

# Integrated Pest Management Annual Report 2019



Photo: Michael Short



Photo: Eric Nicholas





## Preserving Open Space for the Future

The East Bay Regional Park District (Park District) is the largest land owner in the East Bay, overseeing a diverse landscape of 125,000 acres in Alameda and Contra Costa counties and incorporating a regional system of 73 parks and 1,333 miles of trails. Serving 2.8 million East Bay residents with approximately 25 million visits per year, the Park District is the nation's largest regional park agency.

This annual report provides factually transparent information about pest management in the vast and diverse parklands of the Park District. It highlights the variety of pest control methods and projects in the Integrated Pest Management (IPM) program.

Managing the large expanse of open space within the Park District's jurisdiction requires strategic planning and effective policies. 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 prevention and effective control of pests in a continual, sustainable, and ecologically-principled way, while relying on scientific and evidence-based best practices. The Park District's IPM Program is an essential component of the ongoing maintenance of healthy ecosystems that benefit the vitality of wildlife and the quality of park experiences for our visitors.

### The principal goals of the Park District's IPM program are:

**Healthy Forests** Park District wide efforts to reduce risk of catastrophic fire in the wildland and urban interface. This program is primarily run by the Fire and Stewardship departments.

**Public Health** Remediation of pests that pose a threat to public health such as treatments for ticks, E. coli, and harmful algal blooms. Stewardship and Operations departments oversee this program.

**Ecological Function** Vegetation and pest management to promote and maintain sensitive natural resources and increase biodiversity. This broad category includes habitat enhancement, ecological restoration projects, and environmental programs. It is carried out by several departments, including Stewardship, Operations, Environmental Programs, and Design and Construction.

**Safe and Accessible Recreation** Vegetation management to maintain recreational use, including landscaping, gardens and other recreational uses. Operations manages the bulk of the recreation infrastructure.

**Fire Safety** Vegetation management around ignition sources, maintaining building perimeters and fire access in areas that are prone to ignition and in fire prone areas. These include trails, roads, barbecues and fire pits, campgrounds, high use picnic areas, parking lots, buildings, and infrastructure perimeters.

*Healthy and vibrant grasslands  
in Pleasanton Ridge Regional Park,  
Pleasanton.*

## Commitment to Natural Resource Management

The Park District's mission statement continues to be an inspiration and an enduring testimonial to the Park District's commitment to protect 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

Consistent with this mission, the Park District's IPM policy fosters the protection of natural and recreational resources, while minimizing 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, October 1987 Resolution #1987-11-325

### Keystone Tenets of IPM:

The Park District strives to manage pests in the most effective and safest manner for our park visitors and our employees by adhering to an Integrated Pest Management program. This IPM program is a multidisciplinary and cross-departmental effort based on an environmental ethos and within a framework of values, including accountability and transparency.

The management and operation of public parklands 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.

Prevention is the key to safe and effective pest management followed by actions based on best science, weight of evidence principles, best practices, and the Park District's environmental ethos.

**“The Park District has a strong commitment to supporting ecological health and safe recreation. Our Stewardship Department continues to look for effective non-chemical methods to support these goals.”**

