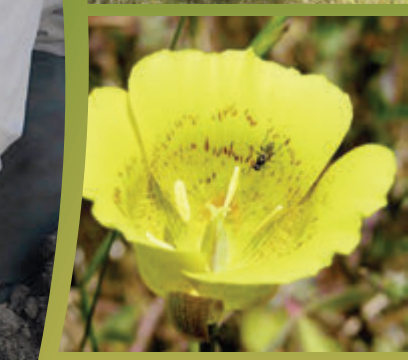
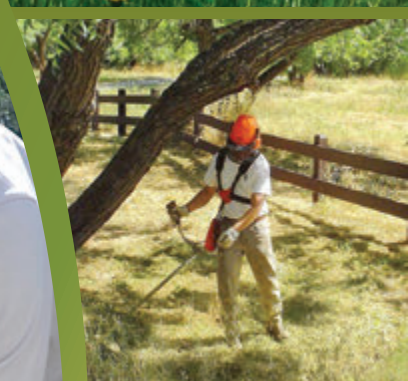


Integrated Pest Management Annual Report 2018



All Rights Reserved, 2019 East Bay Regional Park District
More information may be found at ebparks.org/lipm

Preserving Open Space for the Future

The East Bay Regional Park District (Park District) is the largest land owner in the East Bay and oversees a diverse landscape in Alameda and Contra Costa counties. The Park District comprises 122,000 acres in 73 parks, 55 miles of shoreline, and a 1,333-mile interconnected park trail system. Serving 2.8 million East Bay residents, and approximately 25 million visits per year, the Park District is the nation's largest regional park agency.

The purpose of this annual report is to provide factually transparent information about pest management in the vast and diverse parklands of the East Bay Regional Park District. As you'll see in the following pages, the Park District uses a variety of best practice methods for pest management. This report compares current practices to previous years to measure trends in the Park District's Integrated Pest Management (IPM) program.

Managing the large scale of open space within the Park District's jurisdiction requires strategic planning and effective practices. Governed by a seven-member elected Board of Directors that set policy for the implementation of the Park District Master Plan, the Park District employs close to 1,000 employees across all professional sectors that contribute to the management of the regional parks.

A specific focus of the Park District's land management is the control of pests and diseases in a sustainable and ecologically principled way, while relying on scientific and evidence-based best practices. The Park District's IPM program is an important component of the ongoing maintenance of healthy ecosystems that benefit the vitality of wildlife and the quality of park experiences for visitors.

The Principal Goals of the Park District's IPM program are to:

- **Protect Public Health:** to manage and control health threats such as ticks, yellow jackets, mosquitos, E. coli and harmful algal blooms.
- **Ensure Fire Safety:** to control vegetation around potential ignition sources such as fire pits, campgrounds, and parking lots, and protect people and infrastructure from accidental fires.
- **Manage Healthy and Safe Forests:** to reduce risk of catastrophic wildfire through thinning of trees and vegetation reduction in the wildland urban interface.
- **Maintain Park Infrastructure:** to promote the safe and enjoyable use of park features and trails.
- **Improve Ecological Functions:** to promote and maintain sensitive natural resources, habitat enhancement, ecological restoration projects, and biological diversity.
- **Incorporate New Park Facility Designs:** to manage vegetation and minimize pest control needs in areas such as picnic sites, bridges, and trails.

*A healthy and vibrant forest in
Redwood Regional Park, Oakland*

East Bay Regional Park District is a Leader in Protecting Natural Resources

The East Bay Regional Park District is recognized by environmental agencies and park districts around the country for its effective protection of natural resources and open space, and its public access. The Park District's mission continues to be rooted in an environmental ethic that well serves the people of the San Francisco Bay Area.

The Park District's mission statement, expressed at the founding of the Park District, serves as an inspiration and an enduring testimonial to the District's commitment to conserve open space resources and to provide environmentally responsible outdoor recreational opportunities for present and future generations.

“The East Bay Regional Park District preserves a rich heritage of natural and cultural resources and provides open space, parks, trails, safe and healthful recreation and environmental education. An environmental ethic guides the District in all of its activities.”

– East Bay Regional Park District Mission Statement

The Park District's IPM policy fosters protection of natural resources and minimizes the use of chemicals.

In accordance with the accepted principles of ecology, the District will strive to implement an integrated pest management program which eliminates the use of chemicals as much as feasible whenever alternative methods are effective.

– Pest Management Policy and Practices, EBRPD, Resolution #1987-11-325

Keystone Tenets of IPM:

- At the Park District, IPM is a multidisciplinary and cross-departmental effort based on an environmental ethos within a framework of values, including accountability and transparency.
- The Park District manages pests in the most effective and safest manner for our park visitors and our employees.
- The management and operation of public parkland are rooted in key principles of honoring the land, its ecological systems and its wildlife, as well as honoring our park visitors and the people who conduct sustainable park and landscaping operations, our employees.
- We believe that prevention is fundamental to safe and effective pest management followed by actions based on science standards, weight of evidence principles, best practices and the Park District's environmental ethos.

Our local partners support the Park District's integrated approach.

