

# URBAN TURF AND LANDSCAPE INTEGRATED PEST MANAGEMENT

## ALTERNATIVES TO PESTICIDE AND SYNTHETIC FERTILIZERS IN LOW IMPACT DEVELOPMENT RESIDENTIAL COMMUNITIES

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# Turf and Landscapes

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*“It is almost always less expensive to keep water clean than it is to clean it up.”*

*Basic landscape design, implementation and maintenance can be used to eliminate pesticide and synthetic fertilizer use and avoid expensive mitigation costs.*

# Build Them Out – A Stitch in Time Saves Nine

## Sustainable Landscaping – Back to Basics

Landscape Inventory

Maintenance equipments

Maintenance

Design for Maintenance

Design

Implementation

Adaptive management, monitoring and evaluation



# Landscape Design

## *No Place for Non-Functional Turf*



# Life-Cycle Costing Conventional versus Sustainable Resource Conserving Landscape Projects



Source: Tom Ash, Horticulturalist, Irvine Ranch Water District  
Landscape Architecture Magazine, September, 1995

## Human Health, Environmental Benefits and Savings

Water Conservation 50-90%

Energy Conservation Over 60%

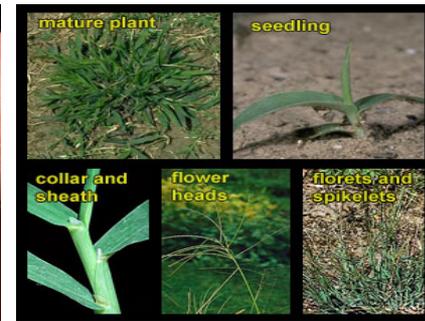
Pollution Prevention

Beneficial Wildlife

# Landscape Inventory – Working from Outside In



	Insects	Disease	Weeds	Vertebrate pest	Abiotic Factors
Lawn					
Landscape					





# Repair Irrigation Promptly - A stitch in time saves nine!



# Implement Pest Zoning, Prioritization and Ranking

## Residential Community A

Pest by Community Type	Classification or Species	Acres	Long-Term Strategy	Short-Term Strategy	Prioritization Number	Budget
Weed	Bermudagrass					
	Nutsedge					
	Broadleaf plantain					
	Perennial weeds in turf					
	Broadleaf weeds in landscapes					

# Alternatives to Pesticides and Synthetic Fertilizers

## Residential Community A

Long Term Strategy	Design improvements	Renovate	Patch	Overseed	Dethatch	Aerate	Fertilize	Irrigation improvements	Bio-Controls	Mechanical	Monitoring and Evaluation
Lawn											
Landscape											
Water body											



**Design**



**Implementation**



**Plant Selection**



**Maintenance**

# Establish moratorium on use of pesticides

Park: Guadalupe River Park

Pesticide Group	Pesticide	Park/Area	Monitoring Year 1, 2, 3
Pre-emergent 			
Post-emergent 			
Synthetic Pyrethroids 			
Bio-Pesticides 			
Reduced Risk Pesticides 			

*“If pesticides are needed for short term, limit inventory by selecting a few”*

# A stitch in time saves nine!



# A stitch in time saves nine!



# A stitch in time saves nine!



# Best Practices

## Pocket Gophers

*Thomomys* species



Associated conditions	herbivorous and feed on a wide variety of vegetation but generally prefer herbaceous plants, shrubs, and trees
Cultural management	Reducing gopher food sources using either chemical or mechanical methods can decrease the attractiveness of lawns and gardens to gophers. If feasible, remove weedy areas adjacent to yards and gardens to create a buffer strip of unsuitable habitat.

**A stitch in time saves nine!**

# Best Practices

## California Ground Squirrels

*Spermophilus beecheyi*



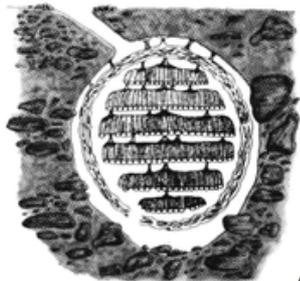
A stitch in time saves nine!



