

San Francisco Department of the Environment
Integrated Pest Management Program Report
Combined years 2006 and 2007

Contents

Executive Summary.....	1
Report.....	1
<i>Introduction</i>	1
<i>Reduced-Risk Pesticides List</i>	2
<i>Exemptions</i>	3
<i>Pesticide Use Data Collection and Analysis</i>	7
<i>Trainings / Conferences</i>	7
<i>Community, Regional, and National Outreach</i>	8
<i>Notes on Pesticide Use Data</i>	9
<i>Future Activities</i>	10
<i>Citywide Pesticide Use Trends</i>	11
<i>Department of Public Health</i>	21
<i>Department of Public Works</i>	24
<i>Department of Transportation (MUNI)</i>	27
<i>Port of San Francisco</i>	30
<i>Public Utilities Commission (PUC)</i>	33
<i>Department of Recreation & Parks (R&P)</i>	37
<i>San Francisco International Airport (SFIA)</i>	41

San Francisco Department of the Environment
Integrated Pest Management Program

ANNUAL REPORT 2006-2007

Covering pesticide use data and program activities for calendar years 2006 and 2007

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Executive Summary

Throughout 2006 and 2007, San Francisco's Integrated Pest Management Program continued to take a leading role in reducing pesticide hazards and promoting effective urban pest management. In 2006, the City received the National IPM Achievement Award at the National IPM Symposium in St. Louis. Other highlights included a special training on turf IPM (the "Turf Summit"), a daylong event on IPM contracting held in cooperation with other agencies, and the semiannual San Francisco Urban IPM conference. The program also presented its annual integrated pest management (IPM) and pesticide safety trainings for client departments, continued to review and update the City's Reduced-Risk Pesticides List, and held monthly meetings of the IPM Technical Advisory Committee, which includes representatives from all major City pesticide users as well as several other public agencies. Overall, the program provided about 4,500 person-hours of training during the two-year period. Through its submission of comment letters to US EPA pesticide reregistration dockets, the program also succeeded in directly changing national pesticide regulations, particularly for a common ingredient of snail baits.

By most measures, pesticide use decreased in 2006-07. Since the beginning of the program in 1996, total pounds of products used as decreased by 88%, and pounds of active ingredient has decreased 83%, when rodenticides and mosquito treatments are excluded. The long-term reduction was especially strong with herbicides (85% reduction) and fungicides (decreased from 144 pounds of active ingredient in 1996 to less than a pound in 2007). Insecticide reduction was approximately 77%, while rodenticide use has increased by 122% since 1996 due to the institution of new control campaigns in City sewers. Use of the most hazardous products (known as "Tier I" products) decreased by 83% since 1999, and medium hazard products (Tier II) decreased by 58%. Overall pesticide use has also decreased since the last report (2005) by 67%.

Significant problems with the City's pesticide use reporting database have slowed the program's ability to provide timely reports. A web-enabled database is under development to help solve these problems, but its progress has been slow.

Introduction

Chapter 3, Section 305(g) of the Environment Code (Integrated Pest Management Ordinance) requires San Francisco's Department of Environment (SFE) to report on the progress of its Integrated Pest Management (IPM) Program to the Board of Supervisors. This report is submitted to fulfill that requirement, and summarizes the progress made by San Francisco's IPM Program, analysis of pesticide use data, and specific information on the City's departments doing most of the pest control on City property from January 2004 through December 2005. *While these reports are normally compiled annually, database malfunctions and staffing challenges delayed the 2004 report considerably, and we have therefore combined two years' worth of data in this document.*

Reduced-Risk Pesticides List

IPM Programs utilize a number of methods to control pests while ensuring a safe working and play environment. *Chemical pesticides represent only a single control strategy and are used only as a last resort.* Sanitation, other pest prevention measures, and non-chemical management approaches should all be implemented *first*.

San Francisco's Reduced-Risk Pesticide List (RRPL) represents the pesticide products approved for use under San Francisco's Integrated Pest Management Ordinance (Adopted 10/96, Chapter 3, San Francisco Environmental Code) when less toxic alternatives are deemed not feasible. No other pesticide products may be used on properties belonging to SF without an exemption from SFE (see summary of exemptions below).

Products on the List are designated as Allowed (A), Limited Use (L), and Limited Use of Special Concern (L*). Each limited-use product notation is accompanied by the specific circumstances under which it is approved for use – the "Use Limitations". These restrictions are in addition to product label restrictions, which are required by federal law. "L*" products carry an additional requirement: Uses of these products must be justified at a public hearing by a representative of the relevant City department.

The list is updated yearly to reflect the availability of new reduced risk products, removal of products with the greatest human health and environmental concern, or products no longer needed. To determine which products present the greatest hazards, SFE employs a robust tier-rating system. This tier system looks beyond the signal word and acute toxicity of a product and evaluates pesticides on such factors as chronic effects (i.e. cancer, reproductive harm), environmental effects (i.e. persistence, bioaccumulation, mobility, water quality), and non-target effects (i.e. impact on wildlife, bees). Using these criteria, products are grouped into tiers with Tier I being the most toxic, Tier III as least toxic, and Tier IV products not having enough information for evaluation.

The tier rating flags potential hazards in a product. The SF IPM Technical Advisory Committee then examines other factors affecting risk, particularly use patterns, the potential for exposure, and hazards of other alternatives, before recommending a pesticide for inclusion on the RRPL. SFE considers this approach to be an example of "anticipatory action to prevent harm," as required by the City's Precautionary Principle Ordinance (SF Environment Code, Chapter 1). For more information on the creation of this list see the report, "Guide to San Francisco's Reduced-Risk Pesticide List," at:

http://www.sfenvironment.com/aboutus/innovative/ipm/pest_list05/Approved_List_Guide.pdf

Four key points about San Francisco's list deserve emphasis:

- **A pesticide list is not an IPM program.** Pesticides should be the last resort, when all other tactics have failed.
- **This list is for institutions, not residents.** Many pesticides on the list were added for specialized purposes not found in residential settings. Homeowners will usually need few or no pesticides to successfully manage common pest problems.
- **Fewer listed products is not necessarily better.** IPM programs require a toolbox of alternatives, for example, alternative attractants in least-toxic ant baits. Therefore, a larger list is indicative of the diversity of pest problems encountered, and does not imply that pesticide use is higher. The important measures of success are: Amount of highly toxic chemicals actually used (both active and inert ingredients), and overall effectiveness in pest suppression.
- **The SF RRPL only applies to City and County of San Francisco departments and properties.** Cities are only legally empowered to regulate their own pesticide use, not the pesticide use of residents or businesses.

Tables 1a and 1b summarize the changes made in the 2006 and 2007 RRPLs, respectively. The most updated list can be found on the web at www.sfenvironment.org/ipmchecklist.

Table 1a. Summary of 2006 Reduced-Risk Pesticide List changes (numbers of products)

	L* Limited Use, Special Concern (Highest concern)	L Limited Use (Medium concern)	A Allowed (Lowest concern)	Total
Pesticides added to 2005 list	1	0	2	3
Pesticides removed from 2005 list	1	4	4	9
Number of products on 2006 list	7	42	26	75

Table 1b. Summary of 2007 Reduced-Risk Pesticide List changes (numbers of products)

	L* Limited Use, Special Concern (Highest concern)	L Limited Use (Medium concern)	A Allowed (Lowest concern)	Total
Pesticides added to 2006 list	4	0	1	5
Pesticides removed from 2006 list	0	5		5
Number of products on 2007 list	11	37	27	75

Exemptions

Under the IPM Ordinance, SFE has the responsibility of reviewing and granting exemptions for the use of pesticides not listed on the Reduced Risk Pesticide List (RRPL). Applicants must demonstrate a good-faith effort to find alternatives to the banned pesticide; that effective, economic alternatives to the banned pesticide do not exist for the particular use; and that they have developed a reasonable plan for investigating alternatives to the banned pesticide during the exemption period. Exemptions may be granted as "trial," "regular," or "emergency" exemptions:

- **Pilot exemptions** are granted for the purpose of testing products that show promise as less hazardous alternatives.
- **Regular exemptions** are considered for managing rare or unforeseen pest problems that cannot be adequately controlled using products on the RRPList.
- **Emergency exemptions** are permitted under the IPM ordinance when a "pest outbreak poses an immediate threat to public health or significant economic damage will result from failure to use a pesticide." In these cases, a City department will proceed with a pesticide treatment without SFE prior approval, but must still notify SFE afterwards.

Exemptions in 2006 and 2007

Exemption Type	2006	2007
APPROVED- Pilot		1
APPROVED- Regular	4	11
DENIED- Regular	2	3
Emergency		1

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Table 2. Summary of exemptions requested in 2006 and 2007. Pesticide types are herbicide (H), insecticide (I), rodenticide (R), fungicide (F). Hazard tiers are determined by a toxicological review, and categorized as most hazardous (*), medium hazard (**), and least hazardous (***)

This table is sorted by Exemption Type, then Date.

Date	Dept	Product	Active Ingredient	Pest	Pesticide type	Justification	Exemption Type	Limitations	Hazard Tier
3/1/07	PUC	Milestone Specialty Herbicide	aminopyralid	Yellow starthistle	H	In 2006, SFE granted an exemption for Transline, which controlled the invasive yellow starthistle, while causing no significant damage to native forbs. Milestone (aminopyralid) is similar to Transline (chlopyralid) in chemical structure and activity. Unlike Transline, Milestone has been registered by USEPA as a Reduced Risk Pesticide. Proposal: test to compare Milestone & Transline.	APPROVED-Pilot	Pilot test on very small scale	*
2/10/06	Rec& Park	Vanquish	dicamba	<i>Soliva sessilis</i> on Harding/Flaming course	H	Only most severely infested areas will be treated. No efficacy with manual removal or spot daubing. Tournament readiness of the course is being compromised by this infestation. Request for an exemption will provide a window for targeted application. Will be used as a tank mix with triclopyr at a reduced rate.	APPROVED-Regular	1) Exemption for March-April 06 2) Monitor for effectiveness and include results in any future exemption requests.	*
4/13/06	Rec& Park	Mavrik Aquaflow	Tau-fluvalinate	<i>Black bean aphid on crops</i>	I	Only to be used by pest control specialists on indoor plants in greenhouses. Other insecticides not successful. Applications will be done at the lower rates, and used through a cold pulse fogger which reduces the risk of exposure to the loader and workers.	APPROVED-Regular	1) Exemption through Aug. 2006, only for greenhouses 2) Consider use of fogger instead of spot spraying 3) repair broken windows, cover vents with cheesecloth to exclude pest immigration 4) throw out plants in early stages of infestation	*
7/19/06	Rec& Park	Basagran	Bentazon - Na salt	yellow nutsedge	H	This newly planted area (3,000 sq ft) incorporated new soil that was contaminated with yellow nutsedge seeds (nutlets) Hand weeding & applications of roundUp Pro Dry not successful.	APPROVED-Regular	1) 2/1/07-3/31/07 2) 2 applications, spot treat only 4) pull up mulch and install weed fabric as barrier	*
8/31/06	Rec& Park	Vanquish	dicamba	<i>Soliva sessilis</i>	H	Only most severely infested areas will be treated. No efficacy with manual removal or spot daubing. Tournament readiness of the course compromised by this weed. Exemption would provide a window for targeted application.	APPROVED-Regular	1) Sept.- Oct. 2006 only 2) Monitor effectiveness 3) > treatments, tell SFE its effectiveness 4) Close course to golfers during application.	*

Date	Dept	Product	Active Ingredient	Pest	Pesticide type	Justification	Exemption Type	Limitations	Hazard Tier
3/1/07	PUC	Transline	Clopyralid	Yellowstar Thistle	H	Positive results from SFPUC tests in 2000 & 2001: 1) Each treatment of Transline (clopyralid) prevents invasive yellow starthistle in degraded serpentine grassland for 1+ year. 2) Native bunchgrasses re-appeared following treatment. Therefore, in 2007, the proposal is to re-treat the 2001 test area on Canada Road with Transline. In the past six years, this area has been re-invaded by yellow starthistle.	APPROVED- Regular	Continue prevention strategies listed. Use Transline ONLY on serpentine grasslands in areas without significant leaching potential, where nonchemical methods are impractical.	*
3/19/07	Rec& Park	Vanquish	dicamba	<i>Soliva sessilis (spunweed)</i>	H	To control infestation and spread of weed, which has compromised tournament readiness of Harding & Fleming Courses. Manual removal or spot daubing not effective. Request for an exemption for April & May 2007 only in most severely infested areas. Course will be closed to golfers then.	APPROVED- Regular	Time limitations as noted. Explore new alternatives to reduce use of dicamba	*
5/3/07	DPH- Laguna Honda	Top Gun All-Weather Bait Block	Bromethalin	Rats, mice	R	New construction around hospital has increased rodents, which have been trapped and removed from wards. Very difficult to do mass trapping in the presence of patients. Rodents pose sanitation problem. State inspector coming.	APPROVED- Regular	Locked bait boxes in the immediate perimeter of the building only. One month limit.	*
5/3/07	DPH- Laguna Honda	Quintox	Cholecalciferol	Mice	R	New construction around hospital has increased rodents, which have been trapped and removed from wards. Very difficult to do mass trapping in the presence of patients. Rodents pose sanitation problem. State inspector coming.	APPROVED- Regular	only if trapping is unsuccessful. One-time only application. Bait should be in a tamper-resistant, fixed bait box or in inaccessible areas.	
7/2/07	Gardens Guild /Mission Bay	Rhapsody ASO	Bacillus subtilis, strain QST 713	Fungal diseases	F	Looking for cure & prevention for Entromsporium leaf spot on Raphiolepis indica.	APPROVED- Regular		***
8/20/07	State Coastal Conservancy	Habitat (BASF)	Imazapyr	Hybrid <i>Spartina (ISP)</i>	H	Infestations difficult to control in the Bay because tarps must stay in place for 1+ years. Infestation at India Basin is 682 sq meters. The ISP's impact evaluation for the Programmatic EIR states that use of an aquatic herbicide is the least impactful method of control, with the highest efficacy and efficiency. Alternatives are not possible because digging or covering can impact aquatic animals, birds, mammals) whereas imazapyr simply kills only the target plant & has an efficacy rate of 75-95% in Year 1.	APPROVED- Regular	Notify SFE if other nearby areas are slated for treatment	**
9/18/07	DPW	Subdue MAXX	mefenoxam (metalaxyl-m)	Pythium	F	Pythium root dieback.	APPROVED- Regular	Minimize potential for exposure to pedestrians.	*

