



CITY OF IRVINE
Integrated Pest Management Program
2020 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 California Department of Pesticide Regulation (DPR) honored the City of Irvine for its effort to reduce the use of synthetic pesticides to manage pests with the 2019 IPM Achievement Award. The Award recognizes organizations that use integrated pest management (IPM) to address the diverse pest management needs throughout California. The City's comprehensive program prioritizes non-chemical pest control methods and is committed to manage municipal landscapes and parks in this most responsible way.

The 2020 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 Methods for Landscape Maintenance

The Public Works and Transportation Department’s Landscape Division employs alternative methods for weed control, such as using steam and mechanical removal. A new technique called Fraze mowing was performed to annual weeds from athletic fields during the springtime. The desired result is removal of annual weeds and to provide a level playing surface for the perennial bermudagrass to regrow into a dense stand of turfgrass. The process is labor intensive and creates a substantial amount of debris for the contractor to haul away. The cost per acre for the operation is approximately \$2,000. Landscape staff noted the improved playability of the fields, but annual weeds regrew quicker than expected, especially crabgrass. In 2021, staff will schedule the Fraze mowing during warmer summer months to allow the bermudagrass to recover quicker and fill in the voids to prevent weeds.



Example of Fraze mowing operation

Other non-pesticide weed control measures include applying three inches of mulch in landscape planter areas to minimize weed growth. Alternative methods are performed by City landscape maintenance contractors in City parks and public right-of-ways. City

contract services manually remove cattails in drainage facilities to ensure proper water flow. In addition, Smart Irrigation Controllers apply the proper amount of water to City landscapes, which minimizes disease and weed growth, thus limiting pesticide use.



Example of a landscape contractor using steam to eradicate weeds in hardscapes.

The City is responsible for maintenance of 100 acres of fuel modification zones in the Village of Turtle Rock where goats are used for vegetation management. The use of goats successfully demonstrates an alternate method to manage property without pesticides or contract labor. This successful practice has been implemented into the maintenance operation for fire fuels reduction.



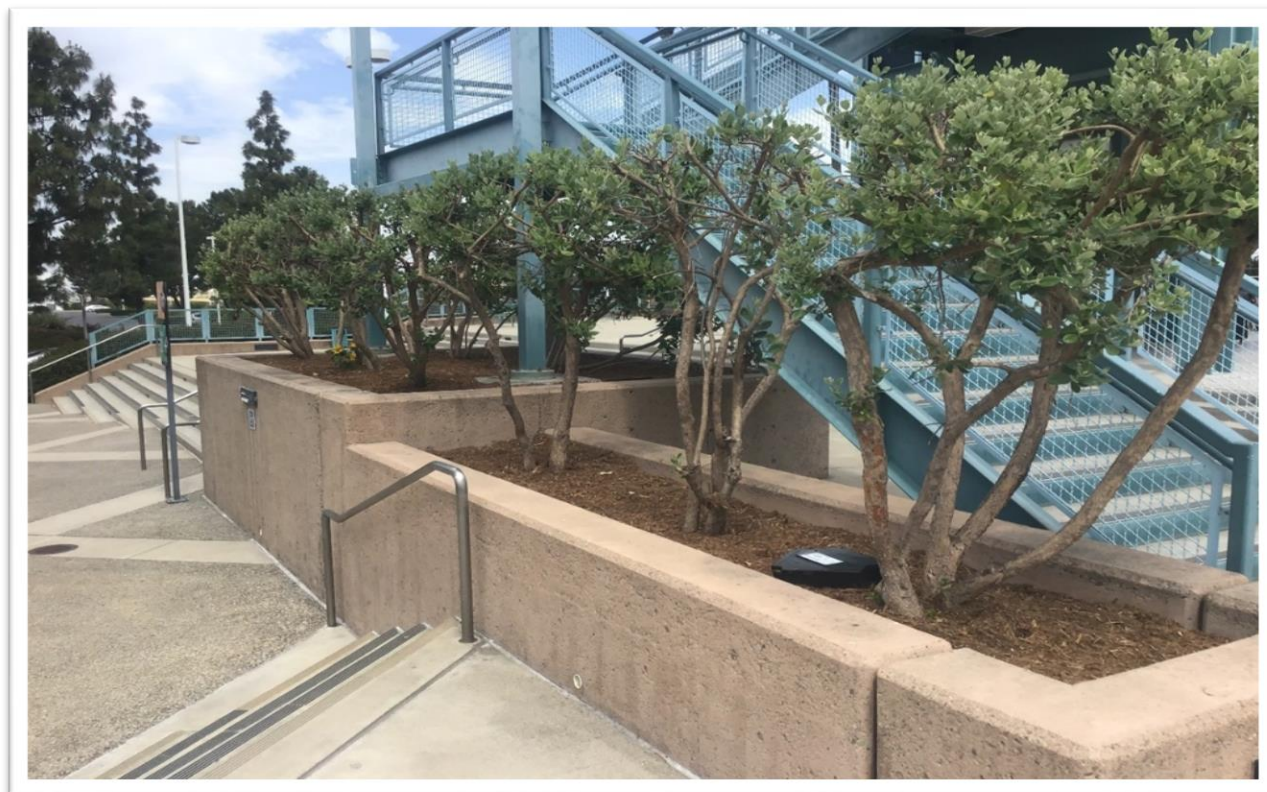
Example of goats performing weed abatement in the City's open space.

