City of Newport Beach

INTEGRATED PEST MANAGEMENT (IPM) POLICY &
IMPLEMENTATION GUIDELINES

*GENERAL IPM POLICY:

For the last 55 years, the trend in pest management has increasing relied on synthetic chemical pesticides. The result has been not only a tremendous increase in the use of many dangerous chemicals, but also an increase in the number of pests that are resistant to the pesticides or new organisms becoming pests. Additionally, some pesticides used for terrestrial pest management have been found in waterways causing problems in the aquatic environment.

Pest control managers are now moving away from their reliance on pesticides alone toward an integrated approach that combines limited pesticide use with more environmentally friendly pest control techniques. This system is known as integrated pest management (IPM), a strategy that focuses on the long-term prevention of pests or their damage through a combination of techniques, including preventative, cultural, mechanical, environmental, biological, and chemical control tactics (**Figure 1**). The techniques are utilized simultaneously to control pest populations in the most effective manner possible.

Developing a comprehensive Integrated Pest Management (IPM) Program and approach allows us to focus on our primary efforts of pollution prevention. By monitoring and preventing pests as well as minimizing heavy pest infestations we can reduce the need for chemicals and/or multiple applications.

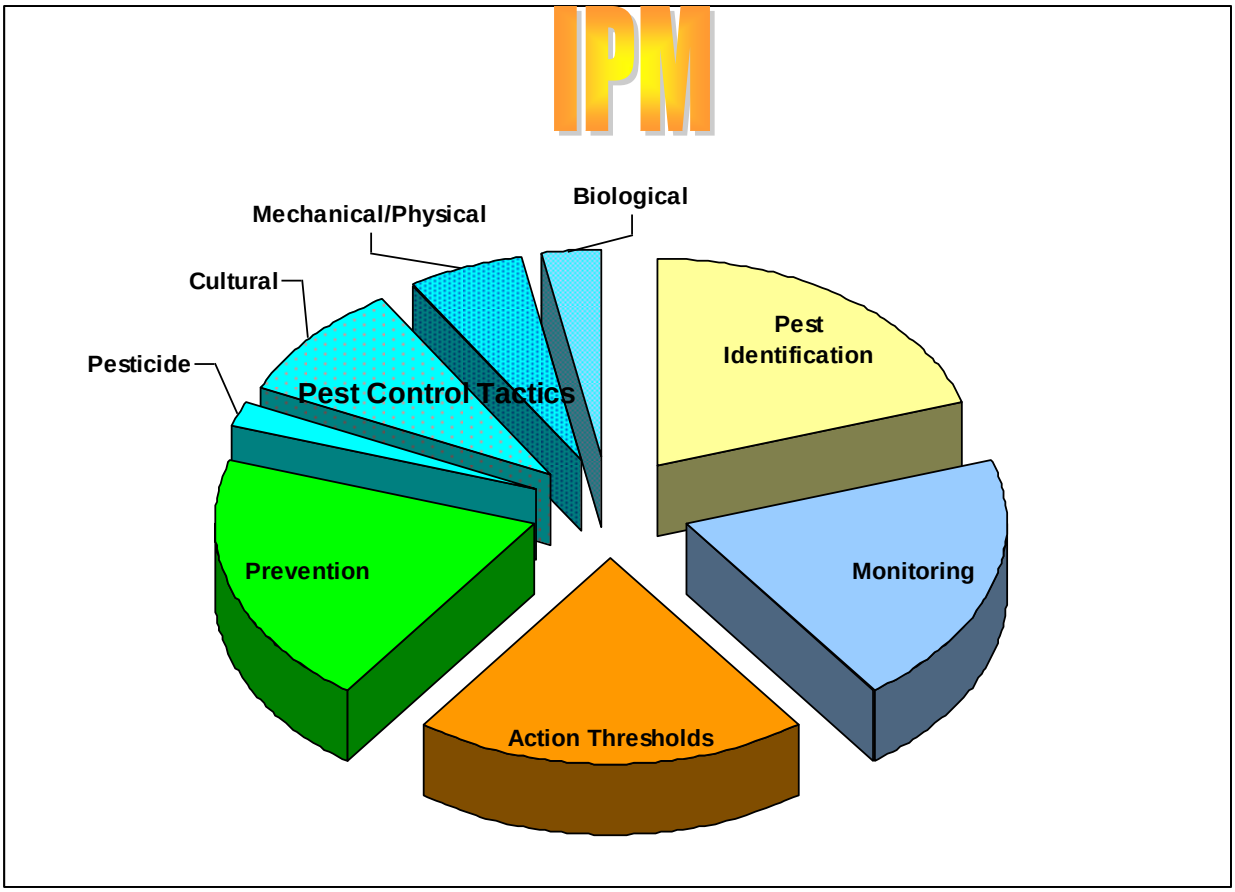
IPM programs utilize monitoring techniques and injury and economic thresholds to determine when to implement control strategies. Treatments are used only used according to established guidelines after monitoring indicates that such treatment is appropriate. Pest control materials are selected and applied in a manner that minimizes risks to human health, beneficial and non-target organisms and the environment.