Date	Dept	Product	Active Ingredient	Pest	Pesticide type	Justification	Exemption Type	Limitations	Hazard Tier
10/25/07	SFIA	Contract All-Weather Blox	Bromadiolone	Rats	R	For use in high risk rodent prone areas. All baits are in tamper-proof bait boxes and 99% of boxes are in areas closed to the public and with little to NO non-target species (e.g., raptors) that could be affected by secondary poisoning.	APPROVED-Regular	Use up existing stock only in areas inaccessible to predators. Use spring traps when possible. Try bromethalin where single-feed rodenticide is considered necessary.	*
11/14/07	PUC	Pentra-Bark	Nonionic Surfactants	Sudden oak death syndrome	F	Pentra-Bark is a penetrating agent that facilitates the movement of Agri-fos into the bark of oak trees to prevent the development of sudden oak death disease, which has caused an epidemic in the Peninsula Watershed.	APPROVED-Regular		***
11/14/07	PUC	Milestone Specialty Herbicide	aminopyralid	Yellow starthistle	H	Like Transline, Milestone selectively controls composites and a few other groups of broadleaf plants. Therefore, it can be used in sensitive habitats. Unlike Transline, Milestone has been registered by USEPA as a Reduced Risk Pesticide. SFPUC tests in 2007 concluded that Milestone instead of Transline.	APPROVED-Regular	For use only in habitat restoration of serpentine grasslands.	*
3/20/07	Rec& Park	Drive	quinclorac	Kikuyu grass	H	To control the infestation and spread on most severely infested areas of Fleming Course, Fairways 1, 7, 8. Course will be closed to golfers during application (April/spring aeration procedure)	DENIED-Pilot		*
4/13/06	Rec& Park	AllPro Rotenone 5% (Powdered Cube)	rotenone	African clawed frog (ACF), an invasive exotic species	General	To eradicate tadpoles of ACF in Lily Pond in Golden Gate Park because draining pond didn't solve problem. To be used: when adult ACF population has been eliminated or can't be trapped & when Dept. of Fish & Game permits treatment.	DENIED-Regular		
12/11/06	SFIA	Dupont Landmark XP	sulfometuron methyl, chlorsulfuron	Broadleaf weeds, yellow star thistle	H	Resistance management in air ops areas, managing yellow star thistle. Oust does not control problem weeds effectively on its own.	DENIED-Regular		*
3/19/07	Rec& Park	Speedzone	Carfentrazone-ethyl, 2,4-D 2-ethylhexyl ester, mecoprop acid, dicamba acid	English daisies	H	Fleming Course 7&8 fairways only	DENIED-Regular		*
5/24/07	Rec& Park	Generation Mini-Blocs	Difethialone	Rats	R	Active rat burrows in tree wells under 4 Sycamore trees on Fulton St. Potential infestation could pose threat to public safety and health.	DENIED-Regular		*
9/26/07	Rec& Park	Primo	Trinexapac-ethyl	Poa annua	H	To crowd out Poa annua in the roughs, without using selective herbicide or pre-emergents. Only to be used at Harding Course to thicken existing turf in the roughs and adjust growth heights of Poa growing in the rough.	DENIED-Regular		*
12/1/07	Rec& Park	Ronstar		Weeds	H	This was an emergency exemption used by Rec & Park.	Emergency		*

Pesticide Use Data Collection and Analysis

Pesticide use data collection has until recently been accomplished using a customized Microsoft Access database; "satellite" versions in various City departments send data to the central SFE database. Since 2005, database problems caused substantial delays and entailed significant staff time to repair. Updating this system is challenging but essential, so we continue to work with the SF Department of Technology (DT) to create a centralized, web-enabled pesticide use reporting database.

Unfortunately, this project has also seen significant delays due to competing priorities for DT staff. It is currently being finalized for rollout to City IPM staff in 2009. However, due to the need to halt use of the Access database (twice) while migrating data into the web database, SFE staff have not yet been able to complete the 2008 pesticide use dataset, and were slowed considerably in completing the 2006-07 dataset. The 2008 report will therefore be presented at the earliest possible date once the new database is completed.

With the upcoming web-enabled database, all City pest managers will be able to automatically print the state pest control use forms required by state law. Contractors will have access to the database, eliminating costly data conversion, and users will also be able to track the use of vacuuming, washing, steaming, trapping, weed-whacking, weed-torching, and a growing list of mechanical methods. .

Trainings / Conferences

Key to the City's successful implementation of its IPM program is the ongoing training of City staff at all levels. SFE staff has been working with City Departments to organize, coordinate and provide a variety of training opportunities, including annual pesticide safety/IPM trainings (required by state law for pesticide applicators), annual weed flamer trainings, annual special topic trainings, and the semiannual San Francisco Urban IPM Conference. Most training events are free of charge to participating departments .

In addition, the IPM Technical Advisory Committee (TAC) Meeting convenes monthly to exchange information and discuss current pest control techniques. The meetings provide opportunities to discuss implementation of the IPM program. Most meetings feature a speaker on technical subjects of interest to the group, and offer state continuing education credits. Participants include departmental IPM Coordinators, safety and environmental compliance staff, pest control contractors, independent IPM experts, pest management staff from other local entities (National Park Service, Presidio Trust, SF Unified School District, University of San Francisco, UCSF), and community members. The City Toxics Reduction Coordinator from SFE chairs these meetings and sets the agendas.

Listed below is a summary of trainings held in 2006-07.

TOTAL Trainings	TOTAL Attendance	TOTAL Trainings X Attendance X Hours
27	1,004	4,504.5

Date	TYPE OF TRAINING	Topic	Aprox. Attendance	Hours
01/12/06	TAC	Identification and Management of Common Plant Diseases	25	2
02/09/06	TAC	Designing out weeds from landscapes	30	2
03/09/06	TAC	Tree Health Care - How to Minimize Pest Problems	25	2
03/22/06	Safety Training	PUC	35	4.5
03/23/06	OTHER	Turf Summit	69	6
03/28/06	Safety Training	Rec & Park	40	4.5
04/13/06	TAC	Advances in exempt herbicides and other exempt pesticide products	25	2
05/11/06	TAC	Arboretum Walk: Pest and Disease Identification and Management	25	2
07/13/06	TAC	Bay Friendly Landscaping and Resources for You	20	2

Date	TYPE OF TRAINING	Topic	Aprox. Attendance	Hours
08/10/06	TAC	An Experiment Called EcoWise Certified	20	2
09/14/06	TAC	Landscape Planning and Design for SF City Property	28	2
10/16/06	OTHER	Managing Ants with Reduced-Risk Methods	58	4.5
10/19/06	TAC	Ant Management Training	25	2
11/09/06	TAC	Permaculture	20	2
12/07/06	TAC	RPPL Review	20	2
01/11/07	TAC	Hands-on diagnosis of pests	25	2
02/08/07	TAC	Invasive species eradication efforts	20	2
02/13/07	IPM Conference		200	8.5
03/08/07	TAC	Identification, prevention, and treatment of common tree diseases (Part II)	30	2
03/30/07	Safety Training	Rec & Park	25	4
04/12/07	TAC	Tree diseases	25	2
05/10/07	TAC	Sustainable Practices for Landscape Professionals	34	2
08/09/07	TAC	Field trip - Filoli Field Trip	20	2
11/01/07	TAC	Invasive Weed Management in California, and How it Affects You	25	2
11/06/07	OTHER	Contracting for IPM Services	96	8
12/06/07	TAC	RRPL review	20	2

Community, Regional, and National Activities

Presentations: IPM staff frequently give presentations to local jurisdictions and at national conferences on IPM. *The San Francisco IPM Program was awarded the National IPM Achievement award* at the 2006 National IPM Symposium in St. Louis.

Submission of comments to US EPA pesticide reregistration dockets. SFE submitted 13 letters to US EPA during 2006 and 2007. In some cases our comments had direct impacts on national pesticide regulations, for example, with the snail bait metaldehyde (see below)

Web Site: The IPM section of the website is the most commonly visited part of the Dept. of the Environment web site (www.sfenvironment.org), and people tend to go directly to the pests section. The shortcut URL is <http://www.sfenvironment.org/ipm>.

Bay Friendly Conference Coordination: IPM staff participated in planning for the 2008 Bay-Friendly conference.

Turf Summit: In April, 2006, SFE organized a special training on environmentally sound turf management, in cooperation with the City of Palo Alto. Dr. Frank Rossi from Cornell Cooperative Extension, a world-renowned expert on turf IPM, led the daylong event.

Urban Pesticide Committee: IPM Program staff actively participated in meetings of the Urban Pesticide Committee, an interagency group organized by the Regional Water Quality Control Board to address pesticide runoff issues.

EcoWise Technical Advisory Committee: IPM staff were members of this committee, which assisted in creation of an independent, third-party ecolabel for pest management. The certification, called "EcoWise®," was launched in the Bay Area in 2006.

Consultations with Other Agencies: IPM staff receive frequent phone calls from agencies throughout the region and the nation seeking advice in establishing IPM programs, experience with various techniques, and other topics.

Notes on Pesticide Use Data

The trends noted in this report are drawn from pesticide use data collected by the big seven City departments and the Citywide pest control contractor since the passage of the Integrated Pest Management Ordinance in 1996. Below are some important notes on the data.

Tier Rating System

The tier rating system was not implemented until 1999, when we evaluated all products in use at that time. Tier I product use may therefore be underreported previous to 1999, since those are the products we were most likely to eliminate in the first years of the program. For this reason, we have in some cases only analyzed data collected since 1999 when evaluating Tier levels.

Some products are excluded

The numbers reported throughout this report exclude the use of Bioweed and Suppressa herbicides/mulches, because these products are composed entirely of corn gluten meal, a food grade ingredient that is 100% non-toxic. The use of these Tier III products requires unusually large quantities of material—thousands of pounds with each application--which would skew the graphs if included. Bioweed was used only in 2000 before its use was discontinued (the large amounts needed were not feasible). The use of Suppressa has likewise declined.

Rodenticides are presented separately

Rodenticide use is presented separately from other pesticide data due to both their public health importance, their unusually small amount of active ingredient (not visible when graphed with other products), and the fact that they are generally required as a response to a public health problem. The latter point means that SFE has more limited control over rodenticide use than over herbicides and insecticides.

Public health mosquito treatments are sometimes considered separately

Like rodenticide use, mosquito treatments are made in response to public health concerns, such as the West Nile virus, and are therefore not under the control of SFE. For this reason, public health treatments are excluded from some analyses.

Muni coach insecticide treatments

SFE currently only has four years worth of data for insecticidal treatments of Muni coaches (which consist of gel baits applied in inaccessible points for cockroach control). While the amount of active ingredient used is relatively small, we did not include it in some graphs because it would confound year-to-year comparisons.

Important factors to consider in analysis

The goals of the SF IPM program are to effectively manage pests, emphasize prevention and non-chemical controls, and in so doing to reduce both the amount and toxicity of pesticides used. However, measuring the success of an IPM program is a complex task. Before drawing conclusions from pesticide use statistics, it is important to consider these factors:

- **Long-term trends are more important than short-term.** Pesticide use always varies somewhat from year to year due to weather, pest pressure, special renovation projects, staffing or other factors. A change in pesticide use from the previous year does not necessarily indicate a long-term trend.
- **Exposure potential is as important as toxicity in determining risk.** A key aim of a pest management program is the reduction of risk. Risk is primarily determined by two factors: Toxicity (for example, how much chemical is required to impair a human or other animal) and exposure (for example, how much of the chemical is likely to actually reach a human or other animal). This means that the formulation and use of the products is all-important. For example,

pesticides applied as aerosol sprays have much higher exposure potential—and therefore pose a greater risk—than pesticides encased in tamperproof bait boxes.

- **Amount of active ingredient used is the preferred performance measure for pesticide reduction efforts.** Referring only to pounds and gallons used can be deceptive. Use statistics expressed in pounds and gallons mask specific products used, and do not necessarily reflect levels of risk posed by pesticides. For example, some products—such as elemental sulfur fungicide, or corn gluten meal—may be relatively nontoxic, but require high application rates to be effective. Another factor not illuminated by overall use statistics is the varying amount of active ingredient (ai) in different formulations. For example, Vanquish (active ingredient=dicamba 57%) and Proturf New KOG Weed Control (active ingredient=dicamba 0.7%) both contain the same active ingredient, but Vanquish is a concentrate. The total pounds remains important to reflect the amount of so-called inert ingredients applied, since these chemicals pose undocumented hazards.
- **Administrative/budget impacts are also important.** Increases in the number of buildings or outdoor acres maintained, decreases in landscaping staff, or underfunding can increase the pressure for herbicide spraying, which often requires less labor than non-chemical methods. Conversely, maintenance delayed (for example, by budgetary restraints) can lead to more serious problems in the future.
- **Ineffective pest management also poses risks.** West Nile virus or encephalitis transmitted by mosquitoes, allergies or asthma caused by cockroaches, and enteric diseases spread by rats are a few examples of hazards posed by pests themselves. It is important to remember that San Francisco's IPM Program has dual aims: Reduction of pesticide hazards and effective pest management.
- **These data do not represent residential or commercial pest management trends.**

Future Activities

Database improvements: Once completed, the web-enabled pesticide use database will provide:

- Standardization of several fields to improve reporting
- Continue improving our ability to track pesticide use based on pounds of *active ingredient* used.
- Streamlined report generation to enable users to print out pesticide use reports required by state regulators without additional effort.
- Implementation of new web-enabled database, including training of IPM personnel.

Pesticide use data collection improvements:

- We plan to continue implementing a system where we can identify specific non-toxic actions such as sanitation, trapping, mechanical weed control, exclusion, and more.

Inert ingredients information

- We plan to increase our efforts to obtain manufacturers' data on inert ingredients.

Rebranding of SF IPM Conference

- A revisioning and strategic planning session is planned for the IPM program. Among other topics, the group will consider investing scarce staff resources into focused, single-subject trainings instead of the large conference.

Citywide Pesticide Use Trends

General trends

Table 3. Key Citywide Pesticide Use Statistics

Since the beginning of the IPM Program in 1996:

88% reduction (lbs. of product) 81% reduction (gals. of product) 83% reduction (lbs. of active ingr.)	Total pesticide use 1996 through 2007, excluding rodenticides and mosquito treatments
85% reduction (lbs. of active ingr.)	All herbicide active ingredients, 1996 through 2007
88% reduction (lbs. of active ingr.)	Glyphosate (Roundup® active ingredient) use 1996 through 2007

Since 1999 (Beginning of Tier system):

83% reduction (lbs. of active ingr.)	Tier I (highest toxicity) total pesticide (not including rodenticides and mosquito treatments)
58% reduction (lbs. of active ingr.)	Tier II (medium toxicity) total pesticide (not including rodenticides and mosquito treatments)

Since last report (2005):

67% decrease (lbs. of active ingr)	Total pesticide use 2005 through 2007, excluding rodenticides
4% increase (lbs. of active ingr)	Tier I (highest toxicity) total pesticide use 2005 through 2007, excluding rodenticides
24% reduction (lbs. of active ingredient)	Glyphosate (Roundup® active ingredient) use 2005 through 2007
83% reduction (lbs. of active ingredient)	Rodenticide use 2005 through 2007

General Trends: 1996-2007

Pesticide use dropped dramatically soon after passage of the IPM Ordinance in 1996, increased over the next few years through 1999, 2000, and 2001, then generally decreased since then. The early drop can be traced to the fact that the Ordinance, when first implemented, was misunderstood and widely misapplied. Many departments simply eliminated pesticide use at first, causing very low pesticide use numbers for the first year of the program. However, because the sudden decrease in pesticide use was not replaced with other management efforts, pest populations (weeds, insects, and vertebrates) built up over that period. Once this situation was understood, IPM Program staff worked with City staff to explore less-toxic products and alternative techniques that could effectively control pests. Hence, the increased pesticide use between 1997 and 1999 reflects an adjustment period when City staff brought runaway pest populations back under

control, while adapting and developing less-toxic techniques. Because we did not track pesticide use before the ordinance, we cannot know if the increase reached back to previous levels or remained lower than in the past.

