

# STRUCTURAL INTEGRATED PEST MANAGEMENT

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EPA Region 10 IPM & Bed Bug Coordinator  
Enforcement and Compliance Assistance Division  
Air and Toxics Enforcement Section







# EPA REGION 10

Alaska, Washington, Oregon and Idaho



- My current responsibilities:
  - IPM Coordinator
  - Bed Bug Coordinator
  - Pesticide Applicator Certification and Training Coordinator
  - Worker Protection Standard Coordinator
  - WSDA Cooperative Agreement Project Officer
  - Indian Health Service Project Officer
  - Pesticide Enforcement



# EPA IPM STRATEGIC PLAN

Office of Chemical Safety and Pollution Prevention

Office of Pesticide Programs

Biopesticides and Pollution Prevention Division

- 1) Public Health
- 2) Agriculture
- 3) Structures

<https://www.epa.gov/aboutepa/epa-organization-chart>





# TOPICS

- IPM Overview
- Developing IPM Policy and Plans
- IPM Implementation
- Resources

*“IPM is a common-sense, sustainable approach. Rather than relying on quick-fixes that simply suppress pests, IPM poses the question, ‘Why are these particular pests a problem at this point in time in this particular environment?’ This approach provides more sustainable results.”*

—Dawn Gouge, Ph.D., Associate Professor and Associate Specialist, Urban Entomology, The University of Arizona



# STRUCTURAL IPM, WHAT DO WE MEAN?

*A sustainable approach to managing pests by combining biological, cultural, physical and chemical tools in a way that minimizes economic, health and environmental risks*

*-Food Quality Protection Act (7 USC 136r-1) Sec. 303*

- Common sense strategies to reduce sources of food, water, and shelter for pests in buildings and grounds
- Safer and healthier environment by managing pests and reducing human exposure to pesticides



# BENEFITS OF IPM

- Reduce exposure to pests and pesticides
- Reduce allergies and asthma
  - Rodents, cockroaches, and dust mites are often present in buildings
- Cost savings
  - Upfront costs, but costs are lower over time
  - Also financial benefits unrelated to pests: weatherization of buildings saves energy and reduces moisture

# COMPONENTS OF AN IPM PROGRAM



- Designate an **IPM Coordinator**
- **Monitor** for pest activity and pest conducive conditions
- **Sanitation, exclusion, and habitat modification**
- **Action thresholds** for pests
  - how many nuisance ants before we take action?
- Careful consideration of all the pest management **options** available
  - preference for low-risk options
- **Education** for all staff
- Keep **records** and **evaluate** your program



# THE IPM CONTINUUM



No monitoring,  
primary control is  
pesticide treatment

Monitoring, multiple IPM  
preventative practices, threshold-  
based action

No IPM

High IPM

**You are probably already doing IPM**

- Are you monitoring for pest problems and pest conducive conditions?
- Are you implementing sanitation, exclusion, and habitat modification techniques to prevent pest infestations?



# WHO IS INVOLVED WITH IPM?

- Developers
- Building Managers: Operations
- Building Occupants
- Building Maintenance
- Cleaning Staff
- Landscapers
- Pest Management Professionals





## Lesson 3. Implementation of IPM Approach

### Topic 2. IPM Approach

MENU

GLOSSARY

RESOURCES

NOTES

### The IPM Pyramid

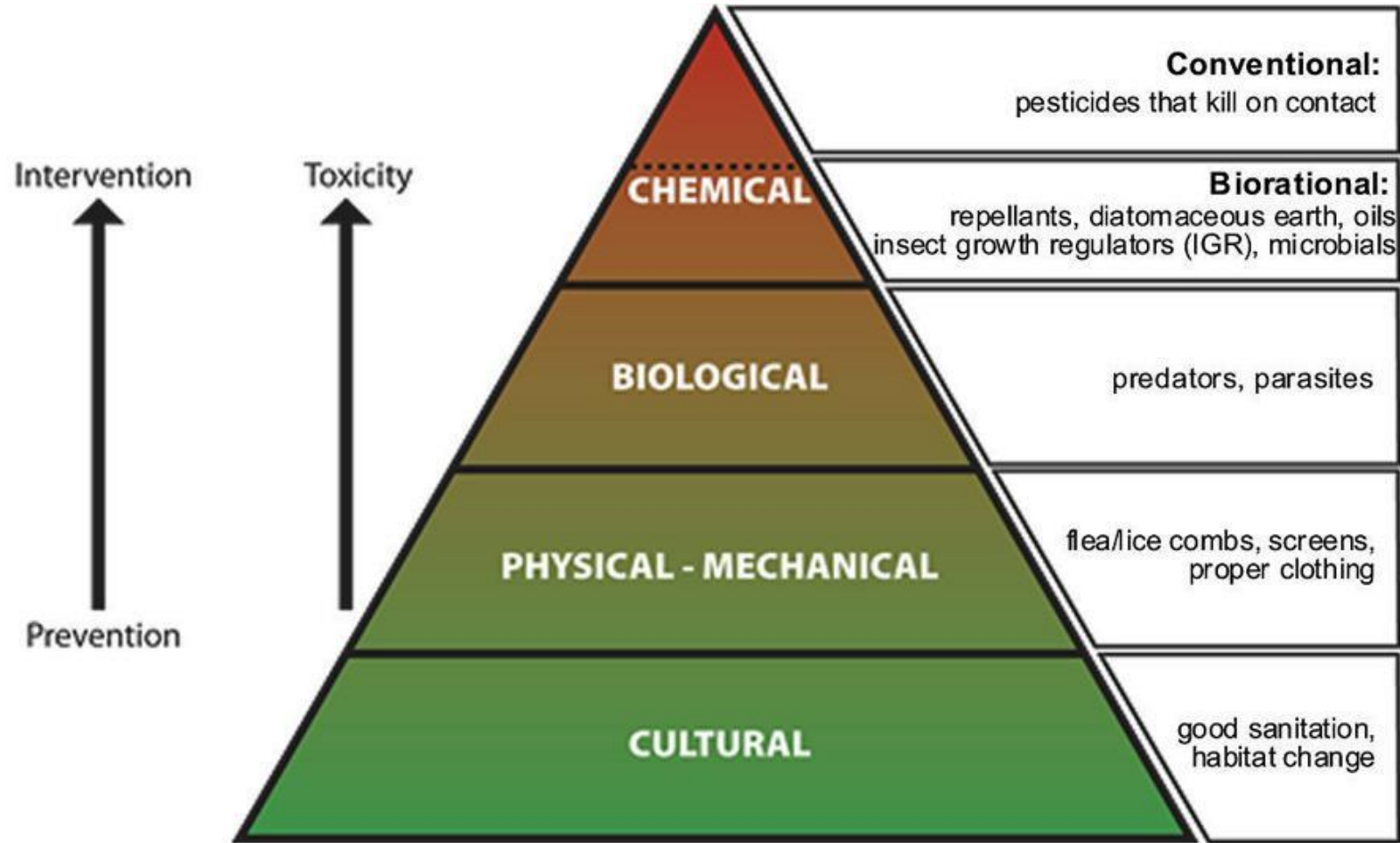
As illustrated in the *IPM Basics for Environmental Health Professionals* course, think about the IPM approach as a pyramid.