The Landscape Division also used biological control to reduce pest populations. 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 organism types used for biological control in landscapes to combat pest populations are predators and parasites. In 2020, nearly one million beneficial insects were released in the parks and streetscapes to combat destructive pests, instead of relying on pesticides.



Example of beneficial insects about to be released in a City park.

Lastly, Landscape modification and proper sanitation continues to be an effective non-chemical approach to rodent management. By removing plants away from buildings, removing understory vegetation and using closed trashcan receptacles, rodent populations are manageable.



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

Alternative Pest Control Methods for Public Facilities Maintenance

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. 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 47 requests for pest control service during the 2020 calendar year. In response to consistently high rodent activity in the absence of pesticides, the use of snap traps was increased at several City facilities. 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 the latter 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. The overall pest program in Facilities Maintenance focuses towards improving seasonal planning, preventive control measures, monitoring, and reporting.

Alternative Pest Control Methods for Open Space Maintenance

The Irvine Ranch Conservancy (IRC) has incorporated the City's IPM policy into its maintenance protocols. No pesticides were applied to control invasive species in 2020; only manual methods were used. Most annual species, including Sahara mustard and stinknet, were pulled by hand. Most perennial species cannot be controlled with organic herbicides and must be dug out of the ground. In particular, mature artichoke thistle is nearly impossible to hand pull and must be removed by shovel in an attempt to destroy the tap root and prevent seeding. The magnitude and threat of the North African knapweed population necessitated mechanical cutting followed by bagging and removal of mature seed.

IRC continued ecological restoration at the junction of the Bommer Meadow and Nature Loop trails. As part of site preparation, grazing operations were expanded in the spring from the original four-acre pilot project site to include an additional four acres on the south side of the Nature Loop Trail. Goats were used to reduce the cover of non-native grasses and broadleaf weeds and to prevent seed set. Additionally, IRC continued to experiment with solarization as an alternative method of weed control at a restoration site along East

Fork Trail that was established in 2018. Results from the past two years indicate that it is a highly effective, but labor-intensive procedure. Restoration crews doubled the area of new solarization beds in 2020 relative to past years.

Pesticide Usage

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 2020.



