

City of Davis
Integrated Pest Management Program
2008 Annual Report

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1.0 Overview

The purpose of this report is to provide the Natural Resource Commission (NRC) with an overview of City efforts to control pests in a variety of settings in and around the community. As outlined in the report, staff employs a number of methods to achieve the functional, public safety, and aesthetic vegetation control standards that have been established for City managed areas. The report also reviews the policy decisions that shaped the City's current approach to weed management and provides analysis of several factors that influence program decisions.

2.0 Introduction and Background

In the 1980's the City of Davis' pesticide use was similar to other cities and agricultural operations. Much of the maintenance of park, greenbelts, landscaping, bike paths, streetscapes and open space consisted of scheduled applications of fertilizers and pesticides. The pesticides used were a mixture of Category I (Danger), II (Warning) and III (Caution) compounds.

In 1989 the city established an Integrated Pest Management (IPM) program where new methods of managing public landscapes were imposed, these included:

- First IPM Policy developed by the Parks and Community Services department.
- First IPM specialist hired by the City of Davis.
- Issuing written pesticide recommendations.
- Consolidate and centralize pesticide storage in upgraded facilities.
- Cooperating with UCD in experimenting and utilizing beneficial insects and other practices.
- Minimize toxic pesticide use.
- Increased staff training and education on IPM.

Seven years later in 1996, the city council approved the creation of an IPM task force which was made up of UCD experts including IPM specialist, entomologist, weed scientist and plant pathologist as well as representatives of the US Forest Service and private landscapers. The task force primary goals were to:

- Reduce the pollution load of pesticides within the City of Davis
- Increase awareness and use of IPM by citizens via education & outreach
- Provide recommendations that will assist in improving the IPM program
- Reduce the use of pesticides within the city, by businesses and retail operations via technical assistance and education programs

The IPM task force report was completed in 1998 with the following conclusions:

- Identify the conditions causing pest problems.
- Devise ways to change conditions so as to discourage reoccurrence of pests.
- Select least hazardous combination of strategies to control the pests.
- Conduct on going training and IPM advisory assistance.

In 1998 the Environmental Protection Agency (EPA) awarded the City of Davis a PESP (Pesticide Environmental Stewardship Program) Grant Award for IPM Education. The IPM demonstration signs and “garden friendly” posting throughout the parks and greenbelts are remnants of that funding.

The IPM program came under review in 2000 by the Natural Resources Commission with the following recommendations:

- Continue reducing category II applications.
- Continue posting for pesticide applications.
- Continue the native grasses area conservation.
- Study the IPM coordinator option.
- Continue training efforts with citizens and staff.

2000 – 2007 Environmental resource supervisors (Open Space), wildlife resource specialist and the environmental compliance coordinator oversaw and reported on the IPM program.

2001 Local interest group requested the County Agricultural Commissioner to investigate herbicide use and reporting within the city. The investigation revealed only minor deficiencies with recordkeeping due to the size of the three departments. Each department would maintain records and coordinate IPM activities.

2005 Public Works develops an IPM plan, which includes:

- Less reliance on chemical controls.
- Maintenance of positive relations between the city’s departments, regulatory agencies, and concerned public entities.
- Balancing weed controls within departmental economic constraints.

2007 Citywide pesticide use policy developed and IPM specialist hired.

2008 IPM Policy developed.

The citywide IPM Specialist position was staffed in the fall of 2007. The IPM Specialist coordinates citywide IPM activities, evaluates and trains field staff on alternative pest control methods, and keeps records for all departments. The position is currently funded between Parks & General Services (PGS) and Public Works (PW) departments.

Parks maintenance personnel in the PGS department as well as contractors are involved in pest control activities, mostly weed control throughout the parks, greenbelts, open space, and landscaped street medians. Public Works has three divisions involved in pest control activities. The Wastewater Treatment Plant (WWTP) personnel maintain the grounds around the plant, lagoons, overland flow, associated open space and treatment wetlands. Challenges posed here are maintaining the function of the overland flow process by controlling broadleaf weeds like curly dock, mustards and perennial pepperweed. The wetlands are constantly threatened by the spread of invasive weeds such as star thistle (*Centaurea solstitialis*) and perennial pepperweed (*Lepidium latifolium*). The transportation division maintains streets, roadsides, bike paths, and the old landfill/ pistol range site. Most weed control is done by a contractor who treats problem roadsides and non-landscaped traffic medians with herbicides in the late fall. The Collections division is in charge of maintaining stormwater flow within drainage channels, right of way

