HENNEPIN COUNTY

# Integrated Pest Management Guidelines

2024

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*Cover image: Wild parsnip. When the sap of wild parsnip comes in contact with skin in the presence of sunlight, it can cause a chemical burn that can look like a blistering rash.*

# Introduction

## Purpose of guidelines

The purpose of these guidelines is to describe Hennepin County's approach to Integrated Pest Management with the goal of preventing or limiting the use of pesticides to control pests within Hennepin County owned and operated facilities and lands. These guidelines were developed by a Hennepin County IPM committee with staff representatives from various departments across Hennepin County (including Public Health, Transportation, Environment and Energy, Facility Services, Land Information and Tax Services), and University of Minnesota Extension (UMN Extension).

Hennepin County acknowledges that IPM strategies described in this document may change with time as research and knowledge changes how we manage pests.

For more information, contact Matthew Stasica, matthew.stasica@hennepin.us.

## What is Integrated Pest Management?

Integrated Pest Management, or IPM as it is commonly known, is a decision-making and action process for preventing unacceptable damage by pests, while also using the most ecological control methods with the least possible hazard to people, property, and the environment.

This IPM definition and pest definition below were developed by the IPM committee based on their research of other IPM programs and the way the county manages its buildings and land.

## Definition of a pest

A pest is any insect, rodent, weed, fungus or other form of plant or animal life that adversely interferes with the aesthetic, health, safety, environmental or economic goals of the county. Pest shall not include viruses or microorganisms on or in a living person or animal but shall include plant diseases.

There are four main groups of pests (UMN Extension, 2012):

1. Weeds – undesirable plants
2. Invertebrates – insects, mites, ticks, spiders, snails, and slugs
3. Disease agents or pathogens – bacteria, viruses, fungi, nematodes, mycoplasmas, and other microorganisms
4. Vertebrates – birds, reptiles, amphibians, fish, and rodents and other mammals

*Figure 1: Reed canary grass. Photo credit: Rosewoman*

A pest identification does not reflect the organism's role in the natural ecosystem, but indicates that in a particular area, it conflicts with the goals of the county. A pest in one area may not be considered a pest elsewhere.

# IPM approach

The Hennepin County IPM committee has chosen the following five IPM steps for the management of pests on county-owned and managed properties.

1. Prevent pests
2. Identify and monitor pest problems
3. Establish action thresholds (using threshold guidelines)
4. Select the best pest management tactic(s)
5. Recordkeeping and evaluation

## 1. Prevent pests

The best way to reduce pest problems is to prevent them from occurring in the first place. The prevention of pests should be part of the everyday maintenance practices on county properties. Staff should always be making decisions, using spaces, and acting in ways that will prevent pest issues from arising. These prevention measures look different for indoor and outdoor spaces.

### Preventing pests in landscapes

Hennepin County staff manage landscapes in roadways, natural areas, and in the diverse landscapes surrounding county facilities. Pests are best controlled in landscapes through appropriate plant selection and maintenance.

- **Plant selection –** Many common pest problems can be reduced in severity or avoided altogether by selecting the appropriate plants and grass types for the site. The right plants for an environment are those that can tolerate or resist host pests but are also plants that can thrive under the conditions of the environment (soil type, water, and sun exposure). For example, selecting the optimum type of lawn seed or sod for turf is important to turf sustainability and disease resistance.
- **Plant maintenance –** Once the right plants have been selected, a maintenance plan that includes watering, fertilizing, pruning, and regular weeding will be needed to keep the plants healthy. This is important because a healthy, vigorously growing plant can often outgrow the damage from insects and diseases and quickly recover from environmental and other stress factors. Plants can have natural defenses against insects and disease organisms; and these defenses are generally at their strongest when plants are stress-free and healthy.

See *Hennepin County Sustainable Landscape Guidelines for Successful Plantings* for strategies to keep plants healthy.