The use of pesticides is often a measure of last resort. Because of this, the management guidelines for pesticide use are presented in a separate section immediately following the IPM guidelines.

* Original language is contained in Orange County Drainage Area Management Plan, Section 5.5.2 Integrated Pest Management adopted in 2003.

Figure 1

Components of an Integrated Pest Management Program



Scope of IPM Policy and Implementation Plan

IPM practices are encouraged over the sole use of pesticides as the primary means of pest management (**Table 1**). As a part of the Municipal Activities Program Manual, the public agencies and their contractors should evaluate the non-chemical components of IPM before intensive use of pesticides.

The goal of IPM is not to eliminate all pests, but to keep their populations at tolerable levels. Pesticides may be part of an IPM program, but they should only be used after the pests exceed established thresholds and only applied in the affected area (in the case of disease prevention, some modifications may be allowed). In general, all pest control strategies should be those that are least disruptive to biological control organisms (natural enemies), least hazardous to humans and the environment

(including non-target organisms), and have the best likelihood of long-term effectiveness.

Table 1. Advantages and Disadvantages of a Pesticide-Based Program versus an IPM-Based Pest Control Program

Pesticide Based Pest Control		**IPM Based Pest Control**	
Advantages	**Disadvantages**	**Advantages**	**Disadvantages**
Quick suppression of pests	Not long-term	Long-term control	It may take longer to see results
	Pest control is reactive	Can be proactive in pest control actions	Must establish thresholds
	Loss of natural controls. Often get outbreaks of other pests	Reduces disruption of natural enemies	
		Pesticides can be used (only used as last resort).	Must have knowledge of pesticides and their effects on other organisms.
Labor is only for spraying	Extra work in cleanup	Staff becomes more knowledgeable of pests and injury symptoms	Labor is required for monitoring and regular scouting Training is required to identify pests and natural enemies.
Not much preparation or follow-up needed	Need a PCA recommendation	Pest management is more organized	Must maintain a record-keeping system.

	Pesticide safety issues for applicators, public, animals	Less exposure to pesticides
	More pesticides in environment	Safer to the environment
	Contamination of water bodies from runoff	Reduces contamination from runoff

Pesticides should not be applied until pests are approaching damaging levels. Because this requires early detection of the pests, monitoring on a regular basis is extremely important and should also be used to determine if natural enemies are present and adequately controlling the pest. If possible, a person should be trained and assigned to scout the sites on a regular basis.

Components of an IPM Program

An IPM program is a long-term, multi-faceted system to manage pests (**Figure 1**). Use of pesticides is a short-term solution to pest problems and should be used only when the other components fail to maintain the pests or their damage below an acceptable level. Successful IPM practitioners are knowledgeable about the biology of the plants and pests and successful IPM programs primarily use combinations of cultural practices as well as a combination of physical, mechanical and biological controls.