Pesticides Usage in Parks and Public Facilities for Weed Control

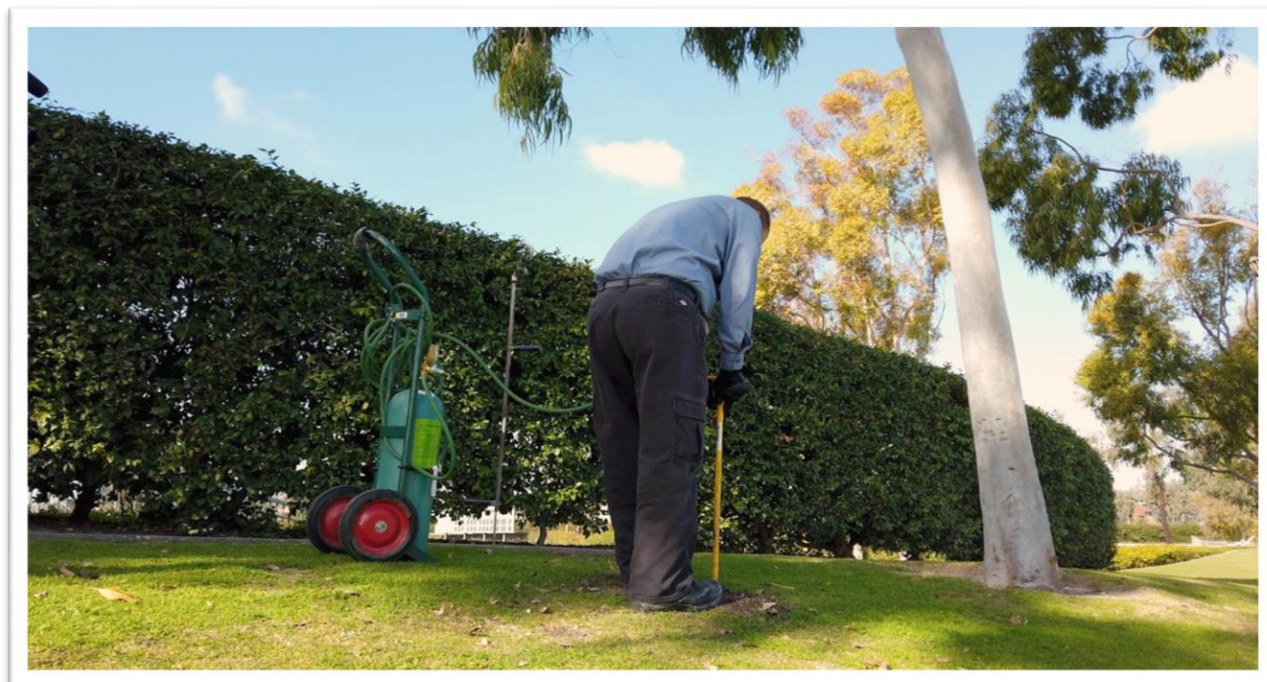
Since the IPM Policy implementation, the Landscape Division has successfully managed a healthy turf grass population with no synthetic weed killer applications on any City turf areas. The City has continued the practice of not using “Speedzone” (2, 4-D) and “Round-Up” (glyphosate) weed killers. In 2020, organic products were used sparingly to control weeds in planters. With 62 parks and the Great Park, the use of organic products were necessary to keep up with effective weed control in the parks. The lone exception was at the Great Park where a systemic synthetic herbicide is used to kill invading Bermuda grass in the synthetic soccer fields since organic products are not effective at controlling Bermuda grass and can damage the synthetic fibers due to their high acidic content.

Pesticides Usage in Parks and Public Facilities for Insect Control

Fire ants continue to be a problem throughout city parks. In 2020, work requests for fire ants increased from 49 in 2019 to 69. The use of the organic product Entrust provided adequate control after three consecutive daily treatments if the fire ants were detected early on in mound formation. The increase in activity and the need for three consecutive treatments is labor intensive and costly. For large scale infestations, staff will continue to work with Orange County Vector Control to apply synthetic baits to protect the public health.

Pesticides Usage in Parks and Public Facilities for Rodent Control

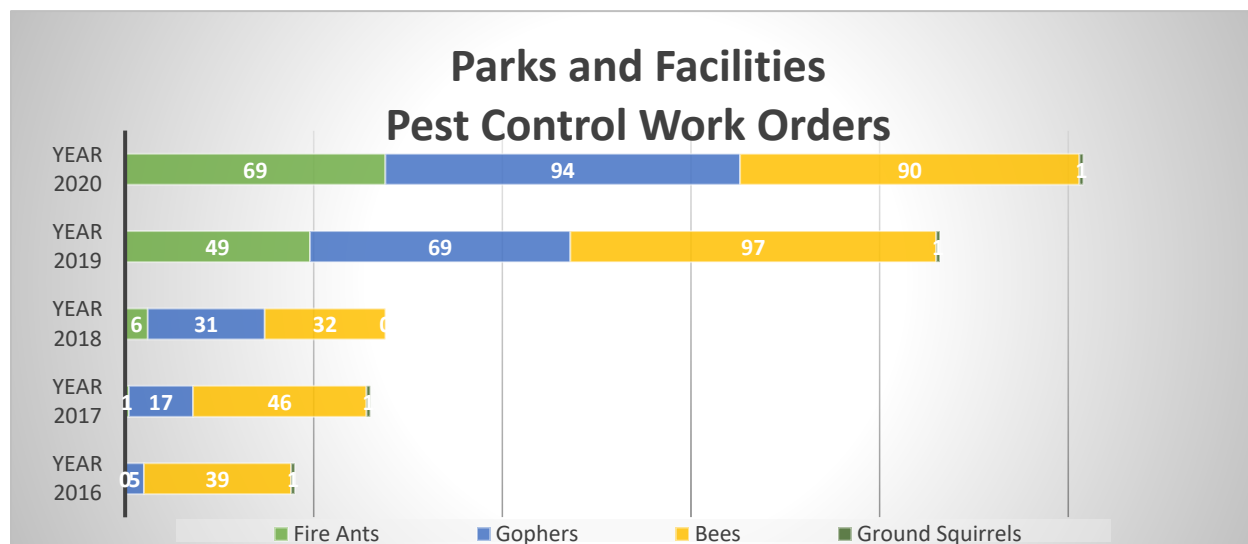
Gopher activity in the parks increased as well from 69 to 94 work requests. The organic products ContraPest and Terad3 are used proactively to provide adequate control for rodents. Gopher X Extermination Machine and IGI Carbon Dioxide Liquid were used to control gophers. IGI Carbon Dioxide Liquid was the preference by the pest control contractor.