As the program has grown and matured, we have successfully worked with pest managers to use smaller quantities of pesticide products, in more directed applications, and only when other options (such as preventive measures or cultural, mechanical, and biological controls) have been exhausted. Trial and error, along with gradual testing of new products and methods has led to the overall decrease in amount of pesticides used over the past few years. Citywide pesticide use records in San Francisco from 1996 through 2007 indicate

- An uneven but general decrease in general pesticide use, when measured in pounds (Fig. 1) until 2007.
- A large decrease in herbicide and fungicide use, when measured in terms of active ingredient used (Fig. 2) Insecticide use has varied and generally declined, particularly when mosquito treatments are excluded from analyses. Rodenticide use has been sporadic in response to rat infestations.
- General decrease in Tier I product use (those with the highest toxicity concerns) (Fig. 3) since 2000. While amounts pre-2000 were lower, note that data relating to tier levels is suspect before 1999. Use of Tier II ingredients has increased substantially since 1996, while Tier III use has been sporadic. Note that most mosquito treatments (excluded from Fig. 3) are Tier III.
- An increase in Tier I (most hazardous) pesticide use in 2005 due to fungicide and insecticide applications at Harding Park golf course, in preparation for the 2005 AMEX tournament.
- An increase in insecticide use since 2004 due to mosquito control efforts associated with West Nile virus prevention (Fig. 4).
- A substantial reduction in glyphosate use since 1996 (Fig. 5). Glyphosate is the active ingredient in Roundup® products, and is the most-used herbicide in the City. These are Tier II products.

Highest toxicity products on the decline, except for golf courses

In general, the City is moving away from the most toxic pesticide products and is instead choosing products that are safer for the environment and public health. The use of products labeled with the signal word of Danger (greatest acute toxicity) has been totally eliminated on city property. The organophosphate insecticides diazinon and chlorpyrifos—known surface water contaminants that are the subjects of numerous federal and state pesticide reduction programs—have been completely eliminated in City operations. Perhaps most impressively, *the City does not use pre-emergent herbicides* except for a few extremely specialized uses, such as airport runways or (temporarily) around new plantings in median strips.

Other than rodent control (discussed below, see *Rodenticide Use*), the greatest obstacle to reducing the City's use of Tier I products is golf. The high aesthetic requirements for golf courses are difficult to achieve without pesticide use, and national tournament organizations pressure City course managers to use products they would not normally apply. The 2005 AMEX tournament at Harding Park is a case in point: Fungicide and insecticide use associated with the tournament almost doubled the City's use of Tier I products (although PGA Tours, which organized the event, lauded the City's Recreation & Parks Department for its success in minimizing pesticide use).

Structural pest control – increase in no-spray visits

The majority of structural pest control (i.e. in and around buildings) is performed by the City's pest control contractor, Pestec. The exceptions are as follows:

- San Francisco International Airport - structural pest control by APM prior to awarding of the new citywide pest control contract in late 2007.
- MUNI – Coach pest control done by Donovan's Pest Control.
- Dept. of Recreation & Parks – some cockroach and ant control by staff.

Prevention, monitoring, and non-chemical control options are the core of a true IPM program. In the case of San Francisco's structural IPM, more than half of Pestec's visits in 2005 did not require pesticide application. In 2006 and 2007, the number of contractor visits that involved no pesticide use increased from 1,599 visits in 2005 to 5,528 in 2006 and 6,263 in 2007. ,

Rodenticide use still high due to more concerted control efforts

Rodenticide use is one category of pesticide use that has not decreased since the inception of the IPM program. Rodenticide use began increasing in 1998, peaked in 2001, and has remained high since then (see Fig. 1). This pattern is due to renewed efforts to control long-standing rodent problems. Rodenticides are the only feasible means for controlling rats in sewers, short of replacing the old brick sewers completely. Therefore, rodenticide use is more a reflection of political will and budgetary allocations for rat control than a sign of increased rat populations or failed preventive efforts.

However, it should be noted that monitoring remains a valid option for lowering rodenticide use, even in sewers. Pestec has been using nontoxic rat bat wired under manhole covers to detect rat presence before introducing toxic bait. This has allowed them to reduce the total amount of rodenticide used.

Despite their low percentages of active ingredients, rodenticides have concerns over secondary toxicity, that is, hazards to non-target predatory animals consuming dead or dying pests. For this reason, the City has now phased out the use of products with active ingredient brodifacoum and difethialone, rodenticides with particularly high secondary toxicity concerns. (See section below)

Increased restrictions on "single feed"rodenticides

In late 2006, it came to the attention of SFE that its previous banning of brodifacoum may be insufficient to prevent wildlife impacts. New data from the US EPA and the state Dept. of Food and Agriculture pointed to difethialone as another ingredient of concern. The unexplained deaths of two raptors in Golden Gate Park, and reports of other raptor deaths by animal rescue groups, spurred the department to organize two special meetings on the subject, including a public hearing on April 12, 2007. The conclusions of this process are reported in detail in the attached recommendations for rodenticide policy, which was approved by the Commission on the Environment. Essentially, all "single-feed" rodenticides are banned with the exception of rat control in sewers, or in commercial food establishments on City property. Other use must receive an exemption not only from SFE but from the Dept. of Public Health, in order to assess whether the situation represents a genuine public health hazard.

Table 3. Top ten pesticide products used in 2006 (as calculated by pounds of active ingredient)

Product Name	Tier	Use Category	Combined Lbs	Combined Lbs a.i.	Type
GOLDEN BEAR MOSQUITO LARVICIDE GB-1111	II	L	267.1	263.63057	Insecticide
ROUNDUP PRO HERBICIDE	II	L	393.7	161.41624	Herbicide
ROUNDUP PRO DRY	II	L	177.0	126.38690	Herbicide
TURFLON ESTER	II	L	141.3	87.01102	Herbicide
AGNIQUE MMF	II	L	76.6	76.58019	Insecticide
VANQUISH HERBICIDE	I	L*	132.8	75.40733	Herbicide
VECTOLEX CG	III	L	730.0	54.75000	Insecticide
SPRAYTECH OIL	III	A	48.9	46.49223	Insecticide
ZOECON ALTOSID PELLETS	II	L	875.8	37.22010	Insecticide
ROUNDUP PRO HERBICIDE	II	L	70.1	28.74433	Herbicide

Table 4. Top ten pesticide products used in 2007

Product Name	Tier	Use Category	Combined Lbs	Combined Lbs a.i.	Type
GOLDEN BEAR MOSQUITO LARVICIDE GB-1111	II	L	1000.2	987.15796	Insecticide
ROUNDUP PRO HERBICIDE	II	L	286.3	117.39969	Herbicide
SPRAYTECH OIL	III	A	116.6	110.78900	Insecticide
ROUNDUP PRO DRY	II	L	131.2	93.69560	Herbicide
VECTOLEX CG	III	L	996.3	74.72080	Insecticide
VANQUISH HERBICIDE	I	L*	116.6	66.24016	Herbicide
AGNIQUE MMF	II	L	65.7	65.74203	Insecticide
ZOECON ALTOSID PELLETS	II	L	1353.0	57.50090	Insecticide
TURFLON ESTER	II	L	84.6	52.11498	Herbicide
GARLON 4	II	L	40.8	25.14077	Herbicide

Glyphosate (*RoundUp, Rodeo*) and other herbicide uses have leveled off after significant decreases.

The herbicide glyphosate has gained a high profile due more to its overuse than to its actual toxicity. The wholesale use of the product on genetically engineered, glyphosate-resistant crops has made “Roundup” a household word. However, the downstream effects of such high-volume use—particularly on aquatic ecosystems—are still unclear, and the precautionary principle suggests that safer weed control methods should be used whenever possible. We consider glyphosate separately both because of its celebrity and because it is the most commonly used pesticide in San Francisco.

The use of dry formulations (wetable powder) has accounted for a relatively minor portion of total use, although City staff, especially in the Recreation and Parks Department, are increasing their use of the dry product due to toxicity concerns related to inert ingredients in the liquid version. Additionally, the solid formulations can help to decrease spills, reduce the difficulty of cleanup, and reduce worker exposure due to splashing and contamination of container covers.

San Francisco has experienced a consistent downward trend in the use of glyphosate products in general, which has decreased by 88% since 1996 (lbs. of active ingredient – see Fig. 5). Much of the decrease in glyphosate-containing products is due to staff moving away from broadcast applications and increasing spot applications. Additional strategies that have contributed to this decrease in glyphosate use include: the use of weed barriers and bark mulches to inhibit weed growth; improvements to plant health to out-compete weed species; increases in hand weeding, weed whacking, and mowing to control vegetation; re-evaluating and decreasing pesticide use in areas where weeds are present but do not need to be controlled; and redefining some previous weeds as “groundcover” or “ornamental”. For example, English daisies were removed from park turf in the past, but are now allowed to grow as ornamentals (except on tournament golf courses, where they interfere with golfers’ ability to locate errant balls). Further reductions may be possible for other uses, such as sidewalk and pavement cracks, and spot weeding in City parks.

The barriers to further reducing the use of spray herbicides include:

- Weed control in dangerous areas such as street and highway medians, where safety concerns are such that City staff must spend as little time in those areas as possible
- Additional staff time required for some mechanical controls

- Additional budget allocation for labor and materials for physical weed barriers such as installing weed barriers and caulking sidewalk cracks

Mosquito management efforts remain high

The San Francisco Dept. of Public Health (DPH) and SF Public Utilities Commission dramatically increased mosquito management efforts in 2004 and 2005, in preparation for the arrival of West Nile virus. The first virus-infected birds were recorded in San Francisco in the summer of 2005. DPH assembled mosquito management plans for City departments, in conjunction with the IPM Technical Advisory Committee. DPH also took on the role of collecting citywide data on infected birds and human cases. The citywide pest control contractor, Pestec, was primarily responsible for applying mosquito larvicides to approximately 20,000 catch basins throughout the City, as well as various other areas of standing water. To accomplish this daunting task, Pestec hired and trained bicycle messengers to do the actual application (which consisted of dropping a soluble plastic packet of Altosid into the storm drains). They also developed a global positioning database to keep track of these treatments. The increase in mosquito management can be seen in Fig. 7.

Because the City and County of San Francisco lacks a mosquito abatement district, neighboring San Mateo County mosquito abatement district assists us by offering free *Gambusia* mosquito fish to all SF residents. Because CCSF owns land in San Mateo County, that land is subject to the vector control requirements of San Mateo County. SMCMAAD therefore applies larvicides to CCSF properties within their county lines as well as to properties bordering their county, which they see as impacting their vector control jurisdiction. Much of this is in the form of helicopter larvicide applications to inaccessible wetland areas. Unlike many other public agencies, no mosquito adulticides are used in San Francisco's management programs.

Successes in improving national pesticide regulation

SFE routinely submits comment letters to the US EPA for pesticides considered relevant to its activities. In several cases these letters have had direct impacts on national pesticide regulations. The best example is the reregistration of metaldehyde, which is the active ingredient in popular snail and slug control products. A competing active ingredient used for the same purpose – iron phosphate – is practically non-toxic but just as effective. SFE requested that the EPA severely restrict metaldehyde use given the fact that a clearly less hazardous, effective product exists. While EPA typically considers reregistrations in isolation, in this case they made an exception. The officer in charge interviewed IPM staff directly regarding their experience with the products, and in the end imposed restrictions on the metaldehyde labels nationwide. We consider this a significant victory.

Citywide Pesticide Use Graphs

Figure 1. Citywide total pesticide use, in pounds of product (including liquid formulations). Corn gluten, a least toxic mulch/herbicide product, is excluded because it was purchased by the ton and would confuse the results.

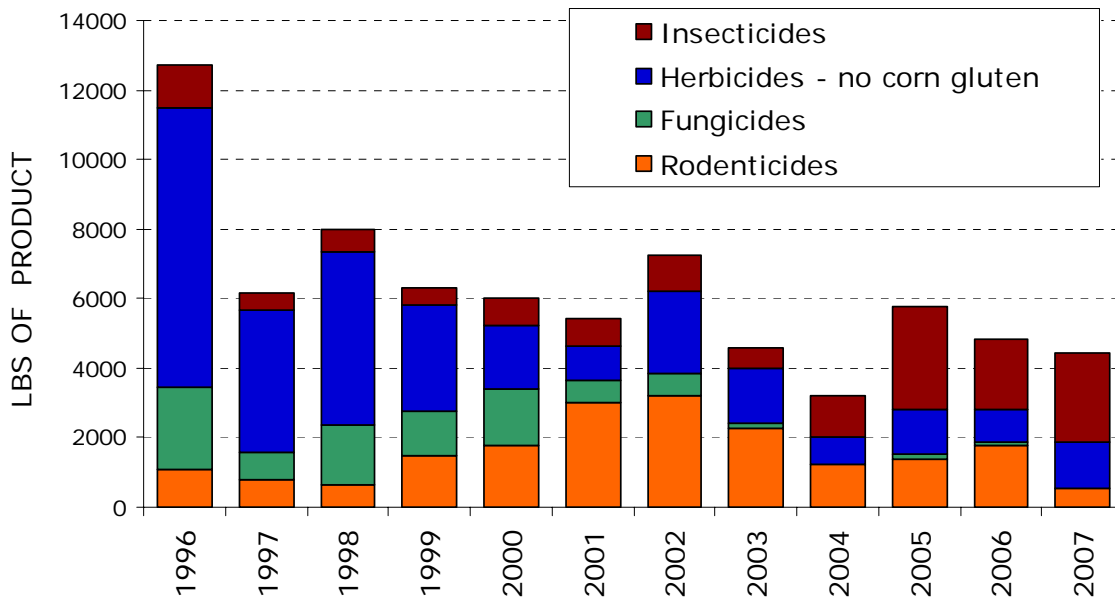


Figure 2. Citywide pesticide active ingredients used. Data does not include mosquito treatments, Muni coach insecticide use, or corn gluten-based herbicides. Muni coach data is only available for a four year period, and mosquito treatments (primarily least hazardous microbial products) are generally outside the control of the IPM program.

