



CONTRA COSTA
CLEAN WATER
PROGRAM



Structural IPM Tailgate

Contra Costa Clean Water Program

June 30, 2011

Agenda

- IPM in a nutshell
- NPDES requirements for IPM
- IPM Policy and Program
- IPM philosophy
- Structural IPM
- Break (video)
- Structural IPM from a stormwater perspective
- MRP pesticide reduction requirements
- Pesticides that threaten stormwater runoff
- Structural IPM examples

Disclaimer

**I AM NOT AN IPM
PROFESSIONAL**

What is a pesticide?

- A pesticide is a chemical used to prevent, destroy, or repel pests. Examples:

Algicides, Antifouling agents, Antimicrobial, Attractants, Biopesticides, Biocides, Disinfectants and sanitizers, Fungicides, Fumigants, Herbicides, Insecticides, Miticides, Microbial pesticides, Molluscicides, Nematicides, Ovicides, Pheromone, Repellents, Rodenticides, Defoliant, Dessiccants, Insect growth Regulators, Plant growth Regulators

What is IPM?

- Integrated Pest Management (IPM) is an effective and environmentally sensitive and long-term approach to pest management that relies on a combination of common-sense practices.
- IPM takes advantage of all appropriate pest management options including, but not limited to, the use of pesticides and pesticide alternatives to manage pests with the least possible hazard to people, property, and the environment.

Why IPM?



- **Contamination of creeks, rivers, and oceans**

- California creeks, rivers, and oceans are being contaminated with pesticides and other chemicals commonly used around our homes and gardens. These chemicals are not only a threat to aquatic life, but they can also affect the quality of our drinking water.

- **Toxicity to living organisms**

- All pesticides are toxic at some level, but each varies in their toxicity to humans and other animals. Organophosphates, including diazinon and chlorpyrifos, are insecticides that contain phosphorus; they are nerve poisons and act by inhibiting important enzymes in the nervous system in animals. Pyrethroids are another class of insecticides that are not as toxic to humans and other mammals, but are quite toxic to fish and invertebrates. Both the organophosphates and pyrethroids pose serious threats to aquatic invertebrates in California waterways.



NPDES requirements for IPM

- C.9 Pesticide Toxicity Control:
 - Implement a pesticide toxicity control program that addresses use of pesticides within your municipality that threatens water quality
 - C.9.a Adopt an IPM Policy or Ordinance
 - C.9.b Implement IPM Policy or Ordinance
 - Establish **written** SOPs for pesticide use and report trends in pesticide use
 - C.9.c Train Municipal Employees (every three years)
 - C.9.d Require Contractors to Implement IPM with contracts including IPM or through IPM certification.



- C.9.e Track and Participate in Relevant Regulatory Processes
- C.9.f Interface with County Ag Commissioners (report improper pesticide usage)
- C.9.g Evaluate Implementation of Source Control Actions Relating to Pesticides
- C.9.h Public Outreach (point of purchase, residents, and PCOs)

IPM Policy

IPM Policy

It is the purpose and intent of this IPM Policy to ensure that the [insert municipality] departments and all those who apply pesticides to property owned and/or managed by the [insert municipality] utilize integrated pest management (IPM) practices, eliminate or reduce pesticide applications on public-owned and/or [insert municipality] managed property to the maximum extent feasible and as required by State and Regional Stormwater regulation to take all reasonable measures to ensure that pest control activities do not threaten environmental and human health.

The [insert municipality], in carrying out its pest management operations, shall focus on long term prevention or suppression of pest problems with minimum impact on human health, non-target organisms, and the environment.