Start with the base and work upward.

- Communication & Education
- Cultural/Sanitation Practices
- Physical/Mechanical Control
- Pesticides (when needed).

Unfortunately, some schools follow an upside-down version of this pyramid, which results in ineffective pest management and unnecessary exposure to pesticides by students and staff.





## IPM for Pests of Animals & Humans



# TOPICS

- IPM Overview

- **Developing IPM Policy and Plans**

- IPM Implementation
- Resources





## Lesson 3. Implementation of IPM Approach

### Topic 2. IPM Approach

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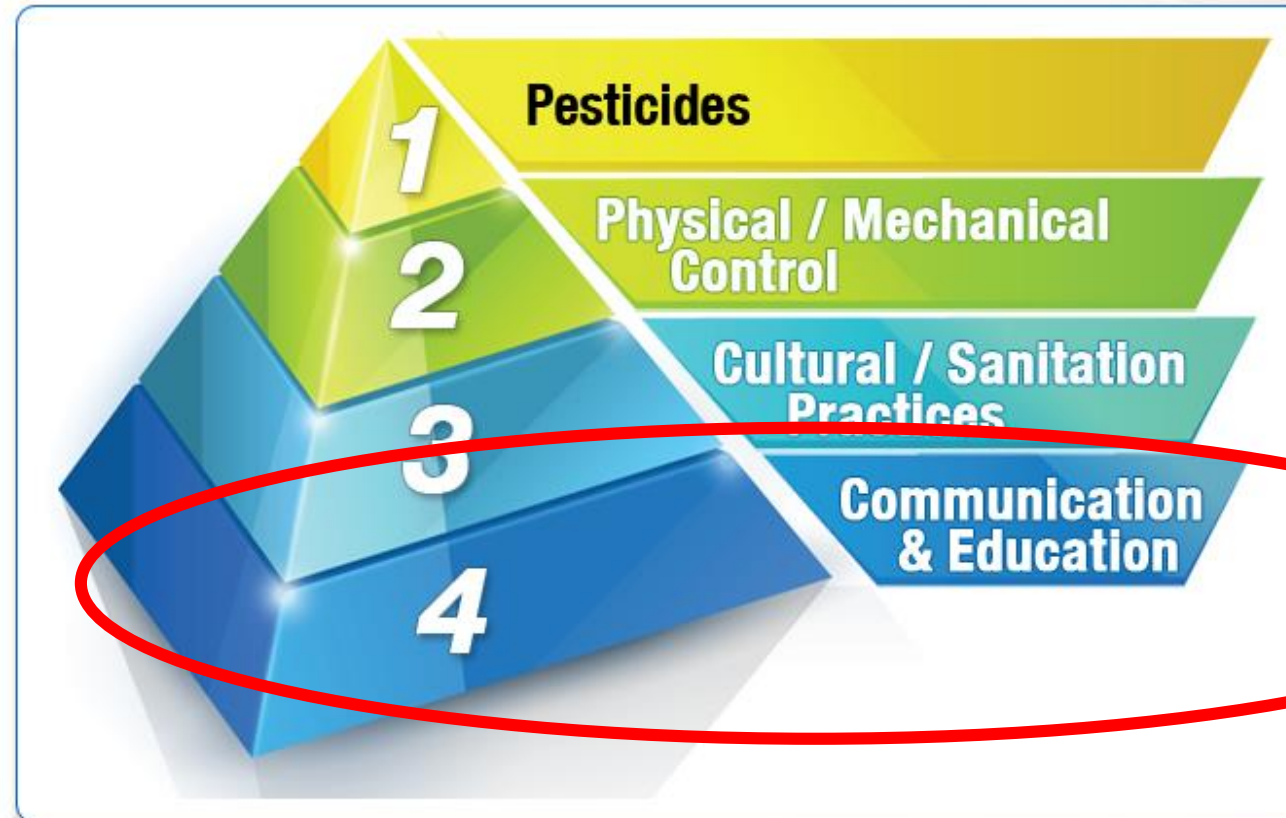
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# PESTICIDE SAFETY AND IPM POLICY

- Institutionalizes program
  - Helps the program be sustainable
  - Management/Director should sign
  - Should be reviewed on a regular basis
- 
- So... what do I write?