“EBRPD sets a strong example for how natural resources can be managed conscientiously in an urban environment.”

– Doug Johnson
Executive Director
California Invasive Plant Council

“EBRPD's steadfast support and leadership in integrated pest management over the years has provided invaluable support in maintaining on-the-ground invasive pest management programs and has set an example of stewardship, with sound, effective and responsible pest management practices.”

– Edmund O. Duarte
Deputy Agricultural Commissioner
Alameda County

Using Best Practices, Effective Tools with an Integrated Approach

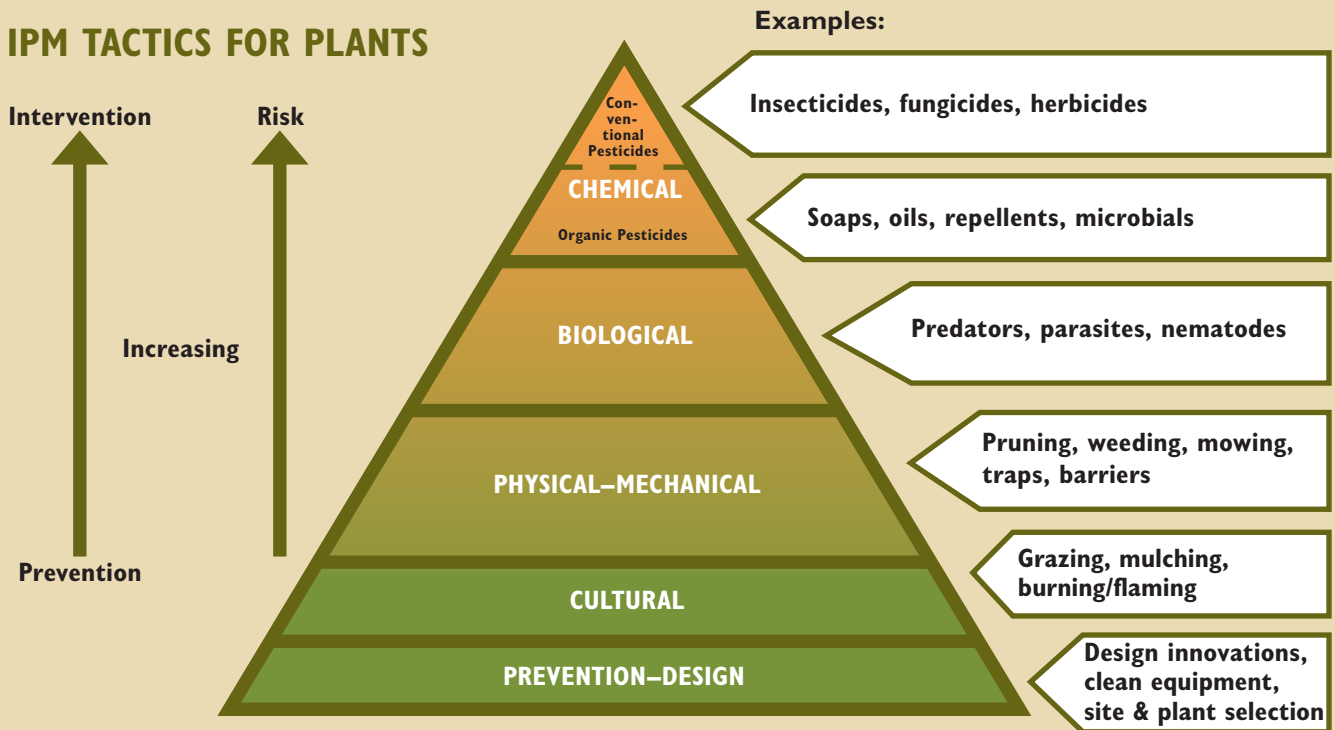
What is Integrated Pest Management?

IPM is a scientific approach to pest management. A pest is any organism that causes damage to human health, safety, recreation, and environmental function. In the Park District, the bulk of pests are nuisance weeds that limit public access to open spaces and degrade recreational enjoyment, as well as noxious weeds that decrease biological diversity and ecological function. Additionally, organisms such as ticks, yellow jackets, rats, and mice can be significant threats to public health in the Park District. Integrated pest management effectively reduces pest populations while minimizing human health and environmental hazards.

Foundations of IPM

At the Park District, IPM is a multidisciplinary and cross-departmental effort based on an ecological framework to identify, understand, and solve pest problems. Thoughtful design and prevention practices provide the foundation of the program. Science guides and provides the structure for an ecologically-sound IPM program.

IPM TACTICS FOR PLANTS



Since the inception of its first Integrated Pest Management policy, the Park District's management of pests is based on regularly reviewed science standards, weight of evidence principles, and best industry practices along with our environmental ethos. Research is used to identify safe, effective, and efficient management tactics to ensure a safe environment for our park visitors, surrounding neighbors, and park employees.

State and federal regulatory agencies require the Park District to implement IPM to protect and preserve diverse ecological habitats for native and endangered animals and plants that live in the forests, creeks, grasslands, and shorelines of our parks. The Park District practices this ecologically-rooted system of managing pests in structural, recreational, and wildland settings as well as habitat enhancement and restoration activities.