The goal of the [insert municipality] is to reduce its use of pesticide use and ultimately replace all pesticides with non-toxic methods of controlling pests on [insert municipality] property. The [insert municipality] recognizes that pesticides are potentially hazardous to human health and the environment, and non-pesticide alternatives will be considered over toxic pesticides on [insert municipality] property. The [insert municipality] will develop an IPM program that will outline all the IPM activities that will be implemented to ensure that less toxic methods are used to control pests on [insert municipality] property. The [insert municipality] will include the following elements in their [insert municipality] IPM program:

1. Establish inspection procedures to monitor pest population levels, perform thorough field assessments of each pest problem, and keep records of such monitoring. Monitoring should be performed by designated personnel or contractor knowledgeable in IPM methods.
2. Establish for each pest an IPM implementation plan which evaluates the biological, aesthetic, and economic loss each site can tolerate and set pest population levels at which corrective action should be taken to ensure that pests do not exceed tolerance levels.
3. Determine corrective actions when an action threshold is reached. Review and consider all available non-chemical options for acceptability and feasibility. Consider the use of chemicals only as a last resort. Select and use chemicals only in accordance with State, Federal and local law and in accordance to the pesticide selection method outlined in the [insert municipality] IPM program document.

4. Identify and evaluate conditions that encourage pest problems. Modify pest ecosystems to reduce food and living space through physical and cultural practices.
5. Determine most effective treatment time, based on pest biology and other variables identified during the above mentioned inspection and monitoring efforts during the field assessments of each pest problem.
6. Establish and maintain an accurate record-keeping system to catalog monitoring information and to document and evaluate the effectiveness of pest management procedures.
7. Evaluate the effectiveness of the IPM program and make adjustments as needed.
8. Conduct an ongoing education program for [insert municipality] staff and members of the public.
9. Designate an IPM Coordinator and Committee to oversee that the IPM program is implemented correctly and appropriately to uphold this document's goals and objectives for IPM practices.
10. Hire pesticide applicators that incorporate IPM implementation in their services and bid them to all [insert municipality] IPM polices outlined in the [insert municipality] IPM program document.

IPM Program

- Goals and Purpose
- IPM Policy
- Roles and Responsibilities (may include an IPM coordinator and/or a IPM committee)
- Implementation Practices
 - Pesticide selection and approval
 - Establishing pesticide free zones (for sensitive public areas and creeks)
 - Pesticide applicator selection and approval process (for hiring a contractor)
 - IPM application (who applies and where)
 - Education and training
 - Notification for pesticide applications
 - Record keeping/program review
 - Outreach to the public

IPM Philosophy

- IPM is not a single pest control method but, rather, a series of pest management evaluations, decisions and controls using a tiered approach (using the least toxic pest control method first then using different methods as needed).
- Methods to manage pests in an IPM program must have the lowest toxicity to people, animals, and plants.
- IPM programs use current, comprehensive information on the life cycles of pests and their interaction with the environment.
- **NO one method is going to work for every pest situation**

IPM Tiered Approach

Use a step method:

1. Set Action Thresholds

Before taking any pest control action, set an action threshold, a point at which pest populations or environmental conditions indicate that pest control action must be taken. Sighting a single pest does not always mean control is needed. The level at which pests will either become an annoyance, problem, or economic threat is critical to guide future pest control decisions.

2. Monitor and Identify Pests

Not all insects, weeds, and other living organisms require control. Many organisms are innocuous, and some are even beneficial. IPM programs work to monitor pests and identify them accurately, so that appropriate control decisions can be made in conjunction with action thresholds. This monitoring and identification removes the possibility that pesticides will be used when they are not really needed or that the wrong kind of pesticide will be used.

3. Prevention

The first line of pest control is prevention by managing the exterior or indoor space to prevent pests from becoming a threat. These control methods can be very effective and cost-efficient and present little to no risk to people or the environment.

2. Control

Once monitoring, identification, and action thresholds indicate that pest control is required, and preventive methods are no longer effective or available, then evaluates the proper control method both for effectiveness and risk. Effective, reduced action methods are chosen first, including highly targeted chemicals, such as pheromones to disrupt pest mating, or mechanical control, such as trapping. If further monitoring, identifications and action thresholds indicate that reduced action methods are not working, then additional pest control methods would be employed, such as targeted spraying of pesticides. Broadcast spraying of non-specific pesticides is a last resort.

