic pets such as feral cats and ~~stray~~ dogs can sometimes become structural pests. Uncontrolled feral domestic pets, unlike most wildlife, are often highly habituated to humans and therefore much more likely to come in very close contact with District staff, tenants, visitors, and livestock (Information Services Division 2012). These close encounters can lead to increased chances of physical injury, disease transmission, contamination of District facilities, and injury to tenant livestock.

Cats and dogs are generally considered private personal property when ownership can be established through collars, registration tags, microchips, tattoos, brands, or other proof of ownership. Pets without identification can be considered free roaming, uncontrolled private property, or feral ~~(wild)~~ animals. In California, both state and local laws govern domestic animal damage control under Fish ~~&~~and Game code, agriculture codes and local ordinances.

District staff consult local city and county ordinances and animal control departments when conducting any domestic animal control actions.

Prevention and Habitat Modification

- Feral domestic pets are often relics of old structures/settlements. If the District inherits older buildings/infrastructure, consider demolition or wildlife exclusion retrofitting so the structures can no longer support animals.
- Control of excessive rodent populations in structures can also help control feral cat populations.
- Ensure outside garbage cans and dumpsters have tight-fitting lids to prevent foraging on human food waste. This is especially important in public gathering areas in parks and open spaces. Cans with domed lids and self-closing, hinged lids are preferred in these outside areas.
- Ensure District staff and tenants have properly placed any bird feeders or bird nest boxes such that they do not also serve as cat feeding stations.
- Prohibit staff and tenants from feeding feral domestic pets on District property. Develop education programs to encourage the public not to feed wildlife or feral animals on District property.

Trapping

Live trapping is effective to capture problem cats but generally ineffective for dogs in California (Green and Gipson 1994; Fitzwater 1994). Because feral domestic pets may be private property, District staff conduct all trapping in conjunction with local animal control departments and/or animal shelters.

6 IPM for Recreational Facilities

6.1 Definition and Purpose

Human use is typically concentrated on preserves at the recreational facilities provided by the District. Recreational facilities within District preserves currently include approximately ~~479~~ 518 miles of access roads and trails as well as associated infrastructure (e.g., bridges, culverts, drainage ditches, parking lots, gates, stiles, bathrooms, picnic areas, one campground, off-leash dog zones, managed turf and landscaped recreation areas, pond viewing and dam areas, and Deer Hollow Farm).

Nuisance pests in and around recreational facilities include plants, insects, and wildlife that can temporarily affect the District's visitor experience in a negative manner. Sometimes nuisance pests at recreational facilities become problematic when there are extra resources readily available (e.g., food, water, shelter) and therefore can be managed with physical control options (e.g., controlling food-trash in picnic and camping areas).

The purpose of pest control in and around recreational facilities is to manage pests for human enjoyment of the natural and scenic qualities of the preserves while also minimizing human exposure to pests. The maintenance of vegetation alongside roads and trails and the control of stinging or biting insects or reptiles at recreational facilities must incorporate protection of the surrounding natural resources as a primary consideration. Unlike buildings, recreational facilities are almost always located in natural (undeveloped) areas, therefore, pest control solutions must also consider protection of the surrounding natural resources as a primary consideration.

6.2 Type of Pests

~~6.2.1 NUISANCE PESTS IN RECREATIONAL FACILITIES~~

Nuisance pests include native and naturalized plants, insects, and wildlife that are present throughout the region and are generally compatible with the District's mission and goals. Conflict only occurs when these species become overabundant or exceptionally close to staff and visitors. For example, native ~~social wasps~~ stinging insects in outside areas ~~would~~ are normally ~~be~~ tolerated, but a ~~wasp~~ stinging insect nest in a public bathroom ~~would be~~is considered an unacceptable risk to visitor health and enjoyment of District lands. Recreational facility pests include mosquitoes, stinging insects, ticks, rattlesnakes, and other native and domestic animals, as well as vegetative pests such as poison oak.

The determination of a nuisance pest can be quite variable depending on the tolerance of staff or the visitor to any real or perceived harm. Care must be exercised when defining tolerance levels for each pest species. One must consider the actual damage potential of the organism versus the cultural acceptance to the risk that the organism poses. For example, poison oak is an important native plant that occurs throughout District lands and is quite common along trails. Educating the public about the effects of poison oak exposure to humans (dermatitis) is the first option to reducing perceived risk of exposure to this pest. When visitors complain about incidences of poison oak exposure, District staff must consider the context of the poison oak exposure risk. At trailheads, campgrounds, and other areas where potential for frequent visitor interactions is high, staff may elect to routinely control poison oak. In contrast, infrequent brushing and/or installation of educational signs may be appropriate for poison oak at remote, backcountry trails that are rarely visited. The District's recreational facility IPM decision-making must always balance health and human safety concerns with the District's goals to protect natural resources.

6.3 Pest Identification

Nuisance pests are generally identified by chance encounters by District staff, tenants, and visitors. Because recreational facilities have more intensive ~~utilization~~ use than the District's surrounding natural areas, nuisance pests can usually be identified relatively quickly before the problem reaches levels where active pest management is required. Routine inspections of recreational facilities should focus on identifying conditions where visitor use levels are high, and where conditions can result in excess food, shelter, and access that support pest problems.

Many nuisance pests can be anticipated and their management scheduled based on an understanding of their biology and behavior. For example, some types of native vegetation grow~~th~~ outwards onto roads and trails in search of light and space, ~~can be anticipated~~ and preventative treatment (brushing) can be scheduled on an annual or periodic basis. District staff can identify problem areas with excess vegetation along trails each year, and schedule abatement accordingly. Other pests may present themselves randomly and/or rarely. For example, a rattlesnake denning along a trailside is a relatively infrequent occurrence. These infrequent pest problems are usually best reported when the staff and/or visitors encounter them.

6.4 Prevention and Retrofit

Nuisance pest control in recreational facilities focuses on first modifying the behavior of humans or the environment structure ~~of our environment~~ to reduce or eliminate the problem. The District's IPM Program relies on cultural pest control practices, such as product design or retrofit and behavior modification as the primary pest control treatments, with active chemical or lethal controls used only as a last resort.

This section describes general operational procedures intended to prevent or minimize the need for pest control in recreational facilities. The District will undertake some or all of the following to help prevent pest infestation from reaching action thresholds:

- Staff training,
- Public education regarding identification and avoidance of naturally-occurring nuisance pests,
- Structural changes intended to pest-proof recreational facilities,
- General sanitation and maintenance actions,
- Landscape maintenance, and
- Waste management procedures.

District procedures for these preventative actions are described in more detail below.

6.4.1 Prevention

Many pest outbreaks can be managed with cultural control options such as changing human behavior (e.g., promoting removal of food-related trash, installing educational signs promoting human avoidance of naturally occurring pests, temporary closures of facilities during periods pests are most likely to be present to physically separate visitors and pests) and engineered control options within our recreational facilities (e.g., securing garbage cans, managing vegetation around heavily used recreational facilities, sealing off buildings and structures~~-~~). Many open space and park districts throughout the nation have dramatically reduced human-wildlife encounters by simply making food and garbage unavailable with wildlife-proof garbage cans (Decker et al. 2008; Herrero et al. 2005). This simple, single engineering solution reduces wildlife habituation to humans, ultimately reducing human conflicts with stinging insects, raccoons, skunks, coyotes, and other naturally-occurring nuisance pest species.

Feeding wildlife can significantly increase nuisance wildlife problems in the District. Using postings and other educational materials in District picnic areas, parking lots, and trailheads can help inform the public that feeding wildlife ultimately causes them great harm. Postings should emphasize that passive feeding (i.e., poor sanitation) is as detrimental to wildlife as active feeding, and that visitors should remove their food-related trash at the end of their visit. Educational postings for conservation related topics are best supported by both active and passive enforcement, or otherwise tend to be ineffective (Baruch-Mordo et al. 2011).

Recreational ~~facilities~~ facility pest problems are often temporary in nature. Rattlesnakes and skunks may temporarily occupy a facility, but otherwise remain unseen by visitors. Instead of actively managing the pest itself, the District can install educational signs promoting human avoidance of naturally occurring pests, or the facility can be temporarily closed (for buildings and other facilities) or rerouted (for trails) so District staff or visitors remain safe during time periods when pests are most likely to occur.

6.4.2 Retrofit

The District will train staff to regularly assess and manage the areas within recreational facilities that are known to attract pests. Some examples of such areas include:

- Storage areas for tools, seeds and plant materials, food, research supplies;
- Waste management areas: trash cans, trash compactors, dumpsters, etc.;
- Drainage areas;
- Plumbing (faulty plumbing such as leaky pipes can support pests);
- Entryways and windows (ensure tight seals to prevent pest entry);
- Landscaped areas, especially immediately adjacent to buildings; and
- Storage areas (such as woodpiles) located next to buildings.

District supervisors should regularly inspect such areas and provide additional training or educational materials to encourage staff to keep such areas clean and pest free. ~~In addition~~ Additionally, in ~~for~~ buildings used for storage of equipment and vegetation materials, items such as seed, hay, or livestock feeds, and all other materials that could attract rodents, will be sealed in plastic or metal containers with tight fitting lids. Actions to prevent or reduce nuisance pests in recreational facilities include:

- Train staff ~~about~~ in proper storage of work supplies in non-occupied buildings.
  - Store all pet food, animal grains, hay, and other consumable agricultural supplies in sealed containers metal/plastic containers.
  - Store plant seeds used for habitat restoration and landscaping in sealed containers.
- Position attractive harborage areas, such as rock piles, soil storage piles, hay, and erosion control materials away from recreational facilities.
- Control food waste in contractor work areas, outbuildings, storage areas, and other non-occupied recreational facilities. Provide sealed garbage containers in or near such areas to prevent inadvertent disposal.
- Reduce, monitor, and where possible, eliminate use and import of natural materials that could introduce pests onto District lands, such as reducing use of off-site fill (soil, gravel, and rock) and livestock feeds (hay) that may contain weed seeds. Where possible, include requirements to ~~utilize~~ use ~~onsite~~ on-site fill, require balanced cut and fill projects on District lands, and require use of certified weed-free erosion control materials for construction projects on District lands.

In addition, landscaping around recreational facilities can harbor pests. Maintenance staff should prune back or remove dense vegetation such as ivy and any landscape vegetation that touches buildings, providing a physical pathway for pests such as ants to access the building. In addition, maintenance of healthy landscapes through proper fertilization, watering, pruning, and aeration is also thought to reduce potential for pests to reach problematic levels.

Landscape design and good landscape maintenance practices can discourage pests and encourage healthy plantings that may resist pest establishment. Some options for pest prevention and reduction in landscaped areas include:

- Appropriate cleaning and maintenance of tools and equipment;
- Selection of new landscape design intended to discourage landscape pest species;
- Replacement of older landscaping design when it is found to harbor pests (e.g., dense vegetation such as ivy near buildings);
- Monitoring of landscaping plants for secondary pests (such as aphids or scale), and treatment as necessary to prevent nuisance pest outbreaks (such as ants).
- Ensuring new planting materials are clean of pests and disease;
- Selection of pest-resistant plants for landscape maintenance projects;
- Positioning planting sites away from buildings; and
- Proper irrigation design, and proper watering practices.

In the event of a pest outbreak in landscaped areas, choose least environmentally disruptive and harmful, effective treatments for landscape pest species.

6.4.3 Timed Maintenance

Many nuisance pests can be managed through preventative treatments based on an understanding of their biology and behavior. This is especially true for the District's routine maintenance needs for horticultural landscaping and native vegetation along gates, stiles, trails, and access roads. Native vegetation grows vigorously after being cut because of plant hormone responses and changes in the availability of soil nutrients (Parr and Way 1988). Vegetation types that are regularly mowed with mechanical equipment have predictable regrowth times that can be measured and incorporated into routine District maintenance schedules. To prevent road and trailside vegetation from becoming a nuisance pest, mechanical brushing can be scheduled for specific times of year to abate the hazard before it becomes a problem. Roadside brushing also serves as secondary control for other nuisance insect and wildlife species. The reduction of cover near trails reduces the chances that visitors and staff will encounter ticks and rattlesnakes.

Some native perennial vegetation (e.g., poison oak or stinging nettles) is less tolerated by humans than other types of native vegetation. The presence of such vegetation may not be appropriate for some trailside locations that have high visitation rates. These special circumstances require the use of more complex management tools for perennial plants such as chemical control. Refer to vegetation management options presented for perennial plants, as detailed in Chapter 8, Table 8-5 for such special circumstances.

6.4.4 Plant Healthcare

Many nuisance pests in horticultural landscaping and turf (e.g., as mildews, rusts, aphids, whiteflies) can be controlled with routine and proper horticultural practices. Proper watering, fertilization, and cutting/pruning can ensure horticultural plants have sufficient resources to grow well without providing support to fungal, insect and mammalian pests. Horticultural plants that are especially susceptible to nuisance landscaping pests should be considered for replacement with more suitable varieties. Often pests can be 'designed' out of the landscape by choosing more appropriate species or varieties for a specific location.

6.5 Damage Assessment

Determine what, if any, damage to recreational facilities or the visitors using them is present. To the extent possible, quantify the damage (square feet or number of occurrences affected) and qualitatively describe the perceived damage.

6.6 Tolerance Levels/Thresholds for Action

If there is no damage to a recreational facility, but a nuisance pest is present that ~~is in~~ conflicts with human use or enjoyment of the structure, determine the tolerance level for each nuisance pest species to ~~determine~~ assess if control is warranted. ~~To the extent possible, quantify the damage (square feet or number of occurrences affected) and qualitatively describe the perceived damage in its context.~~

~~6.7 TOLERANCE LEVELS/THRESHOLD FOR ACTION~~

Recreational facility IPM focuses on modifying the structure of the environment to balance nuisance pest conflicts with visitor needs. In recreational facility pest management, often small retrofits or facility modification can reduce risk of exposure or manage the pest population down to acceptable tolerance levels.

Tolerance levels vary greatly for nuisance pests in recreational facilities. Most nuisance pest species are native species that are compatible with the District's goals for conservation. The District's IPM approach for nuisance pest species begins with establishing tolerance levels that balance human safety, enjoyment, and comfort within visitor facilities with the ability to conserve natural resources, meet regulatory requirements and cost/benefit assessment. Human safety and enjoyment is the primary metric for establishing tolerance levels in visitor facilities. Staff and visitor safety is paramount in regulating treatment actions for nuisance pests. Tolerance levels will consider conservation goals and impacts to the larger surrounding natural system in determining treatment actions.

Refer to Table 6-1 below for management thresholds, and possible treatment options for nuisance pests in and near recreational facilities, presented by pest category.

Table 6-1 Management Thresholds and Treatment Options for Nuisance Insect, Animal, and Plant Pests in Recreational Facilities

Pest Category	Management Threshold (Population Size/Conditions)	Treatment
Mosquitoes	Detection of pest ~~at levels~~ at levels that could cause human health problems, populations causing visitor discomfort, or as required by local regulatory agencies.	Use a combination of the following: • Inspect areas in vicinity of problem area for standing water and other potential mosquito breeding sites. Where possible, repair or drain /eliminate potential breeding habitats • Educate visitors about mosquitoes and human health risks by posting temporary signs in problem areas • Protect workers by requiring use of protective clothing when working in affected areas • Use BTI *(Bacillus thuringiensis israelensis)* discs in water troughs For ongoing pest issues, contact a local county Mosquito and Vector Control District to schedule treatment (District to comply with legal requirements to control mosquitoes for human health and safety).
~~Social Wasps~~ Stinging Insects	Populations causing conflict with humans near structures or other high use visitor areas	Use a combination of the following: • Remove or enclose attractants in well-sealed containers (trash cans, etc.) • Use baited non-toxic water traps (late winter and early spring) • Use non-toxic lure traps set approximately 200 feet apart.
	Nests determined to pose immediate threat to human safety	Use a combination of the following: • Physically remove problem nests with water jets or by digging • Use Pyrethrin aerosol spray to target individual nests.

Pest Category	Management Threshold (Population Size/Conditions)	Treatment
Ticks	Detection of multiple individual in work areas or offices, tick populations causing visitor discomfort.	Use a combination of the following: • Remove and destroy individual ticks. • (See also preventative trail maintenance for native vegetation below.)
Rattlesnakes	Individuals within structures or recreational facilities where contact with humans is likely	Use a combination of the following: • Trap and relocate (obtain appropriate permits from CDFW). • Block access to structures and remove hiding places adjacent to structures and high public use areas.
Native vegetation along trails and roads (poison oak, stinging or scratching plants, brush)	Conditions could cause severe discomfort or health hazards to visitors, volunteers, and staff, or vegetation that is blocking emergency access.	Follow District guidelines for trail clearing in various habitats and slopes. • Mow and prune buffers along trails and roads to reduce direct contact by visitors. • Herbicide use on perennial species only if permanent control is needed.

6.7 Treatment Options

In recreational facilities, pest tolerance levels are based on ensuring the health and enjoyment of visitors, in addition to human health and safety requirements, by following the District adopted details and specifications for trail and other recreational facilities.

When the presence of pests in recreational facilities is determined to require action, pest prevention actions the District may consider in recreational facilities include:

- Reducing the attractiveness of the recreational facilities areas to pests. For example, remove rock and brush piles that are attractive to snakes; seal small burrows and holes that attract ground-dwelling pests; regularly remove food debris that can attract wildlife (e.g., skunks, ravens).
- Educating the public about interactions with wild creatures such as snakes and ticks, and providing suggestions for avoiding unpleasant or dangerous interactions. Support this action with proactive enforcement.
- Sealing up entrances in and near recreational facilities to discourage pest occupation (e.g., screening air vents to bathrooms, screening in overhangs to prevent pests from entering the facility).

- Cutting back unwanted brush, such as poison oak, along trailheads and high use trails to reduce potential for visitor interaction.
- Mowing high grasses along heavily used trails where ticks tend to congregate.

Pest management options for nuisance pests in and around recreational facilities are the same for insect and wildlife pests in buildings that is described above in Chapter 5. The following section describes additional nuisance pests that are not covered in Chapter 5.

Where pesticide use is determined to be the only viable treatment option to address the specific infestation of concern in and around recreational facilities, selection of least harmful products is required. In these limited instances, only pesticides on the District's List of Approved Pesticides ~~(Table 1.1, Appendix A)~~ (Table 3-3) may be ~~utilized~~ used.

The chemical control options presented in this Chapter represent the least harmful, most efficient treatment methods for controlling structural pests. For example, a wasp nest in a public restroom may require use of a pyrethroid wasp spray to immediately eliminate the hazard of wasp injury to visitors. The inclusion of a variety of pest treatment method options in the IPM Program allows the District to respond with the necessary tools based on actual risk to the District, its visitors, workers, structures, and lands.

6.7.1 Mosquitoes

Definitions

Mosquitoes are a family of small, midge-like flies in the *Culicidae* family. Most mosquitoes are considered a pest species because they consume blood from vertebrates, including humans and can transmit diseases and cause uncomfortable dermatitis. Mosquitoes go through four life stages: egg, larva, pupa, and adult. The first three life stages are largely aquatic and last approximately 14 days. Control of wet areas, including stagnant standing rainwater, stock ponds, and even ponded water from leaky pipes is therefore an effective control strategy for controlling this pest species. The females of many, but not all species of mosquitoes consume blood during a portion of their life cycle. In feeding on blood, some species of mosquitoes can transmit extremely harmful human and livestock diseases, such as West Nile virus and Malaria. Therefore, pest control focuses on elimination of stagnant water and wet area habitats, and on control of adults' population numbers where a health concern is detected.

Although mosquitoes are members of the ecosystems of natural areas, the threat of mosquito bites makes them unwelcome in and near buildings and recreational facilities. Mosquitoes are generally only considered pests when their population numbers are incompatible with human health and safety, at which point the District will contact the appropriate county Mosquito and Vector Control District. The county Mosquito and Vector Control District is the agency responsible for monitoring disease outbreaks and implementing necessary pest control for human health and safety.

Pest Management Strategies for Mosquitoes

Prevention
In addition to actions taken by local county Mosquito and Vector Control District to detect and control mosquito populations in natural areas, the District can also implement many non-chemical, cultural control methods to prevent infestation or reduce the number of adult mosquitoes that come into contact with workers and visitors. Depending on the situation, the most important usually include:

- Source reduction (e.g., removing nearby stagnant water ~~around~~), and
- Education (e.g., posting public information signs to inform visitors about mosquitoes and human health risks).

Physical Control

- Install and maintain window screening in recreational buildings.
- Train staff to protect themselves from exposure by wearing long-sleeved clothing, tucking pant legs into socks and/or taping pant cuffs close to the body.

Biological Control
The District places *BTI* discs (*Bacillus thuringiensis israelensis*) in watering troughs throughout the preserves to control mosquitoes. *BTI* is a specific type of bacteria that prevents mosquito larvae from developing.

Chemical Control
Where ~~other forms of~~ chemical control ~~are~~ is determined to be the only viable treatment option to address the specific infestation of concern in and around recreational facilities, the District will contact the appropriate county Mosquito and Vector Control District for assistance and will comply with legal requirements to control mosquitoes for human health and safety~~)~~.

Repellents (active ingredient: N,N-diethyl-meta-toluamide (DEET) or picaridin) can be applied to the skin or clothing, to dissuade insect pests, including mosquitoes, from attacking District staff or workers. Use of repellents will be limited and infrequent.

6.7.2 ~~Social Wasps~~ Stinging Insects

Definitions

Stinging insects are a large group ~~of native stinging insects~~ that generally include social wasps such as yellow jackets, hornets, and mud daubers. Wasps' yellow and black color schemes and social behavior are shared with distantly related bees. Like bees, wasps are an important group of native insects that perform valuable ecological functions in our natural world ~~(Hinkle et al. 2002).~~(Dennis Pittenger 2015). Most of the species in this group are generalist insect predators that are essential in their natural environments to aid in decomposition, control populations of other insects, and some even pollinate flowers like bees. Although wasps are important members of the ecosystems of natural areas, the threat of wasp stings makes them unwelcome intruders in and near buildings and recreational facilities. ~~Social wasps~~ Stinging insects are generally only considered pests when their nests are ~~located~~ in areas where they are incompatible with human use. For example, when ~~social wasps~~ stinging insects nest under the eaves of buildings or alongside trails, they can sometimes exhibit aggressive protective behaviors that can threaten humans with painful and sometimes dangerous stings. Where multiple stinging incidents occur, District staff will consider control of wasp nests.

Wasps belong to a large group of insects in the ~~family~~ order *Hymenoptera* that includes ants, bees, and wasps. Many genera and species within *Hymenoptera* are difficult to tell apart as they share similar body shapes and color schemes. Because many of these *Hymenopteran* insects have protective stings and bites, even some other species outside the family like flies have adapted their body styles to mimic wasps. For this reason, staff must be careful to properly identify the pest to species to ensure that it is an actual nuisance pest species that can sting, rather than a similarly shaped or colored harmless species.

Like honeybees, wasps are social organisms that live together in colonies where individuals have specialized roles. Queens emerge from hibernation each spring to build nests and start larger colonies composed of workers. Pupae are raised in cell-like structures within paper or mud nests that are tended by workers and queens. Different species build different types of nests – from small mud structures that are attached to ledges to aerial and underground paper-type nests. Different species also have different foraging habits. Some prefer hunting for carrion and sweet liquids while others prefer hunting live prey. The species that forage for carrion and sweet liquids are often the most problematic individuals that disturb picnickers.

Pest Management Strategies for ~~Social Wasps~~ Stinging Insects

Prevention

- Ensure outside garbage cans and dumpsters have tight-fitting lids to prevent wasps from foraging on human food wastes. This is especially important in public picnic and gathering areas in parks and open spaces. Cans with domed lids and self-closing, hinged lids are preferred in these outside areas.
- Periodically clean the hinged-lids of garbage and recycling bins so spilled sweet liquids do not attract wasps to picnic areas.
- Ensure all exterior windows that open have tight-fitting insect screens to prevent wasps from gaining entry from the outside when windows are opened.
- If concessionaires sell soft drinks and other sweet liquids on District properties, require drinks to be sold with straws and tight-fitting lids to prevent wasps from entering drinking containers while in use.

Physical Control

- Install baited non-toxic water traps in late winter and early spring to reduce queens in problem areas where wasps are known to be regularly problematic.
- Install pesticide-free lure traps set approximately 200 feet apart in outside problem areas where human/wasp conflicts are known to occur (e.g., picnic areas, outside amphitheaters). Place traps between the center of human activity and natural areas ~~in an attempt to~~to attract wasps away from humans instead of attracting more wasps to human areas.

- Physically remove problem wasp nests with water jets or by digging them out of underground locations. Ensure pest control workers wear protective beekeeper suits to reduce the potential for dangerous stings.

Chemical Control
~~**Pyrethrin Aerosol Sprays.** Pyrethrin-type aerosol sprays containing d-trans allethrin and phenothrin are only recommended where immediate threats exist to human health and safety.~~ Pyrethrin-type aerosol sprays containing prallethrin, and phenothrin are only recommended where immediate threats exist to human health and safety. These aerosol sprays are extremely effective at immediately eliminating single, problem wasp nests that threaten District staff or visitors. The pyrethrin-type sprays work as a contact neuro-poison that results in near immediate mortality of any insect (Jackson et al. 2011). The sprays offer a relatively safe and effective means for rangers and maintenance workers responding to immediate threats of wasp nests. Contact pyrethrins are non-selective, so care must be taken to target only the pest wasp and not to impact other beneficial insects. Contact sprays do not offer population-level control for wasps; diligent sanitation and early seasonal queen trapping are the only known methods to effectively reduce populations of stinging wasps in open landscapes.

~~These aerosol sprays are extremely effective at immediately eliminating single, problem wasp nests that threaten District staff or visitors. The pyrethrin-type sprays work as a contact neuro-poison that results in near immediate mortality of any insect (Jackson 2011). The sprays offer a relatively safe and effective means for park ranger and maintenance workers responding to immediate threats of wasp nests. Contact pyrethrins are completely non-selective, so care must be taken to target only the pest wasp and not to impact other beneficial insects. Contact sprays do not offer population-level control for wasps; diligent sanitation and early seasonal queen trapping are the only known methods to effectively reduce populations of stinging wasps in open landscapes.~~

6.7.3 Ticks

Definition
The western black-legged tick (*Ixodes pacificus*) is a native arachnid (i.e., spider relative) that is very common in grasslands, scrub, and woodlands throughout District lands. Black-legged ticks are common parasites of native mammals such as deer, but they can also be problematic parasites of District visitors and staff. To complete their life cycles, ticks must feed on blood and for this reason can also be dangerous vectors that can transmit blood--borne diseases such as Rocky Mountain spotted fever, Lyme disease, and tularemia ~~(CDC 2013b).~~(CDC 2022). Ticks are an important part of the natural environment and are present on District lands in abundance. Due to their prevalence in naturally occurring deer populations that move through District lands, eradication of ticks in natural areas is impossible; however, some level of preventative control may be warranted in high visitor use areas in and around recreational facilities and buildings. Ticks can be especially problematic indoors where field staff work and store clothing; staff returning from field work can unknowingly introduce ticks into buildings where they can be transmitted to unsuspecting office workers.