Leading with Mechanical and Cultural Approaches

IPM Methodology

IPM is not a single pest control method but, rather, a series of pest management evaluations, decisions, and actions. The management and operation of public parklands are rooted in key principles of honoring the land and ecological systems, and protecting the public and staff through safe, sustainable park operations.

Prevention, Monitoring and Identification of Potential Pests

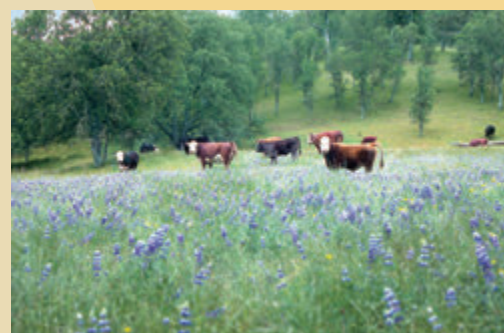
As a first line of pest control, IPM programs work to manage the prevention of pests from becoming a threat. Many insects, weeds, and other living organisms do not require control. IPM programs monitor for pests and identify them accurately, so that appropriate control decisions can be determined.

Methods

IPM methods of control fall under one of several categories: prevention, cultural, mechanical, biological, and chemical. They are listed in the order that indicates their importance. They are often used together or sequentially. Adaptive management provides feedback to this dynamic cycle of land management.

Integrating the following approaches provides for a resilient and sustainable program. The Park District prioritizes mechanical, cultural, and biological controls or a combination of these before considering chemical controls.

- **Cultural controls** include mulching, burning/flaming, grazing, and competitive planting with native plants. These methods are used on a park and landscape-scale across our diverse landscape. For example, annual resource burns are performed at Point Pinole to enhance the coastal prairie. The Park District manages 70,000 acres of public land for ecological functions through grazing.
- **Mechanical controls** include weeding, line trimming, mowing, hand pulling, grubbing, etc. The Park District continues to prioritize the use of mechanical methods as its fundamental tool to control vegetation along roads and trails, to reduce fire risk while providing park maintenance. Many roads and trails are rough mowed or line trimmed. Much of the Park District's fencing is line trimmed, as are most group camps and other recreational areas. Often, vegetative growth is heavy enough to warrant two or more mowings per growing season.
- **Biological controls** utilize natural or introduced enemies of the identified pest. The Park District's efforts to increase biodiversity through invasive weed management and competitive native plantings increase insect diversity that provide natural levels of biocontrol. Additionally, the IPM program works collaboratively with the USDA-ARS (United States Department of Agriculture – Agricultural Research Service) and their biocontrol programs in various parks.



Clockwise from top: Biological (USDA-ARS cape ivy gall fly release), cultural (grazing), and mechanical (mowing and line trimming) make up the bulk of IPM treatments Park District wide.

- **Chemical controls** include the use of organically registered (OMRI) and conventional products that are used to control plants, insects, fungi, or other pests. Conventional and organic pesticides are used when mechanical and cultural methods are insufficient or ineffective. Chemical products are never used in and around play structures or drinking fountains.

Preventing New Pest Threats

Prevention is the cornerstone to any integrated program. Infection by *Phytophthora* species, microscopic water molds, has emerged as a significant threat to many plant species and special communities. Introductions have occurred in the Bay Area through infected nursery stock as well as dirty equipment. The Park District has an internal working group dedicated to addressing these threats through every aspect of Park District work, including planting, and restoration activities. The Park District ensures that special protection is given to avoid highly sensitive resources such as Huckleberry Botanic Preserve with its federally-listed threatened Pallid Manzanita.

CalPhotos @2004 Steve Matson



***Arctostaphylos pallida*; Alameda Manzanita**

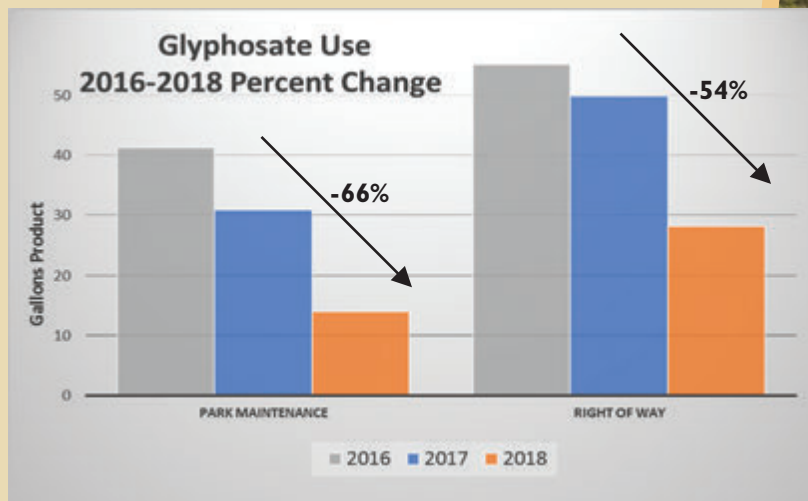
Sudden Oak Death (SOD), caused by the airborne *Phytophthora ramorum*, continues to have severe negative impacts on the East Bay's oak woodlands. Studies performed in the Park District confirm that SOD continues to spread, changing the age structure of oak forests as younger oaks are less susceptible to this introduced water mold. Recent research indicates as much as 30% of oaks are resistant to the pathogen, recovering and persisting after infection for as long as 9 years. Future studies will assess whether this pattern continues.