Pesticide Tiered Approach

- Approved use
 - Baits/traps/caulking/crack sealants/borates, silicates, diatomaceous earth/soap/natural products like oils/mechanical methods/biological controls/physical barriers
- Limited use
 - Pesticides not classified as banned and approved for use as a last resort
- Banned use
 - Carcinogens/cause birth defects/hormone inhibitors/banned by US EPA

Structural IPM



Pest Identification



Pests of Buildings

Pests that Sting, Bite, or Injure:	Wood-destroying, Food, Fabric, and Nuisance Pests:	Vertebrate Pests –Birds, Mammals, and Reptiles
Ants Bed bugs Bees Conenose bugs Fleas Flies Head Lice Hobo spider Lyme disease Mosquitoes Poison Oak Recluse spiders Scorpions Ticks Wasps Widow spiders	Ants Bees Beetles Boxelder Bug Carpenter Bees Centipedes Cockroaches Earwigs Flies Head lice Horntails Millipedes Moths Silverfish Termites Wasps Worms	Bats California ground squirrel Cliff Swallows Deer Gophers House Mouse Lizards Moles Opossum Pocket Gophers Rabbits Raccoons Rattlesnakes Rats Skunks Tree squirrels Voles Woodpeckers

Pest Biology

- Life cycle
- Breeding habits
- Favored habitats
- Behavior
- Pest status



Pest Biology

The screenshot shows the UC IPM Online website interface. The header includes the University of California logo and the text "UC IPM Online STATEWIDE INTEGRATED PEST MANAGEMENT PROGRAM". The main content area is titled "How to Manage Pests Pests in Homes, Gardens, Landscapes, and Turf" and features a search box. A sidebar on the left contains navigation links for various pest categories and resources. Below the search section, there is a "What are Pest Notes?" section and a table of publications.

UC IPM Home > [Homes, Gardens, Landscapes, and Turf](#) > List of Pest Notes

Search

How to Manage Pests

Home & landscape
Agriculture
Natural environments
Exotic & invasive

Weather data & products
Degree-days
Interactive tools & models

Identification Galleries

Natural enemies
Weeds

Educational Resources

Publications & more
Workshops and events
Training programs
Pesticide information

Research and IPM

Grants programs
Funded-project results

- What's new
- Announcements
- Subscribe (RSS)
- Site index
- Help
- Acknowledgments
- UC ANR: more topics

How to Manage Pests
Pests in Homes, Gardens, Landscapes, and Turf

Search home and garden:

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What are Pest Notes?
Pest Notes are peer-reviewed publications about specific pests or pest management topics directed at California's home and landscape audiences. Pest Notes are available in either a web (HTML) version or a PDF version. The web versions include color photographs and links to other pages on our web site. The PDF versions have been designed specifically to print and photocopy well in black and white, and usually have line drawings instead of color photographs. Although they look substantially different from one another, the text is identical in both versions.

Select a title below to download the PDF version of the publication or to go to the HTML versions.

Can't find what you want? Try the search box above. Many additional pests are covered in other parts of our Web site.

Printer-friendly list: [Flyer](#) (328 KB, PDF)

On this page

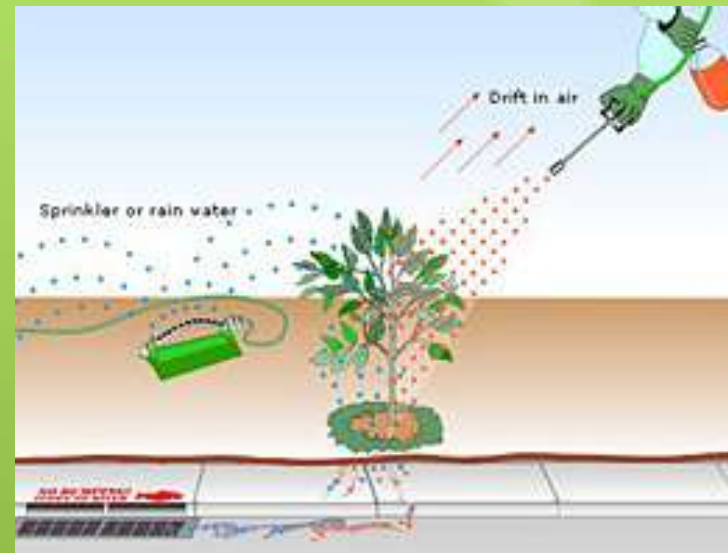
- [Birds, mammals, and reptiles](#)
- [Insects, mites, mollusks, and nematodes](#)
- [Plant diseases](#)
- [Weeds](#)
- [Management methods](#)
- [Miscellaneous](#)

