



CITY OF IRVINE
Integrated Pest Management Program
2018 Annual Report

Introduction

The City of Irvine continues to implement the Public Works Integrated Pest Management (IPM) program adopted by the City Council in February 2016. This IPM policy sets forth the following goals:

Citywide Pest Management Guiding Principles

- Use of organic pesticides in all City properties.
- Limit exposure to any pesticides where children and the general public congregate.
- Incorporate additional guidance on use of pesticides for City rights of way, facilities, and other properties, as reflected in the February 23, 2016, staff report.
- Use Environmental Protection Agency (EPA) Level pesticides in a targeted manner, and only if deemed necessary to protect public health and economic loss by a licensed pest control advisor and City staff, when pests cannot be managed by other methods.

The 2018 IPM annual report summarizes program activities and application data for the year. The IPM program applies to all City departments, although the majority of pest management responsibilities are under the guidance of the Public Works Landscape Division.

Program Components

The City of Irvine IPM Policy promotes environmentally sensitive pest management practices while preserving assets, protecting the health and safety of the public, and City employees. All costs and impacts associated with pesticide use, including community and environmental health, are considered.

IPM is a decision-making process for managing pests. A monitoring system is utilized to determine pest levels and tolerance thresholds. It combines biological, cultural, physical,

and chemical tools to minimize health, environmental, and financial risks. The monitoring system requires extensive knowledge about pests, such as infestation thresholds, life histories, environmental requirements, and natural enemies to compliment and facilitate control of pests.

As part of an IPM program, pesticides may be used when pest thresholds get too high. A pesticide is any substance, or the mixture of substances, used for defoliating plants, regulating plant growth, or for preventing, destroying, repelling, or mitigating any pest, which may be detrimental to vegetation, humans, or animals. Regardless of the pesticide being organic or synthetic, the goal is to rid a pest and caution should be taken when applying the product.

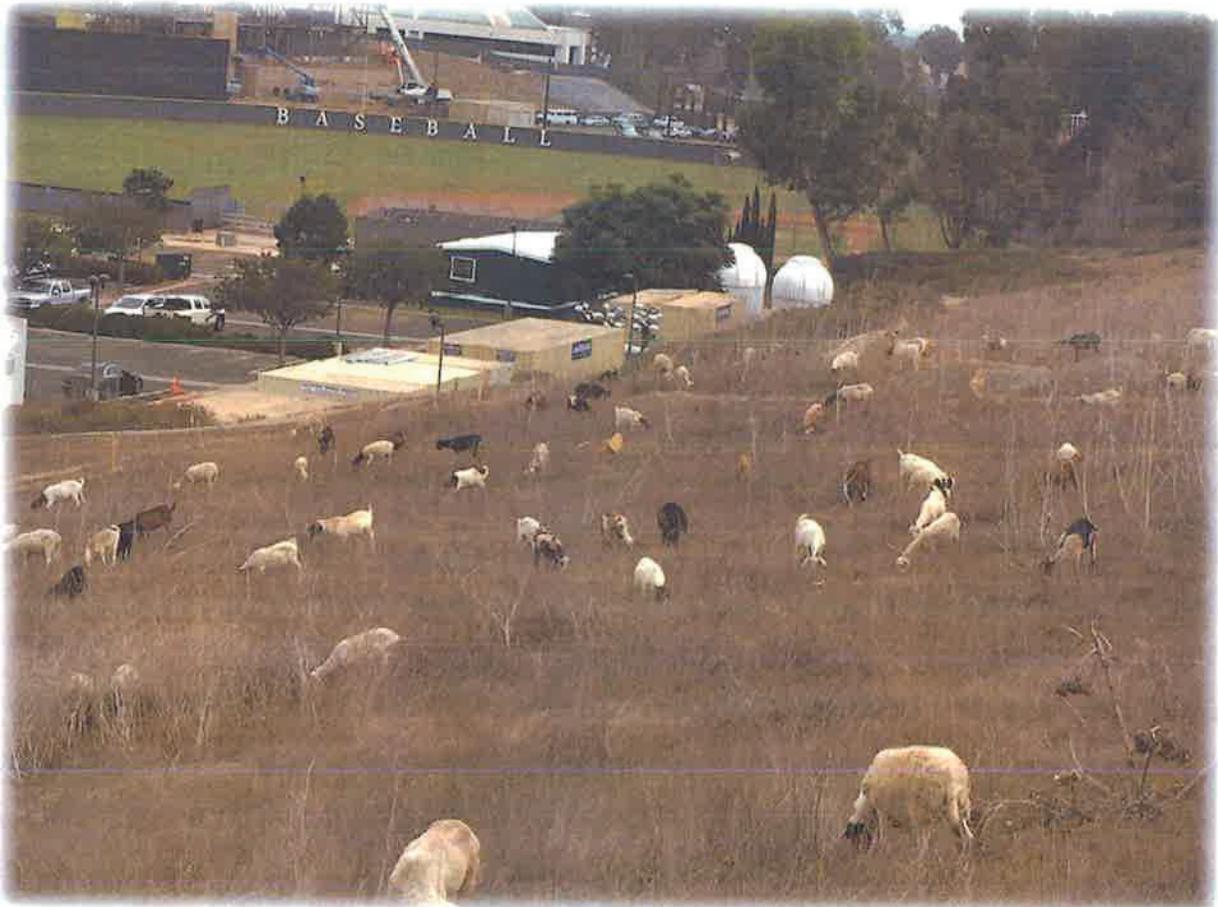
To ensure the IPM program continues to be an adequate tool to meet the City's pest challenges while upholding the program goals adopted by the City Council, staff shall continuously examine and evaluate components of the program's effectiveness. In addition, all contractors that apply pesticides on the City's behalf are required to adhere to the IPM Policy.