– Matt Gaul,  
Chief of Stewardship

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

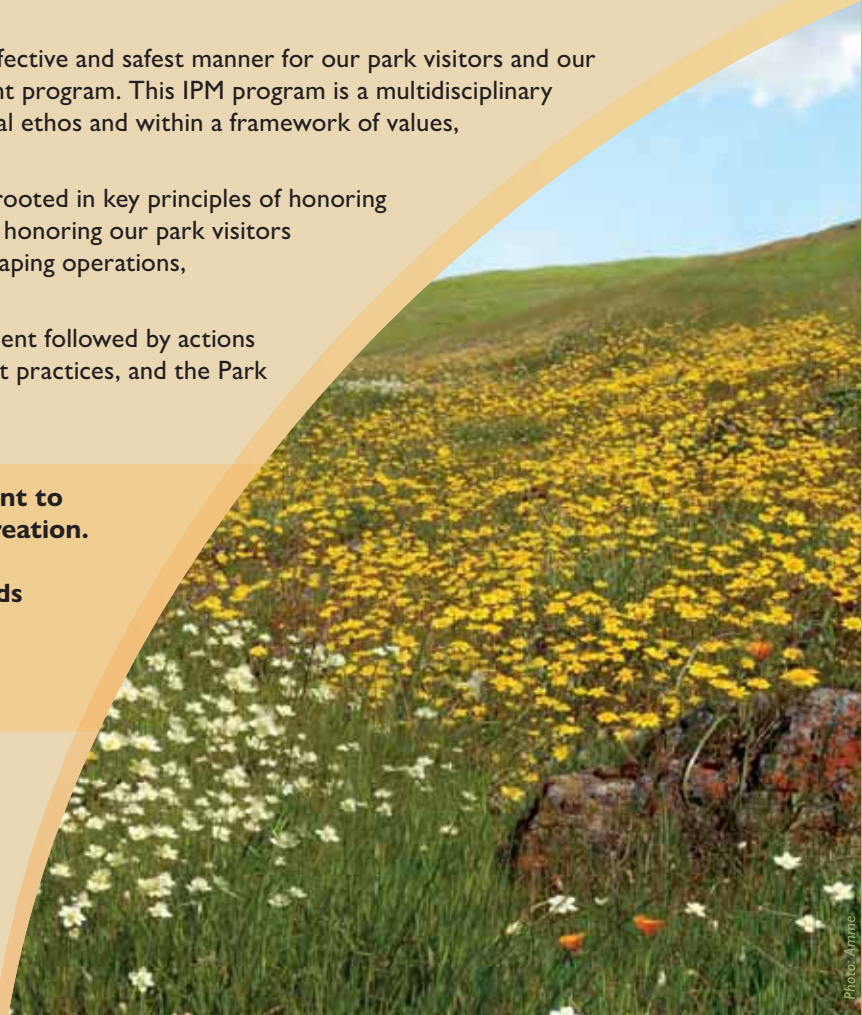


Photo: Airphoto

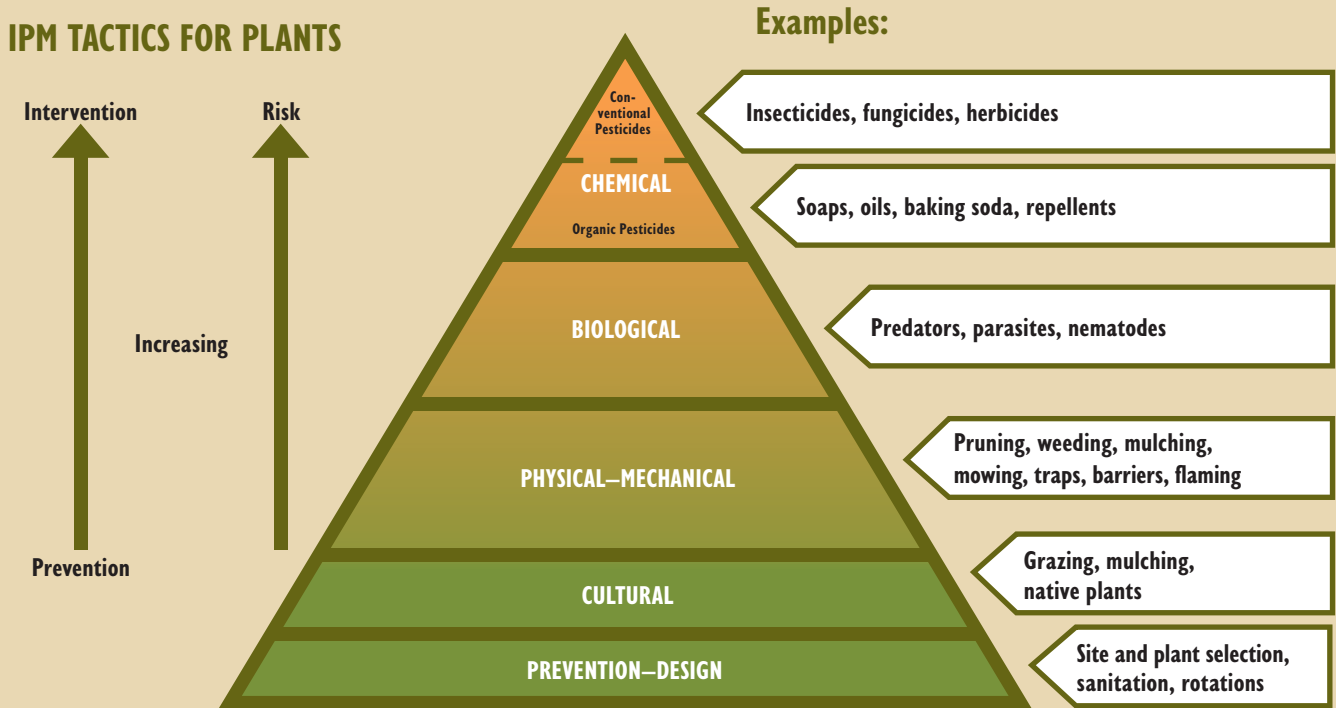
# Integrated Approaches in the Park District

## What is Integrated Pest Management?

IPM is a widely accepted, scientific approach to pest management. A pest is any organism that causes damage to human health, safety, recreation, or environmental function. In the Park District, the bulk of pests are nuisance weeds that limit public access to open spaces, pose a fire risk, and degrade recreational enjoyment. In addition, IPM targets noxious weeds that threaten biological diversity and ecological function. Additionally, higher organisms such as ticks, yellow jackets, rattlesnakes, rats, and mice are also 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.



**Figure 1: Integrated Pest Management hierarchy of methods**

Since the inception of its first Integrated Pest Management policy, the Park District's management of pests has been 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 an enhanced park and trail environment for our park visitors, surrounding neighbors, and park employees.

The Park District utilizes IPM to protect and preserve diverse ecological habitats for native and endangered animals and plants that live in the foliage, forests, creeks, and grasslands of our parks. Our IPM program is a key element of the Park District's practices that support and enhance the diverse habitats through pest management of structural, recreational, and wildland pests.



# Integrated Approaches in the Park District

## IPM Methodology

IPM is not a single pest control method but, rather, a series of pest management evaluations, decisions, and controls. 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 prevent the introduction and spread of pests. Many insects, weeds, and other living organisms do not require control. IPM programs work to monitor for pests and identify them accurately, so that appropriate control decisions can be determined and acted on early.

