TO:	**HONORABLE CITY COUNCIL**	
FROM:	**CITY MANAGER**	**DEPARTMENT: PUBLIC WORKS**
DATE:	**APRIL 19, 2010**	**CMR:215:10**
REPORT TYPE:	**INFORMATION**	
SUBJECT:	**Staff Update on Less-Toxic Pest Control Program for City Operations**	

RECOMMENDATION

Staff recommends that the City Council accept this report titled Update on Less-Toxic Pest Control Program for City Operations.

BACKGROUND

In 2001, the City of Palo Alto adopted a reduced-risk pest management policy and drafted an Integrated Pest Management plan for the use of pesticides by City staff and contractors.

The goals of the Integrated Pest Management program are to:

- minimize water quality and other eco-toxicity impacts from the City's pesticide use;
- minimize total pesticide use; and
- use the least toxic pesticides when pesticide use is required

These goals are achieved through an annual quantification of the City's pesticide use and continual improvement of pest control strategies.

Integrated pest management also known as reduced-risk or less-toxic pest management, encourages long-term pest prevention and suppression through a combination of techniques including biological controls, habitat manipulation, use of resistant plant varieties, improved landscape and building hygiene, and structural repair and pest barriers. Integrated Pest Management sanctions synthetic chemical pesticides only as a last resort, and only with the least toxic chemicals available. While the City of Palo Alto has used these principles for many years, additional storm water protection regulatory requirements resulted in a more formal, structured Integrated Pest Management program in 2001. It should be noted that some pest controls, such as use of mulching, mowing, and mechanical removal of weeds, were in place before quantification of pesticide use began in 2001, so that reductions in the use of some pesticides have been greater over the long term than the data indicates. In addition, natural pest population cycles may fluctuate annually depending on climate, food availability and site conditions and so annual pest management and pesticide use may fluctuate accordingly.

To evaluate the chemical toxicity of chemicals used, a tiered system is used based on a City of San Francisco study which considers (1) acute human toxicity and chronic health risks; (2) the level of training required to use the product; (3) inclusion of a chemical on the Clean Water Act 303d list for impairment of a local water body; (4) environmental toxicity; and (5) a chemical's persistence and mobility in soil. Tier 1 chemicals are of highest concern, Tier 2 are of moderate concern, and Tier 3 are of lowest concern. To be identified as a Tier 1 chemical, a product needs to be identified as high risk with regard to only one of the five criteria above. Because of this strict criteria, most pesticides are classified as Tier 1.

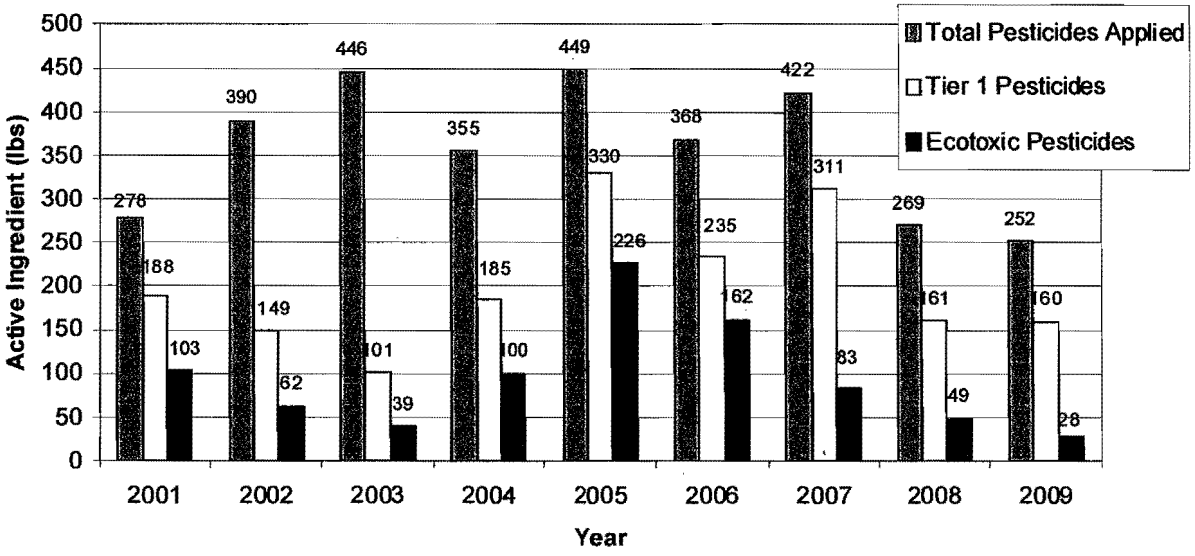
A primary focus of the City's IPM program is to identify and reduce the use of a subset of Tier 1 pesticides that exhibit ecotoxicity. Ecotoxicity is defined as toxicity to birds, fish, bees, and aquatic indicator species, and potential secondary or non-target poisoning from consumption of rodent baits based on product "Material Safety Data Sheets" and other resources.

DISCUSSION

This update summarizes the IPM program's overall program successes, specific 2009 accomplishments and the program's priorities for 2010. It should be noted that while Public Works/Environmental Compliance coordinates the City's IPM efforts, City staff in Community Services (Golf, Open Space, Parks) and other divisions of Public Works (Facilities) should be largely credited with the positive results of their hard work to achieve the City's IPM goals. The attached *2009 Pest Management and Pesticide Use* report includes photos and detailed information.

2009 Program Accomplishments:

Total Active Ingredient, Tier 1 and Ecotoxic Pesticide Use (2001-2009)



- Both the City's total active ingredient as well as ecotoxic pesticide use decreased to historically low levels since the program's inception in 2001. Ecotoxic pesticides use fell by 43% in 2009 which is significant because ecotoxicity reduction is the primary driver of the City's pesticide reduction efforts.

- The herbicide Roundup (glyphosate) use has fallen 78% and insecticide use has fallen 75% since their highest use levels in 2003; rodenticide use decreased by 54% since 2008 and will likely further decrease due to new non-pesticide control methods.

- The Parks Department launched a pesticide-free park program that began with Sarah Wallis Park. One or two parks will be added each year alternating between north and south Palo Alto.

- The golf course implemented a successful perimeter trapping program for gophers. This action significantly reduced the use of ecotoxic rodenticides. Trapping has proven to be better at controlling gopher populations than the chemical controls used in previous years and is less expensive.

- Language for a new Landscape Maintenance Contract was updated to include requirements for Bay Friendly techniques (which supports IPM), the use of organic fertilizers and IPM requirements. The contract will be awarded in 2010 and an update on its impacts will be provided in the 2010 IPM Report.