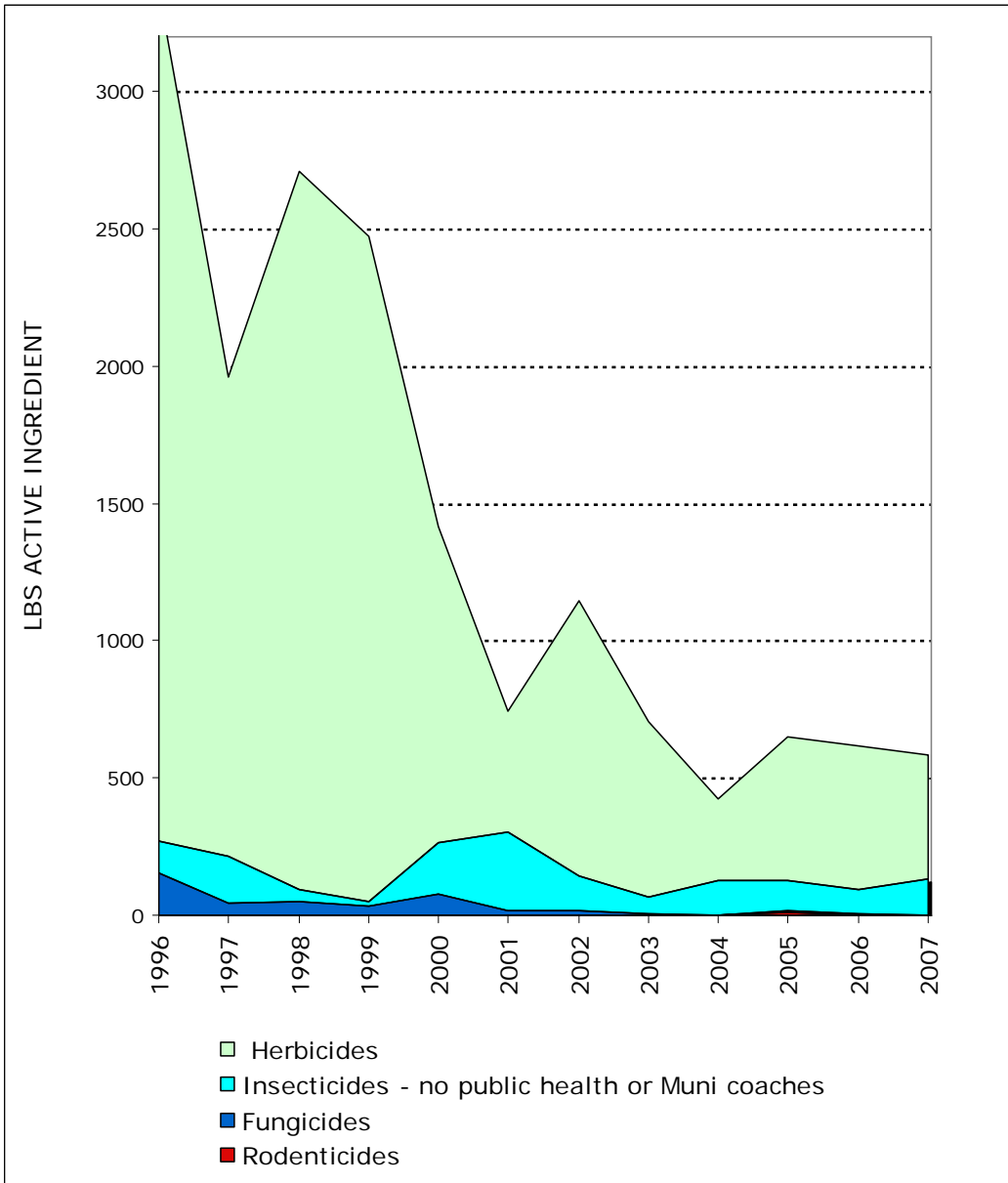
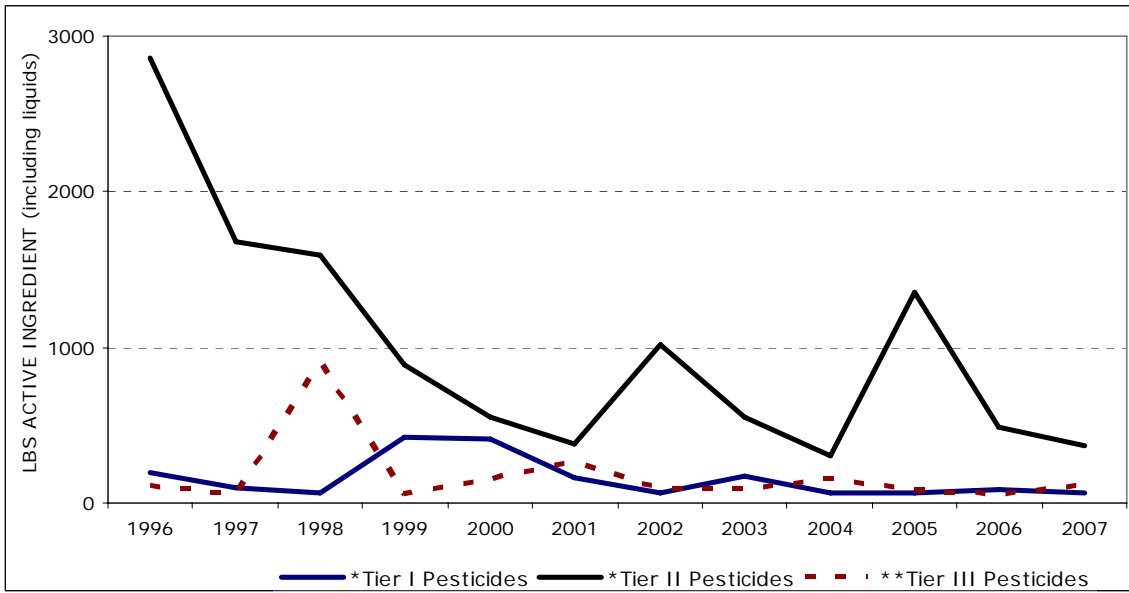


Figure 3. Citywide pesticide use by hazard tier. Tier I products are the most hazardous, Tier III are the least. Graphs reflect total pounds of active ingredient.



* Data does not include rodenticides, insecticides on Muni coaches, or insecticides for mosquito treatments.

** Data does not include corn gluten-based herbicides, rodenticides, insecticides on Muni coaches, or insecticides for mosquito treatments.

Figure 4 Citywide insecticide use breakdown, showing total pounds of active ingredient used.

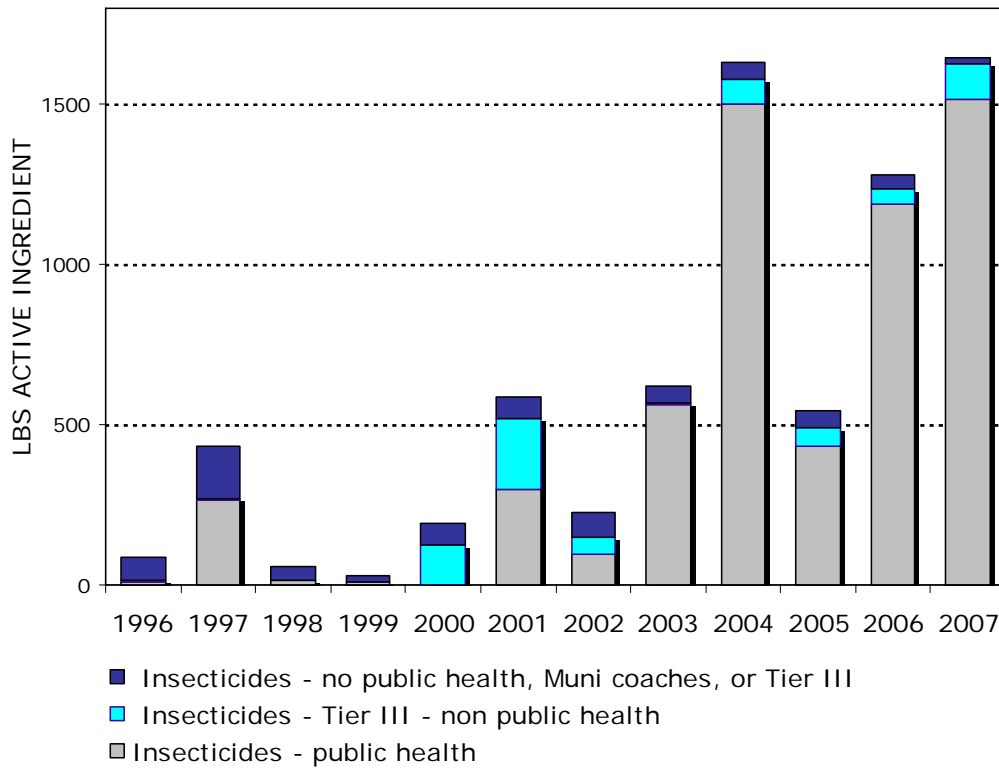


Figure 5 Citywide herbicide use: Amount of glyphosate (Roundup® active ingredient, and most-used product) used compared with amounts of other herbicides.

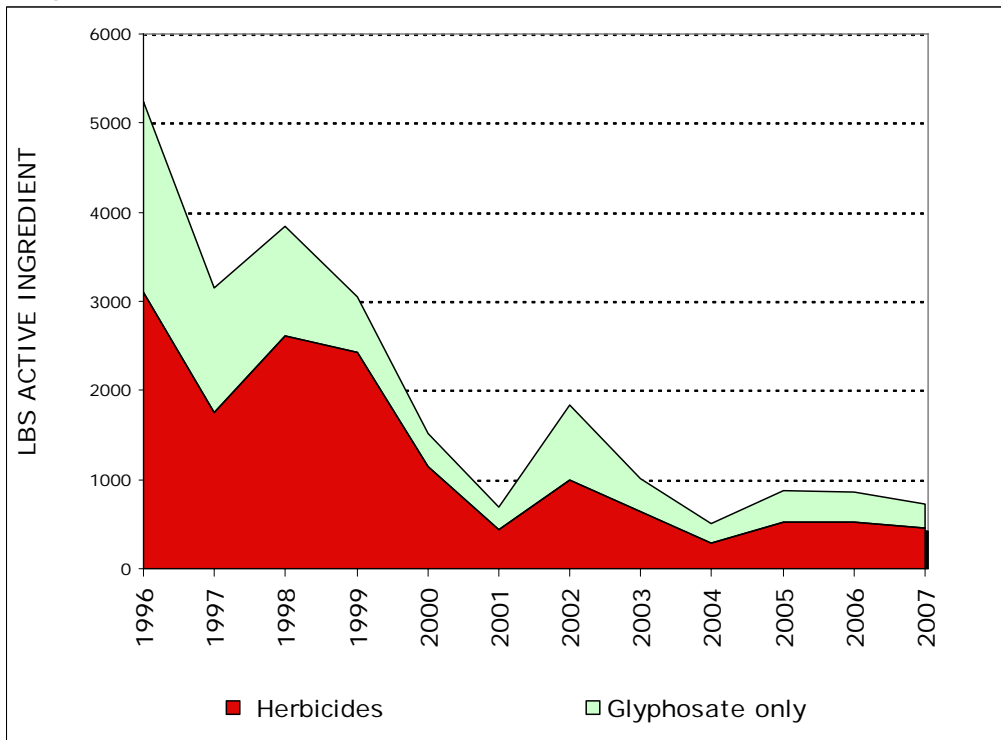
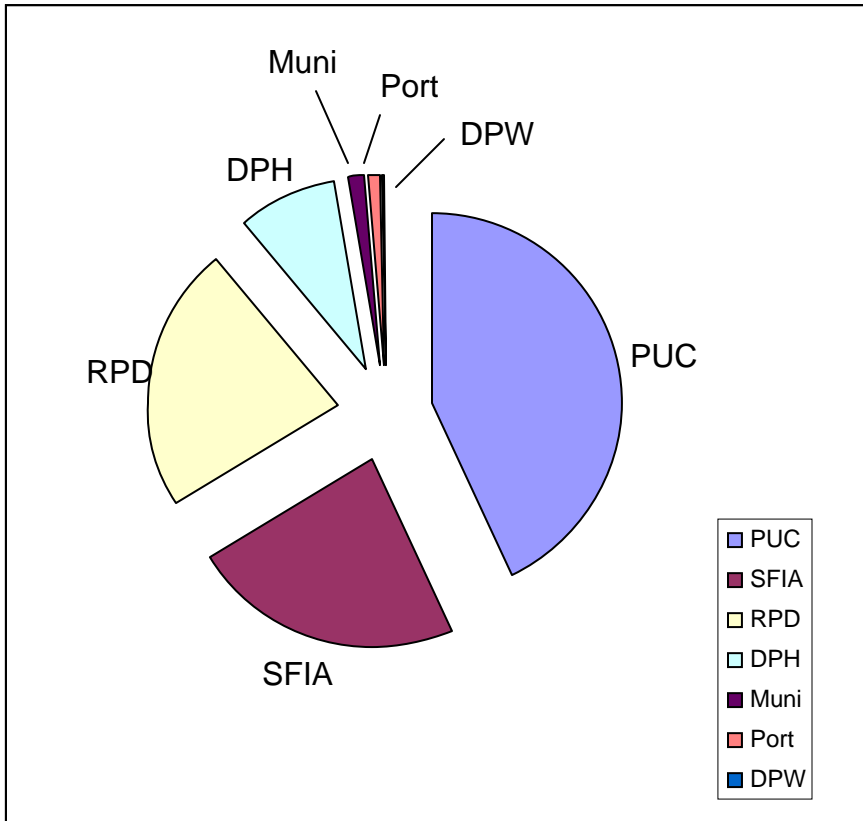


Figure 6. Contribution of big seven City departments to total poundage of pesticide use.



Department of Public Health

Through 2007 SFE continued to facilitate cooperation between DPH and other City departments to address the concerns of mosquito management and West Nile Virus prevention. A coordinated IPM and Green Building effort continued at Laguna Honda Hospital, which is undergoing a major new construction project. These efforts include specifications for pest prevention in the new buildings.

Department of Public Health – Pesticide Use Graphs

Figure 7. Department of Public Health insecticide and herbicide use over time.

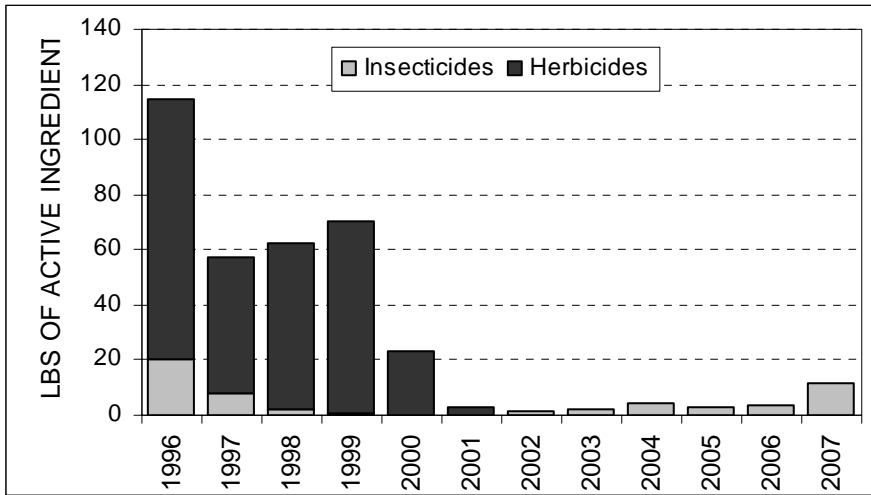


Figure 8. Department of Public Health rodenticide use over time.

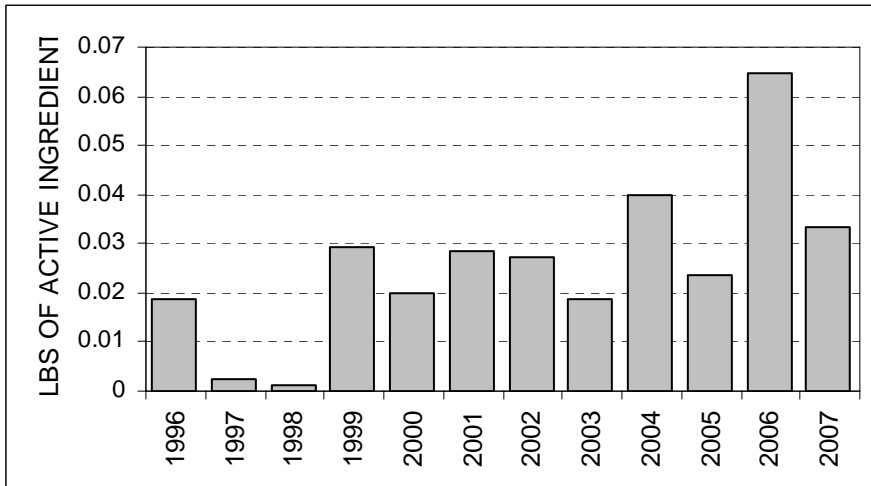


Figure 9. Department of Public Health pesticide use over time for Tier I (highest hazard), Tier II (medium hazard) and Tier III (least hazard) products.