Pest Management Strategies for Ticks

Prevention

- In high visitor use areas, regularly cut or mow alongside trails and picnic areas to reduce the chance of visitors and staff picking up ticks. Ticks often summit tall grass blades and shrub branches to "catch" or brush against a passing animal. Keeping vegetation cut low and pruned reduces the opportunities for ticks to ~~utilize~~ implement this strategy in areas with high pedestrian use.
- Post tick educational materials in District offices and at major trailheads and parking areas.
- Regularly vacuum carpeted areas where District employees work.
- Ensure all exterior windows that open have tight-fitting insect screens to prevent ticks from gaining entry from outside when windows are opened.

Physical Control

- Install carbon dioxide traps daily to collect ticks in field offices where field staff regularly begin and end field days. This may be especially effective in staff changing rooms where field clothes are shed, changed, and stored.
- Train staff to protect themselves from exposure by wearing light colored long-sleeved clothing, tucking pant legs into socks and/or taping pant cuffs close to the body; performing regular inspections of clothing and exposed areas such as the head and neck; and showering or bathing and inspecting their bodies as soon as possible upon completion of work.
- Post educational signs with the information above to ~~help~~ inform visitors of tick prevention and detection strategies they can employ before and after using recreational facilities.
- As ticks are found, remove and destroy individuals.

Chemical Control

No chemical control strategies are recommended for ticks; however, repellents (active ingredient: DEET or picaridin) will be applied to the skin or clothes to dissuade insect pests, including ticks, from attacking District staff and workers. Use of repellents will be limited and infrequent.

6.7.4 Nuisance Animals

Rattlesnakes

Definition

Rattlesnakes are the only type of venomous snake found in California. They are native to California and are ~~considered to be~~ important predators that help keep rodent populations under control. Rattlesnakes are generally extremely wary of humans and tend to shy away from human activities. They are not aggressive towards humans unless cornered, surprised, or stepped-on. Occasionally, they can be considered nuisance pests when they find themselves too close to recreational facilities, occupied buildings, or other areas where human encounters are likely. Though important to the natural world, the threat of rattlesnake bites makes them unwelcome pests in certain portions of District lands.

Pest Management Strategies for Rattlesnakes

Prevention

- District field staff can protect themselves from rattlesnake bites during workdays by wearing high-top leather boots and snake-resistant chaps or gaiters. Snake gaiters are also useful in preventing the dispersal of non-native weed seeds, since weed seeds usually do not penetrate the gaiters.
- Educational materials can warn visitors about rattlesnake hazards and suggest preventative actions such as wearing protective clothing, as described above for District field staff.

Habitat Modification

- Eliminate hiding places for snakes by trailheads and parking areas with brushing, removing rock and brush piles near busy human use areas especially those with children, and filling cracks and holes in publicly accessible buildings. Use stainless steel/bronze mesh or welded wire to plug/fill cracks and holes in the exterior of buildings where snakes could gain entry.
- Where rattlesnake sightings are common, manage recreational facilities during the spring and summer months to reduce suitable habitat, and especially eliminate hiding places for snakes (e.g., brushing trailheads and parking areas, removing rock and brush piles, managing localized prey populations near known snake problem areas, filling cracks and holes in public accessible buildings).

Physical Control

- **Tongs and Funnel Traps.** In certain areas (especially in structures and recreational facilities where humans gather and there is potential for snakebites), the District may elect to capture and relocate, or eliminate single problem snakes.
  - Using snake tongs, snake hooks, or shovels, trained individuals may capture and relocate or eliminate problem rattlesnakes. Captured rattlesnakes can be placed in a secure container for relocation in the preserve to nearby suitable habitat away from people. Occasionally, because of ~~site conditions or~~ the urgency of the situation, a staff member or tenant may need to kill a rattlesnake via decapitation with a shovel.
  - Funnel traps can be used to collect problem snakes. Traps must be checked daily to ensure that non-target wildlife is not trapped accidentally.

Chemical Control

Currently there are no toxicants or fertility control agents available in California for rattlesnakes.

Other Native and Domestic Mammals

See discussion of skunks, raccoons, opossum, and feral cats/dogs in the subsequent Sections 5.9.3 and 5.9.4.

6.7.5 Vegetation Management of Trails and other Recreational Facilities

Definition

The majority of IPM activity associated with recreational facilities is annual brushing (i.e., pruning of vegetation along roads and trails), which keeps them open for vehicular, horse, bicycle, and human foot traffic, and furthermore provides a buffer area to separate humans from pests like ticks, rattlesnakes, and poison oak. The District maintains guidelines for road and trail brushing that prescribe different treatments for different vegetation types and slope conditions ~~(District 2013).~~(Midpen 2021). Mowers and saws may be used by District staff to maintain grass and shrubs near roads and trails in short stature, limb up overhanging tree branches, and remove dead or decadent vegetation. Wider strips of brushing occur along certain roads to provide access for emergency vehicles.

The following section outlines typical vegetation management actions conducted in right of way areas on District lands.

Pest Management Strategies for Vegetation Rights-of-Way

Prevention

- Prepare an annual treatment schedule for maintaining designated trail and roadside rights-of-way based on use and vegetation types. Mechanically mow and brush annually to prevent nuisance vegetation from impeding roads and trails.

Habitat Modification

- Where possible, pave trailheads, parking lots, or other heavily used rights-of-way to reduce annual maintenance needs.
- Eliminate roads, trails, or other rights-of-ways that are determined to be redundant or not necessary.

Physical Control

Manual/mechanical control treatment options include maintenance of existing recreational facilities within District preserves via brushing and/or mowing:

- **Road and trail brushing**. Mechanical mowing is used to prevent nuisance vegetation from impeding roads and trails. Vegetation along approximately ~~600~~ 518 miles of trails and ~~roads~~ road edges is cut back to maintain an open corridor for trail and road use. Typically, the District mows over 100 miles of roadside annually to eliminate weeds and encroaching vegetation and, where applicable, to allow access for Wildland Type 3 fire engines. This work is primarily mechanical work done with brushcutters (~~a.k.a.~~ i.e., weed-whips), hedgers, chainsaws, poles saws, chippers, and tractor-operated mowers (mowing decks either pulled by a tractor or attached to the tractor as part of an articulated arm). All roads are mowed one to four times per year depending on the rainfall/vegetation growth in any one year. Most trails are mowed or brushcut on an annual basis; some trails may need to be brushed up to four times a year if there is a lot of rain and it is a trail heavily used by the public. Some more remote trails may not be brushed every year.

- **Parking lots, gates, and stiles**. On an annual basis, a strip of land around ~~13~~ 40 to 50 parking lots and ~~213~~ approximately 200 to 300 gates and stiles in the preserves are sprayed to maintain an open area for parking and visibility. A few of the locations are brushcut or mowed instead if they are large grassy areas or if there is water too close to allow spraying. Islands in the middle of parking lots or parking lots with narrow grassy edges and bioretention basins are mowed.
- **Miscellaneous recreational areas**. A few miscellaneous recreational areas are mowed one to five times a year with a tractor pulling a mowing deck. This includes a model airplane field and three meadow areas along Rogue Valley Trail maintained at Rancho San Antonio Open Space Preserve (OSP), the picnic table area at the top of Anniversary Trail on Windy Hill OSP, picnic tables at Picchetti Ranch Preserve, and the hang gliding takeoff and landing areas at the top and bottom of Spring Ridge Trail of Windy Hill OSP. In addition, special events occur in the preserves each year (e.g., Volunteer Recognition Event, summer camps, and other public gatherings) that require mowing of grassy areas. At Deer Hollow Farm in Rancho San Antonio OSP, pastures, animal pens, and the Ohlone village are mowed four to five times per year with a tractor mower or brushcutters.
- **Campsite.** The Black Mountain campsite is mowed once a year to provide a comfortable camping experience and to reduce the risk of wildfire encroaching either into or out of the campground.
- **Pond viewing areas and dams**. At some ponds, aquatic and terrestrial vegetation is managed at viewing areas and on dams. Windows of cattails and other tall wetland vegetation are removed in small select areas to allow public viewing of these water bodies. The California Division of Dam Safety requires all woody material be removed and tall herbaceous vegetation be cut on both faces of certain pond dams to improve visibility to see possible failure hazards. Vegetation on the water side of the dam is clipped with mowers and brushcutters; vegetation on the dry side of the dam is controlled with mowers and selective use of herbicides to maintain a light grassy vegetation cover. Woody vegetation is cut in pond spillway to prevent blockage of water flow. Duckweed or azola (aquatic fern) skimming has been done, with limited success, to ~~control~~ prevent these plants from covering the entire surface of some ponds. Downed trees that have fallen in a pond can require removal for aesthetic or other management reasons.
- **Streambed alteration**. The District follows conditions of an annual routine maintenance Streambed Alteration Agreement from CDFW for manual/mechanical vegetation management activities located within CDFW's jurisdiction.
- **Hazard and downed trees**. An estimated 50 to 150 standing hazard ~~and downed~~ trees are limbed or removed every year with chainsaws, pole saws and chippers because they are blocking roads, trails, and parking lots or are otherwise hazardous to visitors, staff, tenants, or contractors. They may be alive or dead.

Midpen also removes downed trees, as appropriate, under the IPMP. Stumps of live hazard trees may be treated with herbicide to prevent re-growth.

Chemical Control

Chemical control is typically not used for right-of-way clearing unless perennial plants require permanent treatment. For example, some problem vegetation, such as poison oak, can be eliminated from specific locations with spot application of herbicides.

- **Glyphosate**~~, the active ingredient in Roundup Custom™ (previously sold as Aquamaster™),~~is a broad-spectrum non-selective systemic herbicide used to control a wide variety of plants, including annual broadleaf weeds, grasses, perennials, and woody plants. It is absorbed through foliage and translocated to growing points. Glyphosate's mode of action is to inhibit an enzyme involved in the synthesis of aromatic amino acids, making it effective on all herbaceous and woody growing plants. It is a rather slow-acting herbicide with symptoms typically appearing within a week, including yellowing and stunting of~~a~~ young leaves and growing points, however it may take up to several weeks for a plant to die.
- **Imazpyr,** ~~the active ingredient in Polaris™ (previously sold as Habitat™),~~ is a non-selective herbicide used to control a broad range of weeds including grasses, broadleaf herbs, woody plants, riparian plants, and emergent aquatic species. Imazapyr has a similar mode of action as glyphosate but acts on a different suite of essential amino acids. Imazapyr is absorbed by leaves and roots, and moves to growing points; it disrupts protein synthesis and interferes with cell growth and deoxyribonucleic acid (DNA) synthesis; plants die from acetohydroxyacid synthase (AHAS) inhibition. ~~growth and DNA synthesis, plants die as a result of AHS inhibition~~. To be effective on aquatic plants, most ~~the majority~~ ~~of~~ plant parts must be accessible above the waterline. Imazapyr can be useful for difficult-to-control species when glyphosate is less effective, and with much lower application rates.
- **Triclopyr** is a selective systemic herbicide used to treat woody and herbaceous broadleaf plants and can be used to treat aquatic and riparian weeds. Triclopyr's mode of action is to mimic the plant hormone auxin, causing uncontrolled plant growth (Tu et al. 2001). The most effective application of triclopyr is to directly apply the herbicide when woody plants and weeds are actively growing (Alligare 2021).

~~7 IPM FOR FUEL MANAGEMENT~~

~~7.1 DEFINITION AND PURPOSE~~

~~This management category addresses IPM as it affects staff selection of options for required and ongoing maintenance of fuel management activities. Fuel management is the practice of removing or modifying vegetation to reduce the risk of wildfire ignitions, rates of wildfire spread, and fire intensity.~~

~~The District aims to manage fuels in a context that supports the maximum safety to adjacent human communities while also allowing fire as a natural process to maintain native species diversity on its preserves. The wildland urban interface (WUI) is the meeting point between wildland vegetation (i.e., fuels) and structures. The WUI warrants fuel management consideration because it is the area where there is the most threat of damage to human life and property. Other important areas to control flammable vegetation on District lands include access roads on and adjacent to District lands that are necessary for emergency access.~~

~~Fuel management is the practice of removing or modifying vegetation to reduce wildfire ignitions, rate of fire spread, and fire intensity. Changing the continuity of the vegetation, and reducing its volume are the two primary actions in fuel management. Preventative treatment actions may include temporary trail or equipment closures during fire season.~~

~~This chapter is not intended to replace a Fuel Management Plan, nor does it present the full range of fire risk management options available on District preserves.~~

~~No new major fuel breaks or fuel management activities on District lands would be implemented as part of the IPMP. The use of prescribed burns to restore natural conditions in preserves would also not be permitted as an option under the proposed IPMP. The IPMP would provide guidance to District staff in selecting the safest, least toxic, and most effective options to maintain existing fuel management activities. Consistent with current activities on District lands, the District's fuel management activities would first consider health, human safety, and regulatory requirements for local and state fire codes, and then balance these requirements with the District's goals to protect natural resources. For example, defensible space around structures is required and regulated under the Uniform Building Code, Uniform Fire Code, Public Resources Code Section 4291/4119, and County and City municipal codes and ordinances).~~

~~7.2 TYPE OF PESTS~~

~~In the context of IPM, vegetation at the WUI and vegetation around structures that could contribute to large, uncontrolled wildfires is considered a potential "pest" that may warrant control, depending on site-specific circumstances.~~

~~7.3 PEST IDENTIFICATION~~

~~Vegetation may be considered a pest where it becomes overabundant, decadent or exceptionally close to facilities, structures, and communities that people inhabit and use. At the same time, fire is a natural component of many common plant communities in the District and helps to maintain species diversity of native grasslands, shrublands, and forests.~~

~~7.4 MANAGING PLANT COMMUNITIES FOR FIRE SAFETY~~

~~The District is faced with the difficult task of protecting the natural values in their OSPs while also protecting the adjacent metropolitan and rural communities of San Mateo, Santa Clara, and Santa Cruz counties from catastrophic wildfires. These goals are sometimes mutually beneficial and they are sometimes mutually exclusive. Frequent, intense wildfires can be destructive to native plants, wildlife, and people. Conversely, our attempts to reduce or eliminate wildfire can also be destructive and this may have significant impacts on biodiversity (Keeley 2006). Use of fuel breaks and other fuel management techniques that disturb large areas can significantly change the composition of native vegetation or eliminate species altogether and help to spread and establish invasive weeds throughout natural areas.~~

~~In a natural burn cycle in shrublands and forests, recovering vegetation is less susceptible to repeat fires for several years after the initial burn (Minnich 2001, Pyne et.al, 1996). The lush new growth of resprouting species is supported by existing deep root systems that help reduce the plants' flammability by maintaining high moisture content in the above-ground growth. Shrub and tree species are also generally separated by bare ground or short statured annual forbs that will not carry a fire over the larger landscape. Once invasive annuals are introduced into this natural scenario, the dynamics change dramatically. The increased abundance of these annual grasses and forbs in turn support increased ignition potential almost immediately following the initial burn (Whisenant 1990). This in turn drives an even more increased fire frequency until shrubs and trees are completely eliminated from the system altogether, leaving only weedy annual grasslands in their wake. This has been described as a "grass-fire cycle" (D'Antonio and Vitousek 1992).~~

~~Fuel management is a complex process that must balance the needs of human communities with natural resource goals. It is unrealistic to think that natural vegetation communities can be managed to create fire-safe, wildfire resilient vegetation that also supports high natural biodiversity (Zedler 1995). Given that the District's lands are all fire prone, the best option for managing fire risk is to focus active management in the wildland- urban interface where fire~~

~~safety is needed most – adjacent to human communities. Because early successional landscapes contain less biomass and are more resistant to fire, targeted management of plant succession in early-successional brushlands and woodlands can be an effective fire management strategy.~~

~~7.5 PREVENTION~~

~~Preventive treatment actions include temporary trail closures or adjustment in equipment use during some high fire hazard conditions. In addition, the following actions may also be considered to prevent vegetation from becoming a fire risk:~~

- ~~Focus fuel management activities in WUI areas adjacent to neighborhood communities, structures, and other at-risk assets.~~
- ~~Work with local fire organizations to amplify results by encouraging neighbors to also manage adjoining properties for fire (reduce fuel loads) within the WUI.~~
- ~~Conduct visitor and neighbor outreach and education about wildfire dangers on and near District preserves.~~
- ~~Eliminate any redundant, unnecessary, or high maintenance roads and trails that are determined to be not necessary on individual District preserves.~~
- ~~Continue to control flammable invasive plants such as French broom in established fuel management areas. Encourage the establishment of native plant communities (which are more resistant to wildfires than invasive plants such as French broom).~~

~~The following management approach is recommended to help promote high diversity natural vegetation communities that are relatively fire safe.~~

- ~~Focus vegetation biomass reduction on non-native vegetation and avoid damaging native grasses, and mature shrublands and forests wherever possible. Where active treatment is needed, seek to break the vertical fuel ladder connection between the ground and the canopy layer, and create some horizontal physical separation between plants where possible. Prioritize projects where invasive plant removal alone can result in fire-safe landscapes.~~
- ~~Implement fuel management projects with low impact tools and methods such as hand cutting and pruning rather than vegetation removal or soil disturbance with hand methods or machines. Although managing woody plant communities can reduce fuel volume, increased disturbance resulting from the active management can counteract the process by promoting the establishment of invasive plants and reducing native plant diversity (Lavin et al. 2013, Keeley 2002). Hand cutting and pruning is not feasible on a large scale because it takes too long across large areas and can result in injuries to staff doing this kind of work over extended periods of time.~~
- ~~Prioritize leaving forest duff and organic soil layers undisturbed in all fuel management actions.~~

- ~~Avoid removing/thinning the canopy layer in mature, established forests and woodlands to maximize shading (thereby promoting shade and related increased moisture under the canopy level) and increase resistance to non-native plant invasion.~~

~~7.6 TOLERANCE LEVELS~~

~~Consistent with current activities on District lands, the District's tolerance for vegetation that poses a fire risk would first consider health, human safety, and regulatory requirements for local and state fire codes, and then balance these requirements with the District's goals to protect natural resources. For example, defensible space around structures is required and regulated under the Uniform Building Code, Uniform Fire Code, Public Resources Code Section 4291/4119, and County and City municipal codes and ordinances).~~

~~Refer to Table 8-1 for management thresholds, and potential treatment options for fuel management presented by type of vegetation.~~

~~Table 8-1 Management Thresholds and Treatment Options for Wildfire Management Pests~~

~~Pest Category~~	~~Management Threshold (Population Size/Conditions)~~	~~Treatment~~
~~Grasslands~~	~~Site-specific management needs are determined based on proximity to developed areas that could be damaged by fire, proximity of ignition sources, current fuel loads within the site, and weather conditions.~~	~~Annual mowing in summer to reduce fuel loads, especially near likely ignition sources (trails, roads, recreational facilities, and parking lots).~~
~~Shrublands (coastal scrub, chaparral)~~		~~Thin brush and mow tall grasses to reduce fuel loads and break fuel ladders. In shrublands, increase spacing between shrub clusters.~~
~~Forests~~		~~Limb up trees to a height of 8 to10 feet, thin brush, and mow tall grasses to reduce fuel loads and break fuel ladders.~~
~~Agricultural Landscapes~~		~~Mowing and brush thinning along roads that could provide ignition sources for adjacent natural areas.~~ ~~Discing along borders of agricultural and rangeland properties to ensure fires do not spread beyond different management units. Conservation grazing reduces fuel loads.~~

~~7.7 TREATMENT OPTIONS~~

~~7.7.1 PHYSICAL CONTROL~~

- ~~Use tractor, truck, and hand mowers to cut or disc vegetation along roads, trails and borders.~~

- ~~Limb up trees to a height of 8 to 10 feet, thin brush, and mow tall grasses to reduce fuel loads and break fuel ladders in high risk fire areas.~~
- ~~Target control of invasive species such as French broom that are known to form dense, highly flammable brush stands.~~
- ~~If they appear to be a wildland fire hazard, woodrat nests within 100 feet of buildings will be moved after consultation with the California Department of Fish and Wildlife. Refer to treatment options under the Buildings section.~~

~~Additional details on physical control options are provided below, presented by the type of work that staff routinely conduct on District preserves.~~

~~DISC LINES~~

~~Disc lines are a type of mechanical fuel treatment that utilize an agricultural cultivator attachment for a tractor to cut and overturn many parallel small trenches in the soil 6 to 12 inches deep. A disc line is typically placed along the perimeter of undeveloped land, ranches, and roadways. The District would continue to maintain 31 miles of disc lines on its land annually as required by local fire agencies. Occasional trimming of overhanging branches with a chainsaw or pole pruner would also be undertaken along disc lines where needed to allow passage of the tractor. Brush encroaching into disc lines is removed with chainsaws, boom flails, and mowing or masticator equipment. Discing is only practical in grassland vegetation types that do not contain many woody shrub or tree species. The intent of discing is to create small swaths of barren soil that do not support fuel or conduct fire. This technique has limited applications in reducing fire risk in natural areas because the soil disturbance associated with this technique is known to encourage establishment of invasive plants such as invasive annual plants, often exacerbating the fuel load problem. Disc lines are more temporary than shaded fuel breaks (described below), but offer the advantage of being a rougher surface that is less prone to soil erosion (Amphion Environmental 1995). Discing requires annual maintenance to be effective, and once cultivation modifies native soil, must be done in perpetuity to manage invasive weeds thereafter.~~

~~SHADED FUEL BREAKS~~

~~Shaded fuel breaks is a forest management strategy that requires selective thinning and removal of the more flammable understory vegetation while leaving the majority of larger, more fire tolerant tree species in place. On District lands, a shaded fuel break is maintained along Monte Bello Road in Monte Bello OSP. Maintenance of the fuel break along the road includes annual mowing in grasslands adjacent to the road, clearance of brush and all dead vegetation, and removal of ladder fuels to the canopy in forested areas. Manual and mechanical tools used for these activities include tractors, brushcutters, chainsaws, chippers, masticators, and/or a JAWZ implement.~~

~~CLEARING AROUND BUILDINGS~~

~~Manual and mechanical clearing of flammable vegetation to provide defensible space occurs on an annual basis around an estimated 117 structures by District staff or by residential, commercial or agricultural/rangeland tenants. This work consists of manual and/or tractor~~

~~mowing, brushcutting, chainsaw work, pole pruning, chipping, masticator and spraying depending on the site conditions and generally occurs within 100 feet of the structures although some jurisdictions require clearing within 30 feet of a property boundary or other additional precautions. The District developed Defensible Space Clearing Guidelines that it adheres by (refer to Appendix C of this EIR). The required amount of clearance for defensible space can vary depending on the Fire District jurisdiction that a parcel falls within. Implementation of the proposed IPMP would not result in any changes to the District's Wildfire Management Policy (District 2012, 76-84) or defensible space requirements (District, local, or state) on or adjacent to District lands. As needed to control fire risk, staff should consult local authorities to update and improve preserve-specific guidelines for clearing around buildings.~~

~~EMERGENCY HELICOPTER LANDING ZONES~~

~~Emergency helicopter zones are maintained annually or bi-annually via mowing with a tractor or brushcutter at 39 locations on District lands. As needed, encroaching brush is mechanically removed using a chainsaw or JAWZ implement.~~

~~TRAIL AND ROAD BRUSHING~~

~~Trail and road brushing is an activity undertaken to facilitate visitor recreation and safety. Refer to discussion above, IPM For Recreational Facilities, for a more detailed discussion of mechanical and manual treatments used to maintain trails and roads.~~

~~DRIVEWAYS~~

- ~~Driveways to residences and other key structures receive additional treatment for ingress and egress in a fire emergency. Vegetation would be maintained to minimize flame length:~~
  - ~~Within 10 feet of the road edge where flames are predicted to be 0-8 feet in length (generally grassy locations and in oak woodlands)~~
  - ~~Within 30 feet of the road edge where flames are predicted to be over 8 feet in length (generally brushy locations and where understory shrubs are developed in woodlands)~~

~~Occasionally, controlling invasive plants as described in the Natural Areas section below also provide fire management benefits by removing dense, highly flammable brush stands such as French broom.~~

~~7.7.2 CHEMICAL CONTROL~~

~~Chemical control is used for fuel management directly adjacent to structures as required and in some high risk fire areas where perennial plants are not responding to manual or mechanical treatments and require permanent treatment. Chemical control treatment options for fuel management include:~~

- ~~**Glyphosate,** the active ingredient in Roundup CustomTM (previously sold as AquamasterTM), is a broad- spectrum non-selective systemic herbicide used to control a wide variety of plants, including annual broadleaf weeds, grasses,~~

~~perennials, and woody plants. It is absorbed through foliage and translocated to growing points. Glyphosate's mode of action is to inhibit an enzyme involved in the synthesis of aromatic amino acids, making it effective on all herbaceous and woody growing plants. It is a rather slow-acting herbicide with symptoms appearing with a week, including yellowing and stunting a young leaves and growing points, however it may take up to several weeks for a plant to die.~~

- ~~**Imazapyr,** the active ingredient in Polaris™ (previously sold as Habitat™), is a non-selective herbicide used to control a broad range of weeds including grasses, broadleaf herbs, woody plants, riparian plants, and emergent aquatic species. Imazapyr has a similar mode of action as glyphosate but acts on a different suite of essential amino acids. Imazapyr is absorbed by leaves and roots, and moves to growing points; it disrupts protein synthesis and interferes with cell growth and DNA) synthesis, plants die as a result of AHS inhibition. To be effective on aquatic plants, the majority of plant parts must be accessible above the waterline. Imazapyr can be useful for difficult-to-control species when glyphosate is less effective, and with much lower application rates.~~

~~Chemical options should be applied in the following situations:~~

~~**WUI Areas and Defensible Space.** To meet legal requirements (District, local, and/or state) for defensible space, flammable vegetation may be spot sprayed annually within the inner 30 feet of land surrounding a structure with glyphosphate in addition to mowing within this area. Trees or large shrubs that require removal within the inner 30 feet of defensible space are typically treated by cut-stump method with glyphosphate to permanently remove them from this high hazard zone. For example, some native resprouting brush species that are also known to be flammable, such as coyote brush and chamise, can be eliminated from proximity to buildings with cut-stump or spot spraying. Spraying around buildings further avoids having to run a brushcutter blade against or around buildings, fences, pipes, rocks, and other obstacles that can be a fire hazard by causing sparks.~~

~~**Disc lines**. Although brush encroaching into disc lines is primarily removed with chainsaws (as discussed above), more stubborn woody plants may require treatment with herbicides by cut-stump method with glyphosphate or imazapyr).~~

~~**Shaded fuel breaks.** Use of glyphosphate in a cut-stump method is used to maintain fuel breaks that contain decadent woody vegetation.~~

7 IPM for Rangelands and Agricultural Properties

7.1 Definition and Purpose

Some District lands encompass rangelands, crop fields, and orchards that are actively managed as grazing or agricultural operations. Rangeland and agriculture activities on District preserves are primarily managed by lessees who will typically operate under ~~a Rangeland Management Plan or~~an Agricultural Management Plan, which is inclusive of Rangeland Management Plans prepared for rangelands, that is attached to their lease. These site-specific management plans guide the rangeland and agricultural activities to ensure compatibility with natural resource protection and low-intensity public recreation.

