IPM Toolkit Launch

Bee City USA

Xerces Society

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Why Ecologically-based Integrated Pest Management?

Photo: Kevin Burkett CC BY SA 2.0

Why is This Important?

- Studies indicate insect declines worldwide
- Many pollinator species are imperiled, including bees and butterflies
- Pesticides are a major threat

Xerces Society/Mace Vaughan

Hallmann et al. 2017, Lister and Garcia 2018 Sánchez-Bayo and Wyckhuys 2019. Thomas et al. 2019, Saunders 2019; Forister et al. 2019

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~98% of Insects Are Not Pests

"Yet most of the chemicals now used, kill all insects, our friends and enemies alike."

- Rachel Carson, Silent Spring

Photo: Predatory stink bug feeding on brown marmorated stink bug - John Flannery (Flickr)

Scientific sources: Stork 2018; Pimental 2009

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Unintended Consequences of Routine Use

The largest mass pesticide poisoning of bumble bees ever documented

- Wilsonville, Oregon bumble bee kill in June, 2013
- Linden trees treated with neonicotinoids
- 50,000 bumble bees poisoned
- Honey bees, lady beetles, more also killed

Photos: Xerces Society/Rich Hatfield

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Background Contamination and Subtle Effects

- Less-than lethal amounts are still concerning
- Background contamination can be widespread
- Real-world impacts like:
  - Decreased reproduction
  - Behavioral changes
  - Changes in physiology
  - Altered learning ability

Photo: Nancy Lee Adamson

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Butterfly Host Plant Sampling

Yards and Parks

- Sampled in Sacramento, CA and Albuquerque, NM
- Butterfly host plants including:
  - Oaks
  - Willows
  - Cottonwoods
  - Lupines
  - Plantains

Credit: Aaron Anderson/Xerces

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Sampling Study

Background contamination common in residential landscapes

- 47 compounds detected
  - 14 insecticides
  - 10 herbicides
  - 20 fungicides

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Sacramento Results

- 5.5 compounds per sample
- Contamination on 94% of samples
- Azoxystrobin in 84% of samples
  - Fungicide
- Methoxyfenozide in 78% of samples
  - Insecticide, used against lepidoptera pests
  - Concern for native butterflies

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Albuquerque Results

- 2.6 compounds per sample
- Contamination on 92% of samples
- Atrazine in 70% of samples
  - Restricted use herbicide
  - Long-lasting in the environment
  - Can synergize the toxicity of some insecticides

Desert willow, a butterfly host plant

Credit: Gerardolagunes/Wikimedia Commons

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Ecologically-Based Integrated Pest and Pollinator Management

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Photo: Xerces Society /Mace Vaughn

IPM: What is it?

a **comprehensive approach to solving pest problems** that focuses on the **big picture.** Instead of simply trying to eliminate a pest, IPM involves **changing factors that favor pests, while using safer, less-toxic methods** that are effective and environmentally sound. (City of Pasadena)

IPM emphasizes **prevention first** and seeks to **eliminate the underlying causes** of plant diseases, weeds, and insect problems **rather than relying on routine use of pesticides**. (Xerces Society)

IPM is a pest management strategy that focuses **on long-term prevention or suppression of** pest problems with **minimum impact on human health, the environment, and nontarget organisms**. (Mary Louise Flint, UCIPM)

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IPM: Practical Steps to Solving Pest Problems

Prevent Pests:
Address Root Causes with Non-Chemical Management

Limit Harm:
Reduce Risk of Exposure and Toxicity from Pesticides

Assess Pressure:
Monitor and Evaluate Plant /System Health

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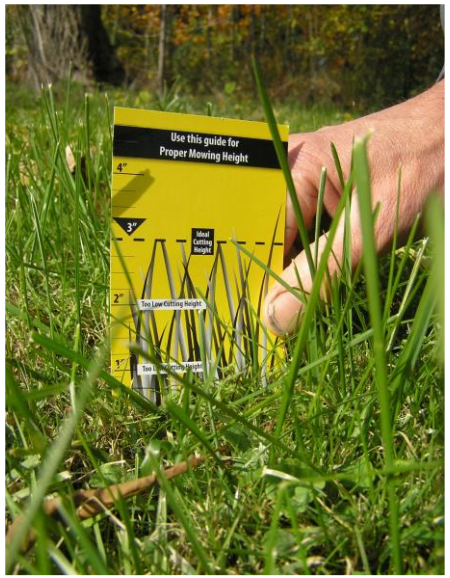
General Non-Chemical Prevention Strategies: **Tips and Examples**