Pest Identification

It is important to learn to identify all stages of common pests at each site. For example, if you can identify weed seedlings, you can control them before they become larger and more difficult to control and before they flower, disseminating seeds throughout the site. It is also important to be sure that a pest is actually causing the problem. Often damage such as wilting is attributed to root disease but may actually be caused by under watering or wind damage.

Prevention

Good pest prevention practices are critical to any IPM program, and can be very effective in reducing pest incidence. Numerous practices can be used to prevent pest incidence and reduce pest population buildup such as the use of resistant varieties, good sanitary practices and proper plant culture. Examples of prevention include choosing an appropriate location for planting, making sure the root system is able to grow adequately and selecting plants that are compatible with the site's environment.

Monitoring

The basis of IPM is the development and use of a regular monitoring or scouting program. Monitoring involves examining plants and surrounding areas for pests, examining tools such as sticky traps for insect pests and quantitatively or qualitatively measuring the pest population size or injury. This information can be used to determine if pest populations are increasing, decreasing, or staying the same and to determine when to use a control tactic. Weather and other environmental conditions may also play a factor in whether a pest outbreak may occur so it is important to monitor temperature and soil moisture as well.

It is important to use a systematic approach when monitoring, for example you should examine leaves of a similar age each time you check for pests, rather than looking at the older leaves on some plants and younger ones on others. Randomly looking at a plant and its leaves does not allow you to track changes in pest population or damage over time.

It is important to establish and maintain a record-keeping system to evaluate and improve your IPM program. Records should include information such as date of examination, pests found, size and extent of the infestation, location of the infestation, control options utilized, effectiveness of the control options, labor and material costs.

Injury Levels and Action Thresholds

In order to have a way to determine when a control measure should be taken, injury levels and action thresholds must be set for each pest. An injury level is the level of unacceptable damage. For example, the injury level for a leaf-feeding beetle may be set at 30% of the leaves being damaged. Action thresholds are the set of conditions required to trigger a control action. An example of this would be finding an average of 5 or more beetles on 10 shrubs in a location. Action thresholds are set from previous experience or published recommendations and based on expected injury levels. Injury levels are often set by the public's comments.

Pest Control Tactics

Integrated pest management programs use a variety of pest control tactics in a compatible manner that minimizes adverse effects to the environment. A combination of several control tactics is usually more effective in minimizing pest damage than any single control method. The type of control that an agency selects will likely vary on a case-by-case basis due to the varying site conditions.

The primary pest control tactics to choose from include:

- Cultural
- Mechanical/Physical
- Biological
- Pesticide

Cultural Controls

Cultural controls are modifications of normal plant care activities that reduce or prevent pests. In addition to those methods used in the pest preventions, other 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/Physical Controls

Mechanical control tactics involve the use of manual labor and machinery to reduce or eliminate pest problems using methods such as handpicking, physical barriers, or machinery to reduce pest abundance indirectly. Examples include hand-pulling or hoeing and applying mulch to control weeds, using trap boards for snails and slugs, and use of traps for gophers.

The use of physical manipulations that indirectly control or prevent pests by 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. Examples include removing garbage in a timely manner and using netting or wire to prevent bird 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. Beneficial organisms can occur naturally or 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).

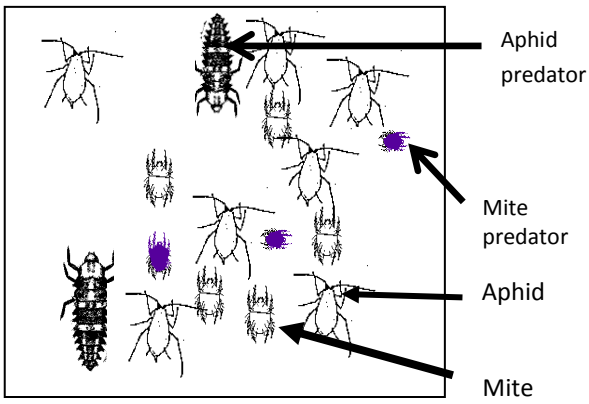
- Herbivores are insects or animals that feed on plants. These are effective for weed control. Biocontrols for weeds eat seeds, leaves, or tunnel into plant stems (e.g. goats and some seed and stem borers).