## Methods

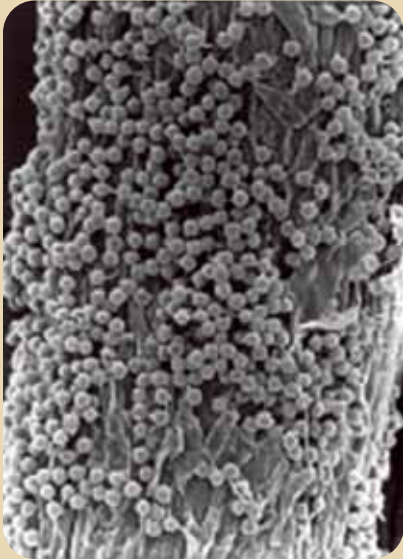
IPM methods of control fall under one of several categories: cultural, mechanical, biological, or chemical, and are listed in the order that indicates their importance and sustainability. Adaptive management provides feedback to this dynamic cycle of land management. Integrating the following approaches 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** applied to reduce pests are mulching, grazing, and competitive planting with native plants. These methods are used on a park and landscape-scale across our diverse parks. 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 the fundamental tool to control vegetation along roads and trails, to reduce fire risk while providing park maintenance. Most fire roads and trails are rough mowed or line trimmed and 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 and their biocontrol programs in various parks.
- **Chemical controls** include the use of organically registered and conventional products that are used to control plants, insects, fungi, or other pests. Conventional and organic herbicides pesticides are used when mechanical and cultural methods are insufficient or ineffective. Conventional or organic products are never used in and around play structures and drinking fountains.



*Clockwise from top: Volunteers add compost amendments to tree plantings; Mowing adjacent to parking lots and road sides maintain vegetation and water quality; Invasive plant control benefits biological diversity.*

## Preventing New Pest Threats



**Figure 2: Electron micrograph of phytophthora zoospores that attach to root hairs and drain nutrients and moisture from plants causing disease and even death.**

Prevention is the cornerstone to any IPM program. The Park District trains its staff every year in mapping and monitoring for new threats to our wildlands and recreational activities. Additionally, the public is encouraged to map weeds through the mobile platform of CalFlora. Staff utilize this valuable community science tool to focus efforts and prioritize actions.

Infection by *Phytophthora* species, microscopic water molds, has emerged as a significant threat to many plant species and special communities.

In particular, Sudden Oak Death (SOD), is caused by the airborne *Phytophthora ramorum* and continues to have severe negative impacts on the East Bay's oak woodlands. Recent 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 airborne water mold. Additional studies indicate that as many as 30% of oaks are resistant to the pathogen, recovering and persisting after infection for as long as 9 years. Management and trainings emphasize the role of park hygiene and best practices in limiting the spread of this devastating disease.

Introductions of other virulent *Phytophthora* species have occurred in the Bay Area and in our parklands through infected nursery stock as well as reusing dirty equipment. Trainings and surveillance continued throughout the Park District in 2019 to prevent the further spread of these potentially deadly pathogens. Education and training on pathogen prevention will continue to be an important component of the Park District's IPM program.



**An oak grove in Sycamore Valley Open Space Regional Preserve, Danville.**



## Maintaining Safe Parks

### Glyphosate-Free Parks

- 2019 was a year for change in the Park District. In July, glyphosate use was removed from general use in developed areas in response to public concerns over its safety. Specific parks within the Park District had already begun reduction in glyphosate use and Board Resolution 2019-07-187 helped accelerate its phase out. As a result, use of glyphosate has dropped 82% since 2016, when reduction was initiated. Park District staff used this broad-spectrum herbicide ONLY in the Ecological Function category outside of developed areas.
- Park staff increased use of pre-emergent and organic burndown hybrid treatments for all bare ground applications in the Fire Safety category after a focused training in the fall highlighted this new approach. Timing of the organic burndown was refined to target weeds in the very early stages of growth to achieve greater efficacy by park staff. Application of this early winter treatment proved challenging to parks with reduced staffing in the off season.
- IPM biologists performed trials with a new organic product, that has shown promise in organic agriculture. Expanded trials are anticipated for 2020.



### Controlling Cyanobacteria Algae

- Management of Harmful Algal Blooms (HABs) was successful and 2019 was the second year without any swimming closures due to HABS at Lake Temescal. By applying an Alum treatment in 2018, the Park District effectively controlled nuisance algal growth in the swim area to prevent cyanobacteria amassing in this popular open water swimming facility. However, ongoing monitoring revealed that nutrient levels from lake sediments began to increase in late 2019. Additionally, Lake Temescal continued to have sewage spills from the City of Oakland's aging infrastructure. These overflows contribute nutrients that further increase algal growth and impact recreational activities. This will likely lead to future blooms. Preparations began in 2019 for additional remediation measures to be implemented in 2020.

### Highlights

- After habitat modifications such as burrow destruction were insufficient to control ground squirrels, successful trapping efforts eliminated the need for rodenticides in two parks for the 2019 season.
- Trainings and partnerships with outside agencies occurred throughout the year to increase Park District staff's knowledge and efficacy in implementing non-chemical methods.
- Volunteer programs in 2019 provided over 4,135 hours of invasive plant removal throughout regional parklands and shorelines.
- Vegetation management on shorebird nesting islands was successful in controlling various annual and perennial weeds that deter nesting of many migratory shorebirds along our bay shoreline. Least tern nesting bird populations continue to be successful after our yearly invasive vegetation management.

