**Nontoxic Integrated Pest Management (IPM) Plan**
Adapted from materials created by Beyond Pesticides, Nontoxic Carlsbad, Pesticide Action Network and Consultants.

**Overview**

A Nontoxic Integrated Pest Management (IPM) Plan is an ecosystem-based strategy to manage pest problems using a variety of methods, techniques and processes without using toxic chemicals. It uses common sense, planning and documentation while utilizing a combination of hands-on, mechanical and nontoxic methods to minimizing pest damage (no single control method). The type of control(s) selected will likely vary on a case-by-case basis due to differing site conditions. Nontoxic pest control methods and materials are selected and applied in a manner that does not present risks to human health, pets, beneficial and non-target organisms, and will not contaminate surrounding air, water, soil or the environment.

A Nontoxic IPM is designed to safeguard and protect the health of infants, children, adults, landscapers and pets by not pollute or contaminate the air, water or land. (To be noted: Water from irrigation often pools, collects, can be consumed or contacted by children and pets, and can empty into and contaminate water sources.)

A Nontoxic IPM recognizes that not all weeds and insects are problematic or must be removed.

For removal of pests, techniques are used such as **mechanical removal** (weeders, sweeping webs, etc.), **biological control** (ladybugs, predators, goats, etc.), **habitat manipulation** and **environmental controls** (removal of food and water source, nontoxic mulch, etc.), **modification of cultural practices and routines** (irrigation, fertilization, mowing height, etc.) and **nontoxic substances** (vinegar, steam, nontoxic bait, etc.).

Only as a last resort, organic pesticides may be used for short-term remediation with documentation showing other methods have proven to be ineffective.

A Nontoxic IPM contains processes to:

* Identify the pest
* Tolerate harmless pests
* Design and implement controls based on knowledge of the pest's habits, life cycle, needs and dislikes
* Take steps to exclude the pest from the area, if possible, including physical removal: example “sweeping” to removing a spider web
* Take steps to remove the pest's food, water and shelter
* Determine the pest's travel patterns and locate their home-base
* Set a threshold to decide when it is time to act
* Monitor pest activity and adjust methods over time
* Identify all possible control tactics (tools in the toolbox)

**Six IPM Essentials**

1. **Monitoring**This includes regular site inspections and trapping to determine the types and infestation levels of pests at each site.
2. **Record-Keeping**
A record-keeping system is essential to establish trends and patterns in pest outbreaks. Information recorded at every inspection or treatment should include pest identification, population size, distribution, recommendations for future prevention, and complete information on the treatment action. Use a simple, straightforward record-keeping sheet that lists: date, location of problematic pest, description of the pest, proposed techniques and methods strategies and tactics and actions taken that focusing on long-term prevention of damage by pests and includes a place to write notes to allow others to help monitor and evaluate the situation.
3. **Action Levels**Pests will virtually never be eradicated. An action level is the population size which requires remedial action for human health, economic, or aesthetic reasons.
4. **Prevention**Preventive measures must be incorporated into the existing structures and designs for new structures. Prevention is and should be the primary means of pest control in an IPM program.
5. **Tactics Criteria**Under IPM, chemicals are used only as a last resort. When used, organic, nontoxic materials are chosen and applied to minimize exposure to humans and all non-target organisms.
6. **Evaluation**A regular evaluation program is essential to determine the success of the pest management strategies. Revisit yearly to improve, with the goal of zero toxic pesticides and limited use of organic pesticides.

**Pest Control Tactics**

The primary pest control tactics are:

* Cultural
* Mechanical
* Environmental/Physical, Habitat Controls
* Biological
* Nontoxic Substances

**Cultural Controls**

Cultural controls are modifications of normal plant care activities that reduce or prevent pests. Cultural control methods include adjusting the frequency and amount of irrigation, fertilization and mowing height. For example, spider mite infestations are worse on water-stressed plants; over-fertilization may cause succulent growth which then encourages aphids; too low of a mowing height may thin turf and allow weeds to become established.

**Mechanical Controls:**

Mechanical control tactics involve the use of manual labor and machinery to reduce or eliminate pest problems, such as handpicking, sweeping webs from bushes, physical barriers, or machinery. Other examples include hoeing and applying mulch to control weeds, using trap boards for snails and slugs, and use of traps for gophers.

**Environmental/Physical Controls:**

The use of environmental/physical controls such as altering temperature, light, and humidity, can be effective in controlling pests. Although in outdoor situations these tactics are difficult to use for most pests, they can be effective in controlling birds and mammals if their habitat can be modified such that they do not choose to live or roost in the area. Other examples include removing garbage in a timely manner and using netting or wire to prevent birds from roosting.

**Biological Controls:**

Biological control practices use living organisms to reduce pest populations. These organisms are often also referred to as beneficials, natural enemies or biocontrols. They act to keep pest populations low enough to prevent significant economic damage. Biocontrols include pathogens, parasites, predators, competitive species, and antagonistic organisms. Biocontrols can occur naturally or they can be purchased and released.

The most common organisms used for biological control in landscapes are predators, parasites, pathogens and herbivores.