Daily park maintenance activities, such as using tools and equipment in multiple parks without cleaning, have been shown to spread soil pathogens that kill native plants. These activities are also known to spread weed seeds. The accidental spread of both weeds and soil pathogens result in decreased native plant diversity. These impacts can be avoided or minimized by practicing daily park hygiene, such as cleaning equipment and personal gear at the appropriate times. As a result, the Park District has launched a series of ongoing prevention trainings across multiple disciplines.

Evidence of Sudden Oak Death is observed in this oak woodland in Briones Regional Park, Martinez.

Significant Reduction of Glyphosate (*Roundup*)

- Park maintenance (vegetation management around structures, fences, walkways, and parking areas) and right-of-way applications (vegetation management along roads, bike paths, trails, etc.) comprise the bulk of conventional and organic herbicides used for vegetation management. Overall, the volume of herbicide products used for vegetation management has decreased over the last three years. Meanwhile, landscape scale resource projects used a greater volume of herbicide product due to the addition of an organic herbicide product that requires higher rates for efficacy.
 - Overall use of glyphosate (*Roundup*) Park District-wide was reduced by 44% since reduction strategies were implemented in 2016.
 - Glyphosate use has been reduced by up to 66% in park maintenance activities and 54% in right-of-way since reduction strategies were implemented in 2016.
- ALL play areas and water fountains continue to be glyphosate-free.
- The Park District continues to focus on replacing the use of glyphosate with a new organic product replacement and early season treatment methods.



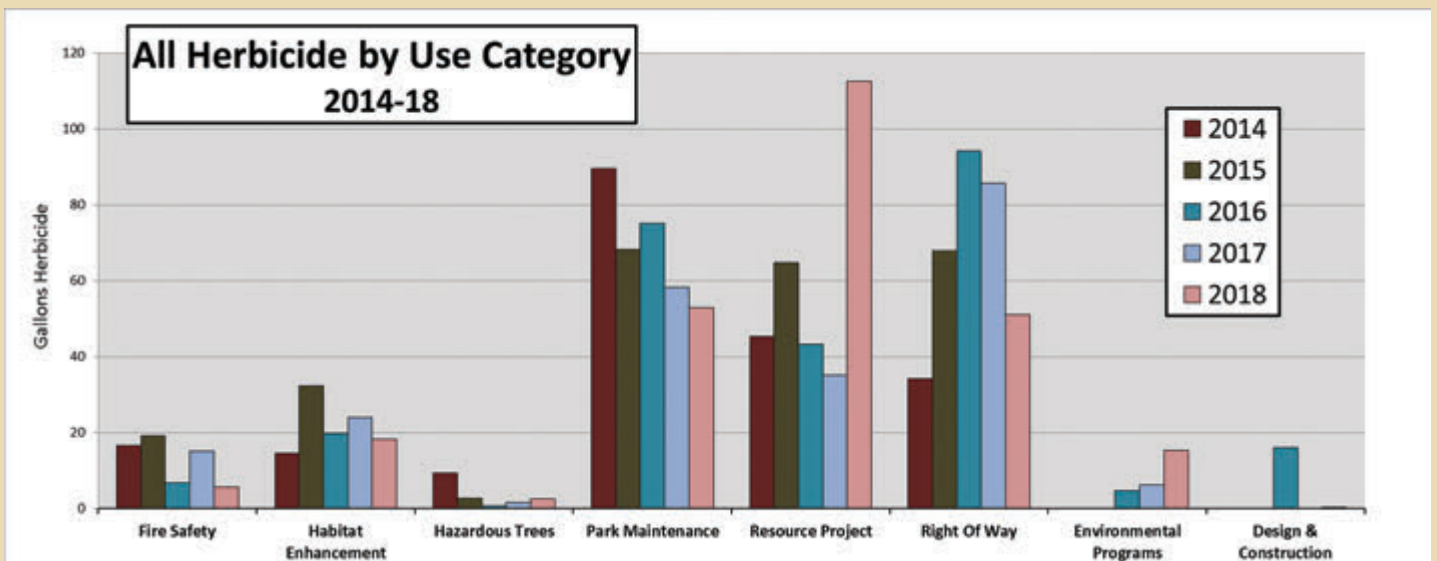
Right-of-way, Lake Chabot Regional Park, Castro Valley: mowing and line trimming along Nike Road.