- Right plant, right place
- Take care of the soil

- Don’t spread weed or disease propagules
- Sanitation
- Mow turf high and often
- Maintain diverse landscapes to support native predators and parasites of pest species



- **Consult experts for prevention practices for specific invasives and emerging pests**

Photos: Diverse landscape -Jennifer Hopwood, Mowing height gauge –The NY State IPM Program, Cornell University; Soil – NRCS Oregon

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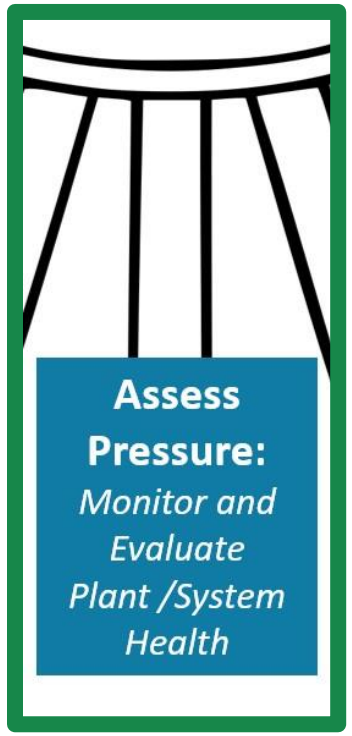
Monitoring for Pests and Pest-Conducive Conditions:
Tips and Examples

- Understand pest life cycles and habitat
- Key staff trained in ID and monitoring methods



- Inspect regularly and systematically. Use results to evaluate preventative management. Written records are most useful.
- Report invasives and emergents.

Images: Tick and spotted lanternfly monitoring – The NY State IPM Program, Cornell University; Monitoring checklist – Portland Community College IPM Plan; Whiteflies – Flickr/ Scot Nelson public domain; leafcutter bee sign – Jennifer Hopwood.

Photos: Diverse landscape -Jennifer Hopwood, Mowing height gauge –The NY State IPM Program, Cornell University; Soil – NRCS Oregon

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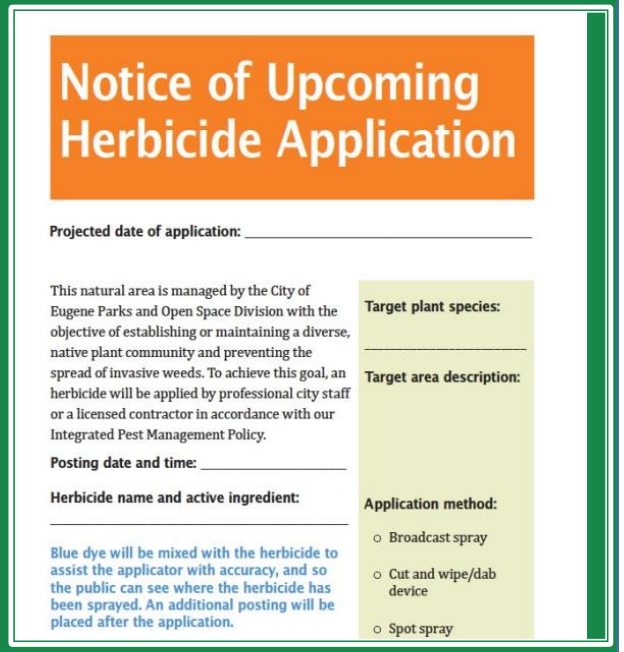
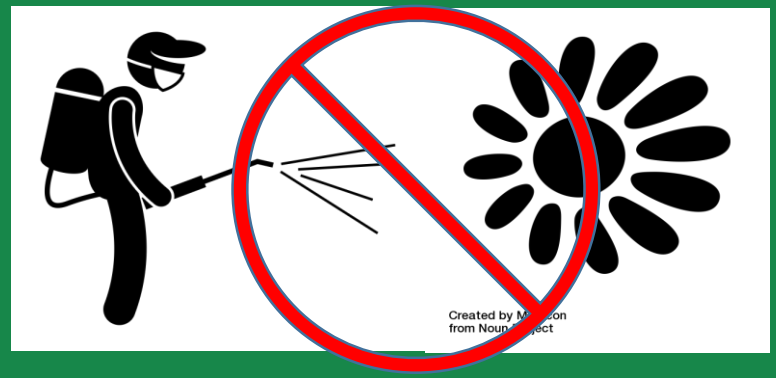
Limiting pesticide harm: tips and examples