- **At Lake Anza, a state-of-the-art oxygenation system broke ground in 2019 after substantial preparation during the previous year. This oxygenation system is designed to reduce harmful algal blooms and improve water quality. The addition of oxygen prevents the release of phosphorous in deep sediments that are trapped behind dams.**

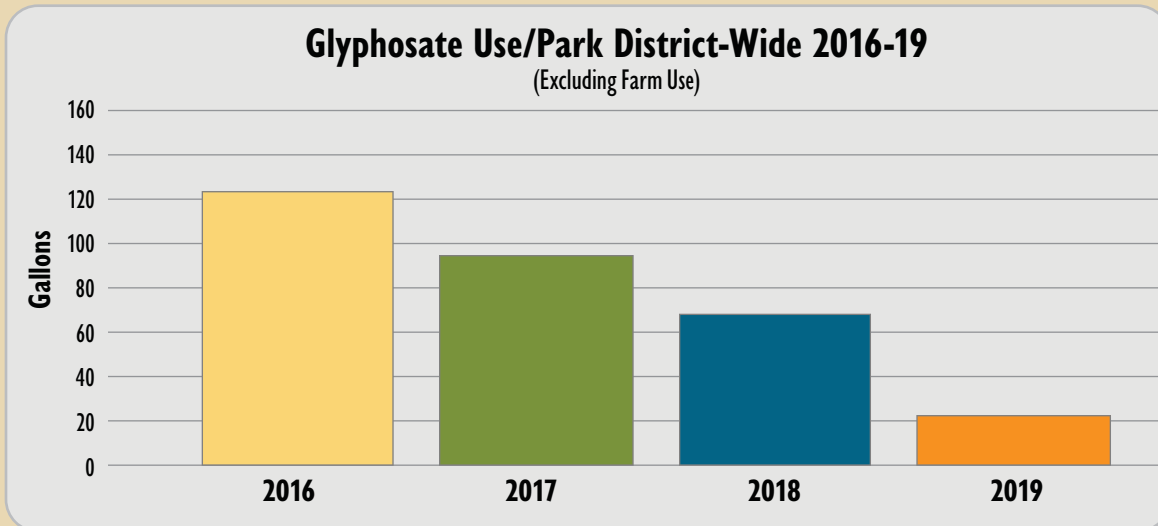
Lake Anza  
Swim Facility.



Photo: Shelly Lewis

## Conventional and Organic Product Trends

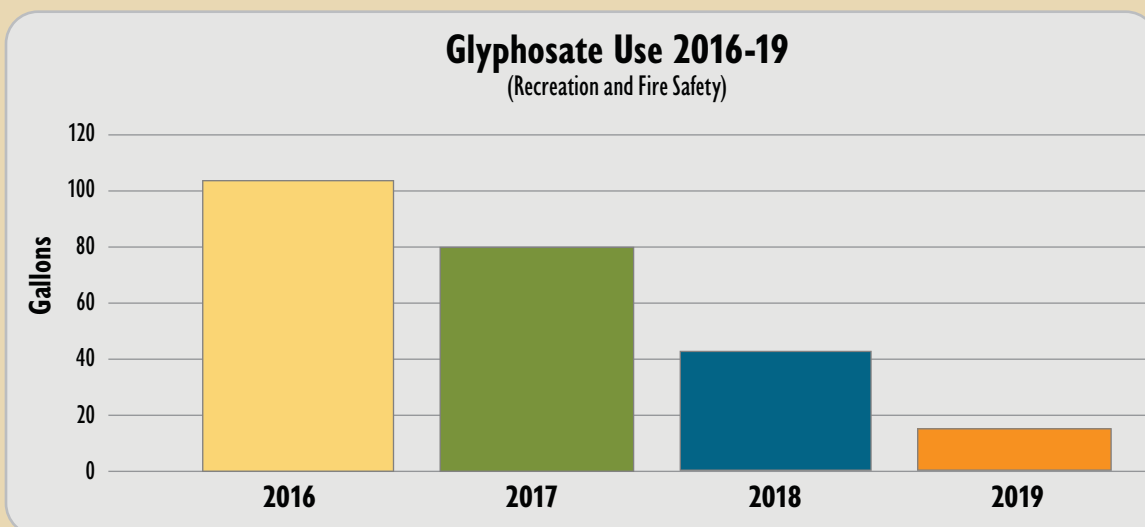
For a list of all products used throughout the Park District, see Appendices A through F.



**Figure 3:** Glyphosate use reductions over four years for all category of uses except farming.

• The Park District's use of glyphosate (Round Up) has declined by 82% since reduction strategies were first implemented in 2016 (Figure 3).

- **ALL** regional park play areas and water fountains continue to be glyphosate-free.
- All developed areas are glyphosate free starting August 2019.
- The Park District continues to increase its proficiency and use of organic herbicides to supplement its cultural and mechanical practices.



**Figure 4:** Glyphosate reductions over four years in the combined Safe and Accessible Recreation, Fire Safety categories of use.

- In Recreation and Fire Safety activities, glyphosate product use has been reduced by up to 87% since reduction strategies were implemented in 2016 (Figure 4).
- Park staff report that the organic burndown herbicide is effective on very young annual weeds but is unsuccessful in controlling perennial plants. Timing is critical and staffing challenges made weed management in the Fire Safety category difficult in many parks.