Alternative Pest Control Projects

The Public Works Landscape Division employs alternative methods for weed control, such as mechanical removal through mowing and hand pulling. City landscape maintenance contractors provide approximately 18 full-time equivalent employees to hand-pull weeds in City parks and public right-of-ways. Other non-pesticide weed control measures include applying mulch in landscape planter areas to minimize weed growth. In addition, Smart Irrigation Controllers apply the proper amount of water to City landscapes, which minimizes disease and weed growth, thus limiting pesticide use. City contract services are now manually removing cattails in drainage facilities to ensure proper water flow with no pesticide residue.

The City is responsible for maintenance of some fuel modification zones in the Village of Turtle Rock and an open-space area in the City of Newport Beach. This year, the

Landscape Division completed a grazing trial using 200 goats for vegetation management purposes on 10 acres within the City's open-space. The trial successfully demonstrated an alternate method to manage City open-space property without pesticides or contract labor. This successful practice will be further implemented into the Public Works operation for fire fuels reduction. For other areas where goats do not graze, the use of motorized weed cutting tools is used to manage the fuel modification zones.



Example of goats performing weed abatement in the City's open space.

The Landscape Division also used biological control to reduce pest populations this year. Biological control uses organisms often referred to as beneficials, natural enemies, or biocontrols. The biological controls act to keep pest populations low enough to prevent significant economic damage. The most common organisms used for biological control in landscapes are predators and parasites. In 2018, close to one million beneficial insects

were released in the parks and streetscapes to combat destructive pests, instead of relying on pesticides.

Another method employed by staff to control pests in 2018 was habitat modification. This method was used at the Irvine Transportation Center to combat an infestation of rats and mice. Landscape modification was implemented by trimming away tree branches from hanging over or touching buildings. For example, shrubs were pruned away from the foundation of buildings. This modification discourages nesting of rodents and removes covered, protected movement. Open trashcan receptacles were replaced with Solar Big Bellies enclosed trash receptacles to eliminate a food source.



Example of raising shrub canopies to reduce covered habitat for rodents.



Example of shrubs removed away from buildings to remove potential nesting sites.

Parks, Fields, and Playgrounds



Since the IPM Policy implementation, the Landscape Division has successfully managed a healthy turf grass population with no weed killer applications on any City turf areas. The City has continued the practice of not using “Speedzone” (2, 4-D) and “Round-Up” (glyphosate) weed killers. The practice of using contract labor to mechanically and manually control weeds has proven effective in City parks. In addition, organic products have provided adequate control for insects and algae.