This IPMP does not replace the requirements of the existing or new individual ~~range or agricultural management plans~~ Agricultural Management Plans developed in the future, nor does it present the full range of agricultural or range management options. Rather, it seeks to provide staff with tools that are consistent with IPM principles to select the safest, least harmful, and most effective treatment options for rangeland and agricultural pests.

7.2 Rangelands

IPM in rangelands focuses on maintaining land uses (e.g., grazing) while also managing for the long-term functioning and stability of high value natural resources (e.g., grasslands, creeks) that surround the rangelands and agriculture. This requires landscape level monitoring to determine when pests such as agricultural pests and invasive plants are present in sufficient numbers to reduce the intended land uses or quality of the managed habitats.

The District established a Conservation Grazing Program in February 2007 with the goal of managing District land with livestock grazing that is protective of natural resources, compatible with public access, maintaining or enhancing the diversity of native plant and animal communities, managing vegetation fuel for fire protection, helping to sustain the local agricultural economy, and ~~preserve~~ preserving or ~~foster~~ fostering appreciation for the region's rural agricultural heritage.

~~By 2015~~As of 2025, there are ~~a total of 10~~ 13 properties, totaling ~~over 10,800~~ approximately 15,480 acres, ~~is projected to be~~ managed ~~with livestock grazing~~ under the District's Conservation Grazing Program. Stocking rates and either year-round or seasonal grazing are prescribed for each property based on site-specific factors such as soil fertility, terrain, plant composition, water availability, and available infrastructure. ~~Typical vegetation pests on rangelands include thistles, Harding and velvet grass, poison hemlock, and encroaching brush.~~

The IPM Coordinator is responsible for reviewing ~~Rangeland~~ Agricultural Management Plans and periodically reviewing existing rangeland practices to make sure they are implemented using current IPM practices outlined herein, and, if pesticides are used, follow the District's List of Approved Pesticides.

7.2.1 Types of Rangeland Pests

Typical pests on rangelands include weeds poisonous to livestock or otherwise detrimental to productive pastures, primarily invasive thistles, Harding and velvet grass, poison hemlock~~,~~ and encroaching brush.

7.2.2 Pest Identification in Rangelands

Because the extent of grassland communities on District lands is so large and interconnected with leased rangeland properties, rangeland pests are inherently difficult to detect. The District will assess a subset of grasslands in and adjacent to leased rangelands on a routine basis to detect problem pests (most commonly to be conducted during a lease renewal or establishment of a new lease). Monitoring rangelands should focus on:

- Sites most likely for pests to invade (e.g., corrals and areas around water troughs and feed stations).
- High value areas (e.g., grassland areas that support special-status species).
- ~~Map~~ Mapping pests of concern, ~~record~~ recording in the District's Pest Database, and ~~evaluate.~~ evaluating, as discussed in Section 4.2.

7.2.3 Tolerance Levels in Rangelands

Determining tolerance levels for pests in grazing lands is largely done by the grazing lessee, in consultation with District staff and rangeland experts. Active pest management would only occur where the lessee determines that tolerance level for a pest is exceeded, for example, where livestock forage quality is severely reduced, resulting in a loss of livestock production value. In some limited instances, the District may assess leased grazing land pests and determine a tolerance level, for example, when the presence of the pest is a target invasive species or particularly if it threatens the persistence of a special-status species or other high value area. Refer to Table 7-1 for an overview of management thresholds and treatment options available for use on District rangelands.

Table 7-1 Management Thresholds and Treatment Options for Rangeland Pests

Pest Category	Management Threshold (Population Size/Conditions)	Treatment
Grasslands	Site-specific management needs are determined by lessee and the District in ~~Rangeland~~ Agricultural Management Plans based on assessment of rangeland condition, type of livestock to be used, and stocking rates/seasons of use. District to work with individual rangeland lessees when rangeland forage values decrease such that stocking rates decline, and or when lessees identify pests that warrant control.	Lessee to monitor forage values in grasslands. In coordination with District, lessee responsible for detection, District notification, and control of rangeland pests such as French broom and invasive thistles that lower value of forage and grassland habitat.
Shrublands (coastal scrub, chaparral)		Lessee to monitor brush encroachment in grasslands. Lessee to work with District to thin brush in grasslands when brush encroachment significantly reduces value of forage and grassland habitat. In shrublands, increase spacing between shrub clusters.

7.3 Agricultural Farms and Fields

The purpose of IPM on agricultural properties is to manage pests to maintain the specific land uses (e.g., crop production), while also providing natural resource protection and visitor access. Agricultural pests that may be encountered include weeds, pathogens, and insects in croplands, and rodents in farm fields and buildings.

~~Two District~~ Some District managed and leased properties contain agriculture fields. ~~The Lobitos Ridge property consists of two crop fields containing flowers and vegetables on seven acres of Purisima Creek Redwoods OSP and the Madonna Creek Ranch property consists of 27 acres on Miramontes OSP on which a tenant cultivates dry farmed hay as well as smaller irrigated areas for pumpkins and other truck crops.~~

~~A draft Agriculture Production Plan has been prepared for the Lobitos property and includes the IPM approach on District agriculture properties. It requires~~ Agricultural Management Plans are anticipated to require that best ~~management~~ practices ~~(BMPs)~~ as defined by the University of California Cooperative Extension Service and the USDA Natural Resources Conservation Service for farm production be followed, and specifically, that IPM techniques, as defined by the crop specific University of California Cooperative Extension Service are employed along with the relevant IPMP BMPs. Methods for controlling ~~of~~ weeds on ~~the site~~ sites covered by the Agricultural Management Plan ~~can be by~~ are mowing, grazing, flaming, or the use of an approved herbicide.

Lessees use District land for various operations, including a Christmas tree farm and chestnut orchard at Skyline Ridge OSP, and a vineyard at Picchetti OSP. A historic fruit orchard is maintained by District staff and volunteers on the Stevens Canyon property. The City of Mountain View operates an educational farm (Deer Hollow Farm) located in the Rancho San Antonio OSP that offers classes and camps for thousands of schoolchildren in farm, garden, native peoples and history.

The IPM Coordinator is responsible for reviewing existing Agricultural ~~Production~~ Management Plans and periodically reviewing existing agricultural practices to ~~make they are~~ implement ~~ed~~ ~~using~~ current IPM practices outlined herein and, if pesticides are used, follow the District's list of approved pesticides. As new agricultural lands are acquired, District staff will help draft new Agricultural ~~Production~~ Management Plans that follow the procedures outlined in this Guidance Manual.

7.3.1 Types of Agricultural Pests

The types of agricultural pests that can be encountered on ~~Midpen~~ District preserves include agricultural insect pests, rodents and other small burrowing mammals, forest pathogens, aquatic invasive ~~species~~ animals and pathogens, and invasive plants.

7.3.2 Regulated Agricultural Pests

Though the definition of a 'pest' can depend on perspective and location, some species are regulated as various types of pests by state and federal laws. Plants classified as '~~Noxious'~~ noxious' are regulated by the California Department of Food and Agriculture (CDFA) and the United States Department of Agriculture (USDA). Wildlife species classified as 'Injurious' are regulated by the CDFW and United States Fish and Wildlife Service (USFWS). Other species that transmit diseases may be regulated by local, state, or federal health departments. Regulated pests pose a risk to the environment, public health, or economic resources. Most often ~~any times~~ the acceptable IPM tolerance level of regulated pests is zero, so that any detected individual initiates a management action. These are species that the District has a legal responsibility to control per state and federal laws and regulations, though control is often conducted by other agencies.

7.3.3 Pest Identification in Agricultural Farms and Fields

Due to the limited number of agricultural lands on District property, pest identification is the responsibility of the lessee, who is to report significant pest infestations to the District. Once pests are reported, they should be mapped and recorded in the District's Pest Database~~,~~ (refer to Section 4.2) and evaluated for their impacts to the surrounding natural areas.

7.3.4 Tolerance Levels in Agricultural Farms and Fields

Active pest management would only occur where tolerance levels are exceeded~~-~~, for example, where agricultural crop production is greatly reduced, or where the presence of the pest threatens the persistence of a special~~-~~-status species occurring in adjacent areas. Refer to Table

7-2 for an overview of management thresholds and treatment options available for use on District rangelands.

Table 7-2 Management Thresholds and Treatment Options for Agricultural Pests

Pest Category	Management Threshold (Population Size/Conditions)	Treatment
Agricultural insect pests	Site-specific management needs to be determined by lessee and District in individual Agricultural Management Plans based on assessment of farm and field conditions, type of crops, and anticipated crop yields. District to work with individual ~~rangeland~~ lessees when crop yields decrease such that economic damage or environmental damage warrant control. Assessments made by the Agricultural Commission's Office supersedes any decisions made by the District and lessees.	Lessee to monitor insect damage of crops. Agriculture insect pest management to be addressed in future Agriculture Management Plans. Staff and tenants to consult crop-specific IPM guidebooks published by University of California Davis - http://www.ipm.ucdavis.edu for both organic and conventional crop production and include pest management actions in the Agricultural Management Plan for individual parcels.
Rodents and other nuisance pests in agricultural areas	Site-specific management needs to be determined by lessee and District in individual Agricultural Management Plans based on assessment of farm and field conditions, type of crops, and anticipated crop yields. District to work with individual rangeland lessees when crop yields decrease such that economic damage or environmental damage warrant control.	Lessee to monitor rodent damage. In coordination with District, lessee is responsible for detection, District notification, and control of problem rodents in farm buildings or crop fields using procedures in the Buildings section above (Chapter 6).
Forest pathogens	Site-specific management needs to be determined by lessee and District in individual Timber Harvesting Plan (THP) based on assessment of forest conditions~~,~~ and habitat type. District to work with a Registered Professional Forester when environmental damage warrants control.	Lessee to use disinfectants to kill or inactivate pathogens (e.g., *Phytophthora*), before plant infection may occur through the decontamination of tools, equipment, vehicles, and footwear in accordance with the latest Guidelines for Minimizing Phytophthora Contamination at Midpeninsula Regional Open Space District Preserves. Strategic removal of vectoring species to protect ecosystem integrity and function and improve wildland fire resiliency.

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Pest Category	Management Threshold (Population Size/Conditions)	Treatment
Aquatic invasive animals and pathogens	Management thresholds for aquatic invasive species and pathogens are preventative and risk-based. Site-specific management needs to be determined by the District based on assessment of aquatic habitat type, hydrologic connectivity, and the potential for introduction or spread associated with District or lessee activities. The threshold for management action is met when there is a reasonable risk of environmental damage, at which point the District will require implementation of preventative measures, including cleaning and disinfection protocols, and coordinate additional response actions as appropriate.	Lessee to use disinfectants to prevent the spread of invasive aquatic animals, such as small invasive aquatic snails (e.g., New Zealand mudsnail), and pathogens to sensitive aquatic species, particularly amphibians (e.g., chytridiomycosis disease). Lessee to use disinfectants to decontaminate equipment, boots, and clothing before and after entering a waterbody, as appropriate. The CDFW aquatic invasive species decontamination protocol provides details on the procedures and best practices (CDFW 2013).
Invasive plants in agricultural farms and fields	Site-specific management needs to be determined by lessee and District in individual Agricultural Management Plans based on assessment of farm and field conditions, type of crops, and anticipated crop yields. District to work with individual rangeland lessees when crop yields decrease such that economic damage or environmental damage warrant control.	**Cultural Control Options:** • Crop rotation • Cover crops and smother crops • Late-season planting • Planting rates and crop density • Water and nutrient management • Crop variety selection • Covering/soil sterilization • Mulching • Soil sterilization **Physical Control Options:** • Mowing • Pulling • Green Flaming~~,~~ • Mulching • Use of weedmats • Hoeing • ~~Discing~~ • Cultivating with tractor implements **Chemical Control Options:** • To be determined by lessee and District in Agricultural Management Plans. Staff and tenants to consult crop- specific IPM guidebooks published by University of California

Pest Category	Management Threshold (Population Size/Conditions)	Treatment
		Davis - http://www.ipm.ucdavis.edu for both organic and conventional crop production and include pest management actions in the Agricultural Management Plan for individual parcels.

7.4 Prevention

Using existing ~~Rangeland Management Plans and~~ or new Agricultural Management Plans, the District will work with lessees to encourage management practices that prevent the establishment of pest species. Prevention strategies for District lands in agricultural production may include:

- During development of new Agricultural Management Plans, encourage lessees to keep lands healthy through soil management, proper irrigation, and by providing sufficient habitat (refugia) for natural insect pest predators (natural enemies) in and near crop production areas.
- During development of new Agricultural Management Plans, and as practical, incorporate good stewardship practices such as rotational cropping, integrating annuals into perennial crops (such as Christmas tree farms), implementing no-till cropping, and, where possible, promoting organic farming practices to reduce annual disturbance and increase farm biodiversity (Rodale Institute, n.d.). ~~(Coll 2004).~~
- During acquisition planning for new preserve lands, encourage landscape mosaics (i.e., plan for a mixture of natural and agricultural or grazing lands) to help maintain natural pest predator populations.
- During lease renewal periods, monitor pest invasions at the edges of agricultural and grazing lands, especially in and near roads, trails, and fuel breaks. Determine if tolerance thresholds are exceeded (both in and adjacent to leased lands) and develop pest control requirements accordingly in the new lease requirements.
- During preparation of new ~~Rangeland~~ Agricultural Management Plans and lease renewals, monitor livestock feeding locations, corrals, watering troughs, and livestock feeding for pests. Consider rotational grazing, changing livestock stocking rates, and/or requiring different types of grazing animals to prevent spread of pests and to promote healthy, diverse grassland areas.

7.5 Treatment Options

Working with lessees, the District will determine a site-specific solution that meets the needs of the lessee, maintains natural resource values and District lands, and addresses the identified pest issue. The general steps involved in implementing IPM in rangelands and agricultural properties are similar, but not identical to those described for buildings and natural areas, and generally include the actions described below.

7.5.1 Wildlife and Pathogen Pest Control

Mechanical Control ~~Options~~

Mechanical control treatment options for rangeland and agricultural properties on District lands include:

- **Rodents**. For rodents in farm buildings or crop fields, refer to the procedures for controlling rodents under the Buildings section above (Chapter 5).

Chemical Control ~~Options~~

Chemical control treatment options for rangeland and agricultural properties on District lands include:

- **Rodents.** For rodents in farm buildings or crop fields, refer to the procedures for controlling rodents under the Buildings (Chapter 5) and Natural Areas sections (Chapter 8), respectively.
- **Forest Pathogens.** Disinfectants, namely sodium dichloroisocyanurate dihydrate, sodium hypochlorite, ethanol or isopropyl alcohol, and dodecyl dimethyl ammonium chloride, will be used to kill or inactivate pathogens (e.g., *Phytophthora* spp.), through the decontamination of tools, equipment, vehicles, and footwear.
- **Aquatic invasive animals and pathogens.** Disinfectants, namely odium dichloroisocyanurate dihydrate, sodium hypochlorite, ethanol or isopropyl alcohol, and dodecyl dimethyl ammonium chloride, will be used to prevent the spread of invasive aquatic animals, such as small invasive aquatic snails (e.g., New Zealand mud snail), and pathogens to sensitive aquatic species, particularly amphibians (e.g., chytridiomycosis disease).

7.5.2 Invasive Insect~~s~~ Control

Because the District has few properties that currently support row crops, agriculture insect pest management for agricultural fields is not covered under the IPMP. If new pesticides are proposed for agricultural insects, they will be 1) evaluated, 2) included in future Agriculture Management Plans, and 3) ~~an~~ environmentally review~~ will be conduct~~ed, and the IPMP will be revised to include the new pesticide, new treatment method, and any required precautions. Staff and tenants should consult crop-specific IPM guidebooks published by University of California Davis (http://www.ipm.ucdavis.edu) for both organic and conventional crop production and include pest management actions in the Agricultural Management Plan for individual parcels.

7.5.3 Invasive Plant~~s~~ Control

Rangelands ~~Control Options~~

Consistent with existent management plans, grazing and agricultural lessees are allowed to control pests through grazing, mowing, pulling, and careful application of District-approved herbicides. Brush, commonly the native coyote brush, limits the available forage for livestock, reduces grassland habitat areas, and creates an increased wildfire fuel load. Grazing tenants typically treat brush encroachment with herbicide and then use a tractor and drag bar to break up dead vegetation for the following season.

Manual/mechanical control treatment options for invasive plants on rangelands include:

- **Mow/Cut.** A brushcutter, disc, brushrake or other motorized cutting machine ~~would~~ can be selected for mowing ~~of~~ weeds and cutting ~~of~~ brush based on the size of the infestation. Most species ~~would~~ require repeated cutting throughout the growing season (generally late spring through mid-summer), or they ~~could~~ re-sprout from their base and continue to grow, flower, and produce seed. Mowing ~~would~~ will be carefully timed according to the phenology of each plant species to minimize the amount of re-sprouting and to avoid spreading ripe seed. Mowing is a temporary measure that controls reproductive spread and can eventually reduce populations of annual plants, but other subsequent treatments (e.g., pulling, herbicide) ~~would~~ will be necessary to eradicate perennial plants. Mowing cannot be used on steep slopes or in locations with desirable native plants unless the timing of the mowing can be selected to affect only target plants.
- **Grazing Regime Modifications.** Invasive plants can also be partially or fully controlled using carefully timed grazing rotation, and~~/~~or~~/~~ manipulating the types and seasons of grazing livestock (~~for example~~ e.g., using goats instead of cattle to forage on invasive thistle species in spring before seed set). ~~As described in Chapter 8, Possible actions~~ Possible modifications to be considered include:
  - Changing types of livestock to include browsing livestock that eat shrubs (e.g., goats);
  - Installing physical barriers (cross fencing);
  - Controlling brush through hand or mechanical treatments;
  - Applying pesticides in a specific location (e.g., directly onto individual plants or small patches of brush); or
  - Implementing a combination of mowing, foliar spraying, and hand removal (for very large brush encroachments).
- **Chemical Control Treatment Options.** Any of the herbicides approved under the IPM Program may be used to treat weeds on rangelands or agricultural fields if cultural or mechanical methods are not effective.

~~Glyphosate will likely be~~ The herbicides referenced in Table 3-3 under the ~~primary herbicide used on~~ Agriculture and Rangelands category are the herbicides anticipated for use for chemical control of thistles and brush on rangelands, and for weeds in agriculture fields and orchards.

Agricultural Farms and Fields ~~Control Options~~

Cultural weed control includes crop rotations, water and nutrient management, late-season planting, and cover/smothering crops (Gunsolus et al. 2010; Smith et al. 2000). Cultural methods are the first line of defense in weed management and primary tools for organic crop production. Manual/mechanical control treatment options for invasive plants on agricultural lands include the following cultural, mechanical, and manual weed control options:

- **Crop Rotation.** Diversifying a rotation is one of the most effective tools against weeds. Over time, routine planting and cultivation dates will select for weeds that are adapted to these strategies. Varying crops by different planting date or growing perennial crops in rotation with row crops can prevent weeds from adapting to the planting regimen.
- **Cover Crops and Smother Crops.** Offseason cover crops and smother crops are effective strategies to outcompete weeds. Cover crops occupy vacant space in an ordinarily fallow field and displace weeds that would otherwise occupy the space. Some species also have allelopathic effects on weeds.

  Smother crops are vigorously growing crops that growers use to suppress weeds. Generally, a smother crop is not harvested but plowed down instead. The primary risk in using smother crops is that their effectiveness in weed control may be inconsistent and unpredictable or they may become weeds themselves.
- **Late-Season Planting.** Delayed planting past the traditional planting times is an option in weed management, but depending on growing season and crop, may also reduce crop yields. Later season planting allows crop seedlings to bypass the competitive flush of weed seedlings and allows for additional time for mechanical weed control operations.
- **Planting Rates and Crop Density.** Increasing the planting rate is another common strategy for weed management. Higher crop densities can lead to greater competitiveness against weeds. In addition, higher planting rates can compensate for crop losses that occur during mechanical weed control operations.
- **Water and Nutrient Management.** Effective water and nutrient management can ensure crops benefit from farming practices rather than weeds. Switching to drip irrigation from flood or broadcast styles, monitoring nutrient requirements instead of blanket fertilization, timing compost applications, and burying irrigation pipe may all help to reduce weed problems.
- **Crop Variety Selection**. Selecting the proper variety of a specific crop that is best adapted for local conditions can reduce the resources necessary for production and consequently reduce weed management problems. If the crop is better adapted to local conditions than the weed, the site will favor the crop over the weed.
- **Mechanical weed control.** Mechanical weed control is the most widely used weed control method for agriculture fields and can occur before, during, and after the crop is planted. This method includes primary tillage, row crop cultivating tillage, use of mulches (e.g., plastic sheeting, straw, wood chips, and sawdust), and/or soil sterilization techniques that use heat to kill weeds and weed seeds in soil. Passive

sterilization uses clear plastic tarps to foster the germination of weeds under the tarp and then exposes the seedlings to hostile growing conditions, causing them to perish, while active sterilization uses extremely high temperature steam to eliminate weed seeds and bulbs with direct contact. Both processes are expensive and require specialized equipment and/or high labor output.

- **Primary Tillage.** Primary tillage is the initial step in seedbed preparation. It incorporates residues from the previous crop and can incorporate compost, manures, and other nutrients. It buries some weed seeds so deeply they cannot germinate, but it also brings other seeds to the surface, allowing them greater opportunity for germination. Tillage is best combined with a forced germination program, where multiple tillage and watering events are coupled to force the germination of weeds and then eliminate them. The timing of primary tillage will encourage different weed species to predominate so the farmer must time the actions to correspond with the primary weed targets.

  A fundamental aspect to consider in seed bed preparation is the concept of providing the crop with an "even start." An even start means controlling weeds that germinate before the crop germinates. Once seed bed preparation is complete, the crop must be planted as soon as possible because if crop planting is delayed, weeds can germinate and get a head start on the crop.

- **Cultivation.** Row crop cultivating tillage is performed after the crop is planted. Cultivation kills weeds by digging them out, burying them, breaking them apart, or drying them out. In addition to controlling weeds, cultivation can break up soil crusting and thus can increase crop emergence, water infiltration, mineralization of nutrients, and soil aeration during the growing cycle.

  A short window of time usually exists for timely use of cultivation. Weeds that emerge before or with the crop are the most critical to eliminate. Weeds that emerge after crop emergence will have less negative impact on yield, but may still contribute to the weed seed bank for problems in future years. When it comes to weeds that emerge with the crop, it is best to be proactive, rather than reactive. Waiting until weeds are noticeable will limit the control options.

- **Mulches**. Mulch is any artificial or natural soil cover. Plastic sheeting, straw, wood chips, and sawdust are all common types of mulches for crop production. Mulches work by eliminating light availability to small weeds. The larger the weed, the deeper the mulch needs to be for effective control. Mulches have the added benefit of also conserving soil moisture and reducing soil erosion. Many organic types of mulch ultimately decompose into necessary plant nutrients for the following growing season.
- **Sterilization**. Soil sterilization uses heat to kill weeds and weed seeds in soil. Two types are common in agriculture, 1) passive soil sterilization with clear plastic tarps, and 2) active soil sterilization with injected steam. Passive sterilization uses clear plastic tarps to foster the germination of weeds under the tarp and then exposes the seedlings to hostile growing conditions and they perish. Active

sterilization uses extremely high temperature steam to eliminate weed seeds and bulbs with direct contact. Both processes are expensive and require specialized equipment and/or high labor output.

- **Manual Weed Treatment.** Specific manual weed treatment methods allowed under ~~the Lobitos~~ Agricultural Management ~~plan~~ Plans are mowing, pulling, flaming~~, mowing~~, mulching, weedmats, and hoeing.

8 IPM in Natural Lands

8.1 Definition and Purpose

Natural areas make up the majority of District lands and typically experience minimal levels of human use. The purpose of IPM in natural areas is to preserve and restore natural resources while also maintaining safe and enjoyable human access for visitors and staff.

IPM in the District's natural areas focuses primarily on the control of pests that threaten the long-term viability of natural resources on District preserves. Pests that are commonly encountered on natural areas include invasive plants and invasive animals, including regulated species (e.g., plants and wildlife that are regulated under state and federal law or ~~CDFW~~ Fish and Game Code, and feral pets). The District spends the majority of its IPM management efforts in natural areas on control of invasive plants.

- **Invasive plants** are implicated in many natural resource and conservation problems and are considered by most land managers to be a threat to their resource management goals. When transplanted to a foreign landscape, invasive plants leave behind their associated predators, prey, and diseases that previously helped to balance their growth and abundance. In addition, many invasive plants have inherent biological traits that allow them to rapidly reproduce and colonize new areas faster than the native plants of the invaded habitat. Some of these invasive plants become problematic because of abundance – they displace native species by outcompeting them for space and resources (CCC 2005; County of San Mateo, CA 1983; State of Washington 2004). Some invasive plants can alter ecosystem processes, such as reducing or changing seasonal food sources for wildlife, hydrological patterns, fire regimes, or soil chemistry (D'Antonio and Vitousek 1992; Keeley 2006; Vitousek and Walker 1989).