## Conventional and Organic Product Trends

### Triclopyr Products/Gallon (Garlon)

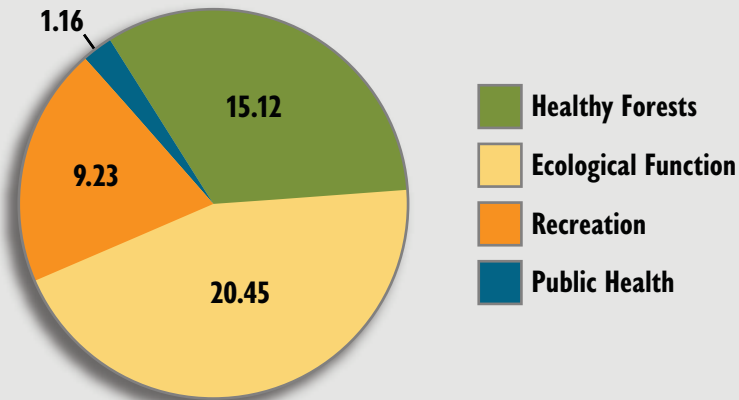


Figure 5: Broadleaf selective herbicide use in 2019 across use categories.

- Triclopyr (Garlon) continues to be used primarily in the Ecological Function and Healthy Forests categories. This selective herbicide is used to control broadleaf weeds and woody resprouting species like poison oak, woody brush and eucalyptus (Figure 5).
- Triclopyr remains the most effective tool in controlling resprouts in fuel management areas.
- Despite exponential growth in acreage, the Park District continues to minimize herbicide use and had a sharp decline in use starting in 2016 (Figure 6).



Eucalyptus forest before thinning.



Eucalyptus forest after thinning.

### Nineteen-Year Herbicide Use

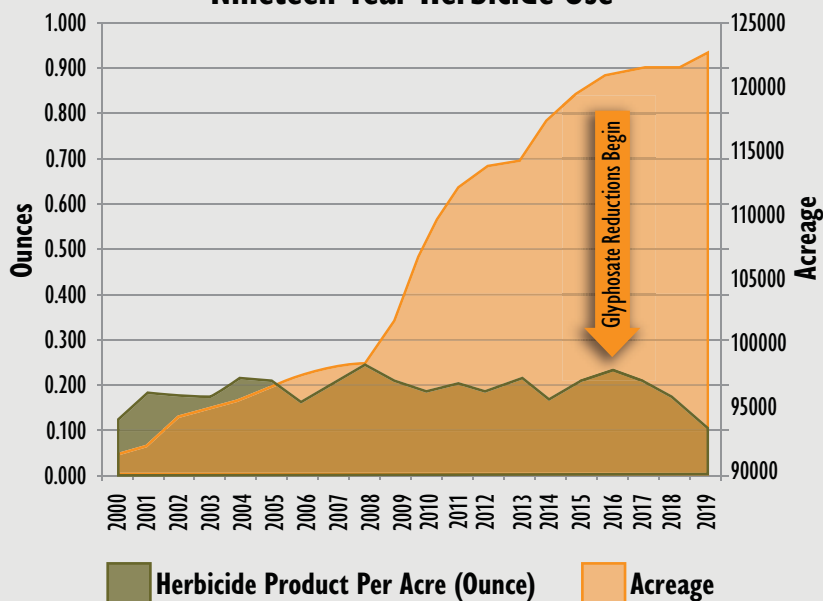


Figure 6: Nineteen-year herbicide use (all products except farm and golf course use) normalized by acreage managed.

## IPM Programs

### Early Weed Treatment

Training in fall 2019 focused on the steps needed to eliminate glyphosate usage while still meeting the IPM goals and objectives. The Park District focused on utilizing a pro-active weed treatment for Fire Safety around barbecues, fire pits, fire strips along roads and around residences. This method utilizes a low risk pre-emergent in combination with an organic burndown herbicide. Timing and site preparation are critical to successful treatment. Effectiveness of this new, approach is dependent on timing treatment when weeds are very small. Data captured through photo point monitoring and record keeping helps aid in an adaptive management framework. Figure 7 illustrates this critical treatment timing and the burndown effects of these acidic oils.



**Figure 7: Bare ground fire strip along campground road at Anthony Chabot.**



**Invasive parrot's feather likely dumped from an aquarium, at Don Castro Reservoir.**

### Aquatic Weed Control

Excess aquatic weeds limit access to fishing and can decrease safety for swimmers. In 2019, IPM staff experimented with lowering the water level to reduce weeds. However, water draw down at Contra Loma was not effective in controlling aquatic weeds due to basin geometry. Submerged and emergent aquatic weeds were subsequently controlled by mechanical harvesting in the fall. Research and trials continue to be conducted by Contra Costa Water District on the feasibility and efficacy of ultraviolet light treatments in this water conveyance system.

The Park District, in collaboration with the Alameda County Flood Control District, treated parrot's feather at Don Castro. This aquarium escapee can quickly overtake small reservoirs, depleting dissolved oxygen levels, and impacting aquatic systems that can lead to fish kills.



## Important Tools for Fuel Management

### Rodenticide Reductions

Staff continues to expand its use of a machine that produces carbon monoxide and is used for vertebrate control in high-use turf areas. This machine supplements the Park District's vertebrate trapping efforts; necessary for areas where the gas readily escapes due to infrastructure or other sub-surface conditions. In 2019, ground squirrel trapping was successful in two parks and replaced the use of rodenticide bait. Trapping of rodents, while more expensive, is preferred because it eliminates off target damage.



### Noxious Rangeland Weed Control

IPM and park staff continued their multi-year commitment to control artichoke thistle in all parks, with an intense focus on areas within Wildcat Canyon Regional Park. After 25 years, and over 95% reductions, biologists continue to seek out remnant populations and isolated plants over the entire extent of the project area. Current control measures are resource intensive and require exhaustive cross-county travel and bush whacking. However, substantially less chemical treatment is required as we focus in on the last 5% of this tenacious weed.