In order to conserve naturally occurring beneficials, broad-spectrum pesticides should not be used since the use of these types of pesticides may result in secondary pest outbreak due to the mortality of natural enemies that may be keeping other pests under control (**Figure 2**).

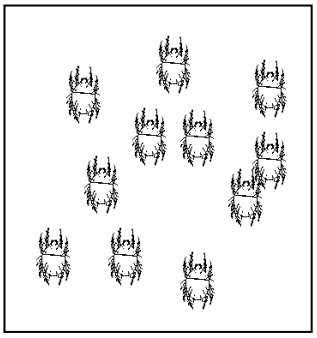
Figure 2

Example of Secondary Pest Outbreak
Caused By Use of a Broad Spectrum Insecticide

A. Aphids and mites controlled by predators



B. After a broad spectrum spray for aphids, predators for mites and aphids are also killed, resulting in an outbreak of mites.



Pesticide Controls

Any substance used for defoliating plants, regulating plant growth or preventing, destroying, repelling or mitigating any pest, is a pesticide. Insecticides, miticides, herbicides, fungicides, rodenticides and molluscides are all pesticides. Anything with an EPA or DPR registration number on the label is a non-exempt pesticide.

Pesticides should only be used when other methods fail to provide adequate control of pests and just before pest populations cause unacceptable damage. The overuse of pesticides can cause beneficial organisms to be killed and pest resistance to develop. When pesticides must be used, considerations should be made for how to use them most successfully. Avoid pesticides that are broad-spectrum and relatively persistent since these are the ones that can cause the most environmental damage and increase the likelihood of pesticide resistance. Always choose the most specific but least toxic to non-target organisms method.

In addition, considerations should be given to the proximity to water bodies, irrigation schedules, weather (rain or wind), etc. that are secondary factors that may result in the pesticide being moved off-site into the environment. Consideration should be made of the temporary loss of use of an area (application in a park may result in the area being sectioned off)

IMPLEMENTION GUIDELINES:

Enter Designated IPM Coordinator or IPM Contact Information Below:

Dan Sereno-Superintendent

City of Newport Beach

949-644-3055

Personnel responsible for the care and maintenance of facilities under the above-mentioned jurisdiction agree to implement a suite of basic integrated pest management procedures selected from the following five main components of an IPM program:

I) Prevention

II) Pest and Symptom Identification

III) Monitoring for Pests and Problems

IV) Action Thresholds and Guidelines

V) Selection of Appropriate Management Methods (Control Tactics)

The procedures seek to increase the long-term prevention and suppression of pest problems (insects, weeds, diseases, and vertebrates) with the minimum impact on human health, the environment, and non-target organisms. Emphasis is placed on improving cultural practices to prevent problems and utilizing alternative control measures instead of broad spectrum pesticides.

Information on the latest IPM information including management of new pests in the landscape is obtained from local UC Cooperative Extension Advisors, UC IPM Regional Advisor, or the Statewide UC IPM Web Site at www.ipm.ucdavis.edu.

I. PREVENTION

A. Landscape Design Procedures *(a minimum of three must be selected)*

X Drainage, soil characteristics, water quality and availability are considered during plant selection.

X Sun exposure, heat, and high temperature conditions are considered during plant selection.

X Adequate space is allowed for root growth, especially trees.

X Nursery stock is inspected and rejected if not healthy (injuries, diseased, circling roots/potbound, poor staking and/or pruning).

X Pest resistant species and cultivars are selected.

X Plants with similar growth characteristics and irrigation requirements are grouped together.

X Landscape design matches available irrigation technology to avoid excess water use and to minimize surface runoff.

B. Site Preparation and Planting Procedures *(a minimum of three must be selected)*

X Assess soil drainage properties and improve compacted soils prior to planting.

X Conduct a soil analysis to determine chemical and physical properties of the existing soil and then add appropriate amendments such as organic matter.

X Ensure irrigation is installed as designed in order to avoid poor uniformity once plants are in place.