- Pesticide-free areas
- Provide advance notification
- Don't apply pesticides during bloom. Avoid soil applications and systemics.

- Avoid "cosmetic" pesticide uses—consider a standard of using only if plant health is threatened
- Stop routine "hidden" pesticide uses (such as using fertilizer/pesticide combo products).
- Choose lower-tox products (ex: insecticidal soaps or horticultural oils, organics (generally)
- Use targeted treatments





Photos: Pesticide-Free Park sign from Reno, NV; Notice from Eugene Parks and Recreation IPM Policy; Backpack sprayer -The Noun Project; Flower by Magicon from the Noun Project

Where to Begin?

- New toolkit!
  - Explanatory page
  - IPM checklist
  - Example page

Credit: Bee City USA - Madison, WI.

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IPM Checklist

- Checklist of key IPM Elements
- Monitoring
- Prevention and Management
- Pesticide Use and Risk Reduction
- Administration
- Community Engagement

✓ Post the IPM plan online (this is a commitment of becoming a Bee City USA or Bee Campus USA affiliate).

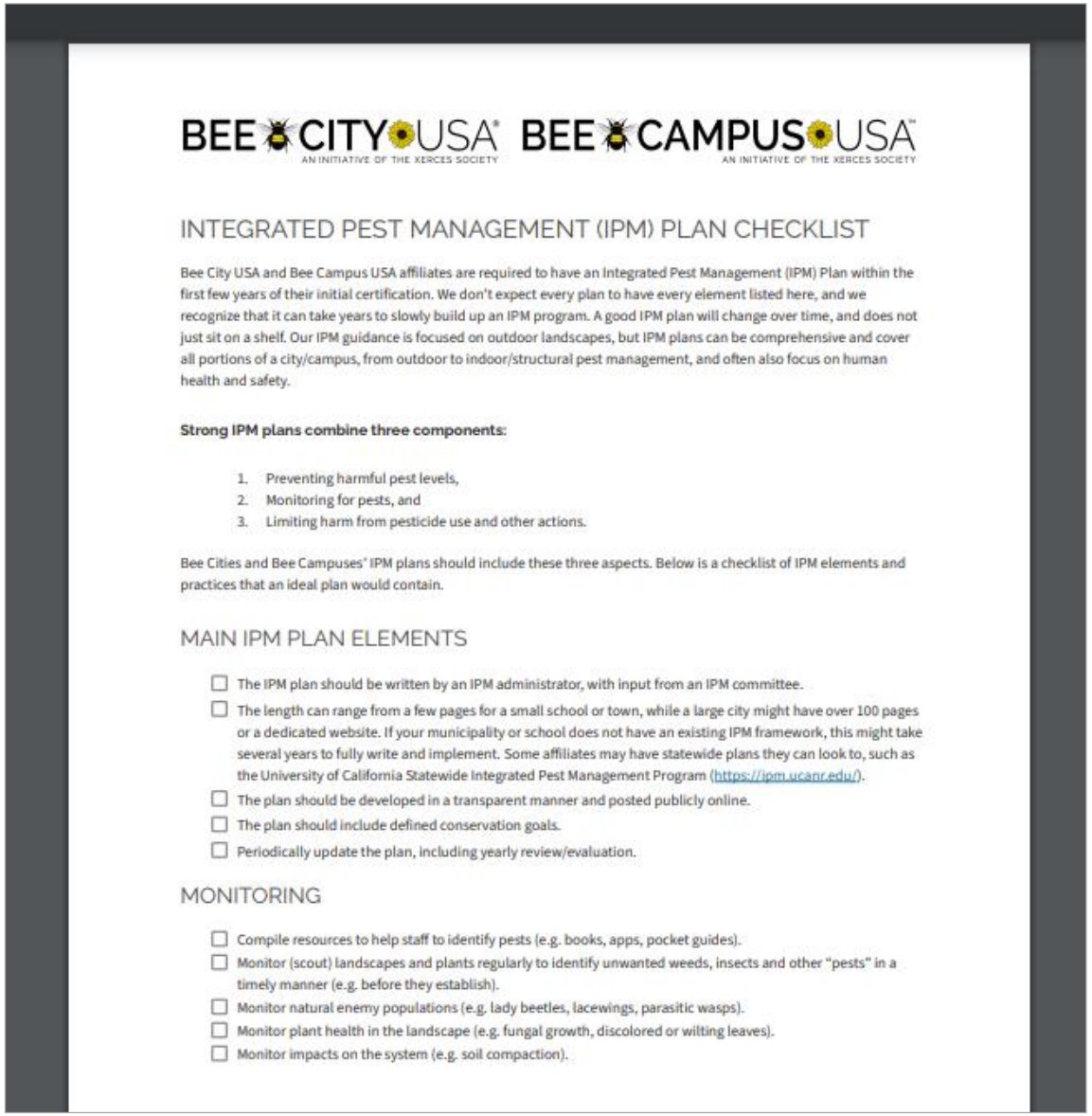
(Credit: Bee City USA - Decatur, GA aka Beecatur)

FURTHER READING

Toolkit: Integrated Pest Management (IPM) Plan

Source: https://beecityusa.org/ipm-checklist/

IPM Checklist - PDF



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INTEGRATED PEST MANAGEMENT (IPM) PLAN CHECKLIST