access and is responsible for maintaining the sanitary sewer system. Current pest control response is dictated by the results of pest population monitoring by field staff. Monitoring results are compared to action thresholds. Action thresholds include functional impairment, fire hazard, and aesthetic degradation. Functional impairments are infestations that impair the operation of a City facility, program, and/ or objective. Stormwater conveyance, for example, may be inhibited due to dense growth of invasive plants. In some instances aggressive pest species such as yellow starthistle (*Centaurea solstitialis*), and perennial pepperweed (*Lepidium latifolium*) are treated prior to threshold realization to prevent rapid colonization and habitat damage. Dense weed growth on City property, adjacent to private or public structures, creates a fire hazard. Weed infestations that occur in parks, bike or sidewalk paths, and road medians are considered hazardous and/ or of poor aesthetic value.

The following section presents the 2008 calendar year activities with regards to the City's IPM Program. IPM policies apply to all City departments. However, this report details P&CS and PW activities, as they have primary pest management responsibility.

3.0 Program Achievements in 2008

3.1 IPM Innovator Award

This award from the California Department of Pesticide Regulation (DPR) is given to organizations recognizing their efforts to reduce chemical pesticides via cultural, biological and mechanical control methods. Throughout the years DPR has given out more than 100 IPM Innovator awards to honor California organizations that emphasize pest prevention, favor least-hazardous pest management, and share their successful strategies with others. The awards are part of a comprehensive, reduced-risk pest management strategy aimed at homes, schools, farms, and the environment.

3.2 Our Water Our World (OWOW) Program

The OWOW program continued to be implemented at three pesticide retail stores in Davis (Davis Ace, Redwood Barn and Nursery, and Longs Drugs) in 2008. This program provides "Less Toxic" fact sheets and shelf tags set adjacent to pesticides. In addition to the written materials, store employees are given training regarding what products are environmentally conscience alternatives for pest control.

3.3 IPM Comic "The Exterminator"

The IPM and Stormwater Pollution Prevention Programs partnered to create a comic book for youth and young at heart that demonstrates least toxic approaches to managing urban household pests.

3.4 Alternative Pest Control Practices

Staff continued to work with alternative pest control methods including:

- **“Green pesticides”**: products derived from soap, acetic acid, herbal oils or microorganisms.
- **Biological control**: use of predatory organisms such as nematodes for grub controls on ball field turf, and promoting birds-of-prey to eat pest rodents.
- **Mechanical control**: removal of weeds by “weed wackers”, tractor implements or hoes.
- **Grazing**: use of goats and sheep at Mace Ranch wildlife habitat.
- **Mulching**: use of wood chips to cover open ground, smothering weeds.
- **Sheet Mulching**: mulching but with cardboard or weed cloth barriers.
- **Flaming**: use of propane flammers to burn down broadleaf weeds.
- **Solarization**: use of clear plastic during the summer to pasteurize the soil, killing or debilitating most weed seeds.
- **Flooding**: use of flooding in the wetlands to deprive weeds of air.

3.5 City of Davis IPM policy incorporating Pesticide Hazard Avoidance and Exposure Reduction (PHAER) zones.

The city IPM Specialist revised the citywide IPM policy with the incorporation of the Pesticide Hazard and Exposure Reduction (PHAER) zones program. This strategy gives structure to the implementation process of the IPM policy in parks and greenbelts by allowing supervisors the needed flexibility in their management options and informing the citizens about the general level of pesticide hazard present on a site-by-site basis. These zones are designated as Green, Yellow and Special Circumstance Zones, with Green Zones providing the lowest potential for pesticide hazard and exposure. Each Zone has a corresponding pesticide list determined by existing toxicological data. Mace Ranch and Central Park are the first parks in the city to have the PHAER zone program implemented. Contracted landscape maintenance and pest control companies have been presented with this program and are expected to abide by it. Staff training of contracted company employees regarding this policy and project has been conducted in Spanish.

3.6 City partnership with the UC Davis Arboretum and volunteers on the Central Park demonstration garden project.

In 2007, city staff from both PW and P&GS participated in the design and development of the Central Park demonstration garden project. This project demonstrates the use of drought tolerant and native plants, zone irrigation, and alternative pest control. The city continues to collaborate with the arboretum with public outreach events related to the garden.