  ~~The California Department of Food and Agriculture~~ CDFA designates a plant species as a noxious weed if they find it to be "troublesome, aggressive, intrusive, detrimental, or destructive to agriculture, silviculture, or important native species, and difficult to control or eradicate" ~~The Department~~(CDFA 2014). CDFA designates a rating for each noxious weed species based on the present distribution of the pest within the state and the likelihood that eradication or control efforts will be successful. The ratings are not laws, but are policy guidelines that indicate the appropriate actions to take against pests. The District works closely with the Agricultural Commissioners for San Mateo and Santa Clara Counties to address state-designated noxious weeds on preserves. The California Invasive Plant Council maintains an Invasive Plant Inventory that rates the threat of non-native plant species by evaluating their ecological impacts, invasive potential and ecological distribution ~~(Cal-IPC 2014).~~(California Invasive Plant Council, n.d.-a). The Bay Area Early Detection Network along with the San Mateo County Weed Management Area and the Santa Clara County Weed Management Area set regional priorities for eradication of invasive plants in the San Francisco Bay Area, particularly those for which early action could substantially reduce future risk ~~(Cal-IPC 2009).~~between 2006 to 2011 (California Invasive Plant Council, n.d.-b). District staff members are active with these organizations and further apply local knowledge to evaluate the invasive risk of existing and new non-native plants found on District preserves and to determine the best responses.

- **Invasive animals** pose another threat to natural areas. Escaped/released domestic animals and other non-native wildlife species can thrive in the favorable climate of the San Francisco peninsula. Once established in a preserve, they compete for valuable resources and disturb the sensitive balance of natural food webs. Bullfrogs and feral pigs are examples of invasive, introduced animals found in District preserves that physically displace or consume the native plants and wildlife that normally inhabit natural areas, or otherwise alter natural processes.

  ~~Wild (feral)~~Feral pigs are an example of an invasive wildlife species with obvious impact on District lands. They have been widespread in the central coast of California since about 1970, reproduce rapidly, dig up meadows and wetlands, and carry diseases that can affect people and livestock. They eat acorns, bulbs, and roots in soil, and are difficult to control. Feral pigs were abundant in the South Skyline region in the 1990s. The District has been trapping feral pigs since 2000 and has substantially reduced their population and damage from their rooting. The management of invasive species may sometimes involve eradication (i.e., the removal of all of the pest species, typically only achievable for new invasive species and small populations of pests), but more common natural area management methods involve incremental reduction of pest numbers (control), removal of individuals that have the greatest impact on critical resources, or the exclusion of a pest species from a defined sensitive area (containment). Programs to control invasive plant and animal species often require a long-term commitment. With many invasive species, short-term lapses in active management can negate years of expensive control programs.

First steps in all invasive species management focus on preventing the establishment of any new pest populations. Prevention or detection actions can minimize many invasive species problems in the future, reducing the need for more active management and costly treatment methods (refer to Section 3.6). In the future, the pest prevention tactics identified below will be based on minimizing dispersal or reacting quickly to new invasions through anticipation and surveillance.

8.2 Regulatory Background

Invasive species are regulated to some extent by state and federal laws. The USDA, CDFA, USFWS, and CDFW all regulate the importation, sale, transportation, and control of designated invasive species.

8.2.1 Regulated Wildlife

Under the Lacey Act, the Secretary of the Interior is authorized to regulate the importation and transport of species, including offspring and eggs, determined to be injurious to the health and welfare of humans, the interests of agriculture, horticulture or forestry, and the welfare and survival of wildlife resources. Wild mammals, birds, fish, mollusks, crustaceans, amphibians, and reptiles are the only organisms that can be added to the injurious wildlife list. ~~The current 2013 list includes 236 species, many of which are kept as pets around the world (USFWS 2013).~~The current 2025 list includes 785 species, many of which are kept as pets around the world (USFWS n.d.). All species listed as injurious may not be imported or transported between states or any United States territory without a permit issued by the USFWS. ~~No injurious species of wildlife are currently known to occur on District lands.~~ The importation of any live amphibians from outside the United States (such as bullfrogs imported from China) has been petitioned by environmental groups for inclusion on the list to prevent the importation of the chytrid fungal pathogen. ~~The USFWS is still reviewing the petition to list exotic amphibians as injurious wildlife.~~ Since publication of the 2014 Guidance Manual, the USFWS issued a final ruling that formally prohibits the importation and interstate transport of genera listed under the Lacey Act due to the risk of fungus (2016), and as of January 2025, this list has been expanded to include additional injurious amphibians (FedCenter.gov 2025).

8.2.2 Regulated Plants

Some species of invasive plants are regulated as noxious weeds by the CDFA and USDA. Because the two agencies work cooperatively, California's classification scheme is representative of both federal and state regulations. ~~CDFA currently lists 251 invasive plant species as noxious weeds (CDFA 2013a).~~Most recently, CDFA revised this list in 2021 to now include 184 invasive plant species as noxious weeds (CDFA 2021). Control actions are determined by a ranking system based on a species' threat to economic or environmental resources. The following is California's ranking system for invasive pest plant species~~:~~ (CDFA n.d.-b):

- **Class A Noxious Weed** – A pest of known economic or environmental detriment which is either not known to be established in California or has limited distribution that allows for the possibility of eradication or successful containment. A-rated pests are prohibited from entering the state because, by virtue of their rating, they have been placed on the Plant Health and Pest Prevention Services Director's list of organisms "detrimental to agriculture" in accordance with the FAC Sections 5261 and 6461. The only exception is for organisms accompanied by a CDFA or USDA live organism permit for contained exhibit or research purposes. If found entering or established in the state, A-rated pests are subject to state (or commissioner when acting as a state agent) enforced action involving eradication, quarantine regulation, containment, rejection, or other holding action.

- **Class B Noxious Weed** – A pest of known economic or environmental detriment that, if present in California, has a limited distribution. B-rated pests are eligible to enter the state if the receiving county has agreed to accept them. If found in the state, they are subject to state endorsed holding action and eradication only to provide for containment, as when found in a nursery. At the discretion of the individual county agricultural commissioner, they are subject to eradication, containment, suppression, control, or other holding action.
- **Class C Noxious Weed** – A pest of known economic or environmental detriment that, if present in California, is usually widespread. C-rated organisms are eligible to enter the state as long as the commodities with which they are associated conform to pest cleanliness standards when found in nursery stock shipments. If found in the state, they are subject to regulations designed to retard spread or to suppress at the discretion of the individual county agricultural commissioner. There is no state enforced action other than providing for pest cleanliness.
- **Class D Noxious Weed** – An organism known to be of little or no economic or environmental detriment, to have an extremely low likelihood of weediness, or is known to be a parasite or predator. There is no state enforced action.
- **Class Q Noxious Weed** – An organism or disorder suspected to be of economic or environmental detriment, but whose status is uncertain because of incomplete identification or inadequate information.
- **Class W Noxious Weed** – This notation indicates that a plant is included in the CCR Section 4500 list of California State Noxious Weeds.

8.3 Type of Pests

Pests in natural areas include invasive plants and invasive animals. This section presents an overview of IPM practices presented for each type of pest.

Traditional IPM concepts can be difficult to apply to invasive species. The ecosystems invaded by these species normally do not support the same predators and parasites that may regulate the species populations in its native range, so simply facilitating increased natural controls may not be effective. Modern IPM strategies for invasive species emphasize use of standardized decision-making processes supported by science-based understanding of invasive species biology and ecological interactions with their host environment. Tolerance levels may vary greatly for invasive species; invasive species impacts range in severity and extent, and some species may be so widespread or complexly woven into their host environment that control is not technically or economically feasible. Monitoring is a critical part of the District's IPM Program; prevention and early detection/eradication strategies can be implemented to prevent new invasive species pest problems before they become unmanageable.

Programs to control invasive plant and animal species require long-term commitment. With many invasive species, short-term lapses in management activity may negate years of expensive control programs. IPM is considered an integral part of a strategy to efficiently and effectively control invasive species on District lands.

8.3.1 Invasive Animals in Natural Lands

Invasive animal management in natural areas focuses on first modifying the behavior of humans or the habitat of natural areas to moderate or eliminate invasive animal pest problems. After these prevention actions are exhausted, invasive animal populations will be managed to a defined tolerance level. Tolerance levels focus on reducing the pest population down to a level that does not cause substantial harm to the natural resource; does not cause severe economic harm; and/or does not cause disruption of natural processes or severe displacement of native species. The District's goal is to maintain the long-term stability and resiliency of its natural areas.

State regulations concerning invasive animals are complex. Some invasive animals in California are regulated for sport and commercial purposes (e.g., feral pigs and bull-frogs), others are expressly prohibited (e.g., northern pike fish), and others are currently unregulated (e.g., snapping turtles and parrots). Some invasive wildlife species can be difficult to manage where adjacent landowners manage the same species for sport or profit. The District prioritizes specific invasive animals for management that have the greatest potential to impact natural areas.

Some regulated game species (e.g., feral pigs) must be controlled under special permits obtained from CDFW.

8.3.2 Invasive Plants in Natural Lands

The District has identified numerous species of invasive plant species present on District lands; ~~75~~specifically, 156 invasive plants ~~were observed in a study conducted in 2004~~are known to occur on District lands as of 2025 (see Table 8-1 below). The list of invasive plant species changes over time and will continue to be updated throughout the life of the IPMP. The following section presents IPM strategies for these target invasive plant species, organized by general life history (e.g., annual and biennial, perennial, aquatic plants). Because there is a great diversity of invasive plant species managed on District lands, specific treatments and management strategies must also ~~take into account~~ consider the life history traits of each species in the context of its specific environment – the details of which cannot be outlined in a single document.

Ultimately, land managers, biologists, and pest control professionals must develop site-specific management for individual projects and species~~, using the information provided in this manual and the District Invasive Plant Control Handbook as guides.~~. The District's goal is to maintain the long-term stability and resiliency of its natural areas.

8.4 Pest Identification

Pest identification for invasive plants and wildlife can be readily undertaken using existing District resources such as invasive plant identification materials, and field guides. Staff should identify the pest to species, and then investigate its life history and life cycle, and document the distribution, density, population size, and population structure (i.e., percentage of each population in immature, adult, and reproductive stages) within the natural areas. Use the target pest list presented in Table 8-1 as a starting point of identifying pests that currently occur on District lands. New pest species may invade District lands over time: if the pest is not listed in Table 8-1, staff should then do basic web searches to determine if the pest is regulated by statute, by which agency it is regulated, or determine if it is an unregulated pest on District lands.

Table 8-1 Invasive Plant Species Documented as Present on the District Lands as of 2025

Scientific Name	Common Name	Life Form	Cal-IPC Invasive Status (2025)[a]	Midpen Rating[b]	Final Rating
Acacia baileyana	Cootamundra wattle	Tree, Shrub	High Risk	--	High Risk
Acacia dealbata	Silver wattle	Tree, Shrub	Moderate	--	Moderate
Acacia decurrens	Green wattle	Tree	--	Limited	Limited
Acacia mearnsii	Black wattle	Tree, Shrub	--	Limited	Limited
Acacia melanoxylon	Blackwood acacia	Tree, Annual herb	Limited	--	Limited
Acacia pycnantha	Golden wattle	Tree, Shrub	High Risk	--	High Risk
Acacia retinodes	Ever blooming acacia	Tree, Perennial herb	--	Limited	Limited
Acacia verticillata	Star acacia	Tree, Shrub	--	Limited	Limited
Acaena novae-zelandiae	Biddy biddy	Shrub (stem succulent)	High Risk	--	High Risk
Aegilops cylindrica	Jointed goatgrass	Annual grass	High Risk	--	High Risk
Aegilops triuncialis	Goatgrass	Annual grass	High	--	High
Ageratina adenophora	Thoroughwort	Perennial herb	Moderate	--	Moderate
Agrostis avenacea	Pacific bentgrass	Perennial grass	Limited	--	Limited
Ailanthus altissimaCentaurea melitensis	Tree of heaven	Tree	Moderate	--	Moderate
Alopecurus pratensis	Meadow foxtail	Perennial grass	High Risk	--	High Risk
Anthoxanthum odoratum	Sweet vernal grass	Annual, Perennial grass	Limited	--	Limited
Anthriscus caucalis	Bur chervil	Annual herb, Vine	--	Limited	Limited
Arctotheca prostrata	Prostrate cape weed	Annual, Perennial herb	Moderate	--	Moderate
Arrhenatherum elatius	Tall oatgrass	Perennial grass	--	Limited	Limited
Arum italicum	Italian lords and ladies	Perennial herb	High Risk	--	High Risk
Arundo donax	Giant reed	Perennial grass	High-Moderate	--	High

Scientific Name	Common Name	Life Form	Cal-IPC Invasive Status (2025)[a]	Midpen Rating[b]	Final Rating
Avena barbata	Slim oat	Annual grass	Moderate	--	Moderate
Avena fatua	Wildoats	Annual grass	Moderate	--	Moderate
Bassia hyssopifolia	Fivehorn smotherweed	Annual herb	Limited	--	Limited
Bellardia trixago	Mediterranean lineseed	Annual herb	Limited	--	Limited
Brachypodium distachyon	Purple false brome	Annual, Perennial grass	Moderate	--	Moderate
Brachypodium sylvaticum	Slender false brome	Perennial grass	--	High	High
Brassica nigra	Black mustard	Annual herb	Moderate	--	Moderate
Brassica rapa	Common mustard	Annual herb	Limited	--	Limited
Briza maxima	Rattlesnake grass	Annual grass	Limited	--	Limited
Bromus catharticus	Rescue grass	Annual, Perennial grass	--	Limited	Limited
Bromus diandrus	Ripgut brome	Annual grass	Moderate	--	Moderate
Bromus hordeaceus	Soft chess	Annual grass	Limited	--	Limited
Bromus madritensis	Foxtail chess, foxtail brome	Annual grass	--	Limited	Limited
Bromus tectorum	Downy chess	Annual grass	High	--	High
Buddleja davidii	Butterfly bush	Tree, Shrub	High Risk	--	High Risk
Carduus pycnocephalus	Italian thistle	Annual herb	Moderate- Limited	--	Moderate
Carduus tenuiflorus	Slender flowered thistle	Annual herbTree	Limited	--	Limited
Carex pendula	Hanging sedge	Perennial grass	High Risk	--	High Risk
Carpobrotus edulis	Iceplant	Perennial herb	High	--	High
Carthamus lanatus	Woolly distaff thistle	Annual herbTree	High	--	High
Centaurea calcitrapa	Purple star thistle	Annual, Perennial herb	Moderate	--	Moderate

Scientific Name	Common Name	Life Form	Cal-IPC Invasive Status (2025)[a]	Midpen Rating[b]	Final Rating
Centaurea melitensis	Tocalote	Annual herb	Moderate	--	Moderate
Centaurea solstitialis	Yellow starthistle	Annual herb	High	--	High
Centaurea stoebe ssp. micranthos	Spotted knapweed	Perennial herb	High	--	High
Centranthus ruber	Jupiter's beard	Annual, Perennial herb	--	Limited	Limited
Cirsium vulgare	Bullthistle	Perennial herb	Moderate	--	Moderate
Clematis vitalba	Old man's beard	Vine	Moderate	--	Moderate
Conium maculatum	Poison hemlock	Perennial herb	Moderate	--	Moderate
Cortaderia jubata	Andean pampas grass	Perennial grass	High	--	High
Cortaderia selloana	Pampas grass	Perennial grass	--	Moderate	Moderate
Cotoneaster franchetii	Cotoneaster	Shrub	Moderate	--	Moderate
Cotoneaster lacteus	Milkflower cotoneaster	Shrub	Moderate	--	Moderate
Cotoneaster pannosus	Woolly cotoneaster	Shrub	Moderate	--	Moderate
Crataegus monogyna	Hawthorn	Shrub	Limited	--	Limited
Crocosmia Xcrocosmiiflora	Monbretia	Perennial herb	Limited	--	Limited
Cupressus macrocarpa	Monterey cypress	Tree	Limited	--	Limited
Cynodon dactylon	Bermuda grass	Perennial grass	Moderate	--	Moderate
Cynosurus echinatus	Dogtail grass	Annual grass	Moderate	--	Moderate
Cytisus multiflorus	Spanish broom	Shrub	High Risk	--	High Risk
Cytisus scoparius	Scotch broom	Shrub	High	--	High
Cytisus striatus	Portuguese broom	Shrub	Moderate	--	Moderate
Dactylis glomerata	Orchardgrass	Perennial grass	Limited	--	Limited

Scientific Name	Common Name	Life Form	Cal-IPC Invasive Status (2025)[a]	Midpen Rating[b]	Final Rating
Delairea odorata	Cape ivy	Perennial herb	High	--	High
Digitalis purpurea	Foxglove	Perennial herb	Limited	--	Limited
Dipsacus fullonum	Wild teasel	Perennial herb	Moderate	--	Moderate
Dipsacus sativus	Indian teasel	Annual, Biennial herb	Moderate	--	Moderate
Dittrichia graveolens	Stinkwort	Annual herb	Moderate	--	Moderate
Echium candicans	Pride of madeira	Shrub	Limited	--	Limited
Ehrharta erecta	Upright veldt grass	Perennial grass	Moderate	--	Moderate
Elymus caput-medusae	Medusa head	Annual grass	High	--	High
Erodium cicutarium	Coastal heron's bill	Annual herb	Limited	--	Limited
Eucalyptus camaldulensis	Red gum	Tree	Limited	--	Limited
Eucalyptus globulus	Blue gum	Tree	--	Moderate	Moderate
Euphorbia lathyris	Gopher plant	Annual, Perennial herb	High Risk	--	High Risk
Euphorbia oblongata	Eggleaf spurge	Perennial herb	Limited	--	Limited
Festuca arundinacea	Reed fescue	Perennial grass	Moderate	--	Moderate
Festuca myuros	Rattail sixweeks grass	Annual grass	Moderate	--	Moderate
Festuca perennis	Italian rye grass	Annual, Perennial grass	Moderate	--	Moderate
Ficus carica	Common fig	Tree	Moderate	--	Moderate
Foeniculum vulgare	Fennel	Perennial herb	Moderate	--	Moderate
Gazania linearis	Gazania	Perennial herb	Moderate	--	Moderate
Genista monosperma	Bridal broom	Shrub	Moderate	--	Moderate
Genista monspessulana	French broom	Shrub	High	--	High
Geranium dissectum	Wild geranium	Annual herb	Limited	--	Limited

Scientific Name	Common Name	Life Form	Cal-IPC Invasive Status (2025)[a]	Midpen Rating[b]	Final Rating
Geranium lucidum	Shining geranium	Annual, Biennial herb	High Risk	--	High Risk
Geranium purpureum	little Robin	Annual, Biennial herb	Limited	--	Limited
Geranium robertianum	herb Robert	Annual herb		--	Limited
Grevillea robusta	Silkoak	Tree	High Risk	--	High Risk
Hedera canariensis	Canary ivy	Vine	High	--	High
Hedera helix	English ivy	Vine, Shrub	High	--	High
Helminthotheca echioides	Bristly ox-tongue	Annual, Perennial herb	Limited	--	Limited
Hirschfeldia incana	Mustard	Perennial herb	Moderate	--	Moderate
Holcus lanatus	Common velvetgrass	Perennial grass	Moderate	--	Moderate
Hordeum marinum	Seaside barley	Annual grass	Moderate	--	Moderate
Hordeum murinum	Foxtail barley	Annual grass	Moderate	--	Moderate
Hypericum canariense	Canary island st john's wort	Shrub	Moderate	--	Moderate
Hypericum perforatum	Klamathweed	Perennial herb	--	Moderate	Moderate
Hypochaeris glabra	Smooth cats ear	Annual herb	Limited	--	Limited
Hypochaeris radicata	Hairy cats ear	Perennial herb	Moderate	--	Moderate
Ilex aquifolium	Holly	Tree, Shrub	Limited	--	Limited
Iris pseudacorus	Yellowflag iris	Perennial herb	Limited	--	Limited
Kniphofia uvaria	Redhot poker	Perennial herb	High Risk	--	High Risk
Lactuca serriola	Prickly lettuce	Annual herb	--	Limited	Limited
Lathyrus latifolius	Sweet pea	Perennial herb	High Risk	--	High Risk
Lepidium chalepense	Lens-podded hoary cress	Annual, Perennial herb	Moderate	--	Moderate

Scientific Name	Common Name	Life Form	Cal-IPC Invasive Status (2025)[a]	Midpen Rating[b]	Final Rating
Lepidium draba	Whitetop	Perennial herb	Moderate	--	Moderate
Lepidium latifolium	Perennial pepperweed	Perennial herb	High	--	High
Leucanthemum vulgare	Oxe eye daisy	Perennial herb	Moderate	--	Moderate
Ligustrum lucidum	Glossy privet	Tree, Shrub	Limited	--	Limited
Limonium ramosissimum	Algerian sealavender	Perennial herb	Limited	--	Limited
Lythrum hyssopifolia	Hyssop loosestrife	Annual, Perennial herb	Moderate	--	Moderate
Marrubium vulgare	White horehound	Perennial herb	Limited	--	Limited
Maytenus boaria	Mayten	Tree, Shrub	High Risk	--	High Risk
Medicago polymorpha	California burclover	Annual herb	Limited	--	Limited
Mentha pulegium	Pennyroyal	Perennial herb	Moderate	--	Moderate
Mesembryanthemum nodiflorum	Small flowered iceplant	Annual herb	Limited	--	Limited
Myoporum laetum	Ngaio tree	Tree, Shrub	Moderate	--	Moderate
Myosotis latifolia	Wide leaved forget me not	Perennial herb	Limited	--	Limited
Myriophyllum aquaticum	Parrot's feather	Perennial herb (aquatic)	High	--	High
Nassella tenuissima	Mexican feathergrass	Perennial grass	Limited	--	Limited
Nicotiana glauca	Tree tobacco	Tree, Shrub	Moderate	--	Moderate
Olea europaea	Olive	Tree, Shrub	Limited	--	Limited
Oxalis pes-caprae	Bermuda buttercup	Perennial herb	Moderate	--	Moderate
Paspalum urvillei	Vasey's grass	Perennial grass	High Risk	--	High Risk
Phalaris aquatica	Harding grass	Perennial grass	--	High	High
Phoenix canariensis	Canary island date palm	Tree	Limited	--	Limited

Scientific Name	Common Name	Life Form	Cal-IPC Invasive Status (2025)[a]	Midpen Rating[b]	Final Rating
Pinus radiata	Monterey pine	Tree	Limited	--	Limited
Pittosporum undulatum	Victorian box	Tree, Shrub	High Risk	--	High Risk
Plantago lanceolata	Ribwort	Perennial herb	Limited	--	Limited
Polypogon monspeliensis	Annual beard grass	Annual grass	Limited	--	Limited
Prunus cerasifera	Cherry plum	Tree	Limited	--	Limited
Pyracantha angustifolia	Firethorn	Shrub	Limited	--	Limited
Pyracantha coccinea	Scarlet firethorn	Shrub	Limited	--	Limited
Raphanus sativus	Jointed charlock	Annual, Biennial herb	Limited	--	Limited
Robinia pseudoacacia	Black locust	Tree	Limited	--	Limited
Romulea rosea	Rosy sandcrocus	Perennial herb	High Risk	--	High Risk
Rubus armeniacus	Himalayan blackberry	Shrub	High	--	High
Rumex acetosella	Sheep sorrel	Perennial herb	Moderate	--	Moderate
Rumex crispus	Curly dock	Perennial herb	Limited	--	Limited
Rumex pulcher	Fiddleleaf dock	Perennial herb	--	Limited	Limited
Rytidosperma penicillatum	Purple awned wallaby grass	Perennial grass	Limited	--	Limited
Salsola soda	Alkali russian thistle	Annual herb	Moderate	--	Moderate
Schinus molle	Peruvian pepper tree	Tree	Limited	--	Limited
Silybum marianum	Milk thistle	Annual, Perennial herb	Limited	--	Limited
Spartium junceum	Spanish broom	Shrub	High	--	High
Stipa miliacea	Smilo grass	Perennial grass	Limited	--	Limited
Torilis arvensis	Field hedge parsley	Annual herb	Moderate	--	Moderate

Scientific Name	Common Name	Life Form	Cal-IPC Invasive Status (2025)[a]	Midpen Rating[b]	Final Rating
Trifolium hirtum	Rose clover	Annual herb	Limited	--	Limited
Ulex europaeus	Gorse	Shrub	High	--	High
Urospermum picroides	Bristly tail seed	Annual, Perennial herb	High Risk	--	High Risk
Verbascum thapsus	Woolly mullein	Perennial herb	Limited	--	Limited
Verbena bonariensis	Purple top vervain	Annual, Biennial herb	High Risk	--	High Risk
Vinca major	Vinca	Perennial herb	Moderate	--	Moderate
Washingtonia robusta	Mexican fan palm	Tree	Moderate	--	Moderate
Zantedeschia aethiopica	Callalily	Perennial herb	Limited	--	Limited

Notes:

[a] **CalIPC Invasive Status Definitions:**

a. High – These species have severe ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal and establishment. Most are widely distributed ecologically.

b. Moderate – These species have substantial and apparent—but generally not severe—ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal, though establishment is generally dependent upon ecological disturbance. Ecological amplitude and distribution may range from limited to widespread.

c. Limited – These species are invasive but their ecological impacts are minor on a statewide level or there was not enough information to justify a higher score. Their reproductive biology and other attributes result in low to moderate rates of invasiveness. Ecological amplitude and distribution are generally limited, but these species may be locally persistent and problematic.

[b] **Midpen ratings:** The rating that District vegetation staff has given a specific species follows the same definitions as Cal-IPC, however, if their rating differs from Cal-IPC, then District staff's rating takes priority and is used for final rating values.