# Best Practices

## Yellow Jacket

*Vespula* spp.



A stitch in time saves nine!

# Best Practices

## Aphids



Woolly apple aphid



Ornamental plum  
infested with waterlily  
aphids



Curling and distortion of  
leaves due to high black  
cherry aphid populations



Leaf curling and distortion  
caused by rosy apple aphid



Sooty mold fungus on leaves

# A stitch in time saves nine!

# Invertebrate Pests

## Biological – Aphids



Syrphid fly



Ladybug

A stitch in time saves nine!



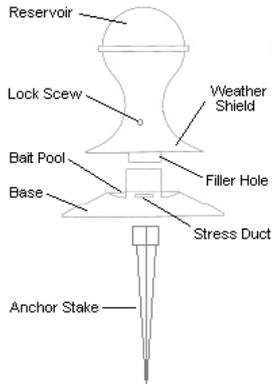
Green lacewings



Fungal pathogen

# Invertebrate Pests

## Physical and Chemical – Ants and Aphids



UC Statewide IPM Project  
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## Potted Plant Insects

# Biological Control



- Bacillus thuringiensis subspecies israelensis (Bti) (Gnatrol)
- Nematode: Steinernerema feltiae

A stitch in time saves nine!

STRUCTURAL  
INTEGRATED PEST MANAGEMENT  
ALTERNATIVES TO PESTICIDES  
LOW IMPACT DEVELOPMENT  
RESIDENTIAL COMMUNITIES

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# What is Structural IPM?



In the context of structural pest control, the California Structural Pest Control Board (SPCB) has adopted the following definition per section 1984 of Division 19 of Title 16 of the California Code of Regulations: “a) *Structural integrated pest management (IPM) means a **systematic decision making approach** to managing pests, which focuses on **long-term prevention** or **suppression** with minimal impact on human health, property, the environment, and non-target organisms. Structural IPM incorporates all reasonable measures to prevent pest problems by properly identifying pests, monitoring population dynamics, and using **behavioral, physical, biological or chemical** pest population control measures **to reduce pests to acceptable levels**. If a pesticide application or other intervention is determined to be necessary, the selection and application of the intervention shall be performed in a manner that **minimizes risk to people, property, the environment, and on-target organisms**, while providing effective pest management.*

b) *For the purposes of this section, intervention means an action, device, product or practice that is intended for the prevention, control, management, elimination or abatement of a pest.”*

# Avoid Do-It-Yourself Pest Control

Promote and Hire qualified professionals.