HTML	PDF	Publication	Published	Pages	Size
Birds, mammals, and reptiles—vertebrate pests					
Bats	Bats	74150	October 2009	5	1 MB
Birds on Tree Fruits and Vines	Birds on Tree Fruits and Vines	74152	September 2010	4	1 MB
Cliff Swallows	Cliff Swallows	7482	July 2005	4	296 KB
Coyote	Coyote	74135	March 2007	7	488 KB
Deer	Deer	74117	June 2004	3	312 KB
Ground Squirrel	Ground Squirrel	7438	February 2010	5	1.4 MB
House Mouse	House Mouse	7483	November 2006	5	300 KB
Lizards	Lizards	74120	October 2004	4	327 KB
Moles	Moles	74115	May 2004	3	510 KB
Opossum	Opossum	74123	April 2005	4	589 KB
Pocket Gophers	Pocket Gophers	7433	September 2009	5	768 KB
Rabbits	Rabbits	7417	April 2010	5	1.2 MB

The image features a solid green gradient background. Numerous butterfly silhouettes are scattered across the frame, primarily concentrated along the left and right edges. The butterflies vary in size and orientation, creating a decorative border effect. The word "Break" is centered in the middle of the image in a dark, sans-serif font.

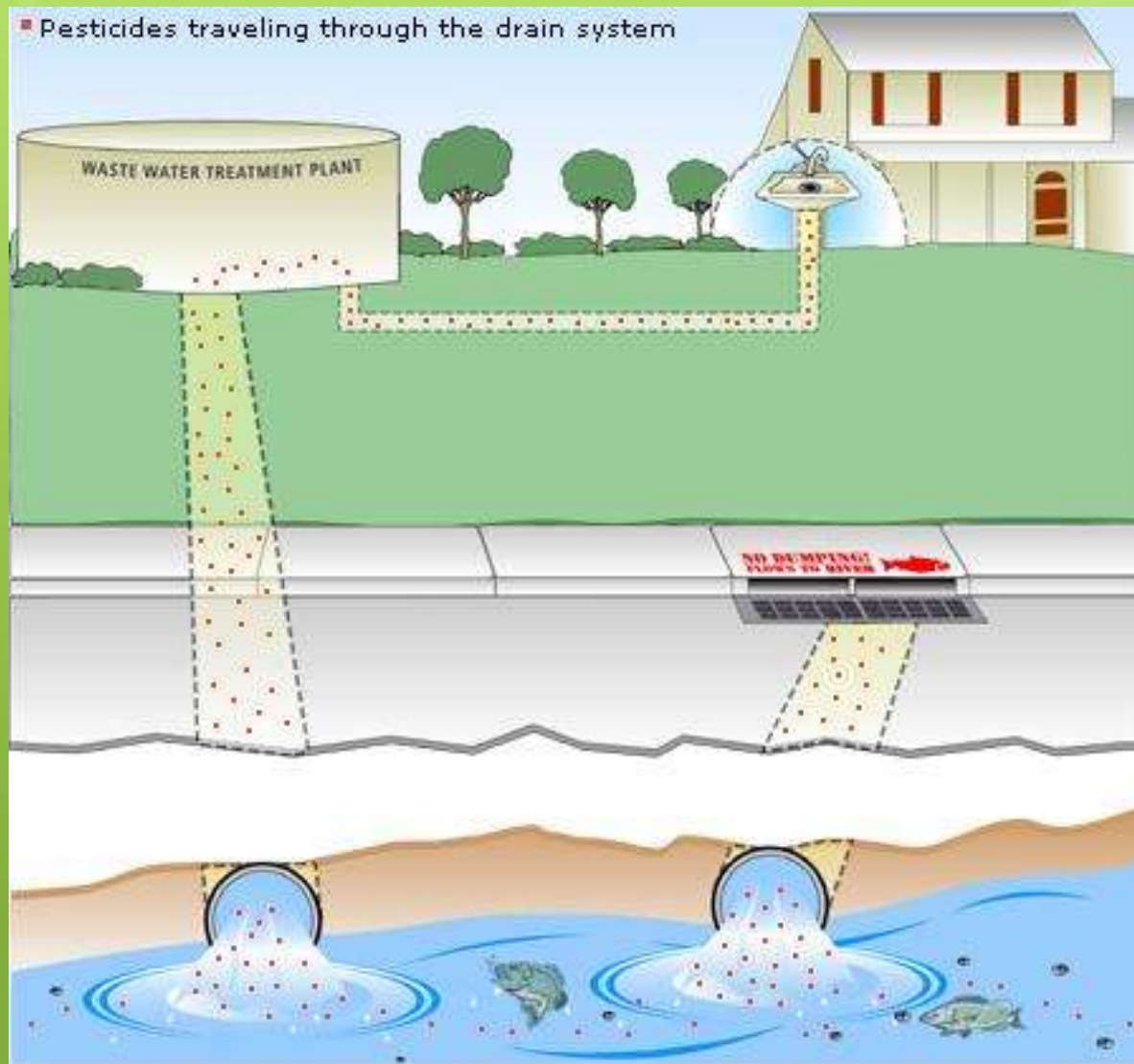
Break

Structural IPM from a Stormwater Perspective



- Structural IPM under a stormwater program will include any and all pesticide use in and around buildings that has the potential to enter the storm drain system (from illicit discharge and/or from stormwater runoff)

How pesticides enter the storm drain system:



MRP Pesticide Reduction Requirements