Program Accomplishments since 2001

- The City was awarded IPM Innovator of the Year Award in 2003 by the California Department of Pesticide Regulation.

- Alternative forms of pest control have been implemented to avoid pesticide use including the use of power washing to control tussock moths, visual barriers and raptor perches to reduce ground squirrel activity, goats for open space weed control and heavy mulching to reduce weeds in parks, structural repairs to deter mice and rats, and experimenting with newer pesticides that meet the City's Tier 2 criteria.

- The City was the first public agency or business to require its structural pest control operators to be EcoWise Certified in 2007. EcoWise Certified is a rigorous Bay Area wide program developed by pest control and water quality professionals and the National Resources Defense Council which demands rigorous less-toxic pest control services and training from pest control operators. The City's current EcoWise Certified pest control operator, Pestec, uses no spray poisons to control ants or stinging insects, and only exclusion methods and traps to control mice and rats. The Facilities Division undertook an ambitious 18 month process to install door sweeps, and make various building repairs to block access to pests across the City. This has reduced pest control complaints and resulted in a much higher efficacy of pest control.

- Piloted the use of "bee tunnels." The City's contractor, Pestec, identified a method of rerouting bees that are entering and exiting their hives away from people when human/bee interface is likely. The device protects bees and humans when a potential for interaction is likely.

- Annually updated information is available to the public on the City's website showing pesticide use by location, date applied and pest managed.

- The City co-funds and operates in-store programs that direct the public to least-toxic pest control products and offers periodic workshops on less-toxic pest control.

2010 Priorities for City of Palo Alto IPM Program
Staff will continue to target the reduction of the City's use of ecotoxic pesticides and those that are used in large amounts. Specific task recommendations are to:

1. Continue to follow and encourage the success of perimeter trapping for gophers which should nearly eliminate all rodenticide use except for small amounts used for ground squirrels.
2. Explore options for ground squirrel control to further reduce ecotoxic pesticide use.
3. Investigate IPM and less-toxic product alternatives for weed control at the golf course.
4. Track the addition of pesticide-free parks in the City and the results of adding IPM language into landscape maintenance contracts.
5. Track and support as appropriate the expansion of EcoWise Certified.

ENVIRONMENTAL REVIEW

This is not a project under the California Environmental Quality Act (CEQA).

ATTACHMENT

Attachment A: 2009 IPM Report

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City of Palo Alto
2009 IPM Program Report
February 8, 2010

Background

In 2001, the City of Palo Alto adopted a reduced-risk pest management policy and drafted an Integrated Pest Management (IPM) plan for the use of pesticides by City staff and contractors.

The goals of the IPM program are to:

- minimize water quality impacts from pesticide-related ecotoxicity;
- minimize total pesticide use; and
- use the least toxic pesticides when pesticides are needed.

These goals are to be achieved through an annual quantification of the City's pesticide use and continual improvement of pest control strategies.

Integrated pest management (IPM), also known as reduced-risk pest management, encourages long-term pest prevention and suppression through a combination of techniques including: biological controls, habitat manipulation, use of resistant plant varieties, improved landscape and building hygiene, and structural repair and pest barriers. IPM sanctions synthetic chemical pesticides only as a last resort, and only with the least toxic chemicals available. While the City of Palo Alto has used these principles for many years, additional storm water protection regulatory requirements resulted in a more formal, structured IPM program. It should be noted that non-chemical controls, were in place before quantification of pesticide use began in 2001, so that reductions in the use of some pesticides have been greater over the long term than the data indicates.

To evaluate the chemical toxicity of chemicals used, a tiered system is used[1] (based on a City of San Francisco study) which considers (1) acute human toxicity and chronic health risks; (2) the level of training required to use the product; (3) inclusion of a chemical on the Clean Water Act 303d list for impairment of a local water body; (4) environmental toxicity; and (5) a chemical's persistence and mobility in soil. Tier 1 chemicals are of highest concern, Tier 2 are of moderate concern, and Tier 3 are of lowest concern. To be identified as a Tier 1 chemical, a product needs to be identified as high risk with regard to only one of the five criteria above.

A primary focus of the City's IPM program is to identify and reduce the use of a subset of Tier 1 pesticides that exhibit ecotoxicity. Ecotoxicity, for this report, is defined as toxicity to birds, fish, bees, and aquatic indicator species, and potential secondary or non-target poisoning from consumption of rodent baits based on product MSDSs and other resources.

This 2009 update summarizes the year's successes and challenges, reports on the City's 2009 pesticide use data, discusses program accomplishments and progress on the 2008 report recommendations, and makes 2010 project recommendations.

[1] See Appendix I: Evaluation and Rating of Pesticide Toxicity Risk

Summary of 2009 Program Achievements and Pesticide Use Changes

1. The City's total active ingredient and ecotoxic pesticide use decreased to historically low levels since the program's inception in 2001. Ecotoxic pesticides use fell by 43% which is significant because ecotoxicity reduction is the primary driver of the City's pesticide reduction efforts.

2. The golf course implemented a successful perimeter trapping program for gophers. This action significantly reduced the use of ecotoxic rodenticides. Trapping has proven to be better at controlling gopher populations than the chemical controls used in previous years.

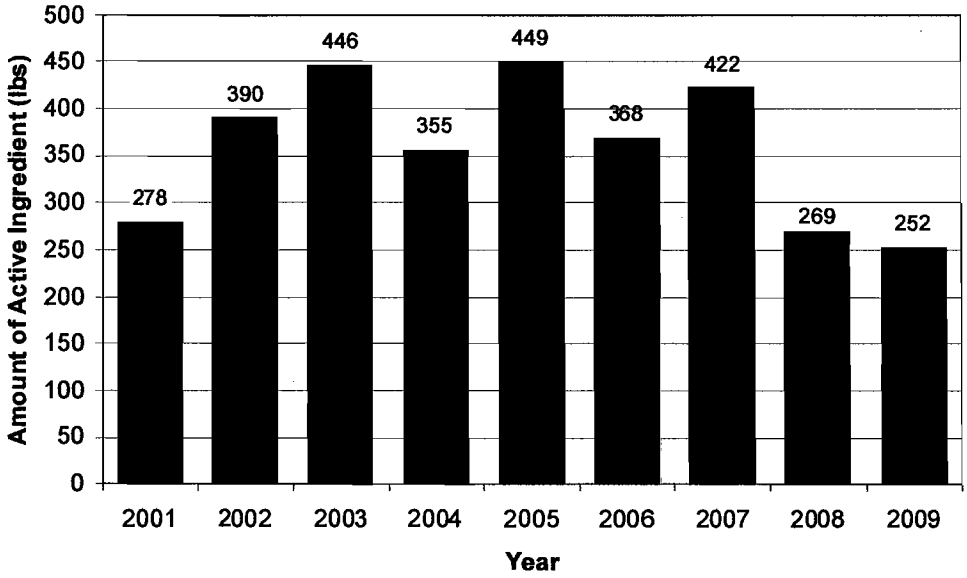
3. The Parks Department launched a pesticide-free park program that began with Sarah Wallis Park. One or two parks will be added each year as funding allows, alternating between north and south Palo Alto.