3.7 PW and PGS field staff received Pesticide Applicator Certificates

Developed and conducted preparatory courses for City of Davis staff seeking Qualified Applicators Certificates. Lead a class once a week for a month before the scheduled exams covering materials such as pesticide safety, laws and regulations, and IPM practices.

3.8 City of Davis IPM Web Site

Online information on the City's IPM program including access to the city's IPM and pesticide use policies, details on how to deal with local pests, links to other useful sites as well as details on the Pesticide Hazard and Exposure Reduction (PHAER) zones program. The Exterminator comic is also available to download.

4.0 Alternative Pest Control Activities

Several alternative pest control methods were continued in 2008 to reduce reliance on pesticides and meet IPM objectives.

4.1 Weed management

Mechanical Removal: Mowing, weed trimming, and tilling continued to be utilized by City crews to control weeds and stimulate native grass growth. Extensive mowing and tilling were used in 2008 at the WWTP, Davis Wastewater Treatment Wetlands (Wetlands), park and greenbelt facilities and various open space areas. Some of these efforts resulted in higher costs associated with labor and equipment maintenance, but helped to reduce herbicide use. Feasibility of future reliance on these methods may be reduced due to budgetary constraints.

Hand Removal: Seasonal employees and volunteers were utilized at the WWTP, Wetlands, and community garden sites to pull weeds from around landscaping and native plant restoration areas. Similar to mechanical removal this control method increases labor. Cuts in City labor force could reduce feasibility of this method; however, volunteer service may help to reduce costs.

Flooding: Water level management continued to be effective at controlling weeds and Canada goose nest density at the local stormwater detention basins and the Wetlands. Water levels were raised onto the seasonal benches during winter months and allowed to remain into spring.

Rx Burning: Prescribed fire was used at the Wetlands to stimulate native grasses and reduce weed seed production.

Grazing: Livestock grazing is utilized at the Mace Ranch Community Park habitat area and Yolo County Grasslands burrowing owl preserve to meet burrowing owl habitat objectives. Livestock are free ranged for 2 months to meet this goal.

Use of Native Vegetation in New Landscaping Projects: The City continued to utilize native trees, shrubs, and grasses in municipal landscape projects. Native plants were included in the landscaping of the new Central Park Garden. Native grasses were seeded along several pond benches at the Wetlands. Once established native vegetation can successfully out compete weed species. This helps to reduce weed management activity. Native plants also require less irrigation, which reduces risk of offsite movement of fertilizers or pesticides into the stormwater system. The use of native plantings increases the costs of the project. Reliance on the use of native plants may be reduced due to budgetary constraints.

Weed Habitat Removal: P&GS landscape contractors and park field staff continued to maintain mulch around landscaped areas. Mulch helps to smother weeds and reduces the need for fertilization and water.

Proper Timing of IPM Control Activities: Continued monitoring of weed development led to proper timing of weed management. Growth stage of weeds often dictates type of management method to be used.

Organic Herbicide: Trials with these products continue to be tested and are showing promising results. Concentrated acetic acid (vinegar) in combination with a soap based herbicide or with the herbal oil based herbicides have shown promise in burning down annual broadleaves. This is encouraging for areas that are sensitive to conventional pesticide use due to human and pet exposure or wildlife habitat. Work will continue in other areas as well, especially those that relate to water quality issues.

Weed Flaming: Propane flamers are utilized when conditions of high humidity reduce the options for other forms of weed control. This technique is effective on small, recently germinated broadleaf weeds.

4.2 *Other Pest management*

City Stormwater Basins and Wetlands Pest Control: Mosquito control within the local stormwater retention basins and at the Wetlands continued to be through water level manipulation and biological control only. Bringing water levels down during the peak mosquito production time allows predatory species to access larvae. All areas continued to support sufficient populations of predatory mosquito fish (*Gambusia affinis*).

Rodents were controlled in a couple of parks by placing secure baiting stations in strategic areas. Results were achieved in a couple of weeks. Musk rats and ground squirrels within stormwater basins, WWTP, Wetlands and parks were removed as needed via both non-lethal/non-toxic live trapping and least toxic baiting. The city has also implemented a barn owl nest box installation program in parks and neighborhoods. The program aims to increase the population of natural predators to help regulate rodent pest species within the city planning area.

Hackberry tree aphid control on some parks and parking lots are performed using imidacloprid to control the aphid and thus the production of honeydew. This product is also occasionally used to

control beetle grubs on the fields at Playfields Park. Predatory nematodes are used as a preventative on these grubs but if population thresholds are exceeded the insecticide is used.