Over the past 3 years, staff has recognized the use of traps for rodent control is not effective so instead moved to organic baits in secured boxes. The organic bait, Terad 3Blox, has proven to be effective for rodent control in City owned parks and replaced the use of Rat X. The Landscape Division plans to test the effectiveness of using fertility control (Contrapest) as an effective treatment for rat and mice control in 2019.

This past year, the Gopher X Extermination Machine was used to control gophers through the use of heated smoke and carbon monoxide injected into the rodents' tunnels. Though it has some success, it had some limitations in that it requires multiple applications to be effective. The Landscape Division plans to test the effectiveness of IGI Carbon Dioxide Liquid for gopher control, which will be available in California in June 2019.

Table 2, Appendix 1 shows the pesticide usage in parks and athletic fields since 2015 for weeds, algae and disease control. Tables 3 and 4, Appendix 1 highlight the number of pesticides used for rodent and insect control since 2015.

Right-of-Way

For right-of-way weed control, the City's landscape maintenance contractors were effective at controlling a majority of the weeds using organic products. For approximately 100 acres of non-landscaped areas (concrete medians and sidewalks), biweekly treatments during the spring months and monthly treatments the rest of the year provided satisfactory control using Suppress EC at the 9 percent concentration. The best success was achieved when the water in the spray tank had a neutral to slightly acidic pH before the addition of Suppress EC. For approximately 925 acres of landscaped medians and parkways, manual hand weeding and organic herbicides still remains the primary practice.

The organic herbicide Suppress EC performed better against broad leaf weeds and grassy weeds. The burn down and top kill process was quicker. Suppress EC works best on newly emerged weeds and at temperature greater than 60 degrees. The City's contractors experimented with five additional organic herbicides: Finalsan, Weed Pharm, Fiesta, and Weed Slayer A & B. The City's contractors have shown a preference to Suppress EC compared to the other products. Table 5, Appendix 1, lists the pesticides used to control weeds in the right-of-way in 2015, compared to 2016 and 2018.

The presence of perennial weeds, nutsedge, field bindweed, and bermuda grass equates to a small percentage of the weed population not successfully controlled by the current maintenance practice. These weeds have extensive vegetative root systems that require systemic activity to control not only the top growth but the aggressive underground roots as well. The use of selective and systemic synthetic products to adequately control perennial weeds were applied in 2018 in limited areas not readily accessible to the public, primarily street medians. Selective and systemic weed killer products only affect the weed and not the desirable plant material surrounding the weed. The weed killer enters the plant through the leaf and moves throughout the weed for complete eradication. Organic products available for use at this time are neither selective nor systemic. The organic products burn down all foliage they come in contact with, including desirable plants.

Using the products identified in Tables 3 and 4, Appendix 1 in the right-of-way areas for control of rodents and insect produced similar results as to what was achieved in the parks.

Public Facilities

The Facilities Maintenance Division of Public Works has implemented an integrated and tiered approach to manage pests in compliance with the City's IPM policy. Facilities Maintenance Staff perform routine inspections to identify, report, and manage pest activity. Compliance has been achieved using monthly services provided by the City's existing pest control contractors and ongoing staff training. Staff communicates frequently with building occupants to identify pest activity and trends. Staff works closely with facility operators to improve food storage, sanitation, and waste management practices.

Exclusion methods and barriers have been deployed at several City facilities to minimize pest intrusions and the Staff is dedicating additional time to pest management research, planning and response.

Staff addressed 53 requests for pest control service during the 2018 calendar year. Staff addressed 59 requests in 2018. Requests to address pest issues are tracked and logged using the division work order system (Lucity).

In response to consistently high rodent activity in the absence of pesticides, the use of snap traps was increased at several City facilities. Approximately 50 smart rodent traps have been setup at several City facilities during the fourth quarter of 2018. The smart traps report when the trap has triggered using Wi-Fi. The smart traps are proving to be very effective at reducing the labor needed to routinely check the traps.