2018 Highlights of the IPM Program

- Due to recent research, triclopyr product rates were cut, resulting in a 75% reduction in product volume without sacrificing efficacy.
- No beach closures at Lake Temescal occurred in 2018 due to harmful algal blooms. The Park District has emphasized a cultural treatment regime for the lake. Excess nutrient-rich sediment in the lake is one of the main causes of harmful algal blooms. In the fall of 2017 and spring of 2018, the IPM program treated the lake with a common, non-toxic water treatment method (aluminum sulfate) which rendered the nutrients less available to the algae.
- At Lake Anza, a state-of-the-art oxygenation system will break ground in 2019 after substantial preparation in 2018. The addition of oxygen prevents the release of phosphorous in deep sediments that are trapped behind dams.
- Park staff treated 86% of all vegetation management areas with a combination of mechanical and cultural methods.
- Volunteer programs in 2018 provided over 10,000 hours of invasive plant removal throughout Park District parklands.
- Least tern nesting bird populations continue to be successful after yearly invasive vegetation management on Least Tern Island.
- The Park District continues to treat the remaining four acres of artichoke thistle infestation in Wildcat Canyon Regional Park. This 98% reduction on over 500 acres occurred over 25 years in a coordinated campaign, with the Contra Costa County Agriculture Department, maintaining grassland habitat so that Santa Cruz tarplant can continue to thrive in Wildcat Canyon.



Lake Temescal, Oakland, is actively managed to remove excess algae and vegetation.



Pilot Programs

Early Weed Treatment: The Park District focused its 2017-18 IPM trainings on early, proactive weed control that included new identification and treatment tools and utilizing organic products with integration of mechanical and cultural techniques. Emphasizing early vegetation management using organic burndown herbicide around difficult to treat developments provided effective early season control for many parks. Effectiveness of this new, more natural tool is dependent on timing, when weeds are very small. The photo on the right illustrates this critical treatment timing and the burndown effects of these acidic oils.



Cultural Control of Aquatic Weeds: The Park District and the Bureau of Reclamation successfully negotiated for periodic water draw down to treat aquatic weeds at Contra Loma Regional Park. This cultural approach eliminates the need for aquatic herbicides and opens up opportunities for access to fishing and fishing derbies.

Rodenticide Reduction: Pilot programs to reduce rodenticide were successful in turf areas with the introduction of a new machine that produces carbon monoxide. Staff report that this new tool increases efficacy and efficiency in the treatment of moles and gophers.



Innovations in Training

Annual IPM Training

The IPM program provides annual integrated training for 200 field personnel. This training focuses on a variety of subjects that promote worker safety, including mechanical treatments, timed mowing, and weed ecology principles such as seed bank management and sampling. Each year new topics are offered to complement staff's wide variety of experiences and skills. Their training is based on pest management principles anchored in informed science, evolving methods and protocols contributing to best industry practices that ensures safety to the public, employees and the environment. As the science-based evidence in this field evolves, so, too, does the Park District's prevention methods.



Wildland Volunteer Network workshop participants tour Redwood Regional Park's Serpentine Prairie restoration.

Wildland Volunteer Network Workshops (California Invasive Plant Council)

The Park District partnered with the California Invasive Plant Council (Cal IPC) to train members of the public and Park District staff on how to work with volunteers safely and effectively. Topics included biology and ecology of invasive plants, management approaches, networking, and plant identification resources.

On-Site Inspection and Calibration Trainings

The IPM program staff conduct on-site trainings on weed identification, vegetation management strategies, product safety, calibration, and equipment upgrades.

Best Management Practices for Field Work

The Park District continues to offer trainings across multiple disciplines to prevent and minimize the spread of weeds and soil pathogens using multifaceted scientific approaches and methods.

Introduction to Bay Friendly Landscape Maintenance for Field Staff

Two trainings were offered for park staff in collaboration with ReScape California to introduce the Bay Friendly Landscape Maintenance Certification program. Topics included maintenance practices that reduce the use of pesticides, and emphasize prevention, watershed protection, soil health, carbon farming, composting, and firescaping.

Early Intervention and Education

Weed Strategy Resources

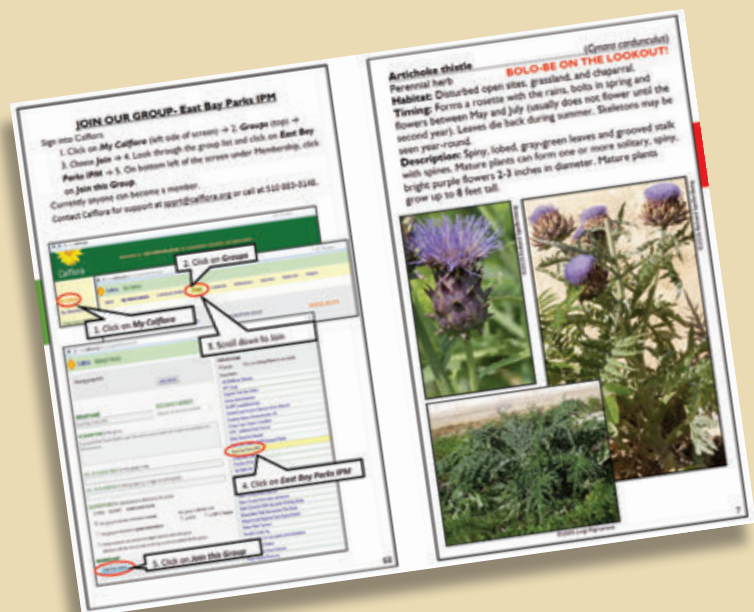
The IPM program produces a seasonal weed calendar that provides generalized treatments based on integrated methods to give staff more opportunity to organize and plan for their vegetation management and invasive weed work. IPM staff also produced an invasive weed guide to help staff identify noxious weeds in early stages prior to bloom. Proper identification at early stages will help staff utilize the most effective and safest form of treatment. For these and additional IPM resources, visit ebparks.org/ipm.