4. Language for a new Landscape Maintenance Contract was updated to include requirements for Bay Friendly techniques (which supports IPM), the use of organic fertilizers and IPM requirements. The contract will be awarded in 2010 and an update on its impacts will be provided in the 2010 IPM Report.

2009 Pesticide Use Information

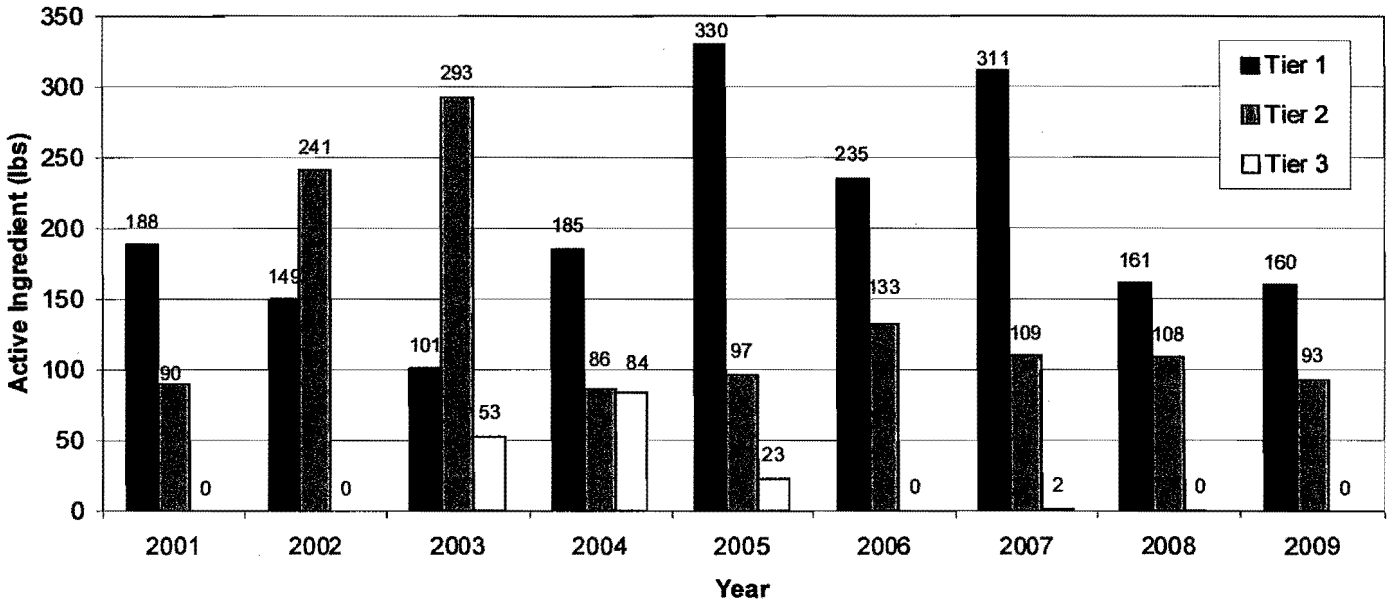
1. **Total Active Ingredient Use Trends**
   Total active ingredient use decreased by 17 pounds (6%) in 2009 because of a reduction in use of aluminum phosphide, flutolanil and imazypyr.

Figure 1: Total Pesticide Active Ingredient Use by Year (2001-2009)



2. **Tier 1-3 Pesticide Use**
The City's use of Tier 1, 2, and 3 pesticides for calendar years 2001 through 2009 is displayed in Figure 2. Figures 3 through 6 provide annual pesticide use, by tier, for controlling fungus, rodents, weeds, and insects, respectively.

Figure 2: Tier 1, 2, and 3 Pesticide Use by Year (2001 – 2009)



Tier 1 Pesticide Use
In 2009, total Tier 1 use remained almost identical to the previous year–one pound less of Tier 1 active ingredient was used in 2009. A decrease of 36 pounds of aluminum phosphide and imazapyr was offset by a 43 pound increase in Mancozeb use.

Tier 2 Pesticide Use
Tier 2 pesticide use decreased by 15 pounds largely because of 14 pounds less flutolanil (ProStar) applications. Fludioxonil (Medallion), flutolanil (ProStar), and glyphosate (Roundup) comprised 92% of the Tier 2 pesticides used in 2009. The use of Roundup herbicide decreased slightly in 2009 but has reduced by 81% from the peak level of 2003 due to heavy mulching and mechanical weed removal. Total herbicide use is at an historical low.

Tier 3 Pesticide and non-chemical controls
Tier 3 products were not used in 2009, but non-toxic pest control measures which are favored over Tier 3 product use continue to expand. Non-chemical controls include power washing for tree pests, mulching to reduce weeds, structural repairs to deter ants and mice, and trapping for gophers.

Toxicity of Pesticides Used for Key Pests

A majority of the Tier 1 pesticides are used for controlling fungi, rodents and insects. Most Tier 2 pesticides are for weed control. Most Tier 3 products have been used for insect or weed control.