* Predators are organisms that eat their prey (e.g. Ladybugs)
* Parasites spend part or all of their life cycle associated with their host. Common parasites lay their eggs in or on their host and then the eggs hatch, the larvae feed on the host, killing it (e.g. tiny stingless wasps for aphids and whiteflies)
* Pathogens are microscopic organisms, such as bacteria, viruses, and fungi that cause diseases in pest insects, mites, nematodes, or weeds (e.g. Bacillus thuringiensis or BT)
* Herbivores are insects or animals that feed on plants. These are effective for weed control (e.g. goats).

Biocontrols for weeds eat seeds, leaves, or tunnel into plant stems (e.g., goats and some seed and stem borers)

In order to conserve naturally occurring biocontrols, no broad-spectrum pesticides of any kind are used since the use of these types of pesticides results in secondary pest outbreaks due to the mortality of natural enemies that may be keeping other pests under control

**Nontoxic Substances**

**Selected Examples:**

* Apple Cider and White Vinegar: slugs, ants, snails
* Apple Cider and White Vinegar: Herbicide (weeds, etc.)
* Apple Cider White Vinegar: Fungicide
* Black Pepper: Ants
* Essential Oils- Insects (many varieties: citrus oil for ants, orange oil for termites, peppermint oil for spiders, etc.)

**Least Toxic Pesticides**

Organic pesticides are a last resort under the tenets of a Nontoxic IPM. This control strategy is only to be used on city owned or controlled properties and rights of way after general preventative practices and non-chemical options have been fully explored.

Organic pesticides may only be used as a short-term remediation with documentation showing other methods have proven to be ineffective to provide adequate control of pests and before pest populations cause unacceptable damage.

Consideration will always be given to the proximity to water bodies, irrigation schedules, weather, etc., that may result in the pesticide being moved off-site, into the environment.

The term “least toxic” refers to pesticides that have low or no acute or chronic toxicity to humans, affect a narrow range of species and are formulated to be applied in a manner that limits or eliminates exposure of humans and other non-target organisms.

Examples of least toxic pesticides include products formulated as baits, pastes or gels that do not volatilize in the air and that utilize very small amounts of the active ingredient pesticide, and microbial pesticides formulated from fungi, bacteria or viruses that are toxic only to specific pest species but harmless to humans.

 **Least toxic pesticides include:**

• Boric acid and disodium octobrate tetrahydrate

• Silica gels

• Diatomaceous earth

• Nonvolatile insect and rodent baits in tamper resistant containers

• Microbe based pesticides

• Pesticides made with essential oils (not including synthetic pyrethroids) without toxic synergists

• Materials for which the inert ingredients are nontoxic and disclosed.

**Least-toxic pesticides must meet the following criteria:**

1. NO Products that contain known, likely, or probable carcinogens - as listed by the CA Office of Environmental Health Hazard Assessment.
2. NO Products that contain reproductive toxicants (CA Prop 65).
3. NO Products that contain items listed by the CA Department of Toxic Substance Control as known, probable, or suspected endocrine disrupters
4. NO Products that contain active ingredients with a soil half-life of thirty days or more.
5. NO Products labeled as toxic to fish, birds, bees, wildlife, or domestic animals.

**The term least toxic pesticides does not include a pesticide that is:**

* Determined by the U.S. EPA to be a possible, probable or known carcinogen, mutagen, teratogen, reproductive toxin, developmental neurotoxin, endocrine disrupter or immune system toxin.
* Any pesticide in the U.S. EPA’s Toxicity Category I or II.
* Any application of any pesticide using a broadcast spray, dust, tenting, or fogging application.

**Chemical pesticide application notification signs shall meet the following criteria:**

1. Posted at perimeter of outdoor areas or at building entrances, where chemical pesticides are to be applied.
2. Posted at least 24 hours prior to application of chemical pesticides and shall remain for at least 72 hours after the application.
3. Include “Notice – Pesticide Treated Area,” and product’s/manufacturer’s name, scheduled date of application, and pest to be controlled - e.g., weeds, insects, rodents.

**Not To Be Used**

Any pesticide that is broad-spectrum and/or persistent shall not be used as it can cause environmental damage and increase the likelihood of pesticide resistance.

**Information About Pesticide Controls**

Pesticides, as defined in California Food and Agriculture Code Section 12753, includes any of the following: (a) any spray adjuvant; (b) any substance, or mixture of substances which is intended to be used for defoliating plants, regulating plant growth or for preventing, destroying, repelling or mitigating any pest...which may infest or be detrimental to vegetation, man, animals, or households, or be present in any agricultural or nonagricultural environment whatsoever.

The term pesticides include organic and chemical products. Insecticides, herbicides, fungicides and rodenticides are all pesticides.

**Employee Training**

Staff and contractors must know the information on the chemical label and the MSDS before using or handling the chemical. In addition, they will be trained annually and when a new pesticide is to be used.

The certified pest control applicators must know:

• The immediate and long-term health hazards posed by chemicals to be used, the common symptoms of chemical poisoning, and the ways poisoning could occur

• The safe work practices to be followed, including the appropriate protective clothing, equipment, mixing, transportation, storage, disposal and spill cleanup procedures applicable to the chemical used

• In addition to the training and annual continuing education required for certification, staff will be encouraged to participate in pesticide application programs that are above and beyond minimum compliance requirements.

**Revisions**

Staff will review the IPM plan annually at minimum and update it as needed.