# IPM POLICY

This model guidance policy represents the US EPA recommendation for best management practices for the successful implementation of pesticide safety and **is not intended to supersede State, Tribal or Local requirements, where those requirements are more stringent or specific.**

- Source: [https://www.epa.gov/sites/production/files/2017-05/documents/epa\\_sipm\\_policy\\_model\\_730-k-15-001\\_feb\\_2015\\_0.pdf](https://www.epa.gov/sites/production/files/2017-05/documents/epa_sipm_policy_model_730-k-15-001_feb_2015_0.pdf)

*"It is the policy of {insert name} to manage pests in and around buildings in a manner that protects human health, maintains the integrity of buildings and grounds, and preserves the environment.*

*{insert name} is committed to the sustainable management of pests through the use of sound Integrated Pest Management (IPM) that focuses on eliminating pest access to food, water and shelter in and around our buildings. This is accomplished through the use of reduced risk pest control methods with a preference to non-chemical control measures. Sanitation, pest exclusion and habitat modification are essential to successful long term pest mitigation. Buildings will be regularly cleaned and repaired in order to prevent pest infestations. All facilities and grounds will be maintained to be free of garbage, debris and clutter. Ornamental plants, turf, and desirable grasses will be managed in a manner that limits animal, plant and microbial pest attraction."*



# IPM PLAN AND PROGRAM

## Establishing a Pesticide Safety and IPM Program

- Step 1: Develop an Official Pesticide Safety and IPM Policy Statement and Plan
- Step 2: Designate Pest Management Roles for Everyone
- **Step 3: Set Pest Management Objectives by Site and Activity**
- **Step 4: Inspect, Monitor and Identify**
- **Step 5: Implement Pest Prevention Strategies**
- Step 6: Evaluating Results and Record Keeping

Source: <https://www.epa.gov/managing-pests-schools/pest-control-school-environment>

# IPM PLAN

- 1) Identify Pest and Monitor Progress
- 2) Set Action Thresholds
- 3) Prevent
- 4) Control



[https://www.epa.gov/sites/production/files/2015-11/documents/ipm\\_in\\_buildings.pdf](https://www.epa.gov/sites/production/files/2015-11/documents/ipm_in_buildings.pdf)



# IPM PLAN: IDENTIFY PEST & MONITOR PROGRESS

- **Correctly Identify Pest**
  - Best preventative measures
  - Reduce unnecessary pesticide use
  - Prevent the elimination of beneficial organisms
- Maintain records for each building detailing monitor techniques, location, and inspection schedule
- Record monitoring results and inspection findings, including recommendations
- Update IPM Plans in response to monitoring results





# IPM PLAN: SET ACTION THRESHOLDS

- Action Threshold = Pest population level at which the pest's presence is a nuisance, health hazard, or economic threat.
- A defined threshold will focus the size, scope and intensity of an IPM Plan.
- Action thresholds are critical to guiding pest control decisions
  - Is one bed bug a problem? 5 bed bugs? 20 bed bugs?
- Thresholds should be pest and area specific
- Below the threshold level, direct control action is not taken, although monitoring, sanitation, and pest proofing should continue

Not All  
Pests  
are  
Treated  
Equally

# IPM PLAN: PREVENT

IPM focuses on prevention by removing conditions that attract pests, such as food, water, and shelter. Preventative actions include:

- Reducing clutter
- Sealing areas where pests enter the building (weatherization)
- Removing trash and overgrown vegetation
- Maintaining clean dining and food storage areas
- Installing pest barriers
- Removing standing water
- Educating building occupants on IPM





# IPM PLAN: CONTROL

Pest control is required if action thresholds are exceeded. IPM programs use the most effective, lowest risk options considering the risks to the applicator, building occupants, and environment. Control methods include:

- Pest trapping
- Heat/cold treatment
- Physical removal
- Pesticide application





# IPM PLAN: CONTROL

Documenting pest control actions is critical in evaluating success and should include:

- An on-site record of each pest control service, including all pesticide applications, in a searchable, organized system
- Evidence that non-chemical control methods were considered and implemented
- Recommendations for preventing future pest problems



# IPM PLAN: DEFINE ROLES & RESPONSIBILITIES

## Developers

- Educate the building management staff on IPM-based design changes
- Integrate IPM recommendations into the building design and construction
- Assess pests in vacant buildings and consult a third-party certified pest management professional for treatment and structural alteration options
- Use IPM strategies to prevent occupants from bringing pests into new or remodeled space





# IPM PLAN: DEFINE ROLES & RESPONSIBILITIES

## Building Management/Operations

- Establish key performance measures to determine success
- Ensure that the IPM Plan includes action thresholds for pests
- Keep a well-recorded physical log of pest management efforts (date, pest type, control method, result, etc.)
- Maintain an IPM budget and use contracts that require IPM methods
- Hold stakeholders accountable according to their roles and responsibilities
- Ensure communication between all stakeholders
- Use prevention measures first, especially those that have multiple benefits, such as weatherproofing (e.g. door sweeps and caulking)



# IPM PLAN: DEFINE ROLES & RESPONSIBILITIES

## **Building Management/Operations**

- Provide training on IPM to all stakeholders
- Identify a building resident(s)/occupant(s) to serve as a volunteer liaison or council between the residents/occupants and building management on environmental matters
- Coordinate with landscapers to minimize pest-conducive conditions
- Provide occupant notices of pesticide applications in accordance with the pesticide label. Consider adopting the LEED (Leadership in Energy and Environmental Design) notification standard.