Figure 3: Summary of pesticides used to control fungus

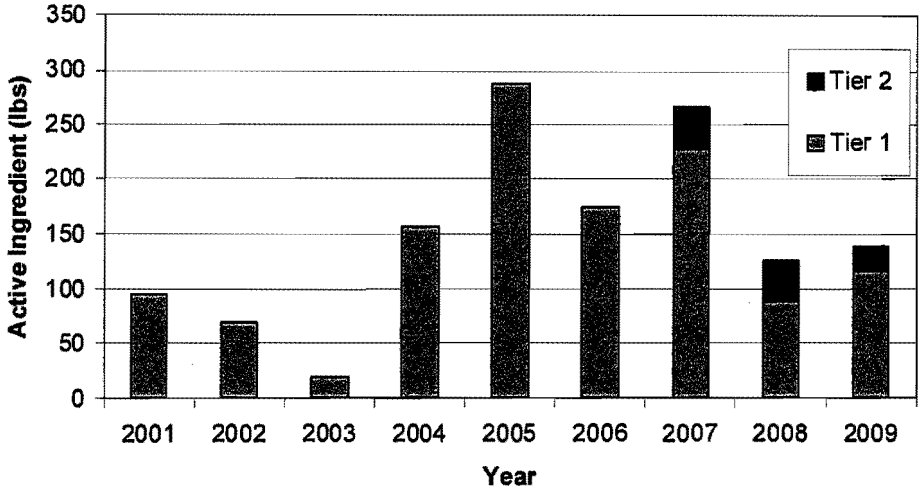


Figure 4: Summary of pesticides used to control rodents

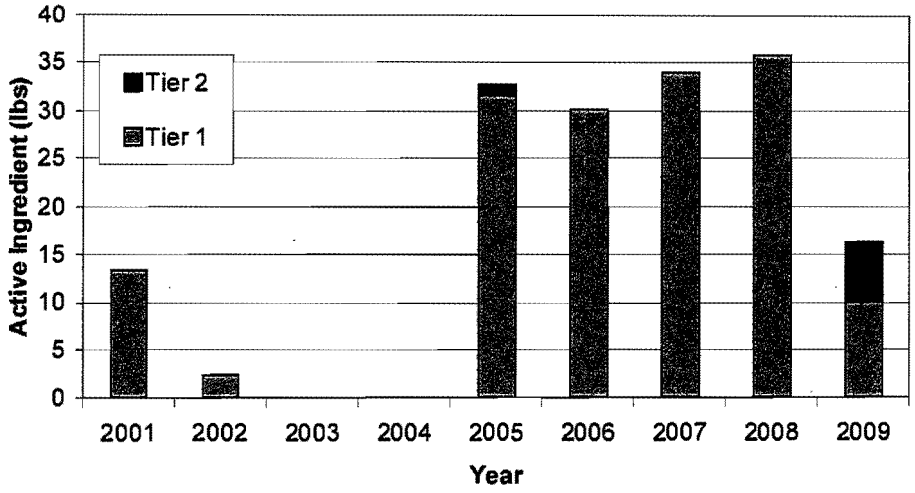


Figure 5: Summary of pesticides used to control weeds

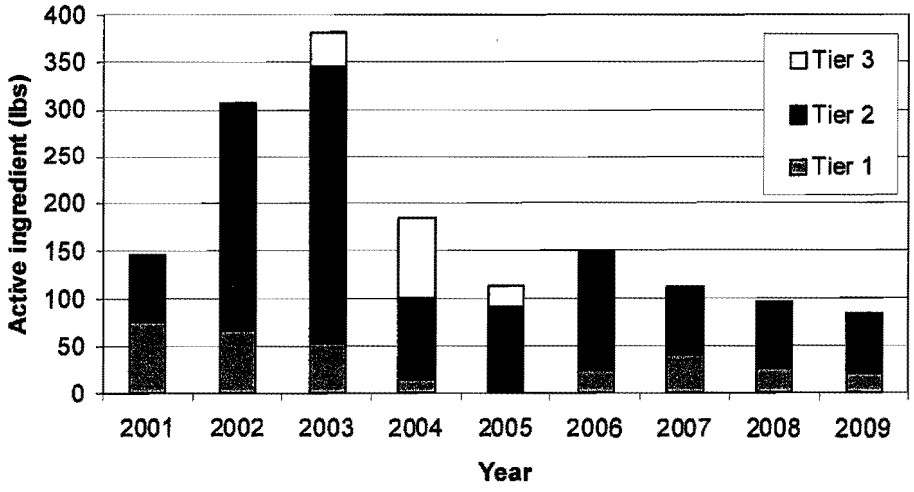
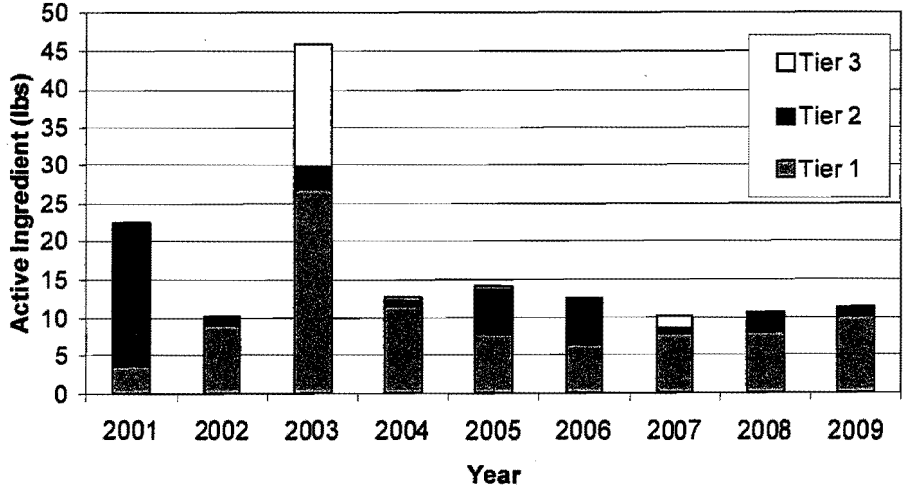


Figure 6: Summary of pesticides used to control insects



Top five active ingredients used by weight

Figure 7 presents the five most-used pesticide active ingredients by weight for 2009. Mancozeb, aluminum phosphide and imidacloprid are Tier 1 pesticides. Flutolanil and glyphosate are Tier 2 pesticides.