Many resources are used for vegetation management including goat grazing throughout the wildland-urban interface in the ridgeline parks.

Invasive Weed Identification Guide

The Park District produces and updates an Invasive Weed Identification Guide and Cal Flora Reporting Tutorial for park staff and the public (available at ebparks.org/ipm). Identification and mapping is a crucial step in early detection and rapid response practice. Knowledge and awareness facilitated by field staff and volunteers allows the Park District to identify threats and initiate early response where needed.



Restoring Habitats for Biodiversity

The Park District utilizes an integrated approach to the recovery of endangered species and restoration projects that protect and increase biological diversity and ecological functioning, such as creating more pollinator habitat, improvements to water quality, erosion control, and groundwater recharge.



Nesting Shorebird Islands and Least Tern Recovery

In partnership with the Park District's wildlife program and volunteers, the IPM program assists with weed control on two islands that support nesting shorebirds. One island is home to one of the most productive least tern colonies in Northern California (left photo).

Santa Cruz Tarplant Recovery and Artichoke Thistle Control

Control of artichoke thistle (left bottom photo) over the last two decades has resulted in the restoration and protection of naturalized annual and perennial native grasslands, providing habitat for the endangered Santa Cruz tarplant as well as many other native plants in Wildcat Canyon Regional Park.



Soft Bird's Beak and Perennial Pepperweed Control

Perennial pepperweed is an invasive plant that threatens coastal habitats, including soft bird's-beak, a rare plant found at Point Pinole. Recovery of soft bird's-beak is an ongoing collaboration among several Park District programs that require perennial pepperweed control along shoreline parks (above photo: pickleweed in foreground, soft bird's-beak in background).

Engaging Our Volunteers and Partners



Invasive Plant Volunteers

The Park District has a robust IPM program that is supported by many passionate wildland weed volunteers. Invasive weed control is the backbone of prevention and control as the Park District continues to manage and maximize diversity and habitat quality across its 122,000 acres. The District's volunteers contributed almost 10,000 hours of habitat enhancement service, hand pulling invasive weeds and planting competitive native plants and trees in 2018.



Oyster Bay Regional Shoreline and Earth Team

The Park District has been collaborating with Earth Team for three years to support development of the former landfill into recreational opportunities at Oyster Bay Regional Shoreline. Students have been planting trees and coastal sage scrub species that will support overwintering monarch butterflies and create an urban forest that delineates an 18-acre disc golf course. Students also help control invasive species by planting and weeding around the trees and coastal sage scrubs.



Transparency, Accountability and Accurate Record Keeping

The IPM program tracks all regulated pesticides used in the District and records usage by park, month, and amount of product. For a list of all general use products used throughout the District, see **Appendix A**.

See **Appendix B** for a complete list of chemicals used by park staff and contractors.

Appendix C and D provide chemical usage information on the Park District's Golf Courses and concessionaires.

In addition, Park staff have begun tracking the amount of time they spend on cultural and mechanical pest management and vegetation control in their parks. This level of detail takes time to capture but the Park District is committed to managing a successful and effective program.

Appendix A: Approved General Use Products

Organic Products

Organic and safer products continue to be an important part of the Park District IPM tool box (see below). The IPM program continues to expand its product list with safer and organically-derived pesticide products.

- **Civitas Turf Defense** is a mineral oil product (EPA Reg. No. 69526-17) that is used to protect golf course greens from insect and fungal damage.
- **Competitor** is a modified vegetable oil that does not contain nonyl-phenol ethoxylate, a suspected endocrine disruptor (CA Reg. No. 2935-50173). It is used as a surfactant and penetrant with triclopyr products.
- **Essentria IC3** is an essential oil-based broad spectrum insecticide that is used around Park District buildings.
- **Fiesta** is a turf weed killer with the active ingredient Iron HEDTA (EPA Reg. No. 67702-26-87865). It works as a burndown product, causing iron toxicity to broad-leaved weeds.
- **Green Clean Algaecide** is a hydrogen peroxide-based product (OMRI) that is used by contractors to treat public health threats such as harmful algal blooms and E. coli outbreaks at swim beaches (EPA Reg. No. 70299-4).
- **Suppress EC** is an OMRI registered non-selective, foliar burndown herbicide (EPA Reg. No. 51517-9). This product contains 79% of the active ingredients caprylic and capric acids.
- **Terad3 Rodenticide** with the active ingredient Cholecalciferol, is an acute toxin that does not cause secondary poisoning. It is used around food service buildings in tamper proof bait boxes.