# IPM PLAN: DEFINE ROLES & RESPONSIBILITIES

## Building Occupants

- Maintain a clean environment by keeping space free of crumbs, food scraps, standing water, and debris that could harbor pests
- Participate in IPM educational opportunities provided by building management
- Communicate pest and repair issues to building management
- Participate in IPM meetings with management through the building resident/occupant liaison
- Inspect your belongings to prevent introducing pests
- Prepare the area for pest control service, as detailed by the PMP
- Work with the IPM coordinator to get help if limitations make it impossible for the occupant to do his/her part
- Report the presence of pests immediately to building management
- Make all necessary preparation and accessibility for PMP appointments





# IPM PLAN: DEFINE ROLES & RESPONSIBILITIES

## **Building Maintenance Staff**

- Repair building deficiencies that may lead to pest problems
- Participate in regular meetings and special trainings on IPM
- Report problems to building management



# IPM PLAN: DEFINE ROLES & RESPONSIBILITIES

## **Cleaning Staff**

- Maintain a clean environment
- Monitor pest reports from occupants (pest pressures)
- Identify repairs that could alleviate pest problems
- Address conditions that provide pests with food, water, and shelter
- Participate in periodic meetings on IPM implementation



# IPM PLAN: DEFINE ROLES & RESPONSIBILITIES

## **Landscaper (if applicable):**

- Utilize landscape designs that eliminate pest-conducive conditions
- Assist the building managers in choosing native endemic plants that minimize potential pests
- Use IPM strategies that include proper watering, mowing, soil testing, and soil aeration
- Communicate with pest management professionals to ensure pest control techniques and pesticides are not harmful to the landscape
- Participate in periodic meetings that focus on implementing IPM
- Provide occupant notices of pesticide applications in accordance with the pesticide label. Consider adopting the LEED notification standard





# IPM PLAN: DEFINE ROLES & RESPONSIBILITIES

## **Pest Management Professionals**

- Notify IPM Coordinator of scheduled visits
- Deliver pest management services that provide a variety of solutions, including non-pesticide options and recommendations for prevention-based improvements
- Stay current on pest management through continuing education
- Educate stakeholders on choices for non-chemical and chemical control methods
- Participate in periodic meetings on IPM implementation
- Keep a well-recorded physical log of pest management efforts (date, pest type, control method, result, etc.)
- Acquire certification through EcoWise, Green Shield, GreenPro, or a program with similar standards

# IPM PLAN

Source: <https://cals.arizona.edu/apmc/docs/az1669-08-03-15.pdf>  
<http://cals.arizona.edu/apmc/westernschoolIPM.html#pubs>



Screenshot of a web browser displaying the "PUBLICATIONS" page from the Arizona Pest Management Center website. The browser window shows the URL <https://cals.arizona.edu/apmc/westernschoolIPM.html#pubs> and several open tabs including "Classes - Stop School Pests", "Tulane university IPM - Google ...", "epa.gov", "School IPM Policies | Integrated...", "Course Calendar | Urban IPM an...", and "Arizona Pest Management Ce...".

## PUBLICATIONS

- [Preparing Your School IPM Plan](#) (PDF Template).
- [Generic School IPM Plan Template](#) (Word, 171KB). Please check your downloads after you click the link.
- [Appendix 1: Pest Monitoring](#) (Word, 35KB). Please check your downloads after you click the link.
- [Appendix 2: Inspection](#) (Word, 115KB). Please check your downloads after you click the link.
- [Appendix 3: Pesticide Application Notification](#) (Word, 55KB). Please check your downloads after you click the link.
- [Appendix 4: Hiring an Outside Contractor](#) (Word, 101KB). Please check your downloads after you click the link.
- [Tribal School IPM Plan Template 011515-v10](#) (Word, 274KB). Please check your downloads after you click the link.
- [School Integrated Pest Management \(in Chinese\)](#)
- [School Integrated Pest Management \(in English\)](#)
- [Reducing Your Child's Asthma Using Integrated Pest Management: A Practical Home Guide for Parents](#)
- [The Business Case For Integrated Pest Management in Schools: Cutting Costs and Increasing Benefits](#)

Fournier, A., T.J. Gibb & C.Y. Oseto. 2010. [Go to the Head of the Class: A Research-based Approach to Understanding Adoption and Implementation of Integrated Pest Management in Schools](#). Purdue IPM Technical Resource Center, Purdue University, West Lafayette, IN. 275 pp.

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# IPM PLAN

Source: <https://cals.arizona.edu/apmc/docs/az1669-08-03-15.pdf>  
<http://cals.arizona.edu/apmc/westernschoolIPM.html#pubs>



Generic-School-IPM-Template-V-27\_061615.docx [Compatibility Mode] - Word

Plewe, Bethany

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Share

## I. INTRODUCTION

*Add a background paragraph here, including the following information: where the school/school district is located, acreage and total enrollment, number and types of schools (elementary, middle or high), number of students in each school, who is responsible for operations and making budgetary decisions for each school.*

**IPM or integrated pest management** is the most sensible, economical and sustainable method of managing pests in any situation with the least possible risk to people, property and the environment. IPM can be defined in numerous ways according to the situation, but common aspects in most definitions are prevention, regular monitoring and use of multiple suitable and compatible techniques (as opposed to relying on one single method) to reduce pest populations and maintain them at levels that do not cause injury or concern.

At (*Name of school/school district*), pests such as (*name the most common pests that are a problem in the schools in your community*) pose significant problems in the school environment.