The IPM department continues to treat other threats to rangeland ecosystems including noxious weeds like barb goatgrass, medusahead, and yellow star thistle. Barb goatgrass poses a particular threat since it is capable of colonizing areas previously thought to support only native grasses and forbs – such as vernal pools, serpentine prairies, and oak woodlands. Efforts to assess the location and extent of these noxious weed populations and ensure a rapid response in treatment continue throughout both counties as new noxious weeds are sighted.

***Artichoke thistle control and grassland restoration at Wildcat Canyon: 2015 (first year of treatment) and in 2019.***

# Innovations in Training and Collaboration

## Annual IPM Training

The IPM program conducts its annual training for 200 field staff, focusing on key principles of mechanical treatments such as timed mowing and weed ecology which includes seed bank management and sampling. Each year new topics are offered to expand staff's experiences and skills.

Training on pest management principles are based upon informed science, evolving new methods and protocols and best industry practices that ensure safety to the public and employees at all times. As the science and empirically-based evidence in this field evolve, so do the Park District's prevention methods. Training in fall 2019 focused on phasing out use of glyphosate and the importance of early season weed management. Additional topics included using organic products, rate reduction, and application foot print reduction of conventional products.



*IPM biologists partnered with California Invasive Plant Council to train East Bay Civicorps in ecology principles that are applicable to their vegetation management work.*

## Wildland Volunteer Network Workshops (California Invasive Plant Council)

The IPM department partnered with the California Invasive Plant Council (Cal IPC) and Department of Pesticide Regulation and other Bay Area land managers, to develop a suite of best management practices for non-chemical methods of vegetation control. Two trainings were held for park staff and the public to gather techniques and experiences from a wide group of practitioners. The findings were presented to the public and park staff in the fall.

## Field Visits and Calibration Trainings

The IPM program conducts onsite trainings for park staff on weed identification, vegetation management strategies, product safety, calibration, and equipment upgrades.

## Best Management Practices for Field Work

The IPM department continues to offer prevention trainings and guidelines to minimize the spread of weeds and soil pathogens across multiple departments. This year's training, given to staff rangers in every park unit, highlighted methods of planting that avoid the inadvertent introduction of pathogens from nursery stock. Available planting methods include: passive restoration, assisted passive restoration, in-field propagations, and seeding.

## Weed Strategy Resources

The IPM department launched the development of an IPM Plan Template in late 2019. This template will serve as a guidance document for parks to catalogue their resources, management areas and practices, and develop their own plan for managing pests in their parklands. Further edits, refinement, and field testing will occur in 2020.



## Innovations in Cultural Applications

### Lake Anza Oxygenation System

A cultural method is one that changes the environment of the pest, such that it no longer causes damage. The Park District has begun the installation of a hypolimnetic oxygenation delivery system to treat the deep, oxygen-poor waters of Lake Anza to reduce the amount of phosphorous that is released from legacy sediments. Phosphorous-rich sediments, typical of coastal California geology, build up behind dams. Over time, these nutrient-laden sediments contribute to increases in photosynthetic cyanobacteria. As reservoirs age, they become plagued by cyanobacteria blooms that can sometimes release toxins and limit recreational contact. The Park District anticipates that the oxygenation system will be fully operational for the 2021 swim season.



### Fire Safety through Targeted Grazing

*The “Baaa” Team:* The Park District grazes over 600 acres with goats along the Wildland Urban Interface (WUI) to control fuel build up in very steep, difficult-to-treat terrain and vegetation. Some of these terrains dominate the popular hill parks of Richmond, Berkeley, Oakland and Castro Valley. Herds of hundreds of goats steward our land while consuming invasive weeds, poison oak, and other dense vegetation that would be impossible to control by mechanical hand crews alone.

### Burning Invigorates Native Plant Communities

The Park District’s Fire Department responds to fire, medical, and other emergencies 365 days a year. However, a few times a year, fire crews come to the rescue of the landscape, gracing our coastal prairies with prescription fire. These prescription burns remove thatch and invigorate coastal prairies where our native grasses and forbs persist. Thanks to this cultural practice, this indigenous method of land maintenance continues to steward these remnant plant communities.



Photo: Steve Bobzien

## Restoring Habitats for Biodiversity

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

### Cape Ivy Control and Riparian Plant Community Restoration

IPM biologists began treatment of 12 acres of extensive patches of this pernicious vine in Leona Canyon in late 2019. Cape Ivy forms a mono culture and smothers native plants and habitat. It can also spread very easily as broken fragments of the plant can germinate. Steep hillsides and thick understory made the hand application of a selective herbicide particularly challenging, but watching the recovery of the native plant community rewards the effort.



*Invasive cape ivy smothers native trees, shrubs, and interpretive panels in Leona Canyon.*



*American avocet chick enjoys the protective camouflage of oyster shell and sand substrate after vegetation management removed weeds.*

### 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 of which is home to one of the most productive least tern colonies in Northern California. In 2019, the IPM department partnered with Earth Team teens to grub out weeds in adjacent uplands that provide weed pressure on the islands.

### Santa Cruz Tarplant Recovery and Artichoke Thistle Control

The Park District continues to treat the remaining four acres of artichoke thistle infestation in Wildcat Canyon Regional Park. This 98% reduction from over 500 acres occurred over 25 years in a coordinated campaign with the Contra Costa County Agriculture Department, maintaining grassland habitat for Santa Cruz tarplant and many other native plants.