Example of a City pest control contractor using the ICI Carbon Dioxide

Pesticides Usage in Parks and Public Facilities for Disease Control

At the Orange County Great Park, organic fungicides are used in combination with synthetic fungicides to provide professional quality athletic fields at the Soccer Complex Stadium and Baseball Complex Stadium.



The graph details the pest activity in parks over the last five years.

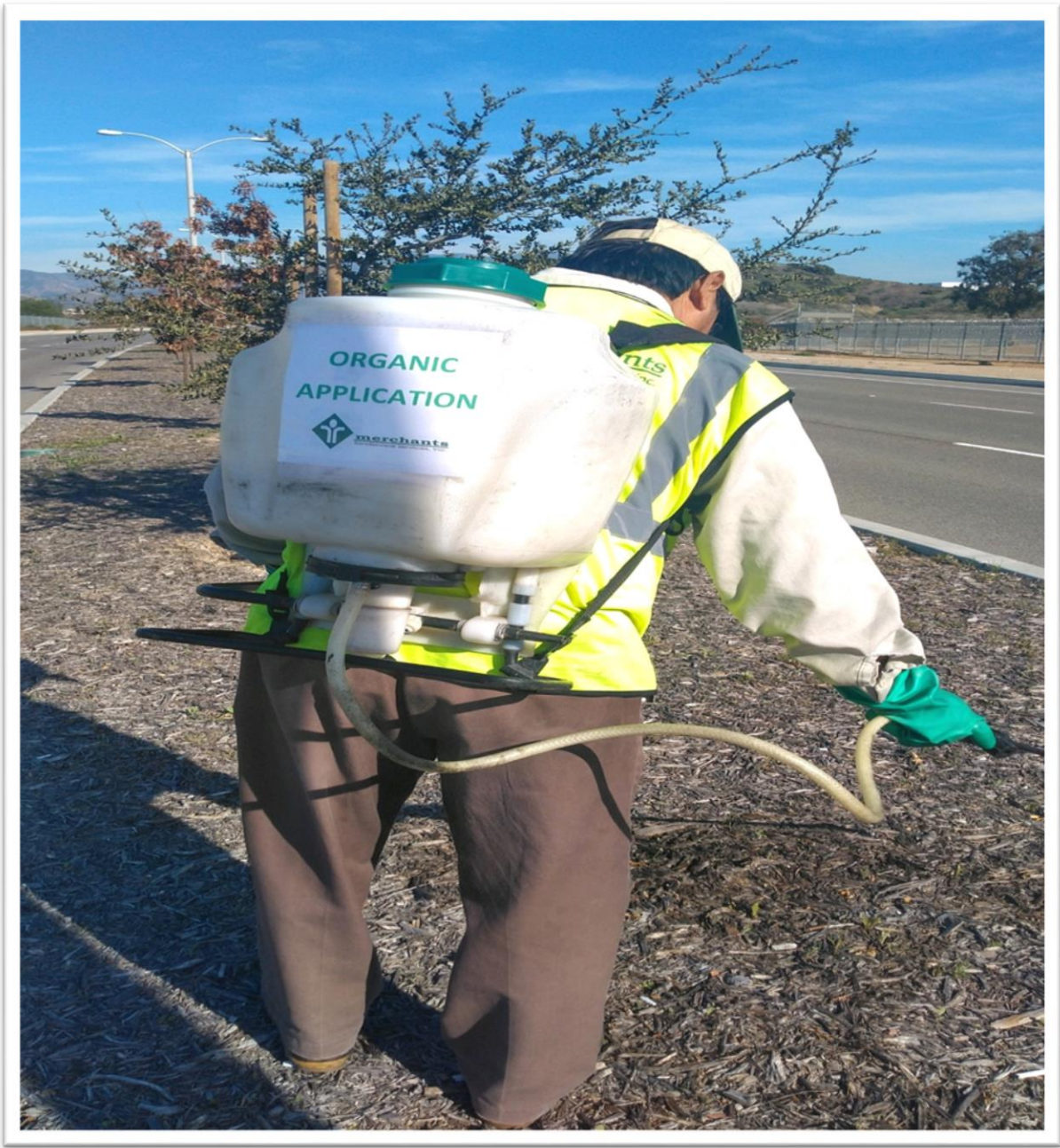
Table 2, Appendix 1 shows the pesticide usage in parks since 2016 for weeds, algae and disease control. Tables 3 and 4, Appendix 1 highlight the number of pesticides used for rodent and insect control since 2016.