### Preventing pests in buildings

Hennepin County owns and rents office space, libraries, correctional facilities, health-care facilities, and maintenance buildings.

To prevent pests in buildings, pest-conducive conditions must be reduced. This can be done through regular inspections, observations, and individual practices. These conditions are often found in what are called pest-vulnerable areas, or PVAs. These are areas where pests are especially likely to be or to cause damage, often due to availability of food, water, or shelter. PVAs include loading docks, dumpster areas, kitchens, food storerooms, cafeterias, lounges, mechanical rooms, and custodial closets.

Examples of ways to reduce pest-conducive conditions:

- Seal gaps and penetrations through walls and ceilings
- Provide sweeps and weather stripping around exterior doors
- Screen open windows. Do not prop unscreened windows open.
- Exterior doors to the buildings should be self-closing. Do not prop doors open.
- Have metal grates covering all floor drains
- Repair any water/rot damaged building exterior such as roof soffits, fascia boards, and siding
- Properly store and remove garbage and recycling regularly from the building
- Repair any decayed grout. The lack of grout allows for water penetration.
- Reduce clutter, such as empty cardboard boxes
- Proper food storage (e.g., refrigerators or tightly sealed containers)
- Remove live plants
- Declutter desks and file cabinets
- Maintain clean dining and food storage areas. Clean up spills and food debris immediately.
- Keep all items off the floor. Move pallet storage frequently.
- Design buildings to promote cleaning. Minimize gaps and inaccessible spaces.
- Avoid installing lockers over a void space
- Remove standing water and moisture
- Hang mops to air dry

*Figure 2: Minnesota's most common bat species, the big brown bat. Bats are beneficial creatures that consume large quantities of mosquitos. On rare occasions, bats find their way into a building and become a nuisance. Photo credit: Andy Birkey*

## 2. Identify and monitor pest problems

### Know the pest

Correct identification and general understanding of pests are crucial to effective management. It is key that a pest is correctly identified so that the appropriate management method is used. Information on origin, legal status (e.g., noxious weed, invasive species), life cycle, reproduction, diet, habitat, habits, method of spread, and management methods known to be effective are valuable. This information also facilitates proper monitoring of pests because it can help to determine what to look for and when. Hennepin County staff developed action plans for pests that are commonly dealt with on county-owned or rented lands and facilities. These action plans provide pest identification, life cycle, habitat, and treatment information.

*Figure 3: Plumeless thistle listed as a prohibited noxious weed on the control list in Minnesota. Photo credit: Matt Lavin*

## Monitor for pests

An organism should not be considered a pest until it has been shown to be one. Monitoring will identify the presence of pests, pinpoint where the pest problems are, and when they are occurring. It involves ongoing inspection and observation (this may include monitoring at different times of the day or night), and problem solving. Thorough record keeping is essential to effective monitoring.

Examples of information to note when monitoring include:

- Determine if target pest is present, where it is located, and the extent of infestation
- Look for signs of pests (e.g., finding parts of the pest or substances produced by pest) and symptoms (e.g., damage to plants or signs of aggressive spread)
  - Identify growth stage of pests to aid determination of timing for most effective management
  - Identify potential access points (e.g., holes in walls or fences)
  - Look for and document pest-vulnerable areas and pest-conducive conditions
- Identify if pest is a rare, threatened, or endangered species or if there are such species nearby that may be affected
- Identify presence of pollinator habitat and foraging pollinators
- Identify possible non-target concerns such as nesting birds and other animals (including humans), insects, pollinator species, and/or critical habitat on subject or adjacent properties
- Identify other possible environmental concerns
- Determine if permission is needed to access property or notifications need to be made before work can begin
- Determine if pest has reached action threshold and management is needed

*Figure 4: Purple Loosestrife, a noxious weed that invades lakes, rivers, and wetlands.*

*Figure 5: Asian longhorned beetle. Its larvae can girdle and kill trees as it feeds on them. They prefer hardwood trees such as maple, ash, and birch. Photo credit: R. Anson Eaglin, USDA-APHIS*

## 3. Establish action thresholds

A key difference between IPM and traditional pest control is that IPM often uses action thresholds. Most pests can be tolerated at some low level, but there is a point where they may no longer be tolerable.