Staff performs facility inspections to identify and eliminate mosquito-breeding habitats. Staff has been trained on best practices to control mosquitos around storage yards and facilities. During later part of the rainy season, staff inspects outdoor storage areas to correct situations where rainwater is trapped in containers or equipment. Staff used adhesive paper traps to control flying insects that manage to reach the interior of the facilities. Staff is documenting preventive pest related inspections, field reports, and service requests using the division work order system (Lucity). Improvements in tracking and managing pest related requests and complaints are being made continually in the software and the process of issuing work orders to the pest control contractor.

The Landscape Division works closely with Facilities Maintenance to reduce the density of foliage around facilities to minimize pest activity. The effectiveness of the modified program has provided control of the rodents in most cases. The program also places an emphasis on controlling rodent, roach, and ant activity at facilities routinely serving food to the public.

Due to limited availability of compliant insecticides and rodenticides, behavioral and operational changes play a key role in maintaining tolerable pest control under the new IPM Policy.

The overall pest program in Facilities Maintenance focuses towards improving seasonal planning, preventive control measures, monitoring, and reporting.

City Open-space

City open-space and City farm lease property is also covered by the IPM policy. The Community Services Department contracts with The Irvine Ranch Conservancy (IRC) for its open-space management, and IRC has incorporated the City's IPM policy into its maintenance protocols.

Priority invasive species were removed/treated across approximately 443 acres, of which 298 were within Natural Community Conservation Plan (NCCP) boundaries. Artichoke thistle continues to be a major target species due to past effort invested and the ability of this species to rebound without control. Efforts continue to expand to include other species, such as Sahara mustard, garland chrysanthemum, stinknet, and fountain grass.

Irvine Ranch Conservancy remained in compliance with the City's IPM policy. No synthetic pesticides were used to control invasive species in 2018; only manual methods and organic pesticides were used. IRC experimented with using the organic herbicide Suppress in controlling various annual and perennial weeds. Summaries of results are available in quarterly and summary reports to the Community Services Manager.

Other City properties, including agricultural field leases managed by the City's Community Development Department, reported that all property leases were in compliance with the City's organic pesticide policy.

2018 Pesticide Use and Analysis

The City's contractors are all licensed by the State of California to use organic and synthetic pesticides, as required by their contracts with the City. As the party responsible to the State for the application for any pesticide, the City's maintenance contractors researched available organic products approved for use in the State of California. All products used were reviewed by the City's Maintenance Superintendents or Department Managers and approved prior to use. Due to the high acidity of the organic weed control products, applicators must use protective equipment to shield their eyes and skin which can sometimes give the public the perception the pesticide being applied is toxic.

Table 1, Appendix 1, provides the active ingredient for the approved organic pesticides used in 2018.

IPM Program Cost Impacts

All City landscape maintenance contracts provide the necessary contract staff and organic products to fulfill the mission of an organic first approach to pest management. Manual hand weeding and organic pesticides require the use of more labor and product, and an increase in the frequency of applications to provide a similar result as compared to past pesticide practices. Staff estimates the budget impact for 2018 at approximately 10 percent of the Division's \$27 million annual allocation. A large part of the impact is from the minimum wage increase of \$11.00 per hour to \$15.00 per hour by 2022 and the higher cost of organic materials. The 2018 Table 6, Appendix 1, provides a comparative example of the cost to make a 100 gallon solution of different organic pesticides for weed control.

The Citywide Pest Management Guiding Principles have been successful for the City of Irvine because of our commitment to provide safe, non-toxic landscapes for the residents as the primary treatment. Though there is still a need for synthetic pesticides in the program, it is only for a small percentage of pests not controlled. After 3 years, the availability of organic products has increased to provide contractors the necessary tools for effective pest control. In the same timeframe, the feedback from residents and other cities has been overwhelmingly positive for the organic first approach. The recent verdicts against Monsanto's Round Up has further highlighted the need to incorporate safe, non-toxic pest control which the City of Irvine is a role model for other cities to follow. Even with the success of the program, City staff will continue to evaluate new non-toxic options and refine practices to provide the most effective, non-toxic solution to pests in the landscape, facilities and open space.