Pesticides Usage in the Right of Way for Weed Control

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 of Suppress EC at the 9 percent concentration provided satisfactory control. Suppress EC works best on newly emerged weeds and at temperature greater than 60 degrees; when the water in the spray tank had a neutral to slightly acidic pH before the addition of Suppress EC.

For approximately 933 acres of landscaped medians and parkways, manual hand weeding and organic herbicides still remains the primary practice. 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 since 2016.

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 2020 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.



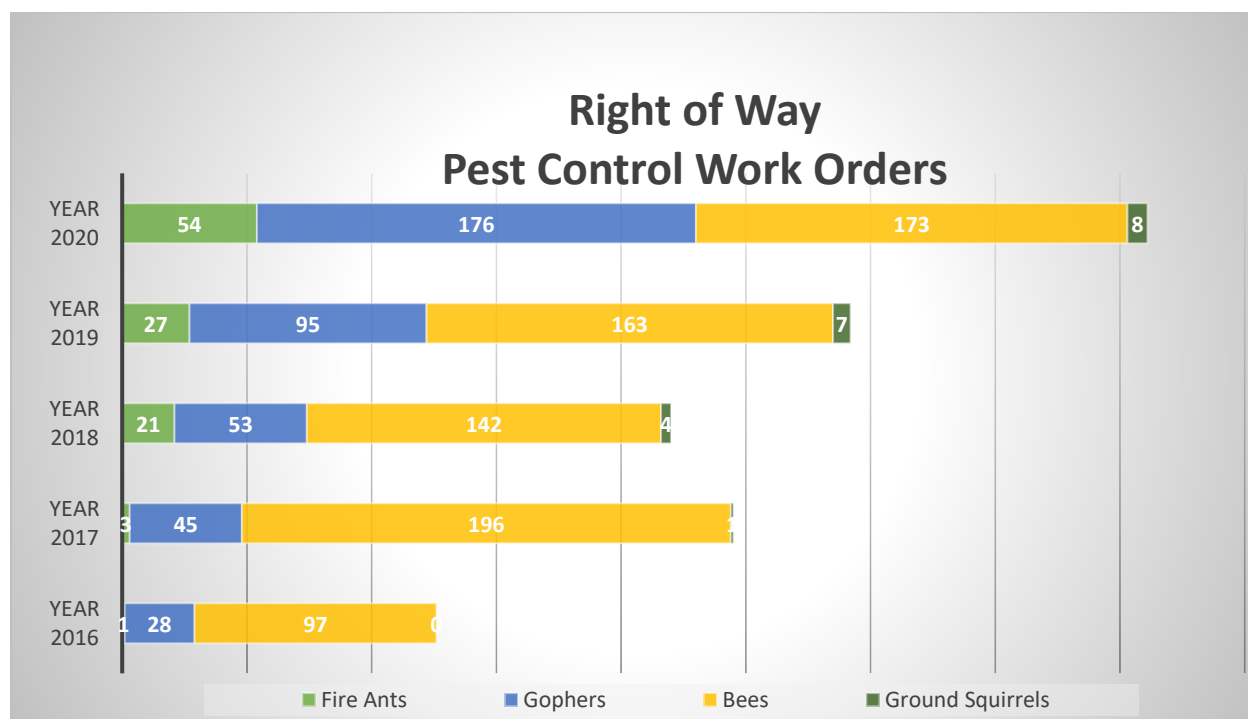
Example of an organic herbicide application by the City's landscape contractor.