Control of artichoke thistle 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 forbs in Wildcat Canyon Regional Park.



*Santa Cruz Tarplant*



*IPM biologist surveys native grasses in artichoke thistle treatment site.*



## Restoring Habitats for Biodiversity



### **Soft Bird's Beak and Perennial Pepperweed Control**

Recovery of soft bird's beak is an ongoing collaboration among several Park District programs that require perennial pepperweed control along shoreline parks.

*Soft bird's beak, a sensitive annual marsh flower, emerges from the pickle weed.*

## Volunteers and Partners



*Earth Team teens protect native tree plantings and create art on the tree cages they installed.*

### **Oyster Bay Regional Shoreline and Earth Team**

The Park District has been collaborating with Earth Team for the past three years to provide stewardship activities for students and support its development of future recreational opportunities at Oyster Bay Regional Shoreline. This year, students helped plant 330 native trees throughout the disc golf course, contributing over 384 hours of service. These trees, funded by Cal Fire and the Regional Parks Foundation, expanded the urban forest at this former landfill and will sequester carbon, reducing greenhouse gas emissions, as well as provide additional overwintering habitat for Monarch butterflies. Students also continued their coastal sage scrub plantings around the exterior of the course to provide buffering for other park users as well as important winter nectar sources for Monarchs. Students helped control invasive species and then created art with the cuttings on the tree cages that they installed.

# Appendix A

## Approved General Use Products

### Organic and Safer Products

Organic products continue to be an important part of the Park District's IPM tool box (see below). The IPM program continues to expand its product list with 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 fungus damage.
- **Competitor** is a modified vegetable oil that does not contain nonylphenol 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 with a caution signal word that is used around Park District buildings.
- **Fiesta** is a turf weed killer, caution signal word, 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 with a danger signal word 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 and has a warning signal word.
- 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.

### Conventional Products

Conventional or synthetic, pesticide use continues to decline. This is due in large part to the continued emphasis on mechanical and cultural methods that are the backbone of pest management at the Park District. Additional contributing factors include the focus on early weed control using organic products, rate reduction, and application foot print reduction of conventional products.

- **Bee Bopper** is a knockdown insecticide with the active ingredients of Tetramethrin and 3-Phenoxybenzyl, that is used on late season yellow jacket nests that are public health threat (EPA Reg. No. 7754-44).
- **Diphacinone** is an anticoagulant rodenticide dispensed in bait stations specifically for the control of ground squirrels and commensal rodents (rats and gophers). Products in this category include treated grain bait (0.001% active ingredient) manufactured by Alameda County Agricultural Department (CA Reg. No. 10965-50001). This product has a caution signal word.
- **Gas Cartridges** are an asphyxiant rodenticide is manufactured by the USDA with active ingredients of sodium nitrate and charcoal (EPA Reg. No. 56228-2). It has a warning signal word and is primarily used for gopher control in turf.
- **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). It contains 7.4% of the active ingredient indaziflam and has no signal word.
- **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 a caution signal word and Pathfinder (EPA Reg. No. 62719-176) with 13.6% active ingredient and a caution signal word.



# Appendix B

## All Products by All Parks

All products are listed by active ingredient and by volume of product. This list does not include golf course, farming, or structural uses which follow this appendix.