Appendix 1

TABLE 1 ORGANIC PESTICIDES USED IN 2018			
PRODUCT	ACTIVE INGREDIENT	TARGET PEST	EPA CATEGORY
Fiesta	Iron HEDTA	Weeds	Caution
Finalsan	Ammoniated soap of fatty acids	Weeds	Warning
Suppress EC	Caprylic acid	Weeds	Warning
Weed Pharm	Acetic Acid	Weeds	Danger
Terad3 Blox	cholecalciferol	Rodents	Caution
Repels-All	Putrescent whole egg solids Cloves Garlic Oil	Rodents Ground Squirrel	N/A
Uncle Ian's Gopher Repellent	Dried blood	Gophers	N/A
Gopher Scram	Clove Oil, Garlic, Linseed Oil, Rosemary Oil, Cinnamon Oil, Dried Blood, Castor Oil	Gophers	N/A
Gopher X	Carbon Monoxide	Gophers	N/A
Eco Exempt Jet	2 Phenethyl proprionate, Rosemary oil	Insects	N/A
WHY Spray	Lemongrass Oil	Insects	N/A
Eco Via EC	Thyme oil, rosemary oil , 2 phenethyl proprionate	Insects	Caution
Essentria IC3	Rosemary oil	Insects	Caution
Entrust SC	Spinosad A & B	Insects	Caution

**TABLE 2
CITY OF IRVINE PESTICIDE USAGE SUMMARY
PARKS AND ATHLETIC FIELDS**

LOCATION	PRODUCT	PEST	TOTAL USE IN 2015	TOTAL USE IN 2016	TOTAL USE IN 2017	TOTAL USE IN 2018
Parks and Athletic Fields	3336 F	Disease	47 oz.	0	0	0
	3336 WP	Disease	4 lbs.	0	0	0
	Aqua Shade	Algae	2 gal	0	0	10 gal
	Arrow 2EC	Weeds	10 oz.	0	0	0
	Fosetyl-A1 80 WDG	Disease	22 lbs.	0	0	0
	Glyphosate 4 Plus	Weeds	1,564 oz.	0	0	0
	Power Zone	Weeds	57 oz.	0	0	0
	Revolver	Weeds	432 oz.	0	0	0
	Round Up Custom	Weeds	1,104 oz.	0	0	0
	Sedge Hammer	Weeds	18 gal	0	0	0
	Speed Zone	Weeds	17 oz.	0	0	0
	SurflanXL 2G	Weeds	400 lbs.	0	0	0
OC Great Park	Glyphosate 4 Plus	Weeds	1,438 oz.	0	0	0
	Orazylin 4	Weeds	128 oz.	0	0	0
	Power Zone	Weeds	331 oz.	0	0	0
	Speed Zone	Weeds	137 oz.	0	0	0
	Turf Wash	Bacteria	6 oz.	0	0	0
	Phycomycin*	Algae	16,400 oz.	12,000 oz.	13,200 oz.	9,200 oz.
	Finalsan*	Weeds	0	0	1,616 oz.	16,097 oz.
	Suppress EC*	Weeds	0	0	1,048 oz.	311,204 oz.

**Phycomycin, an organic product for control of algae in the ponds and basins. Finalsan and Suppress EC are organic weed killer products.*

**TABLE 3
CITY OF IRVINE PESTICIDE USAGE SUMMARY
CITYWIDE – RODENTS**

PRODUCT	PEST	TOTAL USE IN 2015	TOTAL USE IN 2016	TOTAL USE IN 2017	TOTAL USE IN 2018
SYNTHETIC PESTICIDES					
Fumitoxin Tablets	Rodent	1.09 lb.	0	0	64 tablets
Diphacinone	Rodent	69.0 lb.	0	0	0
Rozol Vole	Rodent	2 lb.	0	0	6 lb.
Maki Mini	Rodent	6.0 lb.	0	0	2.25 lb.
Avalon Strychnine	Rodent	1.44 lb.	0	0	1 lb.
Omega Gopher Grain	Rodent	30 lb.	0	0	0
Contract Bait Block	Rodent	28oz	52 oz.	0	0
ORGANIC PESTICIDES					
Rat X	Rodent	1.25 lb.	60 lb.	126.34 lb.	0
Uncle Ian's Gopher Repellant	Rodent	1.0 lb.	212 lb.	997.93 lb.	84.25 lb.
Repels-All	Rodent	0	0	0	6
Terad3 Blox	Rodent	0	0	0	48.01 lb.