Bee City USA and Bee Campus USA affiliates are required to have an Integrated Pest Management (IPM) Plan within the first few years of their initial certification. We don't expect every plan to have every element listed here, and we recognize that it can take years to slowly build up an IPM program. A good IPM plan will change over time, and does not just sit on a shelf. Our IPM guidance is focused on outdoor landscapes, but IPM plans can be comprehensive and cover all portions of a city/campus, from outdoor to indoor/structural pest management, and often also focus on human health and safety.

Strong IPM plans combine three components:

1. Preventing harmful pest levels,
2. Monitoring for pests, and
3. Limiting harm from pesticide use and other actions.

Bee Cities and Bee Campuses' IPM plans should include these three aspects. Below is a checklist of IPM elements and practices that an ideal plan would contain.

MAIN IPM PLAN ELEMENTS

- ☐ The IPM plan should be written by an IPM administrator, with input from an IPM committee.
- ☐ The length can range from a few pages for a small school or town, while a large city might have over 100 pages or a dedicated website. If your municipality or school does not have an existing IPM framework, this might take several years to fully write and implement. Some affiliates may have statewide plans they can look to, such as the University of California Statewide Integrated Pest Management Program (https://ipm.ucanr.edu/).
- ☐ The plan should be developed in a transparent manner and posted publicly online.
- ☐ The plan should include defined conservation goals.
- ☐ Periodically update the plan, including yearly review/evaluation.