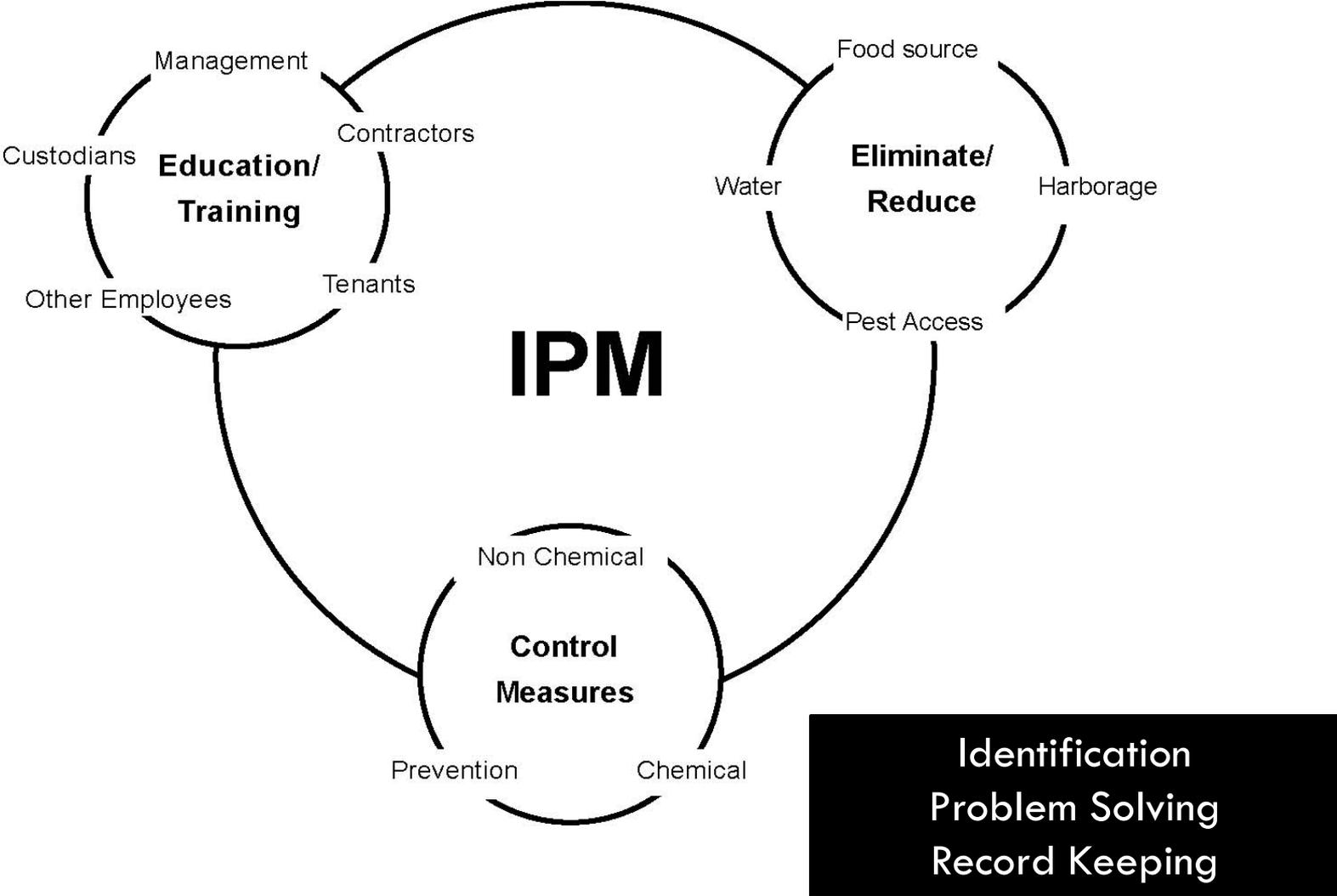


In California only a licensed (by CA Structural Pest Control Board) pest control service provider (Branch 2 and Branch 3) can provide structural IPM services. Their licenses company or individual licenses can be looked by business name or registration number or by employee name or license number.

Branch 2 license holder is required to undergo a minimum of forty hours of training and experience, twenty hours of which are actual field work. The minimum hours must include training and experience in IPM and the impact of structural pest control services on water quality.

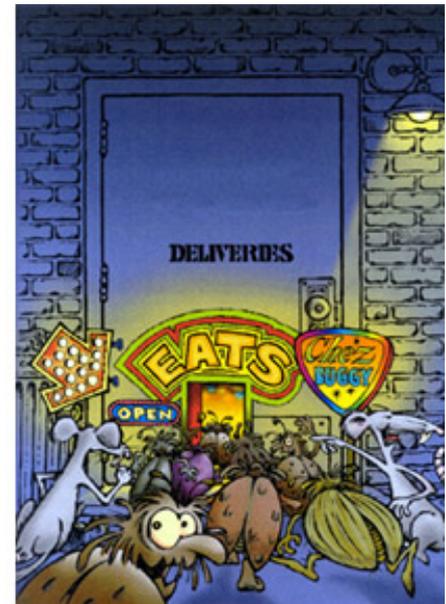
Branch 3 license holder is required to undergo a minimum of hundred hours of training and experience, eighty hours of which are actual field work. The minimum hours must include training and experience in IPM and the impact of structural pest control services on water quality.