Source: Species documented by Midpen staff as of 2025

~~**Table 8-2 Invasive Plant Species Documented as Present on the District Lands**~~

~~Scientific Name~~	~~Common Name~~	~~Life Form~~	~~Cal-IPC Invasive Status (2014)~~	~~CDFA Rating (2014)~~
~~*Acacia baileyana*~~	~~cootamundra wattle~~	~~Tree~~	~~Watchlist~~	
~~*Acacia dealbata*~~	~~silver wattle~~	~~Tree or shrub~~	~~Moderate~~	
~~*Acacia melanoxylon*~~	~~blackwood acacia~~	~~Tree~~		~~Limited~~
~~*Aegilops cylindrica*~~	~~jointed goatgrass~~	~~Annual herb~~	~~Watchlist~~	~~B~~
~~*Aegilops triuncialis*~~	~~barbed goatgrass~~	~~–~~	~~High~~	~~B~~
~~*Ailanthus altissima*~~	~~tree of heaven~~	~~Tree~~	~~Moderate~~	~~C~~
~~*Arundo donax*~~	~~giant reed~~	~~–~~	~~High~~	~~B~~
~~*Asphodelus fistulosus*~~	~~asphodel, onion weed~~	~~Perennial herb~~	~~Moderate–ALERT~~	~~B~~
~~*Brachypodium sylvaticum*~~	~~slender false brome~~	~~Perennial herb~~	~~Moderate–ALERT~~	~~A~~
~~*Brassica (nigra?)*~~	~~mustard~~	~~Annual herb~~	~~Moderate~~	
~~*Carduus pycnocephalus*~~	~~Italian thistle~~	~~Annual herb~~	~~Moderate~~	~~C~~
~~*Carthamus lanatus*~~	~~woolly distaff thistle~~	~~Annual herb~~	~~Moderate~~	~~B~~
~~*Centaurea calcitrapa*~~	~~purple star-thistle~~	~~Annual or Perennial herb~~	~~Moderate~~	~~B~~
~~*Centaurea melitensis*~~	~~tocolate, Malta star-thistle~~	~~Annual herb~~	~~Moderate~~	~~C~~
~~*Centaurea solstitialis*~~	~~yellow star-thistle~~	~~Annual herb~~	~~High~~	~~C~~
~~*Centaurea stoebe ssp. micranthus*~~	~~spotted knapweed~~	~~Perennial herb~~	~~High~~	~~A~~
~~*Cirsium vulgare*~~	~~bull thistle~~	~~Biennial herb~~	~~Moderate~~	~~C~~
~~*Conium maculatum*~~	~~poison hemlock~~	~~Biennial herb~~	~~Moderate~~	
~~*Cortaderia jubata*~~	~~Jubata grass~~	~~Perennial herb~~	~~High~~	~~B~~
~~*Cortaderia selloana*~~	~~pampas grass~~	~~Perennial herb~~	~~High~~	
~~*Cotoneaster spp.*~~	~~cotoneaster~~	~~Shrub~~	~~(several species)~~	

~~Scientific Name~~	~~Common Name~~	~~Life Form~~	~~Cal-IPC Invasive Status (2014)~~	~~CDFA Rating (2014)~~
~~*Cynara cardunculus*~~	~~artichoke thistle~~	~~Perennial herb~~	~~Moderate~~	~~B~~
~~*Cytisus scoparius*~~	~~Scotch broom~~	~~Shrub~~	~~High~~	~~C~~
~~*Dactylis glomerata*~~	~~orchard grass~~	~~Perennial herb~~	~~Limited~~	
~~*Delairea odorata*~~	~~Cape ivy~~	~~Perennial herb~~	~~High~~	~~B~~
~~*Dipsacus sativus*~~	~~teasel~~	~~Biennial herb~~	~~Moderate~~	
~~*Dittrichia graveolens*~~	~~stinkweed~~	~~Annual herb~~	~~Moderate~~	
~~*Elymus caput-medusae*~~	~~Medusa head grass~~	~~Annual herb~~	~~High~~	~~C~~
Ehrharta calycina	~~Perennial velt grass~~	~~Perennial herb~~	~~High~~	
~~*Ehrharta erecta*~~	~~Erect velt grass~~	~~Perennial herb~~	~~Moderate~~	
~~*Eucalyptus camaldulensis*~~	~~red river gum~~	~~Tree~~	~~Limited~~	
~~*Eucalyptus globulus*~~	~~blue gum~~	~~Tree~~	~~Moderate~~	
~~*Euphorbia oblongata*~~	~~Oblong spurge~~	~~Perennial herb~~	~~Limited~~	
~~*Foeniculum vulgare*~~	~~fennel~~	~~Perennial herb~~	~~High~~	
~~*Genista monspessulana*~~	~~French broom~~	~~Shrub~~	~~High~~	~~C~~
~~*Hedera helix*~~	~~English ivy~~	~~Woody vine~~	~~High~~	
~~*Helminthotheca (Picris) echioides*~~	~~bristly ox-tongue~~	~~Annual or biennial herb~~	~~Limited~~	
~~*Hesperocyperis (Cupressus) macrocarpa*~~	~~Monterey cypress~~	~~Tree~~	~~Moderate (when outside native range)~~	
~~*Hypericum perforatum*~~	~~Klamath weed~~	~~Perennial herb~~	~~Moderate~~	~~C~~
~~*Lathyrus latifolius*~~	~~sweet pea~~	~~Perennial herb~~	~~Watchlist~~	
~~*Ligustrum lucidum*~~	~~glossy privet~~	~~or shrub~~	~~Watchlist~~	
~~*Lythrum salicaria*~~	~~purple loosestrife~~	~~Perennial herb~~	~~High~~	~~B~~

~~Scientific Name~~	~~Common Name~~	~~Life Form~~	~~Cal-IPC Invasive Status (2014)~~	~~CDFA Rating (2014)~~
~~*Marrubium vulgare*~~	~~horehound~~	~~Perennial herb~~	~~Limited~~	
~~*Mentha pulegium*~~	~~pennyroyal~~	~~Perennial herb~~	~~Moderate~~	
~~*Mesembryanthemum crystallinum*~~	~~crystalline iceplant~~	~~Annual herb~~	~~Moderate–ALERT~~	
~~*Myosotis (latifolia?)*~~	~~forget-me-not~~	~~Perennial herb~~	~~Limited~~	
~~*Nerium oleander*~~	~~oleander~~	~~Tree~~	~~Watchlist~~	
~~*Olea europaea*~~	~~olive~~	~~Tree or shrub~~	~~Limited~~	
~~*Oxalis pes-caprae*~~	~~Bermuda buttercup~~	~~Perennial herb~~	~~Moderate~~	
~~*Phalaris aquatica*~~	~~Harding grass~~	~~Perennial herb~~	~~Moderate~~	
~~*Pinus radiata*~~	~~Monterey pine~~	~~Tree~~	~~Limited (when outside native range)~~	
~~*Robinia pseudoacacia*~~	~~black locust~~	~~Tree~~	~~Limited~~	
~~*Rubus armeniacus (discolor)*~~	~~Himalayan blackberry~~	~~Shrub~~	~~High~~	
~~*Senecio minimus (Erechtites minima)*~~	~~coastal burnweed~~	~~Annual or perennial herb~~	~~Moderate~~	
~~*Silybum marianum*~~	~~milk thistle~~	~~Annual or biennial herb~~	~~Limited~~	
~~*Spartium junceum*~~	~~Spanish broom~~	~~Shrub~~	~~High~~	~~C~~
~~*Stipa mileacea var. mileacea (Piptatherum miliaceum)*~~	~~Smilo grass~~	~~Perennial herb~~	~~Limited~~	
~~*Ulex europaeus*~~	~~gorse~~	~~Shrub~~	~~High~~	~~B~~
~~*Verbascum (thapsus?)*~~	~~mullein~~	~~Biennial herb~~	~~Limited~~	
~~*Vinca major*~~	~~periwinkle~~	~~Perennial herb~~	~~Moderate~~	
~~*Zantedeschia aethiopica*~~	~~calla lily~~	~~Perennial herb~~	~~Limited~~	

~~Notes:~~

~~a CalIPC Invasive Status Definitions:~~

~~a. High – Species with severe ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal and establishment. Most are widely distributed ecologically.~~

~~b. Moderate- **ALERT** – Species on an active Cal-IPC watch list as a species suspected to causing severe impacts (may be moved to High status). These species have substantial and apparent-but generally not severe-ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal, though establishment is generally dependent upon ecological disturbance. Ecological amplitude and distribution may range from limited to widespread.~~

~~i. **Moderate** – See above---same as above but not on active Cal-IPC Watch list~~

~~c. Limited – Species that are invasive, but that ecological impacts are minor on a statewide level or there was not enough information to justify a higher score. Their reproductive biology and other attributes result in low to moderate rates of invasiveness. Ecological amplitude and distribution are generally limited, but these species may be locally persistent and problematic.~~

~~ii. **Watch List** – On a list of species that require further evaluation and monitoring to determine impact.~~

~~b **CDFA Rating** Definitions:~~

~~**A** – A pest of known economic or environmental detriment and is either not known to be established in California or it is present in a limited distribution that allows for the possibility of eradication or successful containment. A-rated pests are prohibited from entering the state because, by virtue of their rating, they have been placed on the of Plant Health and Pest Prevention Services Director's list of organisms "detrimental to agriculture" in accordance with the FAC Sections 5261 and 6461. The only exception is for organisms accompanied by an approved CDFA or USDA live organism permit for contained exhibit or research purposes. If found entering or established in the state, A-rated pests are subject to state (or commissioner when acting as a state agent) enforced action involving eradication, quarantine regulation, containment, rejection, or other holding action.~~

~~**B** – A pest of known economic or environmental detriment and, if present in California, it is of limited distribution. B-rated pests are eligible to enter the state if the receiving county has agreed to accept them. If found in the state, they are subject to state endorsed holding action and eradication only to provide for containment, as when found in a nursery. At the discretion of the individual county agricultural commissioner they are subject to eradication, containment, suppression, control, or other holding action.~~

~~**C** – A pest of known economic or environmental detriment and, if present in California, it is usually widespread. C-rated organisms are eligible to enter the state as long as the commodities with which they are associated conform to pest cleanliness standards when found in nursery stock shipments. If found in the state, they are subject to regulations designed to retard spread or to suppress at the discretion of the individual county agricultural commissioner. There is no state enforced action other than providing for pest cleanliness.~~

~~Species documented during 2004 study. (District/Shelterbelt Builders Inc. 2004.)~~

8.5 Prevention

IPM in natural areas focuses first on preventative actions. Preventative actions include modifying human behavior and land use practices to minimize conditions that favor invasive plant infestation and establishment. When combined with landscape-level invasive plant monitoring and early detection/rapid response methods, this approach ensures that invasive plants can be managed when they are small, rather than large populations.

Many invasive plants establish themselves in ruderal or disturbed areas, for example, freshly graded, flooded, or mechanically cleared land, while others exploit more subtle disturbance areas, such as edges of trails and roads or overgrazed rangelands. Management of these species can often be accomplished by implementing better land use practices. Landscape management changes such as restoring natural processes (e.g., fire and flooding), reducing stocking rates/using rotational grazing on rangelands, increasing biodiversity in croplands, or altering forestry practices on timber tracts, can reduce invasive species populations to a level where active management is not required (Jackson et al. 2007). Other invasive species can invade stable, intact landscapes. These competitive species usually require active management to achieve effective control.

Seeds, insects, pets, and pathogens from anywhere in the world can easily arrive on District lands via numerous sources. The District's mission includes providing recreational access to ~~60~~ approximately 72,000 acres of public open space, so visitors are one of many sources of potential new pest infestations. For example, a nature-loving tourist may take a plane from another region of the world with a climate similar to California's, and visit one of the District's properties for a hike, inadvertently introducing seeds from invasive species on their hiking boots.

Agricultural pest prevention programs have been implemented by governments throughout the world, with point-of-entry and trade distribution inspections, insect trap monitoring, and nursery certification. ~~In~~ CDFA estimates that in California~~,~~ more than ~~30~~ 20 million vehicles are monitored annually at California agricultural inspection stations when entering the state ~~(CDFA 2013b).~~(CDFA n.d.-a). From these inspection stations, tens of thousands of prohibited materials are intercepted and seized annually which include a wide variety of agricultural pest species. Similar inspection systems are in place in many international ports of entry throughout the state, including airports, ports, and border crossings. Only more recently have regional entities and local governments begun to develop similar programs for species of local interest. These programs face many challenges in locations ~~where~~ with defined borders where effective monitoring can occur do not exist. There is no clear regulatory oversight for local programs, and there is little funding and staffing available. The most successful examples of local control programs have so far been limited to the management of aquatic pest species of restricted distribution (e.g., California's quagga/zebra mussel quarantines using boating restrictions in recreational waterways) (California State Parks, n.d.) ~~(California State Parks 2013)~~.

Although the District may have limited opportunities to restrict the flow of invasive species into its preserves from world trade and tourism, prevention is possible at smaller scales. ~~Project-specific best management practices~~ IPMP BMPs and improved planning can help prevent inadvertent species introductions by requiring staff training on new invasive species that could invade District lands; inspection of outside materials, equipment, and vehicles; and requiring staff and contractors to only use clean materials, equipment, and vehicles on District lands. These ~~best management practices~~ BMPs intended to prevent introduction or establishment of new invasive species should be incorporated into the construction and maintenance of facilities, road maintenance, fire prevention, firefighting, and routine tool maintenance. Section 8.8 identifies specific preventative actions to reduce the potential to introduce and spread invasive species to District lands. Likewise, District visitors can be trained to identify, look for, and report new invasive species that can invade District lands. Educational materials and boot cleaning stations at key entrance points can help prevent inadvertent introductions, or catch them early. And finally, managing lands in a manner that monitors and reduces areas of soil disturbance, reduces unnecessary and redundant trails and roads, and helps promote larger, intact areas of undeveloped natural areas can also make District lands more resilient to new invasive species invasions.

~~8.6 Best Management Practices to Prevent Invasive Species Introductions (Recommendations selected from Cal-IPC)~~

- ~~Sanitation and Prevention of Contamination - All personnel working in infested areas will take appropriate precautions to not carry or spread weed seed or SOD-associated spores outside of the infested area. Such precautions will consist of, as necessary based on site conditions, cleaning of soil and plant materials from tools, equipment, shoes, clothing, or vehicles before entering or leaving the site.~~
- ~~All staff, contractors, and volunteer crew leaders will be properly trained to prevent spreading weeds and pests to other sites.~~
- ~~District staff will appropriately maintain facilities where tools, equipment, and vehicles are stored free from invasive plants.~~
- ~~District staff will inspect rental equipment and project materials (especially soil, rock, erosion control material, and seed) to confirm as much possible that they are free of invasive plant material before their use at a worksite.~~
- ~~Suitable onsite disposal areas will be identified to prevent the spread of weed seeds.~~
- ~~Invasive plant material will be rendered nonviable when being retained onsite. Staff will desiccate or decompose plant material until it is nonviable (partially decomposed, very slimy, or brittle). Depending on the type of plant, disposed plant material can be left out in the open as long as roots are not in contact with moist soil, or can be covered with a tarp to prevent material from blowing or washing away.~~
- ~~Monitor all sites where invasive plant material is disposed onsite and treat any newly emerged invasive plants.~~

- ~~When transporting invasive plant material offsite for disposal, the plant material will be contained in enclosed bins, heavy-duty bags, or a securely covered truck bed. All vehicles used to transport invasive plant material will be cleaned after each use.~~

~~8.6.1 EARLY DETECTION/RAPID RESPONSE~~

~~Preventing the introduction of invasive species is the first line of defense against invasions. However, even the best prevention practices will not stop all invasive species introductions. Early Detection and Rapid Response (EDRR) programs increase the likelihood that invasions will be addressed successfully while the population size and extent are not beyond that which can be contained and eradicated on both practical and economic scales. According to the 2005 California State Noxious Weed Plan, "early detection is the single most important element in successful and economical eradication of new weeds before they become permanently established in new localities" (CDFA 2005).~~

~~An EDRR Program is a formalized monitoring program that utilizes active and passive land surveillance as a method to discover and identify new invasive species or their symptoms before they become widely established. This can be accomplished with 1) active detection, 2) passive detection, and 3) syndromic surveillance as defined by the National Invasive Species Working Group (National Invasive Species Counsel 2003, 2008).~~

~~Active Detection.~~

- ~~Active detection programs have structure, staffing, and dedicated funding to accomplish land surveillance (landscape-level invasive plant monitoring). Dedicated staff, volunteers, or contractors under a specific set of goals may run these programs. Active detection programs for invasive species often have limited resources so it is important to be focused on high-priority targets, such as high-risk locations, high-value resources, important pathways, and populations and species of concern.~~
- ~~**Passive Detection.** Passive detection programs have more limited goals and structure that are embedded into existing programs and activities. These programs fortuitously detect invasive species as staff, volunteers, or contractors conduct other activities and may or may not have specific training or funding for the detection of invasive species.~~
- ~~**Syndromic Surveillance.** Syndromic surveillance uses the analysis of other resource management problems to detect invasive species indirectly through their direct damage or other ecosystem disruption. Detecting the damage associated with invasive species may be the first indication of a new invasion. This is often the case with invasive pathogens and parasites that are difficult to detect. Regardless of which detection system is selected for use by the District, EDRR efforts should include the following objectives:~~
  - ~~Identify potential threats in time to allow control or mitigation measures to be taken;~~

- ~~Detect new invasive species in time to allow efficient and safe eradication or control decisions to be made;~~
- ~~Respond to invasions effectively to prevent the spread and permanent establishment of invasive species;~~
- ~~Provide adequate and timely information to decision-makers, the public, and to partner agencies concerned about the status of invasive species within an area; andadaptively implement detection and early response strategies over time.~~

~~The District currently does not have a well-developed EDRR program, or dedicated staff or contractors to implement such a program on a comprehensive basis. Some aspects of an EDRR program are implemented as District staff work on other projects.~~

~~DETECTION STRATEGIES~~

~~New invasive species may arrive in the District through sudden, unpredictable pathways (e.g., boots on a traveler) and more constant, predictable pathways (e.g., roads, trails, and/or horticultural escapees from neighboring properties). District lands are scattered throughout the San Francisco Peninsula, adjacent to urban development, rural private residences and hobby farms, and production agricultural landscapes including rangelands, dairies, commercial nurseries, and row and cereal crops. Each of these lands uses account for some possible introductions of invasive species along preserve borders, roads, trails, and easements.~~

~~The most efficient way to prevent routine introductions of invasive species into District lands is to use vigilant patrol and monitoring protocols along District boundaries that interface with urban and agricultural landscapes. Trails, roads, and waterways intersecting District lands are the most likely routes of invasion for new species.~~

~~Many of these common pathways have been confirmed by previous District mapping and planning work (District 2004). Refer to Chapter 5, IPM Program Implementation, for more information on how the District intends to implement this action during IPM Program implementation.~~

~~MODELING INVASION PATHWAYS~~

~~The District maintains approximately 142 miles of single-track trail, 444 miles of road, and has a geographic border (not including adjacent District parcels) totaling 397 miles. Not all of these trails, roads, and edges have the same potential to introduce new invasive species into District properties. Locations within the District that receive the most intense impacts from disturbance, visitation, utility maintenance, and neighboring land use are the most likely sources for new species introductions. Simple models can be used on a local preserve level to analyze probable pathways for key invasive species the District may expect to encounter. The District can identify routine and sporadic activities that have a high probability of introducing invasive species and also the types of species anticipated.~~

~~Refer to Chapter 5, IPM Program Implementation, for more information on how the District intends to address EDRR during the IPM Program implementation. Table 10-3 defines a ranking system for the District to identify activities on preserves that are most likely to promote invasive~~

~~species introductions. Table 10-2 provides a summary of known occurrences of novel invasive species (i.e., current targets of early detection programs that are considered likely to invade and impact California ecosystems if allowed to establish), and is intended to be a "Watch List" for use by the District in raising awareness of new invasive plants that may be found in the future on District lands. By understanding both the activities that promote invasions and the candidate species for likely invasion, the District can more successfully plan for prevention, detection, and control activities.~~

~~Table 10-3 Ranking of Most Likely Pathways of Invasive Species Introductions (Identification of Areas and Activities to Prioritize for Early Detection Monitoring)~~

	~~Ranking of vectors' Probability to Import/Distribute Invasive Plants~~
~~1~~	~~Heavy equipment from outside District~~
~~2~~	~~Top soil importation for construction~~
~~3~~	~~Sand or gravel for road construction~~
~~4~~	~~Work activities along rights-of-way external to District (e.g., PG&E, CalWater)~~
~~5~~	~~Work activities of District employees or contractors~~
~~6~~	~~Grazing lessees/livestock grazing~~
~~7~~	~~Visitor vehicle traffic~~
~~8~~	~~Wind~~
~~9~~	~~Visitors hiking~~
~~10~~	~~Wildlife~~
~~11~~	~~Water~~

~~Table 10-4 Prioritization of Specific Areas for Monitoring Based on Suitability for Invasion and Volume of New Plant Material (Seeds, etc.) likely to be Introduced~~

	~~Areas for Monitoring~~
~~Very high priority~~	
~~1~~	~~Construction/maintenance areas~~
~~2~~	~~Buildings, houses at the urban interface~~
~~3~~	~~Paved areas (e.g., roads/parking lots/trailheads)~~
~~4~~	~~Landscaped areas~~
~~5~~	~~Disturbance from human intervention (e.g., emergency fuel breaks during fire fires)~~
~~6~~	~~Trails~~
~~7~~	~~Areas of high visitor use~~
~~8~~	~~Utilities (e.g., cell towers, powerline corridors)~~
~~9~~	~~Pastures/agricultural areas~~

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	~~Areas for Monitoring~~
~~Medium priority~~	
~~10~~	~~District offices, structures~~
~~11~~	~~Riparian areas~~
~~12~~	~~Natural disturbances with no human intervention (e.g., fire, rockfall)~~
~~Low priority~~	
~~16~~	~~Off-trail wilderness areas~~

~~*Source: adapted from* Gerlach et al. 2001~~

~~Table 10-5 Invasive Plant Watch List: Invasive Plants that are Known to be Problematic near District Lands (for use in Early Detection and Rapid Response Efforts)~~

~~Scientific Name~~	~~Common Name~~	~~Species Reported (X) to Occur in:~~			
		~~District~~	~~San Mateo County~~	~~Santa Clara County~~	~~Santa Cruz County~~
~~Plants~~					
~~Acacia paradoxa~~	~~Kangaroo thorn~~		~~X~~	~~X~~	~~X~~
~~Acaena novae-zelandiae~~	~~Biddy biddy~~				~~X~~
~~Achnatherum brachychaetum~~	~~Puna needle grass~~				
~~Acroptilon repens~~	~~Russian knapweed~~			~~X~~	~~X~~
~~Aegilops cylindrica~~	~~Jointed goatgrass~~	~~X~~	~~X~~	~~X~~	
~~Aegilops triuncialis~~	~~Barbed Goatgrass~~	~~X~~	~~X~~	~~X~~	~~X~~
~~Ambrosia trifida~~	~~Giant ragweed~~				
~~Araujia sericifera~~	~~Bladderflower~~		~~X~~	~~X~~	~~X~~
~~Arctotheca calendula~~	~~Cape weed~~		~~X~~		~~X~~
~~Arrhenatherum elatius~~	~~Tall oatgrass~~		~~X~~	~~X~~	~~X~~
~~Asparagus asparagoides~~	~~African asparagus fern~~			~~X~~	~~X~~
~~Asphodelus fistulosus~~	~~Onionweed~~				
~~Brachypodium sylvaticum~~	~~Slender false brome~~	~~X~~	~~X~~	~~X~~	
~~Buddleja davidii~~	~~Butterfly bush~~		~~X~~	~~X~~	
~~Carduus acanthoides~~	~~Spiny plumeless thistle~~				
~~Carex pendula~~	~~Hanging sedge~~	~~X~~	~~X~~		
~~Carthamus leucocaulos~~	~~White stemmed distaff thistle~~				
~~Centaurea diffusa~~	~~Diffuse knapweed~~			~~X~~	

~~Scientific Name~~	~~Common Name~~	~~Species Reported (X) to Occur in:~~			
		~~District~~	~~San Mateo County~~	~~Santa Clara County~~	~~Santa Cruz County~~
~~*Centaurea iberica*~~	~~Iberian knapweed~~			~~X~~	
~~*Centaurea stoebe ssp. micranthos*~~	~~Spotted knapweed~~	~~X~~		~~X~~	
~~*Centaurea sulphurea*~~	~~Sicilian starthistle~~			~~X~~	~~X~~
~~*Cestrum parqui*~~	~~Chilean Jessamine~~				
~~*Chondrilla juncea*~~	~~Skeleton weed~~		~~X~~	~~X~~	
~~*Cirsium undulatum*~~	~~Wavy leaved thistle~~				
~~*Coprosma repens*~~	~~Creeping mirrorplant~~		~~X~~		~~X~~
~~*Crupina vulgaris*~~	~~Bearded creeper~~				
~~*Cuscuta japonica*~~	~~Japanese dodder~~				
~~*Cytisus striatus*~~	~~Portuguese broom~~		~~X~~		~~X~~
~~*Dittrichia graveolens*~~	~~Stinkweed~~	~~X~~	~~X~~	~~X~~	~~X~~
~~*Echium plantagineum*~~	~~Salvation echium~~				
~~*Elymus caput-medusae*~~	~~Medusa head grass~~	~~X~~	~~X~~	~~X~~	~~X~~
~~*Ehrharta calycina*~~	~~Perennial velt grass~~				~~X~~
~~*Ehrharta erecta*~~	~~Erect velt grass~~	~~X~~	~~X~~		~~X~~
~~*Euphorbia esula*~~	~~Leafy spurge~~				
~~*Euphorbia oblongata*~~	~~Oblong spurge~~	~~X~~	~~X~~	~~X~~	~~X~~
~~*Euphorbia terracina*~~	~~Geraldton carnation weed~~				
~~*Fallopia japonica*~~	~~Japanese knotweed~~			~~X~~	~~X~~
~~*Festuca pratensis*~~	~~Meadow fescue~~			~~X~~	~~X~~

~~Scientific Name~~	~~Common Name~~	~~Species Reported (X) to Occur in:~~			
		~~District~~	~~San Mateo County~~	~~Santa Clara County~~	~~Santa Cruz County~~
~~*Gazania linearis*~~	~~Gazania~~	~~X~~	~~X~~	~~X~~	
~~*Gunnera tinctoria*~~	~~Chilean gunnera~~				
~~*Halimodendron halodendron*~~	~~Russian salt tree~~				
~~*Helichrysum petiolare*~~	~~Licorice plant~~				
~~*Hypericum canariense*~~	~~Canary Island St John's Wort~~		~~X~~		~~X~~
~~*Isatis tinctoria*~~	~~Dyers woad~~				
~~*Lepidium appelianum*~~	~~Hairy whitetop~~	~~X~~	~~X~~	~~X~~	
~~*Lepidium campestre*~~	~~Field pepper grass~~		~~X~~		
~~*Ligustrum lucidum*~~	~~Glossy privet~~				
~~*Ligustrum ovalifolium*~~	~~California privet~~		~~X~~		
~~*Limonium ramosissimum*~~	~~Algerian sealavender~~		~~X~~	~~X~~	
~~*Linaria genistifolia ssp. dalmatica*~~	~~Dalmatian toadflax~~		~~X~~		~~X~~
~~*Linaria vulgaris*~~	~~Butter and eggs~~			~~X~~	
~~*Lonicera japonica*~~	~~Japanese honeysuckle~~		~~X~~		~~X~~
~~*Lythrum salicaria*~~	~~Purple loosestrife~~		~~X~~		~~X~~
~~*Nassella formicarum*~~	~~Andean tussockgrass~~				
~~*Nassella tenuissima*~~	~~Finestem needlegrass~~		~~X~~	~~X~~	~~X~~
~~*Oenothera sinuosa*~~	~~Wavy-leaved gaura~~		~~X~~	~~X~~	~~X~~
~~*Oenothera xenogaura*~~	~~Drummond's gaura~~		~~X~~		~~X~~
~~*Onopordum acanthium*~~	~~Scotch cottonthistle~~				