MONITORING

- ☐ Compile resources to help staff to identify pests (e.g. books, apps, pocket guides).
- ☐ Monitor (scout) landscapes and plants regularly to identify unwanted weeds, insects and other "pests" in a timely manner (e.g. before they establish).
- ☐ Monitor natural enemy populations (e.g. lady beetles, lacewings, parasitic wasps).
- ☐ Monitor plant health in the landscape (e.g. fungal growth, discolored or wilting leaves).
- ☐ Monitor impacts on the system (e.g. soil compaction).

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Developing Your IPM Plan

TRAINING AND RESOURCES

An IPM plan can only be successful if the people doing work in the field are trained and have resources to support them. This includes training staff on IPM principles, pest and weed identification, scouting protocols. Staff should be aware of the variety of management techniques for each common pest and the non-chemical methods that should be implemented first. If the decision to use pesticides is made, staff should be provided with approved lists of least-toxic options for various pests. Staff should be careful to read and follow the label on any product used to avoid misuse. Trainings should be backed up by reference materials that they can review.

FURTHER READING

Xerces Society Resources

- Next:
  - Part II: IPM Plan Checklist
  - Part III: IPM Plan Examples & Case Studies
- Handout: Smarter Pest Management: Pollinator Protection For Cities And Campuses
- Handout: Supporting Ecologically Sound Mosquito Management
- Handout: Buying Bee Safe Plants

IPM Example Page

For example, in 2023:

- 45 Bee City and Bee Campus affiliates have eliminated pesticide applications that are solely to maintain aesthetics on their city or campus grounds.
- 34 Bee City and Bee Campus affiliates have restricted pesticide use to only organic approved products.
- 77 Bee City and Bee Campus affiliates only use pesticides as a last resort within the IPM plan.
- 150 Bee City and Bee Campus affiliates avoided use of pesticides in public sites containing designated pollinator habitat or other sensitive features (except when targeted use is deemed the best option for invasive or noxious weed, insect or disease management).
- 88 Bee City and Bee Campus affiliates implemented non-chemical pest prevention and management methods on city or campus grounds.
- 49 Bee City and Bee Campus affiliates sourced plants for city or campus grounds using "Buying Bee-Safe Plants" methods recommended by the Xerces Society.

Taking this a step further, these affiliates dropped pesticide use *altogether* on city or campus grounds, as of 2023:

Bee Cities:

Source: https://beecityusa.org/ipm-plan-examples/

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Example: Pittman Center, TN

- Monoculture of invasive kudzu
  - Fire risk
  - Overrunning the landscape
- Used herd of goats to manage it
- Avoided using toxic pesticides
- Native plants grew in the newly cleared area

Photos: Kristine Johnson and Glenn Taylor. Flowers: yellow trillium and purple phacelia

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Example: University of Wisconsin Stevens Point

- Steam weeder
  - Superheats water to 250 degrees
  - Bursts plant cells without frying mulch/soil like flame weeders
  - Leaves behind pesticide-free mulch for soil organisms
- With other IPM methods, pesticide reduction of 90%

Credit: Bee Campus USA – University of Wisconsin Stevens Point

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Example: Affiliate Statistics

- **45** affiliates have eliminated pesticide applications that are solely to maintain aesthetics on their city or campus grounds.
- **34** affiliates have restricted pesticide use to only organic approved products.
- **77** only use pesticides as a last resort within the IPM plan.
- **150** affiliates avoided use of pesticides in public sites containing designated pollinator habitat or other sensitive features.
- **88** affiliates implemented non-chemical pest prevention and management methods on city or campus grounds.
- **49** affiliates sourced plants for city or campus grounds using “Buying Bee-Safe Plants” methods recommended by the Xerces Society
- **10** affiliates reported to us that they have eliminated pesticide use altogether on city or campus grounds (as of 2023)

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The IPM Plan Journey

- Affiliates aren't expected to adopt all elements immediately!
- We recognize is a journey that can take time
- Please reach out with questions and feedback

Credit: Bee City USA – Westminster, CO

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Questions?

pesticides@xerces.org
beecityusa@xerces.org