

City of Davis
Integrated Pest Management Program
2009 Annual Report

Submitted to the Natural Resource Commission on April 26, 2010
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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 pest 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 pest 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. These broadleaf weeds shade out the grasses leaving bare spots once the annuals have seeded and died. 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. Some 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 2009 calendar year activities with regards to the City's IPM Program. IPM policies apply to all City departments. However, this report details P&GS and PW activities, as they have primary pest management responsibility.

3.0 Public Outreach and Education

Outreach is a very important component of our IPM program because the city manages roughly 16% of the area within the city limits. These areas are made up of parks, greenbelts and open spaces. The remaining 84% is managed institutionally, commercially and privately. These percentages demonstrate the importance of outreach on pesticide reduction practices. Unless citizens are aware of the hazards of pesticides and alternatives to them, the efforts the city employs to reduce pollution will have a minimal impact. A study in 1995 by the US Geological Survey, monitored pesticides in storm runoff from agricultural and urban areas in the Tuolumne river basin around Modesto, CA. Six pesticides were detected from agricultural areas and fifteen pesticides were detected in urban runoff. Similar studies done around the state have found similar results with urban runoff and pesticides. Urban pesticide use can pollute as much or more than agricultural use in some cases. Many private individuals are able to purchase, apply and store hazardous pesticides without the restrictions applied to professional landscapers or farmers, resulting in misuse and pollution. Some of the city's outreach efforts include:

3.1 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 CVS Pharmacy) in 2009. 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. The OWOW program has participated in the Celebrate Davis in May, annual celebration of the Central Park Garden on October 31st, Duck Days in February, and the Ace Hardware Healthy Gardening workshop for customers in September. Three stores were organized to create discount coupons for less toxic products that were handed out at these events. All the stores cooperate in this enthusiastically. Trainings have been conducted for the staff at Ace which is done after hours and an average of 16 employees are

trained on an annual basis. The redwood barn and CVS pharmacy employees get updates on current pests and pesticides of concern and the least toxic way to manage them when the OWOW coordinator comes to town.

3.2 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. Distributed at events and conferences where presentations are made on the city’s IPM program as well as the City of Davis IPM webpage, local comic book shops and the Davis Food Coop.

3.3 Pesticide Hazard Avoidance and Exposure Reduction (PHAER) Zones Park Maps.

The city IPM specialist developed the citywide IPM policy in 2008 with the incorporation of the Pesticide Hazard and Exposure Reduction (PHAER) zones program. This program 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. Maps of parks have been developed and placed on the city’s IPM webpage that demonstrate these areas. Parks that have been mapped are: Community Park, Sandy Motley Park, Mace Ranch Park, Arroyo Park, Pioneer Park, Walnut Park, Slide Hill Park, Chestnut Park, and Sycamore Park. Central and Hacienda Parks have not been mapped since these entire parks have been designated “green”. The remaining parks and greenbelts shall be done through the year averaging three parks a quarter. Contracted landscape maintenance 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.

3.4 City Partnership with the UC Davis Arboretum and Volunteers on the Central Park Demonstration Garden Project.

The Central Park Garden project has been a joint project with the City of Davis and the UC Davis Arboretum since 2007. 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. Hundreds of people stroll through this garden, especially during the biweekly farmers markets.

3.5 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. There were over 1900 recorded pageviews on the IPM webpage in 2009 (See attachment 1).

3.6 Pesticide Hotline

Notification of the city's herbicide application activities in parks and greenbelts is available the evening before via the Pesticide Hotline. Both city staff and contractors must inform the hotline of planned pesticide application by 3 PM the day before. A message is recorded with the information describing location and products that are to be applied.

3.7 IPM Educational Literature and Materials.

Literature, pest prevention tips, materials such as owl boxes and gopher traps, as well as less toxic pesticide alternatives are provided and displayed at community events like Farmers Market, Celebrate Davis, and Duck Days. Additional articles are included in local publications like, the city of Davis Environmental Guide and the Focus Newsletter. Posting continues at locations where alternative to chemical pest control are in use.

3.8 Presentations on the city of Davis IPM program and least toxic pest control.

Presentations have been done at the community gardens and Central Park garden on least toxic pest control methods. Presentations on the city's IPM program have been conducted at professional meetings such as the Ecological Farming Conference, the Pesticide Applicators Professional Association and the city's sponsored Horticultural Pest Control Seminar.

3.9 City of Davis pesticide safety training meetings and seminars.

Pesticide safety training of city staff is conducted once a year for various divisions within the Public Works and Parks departments. Additional workshops are conducted in Spanish for the landscape contractors. Two half day seminars with continuing education credits are conducted for staff, contractors and other pest control professionals in the area. Preparatory courses for City of Davis staff seeking Qualified Applicators Certificates have been conducted covering materials such as pesticide safety, laws and regulations, and IPM practices.