~~Scientific Name~~	~~Common Name~~	~~Species Reported (X) to Occur in:~~			
		~~District~~	~~San Mateo County~~	~~Santa Clara County~~	~~Santa Cruz County~~
~~*Onopordum Illyricum*~~	~~Illyrian thistle~~			~~X~~	
~~*Paspalum urvillei*~~	~~Vasey's grass~~	~~X~~		~~X~~	
~~*Persicaria wallichii*~~	~~Himalayan knotweed~~				~~X~~
~~*Polygonum aubertii*~~	~~Bukhara fleeceflower~~				
~~*Pyracantha coccinea*~~	~~Scarlet firethorn~~				
~~*Pyracantha crenulata*~~	~~Nepalese firethorn~~				
~~*Ricinus communis*~~	~~Castor bean~~		~~X~~	~~X~~	~~X~~
~~*Rubus laciniatus*~~	~~Cut leaved blackberry~~				
~~*Rumex dentatus*~~	~~Toothed dock~~				
~~*Rytidosperma penicillatum*~~	~~Purple awned Wallaby Grass~~		~~X~~	~~X~~	~~X~~
~~*Saccharum ravennae*~~	~~Ravennagrass~~				
~~*Sapium sebiferum*~~	~~Chinese tallowtree~~				
~~*Scolymus hispanicus*~~	~~Golden thistle~~		~~X~~	~~X~~	
~~*Senecio jacobaea*~~	~~Tansy ragwort~~				~~X~~
~~*Senna multiglandulosa*~~	~~Glandular cassia~~			~~X~~	
~~*Sesbania punicea*~~	~~Rattlebox~~			~~X~~	
~~*Solanum carolinense*~~	~~Carolina horse nettle~~				
~~*Solanum rostratum*~~	~~Buffalo berry~~				~~X~~
~~*Spartina alterniflora*~~	~~Salt water cord grass~~				
~~*Spartina densiflora*~~	~~Dense flowered cord grass~~		~~X~~		

~~Scientific Name~~	~~Common Name~~	~~Species Reported (X) to Occur in:~~			
		~~District~~	~~San Mateo County~~	~~Santa Clara County~~	~~Santa Cruz County~~
~~*Spartina patens*~~	~~Salt meadow cord grass~~				

~~Notes:~~

~~Species list and occurrences compiled from the Bay Area Early Detection Network (BAEDN) Priority Weeds and CalFlora (2013), District Weed List. Records of occurrence shown below may be extirpated, but indicate some likelihood of current or future occurrence on District properties~~

~~STAFF TRAINING~~

~~Early detection monitoring can be accomplished by staff, volunteers, park patrons, or contractors. The utilization of existing natural resource management and maintenance staff and volunteers provides the best value for the District. With limited training, existing staff resources can be utilized and repurposed for early detection monitoring at minimal additional cost although it will not be a comprehensive effort. Refer to Chapter 3, Section 3.6 for a more detailed description of planned IPM trainings.~~

~~In a world with millions of species, detecting a new arrival can sometimes be a challenge since very few people have adequate training to identify foreign and unfamiliar species. However, there is potential to train staff and volunteers familiar with District habitats to notice and report when species are found that appear unusual or out-of-place. In addition to new invasive species, other resource management targets such as rare plants and animals may also be discovered through this type of observation.~~

~~The following techniques should be implemented to support an effective early detection program:~~

- ~~**Develop a simple invasive species identification guide for use by laypeople.** Include invasive species currently known to occur in District preserves (Table 10-2), as well as "Watch List" species known to occur in the regions (Table 10-4). The identification guide should include photographs (several life stages), life cycle, and associated habitats. As funding and staffing allow, update this identification guide over time to ensure its usefulness in EDRR efforts. The IPM Coordinator will coordinate regularly with local agencies who track and monitor invasive plants in the region, such as California State Parks, San Mateo/Santa Clara Weed Management Areas, and BAEDN.~~
- ~~**Train permanent and seasonal Rangers, Open Space Technicians, volunteers, and contractors in using electronic and/or paper weed mapping methods.** Practice data collection with staff and volunteers so data recording and processing is consistent. Start with basic paper mapping methods, which can be suitably accurate, easier, and cheaper to manage than digital systems. Enter this information into the District' Pest Database.~~
- ~~**Develop simple workflows that incorporate all District departments/staff that perform pest control.** Develop a methodology to receive and organize weed mapping information so none is lost or forgotten. Consider ways to incorporate this information into existing forms or maps to keep things simple and reduce paperwork.~~
- ~~**Produce and post baseline weed maps for each preserve at field offices** so staff can stay informed about current populations and make updates in real-time directly on maps.~~

- ~~**Ensure that data collection methods are relevant to partner organizations** such as California State Parks, San Mateo/Santa Clara Weed Management Areas, and BAEDN so the information can be shared with other cooperating agencies.~~
- ~~**If using volunteers, support a specialized group of committed individuals that receive training for invasive species identification and mapping activities.** Ensure the goals for use of volunteers in this capacity are clear and that the resulting data generated by the volunteers is useful to District staff.~~

~~RAPID RESPONSE STRATEGIES~~

~~Small infestations of invasive species generally offer the greatest number of treatment method options for successful eradication. Many times, hand removal of individuals is the control method with the greatest selectivity and cost effectiveness with the least amount of indirect impacts. Individual specimens or small patches identified incidentally or during regular monitoring can often be immediately removed. For vegetation removal, hand digging, cutting, or pulling are all examples of selective hand removal. For vertebrate species, hand removal usually means trapping or shooting. Small-scale removal is most effective on newly-established and small populations with limited distributions.~~

~~Pesticides may also be an efficient treatment method for rapid response actions. In some cases, a specific pesticide may be identified to abate an immediate invasive species hazard when it is found. Pesticides may be especially effective for species where hand removal actions are impractical (e.g., steep cliffs) or where hand or mechanical removal methods would risk spread of the species (e.g., where plants that can spread from broken root fragments). It is critical that herbicides be on the List of Approved Pesticides (Appendix A) so there is no delay because of the approval process for implementing a rapid response.~~

~~In all cases, the District will map the occurrence before control, and then revisit the control site several times to ensure full control was achieved. Eradication may require multiple visits in a year, or possibly multiple years of monitoring and treatment.~~

8.6 Damage Assessment

Staff will determine what, if any damage to the natural area and its natural resource value, has resulted from the presence of the pest species. To the extent possible, quantify the damage (in acres, square feet, or numbers of occurrences affected) and qualitatively describe the perceived damage in its context. As an example, a staff person could determine that a certain percentage of the District's native perennial grassland acres are infested with yellow star-thistle, a target pest species, resulting in displacement native species and degradation of a large percentage of the natural resources on District lands. Ultimately, the District's goal is to maintain the long-term stability and resiliency of its natural areas, therefore damage assessments must consider the long-term effects of the pest infestation.

8.7 Tolerance Levels/Thresholds for Actions

Tolerance levels vary greatly for invasive species; some species have much greater impacts on the environment than others, or they may be so completely mixed with native species such that control methods would result in unacceptable damage to native habitats or rare species, or simply be technologically impossible. The District's IPM approach for invasive species begins with establishing site-specific conservation goals, leading to a determination of the targeted actions with which specific individuals or populations can be managed to achieve the stated goals.

Tolerance levels and treatment methods for invasive species are based on the potential of the invasive species to degrade wildlife habitat and other natural resource values such that the long-term stability and resiliency of its natural areas are compromised. To do so, staff must consider worker health and safety, visitor safety, and the technical feasibility of meaningful control (i.e., a cost/benefits analysis). Because many of the District's invasive species populations are present across multiple preserves or present throughout the entire region, scale is an important variable in determining the feasibility and need for control and the selection of a treatment method. Unlike pest management in structural landscapes, invasive species tolerance levels must factor in the scale at which a management tool is both appropriate and effective. Treatments such as hand removal may have minimal negative unintended impacts when a few individuals are removed, but substantially greater impacts (e.g., soil erosion or damage to non-target species, injury to staff) when the same treatment is applied to large areas. Similarly, the control of large populations of invasive plants using mechanical control methods can be cost prohibitive, impractical, and dangerous. The population size and habitat conditions for which each management technique is useful and appropriate is discussed for each section below. Tolerance levels not only differ by species, but also location and spatial scales. All treatment method selections will balance the net negative impacts to the natural environment, safety of the public, District workers and contractors, and the visitor experience.

Establishing tolerance level for insipient and widespread invasive plants in common, widespread natural communities (e.g., yellow star-thistle in annual grasslands or French broom in oak woodlands) will be established on a case-by-case basis by comparing the anticipated benefit against the cost and potential for success of the target invasive control efforts. As an example, tolerance levels for French broom in oak woodlands will be determined based on the total amount of infested areas within total oak woodlands on the subject preserve. As a general rule of thumb, the tolerance level for invasive plants will be exceeded where infestations exceed more than 10 percent of the total amount of a sensitive vegetation type, or 25 percent of the total amount of a common vegetation type. When tolerance levels are exceeded, District staff will then assess if active control is feasible by conducting a quick cost/benefit analysis. If staff determines that control is technically feasible and can be accomplished using existing staff and budgeting parameters, an Individual Pest Plan will be prepared (Chapter3). If however, available pest control options are not likely to be successful, staff may elect not to implement active pest control.

For federal and state listed species, certain protections are required under the state and federal Endangered Species Acts~~,~~ (ESAs), and tolerance levels will be linked to compliance with the ~~ESA's~~ ESAs. For wetlands, tolerance levels are linked to federal regulations under the federal Section 404 Clean Water Act and to state regulations as described in Section 401 Clean Water Act and in the Porter-Cologne Act. For natural communities, tolerance levels will be related to degree of rarity in the region (as indicated by experts such as the state California Natural Diversity Database, California Native Plant Society, and local experts); the relative rarity of the community on District lands; the technical and cost feasibility of the pest to be controlled; and the sensitivity of the natural community to pest damage.

Following procedures outlined in this Chapter, District staff will qualitatively and quantitatively determine the degree of pest damage to the natural resource, then determine if action is warranted.

8.8 Treatment Options

When all other options for preventing or actively reducing pest population levels to below specified tolerance levels have been exhausted, District staff will determine treatment options. Because natural area pest control (typically control of invasive plants) is one of the most expensive and time-consuming aspects of District preserve management, special attention will be given to selecting proven, technically feasible, and cost-efficient least environmentally disruptive and harmful pest control solutions. Refer to Chapter 3 for project prioritization procedures intended to maximize the effectiveness and efficiency of District pest control actions.

Staff will evaluate pests in natural areas as follows:

- Pests will be treated (eradicated or controlled) when their presence could directly threaten the health and safety of visitors and staff.
- For pest infestations that are affecting listed species, pest species will be treated to comply with state and federal ~~Endangered Species Acts~~ ESAs, and tolerance levels will be linked to compliance with the ESAs.
- For pests in wetlands, pest species will be treated to comply with the Federal Section 404 Clean Water Act, and state wetland regulations as described in Section 401 Clean Water Act and in the Porter-Cologne Act.
- Pest species may be considered for treatment (eradicated, controlled, or contained) if and when District staff determines that their presence is likely to result in the loss of the long-term stability and resiliency of the natural areas as a whole.
- Pest species may be considered for treatment (eradicated, controlled, or contained) if and when District staff determines that the pest could displace or degrade individual natural resources (e.g., where the presence of an invasive species is displacing a rare plant or animal population).

  - For natural communities, tolerance levels will be related to the sensitivity of the natural community to pest damage and the degree of rarity of the individual natural community in the region (as indicated by experts such as the state California Natural Diversity Database, California Native Plant Society, and local experts).
  - For native species, tolerance levels will be related to the sensitivity of the individual species to pest damage and the relative rarity of the individual species in the region or on District preserves. (Note: rarity to be determined by experts such as the state California Natural Diversity Database, California Native Plant Society, and local experts)
- Pest species may not receive treatment when their presence is not likely to result in the loss or severe displacement or degradation of natural resources and/or when treatment is considered technically infeasible, unsafe, or harmful to the environment.

If the target pest exceeds specified tolerance levels, the District will begin to investigate pest control options. This includes the following general steps involved in pest control planning:

- Delineate a project area;
- Determine pest control objectives;
- Identify any dispersal routes or mechanisms that may have helped the pest enter or spread onto district lands;
- Identify a range of possible pest control options using information presented below;
- Select a preferred pest control approach;
- Prepare an individual pest management plan (if necessary, see Chapter 3);
- Implement the selected pest control approach; and
- Using adaptive management, monitor, report (see Chapter 3) and adjust the selected pest control approach to achieve project objectives.

8.8.1 Invasive Animals in Natural Lands

Skunks, Opossums, and Raccoons

Skunks, opossums, and raccoons can be nuisances in natural lands, in addition to buildings as discussed in Chapter 5, due to their digging and foraging behaviors, which can disturb soils, damage native vegetation, and degrade natural lands. Skunks, opossums, and raccoons also prey on sensitive wildlife, are attracted to human food sources that increase conflicts, and can damage infrastructure such as trails; additionally, their presence can raise disease risks and lead to unsafe human–wildlife interactions. CDFW regulates these species as nongame or furbearer animals so they all may be controlled without permits if found causing nuisance problems.

Pest Management Strategies for Skunks, Opossums, and Raccoons

Physical Control

Box and Cage Traps. Install one-way door, live box, or cage traps. Trap design varies but solid wall traps are preferred for skunks to shield the trapper from skunk spray during the control operation. The use of live trapping methods ensures that non-target animals can be released unharmed. Current California Department of Fish and Wildlife (CDFW) trapping regulations require that trapped animals are either released immediately or euthanized, live animals may not be relocated without a permit from CDFW.

Chemical Control

Currently there are no toxicants or fertility control agents available in California for these species.

Non-Native Fish

Known species of non-native fish in the District include black bass (*Micropterus* sp.), sunfish (*Lepomis* sp.), catfish (*Ameiurus/Ictalurus* sp.), and mosquitofish (*Gambusia* sp.) ~~(Anderson, 2013)~~ (Tokatlian 2026b). These species are generally found in man-made stock ponds and reservoirs but some also occur in natural sag ponds. The District does not actively manage non-native fish in man-made water bodies unless the water body also supports protected native species such as the California red-legged frog. In special cases where protected species are present, ponds are typically drained for sufficient time to eliminate all non-native fish species and then refilled. As most non-native fish species are managed as game fish by the CDFW, special permits are typically obtained for their control.

Bullfrogs

The American bullfrog (*Rana [Lithobates] catesbeiana*) is a large, brilliant green amphibian that is native to eastern North America. Its natural range does not extend west of the Rocky Mountains and Great Plains, but it is an increasingly common invasive animal in the western United States. Bullfrogs are sold throughout the world as food, pets, fish bait, and for educational purposes. They sometimes become unwanted pets or escape from frog farms and grocery stores, and as a result have readily established themselves in all suitable habitats throughout California.

Bullfrogs are classified by the CDFW as a game amphibian and are regulated by state fishing regulations. As a game amphibian, commercial and sport collection is permitted with commercial and sport fishing licenses, but individuals cannot be controlled as an invasive species unless they are specifically ~~utilized~~ used for a purpose (i.e., wanton waste is prohibited by statute). State fishing regulations do not include any depredation conditions, so all bullfrog control efforts and programs require a specific Memorandum of Understanding or Special Permit from the CDFW (Tokatlian 2026a). ~~(Kasteen, pers. comm., 2013)~~.

American bullfrogs are most problematic in the District because they directly affect the federally Threatened California red-legged frog (*Rana draytonii*) and San Francisco garter snake (*Thamnophis sirtalis tetrataenia*)- (Lawler et al. 1999; Kim et al. 2021). In habitats where they exist together, large, overwintering bullfrog tadpoles can compete with California red-legged frog tadpoles or even consume them directly. Adult bullfrogs consume California red-legged frogs in all forms (i.e., as tadpoles, metamorphs, or as adult frogs), in addition to other native wildlife species such as newts, salamanders, garter snakes, birds, and bats. Their voracious appetites have been implicated in the declines of many North American amphibian species.

In addition to competition and predation, bullfrogs spread chytrid fungus – a lethal skin disease known as chytridmycosis that impacts many of California's native amphibians (Schloegel et al. 2009). Chytrid fungus is a non-native fungal pathogen from Asia that has spread resulting in amphibian population decline all over the world. Because bullfrogs are domestically raised for food and educational purposes worldwide, many that are imported to California each year carry the chytrid fungus from unregulated foreign frog farms. As these individual frogs are accidentally or intentionally released into the wild, they help to spread the fungal disease throughout native amphibian populations.

~~Pest Management Strategies for Bullfrogs~~

Prevention and control of American bullfrogs is discussed below. Tolerance levels and treatment methods are also outlined in Table 8-2.

Prevention

- **Education.** Education can be an important tool for the District in preventing captive frogs from being intentionally released onto District lands. Some people feel ethically motivated to release captive pets and food animals back into natural environments for humane reasons or when they no longer wish to care for them. Public outreach and judiciously placed educational materials such as signs and brochures in District preserves with wetlands may be a useful strategy to curb intentional releases of animals.
- ~~**Fencing.** Exclusionary fencing to keep bullfrogs from entering non-infested wetlands is a temporary tool for use while other control methods are applied concurrently. Fencing is not considered a long-term solution because it disrupts movement of other wildlife, can entrap non-target wildlife species, and may disrupt the natural processes of the wetlands. Exclusionary fences are useful during pond draining to limit the potential for dispersal of bullfrogs out of the treatment area. Exclusionary fencing may also be used in conjunction with funnel traps to collect bullfrogs as they attempt to disperse from drying ponds.~~

Physical Control

- **Gigging or shooting.** Gigging or shooting American bullfrogs (a pest species not native to California) are two methods that are implemented with small caliber air rifles and lead-free ammunition to eliminate individual adult bullfrogs. Gigging is the targeted spearing of fish or frogs with barbed tines mounted on a long pole. Both gigging and shooting are effective and humane methods for selective removal of target adult bullfrogs. However, this treatment method alone will rarely eradicate bullfrogs from the target area because only a portion of adults are usually found, and it does not control eggs or larval stages. Some studies have indicated that adult metamorph removal (i.e., removal of immature bullfrogs) is the most economical removal method for population suppression (Govindarajulu et al. 2005). Egg masses can also be collected to remove additional life stages at the appropriate time of year.

- **Trapping.** Submerged funnel traps and floating cage traps can be used to control different life stages of American bullfrogs. Funnel traps designed for catching baitfish can be used to live capture bullfrog tadpoles. Floating cage traps have been successfully used to catch adult frogs. Trap designs for bullfrog removal are relatively recent and mainly rely on modifying Australian cane toad traps. Methods designed to trap multiple life stages of frogs in parallel have proven to be effective for bullfrog management (Snow and Witmer 2011). Though trapping is a recently developed treatment method for bullfrogs, it may be effective especially where other sensitive amphibian species are present to which impacts must be avoided.
- **Electrical currents.** Use of electrical currents (electroshocking) to temporary disable frogs in netting and gigging operations have proved to be effective in some control programs (Orchard 2011). Twelve volt (12v) direct current (DC) electroshockers that are typically used in fisheries management are mounted either on small boats or on backpacks, then the electroshock current applied to the surface of the wetland. This treatment is non--specific, and will affect all aquatic species within the range of the electroshocking 'wand'. Electroshocking is not lethal, rather it shocks and lifts the affected individuals to the surface where they can be netted or otherwise collected. This treatment method, therefore, must be followed by another treatment method such as hand removal or gigging. Even with follow-up control of individuals found by electroshocking, this treatment method alone will rarely eradicate bullfrogs from the target area because only a portion of adults are usually found, and it does not control eggs or larval stages.
- **Habitat Manipulation.** Pond draining is one of the most common methods used for bullfrog control in California, especially in projects where protected species may be present such as the native California red--legged frog. American bullfrogs need a perennial water source to complete their lifestyle. In contrast, California red-legged frogs only need water during their breeding cycle. The *USFWS California Red-legged frog Recovery Plan* and others recommend draining ponds that contain both bullfrog and California red-legged frog species every other year to reduce the habitat suitability for bullfrogs (Gray 2009).Type conversion of permanent stock ponds to ephemeral wetlands can also reduce bullfrog populations across a landscape scale.
- ~~**Exclusionary Fencing.** The District may install exclusionary fencing to keep bullfrogs from entering non-infested wetlands as a temporary preventive tool for use while other control methods are applied concurrently. Fencing is not considered a long-term solution because it disrupts movement of other wildlife, can entrap non-target wildlife species, and may disrupt the natural processes of~~

~~the wetlands. Exclusionary fences are useful during pond draining to limit the potential for dispersal of bullfrogs out of the treatment area. Exclusionary fencing may also be used in conjunction with funnel traps (described below) to collect bullfrogs as they attempt to disperse from drying ponds.~~

Chemical Control

No toxicants or fertility control treatments are registered for use in controlling bullfrogs in California (Table 8-2).

Table 8-6 Treatment Methods for American Bullfrogs

Pest Category	Treatment Method Thresholds	Timing	Treatment	Treatment Constraints
American Bullfrogs	Incipient: < 25 individuals	Adults present in breeding ponds (February - ~~July~~ October)	Hand removal of adults; gigging, shooting adults and metamorphs, dipnet collection of larvae, egg mass collection	Small populations - accessible water bodies only
	Medium - Expanding Population	Adults and juveniles present in breeding ponds (February - August)	Funnel and cage trapping~~,~~ ~~exclusionary fencing~~	Requires combined trapping of tadpoles and adults
	Large - established populations in managed ponds	Adults present in breeding ponds (April - October)	Pond draining ~~with exclusionary fencing~~	Not possible in wetlands or where other natural resource may be damaged by draining

Other Non-Native Amphibians and Reptiles

Several species of non-native turtles are known to occur in District ponds and water bodies. These species are common food items for Bay Area ethnic communities and/or pet species. The red-eared slider (*Trachemys scripta elegans*) is the most common species known to occur within the District and an eastern snapping turtle (*Chelydra serpentina serpentina*) ~~has~~ and river cooter (*Pseudemys concinna*) have been documented in at least one District pond. Red-eared sliders are managed as game fish species and snapping turtles are a restricted species in California. The District does not actively manage red-eared sliders unless the water body also supports protected, native species such as California red-legged frogs. The District will attempt to trap non-native turtles and remove them in compliance with CDFW when they share habitat with protected, native species. The District will attempt to trap restricted amphibian and reptile species in compliance with CDFW~~.~~, and send applicable species to wildlife sanctuaries, as appropriate. Traps are designed specific to the target species and meant to capture the turtles without harm. Traps are checked daily for release and documentation of any native species and removal of any non-native species. A qualified biologist determines if any native species are present in the trapping area and consults with CDFW and USFWS if special-status species are present. A qualified biologist complies with CDFW recommendations for restricted species since they are illegal to possess in California without a special permit. In special cases, ponds are drained for sufficient time to collect and eliminate non-native amphibian species (in compliance with ~~CDFW~~ the Fish and Game Code) and then refilled. See information on pond draining presented above for bullfrogs.

Feral Pigs

Feral pigs (*Sus scofra*) are one of the most destructive wildlife species in California and continue to expand their range throughout the entire United States. Feral domestic and wild Eurasian pigs are not native to North America but have been introduced in multiple events. These wild pigs have hybridized to become unique, abundant invasive pests in California, and they are thought to be one of the most prolific large mammals on earth (West et al. 2009)

Any pig living unassisted in the wild in California is classified as a game animal by current ~~CDFW~~ the Fish and Game Code, which regulates the sport harvest of game animals in California. Pigs have extremely generous allowable methods of sport take, and can be harvested year-round in unlimited quantities with a hunting license and valid pig tag. Because they are also regulated as an agricultural pest in California by the USDA – APHIS Wildlife Damage Control Services and the CDFA, their management is often regulated by depredation permits from the CDFW. These permits can be obtained by private growers, ranchers, or other landowners and public agencies when proof of economic damage can be documented to the CDFW.

Pigs are mammals that are capable of extremely high reproductive rates when environmental conditions are favorable. In California's Coast Ranges, they can reach high populations densities because of cool weather, year-round access to water, and food (including acorns, a favored food source) through the winter months. Their invasive potential is largely because of their ability to quickly increase population size; they reach sexual maturity at young ages, females can have multiple litters each year, and natural mortality rates are generally low with few native predators. They can also disperse over large distances to invade new habitats and so cannot be managed effectively on a local basis.

Pigs cause damage to California agriculture and native fish and wildlife. Their destructive rooting behavior is visible in many natural areas. Rooting increases erosion and soil sedimentation, decreases water quality, directly reduces native plant species (e.g., ingestion of tubers, acorns), and promotes the establishment of non-native and invasive plants in disturbed soils (Kotanen 1995; Seward et al. 2004). They also create competition for food resources that would normally be consumed by native wildlife (especially winter acorns), spread disease to wildlife, and consume ground nesting birds, reptiles, amphibians, and small mammals (Barrett 1982; Conservation Biology Institute 2009). Feral pigs also cause significant crop damage through the direct consumption and damage to crops, transmission of disease to livestock, and other damages to property and agricultural infrastructure (U. S. Department of Agriculture 2011). The District has in the past conducted feral pig predation under a CDFW permit.

Pest Management Strategies and Wild Pigs

Under the direction of the California Department of Fish and Wildlife, the District has developed a management program to capture feral pigs using baited traps and humane termination (shooting). As part of the program, the District coordinates with other regional land management agencies that are controlling feral pig populations.

~~Since 2000, over 300 feral pigs have been dispatched and~~ Feral pig rooting, damage, and sightings have substantially decreased on District lands in recent years. Prevention and control of feral and wild pigs is discussed below. Tolerance levels and treatment methods are also outlined in Table 8-3.

Table 8-7 Treatment Methods for Feral and Wild Pigs

Pest Category	Treatment Method Threshold	Timing	Treatment	Treatment Constraints
Feral ~~&~~and Wild Pigs	Incipient: ≤ 2 individuals	Year-round	Shooting incidentally observed individuals	Not possible in heavy visitor use areas
	Medium to large populations	Year-round	Cage and corral trapping program	--

Prevention

- **Fencing.** Exclusion of pigs with pig-proof fencing can be effective in preventing high value areas from being invaded by pigs. Fencing must be maintained annually to be effective. Pig-proof fencing is usually very expensive to install and maintain and also has the possibility of restricting the movement of native animal species. It is an effective strategy for protecting extremely high value natural areas, agricultural lands, or archeological sites in small areas.