Sewer line root control is conducted by the Collections division of PW as part of a comprehensive sanitary sewer maintenance program. This regulatory mandated program aims to prevent sanitary system overflows or system failure by controlling, among other things, root intrusion. Root control includes, but is not limited to, the use of Vaporooter, a class one category pesticide. Prior to 2008, this product was not included in pesticide use reporting due to a misunderstanding of product registration. Since becoming aware of this error, changes have been made to include the product in pesticide reporting and ensure that it is used in accordance to the City's pesticide application policy. Mechanical methods as well as alternative herbicides will be evaluated to determine the most efficient and safe way to control root intrusion in the sewer lines.

5.0 Public Outreach and Education

The City continued to provide public outreach and education on pesticides using several forms of communication. City staff was also educated on weed and pest control techniques and current trends in IPM. Outreach and education efforts included:

- Development of City of Davis' IPM website.
- Development of IPM comic "The Exterminator".
- Notification of City herbicide application activities in parks and greenbelts via the Pesticide Hotline.
- Tips and alternatives to pesticide use provided in the annual PW sponsored "Utility Connections" and citywide "Focus" newsletters.
- Distribution of IPM educational literature at community events. The city partnered with the Master Gardener Program to provide free advice at the Celebrate Davis event. The Davis Green Home and Garden Expo provided opportunities to display the city's effort at least toxic pest control. Tables featured the OWOW program, bat and owl boxes as well as pamphlets and handouts on our pest control programs among other things.
- Periodic presentations at local schools regarding stormwater quality including tips and alternatives to pesticide use.
- Presentations on least toxic pest control at the community gardens, Central park garden and the Mace Channel Herb Garden.
- City sponsored annual Horticulture Pest Control Seminar where continuing education units are available to city staff and other pest control professionals from the school district and surrounding communities.
- Pesticide safety training for City field staff.
- Attendance at IPM conferences by departmental staff involved with IPM coordination.
- Annual presentations to the city council and citizen advisory commissions.
- Encouraging local pesticide vendors to participate in the OWOW program.
- Use of positive posting at location where alternatives to chemical pest control were in use.

6.0 2008 Pesticide Use

TABLE 1: Summarizes pesticide use¹ by product for calendar year 2008 with comparison to 2005 through 2008.

Product	EPA Category	2005 Use	2006 Use	2007 Use	2008 Use
Round-up [3]	III	101 gal	100 gal	180 gal	127 gal
Vaporooter [7]	I	No data	No data	No data	19.5 gal
Surflan As	III	0 gal	0 gal	0 gal	0 gal
Prepair	III	0 lbs	7.7 gal	0 gal	0 lbs
Atrimec	III	13.5 gal	0 gal	0 gal	0 gal
Safer Soap	III	0 gal	2.7 gal	6.1 gal	0 gal
Garlon 4	III	3.7 gal	20.8 gal	22 gal	1.1 gal
Goal [1]	II	17.8 gal	100 gal	180 gal	21.2 gal
Manage	III	2.2 lbs	0.006 lbs	0.9 g	1.3 g
Turflon	III	1.1 gal	0.2 gal	0.03 gal	3.1 gal
Transline	III	0.26 gal	1 gal	0.3 gal	1.3 gal
Telar	III	10.8 oz	17 oz	36.1 oz	8.7 oz
Fusilade	III	0 gal	0.02 gal	0.06 gal	0.25 gal
Aquamaster [8]	III	13.3 gal	1.5 gal	3.9 gal	1.8 gal
Merit	III	8.4 gal	8.5 gal	0 gal	0 gal
Direx 4L	III	6.8 gal	2.5 gal	4.7 gal	0.5 gal
Snapshot	III	4825 lbs	2922 lbs	3325 lbs	5900 lbs
Shark	III	0 gal	0.03 gal	0 gal	0 gal
Clarity [2]	I	1 gal	2.6 gal	1.1 gal	0.7 gal
Weedar 64 [2]	I	5 gal	1.9 gal	3.4 gal	2.2 gal
Barricade	III	0 gal	0.2 gal	5.2 gal	2.3 gal
Greenmatch [6]	III	0 gal	0 gal	1.3 gal	0 gal
Zenith 75WSP	III	0 gal	0 gal	0.3 gal	0.4 gal
Sedgehammer	III	0 lbs	0 lbs	3.8 g	104.3 g
Payload	III	0 gal	0 gal	2.7 gal	2.5 gal
Pendulum	III	0 gal	0 gal	0 gal	500 lbs
Scythe	II	0 gal	0 gal	0 gal	1.3 gal
Landmark	III	0 gal	0 gal	2.3 gal	0.9 gal
Milestone	III	0 gal	0 gal	2.9 gal	0.5 gal

Notes:

[1] Used primarily in native grass restoration sites with limited public access (e.g. outlying open spaces and Davis Wetlands). Includes Goaltender.