4.0 Alternative Pest Control Activities

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 and South Fork Preserve.
- **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.

Several alternative pest control methods were continued in 2009 to reduce reliance on conventional pesticides and meet IPM objectives.

4.1 Weed management

Green Herbicides: Successful adoption and use of 20% acetic acid with a soap-acid based herbicide (Scythe) in the green zones and sensitive areas at the wetlands are significant in the reduction of our conventional pesticides. The same combination with half an ounce of Round Up per gallon is used in yellow zones, a reduction of 75% of Round Up per gallon per application (1/2 ounce vs. 2 ounces). Staff is satisfied with the effectiveness of the applications, being able to see the burn down effect sooner than with an application of Round Up alone. By seeing the burned weeds they can touch up missed areas within 24 hours giving more efficient control. Trials continue with these products and are showing promising results. 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.

Mechanical Removal: Mowing, weed trimming, and tilling continued to be utilized by City crews to control weeds and stimulate native grass growth. Mowing and tilling were used in 2009 at the WWTP and Wetlands, park and greenbelt facilities, drainage channels and various open space areas.

Mulching: Parks staff and volunteers continued to maintain mulch around landscaped areas and in some tree wells. Sheet mulching; placing sheets of corrugated cardboard with a wood chip mulch layer on top prevents weeds from emerging through the chips until the cardboard breaks down. This has been applied to known weedy areas with outstanding results. Besides smothering weeds, mulch reduces the need for fertilization and water.

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. Aquatic weeds such as cat tails, algae and water primrose will be controlled once water levels recede.

Rx Burning: Prescribed fire has been 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 South Fork Preserve along Putah Creek. Livestock are free ranged for 2 months keeping grass and weeds down.

Use of Native Vegetation in Landscaping Projects: The City continued to utilize native trees, shrubs, and grasses in municipal landscape projects. Native plants are demonstrated in the landscaping of the Central Park Gardens. Native plants and grasses were seeded along several pond benches at the Wetlands and in open space areas such as Willowbank, Woodbridge and Wildhorse. Once established, native vegetation can successfully out compete weed species and reduce the need for irrigation.

Proper Timing of IPM Control Activities: Continued monitoring of weed development leads to proper timing of weed management. Growth stage of weeds often dictates type of management method to be used. The success of the vinegar soap herbicide mixture is based on the precise application when the weed seedlings are the most susceptible. Since weed control is not the primary responsibility of staff, sometimes the window of opportunity is missed resulting in weeds going to seed or requiring a more labor-intensive effort to control.

Weed Flaming: Propane flammers 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. A large tractor mounted flamer has been borrowed from UC Davis to be tried at the wastewater treatment plant and at the wetlands.

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*).

Gophers were a problem this season at Pioneer Park and soccer field. Mechanical traps were set throughout the park resulting in 27 trapped rodents. Rats were controlled in a couple of parks by placing secure baiting stations in strategic areas. Results were achieved in a couple of weeks. The city continues implementing the 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.

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 restricted use 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. In 2009, no pesticide use was reported for sewer line root control. In 2010,

nine applications were made with an alternative product to Vaporooter known as Root X, a less hazardous alternative. Mechanical methods are used if there is a clogged line, and then the pesticide is used to prevent immediate repeat intrusion of the roots.

6.0 2009 Pesticide Use

TABLE 1: Summarizes pesticide use¹ by product for calendar year 2009 with comparison to 2005 through 2009.

Product	EPA Category	2005 Use	2006 Use	2007 Use	2008 Use	2009 Use
Round-up [3]	III	101 gal	100 gal	180 gal	127 gal	93.5 gal
Vaporooter [7]	I	No data	No data	No data	19.5 gal	0 gal
Safer Soap	III	0 gal	2.7 gal	6.1 gal	0 gal	0 gal
Garlon 4	III	3.7 gal	20.8 gal	22 gal	1.1 gal	1.3 gal
Goal [1]	II	17.8 gal	100 gal	180 gal	21.2 gal	23.1 gal
Manage	III	2.2 lbs	0.006 lbs	0.9 g	1.3 g	0 g
Turflon	III	1.1 gal	0.2 gal	0.03 gal	3.1 gal	32 gal
Transline	III	0.26 gal	1 gal	0.3 gal	1.3 gal	2.4 gal
Telar	III	10.8 oz	17 oz	36.1 oz	8.7 oz	34.3 oz
Fusilade	III	0 gal	0.02 gal	0.06 gal	0.25 gal	4.25 oz
Aquamaster [8]	III	13.3 gal	1.5 gal	3.9 gal	1.8 gal	0.3 gal
Merit	III	8.4 gal	8.5 gal	0 gal	0 gal	0 gal
Direx 4L	III	6.8 gal	2.5 gal	4.7 gal	0.5 gal	0 gal
Snapshot	III	4825 lbs	2922 lbs	3325 lbs	5900 lbs	0 lbs
Clarity [2]	I	1 gal	2.6 gal	1.1 gal	0.7 gal	0 lbs
Weedar 64 [2]	I	5 gal	1.9 gal	3.4 gal	2.2 gal	0 gal
Barricade	III	0 gal	0.2 gal	5.2 gal	2.3 gal	0 gal
Greenmatch [6]	III	0 gal	0 gal	1.3 gal	0 gal	1.5 gal
Zenith 75WSP	III	0 gal	0 gal	0.3 gal	0.4 gal	0 gal
Sedgehammer	III	0 lbs	0 lbs	3.8 g	104.3 g	4.25 g
Payload	III	0 gal	0 gal	2.7 gal	2.5 gal	0.9 gal
Pendulum	III	0 gal	0 gal	0 gal	500 lbs	0 lbs
Scythe	II	0 gal	0 gal	0 gal	1.3 gal	7.7 gal
Landmark	III	0 gal	0 gal	2.3 gal	0.9 gal	.34 gal
Arrow	III	0 gal	0 gal	0 gal	0 gal	2 gal
Milestone	III	0 gal	0 gal	2.9 gal	0.5 gal	0.25 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).