X Follow proper planting procedures for particular plant species to avoid planting too deeply or too shallow.

☐ Nursery tree stakes are removed at planting and replaced with staking that allows trunk to flex; removing these stakes after 1 to 1.5 years.

☐ Utilize a soil probe or other soil moisture measurement device to monitor soil moisture levels in existing root ball and surrounding soil during establishment period.

C. Water Management *(a minimum of three must be selected)*

X Plants are examined weekly for symptoms of water stress and to assist in determining irrigation scheduling.

☐ Monitor soil moisture with a soil probe or soil moisture sensors to assist in scheduling irrigation.

X Utilize evapotranspiration (ET) data or 'smart' clock technology to schedule irrigation.

X Cyclic irrigation (short-multiple run times) is employed to minimize surface runoff.

X Utilize low precipitation sprinklers or low-volume systems to reduce surface runoff.

X Systems are inspected monthly to check for leaks, broken pipes, and clogged or broken sprinkler heads.

X Adjust sprinklers to avoid application of water directly to the trunk of trees (can promote disease) or on to concrete surfaces where it can enter storm drains.

☐ Establish a hotline or email or other dedicated method where citizens can report leaks and broken sprinkler heads

D. Fertilizing Procedures *(a minimum of three must be selected)*

X Fertilize only when plants are actively growing to avoid nutrient losses below the root zone.

X Fertilizer is not applied within 48 hours of a rain event to avoid losses below the root zone and in surface runoff.

X Soil analyses are conducted in order to determine existing nutrient levels in the soil prior to fertilizing.

X Turf grass fertilizer maintenance schedules are based on UC recommendations found online at UC Guide for Healthy Lawns.

http://www.ipm.ucdavis.edu/TOOLS/TURF/MAINTAIN/fertilize.html

X Sports turf grass fertilizer maintenance guidelines are based on UC recommendations found in **Establishing and Maintaining the Natural Turf Athletic Field (UCR ANR Publication Number: 21617).**

X Overfertilization, especially of trees and shrubs, is avoided to ensure plant growth is not excessively succulent making it more susceptible to pest infestations.

X Off-target fertilizer applications or spills are cleaned up immediately by sweeping up and applying to landscape or turf or replacing in spreader or bag to ensure material does not enter storm drains.

E. Pruning Procedures *(a minimum of three must be selected)*

X Damaged or diseased wood is regularly pruned from landscape plants.

X Trees are pruned according to standards set forth by a professional tree care organization such as the International Society of Arboriculture.

☐ Replace plants too large for a space instead of pruning them severely.

X Unnecessary pruning is avoided as wounds are entry sites for decay and disease organisms.

☐ The age and species of the plant is taken into account when determining the time of year to prune. For example, eucalyptus should be pruned in December and January when long-horned beetles are not active.

☐ Tree height reduction is discouraged. When deemed necessary by a licensed arborist, the crown reduction method approved by a professional tree care organization is utilized. Topping is never done to reduce tree size. NO TOPPING OR 'HAT RACKING' IS PERMITTED.

II. PEST AND SYMPTOM IDENTIFICATION

A. Insects, Mites, and Snails and Slugs *(a minimum of three must be selected)*

X Field personnel are trained to recognize basic pests found in the landscape in the following groups: insects, mites, and mollusks.

X A licensed Pest Control Adviser is on staff or hired to properly identify a pest and the symptoms caused by the pest.

☐ Field personnel are trained to utilize disease life cycles to apply treatments when the organism can be controlled most effectively.

X Field personnel are trained to distinguish between beneficial insects and actual pests found in the landscape (e.g. parasitizing wasps).

☐ Unknown samples are submitted to the Orange County Agricultural Commissioner for identification by the county entomologist or plant pathologist.

X Abiotic or nonliving factors (wind, sunburn, air pollution, etc…) are considered as possible causes of observed symptoms as well as biotic (living) factors.

B. Weeds *(a minimum of one must be selected)*

X Field personnel are trained to identify common weeds in the landscape.