New protocols utilizing organic methods combined with early season treatments provide fire safety for Del Valle Regional Park's picnic areas.



Before forest thinning



After forest thinning

Conventional Products

Use of conventional, also called synthetic, pesticides continues to decline. The Park District's use of conventional products in 2018 declined by 39% from the previous year. This is due in large part to the continued emphasis of mechanical and cultural methods that are the backbone of pest management at the Park District. Additional contributing factors included the focus of early weed control, using lower concentrations, and the reduction of treatment area footprints.

- **Bee Bopper** is a knockdown, shootable stream insecticide with the active ingredients of Tetramethrin and 3-Phenoxybenzyl, that is used on late season yellow jacket nests that are a public health threat (EPA Reg. No. 7754-44).
- **Diphacinone** is an anticoagulant rodenticide dispensed in bait stations specifically for the control of ground squirrels. Products in this category include treated grain bait (0.001% active ingredient) manufactured by Alameda County Agricultural Department (CA Reg. No. 10965-50001).
- **Gas Cartridges** are an asphyxiant rodenticide manufactured by the USDA with active ingredients of sodium nitrate and charcoal (EPA Reg. No. 56228-2). It is primarily used for gopher control in turf.
- **Glyphosate** (i.e. Roundup) is a broad spectrum, non-selective post-emergent herbicide used in landscape, right-of-way and open space. These products include: Roundup Custom (formerly Aquamaster) (EPA Reg. No. 524-343) and Roundup Pro Max (524-579).
- **Indaziflam** is a broad spectrum pre-emergent herbicide used in landscape and right-of-ways. This product is sold as Specticle Flo (EPA Reg. No. 432-1518). This product contains 7.4% of the active ingredient indaziflam.
- **Triclopyr** (i.e. Garlon) is a broadleaf, selective, post-emergent herbicide used principally for the control of resprouts from woody plant species such as eucalyptus, mayten, acacia and broom species. Products in this category include Garlon 4 Ultra (EPA Reg. No. 62719-527) with 60.45% active ingredient and Pathfinder (EPA Reg. No. 62719-176) with 13.6% active ingredient.

Appendix B: All Products by All Parks

All products are listed by active ingredient and by volume of product.

Park	Purpose	Applicator	Bee Bopper, oz	Capstone, gal	Clearcast, gal	Competitor, gal	Diphacinone, lbs	envoy plus, gal	Esplanade 200SC, gal	Garlon 3A, gal	Garlon 4 Ultra, gal	Gas Cartridges, oz	Green Clean Pro, lbs	Hasten Oil, gal	Liberate, gal	Milestone, oz	MSO, gal	Pathfinder II, gal	Phoslock, lbs	Physan 20, oz	Polaris, gal	Pro-Spreader-Activator, gal	Pro-Tron, gal	R-11, gal	RoundUp Custom, gal	RoundUp Pro, gal	Roundup Pro Max, gal	Specticle Flo, oz	Stylet Oil, oz	Suppress, gal	Telar, oz	Transline, gal	Turflon, gal	VistaXRT, gal				
AC	Fields	Contractor				2.44					1.63																											
AC	Habitat Enhancement	Park Staff				3.79					1.77			1.50																								
AC	Hazardous Trees	Park Staff				0.31					0.06																											
AC	Park Maintenance	Park Staff				5.80					0.28															0.31												
AC	Resource Project	County Ag				2.00					0.44																											
ACT	Park Maintenance	Park Staff				0.33					0.11																											
ACT	Right Of Way	Park Staff																																				
AF	Park Maintenance	Contractor							0.24																													
AF	Public Health	Park Staff																																				
BD	Habitat Enhancement	Park Staff				5.13					3.54																											
BD	Hazardous Trees	Park Staff				0.75					0.38																											
BD	Park Maintenance	Park Staff									0.38																											
BD	Right Of Way	Park Staff									0.01																											
BG	Hazardous Trees	Park Staff																																				
BG	Park Maintenance	Park Staff																																				
BN	Resource Project	PMA				4.38																																
BN	Right Of Way	Park Staff									0.16																											
BN	Park Maintenance	Park Staff																																				
CB	Habitat Enhancement	Park Staff				0.04																																
CB	Park Maintenance	County Ag					100				0.10																											
CC	Public Health	Park Staff																																				
CC	Right Of Way	Park Staff				28																																
CT	Right Of Way	Park Staff				0.59																																
CH	Park Maintenance	Park Staff																																				
CH	Resource Project	PMA				22.50					5.00																											
CH	Right Of Way	Park Staff																																				
CL	Park Maintenance	Park Staff																																				
DC	Park Maintenance	Park Staff				0.07																																
DF	Habitat Enhancement	Park Staff				0.13					0.17																											
DF	Park Maintenance	Park Staff																																				
DV	Park Maintenance	Contractor																																				
DV	Right Of Way	County Ag					120																															
DW	Resource Project	County Ag																																				
ECC	Environmental Programs	Contractor				9.35																																
ECC	Park Maintenance	Park Staff				42																																
ECC	Public Health	Park Staff									0.06																											
ECC	Resource Project	PMA				0.08																																
ECC	Right Of Way	Park Staff							0.58																													