Physical Control

- **Shooting.** Shooting (either hunting or professional depredation) is the most common method for feral pig control throughout California (CDFW n.d.) Though state sport hunting is regulated in such a way to offer some control of pig populations, there can still be a population increase above target levels because pigs often change their behaviors to avoid hunting pressure. Permitted depredation hunting with the assistance of tracking dogs or using nighttime vision aids and thermal imaging can increase the effectiveness of managing populations. Shooting methods should only employ lead-free, copper-based ammunition to reduce non-target mortality to pig carcass scavengers. Shooting has limited public appeal in and near recreational facilities and may not be a practical option for the District.

- **Trapping.** Trapping is the most effective means for regulating wild pig populations on a small landscape scale, although it must be done in perpetuity to maintain low population numbers. Cage- or corral-type traps are the most commonly used trap design in California. Snares have been found to be highly successful in Hawaii and Texas. Cage traps function by attracting single or multiple pigs into traps with bait through a one-way or guillotine trap door. Since pigs have large home ranges and they can disperse over large landscapes, effective trapping must focus on areas pigs are actively using. This requires the trapper to scout large landscapes or use a network of camera-traps to identify locations where pigs are actively travelling and feeding. Pre-baiting increases the effectiveness of live-catch traps. Trapping requires great effort and costs are typically high, but it is currently one of the most effective methods available for population control. All cage trap and snaring methods must be permitted through the CDFW on a project-by-project basis.

Chemical Control

- **Toxicants.** No toxicants are currently registered for the control of pigs, although some are in development ~~for Federal registration through the EPA (Lapidge 2012).~~ (e.g., warfarin and sodium nitrite) for Federal registration through the EPA (Smith 2020).
- **Contraception.** Currently, no immuno-contraceptives are registered for use on wild pigs although some are in development. The Wildlife Society considers wild pig contraception controls to be impractical in the field (Fagerstone et al. 2002) so they are likely not a viable treatment method for managing feral pigs on District lands.

Feral Pets

As with non-native turtles, domestic animals are sometimes released by preserve visitors, or wander into preserves on their own. Some people feel ethically motivated to release captive pets and food animals back into natural environments for humane reasons or when they no longer wish to care for them. As a result, domestic cats, dogs, rabbits and other species end up living in preserves, and ~~utilizing~~ consuming native rodents, plants, and insects ~~for food~~.

Prevention

~~**Education.**~~ Education can be an important tool for the District in preventing pets from being intentionally released onto District lands. Public outreach and judiciously placed educational materials such as signs and brochures in District preserves may be a useful strategy to curb intentional releases of animals.

Live Capture
~~Utilize~~ Use catch pole or otherwise trap feral dogs, cats, turtles, rabbits and other domesticated animals found escaped or released in the preserves and return them to their owners or turn them over to local animal control departments or animal shelters.

~~8.8.2 INSECT PESTS IN NATURAL AREAS~~

~~In general, insects are considered a natural component of the District's natural areas and do not warrant control. In some limited circumstances, such as restoration of a native habitat through active planting, short term insect control may be warranted (for example, to control stinging insects or Argentine ants within a specified area during clearing or planting to protect worker or volunteer safety, plant health, and promote native insect pollination). For information regarding control of insect pests in natural areas, refer to the Buildings section (Chapter 6).~~

8.8.3 Invasive Plants

The selection of physical control, chemical control, or other treatment methods for the District's target invasive plant species on over ~~60~~ 72,000 acres of terrestrial and aquatic habitats in natural areas, various rangelands, and agricultural properties is an extremely complex task. This document is only intended to summarize generalized options for simplified management scenarios, and to provide decision-making tools for the thoughtful implementation of an IPM strategy. Staff who are selecting a project-level IPM strategy must ~~take into account~~ consider site-specific conditions, detailed life history information for a target invasive plant, project history, an understanding of the native vegetation where these plants occur, the impacts of the target plant, and the feasibility for safe and effective long-term control. Maintaining pest levels below a desired tolerance level will ultimately rely on several integrated methods for various stages of the project; rarely will a single method, pesticide or otherwise, suffice to achieve long-term success.

Annual and Biennial Invasive Plants

Annual plants live for one growing season and germinate from seed. Only the dormant seed bridges the gap between one generation and the next. Biennial plants have a similar life history except they can live for several growing seasons before flowering and death. After germination, many species develop into prostrate (i.e., ground-hugging) basal rosettes. This growth form allows the plant to suppress germination of other plants near its root zone to maximize the solar energy reaching its leaves. After a critical amount of energy is collected and stored in the basal rosette form, the plant initiates its final growth stage and elongates or 'bolts' to produce a flowering stalk. Environmental cues that initiate bolting, flowering, and seed production include changes in day length, light and temperature, soil moisture and other stresses to the plant (California Weed Science Society 2002)~~(Lanini 2002)~~.

Many annual plants, both native and non-native, are considered 'weedy' because they have generalist rather than specialist life history traits. Annuals may be self-fertile or require pollination, or may ~~utilize~~ use a combination of both pollination strategies. Often, invasive plants are highly successful because they produce many viable seeds with or without specialized pollination. In contrast, many native plants rely on specific native pollinators such as solitary native bees and cannot compete with the volume of seed production of invasive plants. Since annuals rely entirely on seed production for survival, the most successful invasive annual plants typically produce tremendous amounts of seeds each year. Many invasive (and native) species also have specialized seed coats that aid in seed dormancy in the soil, allowing the seed bank of a plant to persist in the soil for many years. Seed dormancy allows the plant to germinate only when environmental conditions ideal for growth are present and allows for seedling emergence over several decades instead of just one or a few years. The extended germination period of some invasive species can be problematic for control efforts, as follow-up treatments for new seedlings may be required for many years.

Within District lands there are two main growing seasons for annual and biennial invasive plants: referred to as early season and late season. Early season annuals and biennials germinate, flower, and seed between November and June, while late season annuals and biennials germinate, flower, and seed between February and ~~August~~ September. Common annual invasive plants that the District currently manages include yellow star-thistle (*Centaurea solstitialis*), wooly distaff thistle (*Carthamus lanatus*), and Italian thistle (*Carduus pycnocephalus*). Biennials include purple star-thistle (*Centaurea calcitrapa*) and poison hemlock (*Conium maculatum*).

Perennial Invasive Plants

Perennial plants persist for many growing seasons and have a great diversity of growth strategies. Perennials include ferns, bulbs, herbaceous plants, woody shrubs, and trees. Herbaceous perennial plants typically go dormant, die back, and or lose their leaves each winter and regrow from the root system the following spring. Evergreen perennial plants retain their above-ground stems and leaves throughout their life, except sometimes in cases of extreme stress (e.g., drought). Deciduous perennial plants retain their aboveground stems but lose their leaves seasonally when they are not actively growing. Trees and shrubs are perennial plants with woody stems and can be either evergreen or deciduous.

Understanding the biology and reproduction method of perennials is essential to developing effective control strategies. Perennial plants can have multiple reproduction methods, including seeds, re-growing from vegetation fragments, or resprouting or colonizing from roots. In some cases, species may use a combination of all these reproductive strategies for successful establishment and expansion. Perennial plants can spread vegetatively from many different portions of the plant (e.g., from runners, tubers or bulbs, root fragments) depending on species. Preventing seed production in perennial invasive species that rely exclusively on seeds for regeneration can deplete the existing seed bank, (as with annuals), but this strategy does not address the parent population which must also be controlled. Control of perennial plants often focuses on removal of the roots or other underground storage tissues, where energy reserves are stored. However, this treatment method may result in ground disturbance and/or soil erosion that must also be mitigated or avoided.

Pest Management Strategies for Invasive Plants

Prevention and control of invasive plants is discussed below. Tolerance levels and treatment methods are also outlined in Table 8-4 (Annual Plants), Table 8-5 (Perennial Plants), and Table 8-6 (Aquatic Plants).

Prevention

- ~~Develop and implement~~ Implement an employee and contractor prevention training program~~;~~ (refer to Appendix C for the IPMP BMPs and Section 3.9); include invasive plant identification and cleaning protocols for clothing, tools, and vehicles.
- Inspect recreational facilities (e.g., parking lots, trails, visitor centers) that experience high visitor use often during target invasive plant flowering and seed production times. Treat any detected target invasive plant populations to prevent spread from the facility into the preserves.
- Establish and maintain cleaning and prevention facilities (e.g., boot cleaning stations) and post educational materials in parking lots and trailheads to encourage visitors to clean their boots, socks, pants, etc. before entering District lands.
- If target invasive plants have already begun to flower and set seed before management, consider manual control methods (e.g., cutting and bagging the flower/seed heads) intended to reduce the ~~amount~~ number of new seeds released. This type of active management is only feasible for small populations.
- Prevent the spread of plant fragments (roots, stems) of certain perennial species that can produce new plants from these plant fragments during soil disturbing activities such as trail and road maintenance.

Physical Control

Physical control of invasive plants includes actions that physically remove plants in part or in their entirely, including (but not limited to) hand pulling using weed wrenches; shovels; mechanical controls using brushcutters, chainsaws, mowers, pole pruner, chippers, masticators, and other similar equipment, and other types of control to remove plants such as green flaming (i.e., use of a propane torch on emergent seedlings), or grazing the plant using livestock. These types of controls are described in more detail below.

- **Pulling of individual plants by hand before flowering and seed development**. Given the stout taproot of many annuals and biennials, it is best to undertake hand removal after regular periods of rain when the soil is moist and the entire taproot can be easily removed. Grasp the plant at the base and pull straight up.
- **Leaving the portion of the root deeper than a quarter to a half inch below the surface is usually acceptable for annual species as they are not likely to re-sprout from a remaining root fragment.** Digging tools can also be used to loosen the root out of the soil, however, limit the amount of soil disturbance as much as possible.

- **Cutting plants below the root crown with a pick or shovel before flowering or seed set** (to be applied only to crown-sprouting plant species). Perennial invasive plants with large amounts of vegetative material are often ~~be~~ easier to control once the mass of above-ground vegetation is cut to near-ground level (e.g., large perennial grasses and shrubs) to improve access to the root system. For plants that can regenerate from underground root fragments, root and/or stem material ~~would~~ will be carefully collected, then disposed of in compost or garbage offsite or completely covered (composted, solarized) onsite to prevent it from re-establishing onsite.
- **Mowing of late season annuals/biennials when a very small percentage of plants are beginning to flower**. Mow as close to the ground as is safe (hitting rocks with mowing equipment may cause sparks and risk ~~start~~ starting a fire). Follow-up mowing may be required at four- to six-week intervals. Mowing early season annuals/biennials, or mowing late season annuals/biennials too early will likely result in resprouting and formation of multiple flowering stalks during bolting (thereby increasing seed production).
- **Green flaming of young seedlings with a hot propane flame immediately following germination**. This method is typically applied in early winter, during or immediately after a rain event to reduce potential for wildfires. ~~Green, referred to in this report as "green~~"Green flaming" is only effective on some species of non-fire adapted herbaceous and shrub species (dicots), and it is not effective on grasses (monocots).
- Selective grazing to remove or suppress some species when grazing is timed for periods when the plants are both palatable to the selected type of livestock (e.g., goats for brush, cattle or sheep for grasses) and susceptible to grazing effects (i.e., when plants are very young and do not have substantial underground energy reserves built up to support re-sprouting).
- **Hand removal of small insipient populations of perennial invasive plants**. Hand-removal of mature plant parts ~~would~~ will be accomplished using a weed wrench, or by digging up individual plants, including as much of the root system as possible. Multiple re-treatments ~~would~~ will be required for the control of most invasive perennials, because their root systems are often large and challenging to pull manually and many species have regenerating roots, stolons, and rhizomes that can break off during the removal effort and regrow. Digging can also promote soil disturbance, a secondary effect that can promote the germination of new seedlings in disturbed soils areas.
- **Burning to reduce ~~greenwaste~~ green waste**. After large stands of broom are pulled, the green plants ~~would~~ will be stacked in piles no greater than six feet by six feet to dry out. The piles ~~would~~ will be located on mineral soils with a 4-inch by 12-foot wide trench to catch debris and ~~would~~ will not be located under the drip line of trees. Brush piles ~~would~~ will be burned during the wet season on days that the Bay Area Air District (Formerly the Bay Area Air Quality Management District~~-~~

~~(BAAQMD~~) designates as "open burn status" and the piles ~~would~~ will be monitored to ensure that all combustible material is consumed before leaving the site. Open Burning Regulation 5 Notification Form ~~C for Hazard Reduction Fires would~~ will be filed with the ~~BAAQMD~~ Air District, and all conditions of ~~Hazard Reduction Fires per BAAQMD~~ the Air District regulations ~~would~~ will be followed.

- **Use of tractor-mounted implements**. Jawz is a hydraulic implement mounted onto an excavator or other tractor. Opposing jaws pinch the stalk of the plant and the arm of the excavator pulls the plant out by its roots and then drops it in a pile for future burning, chipping, or composting. The use of Jawz ~~would~~ will be limited in steep terrain and areas where there is excessive soil. Removal of coyote brush is the most common species that Jawz are used for on District lands.
- **Use of a masticator for brushing**. A masticator is a high-rotation drum with fixed teeth mounted on the hydraulic arm of an excavator that pulverizes vegetation. A masticator ~~would~~ will be used for structure brushing, road brushing, parking lot brushing, fuel breaks, and brush removal in grasslands. The masticator ~~would~~ will cut vegetation ranging from grass to 6-inch diameter trees and can reach up to 22 feet horizontally. Masticators leave behind mulch and pieces of shattered wood up to approximately 12 inches long and can require, depending on vegetation, follow-up use of chainsaws by field staff. Use of a masticator ~~would be~~ is limited by terrain and soil moisture (i.e., soft ground). A masticator ~~would~~ will be used less than four miles per year.

Biological Control

Hairy weevils are used as biocontrol insects for yellow star-thistle, which involves the release of approximately 20,000 hairy weevils (*Eustenopus villosus*) on approximately 800 acres per year at Fremont Older, Monte Bello, Rancho San Antonio, Russian Ridge, Skyline Ridge and St. Joseph's Hill and possibly biocontrol at other preserves in the future. This form of biocontrol is intended to control seed production of yellow star-thistle. Selected areas are typically heavily infested with yellow star-thistle, and other forms of control were determined to be infeasible due to site access limitations, labor costs or staffing safety issues. In these instances, biocontrol is intended to keep the infestations from spreading or becoming denser, until such time as other methods can be ~~utilized~~ used.

Table 8-8 Treatment Thresholds and Methods for Annual and Biennial Invasive Plants

Pest Category	Treatment Method Thresholds	Phenology	Timing	Treatment	Treatment Constraints - Assets
Annual/Biennial Invasive Plants	Incipient/small: < 100 individuals	Basal rosette or bolting before seed production	February - May	Manual (Hand removal)	Use for small infestations only; worker hazards may occur when applied at larger scales

IPM IN NATURAL LANDS

Pest Category	Treatment Method Thresholds	Phenology	Timing	Treatment	Treatment Constraints - Assets
	Small to medium: <5 acres	Bolt stage – flowering	March - June	Cutting (Mowing)	Not effective on most species - especially not biennials; to be used for suppression/containment goals only
	Small to medium: <5 acres	Early seedling - from germination to appearance of first true leaves	November-January	Propane Torch (Green Flaming)	Narrow timing window; only appropriate for sparse vegetation with low ignition potential. Usually applied during rain events to reduce wildfire risk.
	Medium to large: >5 acres	Seedling to pre-flowering grasses	December-April	Herbicide: clethodim	Highly selective to monocots only; rate selective for annual grasses only
		Seedling stage through late flowering/bud stage	December-April	Herbicide: glyphosate IPA and glyphosate k	Spot treatments; non-selective
		Pre-germination to flowering stage	November-July	Herbicide: imazapyr (pre/post emergent)	Spot treatments where residual control of seedlings is desired; non-selective
		Ranging plant size	March-November	Herbicide: triclopyr BEE (post emergent)	Spot treatment for control of annual and perennial broadleaf weeds and woody plants
		Ranging plant size	Anytime	Herbicide: triclopyr TEA (post emergent)	Spot treatment for control of annual and perennial broadleaf weeds and woody plants
	Large: >5 acres	Pre-germination to dicot seedling stage	December-February	Herbicide: aminopyralid (pre/post emergent~~-~~)	Moderately selective for specific dicot plant families only; promotes grass and unaffected dicot species
		Later dicot seedling stages – bolting	January - March	Herbicide: clopyralid (pre/post emergent)	Highly selective for specific dicot plant families only; promotes grass and unaffected dicot species

Pest Category	Treatment Method Thresholds	Phenology	Timing	Treatment	Treatment Constraints - Assets
		Bolt stage – flowering	March - June	Grazing	Effective on only some species; effectiveness varies by stock type, grazing season, grazing rotation, and intensity
		Ranging plant size	March-November	Herbicide: triclopyr BEE (post emergent)	Spot treatment for control of annual and perennial broadleaf weeds and woody plants
		Ranging plant size	Anytime	Herbicide: triclopyr TEA (post emergent)	Spot treatment for control of annual and perennial broadleaf weeds and woody plants

Table 8-9 Treatment Thresholds and Methods for Perennial Invasive Plants

Pest Category	Treatment Method Thresholds	Phenology	Timing	Treatment	Treatment Constraints - Assets
Perennial Invasive Plants	Incipient/small: < 100 individuals	Herbaceous perennials seedling to mature	Any time	Manual (Hand removal)	Use for small infestations only; worker hazards may occur when applied at larger scales
	Incipient/small: woody plants with trunk diameter < 2”	Woody plants/trees - Seedling to mature	Any time	Manual (Digging - Leveraged Pulling)	Use for small infestations only; worker hazards may occur when applied at larger scales
	Small to medium: < 5 acres	Flowering to bud stage	December-July	Cutting (Mowing)	Not effective on most species; for suppression/containment/pre-treatment goals only
	Small to medium: <5 acres	Early seedling – from germination to appearance of first true leaves	November-January	Propane Torch (Green Flaming)	Narrow timing window; only appropriate for bare ground areas with no ignition potential
	Medium to large: > 5 acres	Seedling to pre-flowering grasses	December-April	Herbicide: clethodim	Highly selective to monocots

IPM IN NATURAL LANDS

Pest Category	Treatment Method Thresholds	Phenology	Timing	Treatment	Treatment Constraints - Assets
		Seedling stage OR late flowering/bud stage	December-July	Herbicide: glyphosate IPA and glyphosate k	Spot treatments; non-selective
		Seedling or actively growing	December-June	Herbicide: aminopyralid (pre/post emergent)	Moderately selective for specific dicot plant families only; good for difficult to control vines/brambles
		Seedling or actively growing	December-June	Herbicide: clopyralid (pre/post emergent)	Highly selective for specific dicot plant families only; good for difficult to control vines/brambles
		Pre-germination to flowering stage	November-October	Herbicide: imazapyr	Spot treatments where residual control of seedlings is desired or difficult to control species; non-selective
		Ranging plant size	March-November	Herbicide: triclopyr BEE (post emergent)	Spot treatment for control of annual and perennial broadleaf weeds and woody plants
		Ranging plant size	Anytime	Herbicide: triclopyr TEA (post emergent)	Spot treatment for control of annual and perennial broadleaf weeds and woody plants
	Trees > 6” stump diameter	Actively growing, post-flowering	Anytime	Herbicide: glyphosate IPA and glyphosate k	Spot treatments; non-selective
		Actively growing, post-flowering	Anytime	Herbicide: imazapyr	Spot treatments where residual control of seedlings is desired or difficult to control species; non-selective; basal bark treatments
		Conifers – mature	Anytime	Cutting	Hand methods time consuming; mechanical harvesters for large areas > 10 acres

Chemical Control
Chemical control of annual and biennial weeds includes two strategies to treat different life stages: 1) post-emergent (i.e., direct application of herbicide to eliminate the plant), and 2) pre-emergent (i.e., treatment to prevent the germination of seeds). Herbicides are also classified as either selective or non-selective. Selective herbicides control plants in specific plant families or life stages, while allowing other plants to survive uninjured. ~~Utilizing~~ Using selective herbicides can be a powerful tool in balancing active management with protecting desirable, native vegetation types. Non-selective herbicides and application methods injure all plant species that are directly exposed to treatment, so should be directed only to the target species. Selectivity may be based on the chemistry of the herbicide, but can change with the timing of the application.

- **Aminopyralid**~~, the active ingredient in Milestone™,~~ is a selective herbicide used to control broadleaf invasive plants, especially sunflower and bean plant families. ~~Milestone™ is an EPA Reduced-Risk~~ The pesticide product ~~that~~ is considered to have low exposure risks associated with wildlife and humans, especially in natural areas where exposure levels will be of short duration and low total exposure rates ~~(Appendix A).~~(Table 3-3). Plants in the nightshade, bean, rose, and sunflower families are particularly sensitive to this herbicide. However, grasses are not affected by the herbicide when used after grass seed germination, making it an attractive IPM option for annual plant control in grasslands. Aminopyralid ~~controls plants by disrupting~~ disrupts the normal hormone balance, targeting auxins, and causing uncontrolled growth in susceptible plants. Symptoms of effective aminopyralid application include bending and twisting of stems and petioles, swelling at nodes, stem elongation, leaf curling, chlorosis (yellowing) of growing points, and plant mortality within three to five weeks. Aminopyralid persists in the soil and is absorbed by plant roots, and thus prevents germination of new seeds after an initial treatment. It can be used before an invasive plant species germinates in a known population area, or well after seedlings emerge, making it a nimble tool for invasive species plant control.
- **Clethodim**~~, the active ingredient in Envoy Plus™,~~ is a selective herbicide that provides post-emergent control of grasses. It does not affect broadleaf plants or sedges and has no uptake through roots or pre-emergent effect. Clethodim is a lipid-synthesis regulating herbicide that impacts chemical pathways that are only present in some monocots (e.g., grasses). Clethodim is most effective on young grasses, especially annuals, and thus is recommended for early season application only. Grass-specific herbicides are highly effective tools for invasive grasses growing in complex native vegetation. They are effective tools for the elimination of annual and perennial grasses in broadleaf (dicot) dominated environments or in eliminating annual grasses from some perennial grassland systems.
- **Clopyralid**~~, the active ingredient in Transline™,~~ is a selective herbicide used to control broadleaf invasive plants, especially thistles and clovers, and woody leguminous plants. Plants in the nightshade, bean, and sunflower families are particularly sensitive to this herbicide. Grasses are not affected by it, making it an

attractive IPM option for annual invasive plant control of these susceptible broadleaf plants in grasslands. Clopyralid is a growth regulator, rapidly transported through plants primarily through the phloem, and accumulates in growing points. It is absorbed into the plant by leaves, stems, and roots. Symptoms of effective clopyralid application include bending and twisting of stems and petioles, swelling at nodes, stem elongation, leaf curling, chlorosis (yellowing) of growing points, and plant mortality within three to five weeks. Clopyralid can travel through soil and should not be used where soils have very rapid permeability, such as loamy sand to sand. ~~Transline™ is very similar to Milestone™ but it is more selective (i.e., active on a narrower list of susceptible plant families). It is useful in controlling invasive thistles and legumes on rangelands, so is used in situations when the less-selective Milestone™ could impact desirable native plants. Transline™ is also generally more effective than Milestone™ on later plant growth stages so it is a valuable backup for Milestone in certain conditions.~~

- **Glufosinate** is a non-selective foliar herbicide with no soil residual. After application, glufosinate is only weakly translocational, meaning it moves inefficiently within the plant and primarily affects the treated foliage rather than being readily transported to roots or other plant organs. Glufosinate provides control of many annual broadleaf and grass weeds; however, the herbicide is less successful at control of large or well-tillered annual grasses. Glufosinate also provides suppression of some perennial (Minnesota Department of Agriculture n.d.).
- ~~**Glyphosate,** the active ingredient in both Roundup ProMax™ and Roundup Custom™ (formerly sold as Aquamaster™~~**Glyphosate (IPA and K)**~~,~~ is a non-selective herbicide used to control a wide variety of plants, including annual broadleaf plants, grasses, perennials, and woody invasive plants. It is absorbed through foliage and moves throughout the plant's growing points. Glyphosate's mode of action is to inhibit an enzyme involved in the synthesis of aromatic amino acids, making it effective on all herbaceous and woody growing plants, but not effective as a pre-emergent herbicide. It is a rather slow-acting herbicide with symptoms appearing within about a week, including yellowing and stunting of young leaves and growing points, however it may take up to two weeks for complete plant mortality. Young, actively growing plants are most susceptible to glyphosate treatments when applied during warm weather. Perennial woody plants are best treated in the late summer or fall when plants are moving carbohydrates into their underground storage tissues. Glyphosate is the most commonly used herbicide in invasive plant control in natural areas, and herbicide resistance is a growing problem in some annual species ~~(Monsanto 2008).~~(Monsanto 2018)
- **Imazamox** is a selective, broad-spectrum herbicide applied post-emergence to control both broadleaf and grass weeds. It acts through contact activity and also provides residual control in the soil, allowing it to affect newly emerging plants

after application. It is a systemic herbicide that moves throughout the plant tissue and prevents plants from producing an essential enzyme for growth (PubChem, n.d.).

~~Roundup ProMax™ contains a surfactant (i.e., a substance that adhere pesticides to plant leaves) that enhances the absorption of glyphosate on treated leaves so it is considered by herbicide applicators to be an efficient product to mix and apply. Roundup Custom™ contains only glyphosate dissolved in water with no surfactant, and is thus recommended for use on plants in aquatic, riparian, and other sensitive habitats. It is often mixed with an appropriately labeled surfactant to enhance the spread, adhesion, and penetration to the target plant, thereby increasing effectiveness of the entire mixture.~~

- ~~**Imazapyr,** the active ingredient in Stalker™ and Polaris™/Habitat™~~ **Imazapyr** is a non-selective herbicide used to control a broad range of invasive plants including grasses, broadleaf herbs, woody plants, riparian plants, and emergent aquatic species. Imazapyr has a similar mode of action as glyphosate but acts on a different suite of essential amino acids. Imazapyr is absorbed by leaves and roots, and moves to growing points; it disrupts protein synthesis and interferes with cell growth and DNA synthesis, causing plant mortality. Unlike glyphosate, imazaypyr has pre- and post-emergent effects. It also has moderate soil persistence, which can be useful for difficult-to-control species for which glyphosate is less effective or when parallel treatments of the parent population and seedlings are desired.
- **Triclopyr (TEA and BEE)** is a selective systemic herbicide used to treat woody and herbaceous broadleaf plants and can be used to treat aquatic and riparian weeds. Triclopyr's mode of action is to mimic the plant hormone auxin, causing uncontrolled plant growth (Tu et al. 2001).