☐ Field personnel are trained to utilize weed life cycles to properly control weeds such as controlling crabgrass utilizing a pre-emergent herbicide applied in mid-January.

X A licensed Pest Control Adviser is on staff or contracted to properly identify the pest.

C. Diseases *(a minimum of one must be selected)*

☐ Field personnel are trained to recognize common diseases or their signs/symptoms in the landscape.

☐ Field personnel are trained to utilize disease life cycles to apply treatments when the organism can be controlled most effectively.

☐ Field personnel are trained to recognize the difference between biotic and abiotic problems.

☐ Field personnel are trained to understand how common diseases are spread throughout the landscape.

☐ Disease signs and symptoms are sampled and submitted to the Orange County Agricultural Commissioner for identification by the county plant pathologist.

X A licensed Pest Control Adviser is on staff or contracted to properly identify the pest.

X Photographs of disease signs and symptoms are taken and compared to reference guides such as UC IPM's *Pests of Landscape Trees and Shrubs*.

D. Vertebrates *(a minimum of one must be selected)*

X Field personnel are trained to recognize vertebrate pests and the damage they cause in the landscape.

☐ Field personnel are trained to utilize vertebrate behavior to properly control the pest most effectively.

☐ At least one field staff member is trained in vertebrate baiting and trapping.

X A licensed Pest Control Adviser is on staff or contracted to properly identify vertebrate pest.

III. MONITORING FOR PESTS AND PROBLEMS

A. Insect/Mollusk Monitoring Procedures *(a minimum of three must be selected)*

☐ Visually inspect plants for insects, mites, snail and slug damage at least monthly; recording results utilizing a method conducive to tracking changes and easy recall of data.

☐ Yellow sticky traps are utilized to assess populations of insects.

X Insects are dislodged from plants by shaking over a collection surface usually consisting of a clipboard with a white sheet of paper.

☐ If available for a particular insect, phermone-baited traps are utilized.

X Soil-dwelling turf insects are brought to the surface for monitoring by flushing a specific area of soil (i.e. 2’ x 2’ grid) with plain water or a soapy water mixture.

X The amount of honeydew (aphids) and frass (caterpillars) present is utilized as an indicator of population levels.

B. Weed Monitoring Procedures *(a minimum of two must be selected)*

X Landscapes are inspected at least 4 times a year (early winter, early spring, summer and early fall) for weeds in order to determine if and when a weed problem exists.

X Utilize site surveys to record the location, date, and severity of weed problem; recording results utilizing a method conducive to tracking changes and easy recall of data.

☐ Count and record the number of weeds encountered at periodic intervals (e.g. every 1 to 2 feet) along a straight line transecting a landscapes area or within a selected area, for example 4 sq. ft. samples done in random places in a bed or turf area.

C. Disease Monitoring Procedures *(a minimum of two must be selected)*

X Landscapes are regularly checked for conditions, such as overwatering and injuries, which promote disease.

X Landscapes are checked monthly, at a minimum, for disease symptoms and signs. Disease prone plants are checked more frequently.

☐ Records are kept utilizing a method conducive to tracking changes and easy recall of data of each landscape inspection noting, date when disease signs and symptoms were first noticed and the current environmental conditions and soil moisture levels.

D. Vertebrate Monitoring Procedures *(a minimum of two must be selected)*

X Landscapes are regularly inspected for vertebrate presence either by damage caused by animal, actual animal sightings, and/or droppings.

X Records are kept of the absence or presence of actual vertebrates, the damage caused, and/or the presence or absence of droppings.

☐ Maps are created and updated at least twice a year, recording area of high vertebrate damage or signs (such as gopher mounds).

IV. ACTION THRESHOLDS AND GUIDELINES

A. Insect/Mollusk Thresholds and Guidelines *(a minimum of one must be selected)*

X Insect tolerance levels are established based on the public's acceptance of damage to the landscape or a certain level of nuisance pests (i.e. ants), the actual plant species in the landscape, and long-term monitoring and knowledge of pests causing the damage.

☐ Thresholds are based on levels were reasonable control of the pest can be achieved with minimum impact on the environment.