Page 7 of 32 7358 words 130%



# CONTRACTING? ENSURE SUCCESS

- Provide a copy of your pest management policy to the Pest Management Professional (PMP)
- Discuss the program with the PMP and establish goals and objectives
- Confirm that control methods used are consistent with the policy
- Work closely with PMP and communicate pest management recommendations to administrators and staff and ensure that they are carried out
- <https://www.beyondpesticides.org/assets/media/documents/documents/modelIPMcontract.pdf>



# OPTIONS: USING PESTICIDES

*“When reasonable non-chemical approaches do not provide adequate control, products that pose the least risk to people and the environment will be selected, and then only used when and where pests are present, or expected to be present, as determined by monitoring and action thresholds and approved by the IPM coordinator.”*

EPA Model Pesticide Safety and IPM Guidance Policy for School Districts

## Recommendations:

- Pesticides should only be applied by certified pesticide applicators
- Avoid routinely scheduled pesticide applications
- Use least-toxic pesticides and application methods with the least risk of exposure
- Apply pesticides when no one is in the treatment area and it will remain unoccupied for at least 8 hours or the reentry time span specified on the label (whatever is longer)
- Describe how pesticides are to be used, handled, stored, or removed in school policies

**The Label is the Law**

**WA state rules for posting, notification, and recordkeeping**



# TOPICS

- IPM Overview
- Developing IPM Policy and Plans
- **IPM Implementation**
- Resources





# IPM IMPLEMENTATION

## **Regular IPM Team Meetings**

Regular IPM team meetings enable all parties to understand their roles and responsibilities

At the initial team meeting:

- set IPM goals and action thresholds
- discuss a pesticide use plan

Use this information to develop an IPM plan that details responsibilities, action thresholds, and treatment methods

The IPM Program Review Form (Appendix A) serves as a checklist to support the design and implementation of your IPM program.



# IPM IMPLEMENTATION

## Education and Outreach

IPM training and education should be recorded in your IPM Plan. Seek to partner with key stakeholders in your community. This is especially important in buildings in which the occupants are more susceptible to the health impact from pests (e.g., hospitals, schools, and daycares).

Partnership suggestions include:

1. IPM professionals should be encouraged to participate in or become members of local environmental advisory/strategy committees or counsels.
2. Pest management professionals (PMPs) should join local environmental and community health organizations to promote the benefits of IPM.
3. Building managers and key stakeholders should use local laws / ordinances to leverage funding to support their IPM programs





# IPM IMPLEMENTATION

## Regular IPM Assessments

- **Monitor** for pest activity and pest conducive conditions
  - Regularly inspect property for pests
  - Use a standardized checklist
- Determine if **sanitation, exclusion, and habitat modification is necessary**

# INSPECTIONS - IPM TOOLS



Identification guides

Strong flashlight

Caulk gun/silicone sealant

UV light

Magnifying glass

Inspector's mirror

Copper mesh

Gloves





# Walkthrough Inspection Checklist - example

## 1. GROUND LEVEL

	Yes	No	N/A
1a. Ensured that ventilation units operate properly .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1b. Ensured there are no obstructions blocking air intakes .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1c. Checked for nests and droppings near outdoor air intakes .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1d. Determined that dumpsters are located away from doors, windows, and outdoor air intakes .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1e. Checked potential sources of air contaminants near the building (chimneys, stacks, industrial plants, exhaust from nearby buildings) .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1f. Ensured that vehicles avoid idling near outdoor air intakes .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1g. Minimized pesticide application .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1h. Ensured that there is proper drainage away from the building (including roof downspouts) .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1i. Ensured that sprinklers spray away from the building and outdoor air intakes .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1j. Ensured that walk-off mats are used at exterior entrances and that they are cleaned regularly .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

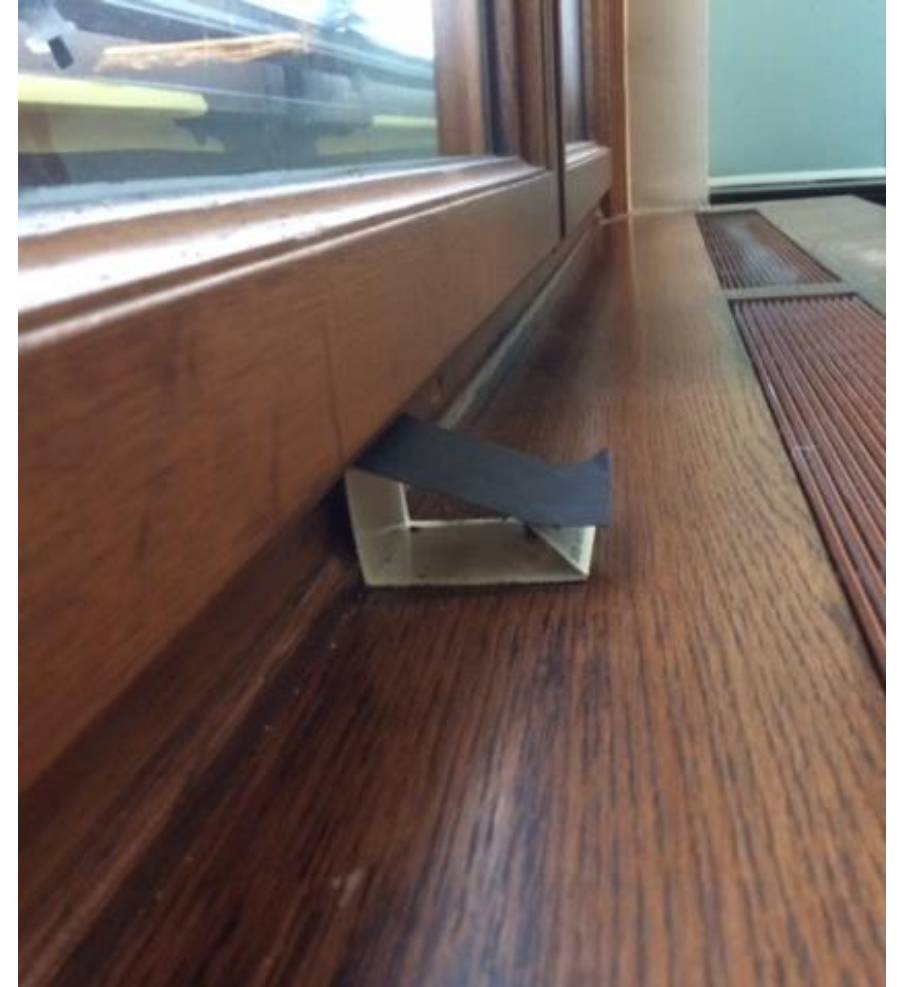
Source: [https://www.epa.gov/sites/production/files/2014-11/documents/walkthruchklst\\_0.pdf](https://www.epa.gov/sites/production/files/2014-11/documents/walkthruchklst_0.pdf)