Appendix B: All Products by All Parks, continued

Park	Purpose	Applicator	Bee Bopper, oz	Capstone, gal	Clearcast, gal	Competitor, gal	Diphacinone, lbs	envoy plus, gal	Esplanade 2005C, gal	Garlon 3A, gal	Garlon 4 Ultra, gal	Gas Cartridges, oz	Green Clean Pro, lbs	Hasten Oil, gal	Liberate, gal	Milestone, oz	MSO, gal	Pathfinder II, gal	Phoslock, lbs	Physan 20, oz	Polaris, gal	Pro-Spreader-Activator, gal	Pro-Tron, gal	R-11, gal	RoundUp Custom, gal	RoundUp Pro, gal	Roundup Pro Max, gal	Specticle Flo, oz	Stylet Oil, oz	Suppress, gal	Telar, oz	Transline, gal	Turflon, gal	VistaXRT, gal				
GD	Park Maintenance Resource Project	Park Staff Contractor				1.88																																
GD	Resource Project	County Ag				14.09											18																					
HS	Resource Project	IPM				0.05											5.25				41.46				0.19													
HS	Right Of Way	Park Staff				2.33											21				0.15																	
LC	Habitat Enhancement	Park Staff																																				
LC	Park Maintenance	Park Staff																																				
LT	Park Maintenance	Park Staff																																				
LT	Right Of Way	Park Staff																																				
MK	Habitat Enhancement	Park Staff				1.00											7																					
MK	Park Maintenance	Park Staff																			0.28																	
MK	Resource Project	IPM				0.09																																
MILK	Park Maintenance	County Ag																																				
MILK	Resource Project	IPM				14.47											18.65				31.96	2.81			0.05	1.13												
PP	Environmental Programs	Contractor				2.70																																
PP	Habitat Enhancement	Park Staff				0.004															0.01																	
PP	Hazardous Trees	Contractor																																				
PP	Park Maintenance	Park Staff																																				
PP	Resource Project	IPM				0.44															1.06																	
PP	Right Of Way	Park Staff																																				
PR	Environmental Programs	Contractor																																				
PR	Resource Project	County Ag																																				
PR	Park Maintenance	Park Staff																																				
PR	Resource Project	IPM				0.56																																
QL	Habitat Enhancement	Park Staff																																				
QL	Park Maintenance	Park Staff																																				
SC	Park Maintenance	Park Staff				0.03																																
SC	Resource Project	IPM				0.88																																
SC	Right Of Way	Park Staff																																				
SP	Park Maintenance	Park Staff																																				
SU	Park Maintenance	Park Staff																																				
SU	Resource Project	County Ag				0.89																																
TL	Design & Construction	Contractor				0.24																																
TL	Fuels	Contractor				0.03																																
TL	Habitat Enhancement	Park Staff				1.64																																
TL	Park Maintenance	Park Staff																																				
TMA	Park Maintenance	IPM				0.63																																
TMA	Park Maintenance	IPM				0.23																																
TMA	Public Health	IPM											650																									
VH	Park Maintenance	Park Staff																																				
VH	Resource Project	IPM																																				
WIC	Fuels	Contractor				1.63																																
WIC	Habitat Enhancement	Park Staff																																				
WIC	Hazardous Trees	Park Staff																																				
WIC	Resource Project	IPM				2.00																																

Appendix C Golf Course Products

	chlorothalonil, gal	clopyralid, gal	diquat, gal	ethephon, gal	fluazinam, gal	fluxapyroxad, gal	glyphosate, gal	indaziflam, gal	iprodione, gal	mineral oil, gal	penoxsulam, gal	penthiopyrad, gal	propiconazole, gal	tebuconazole, gal	trinexapac-ethyl, gal	polyoxin D zinc, lbs	pyraclostrobin, triticonazole, lbs
Tilden	5.00	0.87	0.31	20.00	1.05		2.09	0.04	10.03	121.50	0.47	0.41	2.50	1.02	4.16		
Redwood Canyon	18.05				1.09	1.50	1.05				1			6.56	0.30	23.10	60.00

Appendix D Organic Farming Products

Perry Farms, Ardenwood Historic Farm	
ACTIVE INGREDIENT	AMOUNT
bacillus thuringiensis	8 lbs.
bacillus thuringiensis	3 oz.
citrus oil	13 oz.
fluoroacetic acid	40 oz.
potassium salts	656 oz.
pyrethrins	134 oz.
spinosad	19 oz.
streptomyces lydicus WYEC 108	2 oz.
sulfur	500 lbs.



Photo: Jerry Ting

Integrated Pest Management Annual Report 2018



2950 Peralta Oaks Court, Oakland, CA 94605
Tel: 1-888-EBPARKS or 1-888-327-2757 (TRS 711)
ebparks.org



*The restored Serpentine Prairie in
Redwood Regional Park, Oakland.*