Pesticides Usage in the Right of Way for Insect Control

Insect work requests continue to increase and are difficult to manage with repeat organic treatments due to the vastness of the citywide right of way landscaping exceeding 900 acres. This has modified the Landscape Division’s practice to use synthetic products in medians and areas where no public interacts to control the pests more effectively without additional required treatments. This is especially targeted at fire ants.

Pesticides Usage in the Right of Way for Rodent control

This past year, gopher work requests continue to increase from 95 to 176. They are difficult to manage with repeat organic treatments due to the vastness of the citywide right of way landscaping exceeding 900 acres. This has modified the Landscape Division’s practice to use synthetic products in medians and areas where no public interacts to control the pests more effectively without additional required treatments. The graph below demonstrates the increased pest activity the city has been experiencing since implementing the IPM Policy.



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. Alternative methods 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 2020 at approximately 10 percent of the Division's \$28 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 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 5 years, organic products have demonstrated they can be utilized as part of an effective pest control program. The ability to operate solely with organic products has not been possible to maintain the same high-quality landscape and athletic fields prior to the policy implementation. With that said, the organic first approach significantly reduces the city's reliance on synthetic products specifically in the areas the public uses, such as parks. The feedback from residents has been overwhelmingly positive for the organic first approach and we expect continued success using the tiered approach of the City's Integrated Pest Management Policy. 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 2020			
PRODUCT	ACTIVE INGREDIENT	TARGET PEST	EPA CATEGORY
Finalsan	Ammoniated soap of fatty acids	Weeds	Warning
Suppress EC	Caprylic acid	Weeds	Warning
Scythe	Pelargonic acid	Weeds	Warning
Whack Out Weeds	Peppermint oil, potassium sorbate and sodium chloride	Weeds	Caution
Terad3 Blox	Cholecalciferol	Rodents	Caution
ContraPest	4-Vinylcyclohexene diepoxide- 0.09604% Triptolide- 0.00118%	Rodents	Caution
Uncle Ian's Gopher Repellant	Dried blood	Gophers	N/A
ICI Carbon Dioxide Liquid	Carbon Dioxide	Gophers	N/A
Eco Via EC	Thyme oil, rosemary oil, 2 phenethyl proprionate	Insects	Caution
Entrust SC	Spinosad A & B	Insects	Caution

**TABLE 2
CITY OF IRVINE PESTICIDE USAGE SUMMARY
COMMUNITY AND NEIGHBORHOOD PARKS**

PRODUCT	PEST	TOTAL USE IN 2016	TOTAL USE IN 2017	TOTAL USE IN 2018	TOTAL USE IN 2019	TOTAL USE IN 2020
Whack Out Weeds*	Weeds	0	0	0	0	18,779 oz.
Glyphosate 4 Plus	Weeds	0	0	0	0	0
Round Up Custom	Weeds	0	0	0	0	0
Speed Zone	Weeds	0	0	0	0	0

**Whack Out Weeds is an organic weed killer product.*

**TABLE 2
CITY OF IRVINE PESTICIDE USAGE SUMMARY
ORANGE COUNTY GREAT PARK**

PRODUCT	PEST	TOTAL USE IN 2016	TOTAL USE IN 2017	TOTAL USE IN 2018	TOTAL USE IN 2019	TOTAL USE IN 2020
Actinovate*	Disease	0	0	0	0	1,422 oz.
Companion Maxx*	Disease	0	0	0	0	10,304 oz.
Insignia SC	Disease	0	0	0	0	200 oz.
Banner Max II	Disease	0	0	0	0	329.5 oz.
Clearys 3336F	Disease	0	0	0	0	1,395 oz.
Glyphosate 4 Plus	Weeds	0	0	0	0	0
Arrow 2 EC	Weeds	0	0	0	0	2,830 oz.
Sedgehammer	Weeds	0	0	0	0	0.14 oz.
Speed Zone	Weeds	0	0	0	0	0
Phycomycin*	Algae	12,000 oz.	13,200 oz.	9,200 oz.	3,200 oz.	12,000oz.
Finalsan*	Weeds	0	1,616 oz.	16,097oz.	18,304oz.	26,428oz.
Suppress EC*	Weeds	0	1,048 oz.	311,204 oz.	30,781 oz.	30,312oz.
Scythe*	Weeds	0	0	0	0	31,416oz.