An occasional ground beetle in a hallway, for example, would bother few people. The costs and risks of taking action because of that one beetle—replacing door sweeps, caulking cracks in walls, or applying pesticide—would far outweigh any benefits. Thirty ground beetles in a hallway, however, would be a different story.

Determining when a pest becomes intolerable is the idea behind action thresholds—the point of pest infestation when a management tactic must be used to prevent unacceptable damage from occurring. Sometimes an action threshold is a number: Five yellow jackets at a trash can, 10 percent feeding damage to a plant, or three flies in a conference room. Sometimes it is qualitative: Light or no infestation versus heavy infestation. Below the threshold, county staff can determine whether additional management action is needed beyond normal day-to-day prevention practices and inspections. If a pest is at or above the action threshold, staff must act to manage the pest beyond what is typical.

Action thresholds are easy to understand; however, establishing them is more difficult. Action thresholds may look very different from pest to pest (e.g., mouse vs. ant) and even for the same pest occurring in multiple environments. They are influenced by the type of pest, the environment, and what constitutes unacceptable damage in that environment. Action thresholds are also influenced by health or environmental concerns, aesthetics, cost, visibility, the seasons, goals of a property manager, and other factors.

Due to the unique characteristics of pests and site-specific variables involved in determining action thresholds, flexibility to determine thresholds is necessary. Because facility managers know their sites best, Hennepin County provides guidelines for determining if action will be necessary instead of setting specific thresholds for pests.

*Figure 6: Palmer amaranth is on Minnesota's prohibited noxious weed eradicate list. It is a fast-growing weed (2-3 inches per day) and a prolific seed producer (up to 500,000 seeds can come from one plant). It is resistant to multiple classes of herbicide. Photo credit: United. Soybean Board*

*Figure 7 Poison hemlock is highly poisonous to humans and livestock. It can be fatal if ingested. Photo credit: Melissa McMasters*

## Threshold Guidelines

- **Health and Safety Risk –** Consider if the pest (or the amount of the pest currently present) will cause irritation or harm to people. Also, consider the proximity of the pest to human activity, and the likelihood of humans to encounter the pest in the location. Generally, pests that pose a health and safety concern should have lower action thresholds.
- **The Pest Threat–** Consider the biological and general characteristics of the pest (e.g., its ability to reproduce, the potential extent of harm it can cause, and legal status). For example, a dandelion problem is very different from a wild parsnip problem (see Figure 9).
- **Economic Risk –** Consider if the pest (or the amount of pests currently present) will likely cause damage to plants, infrastructure, landscapes, or other property that would cause significant cost for the county. Generally, pests likely to cause economic damage should have lower action thresholds.
- **Environmental Risk –** Consider if the pest (or the number of pests currently present) will likely bring harm to plants, animals, water resources, or contribute to loss of natural habitat. Generally, pests that pose an environmental threat should have lower action thresholds.
- **Function –** Consider if the pest (or the number of pests currently present) will likely disrupt the function of the location. What is the location used for? Generally, a location used for human occupation (internal and/or external to a building) should have lower pest action thresholds.
- **Aesthetic Risk –** Consider if aesthetics is a critical factor for the location. Aesthetic damage occurs when the appearance of something is degraded. Examples include bird droppings on sidewalks, defoliation or flower damage to landscape plants, and disease spots in lawns. People often disagree over what level of aesthetic damage should trigger action. What is acceptable to one person may not be to another. Consider the visibility and function of the location. Generally, pests that cause aesthetic damage in highly visible locations should have lower action thresholds.