[2] Use of this material is restricted to the Overland Flow process of the Wastewater Treatment Plant. Public access is prohibited.

[3] Combined Round-up products (Ultra, Pro, Weather max).

[6] Organic herbicide

[7] Used in sewer lines to remove intruding roots

[8] Includes Rodeo, the old name for Aquamaster (aquatic glyphosate formulation)

¹ Includes City contracted pest control applications.

6.2 Comparison of 2008 Usage to 2007 Usage

Use of liquid products in 2008 was 45% lower than in 2007 (416 gallons vs. 187 gallons). Solid products were used more (56%) in 2008 than in 2007 (5900 pounds vs. 3325 pounds). The data suggests that in years where pre-emergence herbicides increases, post emergence use decreases. This year the use of pre emergence is lower in the first two months and is expected to reduce for the rest of the year. The use of post emergence herbicide is also expected to decrease somewhat because of the increased use of “green herbicides” as a substitute in some situations.

6.3 Pesticide Use by Management Area

The City currently manages 1736 acres of land that are subject to IPM. This acreage is divided into 6 major management areas including: Parks, greenbelts, and streetscapes (528 ac.); Open Space (548 ac.); Transportation System (30 ac.); Stormwater System (101 ac.); Wastewater System (489 ac.); and Facilities (40 ac.). The 6 major areas are further divided into sub areas. Table 3 details the sub areas and offers a percentage of total annual use by major area,

Table 3: Percentage of total pesticide use by major area in 2008 with 2007 comparison.

Major Area	Sub Area	Acres	% of Total Use 2008/ 2007
Parks, greenbelts, and streetscapes		528	46/ 60
Open Space		548	2/ 2
	Agricultural buffers		
	Restoration areas		
	Mitigation habitat		
Transportation System		30	7/ 8
	Street median and Shoulders		
	Sidewalks		
	Bike paths		
Stormwater System		101	<1/ <1
	Detention/habitat ponds		
	Drainage stations		
	Conveyance channels		
Wastewater System		489	34/ 28
	Wastewater Plant		
	Davis Wetlands		
	Sewerline Root Control		10/NA
Facilities		40	1/ 2
	Old landfill/ pistol range		
	Corp yards, facility parking and landscaped areas		
		1736	100

7.0 Program Goals and Challenges for 2009

7.1 IPM Goals for 2009

PW and P&GS will continue to investigate and utilize feasible alternative pest control methods as directed by the IPM Specialist. PW will continue to implement its herbicide reduction plan to further refine pest control activities for less reliance on conventional pesticides.

The following parks will be included in the PHAER zones program:

- Winter of 2009: Central Park and Mace Ranch Park
- Spring of 2009: Arroyo Park, Walnut Park and Community Park.
- Summer 2009: Pioneer Park, Slide Hill Park, Chestnut Park, Sandy Motley Park.
- Fall 2009: Westwood Park, Barovetto Park, North Star Park and Sycamore Park.

The IPM Coordinator will continue to work on outreach such as an “Adopt-a-Park” program that recruits volunteers to participate in alternative weed control at select parks in Davis.

Public outreach and education on IPM will continue through literature and staff presentations at various public events.

Trainings will continue for P&GS and PW staff on pesticide safety and IPM practices.

Crew supervisors from PW will continue to test alternatives to current sewer line root control methods. Tests on alternative herbicides and methods will continue in order to find a less toxic alternative.

7.2 Anticipated Challenges for 2009

Pest control strategies are dictated by weather, pest persistence and staff availability to implement management techniques. Persistence of infestations and budgetary constraints may hinder alternative control methods and cause an increased reliance on conventional methods primarily because the service level standards expected by the community. While the majority of staff has accepted and works with IPM practices, some concern over effectiveness of alternative methods continues. Primarily, the concern is that alternative methods are not cost effective and may not be suitable in certain applications. The IPM specialist will continue to work with staff and management to keep them informed on pesticide regulation updates, safety, and conduct field trial to demonstrate alternatives, their effectiveness, limitations and costs.