Park	Purpose	Applicator	Bee Bopper, oz	Competitor, gal	Diflucanone, lbs	Envoy plus, gal	Esplanade 200SC, gal	Garlon 3A, gal	Garlon 4 Ultra, gal	Gas Cartridges, oz	Green Clean Pro, lbs	Hasten Oil, gal	Milestone, oz	Pak 27, lbs	Pathfinder II, gal	Physan 20 oz	Polaris, gal	Pro-Spreader-Activator, gal	Pro-Tron, gal	R-11, gal	Roundup Custom, gal	Roundup Pro Max, gal	Speccide Flo, oz	Suppress, gal	Telar, oz	Turfion, gal	VistaXRT, gal
Anthony Chabot	Healthy Forests	Contractor						0.41				0.02															
		Park Staff		3.79					1.77				1.50														
	Ecological Function	IPM		0.34									0.05														
County Ag			1.88									0.41															
Alameda Creek Trails	Park Maintenance	Park Staff																0.02			0.09						
	Roads and Trails	Park Staff																				0.94	0.12				
Ardenwood Farms	Park Maintenance	Contractor																					0.42	2.50			
		Park Staff	28.00																								
Black Diamond	Ecological Function	Park Staff		12.00					4.00																		
	Hazardous Trees	Park Staff						0.13				0.38															
	Park Maintenance	Contractor																1.24									
Park Staff				13.57				4.88				1.13											0.08	0.19			
Botanical Garden	Park Maintenance	Park Staff		0.09				0.03								1.00						0.02	0.00	0.15			
Briones	Park Maintenance	Park Staff										0.06	0.03									5.47	0.68				
	Ecological Function	IPM		2.50									1.75														
Crown Beach	Ecological Function	Park Staff		0.05		0.12																					
	Park Maintenance	Park Staff																							3.00		
Contra Costa Trails	Park Maintenance	Park Staff		1.50																			0.28	3.00			
	Roads and Trails	Park Staff		0.59																		2.25					
Cull Canyon	Park Maintenance	Park Staff																				1.17					
Contra Loma	Park Maintenance	County Ag			175.00																						
		Park Staff																						0.14			
Coyote Hills	Public Health	IPM		1.73				1.16				0.15															
Don Castro	Park Maintenance	Park Staff										0.04													0.19		
Diablo Foothills	Ecological Function	Park Staff		0.00																	0.02						
Del Valle	Park Maintenance	Contractor										3.50	0.30														
		Park Staff			340.00																			1.20	7.11		
District Wide	Ecological Function	County Ag						0.00				1.15							0.77								
East Contra County Trails	Roads and Trails	Park Staff				0.23																	0.10	0.11			
Garin/Dry Creek	Resource Project	IPM																					0.72				
		IPM		0.10															0.30								
Hayward Shoreline	Park Maintenance	IPM		0.03															0.08								
		Park Staff		8.28									0.02							21.55		0.10					
	Ecological Function	IPM		0.22																							
Lake Chabot	Roads and Trails	Park Staff																									
	Ecological Function	Park Staff		1.08				0.81				0.04															
Las Trampas	Park Maintenance	Park Staff		0.16				0.16																			
		Park Staff		0.70				0.47																			
	Roads and Trails	Park Staff		2.20					235.00															0.37	4.00		
Miller/Knox	Park Maintenance	Park Staff		0.59				0.39														2.06	0.26				
Martin Luther King, Jr.	Park Maintenance	Park Staff						0.04				0.16															
		County Ag		100.00																							
	Public Health	Park Staff	24.00	0.05														0.15									
	Ecological Function	IPM		5.18								0.02	0.50	14.39							0.09		0.13				
Point Pinole	Ecological Function	Contractor		0.00			10.25															0.14				4.59	
		Park Staff		3.23			2.23			0.03													0.05				
	Park Maintenance	Contractor		0.00		0.27						0.39													15.00		
		Park Staff		0.18			0.09	35.00																			
	Public Health	Park Staff	14.00	0.00																							
	Ecological Function	Contractor		0.00				0.18				0.35	0.04														
IPM			0.25														0.27				0.05			0.01			
Pleasanton Ridge	Ecological Function	Park Staff																				0.05					
		County Ag											0.05														
Quarry Lakes	Park Maintenance	IPM		0.56									0.23														
		Park Staff		0.94																			0.08	2.50			
Shadow Cliffs	Park Maintenance	Contractor		4.50				3.00					0.16														
		Park Staff		0.01		0.04																					
Sibley	Design & Construction	Contractor		0.36				0.24							0.02												
	Healthy Forests	Contractor						1.50				0.02															
Sunol/Mission Peak	Park Maintenance	Park Staff	0.25	0.07				0.05														0.02	0.09				
		Ecological Function	County Ag										0.32														
Tilden	Healthy Forests	Contractor		2.25				1.00																			
		IPM		7.31				2.44							2.75												
Temescal	Public Health	Contractor							700.00																		
		IPM											150														
Vasco Hills Corridor	Ecological Function	Contractor						0.24				0.01															
	Park Maintenance	Park Staff																				0.92					
	Ecological Function	Contractor		0.49				1.26				0.05											4.08				
Wildcat Canyon	Healthy Forests	Contractor						2.50																			
	Park Maintenance	Park Staff						0.00															0.13				
	Ecological Function	IPM		0.11				0.48				0.11								0.21		0.10					



## Appendix C Golf Course Products

Redwood Canyon	Tilden	Active Ingredient (Gallons)
	0.09	2, 4-D, dicamba, mecoprop, carfentrazone
0.63	0.13	clopyralid
3.02	5.00	ethephon
	1.92	fluazinam
	1.30	fluazinam + tebuconazole
	0.07	flumioxazin
	0.75	glufosinate
3.02	5.00	glyphosate
	0.01	indaziflam
	19.00	iprodione
	73.00	mineral oil
	0.18	penoxsulam
	1.69	penthiopyrad
	6.33	tebuconazole
	0.54	triclopyr
	4.16	trinexapac-ethyl
8.16		chlorothalonil
0.13		polyoxin D zinc, lbs.

## Appendix D Organic Farming Products

Active Ingredient	
bacillus thuringiensis, gal.	0.38
bacillus thuringiensis, lbs.	4.5
citrus oil, gal.	0.54
methylated silicones and poly glycol monoallyl ether, gal.	0.36
polydimethylsiloxane, gal.	0.22
potassium salts, gal.	10.09
pyrethrin, gal.	2.25
spinosad, gal.	0.22

## Appendix E Conventional Farming Products

Active Ingredient	Gallons
2-hydroxy-1,2,3-propanetricarboxylic acid	0.42
abamectin	0.05
mineral oil	1.13
alkyl phenol ethoxylate	0.51
bifenthrin	0.10
chlorantraniliprole	0.16
dimethoate	0.50
esfenvalerate	0.68
flumioxazin	0.12
flupyradifurone	0.22
glyphosate	5.59
lambda-cyhalothrin	0.06
methomyl	0.50
methoxyfenozide	0.13
methylated vegetable oil	1.25
polyalkyleneoxide	0.02
H <sub>z</sub> SNPV virus	0.55
propargite	0.31
S-metachlor	0.21
tall oil fatty acid	0.12
triclopyr	1.25

## Appendix F Structural Pest Control Use

Active Ingredient	Ounces
bifenthrin	4
botanical oils	8.396
bromethalin	298.97
cholecalciferol	24
cyano-methyl-chloro-alpha-benzeneacetate	2.25
deltamethrin	1
indoxacarb	4.804
Iron phosphate	1



Photo: Alan Mendez



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*Healthy Parks Healthy People*

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*Native mule's ear bloom in Round Valley  
Regional Preserve, Brentwood*