Aquatic Invasive Plants

Aquatic invasive plants, like terrestrial invasive plants, can arrive on District preserves from a variety of sources including migrating birds, animals, and humans, or they are already present on properties that the District purchases. Often, a small seed or plant fragment stuck to a duck's foot or canoe paddle is all that is necessary to expose a wetland habitat to a new invasive aquatic species. Aquatic invasive plants are divided into two major groups: 1) emergent invasive plants and 2) submerged invasive plants. Each group requires a different control strategy. Emergent invasive plants, in general, are rooted in soil below shallow water from one inch to 24 inches deep, and extend leaves above the water surface at least seasonally; or they can grow in neighboring upland areas as long as their roots can easily reach the water table (California Weed Science Society 2002)~~(Anderson 2002).~~ Some emergent invasive plants are actually floating plants that need no soil contact. Submerged invasive plants are those that grow on the bottom of lakes, rivers, and streams, and do not need exposure to the air to complete their life cycles.

Aquatic invasive plants can compromise both fish and wildlife habitat, promote flooding, provide breeding habitat for mosquitoes, and can impede or slow the distribution of water in irrigation canals/ditches (Thunberg et al. 1992). All aquatic invasive plant control requires specialized expertise and equipment to effectively manage the target pest. Submerged invasive plants are especially difficult to control and often require specialty floating equipment and boats to access the plants.

Native aquatic plants can require management as well to maintain navigational, recreational, and agricultural uses of water bodies. Native vegetation in ponds and other static water bodies decomposes to naturally fill-in to a point where they eventually cease to be water bodies. At times, the District manages water bodies to support aquatic wildlife and agriculture that requires occasional maintenance. Plants and sediments are mechanically removed to increase shoreline areas and sustain open water habitats.

Pest Management Strategies for Aquatic Invasive Plants
Prevention and control of aquatic invasive plants is discussed below. Tolerance levels and treatment methods are also outlined in Table 8-6.

Table 8-10 Treatment Thresholds and Methods for Aquatic Invasive Plants

Treatment Method Thresholds	Phenology	Timing	Treatment	Treatment Constraints - Assets
Incipient/small: < 10 individuals	Emergent perennials - seedling to mature	Varies by species	Manual (Hand removal)	Small amounts only; worker hazards at larger scales
Small to medium: < 5 acres	Emergent perennials - mature	Varies by species	Cutting (Mowing)	Not effective on most species; for suppression/ containment/ pre-treatment goals only
Small to medium: < 5 acres	All stages	Varies by species	Pond draining, pond skimming	Non-selective. Can be combined with aquatic animal control.
Large: ≥ 5 acres	Floating perennials - mature	Varies by species	Harvesting	Requires specialized aquatic weed control machines

Prevention

- Implement an employee and contractor training program; include aquatic invasive plant identification and cleaning protocols for clothing, tools, vehicles, and boats.
- Inspect recreational facilities that contain aquatic features often during target invasive plant flowering and seed production times. Treat any detected target invasive plant populations to prevent spread into District lands.
- Prevent the spread of plant fragments (roots, stems) of certain species that can produce new plants in irrigation ditches, canals, and streams.

Physical Control

- Pulling aquatic plants is similar to pulling terrestrial weeds, and requires removing the entire plant, including leaves, stems, and roots, and disposing of the material away from the shoreline. In wetlands and shallow water less than three feet deep, no special tools are required. Deeper water may require SCUBA divers equipped with mesh bags to collect plant fragments as they work. Additional precautions are required for staff working in aquatic locations to protect both the habitat and the staff.

- Specialized equipment can be used to excavate or 'harvest' floating or submerged aquatic vegetation. Generally, these types of control efforts seek to clear waterways for adequate water flow or boat access rather than ~~completely~~ eliminate the problem plant. They can be effective tools for the removal of biomass from flood control channels and navigable waterways.
- Pond draining may be implemented for small water bodies to eliminate invasive aquatic plants and invasive animals such as bullfrogs concurrently. Some plants have propagules that can remain viable during dry periods, so this method is only effective on some aquatic plant species. All projects that temporarily divert water and discharge sediment may require permits from regulatory agencies, and may require additional monitoring and reporting.

Chemical Control

Some of the herbicides included in the IPMP include those that are formulated for use in and near aquatic habitats~~ (Roundup Custom™ for example, which can also be used with an added surfactant).~~. The District, on rare occasions, may need to use chemical treatments within or very near to aquatic habitats including treatments in seasonal wetlands (during the dry season) to control pest species (e.g., to remove slender false brome or cattails). In these situations, the District ~~would~~ will use herbicides suitable for aquatic habitats. The aquatic formulations for selected herbicides in the IPMP ~~would~~ will most often be used in upland habitats within the District. These formulations are useful in upland areas for certain pest species because the surfactants included in the formulation provide increased adhesion to selected target plant species than the non-aquatic formulations and are, therefore, more effective at providing the desired control of the pest species.

- ~~**Roundup Custom™ contains only glyphosate**~~ **Glyphosate** is dissolved in water with no surfactant, and is ~~thus~~ recommended for use on plants in aquatic, riparian, and other sensitive habitats.
- **Imazapyr**~~, the active ingredient in Stalker™ and Polaris™ /Habitat™,~~ is a non-selective herbicide used to control a broad range of invasive plants including grasses, broadleaf herbs, woody plants, riparian plants, and emergent aquatic species.
- **Disinfectants** (refer to Table 3-3) are used to decontaminate equipment, boots, and clothing before and after entering a waterbody, as appropriate. The CDFW aquatic invasive species decontamination protocol provides details on the procedures and best practices.

Aquatic Invasive Animals

Aquatic invasive animals, like aquatic invasive plants, can be introduced to District wetlands, rivers, lakes, and other aquatic habitats through a variety of pathways, such as the transport of larvae, eggs, or small organisms attached to boats and recreational gear (US EPA 2016). Once introduced, these species may establish populations and spread rapidly due to the absence of natural predators. These animals can disrupt native ecosystems by preying on native species, competing for resources, altering habitat structures, degrading water quality, and interfering with recreation, and other human uses (National Invasive Species Information Center, n.d.; Wiedemer and Chan, n.d.).

Pest Management Strategies for Aquatic Invasive Animals

Chemical Control

For prevention of aquatic invasive animals entering District lands, district staff may have to use chemical means.

- **Disinfectants** (refer to Table 3-3) are used to decontaminate equipment, boots, and clothing before and after entering a waterbody, as appropriate. The CDFW aquatic invasive species decontamination protocol provides details on the procedures and best practices. Disinfectants are used to decontaminate equipment, boots, and clothing before and after entering a waterbody, as appropriate. The CDFW aquatic invasive species decontamination protocol provides details on the procedures and best practices.

8.8.4 Invasive Insects in Natural Lands

In general, insects are considered a natural component of the District's natural areas and do not warrant control. In some limited circumstances, such as restoration of a native habitat through active planting, short term insect control may be warranted (for example, to control stinging insects or Argentine ants within a specified area during clearing or planting to protect worker or volunteer safety, plant health, and promote native insect pollination). For information regarding control treatment options for insect pests in natural areas, refer to the Buildings section (Chapter 5).

8.8.5 Forest Diseases

At present, the District manages forests primarily for ecological and recreational values (rather than for timber value), therefore management actions are focused on maintaining the long-term stability and resiliency of forests to disruptive changes such as climate change and forest diseases. The threshold for active management of forest diseases and invasive species focuses on the level of damage from a forest disease that could result in a substantial alteration in the forest species composition, extent, or density.

~~**SUDDEN OAK DEATH**~~

Forest Pathogens

Sudden oak death (SOD) is a plant disease caused by an exotic water mold (*Phytophthora ramorum*) that has been implicated in native oak and tanoak deaths throughout coastal California and Oregon ~~(CA Oak Mortality Taskforce 2013).~~(National Park Service 2022). The pathogen often results in mortality of certain oak species, specifically coast live oak (*Quercus* *agrifolia*), black oak (*Quercus kelloggii*), canyon live oak (*Quercus chrysolepis*), and Shreve oak (*Quercus parvula var. shrevei*), as well as tanoak (*Notholithocarpus densiflorus*). The pathogen can also cause twig and foliar disease symptoms in many other native plant species, most notably in California bay laurel (*Umbellularia californica*), which is a species that can act as a vector for this pathogen~~, which vectors to pathogen~~. The wholesale loss of oak tree species in coastal forests can cause major ecosystem disruptions, especially because so many native species depend on oaks and their fall acorn masts. Sick and dying trees also greatly increase the wildfire risk in native coastal forests dominated by oaks.

~~It is still uncertain how the invasive forest pathogen *Phytophthora ramorum* causing sudden oak death (SOD) will impact the native forests and woodlands of the greater Bay Area~~. Methods such as selective removal of California bay laurel trees (known to harbor the pathogen), pesticide applications, and promoting conifers over hardwoods have all been proposed for local and landscape scale management of the SOD pathogen (Filipe et al. 2013). The SOD pathogen is extremely difficult to detect until advanced infection and symptoms are visible in individual plants. Because this pathogen is a water mold, it can move great distances through the landscape using wind (e.g., windborne transport of spores) or through water (e.g., transport of spores in waterways and through fog drip), making management very difficult at any scale (Filipe et al. 2012). The landscape scale management of high value forested areas (e.g., selective removal of diseased trees, selective removal of host plants such as California bay laurel, replanting conifers and other disease-resistant trees) may be one of the few ways to slow the spread of the disease. District staff should consult the California Oak Mortality Task Force (http://www.suddenoakdeath.org) for the most recent information on effective control of SOD.

Pest Management Strategies for ~~Sudden Oak Death~~ Forest Pathogens

At present, the District maintains a SOD inventory and monitors ~~and manages SOD on Rancho San Antonio, Monte Bello, El Corte de Madera Creek, Los Trancos, Russian Ridge, Skyline Ridge, Long Ridge and Saratoga Gap OSPs.~~ for SOD occurrences throughout the approximately 72,000 acres of District lands, including monitoring for new or emerging strains of SOD. It is unclear ~~if~~ whether the vegetation composition shift is a temporary phenomenon, or a more permanent result of the disease infestations. Because the long-term effect of the disease on California's forests are unknown, the District is working with the California Oak Mortality Task Force to further study and monitor the impacts of the disease on District lands. ~~In 2006, the District adopted a ten-year Sudden Oak Death plan to map oak trees on District Preserves that are potentially resistant to the SOD pathogen, treat a selected number of specimen oak trees, and establish collaborative funding for SOD research to help guide land management decisions.~~

The following list outlines general steps that District staff will follow when managing ~~SOD infestations~~ forest pathogens, such as *Phytophthora*:

- Track the effects of SOD disease (mapping dead oaks as staffing and budgeting permit), and share this information with the California Oak Mortality Task Force (www.suddenoakdeath.org) as staffing and funding allow.
- Removal of California bay trees or their branches within 15 feet of the trunks of high value oaks. Ongoing research at the District and other locations in the state

are evaluating whether California bay laurel removal is effective for managing larger stands or forests infested with SOD or to prevent or slow down the spread of SOD. This option is costly and requires regular maintenance and monitoring and, therefore, is implemented in limited areas.

- For individual high value oaks such as very large mature oaks near picnic facilities, consider spot treatment of individual oaks with pest control sprays ~~(e.g., Agri-Fos™)~~ intended to reduce potential for SOD infection. Due to high cost, this option should not be applied on a landscape level.
- Use of disinfectants to kill or inactivate pathogens, before plant infection may occur through the decontamination of tools, equipment, vehicles, and footwear in accordance with the latest *Guidelines for Minimizing Phytophthora Contamination at Midpeninsula Regional Open Space District Preserves*.
- Treatments such as solarization or steam treatments will be used in targeted areas to remediate *Phytophthora*-infected soils.

9 Glossary

Active management — Physical actions intended to manage natural resources or built facilities for a desired outcome. Active management may include physical control (hand, mechanical control), or chemical control of pests or manipulation of their habitats. For example, mowing yellow star-thistle to remove it from an infested rangeland ~~would be~~ is considered active management. In contrast, ***passive management*** includes design and cultural practices intended to change human behavior or the physical environment~~al~~ in a manner that discourages pests from occurring. For example, installing boot cleaning stations, or requiring ranchers to inspect feed for yellow star-thistle seeds ~~would be~~ is considered passive management.

Active Ingredient — The specific chemical or substance in a product that directly controls, prevents, destroys, repels, or mitigates pests, or functions as a plant growth regulator, desiccant, or defoliant.

Agricultural Property — Any land, pasture, building, or other real estate primarily used for farming or other agricultural purposes, such as growing crops, raising livestock, or cultivating timber.

Allelopathy/Allelopathic effect — The suppression of growth of one plant species by another because of the release of toxic substances. The effect of suppressing the growth around a plant resulting from the release of toxic substances.

Auxin — A class of ~~substances~~ hormones that, in minute amounts, regulate or modify the growth of plants, especially root formation, bud growth, and fruit and leaf drop.

Basal bark — Using this treatment method, an oil mixture containing herbicide is applied to the lower 12 to 15 inches of brush and tree trunks (including the entire stem, root collar area, and exposed roots) via low-pressure backpack sprayer. This method is used to selectively control woody plants with basal stems less than six inches in diameter.

Basal rosette — A cluster of leaves spreading outward from the base of a low-growing plant. In thistles, such as yellow star-thistle, a basal rosette forms just before the plant bolts (i.e., sends up a main stem on which flowers are produced). Often, the timing of pest control treatment of plants is recommended for the "basal rosette stage."

Biological Monitor — An individual who has academic and professional experience in biological sciences and related resource management activities, experience with construction-level biological monitoring, is able to recognize species that may be present within the Project area, and is familiar with the habits and behavior of those species.

Bolt stage — A plant developmental stage during which a young plant sends up a main stem on which flowers are produced. The timing of pest control treatment of plants is often recommended for either just before or just after “bolt stage~~”~~.”

Broadleaf — Plants possessing broad (as opposed to needlelike or grass-like) leaves. Most of the trees and shrubs on District preserves are broadleaves. Pest control treatments prescribe different treatments for broadleaf plants than for grasses, sedges, and needle-bearing trees such as pine trees.

Cut-stump application — Under this treatment, the woody plant is cut close to the ground at a 90-degree or 45-degree angle with a chainsaw or pole saw. Debris is removed from the cut stump and herbicide immediately applied to the circle of living cells. Cut-stump application is used to selectively eliminate woody trees and shrubs. Woody plants tend to re-sprout frequently when cut unless treated with herbicide.

Chlorosis — A condition in which leaves produce insufficient chlorophyll. As chlorophyll is responsible for the green color of leaves, chlorotic leaves are pale, yellow, or yellow-white. The affected plant has little or no ability to manufacture carbohydrates through photosynthesis and typically dies. Some pest control of plants induces chlorosis, thereby eliminating the pest plant’s ability to survive and reproduce.

Containment — A pest control strategy that focuses on establishing a pest-free area (e.g., a mowed or cleared area around a well-established population of invasive plants), and ensuring, through active management, that the target pest does not move past the defined area into the surrounding (pest free) areas. Containment is typically used when eradication of a target pest is no longer considered a viable ~~an~~ option.

Control — A pest control strategy that focuses on reducing the number, amount, or extent of a pest over time to achieve a defined tolerance level. Control may result in full eradication of a pest, or reduction in the pest such that ~~is~~ it no longer causes economic or environmental damage, or human health concerns.

Dicot — Dicotyledons, (also known as dicots), are a group of flowering plants whose seed typically produce two embryonic leaves or cotyledons when first germinating. Pest control techniques often prescribe different treatment for dicot plants than for ***monocots*** (~~i.e~~e.g., grasses, sedges, and bulbaceous plants that only produce one embryonic leaf).

Eradicate — A pest control strategy that focuses on eliminating all members of a target pest population.

Frill/injection — A drill or sharp tool such as a hatchet is used to create holes or cut through the exterior bark of a tree and into the sapwood. Each penetration point into the sapwood is then filled with the label-recommended amount of concentrated herbicide solution using an injection system, squirt bottle, or brush. This application method is often used for the control of trees that cannot be managed via basal bark application.

Pesticide formulation — A mixture of active ingredients, which control pests, and other ingredients that aid in delivery and application for pest control purposes.

Gigging — A pest control method typically used to kill bullfrogs, fish, and other aquatic pests whereby the animal is speared with a trident or spear while in water.

Herbicide — A pesticide (see definition below) intended for preventing, destroying, or controlling plant pests.

Herbivory — A type of predation typically used to describe the consuming of plants by animals. Herbivory has an impact on the health, structure, and diversity of natural plant communities. For example, low level herbivory can remove aging roots and leaves, allowing new growth of young roots and shoots resulting in healthy plant growth. At high levels, herbivory can damage plants, changing the composition, and reducing the quality of the natural plant community.

Homopteran Insect — A suborder of insects, including cicadas, aphids, and scale insects, having wings of a uniform texture held over the back at rest.

Hypercalcemia — An abnormally high level of calcium in the blood. In pest control, hypercalcemia is usually associated with rodenticide use.

Injurious — The term "injurious wildlife" refers to a defined list of species identified in either the federal Lacey Act (18 U.S.C. 42) or related implementing regulations (50 CFR 16). The U.S. Fish and Wildlife Service Office of Law Enforcement plays a role in preventing the introduction of invasive species into the U.S. through the enforcement of the Lacey Act which makes it illegal in the United States to import injurious wildlife, or transport such wildlife between states without a permit. Species are placed on the list when they are determined to be injurious to~~:~~ human beings; the interests of agriculture, horticulture, forestry, or wildlife; or wildlife resources in the U.S.

Insecticide — A pesticide (see definition below) intended for preventing, destroying or controlling insect pests.

Insipient (invasive population) — A population (usually referring to an invasive plant) that is small, but is beginning to reproduce and become established in a location or a region.

Metamorph (amphibian) — A major change in the form or structure of some animals or insects that happens as the animal or insect becomes an adult. For amphibians, a metamorph refers to the stage of development between larval and adult. For example, the stage between a tadpole and adult frog. Some pest control techniques recommend treatment timing before or after the metamorph stage.

Monocot — Monocotyledons, (also known as monocots), are a group of plants whose seed typically produce only one embryonic ~~leaves~~ leaf or cotyledon when first germinating (e.g., grasses, sedges, and bulbaceous plants). Pest control techniques often prescribe different treatment for monocot plants than for ***dicots*** (i.e., plants that produce two embryonic leaves when first germinating~~, such as flowering plants~~)

Non-Native Species — An introduced, alien, exotic, or non-indigenous~~, or non-native~~ species. Includes species living outside their native distributional range, which have arrived ~~there~~ by human activity, either deliberate or accidental. Some introduced species are damaging to the ecosystem they are introduced into, others have no negative effect and can, in fact, be beneficial~~, as an alternative to pesticides in agriculture for example~~. Refer to the definition of ***pest*** and ***invasive species*** (below) to differentiate non-native species that cause harm from other non-native species.

Noxious weeds — A plant species that has been designated by country, state, provincial, or national agricultural authority as one that is injurious to agricultural and/or horticultural crops, natural habitats and/or ecosystems, and/or humans or livestock. These weeds are typically agricultural pests, though many also have impacts on natural areas. Many noxious weeds have come to new regions and countries through contaminated shipments of feed and crop seeds or intentional introductions such as ornamental plants for horticultural use.

Pest Species — Insects, animals, or plant species that are incompatible with the District's goal of protecting and restoring the natural environment, and with providing opportunities to enjoy and learn about the natural environment. Several categories of pest species are defined below:

- **Invasive species** are ~~animal or~~ plant ~~species~~ or animals that invade and dominate sufficiently large areas, causing a reduction in biodiversity. They proliferate in the absence of natural control and interfere with the natural processes that would otherwise occur in natural areas. Once established, invasive species can become difficult to manage and can eliminate native species or otherwise alter the ecosystem. Invasive species are targeted in natural areas and rangelands. Invasive species can alter ecosystem processes by changing biotic ecosystem characteristics (such as plant community composition, structure, and interactions; trophic relationships; and genetic integrity) and abiotic characteristics and processes (such as fire regimes, erosion, sedimentation, hydrological regimes, nutrient~~,~~ and mineral conditions, and light availability).
- **Structural and agricultural pests** include insect, plant, and animal pests that damage occupied buildings, formal landscapes, or agricultural crops, or pests that are a health threat to humans working in, living in, or visiting the buildings. Examples of structural pests include termites, ants, rodents, and stinging insects in buildings, and weeds in formal landscaped areas. Examples of agricultural pests include insects, weeds, and burrowing mammals such as moles and voles that damage crops. Structural and agricultural pests are targeted in buildings, recreational facilities, and agricultural properties.
- **Nuisance pest species** include species that commonly occur on District lands, such as stinging insects, but whose presence can be incompatible when their proximity or behavior conflict with human use of buildings and recreational facilities in the

preserves. For example, hornets that locate their ground nests in trails must be removed if they are stinging hikers and horses using the trail. Branches and other types of vegetation must be trimmed back from trails, parking lots, picnic tables, and benches to allow safe visitor use. Similarly, vegetation must be cut back from the sides of roads to keep them open for patrol, maintenance, and emergency vehicles. Problem pest species are targeted in areas with focused visitor use.

Pesticide — A substance or mixture of substances intended for preventing, destroying, or controlling any pest, including vectors of human or animal disease, unwanted species of plants or animals causing harm during or otherwise interfering with the production, processing, storage, transport or marketing of food, agricultural commodities, wood and wood products or animal feedstuffs, or substances which may be administered to animals for the control of insects, arachnids, or other pests in or on their bodies.

Pesticide is a broad term that encompasses:

- **Herbicides** (substances intended to control plant pests),
- **Insecticides** (substances intended to control insect pests),
- **Rodenticides** (substances intended to control rodent pests),
- **Other Substances,** such as **Fungicides** (substances intended to fungus pests) and **Surfactants** (substances that adhere pesticides to surfaces such as plant leaves) and other substances often used with other pesticides to increase treatment results.
- **Disinfectants**, such as quaternary ammonium solutions, are used to decontaminate all equipment, including but not limited to, wading, dive, and sampling equipment (e.g., water quality probes, nets, buckets, substrate samples, etc.); fishing gear; and watercraft.
- **Repellents** are not substances used to eliminate pests, rather, they are designed dissuade pests.

Phloem — The living tissue in plants that carries soluble organic material made during photosynthesis — in particular, sucrose, to all parts of the plant where it is used for growth and reproduction. Many pest control treatments focus on disrupting the phloem through mechanical or chemical means, thereby disrupting the flow of nutrients to the plants, causing plant death.

Pre-bait — A substance used to attract pests (e.g., rodents or other animals) to a feeding site as a preliminary step to use of a rodenticide or other pesticide to control the target pest.

Propagule — Any vegetative portions of a plant, such as a bud, stolon, root, tuber, rhizome, or other offshoot, that aids in the dispersal of the species and from which a new plant may grow. In pest control, follow-up treatments for invasive plants often focus on prevention and control of propagules after the initial mature plants are treated.

Qualified Biologist — An individual who has a minimum of five (5) years of academic training and professional experience in biological sciences and related resource management activities, with a minimum of two survey seasons years (e.g., two seasons during the blooming season of sensitive plants) conducting surveys for each species that may be present within the Project area.

Rangeland — A large expanse of natural land that is covered primarily by native plants such as grasses, forbs, and shrubs, and is suitable for grazing animals.

Rhizome — A modified subterranean stem of a plant that is usually found underground from which a new plant may grow. Plants often send out roots and shoots from these modified stems, resulting in vegetative (asexual) reproduction of a plant. In pest control, follow-up treatments for invasive plants often focus on prevention and control of rhizomes after the initial mature plants are treated.

Root Crown — The junction between the root and shoot portion of a plant. Crown sprouting is the ability of a plant to regenerate its shoot system after destruction of the above-~~-~~ground portions of the plant. Crown sprouting plants typically have extensive root systems in which they store nutrients, allowing them to survive after damage to the above-ground parts of the plant. In pest control, follow-up treatments for crown-sprouting plant species often focus on control of resprouting vegetation after the initial mature plants are treated.

Sensitive Natural Community — Plant or animal species that are listed to the California Department of Fish and Wildlife (CDFW) California Natural Diversity Database (CNDDB) due to the rarity of the community in the state or throughout its entire range (globally) (The California Biologist's Handbook, n.d.).

Seed Bank — In natural systems, the natural storage of seeds, often dormant, within the soil below the parent plant. In invasive plant control, treatment often focuses on long-term management of plants that ~~sprout~~ germinate from the seed bank, often years after the initial removal of mature invasive plants.

Shooting — A plant that sends up shoots (new growth) from the underground portions of the plant. In pest control, recommended treatments are often timed for when invasive plants are actively 'shooting' or sending up new growth.

Spray application — Depending on the size of the infestation, herbicide is applied with a 5-gallon backpack sprayer or, for larger areas, a 14-gallon tank mounted on an all-terrain vehicle or 150-gallon truck with a hose that is directly controlled by an operator. All methods of spraying under this program are selective, that is, the operator (who is trained in identifying plants) is in direct control of the sprayer, will point the spray tip directly at the target weed or pest, and will manually turn the spray equipment on and off to control the amount and direction of spray.

Stolon — A prostrate plant stem, at or just below the surface of the ground, that produces new plants from buds at its tips or nodes. In pest control, treatments for plants that produce stolons often focus on removal of existing stolons, and retreatment of new plants produced from any remaining stolons.

Suitable- Special Status Species Habitat — Habitat of a special status species including plant and animal species that are legally protected under environmental regulations, and include species that are considered sufficiently rare by the scientific community to qualify for such status.

Taproot — A large, somewhat straight to tapering plant root that grows downward ~~that~~ formings a center from which other roots sprout laterally. The taproot system contrasts with fibrous root system, which typically ~~have with~~has many branched roots. Pest control of invasive plants often focuses on removal of the entire taproot to kill the target invasive plant.

Tolerance Levels — The level at which pests can be present without disturbing or disrupting natural processes, causing economic damage, degrading intended uses or human enjoyment of built facilities, or resulting in ecological or public health impacts.

Tenting — Tenting involves sealing the entire structure with a material that can serve as a secure enclosure and fumigating with sulfuryl fluoride (Vikane). Tear gas (chloropicrin) is incorporated into the fumigant gas to serve as a warning agent for humans and animals, since Vikane gas has no warning properties (e.g., odors, eye irritation)

Treatment Site(s) — The entire area where pest control measures are applied, which includes the pest and its nonliving and living surroundings.

Wipe application — Under this treatment, herbicide is applied to the target plant using a sponge for selective treatment. This method generally results in less potential for herbicide drift than spraying, although care must be taken that the applicator does not drip or overlap onto non-target plants. This method works best on plants that form a basal rosette of leaves.

Wick application — A wick or rope is saturated in herbicide and attached to a reservoir containing a concentrated herbicide solution. The wick or rope is used to wipe herbicide directly onto target plants, typically weeds that are taller than surrounding non-target plants. Wick applicators may range in size from hand-held to truck-mounted.

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