# MONITORING RECOMMENDATIONS



- 20-40 insect monitoring traps per building in Pest Vulnerable Areas (PVAs)
  - Any place where there could be food
  - Any place with clutter
  - Any classroom with a pest sighting
- Inspect building grounds regularly
- Look for pest signs and pest conducive conditions
- Use pest sighting logs



Source: Gouge, Baldwin, Oi, & Schmeits , 2007



# INSPECTIONS - THINK LIKE A PEST



# INSPECTIONS - IDENTIFY YOUR PEST





# SANITATION



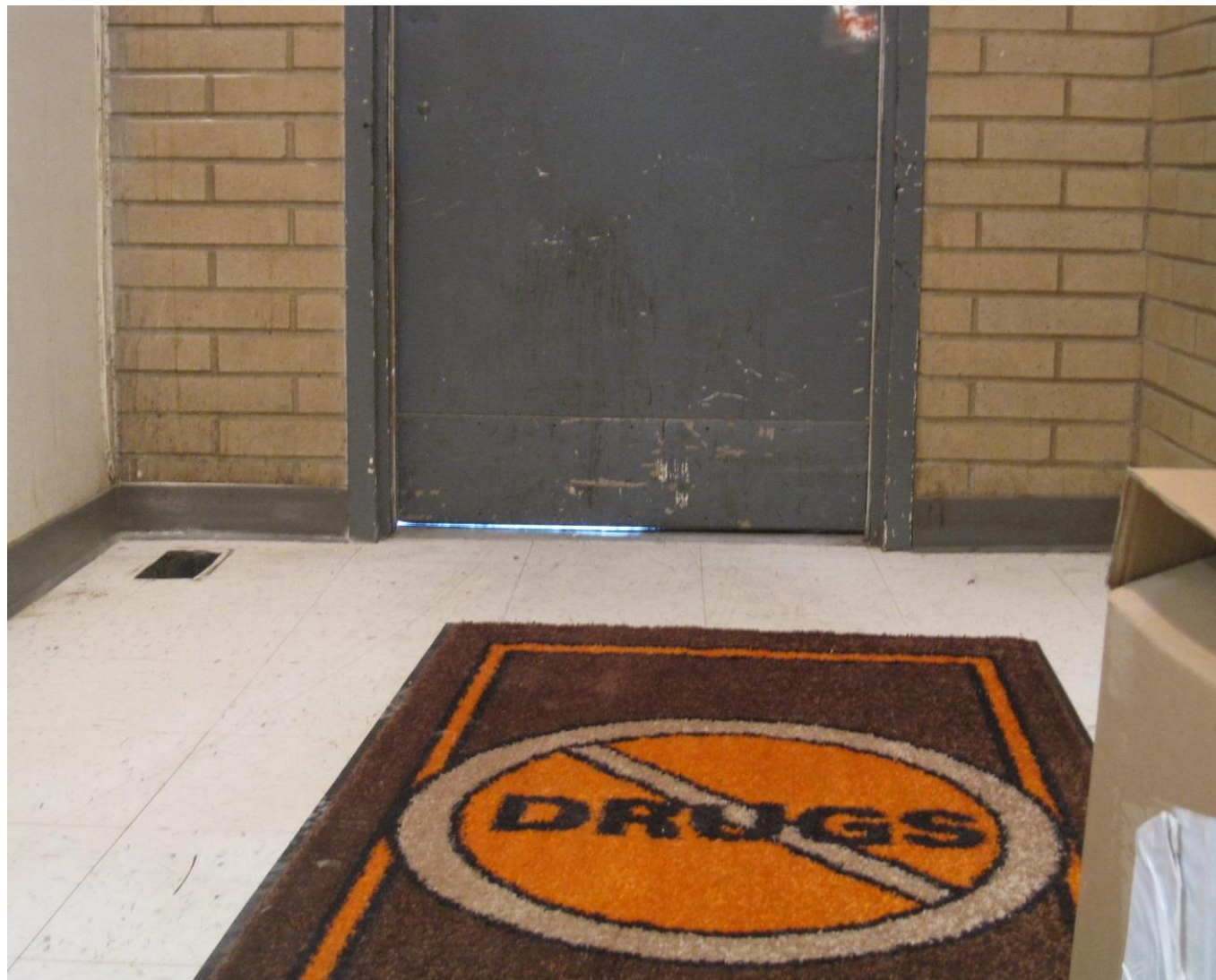


# EXCLUSION





# EXCLUSION



©Take your own photo of uneven surface

## Door sweeps

Image Source: EPA Region 8

# PHYSICAL/MECHANICAL CONTROL





# ELIMINATE CLUTTER



# TOPICS

- IPM Overview
- Developing IPM Policy and Plan
- IPM Inspections/Assessments
- **Resources**