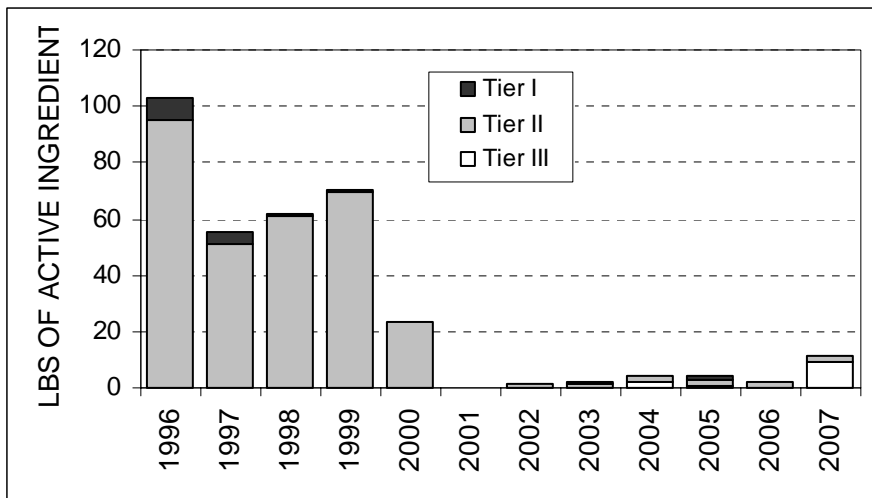


Table 5. Department of Public Health pesticide products used in 2006

Pesticide	EPA Number	Hazard tier	Use category	Total lbs active ingred	Pesticide type
SUN SPRAY ULTRA-FINE SPRAY OIL	862-23-AA-53219	I	L*	1.434	Insecticide
AGNIQUE MMF	53263-28	II	L	1.067	Insecticide
ZOECON ALTOSID PELLETS	2724-448-ZA-2724	II	L	0.953	Insecticide
TERRO CALIFORNIA ANT KILLER	149-8-AA-149	II	L	0.107	Insecticide
AQUABAC (200G)	62637-3-ZA-62637	III	A	0.084	Insecticide
JB EATON TOP GUN ALL WEATHER BAITBLOCK RODENTICIDE	67517-66-56	II	L	0.065	Rodenticide
ALTOSID BRIQUETS	2724-375-ZA-64833	II	L	0.037	Insecticide
TRIFLURALIN	64405-2-AA-64405	II	L	0.015	Insecticide

Table 6. Department of Public Health top 10 pesticide products used in 2007

Pesticide	EPA Number	Hazard tier	Use category	Total lbs active ingred	Pesticide type
VECTOLEX CG	73049-20	III	L	6.705	Insecticide
VECTOLEX WDG	73049-57	III	A	1.773	Insecticide
ZOECON ALTOSID PELLETS	2724-448-ZA-2724	II	L	1.400	Insecticide
VECTOLEX G BIOLOGICAL MOSQUITO LARVICIDE	275-77-AA-275	III	A	0.732	Insecticide
AGNIQUE MMF	53263-28	II	L	0.521	Insecticide
DRIONE INSECTICIDE	4816-353			0.306	
TERRO CALIFORNIA ANT KILLER	149-8-AA-149	II	L	0.167	Insecticide
JB EATON TOP GUN ALL WEATHER BAITBLOCK RODENTICIDE	67517-66-56	II	L	0.033	Rodenticide
ALTOSID BRIQUETS	2724-375-ZA-64833	II	L	0.024	Insecticide
CB-80 EXTRA INSECTICIDE	9444-175-AA-9444	I		0.020	Insecticide

Department of Public Works

The Department of Public Works manages considerable acreage in the City. A considerable amount of its efforts have been devoted to manual weed removal, but in recent years its chemical weed management has largely been conducted by SF PUC under work order arrangements. For this reason, the data does not necessarily reflect the total pesticide use on DPW properties.

Department of Public Works – Pesticide Use Graphs

Figure 10. Department of Public Works herbicide use over time.

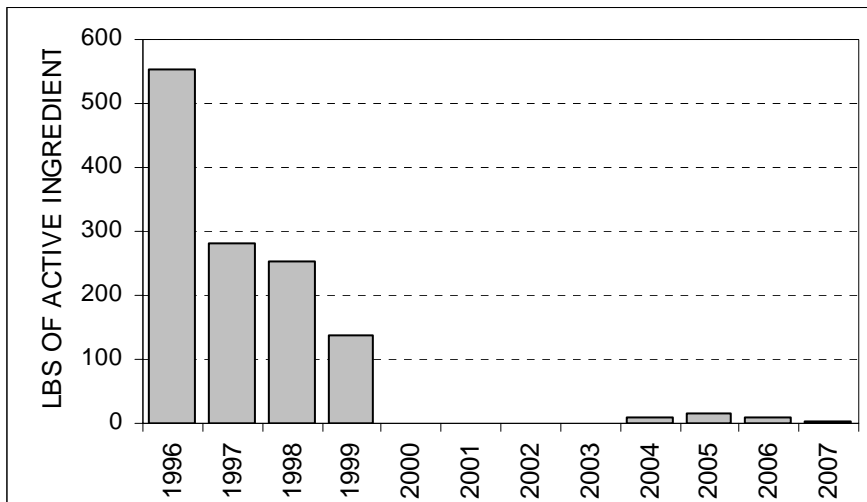


Figure 11. Department of Public Works insecticide use over time.

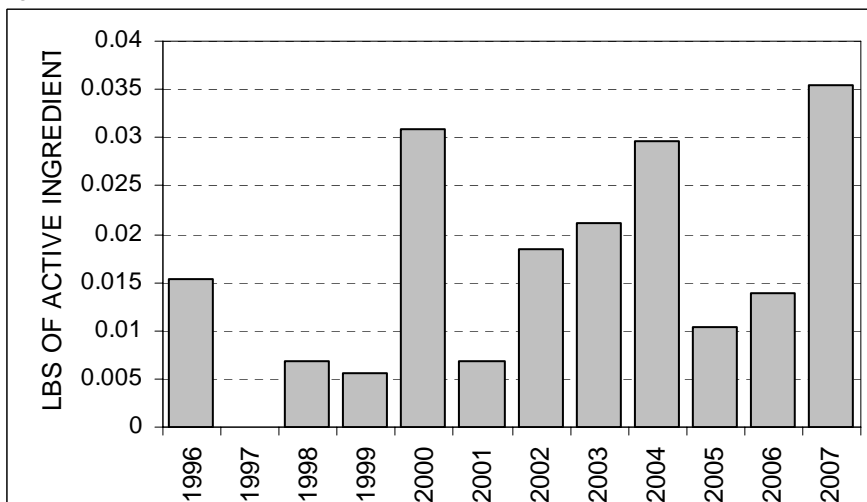


Figure 12. Department of Public Works rodenticide use over time.

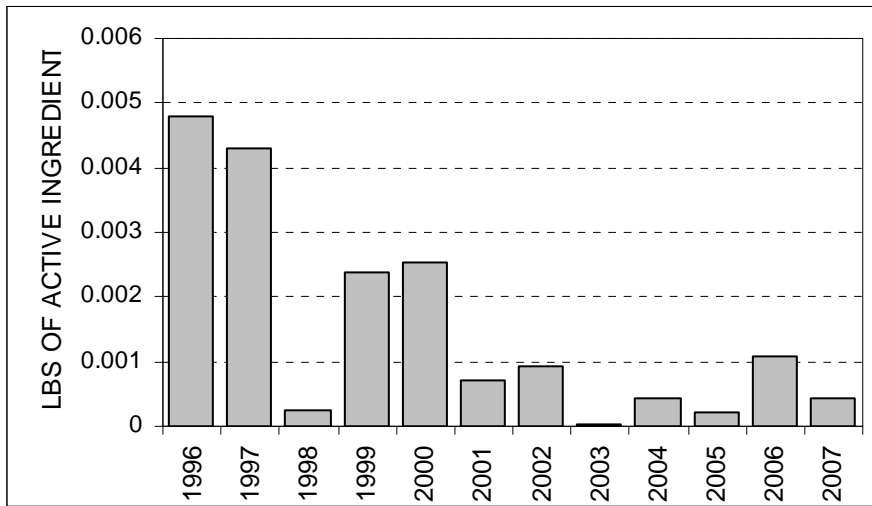


Figure 13. Department of Public Works pesticide use over time for Tier I (highest hazard), Tier II (medium hazard) and Tier III (least hazard) products

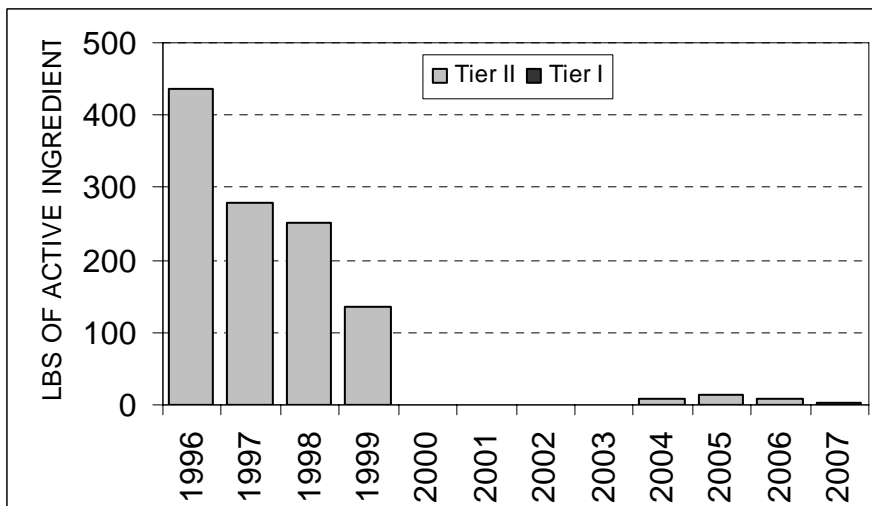


Table 7. Department of Public Works pesticide products used in 2006

Pesticide	EPA Number	Hazard tier	Use category	Total lbs active ingred	Pesticide type
ROUNDUP PRO HERBICIDE	524-475-ZA-524	II	L	8.058	Herbicide
ROUNDUP PRO DRY	524-505	II	L	0.089	Herbicide
TERRO CALIFORNIA ANT KILLER	149-8-AA-149	II	L	0.014	Insecticide
JB EATON TOP GUN ALL WEATHER BAITBLOCK RODENTICIDE	67517-66-56	I	L*	0.001	Rodenticide

Table 8. Department of Public Works pesticide products used in 2007

Pesticide	EPA Number	Hazard tier	Use category	Total lbs active ingred	Pesticide type
ROUNDUP PRO DRY	524-505	II	L	3.748	Herbicide
GENTROL POINT SOURCE	2724-469-ZA			0.793	Insecticide
TERRO CALIFORNIA ANT KILLER	149-8-AA-149	II	L	0.036	Insecticide
JB EATON TOP GUN ALL WEATHER BAITBLOCK RODENTICIDE	67517-66-56	I	L*	<0.001	Rodenticide

Municipal Transportation Agency - MUNI

MUNI – Pesticide Use Graphs

Figure 14. Municipal Transportation Agency - MUNI herbicide use over time.

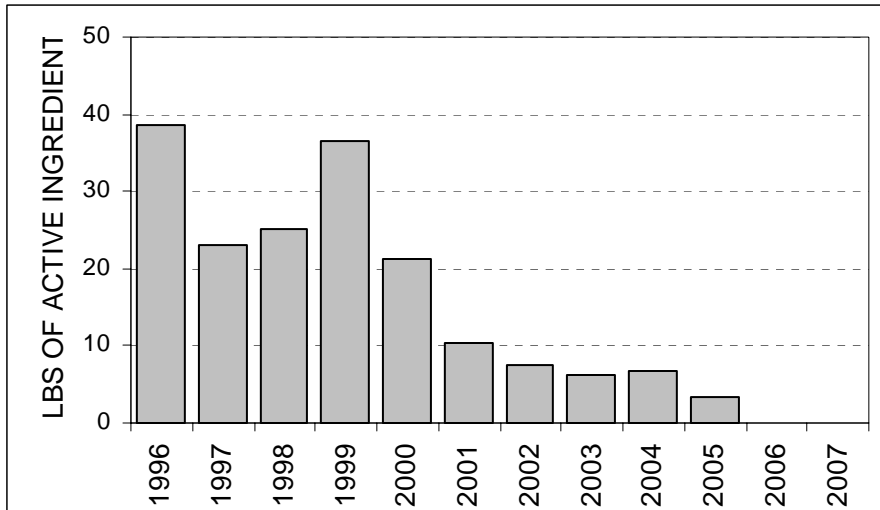


Figure 15. Municipal Transportation Agency - MUNI insecticide use over time.

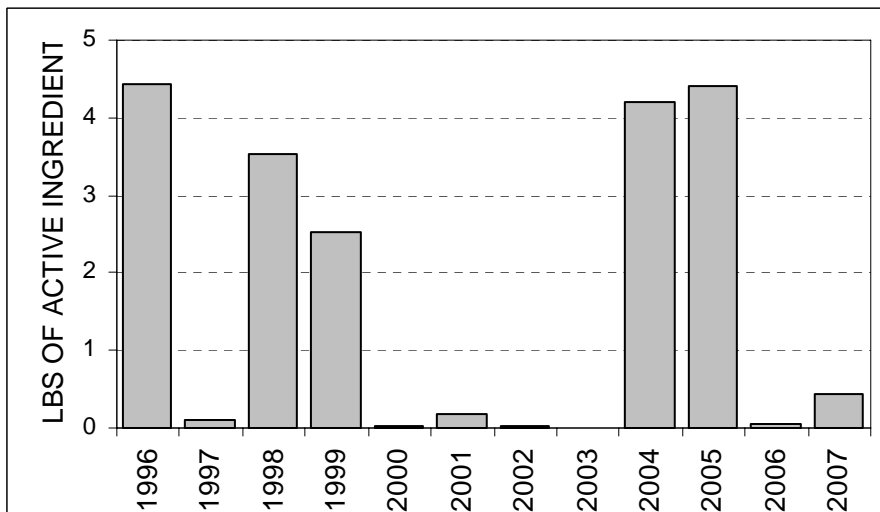


Figure 16. Municipal Transportation Agency - MUNI rodenticide use over time.