Figure 7: Top Five Pesticides Applied by Weight

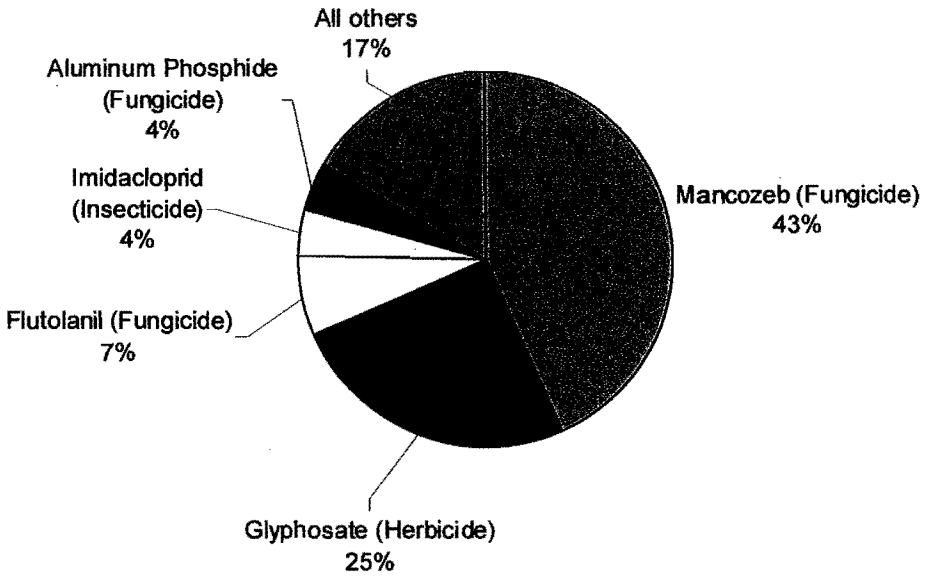


Figure 8: Usage History for 2009 Top Five Active Ingredients

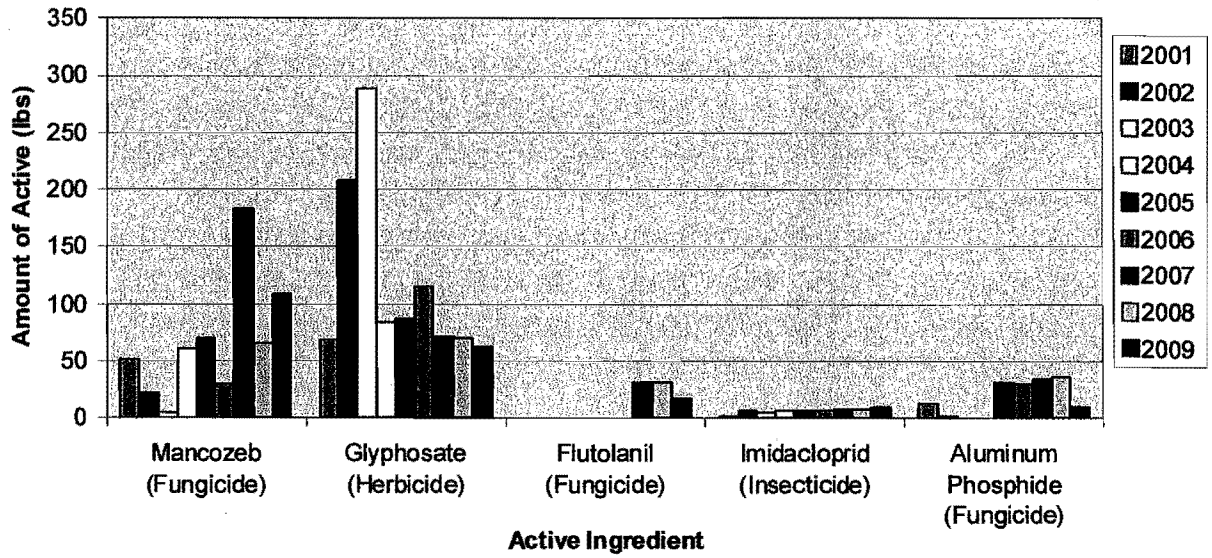


Table 1: 2009 Change in Top Five Active Ingredient Usage						
Active Ingredient	**Tier**	**2008**	**2009**	**Amount Changed (lbs)**	**Percent Change**	**Location Used**
Mancozeb (Fungicide)	1	66	109	43	64%	Golf Course
Glyphosate (Herbicide)	2	69	63	-6	-9%	Parks, PWD Operations-Trees
Flutolanil (Fungicide)	2	32	18	-14	-44%	Golf Course
Imidacloprid (Insecticide)	1	8	10	2	24%	Trees
Aluminum Phosphide (Fungicide)	1	36	10	-26	-72%	Open Space–Foothills Park

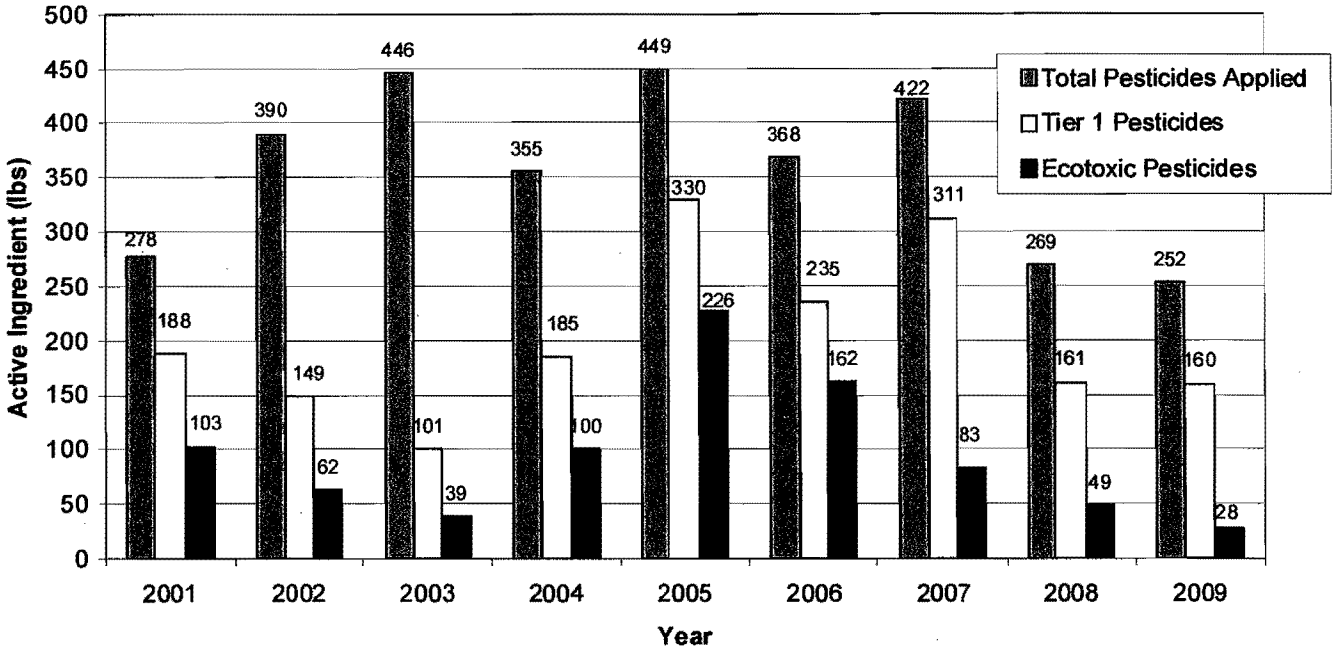
Ecotoxic Pesticide Use in 2009

The primary driver of the City's IPM policy and plan is the avoidance of ecotoxicity in water bodies from pesticide use. Ecotoxicity, for this report, is defined as toxicity to birds, fish, bees, and aquatic indicator species, and potential secondary or non-target poisoning from consumption of rodent baits based on product MSDSs and other resources. Ecotoxic pesticides are a subset of Tier 1 pesticides as described previously in this report. A product's potential ecotoxicity does not necessarily mean an immediate threat to the environment; how, where, and when the pesticide is applied and the product's breakdown time are all factors in its ultimate environmental impact.