¹ Includes City contracted pest control applications.

- [6] Organic herbicide
- [7] Used in sewer lines to remove intruding roots
- [8] Includes Rodeo, the old name for Aquamaster (aquatic glyphosate formulation)

6.2 Comparison of 2008 Usage to 2007 Usage

Use of liquid products in 2009 was 11% lower than in 2008 (187 gallons vs. 165.6 gallons). Solid products were dramatically reduced by 99.99985% in 2009 compared to 2008 (.009 lbs vs. 5900 pounds). This drastic reduction was due to the elimination of the pre-emergent herbicide “Snapshot” in parks and green belts. The Park supervisor decided to not apply the pre-emergent in order to determine where the problem areas are. This season was wet early on and weed emergence became evident in the late fall with our significant early rains. Most areas were scouted and the post emergent applications were adequate to control the weeds. Other areas were not treated at the opportune time and required more intensive weed control measures by mechanical and chemical means. This next season there may be some pre emergent application in the determined problem weedy areas or in areas that will lack the sufficient scouting and precise timing of application due to reduction in the labor force.

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 2009 with 2008 comparison.

Major Area	Sub Area	Acres	% of Total Use 2009/ 2008
Parks, greenbelts, and streetscapes		528	46/ 46
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	44/ 34
	Wastewater Plant		
	Davis Wetlands		
	Sewerline Root Control		0/10
Facilities		40	<1 / 1
	Old landfill/ pistol range		
	Corp yards, facility parking and landscaped areas		
		1736	100

7.0 Program Goals and Challenges for 2010

7.1 IPM Goals for 2010

Continue to investigate and utilize feasible alternative pest control methods through out the city by each division as directed by the IPM Specialist in order to refine pest control activities for less reliance on conventional pesticides. Open communication between the divisions and the IPM coordinator are key to this goal.

The following parks will be included in the PHAER zones program in 2010: Westwood Park, Barovetto Park, Northstar Park, Oak Grove Park, Oxford Circle Park, Putah Creek Park, Redwood Park, Willowcreek Park, N Street Park, Cedar Park, West Manor Park and Whaleback Park.

The IPM Coordinator will continue to add material to the IPM website, updating links, adding some video and keeping the site fresh to draw more viewers.

Public outreach and education on IPM will continue through literature, staff trainings and public presentations at local meetings, as well as professional meetings and conferences statewide.

The IPM coordinator will continue to network with other pest control and landscape professionals through the Sustainable Parks Information Network (SPIN) which is a webpage similar to a social networking site but designed for landscape and parks professionals that share information on sustainable practices by posting presentations, videos and blogs. The site is schedule to start in May and is sponsored by the Northwest Coalition to Alternatives to Pesticides (NCAP). In addition a group of IPM coordinators from throughout the state is forming to share information on practices and common challenges of the position. The first meeting is in Oakland on April 29, 2010, and has participants from San Francisco, San Mateo, Contra Costa County, UC Berkeley, Davis, Palo Alto, the Presidio (SF) and Santa Monica.

Collaborate with the volunteer coordinator 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.

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

7.2 Anticipated Challenges for 2010

Pest control strategies are dictated by weather, pest persistence and staff availability to implement management techniques. This has been a wet year with weed pressures being greater than normal. Diligent scouting and precise timing on applications has been successful in some instances where in other situations the weather has caused greater control efforts. Training staff to seize the window of opportunity will be the focus of future trainings. Personnel reductions may hinder alternative control methods and may cause an increased reliance on conventional methods primarily because of the service level standards expected by the community. 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.