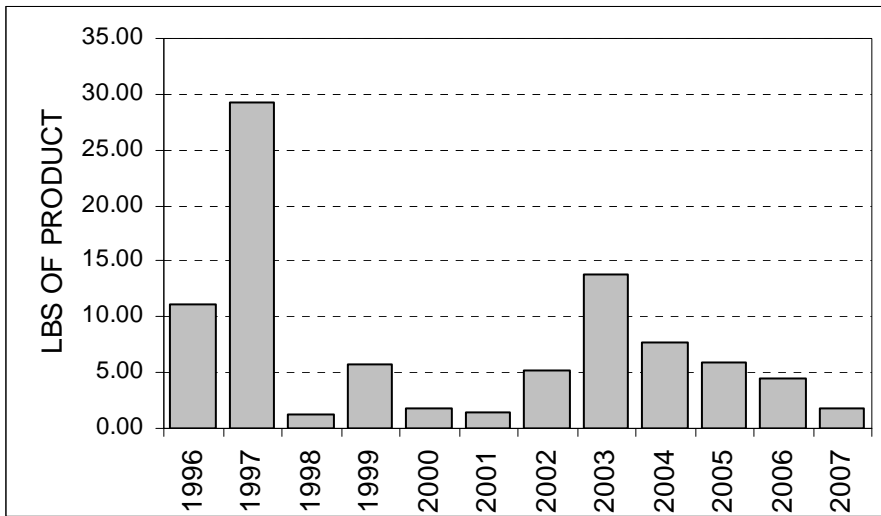


Figure 17. Municipal Transportation Agency - MUNI pesticide use over time for Tier I (highest hazard), Tier II (medium hazard) and Tier III (least hazard) products

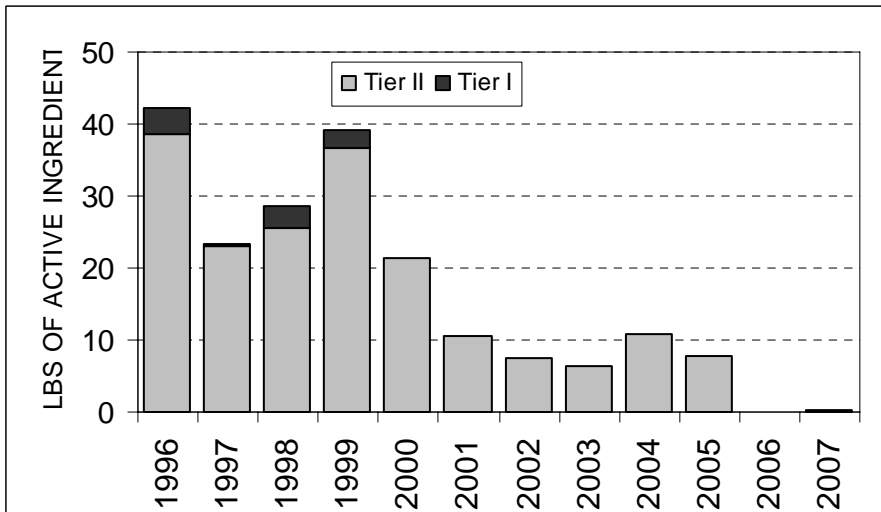


Table 9. Municipal Transportation Agency - MUNI pesticide products used in 2006

Pesticide	EPA Number	Hazard tier	Use category	Total lbs active ingred	Pesticide type
TERRO CALIFORNIA ANT KILLER	149-8-AA-149	II	L	0.022	Insecticide
MAXFORCE FC PROFESSIONAL ROACH KILLER BAIT GEL	432-1259	II	L	0.010	Insecticide
TRIFLURALIN	64405-2-AA-64405	II	L	0.009	Insecticide
JB EATON TOP GUN ALL WEATHER BAITBLOCK RODENTICIDE	67517-66-56	I	L*	0.001	Rodenticide
MAXFORCE ANT BAIT F1	432-1254	II	L	<0.001	Insecticide

Table 10. Municipal Transportation Agency - MUNI pesticide products used in 2007

Pesticide	EPA Number	Hazard tier	Use category	Total lbs active ingred	Pesticide type
AGNIQUE MMF	53263-28	II	L	0.391	Insecticide
VECTOLEX G BIOLOGICAL MOSQUITO LARVICIDE	275-77-AA-275	III	A	0.028	Insecticide
MAXFORCE FC PROFESSIONAL ROACH KILLER BAIT GEL	432-1259	II	L	0.008	Insecticide
TERRO-PCO LIQUID ANT BAIT	149-8-AA-64405	II	A	0.002	Insecticide
ZOECON ALTOSID PELLETS	2724-448-ZA-2724	II	L	0.001	Insecticide
JB EATON TOP GUN ALL WEATHER BAITBLOCK RODENTICIDE	67517-66-56	I	L*	<0.001	Rodenticide

Port of San Francisco

Port of San Francisco – Pesticide Use Graphs

The Port of San Francisco is one of the City's largest landowners, and has made a concerted effort in recent years to reduce its herbicide use to a minimum through the use of mulch, better landscaping, and manual controls. Through the City's pest control contractor, the Port also routinely conducts mass-trapping of rat populations on its properties as an alternative to rodenticide baits.

Figure 18. Port herbicide use over time.

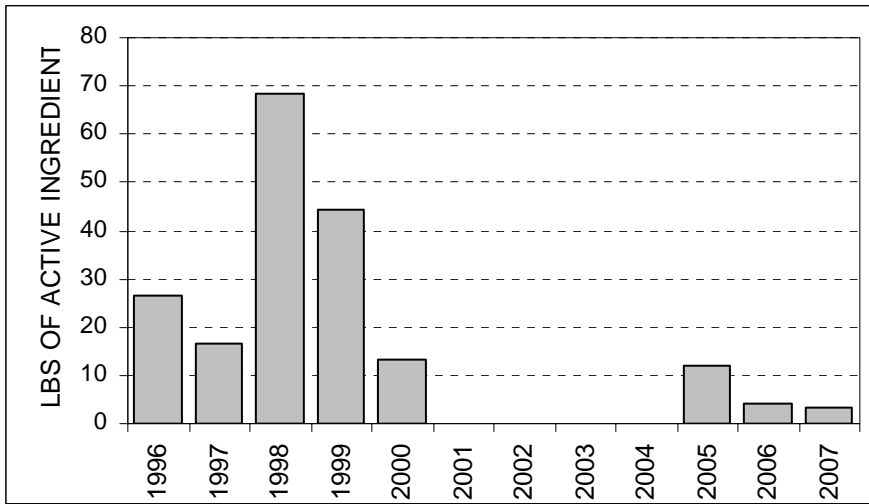


Figure 19. Port insecticide use over time.

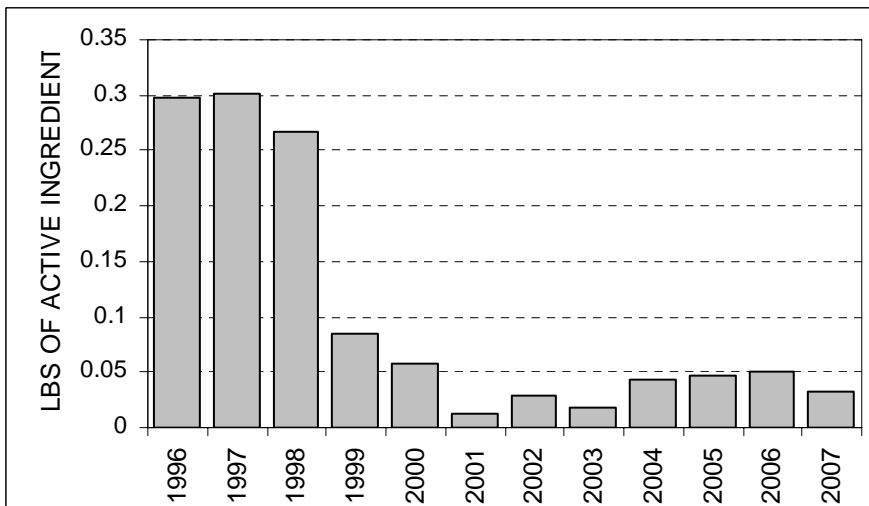


Figure 20. Port rodenticide use over time.

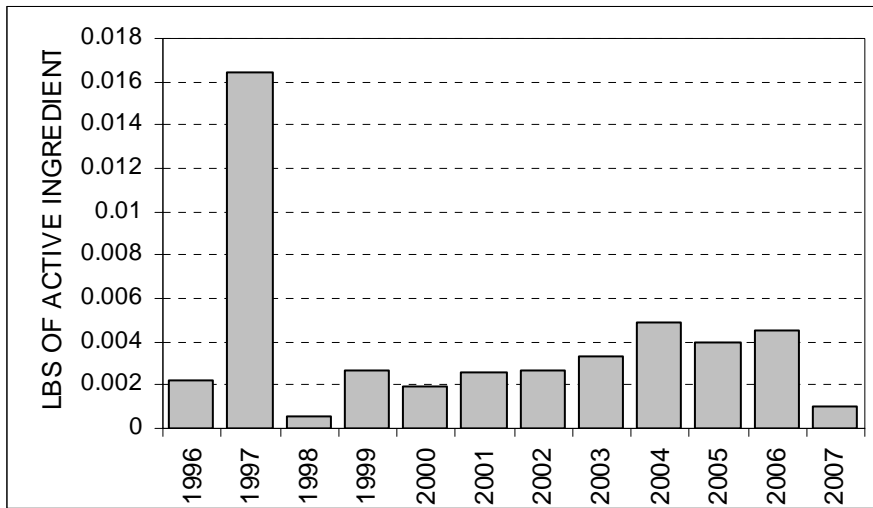


Figure 21. Port pesticide use over time for Tier I (highest hazard), Tier II (medium hazard) and Tier III (least hazard) products

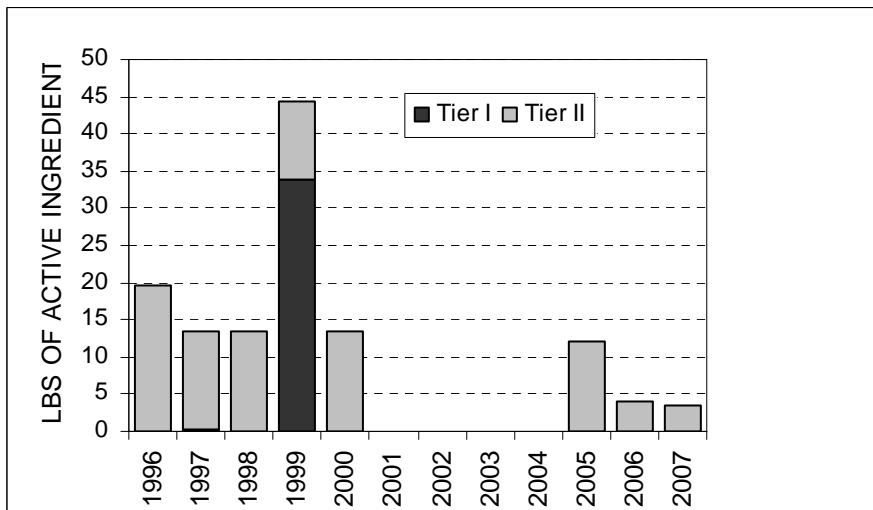


Table 11. Port pesticide products used in 2006

Pesticide	EPA Number	Hazard tier	Use category	Total lbs active ingred	Pesticide type
ROUNDUP PRO HERBICIDE	524-475-ZA-524	II	L	4.003	Herbicide
TERRO CALIFORNIA ANT KILLER	149-8-AA-149	II	L	0.042	Insecticide
TRIFLURALIN	64405-2-AA-64405	II	L	0.007	Insecticide
JB EATON TOP GUN ALL WEATHER BAITBLOCK RODENTICIDE	67517-66-56	I	L*	0.005	Rodenticide
MAXFORCE FC PROFESSIONAL ANT KILLER BAIT GEL	432-1264-ZA	II	L	<0.001	Insecticide

Table 12. Port pesticide products used in 2007

Pesticide	EPA Number	Hazard tier	Use category	Total lbs active ingred	Pesticide type
ROUNDUP PRO HERBICIDE	524-475-ZA-524	II	L	3.415	Herbicide
TERRO CALIFORNIA ANT KILLER	149-8-AA-149	II	L	0.032	Insecticide
JB EATON TOP GUN ALL WEATHER BAITBLOCK RODENTICIDE	67517-66-56	I	L*	0.001	Rodenticide

Public Utilities Commission (PUC)

The Public Utilities Commission is the largest City landowner. It manages extensive watershed lands on the peninsula, which are habitat for a wide array of endangered species. PUC pest managers have been creative and resourceful in finding more effective, least-hazardous techniques for management of these sensitive areas. For example, PUC conducted pilot experiments with Milestone® herbicide as a safer technique for controlling invasive weeds in serpentine soil habitats. Goats are used extensively for vegetation control along PUC rights-of-way. In addition, PUC conducts the bulk of the City's mosquito management efforts through the citywide pest control contractor, monitoring larval populations in over 20,000 catchment basins.

Public Utilities Commission – Pesticide Use Graphs

Figure 22. PUC herbicide use over time.

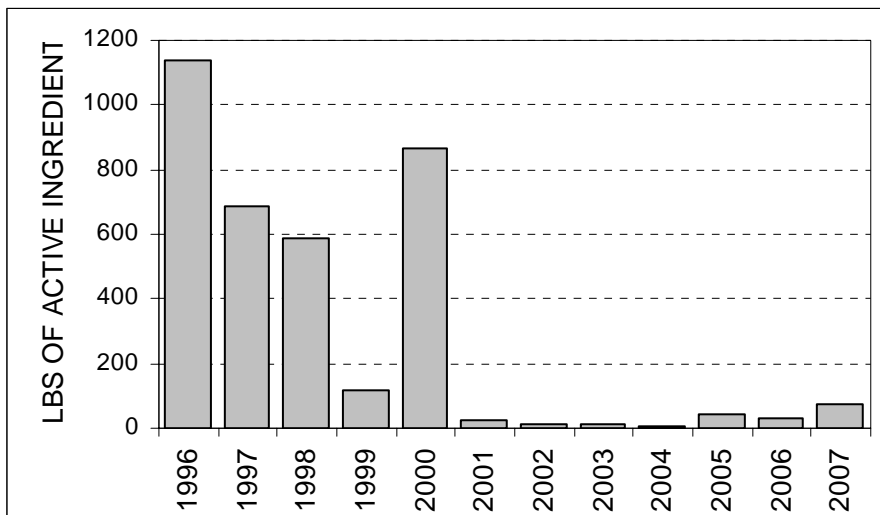


Figure 23. PUC insecticide use over time.

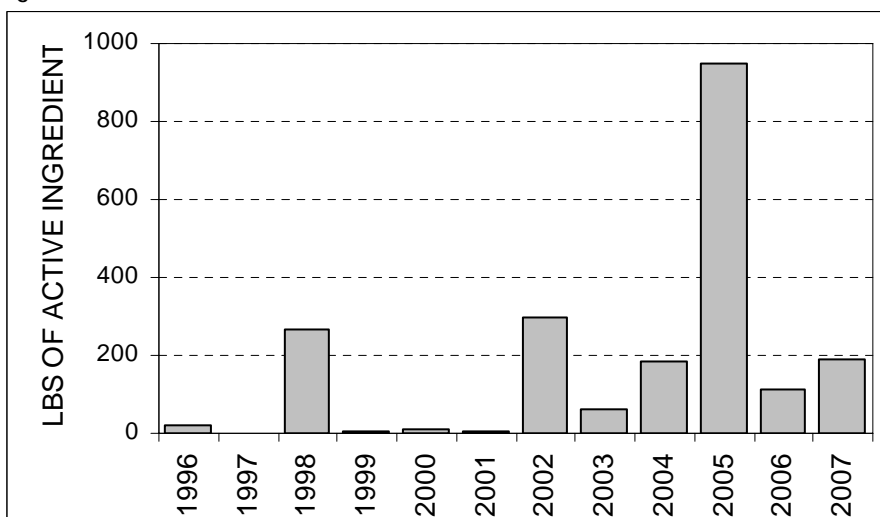


Figure 24. PUC rodenticide use over time.