Factors to consider:

- Some product formulations use procedures that restrict product entry into the environment, such as containerized ant baits and dusts (applied in wall cracks and crevices).
- Conversely, even small amounts of some pesticides such as non-containerized pyrethroids (e.g., bifenthrin, cyfluthrin, delta-methrin) usually associated with sprayed ant pesticides, should be targeted because of their persistent toxicity in urban creek and Bay sediments when rain or irrigation washes them from surface areas into waterways.
- Pesticides not identified by the EPA as known ecotoxins are not free of risk. Proprietary inert ingredients and synergistic effects of multiple pollutants may still impact water quality and for that reason, large amounts of use of any single product are warranted for potential reduction.

Figure 9: Total Active Ingredient, Tier 1 and Ecotoxic Pesticide Use (2001-2009)



Ecotoxic pesticide use trends

In the first three years of Palo Alto's IPM program, the recorded use of ecotoxic and other Tier 1 active ingredients decreased because of expanded use of non-chemical and less toxic pesticide controls, a suspended use of some products while the goals of the City's IPM program were clarified, and because not all information was able to be captured from contractors. In 2004 and 2005, ecotoxic pesticide use increased because of weather conditions which resulted in the need for more fungicide use at the golf course, but then decreased from 2006 to 2008 because of less PCNB and thiophanate-methyl use and because the Tier 2 fungicides fludioxonil (Medallion) and flutolanil (Pro Star) were rotated into the suite of fungicides used throughout the year.

In 2009, the golf course helped reduce the City's ecotoxic use further by switching to trapping for gophers in lieu of chemical controls. This reduced the City's ecotoxic pesticide use to 28 pounds, the lowest number in the program's history.

Rodents (gophers and ground squirrels), insects and weeds now pose a similar challenge in terms of which pests currently prompt the use of ecotoxic pesticides.

Rodenticides for rats and mice are essentially no longer in use because of structural repairs that Facilities Division has made, and because the City's structural pest control provider does not use bait for mice or rats. The expanded gopher trapping in 2009 was very successful and Open Space plans to use more trapping for their gopher problem in 2010. Staff anticipates that rodenticide use will continue to decrease because of these efforts.

Insecticides used to control insect tree pests comprised 36% of the City's ecotoxic pesticide use in 2009, but these products are injected into the ground around tree roots and pose minimal threat to surrounding areas. Less than one percent of one additional ecotoxic pesticide is applied to tree foliage.

Approximately 28% of the City's ecotoxic pesticides are used for weed control at the golf course. Staff will investigate alternative control measures in 2010.

Table 2: Locations of Ecotoxic Pesticide Use in 2009 and Potential for Reduction			
Division	**Active Ingredient**	**Percent of Ecotoxic product used and pest**	**Opportunity for Reduced Use**
Operations-Trees	Imidacloprid (Merit)	36% (10.20 lbs) Insects	**Low.** **Action:** Staff has already significantly increased power washing to control insects and incorporates many IPM measures into tree pest management. Imidacloprid is injected into ground around tree roots and thus greatly minimizes potential release to surrounding environment.
Open Space/foothills	Aluminum Phosphide (Fumitoxin)	36% (10.18 lbs) Gophers	**Moderate.** **Action**: Staff will experiment with perimeter trapping in 2010 to reduce rodenticides.
Golf course	Mecoprop-P, Diacamba, carfentrazon-ethyl, 2,4-D 2-Ethylhexyl Ester * (Speedzone)	27% (7.54 lbs) Weeds	**Low** **Action**: Weeds are difficult to control because of high standards for golf course playability and turf stress.
Golf course	Clopyralid, Monoethanolamine Salt (Lontrel Turf and Ornamental)	1% (0.37) Weeds	**Moderate** Action: Staff will investigate alternatives for golf course weeds control.
Trees	Spinosad (Conserve)	<1% (0.02) Insects	**Low** A very small amount of this product is used each year and not considered a priority active ingredient to target for reduction.

**These four active ingredients are all used in one product. Their weight has been totaled together for ease of review*

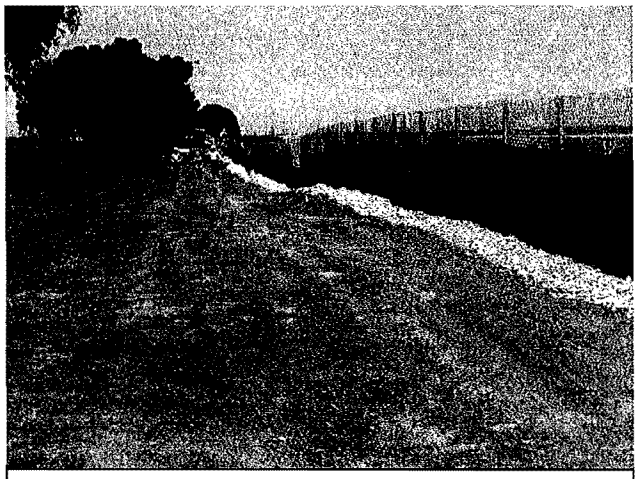
Table 3: Progress on 2009 Recommendations for City of Palo Alto IPM Program	
Recommendation	**Status**
1) Follow and encourage the success of perimeter trapping for gopher and ground squirrels.	Perimeter trapping has proved hugely successful and has greatly reduced the gopher population at the golf course, leading to a subsequent 72% reduction in aluminum phosphide use. The golf course plans to continue using perimeter trapping and is exploring trapping options for ground squirrels which should also further reduce rodenticide use.
2) Set up initial meeting with Department of Fish and Game, Berkeley biologist and City staff to explore reintroduction of native weasels to City property.	A meeting was held with Open Space, Environmental Compliance and Dr. Gilbert Proulx. Open Space is considering if and when a reintroduction could proceed and will be the lead for this action.
3) Track and support as appropriate the expansion of EcoWise Certified into a program that is adopted and managed by the Structural Pest Control Board.	EcoWise has been adopted by the Biointegral Resource Center and has funding for 2010. Its primary goal is to make EcoWise self-supporting and to continue as a third-party IPM certifier to companies and practitioners. Outreach on EcoWise Certified could be done in 2010, although if future program funding fails it may seek sponsorship of another organization in the following year.
4) Go out for bid for next three-year structural pest control contract emphasizing EcoWise Certified requirements.	Revisions to the contract language were made. The contract will be awarded in early 2010.
5) Advocate and publicize the use of bee tunnels.	Outreach was conducted through a tour. Sharing this IPM strategy will continue periodically.
6) Explore the timing for inclusion of IPM language into landscape maintenance contracts.	Environmental Compliance staff suggested changes to the Landscape Management Contract which will be awarded in 2010. Parks staff anticipates that a majority, if not all, of the ECD suggestions will be incorporated into the new contract. Changes include: a preference to have Bay Friendly Certified landscapers, increased mulching and organic fertilizer usage.
7) Investigate the possibility of having a pesticide-free park or demonstration site in the City.	The Parks Department successfully launched its first pesticide-free park at Sarah Wallis Park. The Parks Department plans to add one or two additional parks to the list of those that don't use pesticides each year as funding allows.