# Provide Training to Facilities Management Group



# Design to Build Them Out

In the short term, IPM can be more costly because labor to perform **inspections and monitoring** may be more expensive than labor to apply pesticides. It may **cost more** to make necessary repairs and vermin proofing. But in the long term, IPM can be **more cost effective** as it aims to eliminate the current problem and prevent future problems.



# Search Out The Source

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Inspection

## Visual Search out the Source (SOS)

- ✓ Pest or evidence
- ✓ Sanitation
- ✓ Sanitation by Design
- ✓ Housekeeping
- ✓ Maintenance
- ✓ Maintenance by Design

Leave monitoring devices



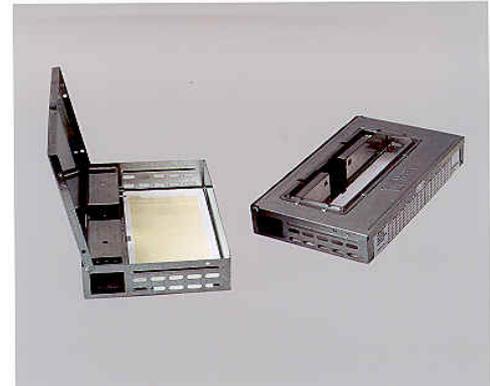
**Develop systems for inspecting structural integrity, examining incoming goods and services, suppliers to ensure that pests are stopped at the point of origin.**

# Digital Monitoring

Inspection – Sanitation, Housekeeping, Maintenance



# Monitoring Devices



Per CA Structural Pest Control Board Regulations, when a covered or uncovered bait station is used for any rodenticide the bait station shall be adequately marked with signal work or symbols required on the original rodenticide or avicide label, the generic name of the pesticide, and the name, address and telephone number of the structural pest control company

# Monitoring Devices



Flour Beetle



Indianmeal moth



# Monitoring Devices



Wasp Trap



Fly Trap



Fly Trap



Roach Trap



Flea Trap



Fly Trap

Monitoring with traps is an essential element in the pest management of yellowjackets. In addition to locating areas of high foraging activity, traps help quantify the foraging activity and establish when baiting programs should begin.

# Monitoring Devices



Fly Trap



Fly Trap



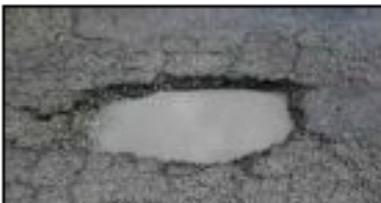
Fruit Fly Trap



Insect Light (UV) Trap

# Eliminate Conditions Conducive to Pest Harborage, Breeding and Survival

## Inspection – Sanitation, Housekeeping, Maintenance



Pest Conducive Conditions Include Gaps under doors, Poor Sanitation, Vegetation touching with buildings

# Eliminate Conditions Conducive to Pest Harborage, Breeding and Survival

## Inspection –Sanitation, Housekeeping, Maintenance



Sanitation, Structural or environmental conditions attractive to pests are known as pest conducive conditions