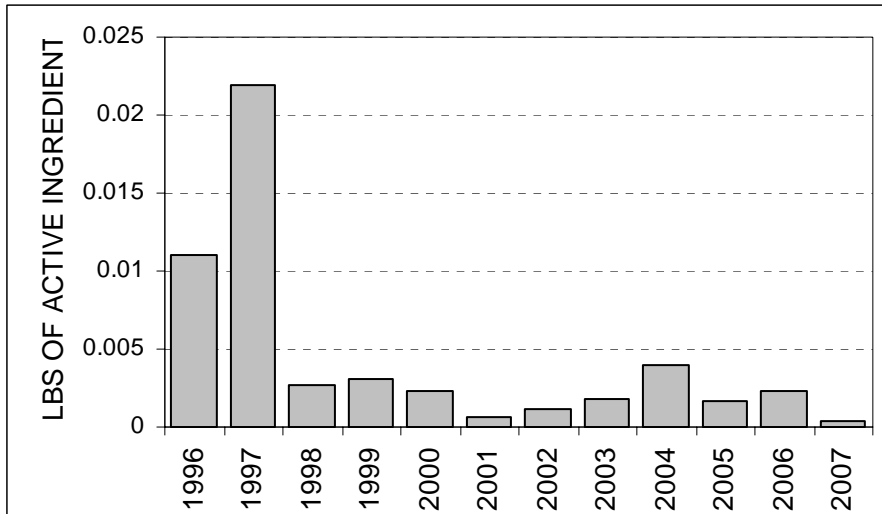


Figure 25. PUC pesticide use over time for Tier I (highest hazard), Tier II (medium hazard) and Tier III (least hazard) products

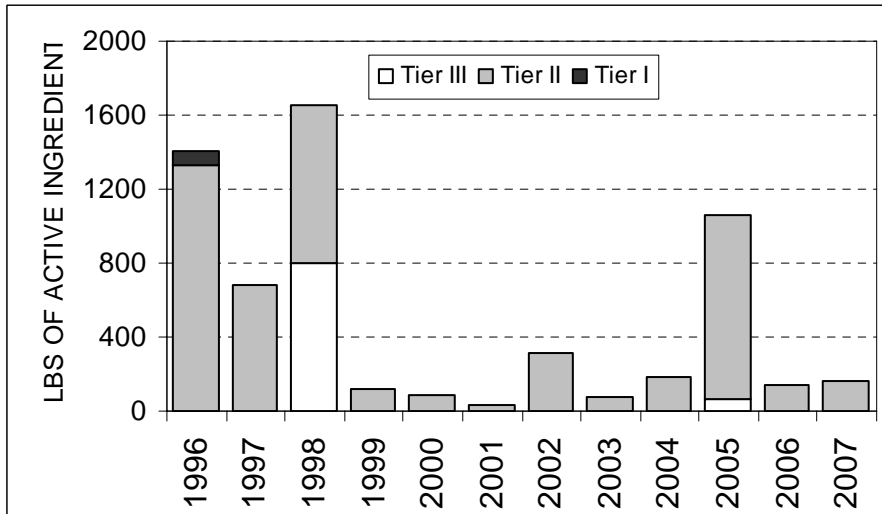


Table 13. PUC top ten pesticide products used in 2006

Pesticide	EPA Number	Hazard tier	Use category	Total lbs active ingred	Pesticide type
AGNIQUE MMF	53263-28	II	L	75.416	Insecticide
ZOECON ALTOSID PELLETS	2724-448-ZA-2724	II	L	36.267	Insecticide
ROUNDUP PRO DRY	524-505	II	L	25.436	Herbicide
GARLON 4	62719-40-ZB-62719	I	L	4.330	Herbicide
ROUNDUP PRO	524-529	II	L	2.744	Herbicide
AQUABAC (200G)	62637-3-ZA-62637	III	A	0.975	Insecticide
TERRO CALIFORNIA ANT KILLER	149-8-AA-149	II	L	0.167	Insecticide
CB-80 EXTRA INSECTICIDE	9444-175-AA-9444			0.100	Insecticide
TRIFLURALIN	64405-2-AA-64405	II	L	0.054	Insecticide
ALTOSID BRIQUETS	2724-375-ZA-64833	II	L	0.014	Insecticide

Table 14. PUC top ten pesticide products used in 2007

Pesticide	EPA Number	Hazard tier	Use category	Total lbs active ingred	Pesticide type
ZOECON ALTOSID PELLETS	2724-448-ZA-2724	II	L	56.099	Insecticide
ROUNDUP PRO	524-529			36.001	Herbicide
GARLON 4	62719-40-ZB-62719	II	L	33.204	Herbicide
RODEO AQUATIC HERBICIDE	524-343-AA-524	II	L	8.403	Aquatic
ROUNDUP PRO HERBICIDE	524-475-ZA-524	II	L	3.112	Herbicide
VECTOLEX WDG	73049-57	III	A	0.168	Insecticide
TERRO CALIFORNIA ANT KILLER	149-8-AA-149	II	L	0.123	Insecticide
MILESTONE	62719-519-AA	II	L	0.096	Herbicide
TERRO-PCO LIQUID ANT BAIT	149-8-AA-64405	II	A	0.054	Insecticide
AQUABAC (200G)	62637-3-ZA-62637	III	A	0.032	Insecticide
TRANSLINE	62719-259-AA-62719	I		0.017	Herbicide
TRIFLURALIN	64405-2-AA-64405	II	L	0.013	Insecticide
PT 515 WASP-FREEZE WASP AND HORNET	499-362-AA-499	II	L	0.012	Insecticide

Department of Recreation & Parks (R&P)

The Department of Recreation & Parks manages extensive parklands and recreation centers throughout the City. These include a system of natural areas, where staff have engaged volunteers to remove invasive weeds and make way for endemic plant species. Department IPM staff continually test new pest management techniques, such as the use of compost teas for turf pathogen control, the application of EPA-exempt products for weed control, the use of herbicide daubers to decrease use of Roundup, and smoke bombs or habitat manipulation to address ground squirrel problems.

The Department also manages four golf courses, and leases land for a fifth. The tournament level course – Harding/Fleming – is subject to exacting cosmetic standards as part of an agreement with PGA Tours, in order to meet the criteria for high-profile, televised professional tournaments. These cosmetic standards often require higher inputs of chemical pesticides. The 2005 AMEX Tournament at Harding resulted in a major spike in pesticide use.

The pesticide use statistics for this department clearly show the 1996-98 reduction of herbicide use that resulted from reduction of maintenance, and the 1999-2000 spike resulting from the department addressing deferred maintenance.

Department of Recreation and Parks – Pesticide Use Graphs

Figure 26. Department of Recreation and Parks herbicide use over time.

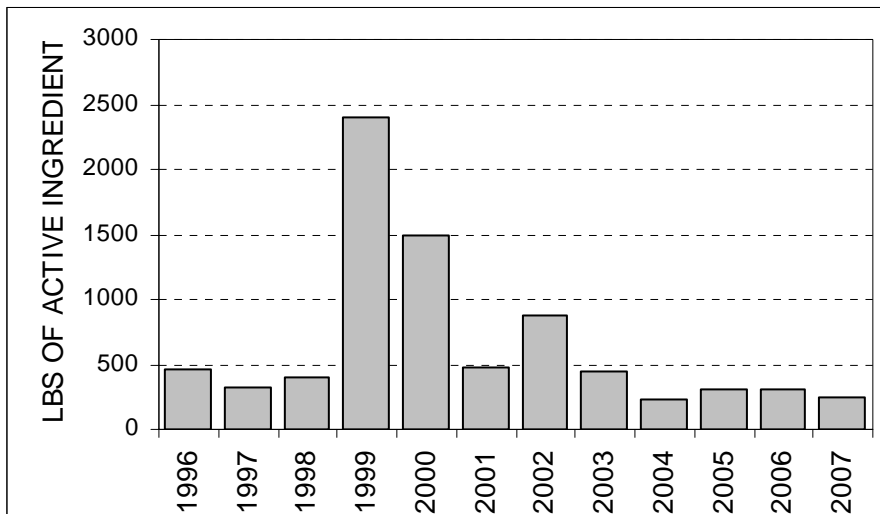


Figure 27. Department of Recreation and Parks insecticide use over time.

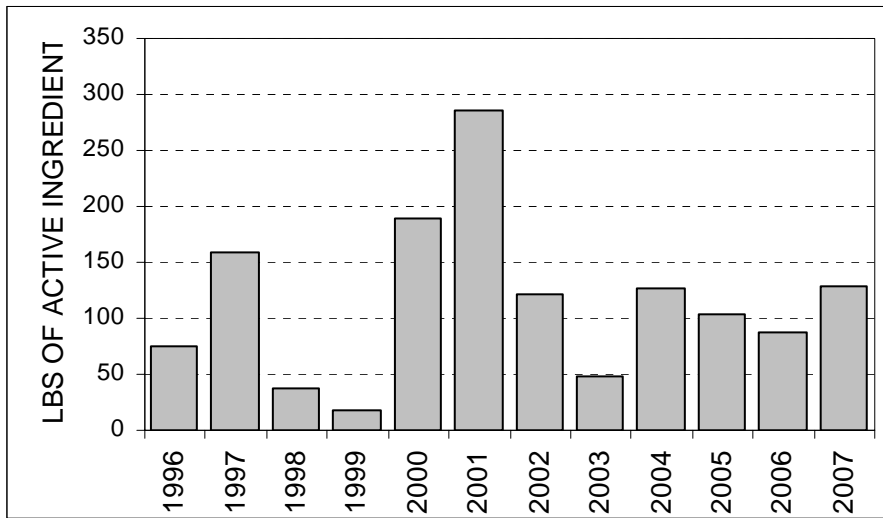


Figure 28. Department of Recreation and Parks rodenticide use over time.

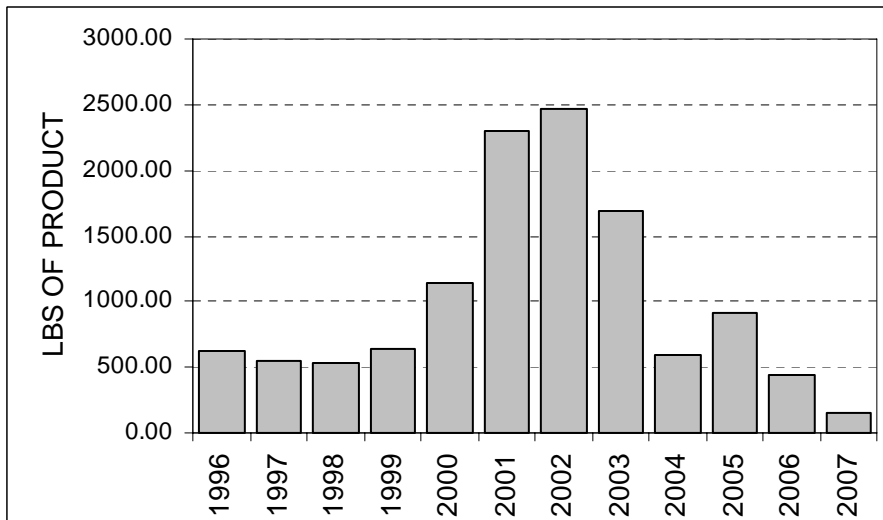


Figure 29. Department of Recreation and Parks fungicide use over time.

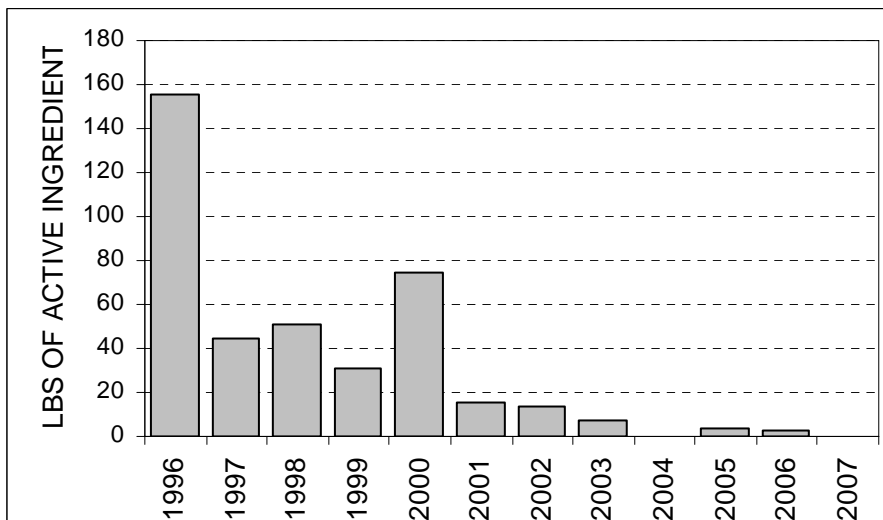


Figure 30. Department of Recreation and Parks pesticide use over time for Tier I (highest hazard), Tier II (medium hazard) and Tier III (least hazard) products

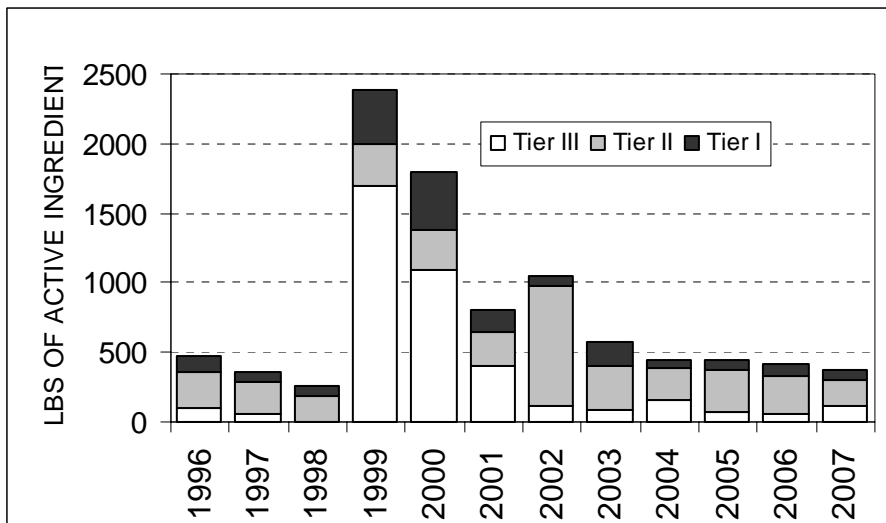


Table 15. Department of Recreation and Parks top ten pesticide products used in 2006

Pesticide	EPA Number	Hazard tier	Use category	Total lbs active ingred	Pesticide type
ROUNDUP PRO DRY	524-505	II	L	100.951	Herbicide
TURFLON ESTER	62719-258-AA-62719	I	L	87.011	Herbicide
VANQUISH HERBICIDE	55947-46-AA-55947	I	L*	75.407	Herbicide
SPRAYTECH OIL	65328-50001-AA-65328	III	A	46.492	Insecticide
ROUNDUP PRO HERBICIDE	524-475-ZA-524	II	L	24.049	Herbicide
GARLON 4	62719-40-ZB-62719	I	L	23.062	Herbicide
JMS STYLET-OIL	65564-1-AA-65564	II	A	22.967	Insecticide
M-PEDE INSECTICIDE	53219-6-AA-53219	II	L	14.063	Insecticide
AQUASHADE	33068-1-AA-33068	III	L	4.335	Aquatic
PROTURF NEW K-O-G WEED CONTROL	538-112-AA-538	I	L*	2.272	Herbicide

Table 16. Department of Recreation and Parks top ten pesticide products used in 2007

Pesticide	EPA Number	Hazard tier	Use category	Total lbs active ingred	Pesticide type
SPRAYTECH OIL	65328-50001-AA-65328	III	A	110.789	Insecticide
ROUNDUP PRO DRY	524-505	II	L	93.361	Herbicide
VANQUISH HERBICIDE	55947-46-AA-55947	I	L*	66.240	Herbicide
TURFLON ESTER	62719-258-AA-62719	II	L	52.115	Herbicide
ROUNDUP PRO HERBICIDE	524-475-ZA-524	II	L	19.225	Herbicide
GARLON 4	62719-40-ZB-62719	II	L	12.522	Herbicide
M-PEDE INSECTICIDE	53219-6-AA-53219	II	L	8.706	Insecticide
PROTURF NEW K-O-G WEED CONTROL	538-112-AA-538	I	L*	3.311	Herbicide
SAF-T-SIDE FOR GROVE TREES	48813-1-AA-48813	II	L	3.176	Insecticide
JMS STYLET-OIL	65564-1-AA-65564	II	A	3.112	Insecticide

San Francisco International Airport (SFIA)

SFIA is unique among City departments in that the airport leases much of its property to a wide variety of tenants, ranging from large hangars leased to major airlines to small booths rented to food vendors. SFIA used a pest control contractor to perform most of its pesticide application and routine pest management services. However, the individual tenants (such as small restaurants) often maintain separate contracts with their own pest control operators, or perform pest management activities themselves. In addition, SFIA has various agreements with other agencies, notably CalTrans, to manage pests and weeds on their properties. Finally, large parts of the airport are subject to stringent FAA regulations governing weed height, fire hazards, and bird populations. Within such a complex context, communication and coordination of pest management efforts are a challenge.