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

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

PRODUCT	PEST	TOTAL USE IN 2016	TOTAL USE IN 2017	TOTAL USE IN 2018	TOTAL USE IN 2019	TOTAL USE IN 2020
SYNTHETIC PESTICIDES						
Fumitoxin Tablets	Rodent	0	0	64 tablets	93 tablets	378 tablets
Rozol Vole	Rodent	0	0	6 lb.	0	0
Maki Mini	Rodent	0	0	2.25 lb.	0	0
Avalon Strychnine	Rodent	0	0	1 lb.	0	0.25 lb.
Contract Bait Block	Rodent	52 oz.	0	0	0	0
ORGANIC PESTICIDES						
Rat X	Rodent	60 lb.	126.34 lb.	0	0	0
Uncle Ian's Gopher Repellant	Rodent	212 lb.	997.93 lb.	84.25 lb.	32.5 lb.	10 lb.
Repels-All	Rodent	0	0	6	0	0
ICI Carbon Dioxide	Rodent	0	0	0	45 lb.	84 lb.
ContraPest	Rodent	0	0	0	10.08 oz.	108.24 oz.
Terad3 Blox	Rodent	0	0	48.01 lb.	37.86 lb.	127 lb.

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

PRODUCT	PEST	TOTAL USE IN 2016	TOTAL USE IN 2017	TOTAL USE IN 2018	TOTAL USE IN 2019	TOTAL USE IN 2020
SYNTHETIC PESTICIDES						
Transport GHP	Insects	0	0	0.3 oz.	0	0
P.I. Contact	Insects	0	0	8 oz.	5 oz.	0
Talstar	Insects	208 oz.	0	0	0	0
Masterline Bifenthrin	Insects	6.49 oz.	0	0	0	0
ORGANIC PESTICIDES						
Essentria IC3	Insects	13,516 oz.	22,696 oz.	20,826 oz.	0	0
EcoEXEMPT	Insects	1,625 oz.	591 oz.	84.25 oz.	0	0
EcoVia	Insects	43 oz.	121.60 oz.	379.21 oz.	183.75 oz.	444 oz.
WHY Spray	Insects	0	2,268 oz.	71 oz.	0	0
Entrust SC	Insects	0	0	2.79 oz.	392 oz.	697 oz.

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

PRODUCT	PEST	TOTAL USE IN 2016	TOTAL USE IN 2017	TOTAL USE IN 2018	TOTAL USE IN 2019	TOTAL USE IN 2020
SYNTHETIC PESTICIDES						
Round Up	Weeds	0	0	0	0	0
Arrow 2EC	Bermuda grass	0	0	0	3,017 oz.	218 oz.
Speed Zone	Turf Weeds	0	0	0	0	0
Turflon Ester	Bindweed	0	0	700 oz.	0	0
Sedge Hammer	Nutsedge	0	0	4.59 oz.	20.52 oz.	0.3 oz.
Fusilade	Bermuda grass	0	0	0	0	22 oz.
Reward	Cattails	0	0	0	0	512 oz.
ORGANIC PESTICIDES						
Avenger	Weeds	20,672 oz.	512 oz.	0	0	0
Scythe	Weeds	9,538 oz.	10,748 oz.	0	11,475 oz.	7,373 oz.
Suppress EC	Weeds	17,316 oz.	223,484 oz.	311,204 oz.	439,502 oz.	486,872 oz.
Finalsan	Weeds	0	1,700 oz.	16,097 oz.	12,282 oz.	64,670 oz.
Weed Pharm	Weeds	0	327,879 oz.	77,952 oz.	0	0
Fiesta	Weeds	0	1,812 oz.	144 oz.	0	0
PreEmerge	Weeds	0	768 oz.	0	0	0
Weed Slayer A	Weeds	0	0	140 oz.	0	0
Weed Slayer B	Weeds	0	0	140 oz.	0	0

Appendix 2

Contractor daily application logs and reports for 2020