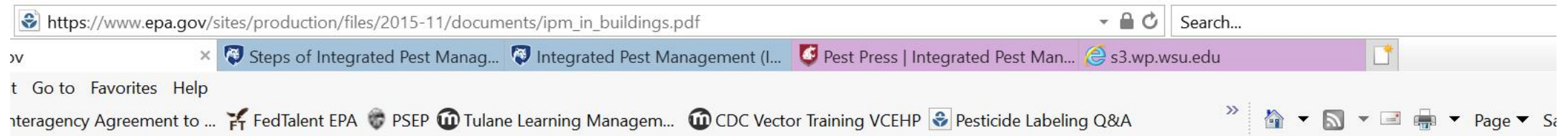






# EPA RESOURCES

[https://www.epa.gov/sites/production/files/2015-11/documents/ipm\\_in\\_buildings.pdf](https://www.epa.gov/sites/production/files/2015-11/documents/ipm_in_buildings.pdf)



## Integrated Pest Management in Buildings

### Introduction

Integrated Pest Management (IPM) is an environmentally friendly, common sense approach to controlling pests. This document serves to define IPM, describe proper IPM implementation in buildings, and outline the roles and responsibilities necessary for success. The following IPM principles apply to both new construction and existing commercial and residential structures and their landscaping.

This document will best serve individuals responsible for pest prevention and management in buildings



# EPA RESOURCES

<https://www.epa.gov/managing-pests-schools/>



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## Webinars about Integrated Pest Management in Schools

View recordings of webinars in our four part series on mosquitoes. The EPA Center for Integrated Pest Management hosts a yearly webinar series featuring experts from across the country relaying educational and practical strategies for establishing and improving integrated pest management programs in schools.

### Previous Webinars

Follow these links for more information on these previous webinars and to view the recordings.

#### Getting Started: IPM 101

- [Plan Your Work and Work Your Plan: Learn How to Develop a Comprehensive IPM Program](#)
- [Pests of Public Health Importance and the Role of Integrated Pest Management in Schools](#)
- [Back-To-School with IPM](#)
- [Writing an IPM Policy for Your School District](#)
- [The Basics of School IPM](#)

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Pests
Bed Bugs
Bees and Wasps
Biting Flies
Fleas
Gypsy Moths
Integrated Pest Management

## Integrated Pest Management (IPM)

[Español](#)

Integrated Pest Management (IPM) is a way to control pests that helps keep people, pets, and the environment safe and healthy. It emphasizes pest prevention and reduces use of chemicals. IPM requires learning about the pest in question and doing what's necessary to eliminate their access to food, water, and shelter. IPM uses physical barriers that block pest entry. For long-term prevention, choose these control methods:

- Keep kitchens and garbage areas as clean as possible.
- Use physical barriers such as screens and caulk to keep pests out of buildings.
- Set baits or traps to prevent problems or get rid of them early.

- <https://www.doh.wa.gov/CommunityandEnvironment/Pests/IntegratedPestManagement>



# EDUCATION PEST PRESSES

Pest Press

ISSUE #6

INTEGRATED PEST MANAGEMENT

WINTER 2012



Figure 1. Pigeon or rock dove



Figure 2. English sparrows



Figure 3. European starling

Images courtesy of the Department of Communications and Marketing, Virginia Cooperative Extension, Virginia Tech.

## COMING HOME TO ROOST: NUISANCE BIRDS

We all enjoy birds in our gardens. However, while many birds are adapted to living around humans, three invasive species frequently become pests: pigeons (rock doves), English or house sparrows, and European starlings. Pigeons and sparrows scavenge in parking lots, picnic areas, and parks, while starlings are more likely to be seen in mowed, grassy fields where they forage for seeds and insects.

### PIGEONS

Pigeons collect in flocks on structures such as underpasses, buildings, and bridges. Color varies, but most birds are gray with iridescent neck feathers and a black band on their tail. Pigeons feed on grain, garbage, and everything in between. They do not migrate, exhibit extreme site loyalty, and have excellent homing instincts, making it difficult to manage pigeons by trapping and relocation. Scare tactics are not particularly effective for pigeons, as they quickly acclimate to owl figures, noises, and other "threats."

### ENGLISH SPARROWS

English sparrows are medium-sized songbirds. The male has a black bib and white cheeks, while the female is gray-brown all over. They feed on grains, seeds, fruit, and human food debris. They build messy nests in sheltered locations, including on light fixtures, signs, and building ledges. Sparrows do not migrate, so are seen year-round in most areas. They generally do not respond very well to scare tactics, but nest removal and "bird-proofing" strategies are effective.

### EUROPEAN STARLINGS

Starlings have short tails and chunky bodies. Males are glossy black with speckled feathers, while females are dull brown. Both have bright yellow beaks in the spring. These aggressive, noisy pests crowd out native birds and devour grain, fruit, seeds, and insects in gardens and fields. Starlings build

PNW  
PEST PRESS

ISSUE 9

IPM IN SCHOOLS

FALL



Bed bugs adult (center), nymph (upper left), and fecal spots.

## Controlling Bed Bugs

Bed bug control requires a combination of approaches, as pesticides alone are not completely effective. A comprehensive strategy should include education and awareness about bedbugs, vacuuming and cleaning, and elimination of hiding places. Professional steam or heat treatments can be effective if performed by trained personnel. Less-toxic insecticides can be used, but application of residual insecticides is not advised in most school situations. Bug bombs or foggers are NEVER recommended in any situation, as bed bugs hide in sheltered places that are unaffected by these pesticide applications. For the best results, consider consulting with a professional pest management company with experience in bed bug detection and control.