IPM Program History 2001-2009

Accurately assessing the success of the City's efforts to reduce pesticide use and use least toxic products is difficult when relying solely on yearly numerical fluctuations in pesticide use. Variations in weather patterns, natural pest population cycles, and challenges associated with quantifying pest control efforts that use biological or mechanical controls in lieu of pesticides are all important considerations. The following are a summary of key Palo Alto IPM accomplishments to date:

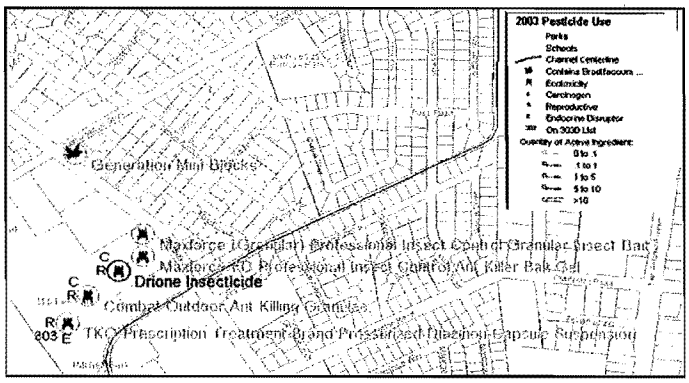
2001

- IPM policy is the first City Policy in the County to be adopted. The IPM Committee drafts the IPM Plan and Procedures.
- A tiered system for analyzing City pesticide use is adopted and the first annual report on the City's pesticide use is completed.
- IPM Committee votes to discontinue use of organophosphate pesticides due to water quality concerns associated with their use.
- Solarizing non-native plants at Pearson-Arastradero Preserve (weeds are covered in plastic tarps and destroyed by heat).
- Mechanical removal of weeds in Open Space Ponds
- Bermuda grass replaces bent grass at bowling green to reduce need for pesticides.
- City begins mulching in lieu of glyphosate use to control weeds (both pre and post emergent). Mulching becomes a significant contributor to the reduction of herbicide use in the City.
- Herbicide spraying discontinued at schools due to Healthy Schools Act.



A visual barrier installed at the golf course decreased ground squirrel damage by 100%.

GIS view of pesticide application next to Adobe creek



2002

- Completed five extensive IPM plans and related training for ants, weeds, yellowjackets gophers and ground squirrels.
- Identified all leased facilities and contractors for inclusion in the City's annual pesticide reports.

2003

- City receives Department of Pesticide Regulation IPM Innovator award http://www.cdpr.ca.gov/docs/ipminov/awards/03awards.htm
- Piloted new methods to reduce yellow jackets in Parks and Open Space.
- Piloted gopher reduction strategies at Foothills Park using trapping as a primary method.

- In partnership with Santa Clara County Airport and Baylands and golf course Staff implemented two new measures to reduce ground squirrel populations
    a. The installation of a visual barrier hung along the golf course/airport fence line to decrease the ground squirrels' ability to see predators and thus reduce activity.
    b. a trap design around Baylands buildings that can capture up to four ground squirrels at a time.

Goats are used to reduce weeds at Enid Pearson Arastradero Open Space Preserve.

2004

- Created pesticide data entry system using a centralized database and simplified reporting interface. This streamlines staff reporting time and allows staff to also print mandatory monthly DPR reports.
- Transferred pesticide use information in database to GIS format allowing for visual assessment of pesticide applications next to creeks and the Bay.
- Use of goats in Open Space areas to control weeds proves successful (reintroduction of goats to this area is on hold due to mountain lion concerns in that area).

A bee tunnel is installed over a bee hive in a public parking lot.

2005

- Scope of Services for City wide IPM contract drafted. RFP to go out in 2006.
- Less toxic, botanically-based insecticides ordered for Facility staff use and related *Approved Pesticide List* for Facilities and staff at the Regional Water Quality Control Plant who are responsible for their own pest control
- Confirmed pesticide reduction hierarchy

2006

- Hired EcoWise Certified structural pest control company to service all City facilities (Pestec)
- Identified less toxic fungicide alternatives
- Provided mini grants (<$5,000) to golf course and Art Center for structural pest control.
- Improved the City's database system.

Dr. Gilbert Proulx provides information on gopher biology and trapping.

2007

- Implemented EcoWise Certified contractor service into City operations and consolidated related billing and service levels.
- Completed 50% of recommended building repairs to reduce overall conditions that encourage pest activity.
- Tested two Tier 2 fungicide alternatives.

- Held two region-wide trainings for IPM structural pest control

2008

- Medallion and Prostar, two Tier 2 fungicides, were incorporated into ongoing use at the golf course.
- A gopher and ground squirrel workshop was held inspiring staff to experiment with the use of perimeter trapping to control these animals.
- The City's contractor, Pestec, identified a method of rerouting bees that are entering and exiting their hives away from people when human/bee interface is likely. Staff developed a public education piece and internal protocol for responding to bee complaints.
- Completed structural building repairs identified in 2007 needed for ant and rat control.
- Public Works Trees incorporates power washing to remove tussock moths from trees in City parks.

2009

- Perimeter trapping proved hugely successful and reduced aluminum phosphide use by 72%.
- The Parks Department launched its first pesticide-free park at Sarah Wallis Park.
- IPM language was added to parks maintenance contract.
- Palo Alto ecotoxic and total active ingredient pesticide use the lowest in program history.

2010 Recommendations for City of Palo Alto IPM Program

Based on analysis of 2009 data

Staff recommends that the City continue to target the reduction of ecotoxic pesticides and those that are used in large amounts. These recommendations factor in reduced funding and staff resources from previous years' budget reductions. Specific task recommendations are to:

1. Continue to follow and encourage the success of perimeter trapping for gophers.

2. Explore options for ground squirrel control to further reduce ecotoxic pesticide use.

3. Track and support as appropriate the expansion of EcoWise Certified.

4. Advocate and publicize the use of bee tunnels.

5. Track the addition of pesticide-free parks in the City and the results of adding IPM language into landscape maintenance contracts.