- Stormwater programs are not solely responsible for achieving TMDL compliance and urban runoff allocations for pesticide related toxicity for urban creeks.
- Stormwater programs are required under the Municipal Regional Permit (MRP) to implement IPM, show trends in pesticide use, and provide reasons for increases in pesticide use.

Pesticides that Threaten Stormwater Runoff

- Organophosphorous pesticides (chlorpyrifos, diazinon, and malathion)
- Pyrethroids (bifenthrin, cyfluthrin, beta-cyfluthrin, cypermethrin, deltamethrin, esfenvalerate, lambda-cyhalothrin, permethrin, and tralomethrin)
- Carbamates (e.g., carbaryl)
- Fipronil

Known problem pesticides: Pyrethroids and Organophosphates

- Pyrethroids are common residential insecticides, found in products for ant control, home lawn, garden and landscape care, as well as in structural pest control products. Common pyrethroid active ingredients in home use products include bifenthrin, cypermethrin, permethrin, and cyfluthrin. Pyrethroids mimic the mode of action of the plant-derived pesticide pyrethrin, but are much more toxic and persistent in the environment. They attach to soil particles and are washed into waterways on sediment.
- Organophosphate pesticides containing diazinon and chlorpyrifos were widely used in the 1990s but were withdrawn from the market for home use in the early 2000s because of risks to children. These materials are highly soluble in water and have been found in California creeks at levels toxic to aquatic invertebrates.