**TABLE 4
CITY OF IRVINE PESTICIDE USAGE SUMMARY
CITYWIDE – INSECTS**

PRODUCT	PEST	TOTAL USE IN 2015	TOTAL USE IN 2016	TOTAL USE IN 2017	TOTAL USE IN 2018
SYNTHETIC PESTICIDES					
Temprid	Insects	8 ml	0	0	0
Transport GHP	Insects	74.9 oz.	0	0	0.3 oz.
PT Wasp Freeze	Insects	8 oz.	0	0	0
P.I. Contact	Insects	156 oz.	0	0	8 oz.
Demand CS	Insects	24.5 oz.	0	0	0
Tengard	Insects	12.2 oz.	0	0	0
Tempo SC Ultra	Insects	7.5 oz.	0	0	0
UP Star Gold	Insects	6 oz.	0	0	0
Talstar	Insects	71.7 oz.	208 oz.	0	0
Masterline Bifenthrin	Insects	95.93 oz.	6.49 oz.	0	0
ORGANIC PESTICIDES					
Essentria IC3	Insects	0	13,516 oz.	22,696.41 oz.	20,826 oz.
Eco EXEMPT Jet	Insects	0	1625 oz.	591 oz.	84.25 oz.
EcoVia	Insects	0	43 oz.	121.60 oz.	379.21 oz.
WHY Spray	Insects	0	0	2,268 oz.	71 oz.
Entrust SC	Insects	0	0	0	2.79 oz.

**TABLE 5
CITY OF IRVINE PESTICIDE USAGE SUMMARY
RIGHT-OF-WAYS**

PRODUCT	PEST	TOTAL USE IN 2015	TOTAL USE IN 2016	TOTAL USE IN 2017	TOTAL USE IN 2018
SYNTHETIC PESTICIDES					
Round Up	Weeds	8,139 oz.	0	0	0
Arrow 2EC	Bermuda grass	115 oz.	0	0	0
Speed Zone	Turf Weeds	227.9 oz.	0	0	0
Power Zone	Turf Weeds	14,848 oz.	0	0	0
Turflon Ester	Bindweed	56 oz.	0	0	700 oz.
Sedge Hammer	Nutsedge	432 oz.	0	0	4.59 oz
Gallery 75	Pre-emergent	16 oz.	0	0	0
Orazylin 4	Pre-emergent	89 oz.	0	0	0
Fusilade	Bermuda grass	0	0	0	148 oz.
ORGANIC PESTICIDES					
Avenger	Weeds	0	20,672 oz.	512 oz.	0
Scythe	Weeds	0	9,538 oz.	10,748 oz.	0
Suppress EC	Weeds	0	17,316 oz.	223,484 oz.	311,204 oz.
Finalsan	Weeds	0	0	1,700 oz.	16,097 oz.
Weed Pharm	Weeds	0	0	327,879 oz.	77,952 oz.
Fiesta	Weeds	0	0	1,812 oz.	144 oz.
PreEmerge	Weeds	0	0	768 oz.	0
Weed Slayer A	Weeds	0	0	0	140 oz.
Weed Slayer B	Weeds	0	0	0	140 oz.

TABLE 6				
PRODUCT	COST PER GALLON	DILUTION RATE	100 GALLONS OF SOLUTION	TOTAL COST
ORGANIC PESTICIDES				
Weed Pharm	\$12.00	N/A	100 gal	\$1200.00
Finalsan	\$49.00	16.7%	16.7 gal	\$818.30
Suppress EC	\$70.00	9%	9 gal	\$630.00

Appendix 2

Contractor daily application logs and reports for 2018