*Figure 8: Mature garlic mustard leaves. It is an invasive plant that releases chemicals that can harm the growth of neighboring native plants. Photo credit: Yankech gary*

*Figure 9: Wild parsnip. When the sap of wild parsnip comes in contact with skin in the presence of sunlight it can cause a chemical burn that can look like a blistering rash*

## Zero Tolerance Situations

There are instances where pests must be dealt with due to a clear danger to human health and safety (legal concerns), or to the property. Under these circumstances, the IPM program recommends a zero-tolerance threshold, in which action should take place immediately after identification of the pest in that location.

There are several pests that should not be tolerated due to the human and environmental harm they can do. Steps should be taken immediately upon discovery to remove or irradicate these pests from the building or outdoor environment. The following is a partial list of well-known pests that should not be tolerated.

*Figure 10: Bed bug after a blood meal. Bed bugs feed on humans and pets. Adult bed bugs can live up to one year without a blood meal. Photo credit: Mike Lewis for the Center for Invasive Species*

- Rodents and cockroaches in a food preparation area/kitchen
- Termites, bedbugs, and carpenter ants in buildings
- Poison hemlock, wild parsnip, poison ivy in outdoor spaces of county properties that the public visits frequently, such as libraries and office spaces
- Skunks, racoons, and other potentially disease-carrying animals.
- Wasps at building entrances or outdoor gathering spaces

Some very noticeable pests cause little damage to a plant, such as the white powdery mildew on lilac leaves. Some pests associated with plant foliage and fruit-bearing species may look severe but may only cause cosmetic damage. In situations such as these, taking no action may be the best approach.

## 4. Select best pest management tactics – decision making process

The IPM program recommends a hierarchy of management methods or a tiered approach to managing pests beginning with prevention through using cultural/sanitation methods (see Figure 11).

The goal of this program is to select a method that is the least toxic but effective approach. The program encourages selection of the most appropriate management tactics after considering all management methods in the IPM hierarchy from top to down with the use of pesticides being the method of last resort.

**Cultural/Sanitation** – Management activities that disrupt the normal relationship between the pest and the host and makes the pest less likely to survive, grow, or reproduce such as mulching, irrigation, seeding, eliminating food, water, shelter, or other necessities important to the pest's survival.

**Physical/Mechanical** – The use of physical barriers to prevent movement of pests or the physical removal or

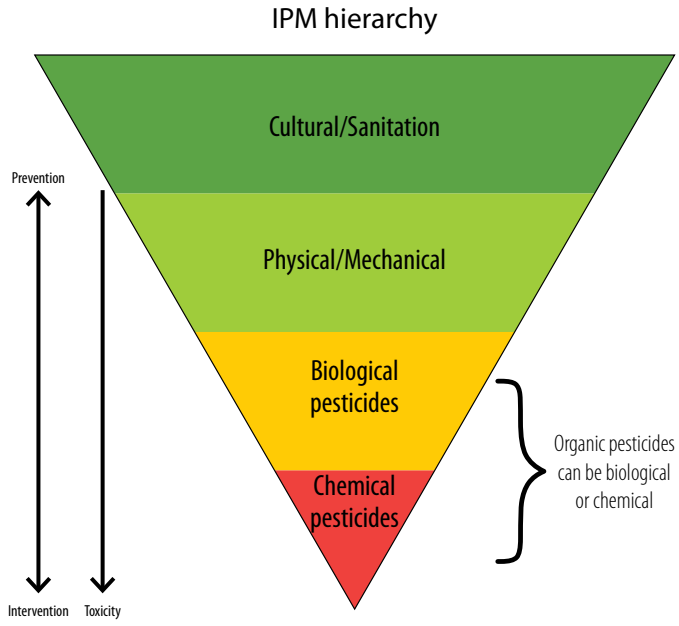


*Figure 11: IPM hierarchy*

destruction of pests. Examples include traps, heat or cold, hoes, hand removal, mowers, brush cutters, mulch, string trimmers, barriers like garden fabric and window screens (including caulking and steel wool for structural pests), or other physical means to control pests.