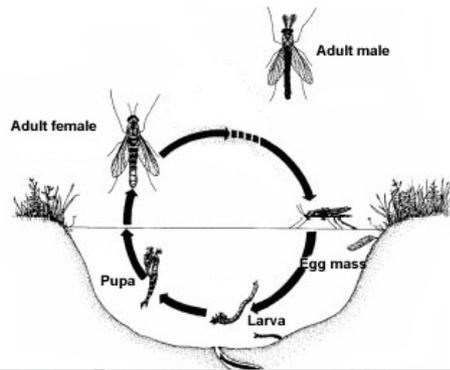
# Educate Residents

## Inspection

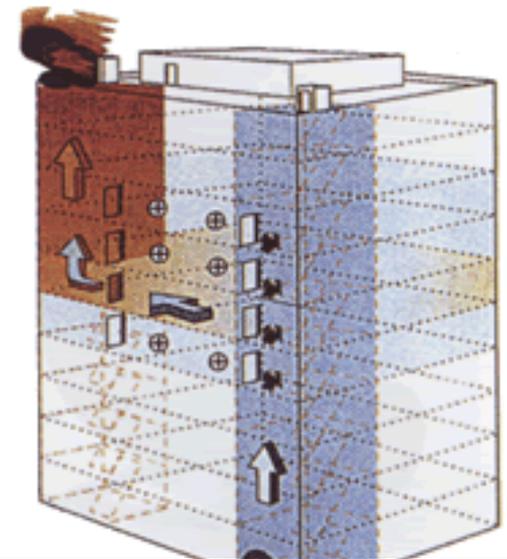
Appliances	Mice, Cockroaches
Books/Papers	Cockroaches, Silverfish, firebrats
Cardboard containers	Cockroaches, silverfish, firebrats, stored product pests moths, spider, mice, rats (occasionally)
Carpet/rugs	Carpet beetles, fleas, cockroaches, clothes moths
Clothing	Clothes moths, lice, fleas, carpet beetles
Cut flowers	Carpet beetles, spiders

# Implement Low Impact Controls

## Case Study - Non-Biting Midges



- Nutrient Reduction
- Winter Draw Down
- Diversion of Adults
- Electrocutation Traps
- Lighting Issues
- Larvicides: Bti, Methoprene
- Air filters
- Positive Air Flow



Landscape management has a direct effect upon pest occurrence inside buildings because often landscape pests find their way into buildings

# Implement Low Impact Controls

## Case Study – Flies



# Implement Low Impact Controls

## Case Study – Stink bugs



# Implement Low Impact Controls

## Case Study – Wasps and Yellow Jackets



# Implement Low Impact Controls

## Case Study – Ground Nesting Yellowjackets



Limited field trials showed that Fipronil mixed with ground chicken baits eliminated German yellowjacket populations **within hours** in small areas. Subsequent monitoring in the following weeks showed **no resurgence** of German yellowjacket populations in treated areas indicating that a very short experimental exposure of fipronil was sufficient to destroy the colony completely.

**Effective baiting reduced the number of yellowjackets over a wide area.** Depending on the number of nests and foragers and the native food supply, fipronil bait was **effective over a distance of 500 to 600 feet, about 0.21 miles.**



UC, Riverside  
Donald A. Reiersen ,  
Michael Rust

Yellow jackets stings may life threatening to sensitive individuals

# Implement Low Impact Controls

## Case Study – Ground Nesting Yellowjackets



**Contech trap captured 62% compared to 38% with the UCR trap. The Contech flexible bag trap may be a useful monitoring tool for determining when baiting should begin and for evaluating the efficacy of baiting treatments. Sterling and other kinds of dry traps are effective at attracting and capturing yellowjackets, but live trapped wasps tend to dismember others in the trap. This makes it difficult to count the number trapped as is done for monitoring purposes. Depending on price and availability, the PMP may wish to consider the Contech trap.**

UC, Riverside  
Donald A. Reiersen ,  
Michael Rust

Yellow jackets stings may life threatening to sensitive individuals

# Implement Low Impact Controls

## Case Study – Bedbugs



Process involves heating unit over 130 degree F using thermal heater or steaming over 120 degree F preferably with dry vapor steamer



# Implement Low Impact Controls

## Case Study – Book Lice (Psocids)



# Implement Low Impact Controls

## Case Study – Cockroaches



To address effective management of Oriental cockroaches in a hospital environment may require to inspect behind steamers in the kitchen, steam pipe tunnels under the building, irrigation valve boxes in the landscapes around the building