## Bed Bugs

"Good night, sleep tight; don't let the bed bugs bite." The familiar refrain we have heard for years has taken on a more sinister meaning as bed bugs make a world-wide resurgence. Motels, theaters, schools, apartment buildings, and homes are just some of the places bed bugs can be found. The good news is, unlike many other blood-sucking parasites, bed bugs are not known to transmit human diseases. Bed bugs prefer to feed on humans, but in a pinch they will also feed on other animals such as rodents, bats, and birds. Bed bugs move around by hitching rides or laying eggs on clothing, furniture, bedding, and baggage. Bed bugs don't discriminate. People of all economic levels, housing types, races, colors, and religions are equally susceptible.

Adult bed bugs are flat insects around 1/4" long and typically rusty brown-red in color. They are flat and broadly oval in shape. They lack wings, but can crawl very quickly. After feeding, adults are more elongated and torpedo-shaped, gradually returning to their flat, oval shape as their meal is digested. Females lay tiny white eggs that hatch into light-colored nymphs in about seven to 10 days. Immature nymphs resemble adults but are smaller (from less than 1/10" to almost 1/4" depending on developmental stage). The nymphs turn bright red after a blood meal. While nymphs need blood meals to complete their development, adult bed bugs can survive for several months without feeding. During the day, bed bugs hide in any available crack, crevice, or sheltered spot within a few yards of their feeding area. At night, they come out of hiding to feed. Bites often occur as a row of several raised, reddened bumps. Most people don't notice being bitten, but later the bites can become very itchy or painful. Bed bug bites can take up to two weeks to produce a reaction. Some individuals may have no reaction at all.

## BED BUGS IN SCHOOLS: WHAT YOU SHOULD KNOW

Schools are not an ideal environment for bed bugs which prefer to feed at night—a time when most schools are relatively empty. Most bed bugs are brought into schools as stowaways on student or staff belongings. If bed bugs are detected in a classroom, collect a sample for identification by a professional. Bed bugs can closely resemble other species, so accurate identification is essential. Once a bed bug is identified, a thorough inspection of the area should be performed.



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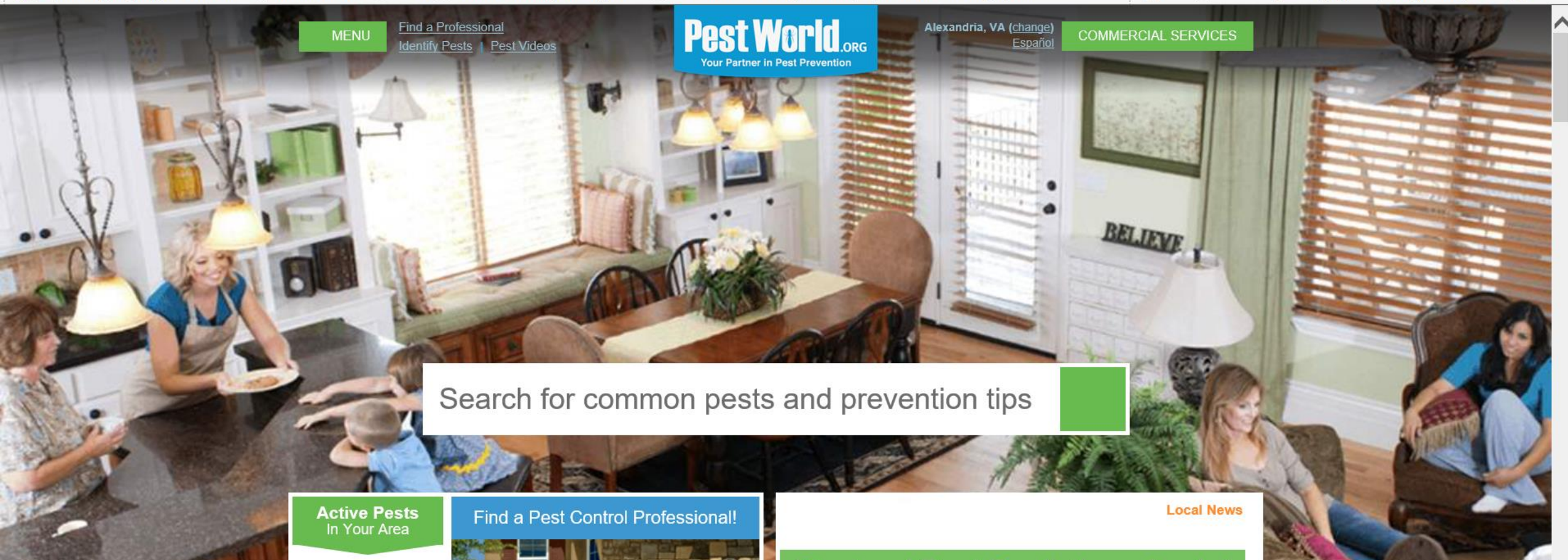
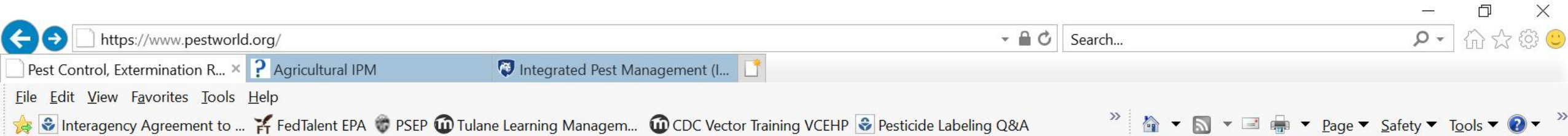
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# PEST WORLD

<https://www.pestworld.org/>



# THANKS FOR YOUR TIME!

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