**Biological –** Biological controls are management activities performed using natural enemies (e.g., an insect or animal predator, parasite, fungus, nematode or other pathogen) or competitive organisms intentionally released by humans with the intention of causing a reduction in a host or pest population. This includes biological pesticides that are derived from natural materials, such as plants, animals, microorganisms, or certain minerals.

Biological controls can be a cost effective, sustainable, long-term strategy for reducing pest problems. For example, the adult flea beetle (aphthona lacertosa) is used to control the invasive leafy spurge plant. The adult beetle feeds on leaves and the larvae feed on leafy spurge roots to reduce leafy spurge plant infestations. Leafy spurge is a noxious weed that left uncontrolled reduces native plants.

**Pesticides –** When good cultural practices aren't enough to control pests and biological controls aren't available, it may be necessary to use a pesticide as a last resort to protect people, plants, or animals. Pesticides are any substance intended to kill, repel, or in any other way prevent or mitigate a pest's ability to cause harm. Pesticides can be man-made chemicals, natural materials, organic, insecticidal soaps and more. The registration, distribution, sale, and use of pesticides is governed by the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA).

*Figure 12: Leafy spurge is an invasive plant. Its milky sap is toxic to livestock. Photo credit: Wisconsin First Detector Network*

Pesticides are available as baits, granular formulations, and sprays/liquid formulations. Baits are used for mobile pests such as moles, mice, and slugs. Granular formulations combat weeds or soil insects, are easy to apply since they require no mixing, and can reduce the risk of drift. Sprays/liquid formulations can achieve pest control quickly, do typically require mixing, and their use depends on environmental conditions. Wind can cause unwanted drift of the pesticide onto nearby surfaces.

The management methods selected should be acceptable and practical for the site and the pest. When selecting a method, consider:

- Cost
- Ease of use
- Environmental protection
- Human safety and health
- Use/function/purpose of yard or garden
- Aesthetics
- Effectiveness
- Time
- Weather conditions such as temperature and wind

**Organic pesticides –** Though it is natural to think organic pesticides are safer than non-organic pesticides, some are not. Thinking a pesticide is safe(r) may lead some people to disregard needed and required safety practices resulting in misuse, placing people and the environment at risk. It is important to treat all pesticides, including organic pesticides, with the same level of care as the most toxic ones (UMN Extension).

The Pesticide Environmental Stewardship Program* also warns:

There is no relationship between "natural" and "safe," or between "synthetic" and "unsafe." Copper and sulfur, though natural elements used in pesticides approved for organic production, are more toxic to humans than many conventional pesticides. Safe pesticide use, therefore, is not dependent on whether a pesticide is natural or synthetic, but on following all label directions for the particular product.

*The Pesticide Environmental Stewardship Program is an Environmental Protection Agency (EPA) partnership program that works with the pesticide-user community to promote IPM.

## 5. Recordkeeping and evaluation

The recordkeeping of management methods used for specific pests and their effectiveness is an important element of IPM because it allows county staff to evaluate and understand what has been successful and what needs to be done differently.

Staff need time allocated for appropriate record keeping; however, record keeping is not intended to be burdensome. The following are examples of records that could be maintained as part of the IPM program:

- Pest identification and assessment (e.g., date, specific location, name, stage of life cycle, extent of infestation, other pertinent information)
- Maintenance practices performed to prevent or minimize pest populations and/or to enhance healthy plant growth
- Management methods implemented to control pests and their effectiveness (i.e., if pesticides were used, this will entail filling out a pesticide application form). Pesticide use records stored in a searchable, organized database.
- Evidence that non-chemical methods were implemented or considered
- Recommendations for preventing or managing future pest problems
- Any adverse effects on non-targets
- Other pertinent information

# Contact

To translate IPM principles into practice and to provide a customized approach to managing each pest, contact Hennepin County Environment and Energy department.

Matt Stasica, environmentalist
matthew.stasica@hennepin.us
612-348-3777

Hennepin