During the past three year, the airport has expanded the area of its management lands by almost one-third, increasing the pressure to use herbicides. With the advent of West Nile virus, SFIA also increased its mosquito larvicide treatments considerably.

San Francisco International Airport – Pesticide Use Graphs

Figure 31. San Francisco International Airport herbicide use over time.

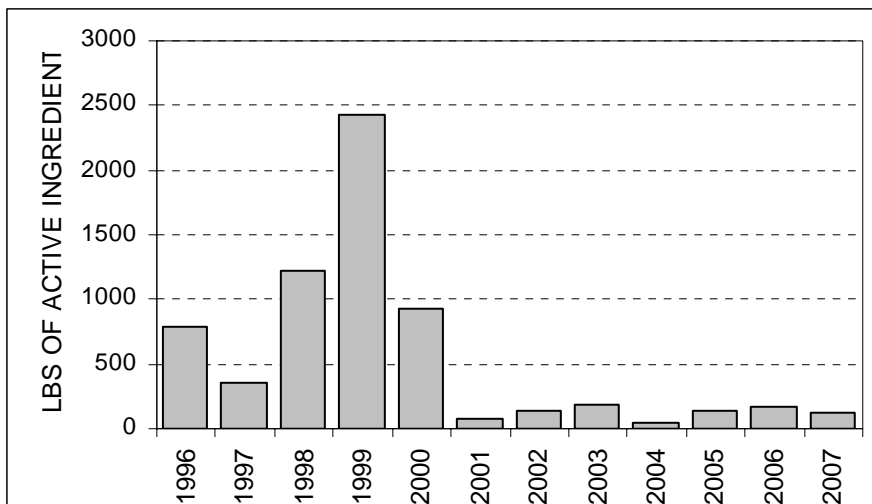


Figure 32. San Francisco International Airport insecticide use over time.

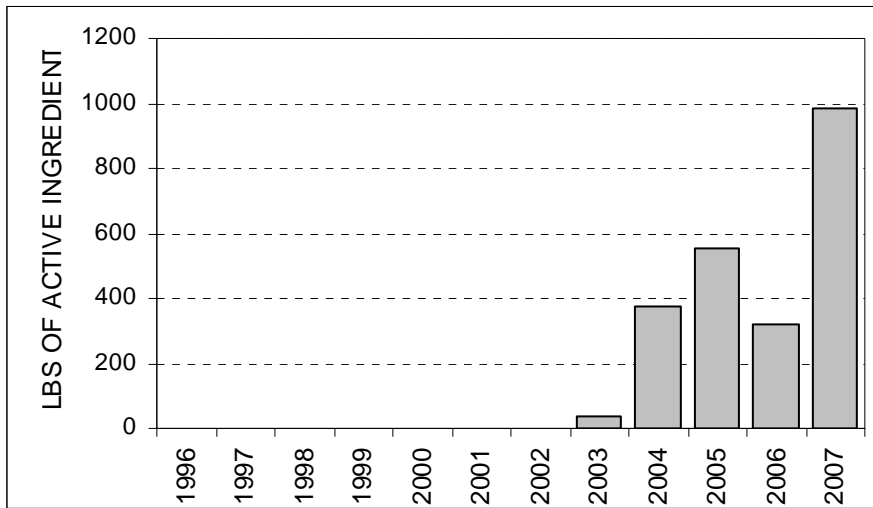


Figure 33. San Francisco International Airport rodenticide use over time.

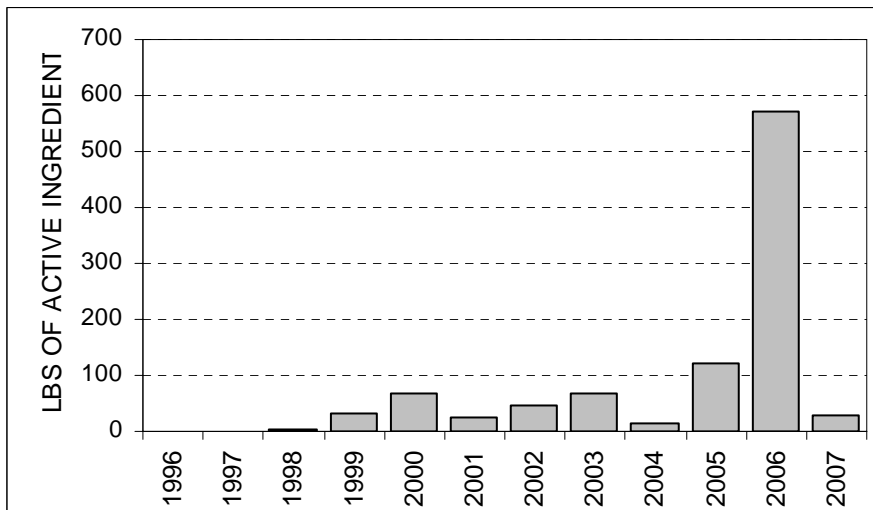


Figure 34. San Francisco International Airport pesticide use over time for Tier I (highest hazard), Tier II (medium hazard) and Tier III (least hazard) products. Note that a logarithmic scale is used to make trends visible, due to large quantities of some Tier III products used.

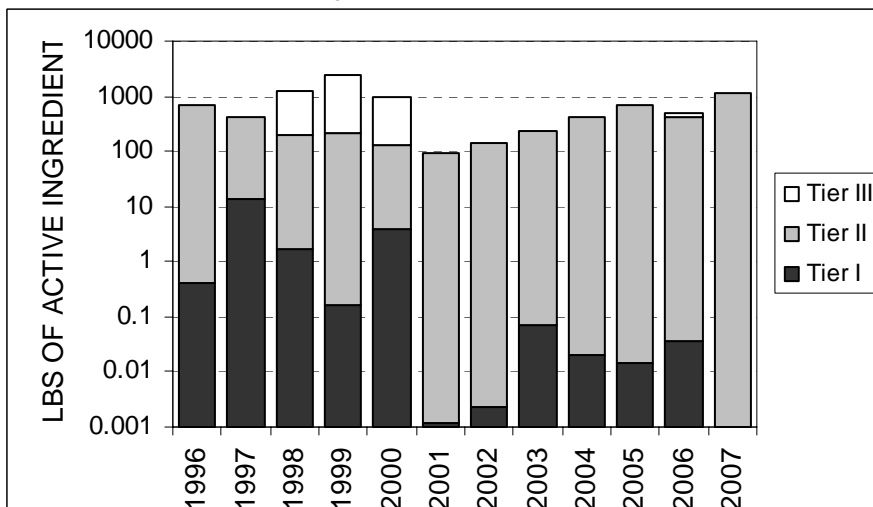


Table 17. San Francisco International Airport top ten pesticide products used in 2006

Pesticide	EPA Number	Hazard tier	Use category	Total lbs active ingred	Pesticide type
GOLDEN BEAR MOSQUITO LARVICIDE GB-1111	8329-72	II	L	263.631	Insecticide
ROUNDUP PRO HERBICIDE	524-475-ZA-524	II	L	154.053	Herbicide
VECTOLEX CG	73049-20	III	L	54.750	Insecticide
ROUNDUP PRO DRY	524-505	II	L	9.586	Herbicide
OUST XP HERBICIDE BY DUPONT	352-601-AA-352	I	L	2.109	Herbicide
TRIFLURALIN	64405-2-AA-64405	II	L	0.450	Insecticide
TERRO CALIFORNIA ANT KILLER	149-8-AA-149	II	L	0.059	Insecticide
CONTRAC ALL-WEATHER BLOX	12455-79-AA-12455	I	L*	0.029	Rodenticide
NEU 1165M SLUG AND SNAIL BAIT (AKA SLUGGO)	67702-3-AA-67702	III	A	0.020	Snails N Slugs
MAXFORCE PROFESSIONAL INSECT CONTROL ANT	64248-6-AA-64248	I	L	0.008	Insecticide

Table 18. San Francisco International Airport pesticide products used in 2007

Pesticide	EPA Number	Hazard tier	Use category	Total lbs active ingred	Pesticide type
GOLDEN BEAR MOSQUITO LARVICIDE GB-1111	8329-72	II	L	987.158	Insecticide
ROUNDUP PRO HERBICIDE	524-475-ZA-524	II	L	114.571	Herbicide
OUST XP HERBICIDE BY DUPONT	352-601-AA-352	II	L	5.145	Herbicide
GARLON 4	62719-40-ZB-62719	II	L	3.964	Herbicide
ROUNDUP PRO DRY	524-505	II	L	1.460	Herbicide
M-PEDE INSECTICIDE	53219-6-AA-53219	II	L	0.054	Insecticide
PT 515 WASP-FREEZE WASP AND HORNET	499-362-AA-499	II	L	0.002	Insecticide
CONTRAC ALL-WEATHER BLOX	12455-79-AA-12455	I	L*	0.002	Rodenticide
AVERT PRESCRIPTION TREATMENT 310	499-294-AA-499	II	L	0.000	Insecticide

Figure 40.

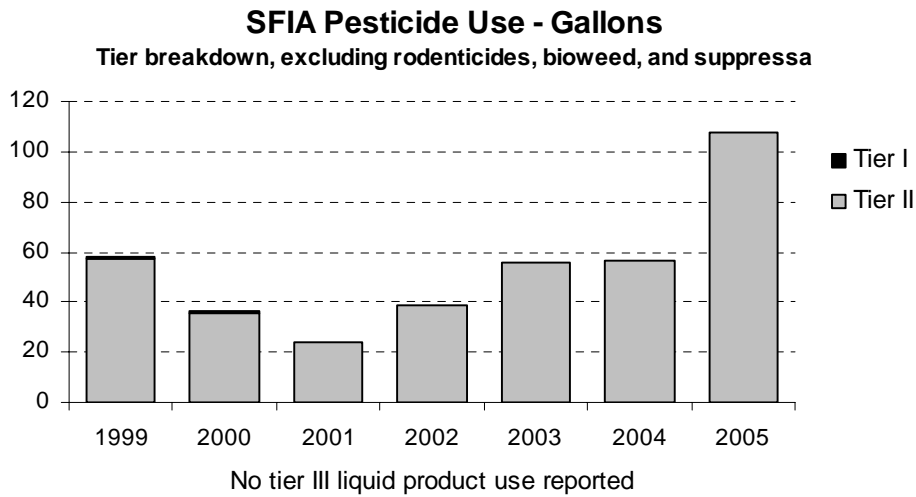


Figure 41.

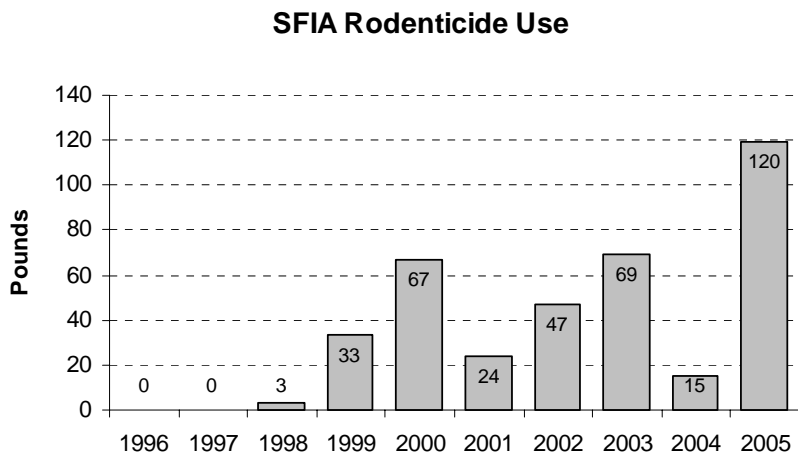


Figure 42.

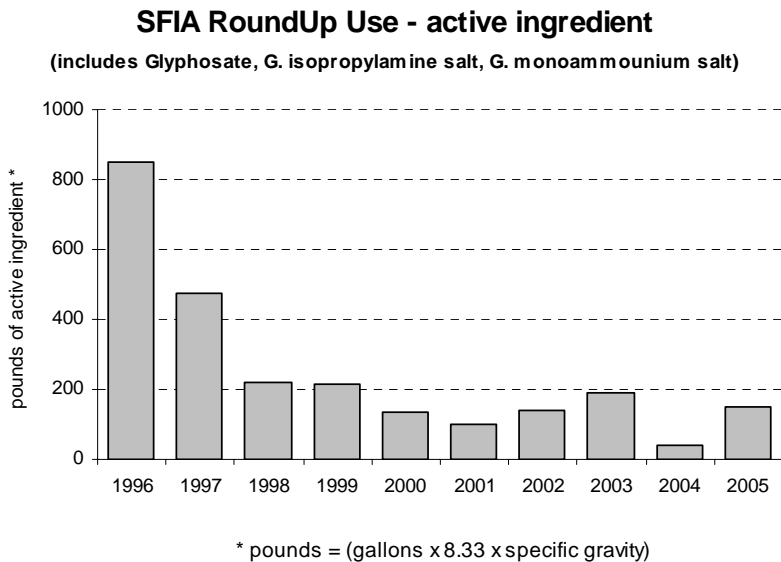


Figure 43.

SFIA Mosquito Larvicide Use