6. Investigate IPM and less-toxic product alternatives for weed control at the golf course.

Appendix I: Evaluation and Rating of Pesticide Toxicity Risk

1. **Information sources for pesticide evaluation**
   Information used to evaluate hazards are obtained from the sources listed in Table 1 below:

Table 1-Pesticide Information Sources

Information	Source
Product Literature	Crop Data Management Systems Website
Product MSDS	Manufacturers' Websites
Product Label	Calif. DPR Website
Other Manufacturers' Data	EPA Reregistration Eligibility Decisions (R.E.D.) Website
Registration Documents	
Ingredient Data	EPA & Other Websites
	Toxicology Literature
Specific Product Risk Ratings	San Francisco & Seattle IPM Websites

2. **Defining pesticide risks.** Three factors define the overall risk:

   a) **The level of hazard inherent in the chemical.** Some pesticide ingredients can cause immediate, acute injury (e.g., eye irritation), while others may take years for their toxic effects to be seen (e.g., cancer).

   b) **The level of exposure that the user, near-by person, or the environment might incur.** For example, consider a rat poison contained in a tamper-resistant trap, versus that same rat poison in pellet form spread on the ground next to a building foundation.

   c) **The susceptibility of the exposed person or animal to the hazard.** For example, people with asthma may be more susceptible to air-born chemicals. Also, children, the elderly, or people recovering from an illness may each have a somewhat lesser tolerance to chemical exposures than would an average healthy adult.

3. **Qualifying the criteria used to define pesticide risks**

There are several dozen chemical hazards and exposure issues that can be used to evaluate the overall risk of individual pesticides. Examples include: toxicity to humans and animals; potential to cause cancer; use in a sprayer versus sprinkling as a powder; and flammability.

The US Environmental Protection Agency (EPA) and California Department of Pesticide Regulation (DPR) routinely evaluate the top 20 or so of these criteria when making decisions

about registering pesticide products. The Cities of San Francisco and Seattle use similar criteria as part of their IPM programs. RWQCP staff primarily use the San Francisco criteria list in reviewing pesticides used in Palo Alto. The risk evaluation criteria are described below: These descriptions are adapted from extensive reports that are available on the San Francisco and Seattle IPM websites.

a) EPA Hazard Class - "Signal Words" are required by US EPA on pesticide labels to indicate the overall hazard category for a product, based on acutely toxic effects. Listed from most to least hazardous, the signal words are: I-Danger, II-Warning, III-Caution, or IV-Caution. It is preferable to use pesticides labeled as "Caution."

b) Use Restricted to Certified Applicators – Some products evaporate easily, are easily absorbed through skin, or have other characteristics that make them a high risk to untrained users. The EPA designates in its registration decisions which products are to be used only by a certified applicator. It is preferable to use products that have no use restrictions.

c) Chronic Toxicity – Longer term tests on active pesticide ingredients indicate their likelihood of causing cancer, reproductive or developmental harm, or disruption of hormone systems. There is uncertainty in evaluating animal tests of these types, and how to apply the results to humans. Therefore, the results will be stated as probabilities, e.g., iprodione is a "probable human carcinogen," or iprodione is "known to the State of California to cause cancer and reproductive harm." It is preferable to avoid pesticide products that have a possibility of causing cancer, reproductive or developmental harm, or disrupting hormone systems.

d) Contains Clean Water Act (303d) Listed Chemicals – Copper, chlorpyrifos, and diazinon are three pesticide ingredients managed under the Clean Water Act. The City has a stated policy of not using products with diazinon or chlorpyrifos.

e) Ecotoxicity (Animal Toxicity) – Laboratory tests on birds, fish, bees, and other wildlife indicate how these animals may react to unintended pesticide exposures (i.e., where they are not the pest being dealt with). As described above for acute oral toxicity, the test results are given in terms of the dose that kills half of a group of birds, fish, or other test animals. It is preferable to use pesticides with the following toxicity levels:

   - Bird toxicity > 2,000 mg/kg
   - Fish toxicity > 100 mg/l
   - Bee toxicity > 11 μg per bee

f) It is preferable to avoid products that are labeled as "highly" or "extremely" toxic to these and other animals. Brodifacoum, Bromadionone and Bromethalin are considered specific high-risk animal toxins, particularly due to the possibility of secondary poisonings. In addition there are concerns about two rodenticides, chlorphacinone and diphacinone, which although less toxic, also present primary and secondary risks.

g) Persistence and mobility in soil – Many pesticides biodegrade readily, and tend to remain in the area where they are placed. Other products persist in the environment, and tend to move through soil into the groundwater or a near-by stream. It is preferable to use pesticides with the following characteristics:

- Persistence in soil < 30-day half-life
- Ability to move through soil = "Low"
- Not labeled as a groundwater contamination hazard

4. **Rating Pesticide Toxicity** The City of Palo Alto uses the San Francisco strategy of placing pesticides into groups, or tiers, according to their relative risks. Table 2 outlines the four tiers that are used, and the criteria that place a product into a specific tier.

Table 2. Pesticide "Tier Definition" System

All pesticide products are classified into one of four tiers based on each product's hazards:

Tier 1: Highest concern

Tier 2: Moderate concern

Tier 3: Lowest concern

Tier 4: Insufficient information

Tier 1: A product is Tier 1 if any one of the following are true:

- Product is a restricted-use pesticide
- Product contains known, likely, or probable carcinogens, reproductive toxicants (CA Prop 65 list or other published test) or endocrine disruptors as active ingredients (Illinois EPA list, or other published test results)
- Product contains diazinon, chlorpyrifos, or copper, identified as important causes of impaired waterbodies in California Regions 2 and 5 under section 303(D) of the Clean Water Act
- Product labeled as highly toxic or extremely toxic to birds, aquatic species, bees, or wildlife.
- Product contains the rodenticides brodifacoum, bromethalin, or bromadionone
- Product contains active ingredients with soil half-lives greater than 100 days (not applicable to products used only indoors or to products used only in bait stations)
- Product contains active ingredients with mobility ratings high or very high or with specific label warnings about groundwater hazard. (not applicable to products used only indoors or to products used only in bait stations)

Tier 2: All products not specifically assigned to Tier 1 or Tier 3.

Tier 3: A product is placed into Tier 3 if all of the following are true:

- Product contains no possible or probable carcinogens
- Product contains no reproductive/developmental toxicants (CA Prop 65 list)
- Product contains no ingredients listed by Illinois EPA as known, probable, or suspect endocrine disrupters
- Active ingredient has soil half-life of 30 days or less (exception for minerals
- Active ingredient has extremely low or very low mobility in soils.
- Product is labeled as non-toxic to fish, birds, bees, wildlife, or domestic animals.

Tier 4: Not enough information. Product registration or label not found, or key data not located for active ingredient (e.g., half-life, soil binding, ecotoxicity, etc.)