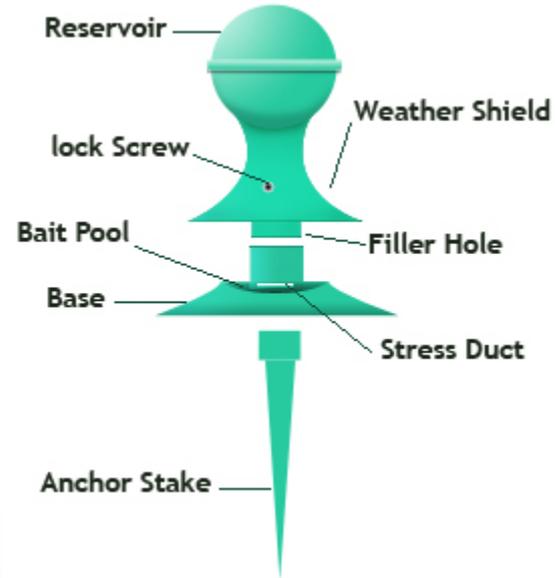
# Implement Low Impact Controls

## Case Study – Rats



# Implement Low Impact Controls

## Case Study – Ants



Less insecticide and more target specific applications can be used effectively to control Argentine ants outdoors

# Implement Low Impact Controls

## Case Study – Ants



# Implement Low Impact Controls

## Case Study – Fungus Gnats



- *Bacillus thuringiensis* subspecies *israelensis* (Bti) (Gnatrol)
- Nematode: *Steinerema feltiae*

# Implement Low Impact Controls

## Case Study – Indian Meal Moths and Drug Store Beetles



# Implement Low Impact Controls

## Case Study – Drywood Termites



Process involves heating all wood in the structure to a minimum of 120°F and holding this temperature for at least 33 minutes.

You may search the CA Structural Pest Control Board's wood destroying organism system to see if specific property has been inspected within last two years by checking Board's Wood Destroying Organism System Inspection database or by sending mail request for copy of inspection or completion reports

# Impact Low Impact Controls

## Case Study – Subterranean Termites

Baits for subterranean termites are commercially available in California. Several bait products (e.g., Sentricon with hexaflumuron and FirstLine with sulfluramid) are available for professional use only.

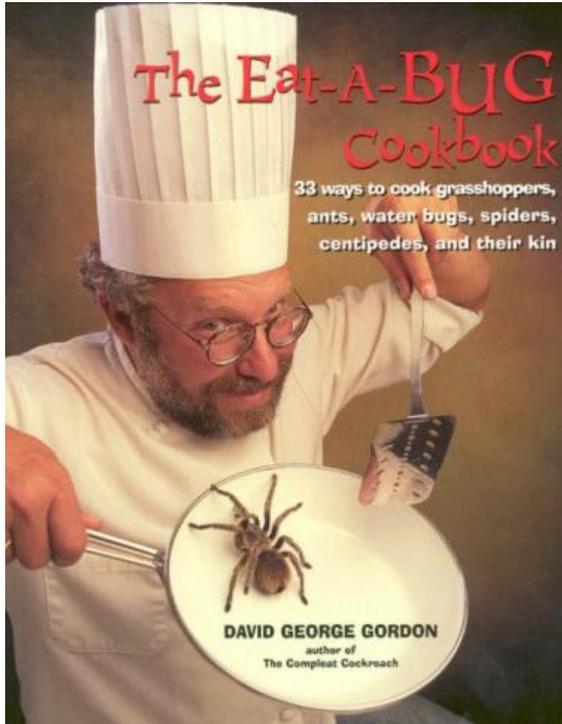
There is also an over-the-counter product (Terminate with sulfluramid) available in retail stores. Currently, baits are only available for subterranean termites.

Because subterranean termites in California vary in their foraging and in the times that they will take baits, the **placement of bait stations** and the **time of installation** is a crucial component in a **successful baiting program**. Be sure to read and follow all the label directions for the product you use. Once a termite infestation is controlled, it is essential that the bait stations continue to be monitored monthly. **Spring is an especially critical time to detect invasion by new colonies.**

Per CA Structural Pest Control Board Regulations, when a termite baiting system contract is terminated, any toxicant used to modify, control, change or eliminate the behavior and existence of termites excluding liquid termiticide, shall be removed from the property

# Practice IPM

## Case Study – Eat-A-Bug



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