IPM Example:
German cockroach
Blatella germanica



German cockroach

- Most prolific of all cockroaches
- 30 to 40 eggs per ootheca
- 2 month development time
- Found only indoors
- Public health threat
- Germ transport
- Allergen production



German Cockroach Biology

- Egg case, nymph, adult stages
- Maximum growth rate at 33°C (91°F), preferred temps 75° to 90°F
- Spend most time in cracks (1 to 4 mm-wide)
- Found mostly in close proximity to food, water and harborage



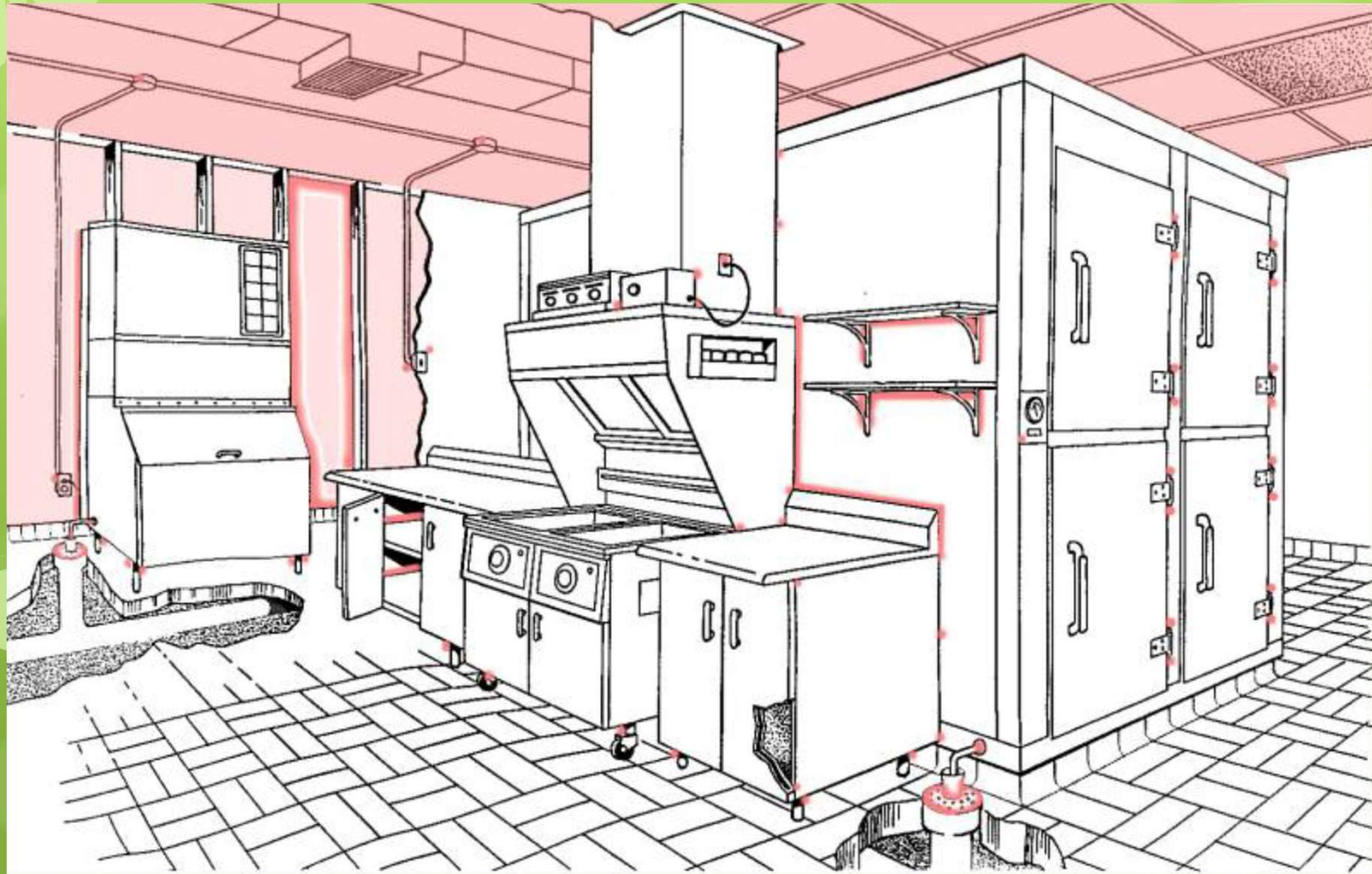
Example thresholds for German Cockroach

Average # cockroaches per zone	Action
0	None
1-2	Bait Stations; check sanitation
3-6	Spot treat; add or replace baits; review sanitation
7-15	Thorough bait and spot treat applications; revisit in two weeks
15+	Close facility; conduct thorough inspection and sanitation improvement; increase baits in infested

Proper placement of sticky trap



Treatment areas for German Cockroach



Effective controls

- Caulk and seal harborages
- Eliminate, reduce, separate water and food resources
- Bait and dust harborage areas identified by sticky traps
- Apply residual sprays to harborages
- Monitor and test different methods to determine if pesticide treatment is necessary and when and where to apply.

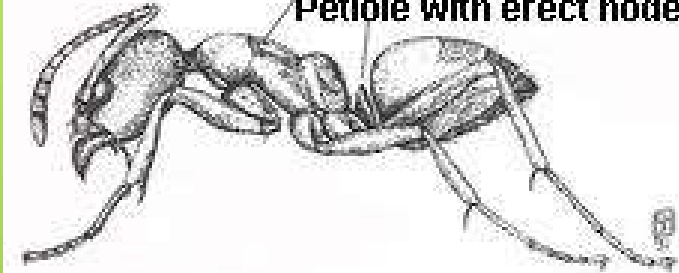
IPM Example: Argentine Ant *Linepithema humile*



Argentine Ant

Thorax uneven in shape

Petiole with erect node



- Most common ant occurring in and around the house and garden
- Workers are all the same size, small, 1/8-inch long
- Uniformly dull brown
- Petiole with 1 erect node
- Thorax uneven in shape when viewed from side
- Musty odor emitted when crushed

Argentine Ant Biology

- Outdoors in soil, under wood, slabs, debris, mulch, or in branches and cavities of trees and shrubs
- Shallow, 1- to 2-inch deep mounds in open, often disturbed habitats, either moist or dry
- Millions of ants per colony with multiple queens and many subcolonies



Behavior

- Feed on sweets, fresh fruit, and buds of some plants
- Tend honeydew-producing species
- Forage for sweets and oils in homes
- Travel rapidly in distinctive trails along sidewalks, up sides of buildings, along branches of trees and shrubs, along baseboards, and under edges of carpets
- Colonies may split in spring and summer when queen and workers move to new site; not antagonistic toward each other

Prevention



- Manage honeydew-producing insects such as aphids and soft scales on trees and shrubs near the house. Once in trees, ants protect these pests from natural enemies, making many pest problems worse.
- Remove trees and shrubs that consistently host ants and are adjacent to houses. Honeydew producers provide a great source of food for ants, and ant colonies may enlarge as a result and frequently invade nearby structures.
- Band tree trunks with sticky substances such as Tanglefoot.
- Trim branches to keep them from touching structures or plants so that ants are forced to climb up the trunk through the Tanglefoot.
- Protect young or sensitive trees from possible injury by wrapping the trunk with a collar of heavy paper, duct tape, or fabric tree wrap and coating this with the sticky material.
- Check the sticky material every 1 to 2 weeks and stir with a stick to prevent it from getting clogged with debris that allows ants to cross.

Effective controls

- Sponge invaders with soapy water as soon as you see them.
- Plug up ant entryways with caulk or petroleum jelly.
- Remove infested potted plants.
- Clean up food sources such as sugary spills, pet food, or garbage.
- Rely on baits to control the ant colony.
- Indoor sprays are not usually necessary.
- Monitor and test different methods to determine if pesticide treatment is necessary and when and where to apply.

Take Home Message

- Urban runoff is the leading source of pollution to the S.F. Bay
- All stormwater programs are required to have IPM programs/policies and to implement those program/policies
- All pesticide use has to be tracked to show trends
- IPM Programs or SOP need to be written and contain a tiered approach to pesticide use with an approved/limited/banned classification of pesticide use.
- IPM is a long-term, common-sense program of managing pests with the least toxic effect on people and the environment.
- Come see me in three years.