☐ Insect monitoring records are utilized to establish threshold levels for the implementation of control strategies. For example, the threshold for the presence of aphids on a rose garden at City Hall is low, while in a native shrub border it might be considerably higher.

B. Weed Thresholds and Guidelines *(a minimum of one must be selected)*

X Weed tolerance levels are established based on public safety or the public's acceptance and the resources available to manage the landscape at that level.

☐ Weed monitoring records are utilized to rank the percentage of the landscape area infested (none, light, moderate, heavy, or very heavy) with weeds.

☐ Public areas are ranked according to high, medium, or low level of weed control and management conducted according to levels set for each rank (see Appendix A)

C. Disease Thresholds and Guidelines *(a minimum of one must be selected)*

X Disease tolerance levels are established based on the public's acceptance and the resources available to manage the landscape at the level required.

☐ Disease monitoring records are utilized to establish threshold levels for the implementation of control strategies. For example, the threshold for the presence of powdery mildew on roses at City Hall is much lower than the threshold for its presence on Euonymus in a parking lot at a city sports park.

D. Vertebrate Thresholds and Guidelines *(a minimum of one must be selected)*

X Vertebrate tolerance levels are established based on public safety, the public's acceptance and the resources available to manage the landscape at the level required.

☐ Vertebrate monitoring records are utilized to establish threshold levels for the implementation of control strategies. For example, the threshold for the presence of gopher mounds in a sport field is zero, while in a native shrub border it might be two before a trapping strategy is implemented.

V. SELECTION OF APPROPRIATE MANAGEMENT METHODS

A. Insect/Mollusk Management Methods

Cultural/Mechanical/Physical Control Methods *(a minimum of three methods must be selected)*

☐ Sticky barriers are applied to trunks of trees and large shrubs to prevent ants and other wingless invertebrates from plant canopies.

X Small insect infestations are removed by pruning infested plant parts.

☐ Copper bands are installed around base of trees or planting areas where snail and slug infestations are prevalent.

☐ Plant canopies are thinned to increase light penetration to exposure certain soft-bodied insects (soft-scale) as well as snails and slugs to heat.

X Strong streams of water are used to dislodge insects such as aphids and whiteflies, from leaves.

X Avoid use of plants that snails and slugs use for shelter.

☐ Avoid irrigating between 5pm and 5am when moisture remains on plant material for several hours.

Biological Control Methods (*a minimum of one method must be selected)*

X Persistent broad-spectrum pesticides are avoided, especially if biological control of an insect has been established by UC researchers. Examples include parasitoid wasps controlling Eugenia Psyllids, Giant Whitefly, and Ash Whitefly.

☐ Natural predators (beneficial insects) are augmented with purchases of additional predators from commercially available resources.

Pesticide Control Methods (*a minimum of five methods from must be selected)*

X The most selective, rather than broad-spectrum, pesticide is used

☐ If available for controlling a particular insect, biological and botanical pesticides are selected

☐ Insecticidal soaps are utilized to control infestations of soft-bodied insects such as aphids, thrips, and immature scales.

X Horticultural oils (neem oil and narrow-range refined oils) are utilized to control infestations of soft-bodied immature and adult insects such as aphids, scales, and whiteflies.

☐ Pesticides are only utilized when the potential for impacts to the environment, especially water quality, are minimized.

X Equipment is calibrated prior to the application of the insecticide to avoid excess material being applied to the landscape environment.

X Applicators are trained to not apply pesticides to hard surfaces and to not allow any pesticide to enter the storm drain system

X Spot treatments are utilized rather than broadcast methods

X Insecticide/fertilizer combinations are only used if appropriate timing for BOTH the insecticide application and the fertilizer application.

B. Weed Management Methods

Cultural, Mechanical, and Physical Control Methods *(a minimum of three methods must be selected)*

☐ Timers are set to avoid overwatering as weeds establish in areas where soil moisture is excessive.

X Drainage is managed to avoid wet areas.

X Weeds are removed from a site prior to planting.

X Mower height is adjusted to turf species and time of year.

☐ Mower is washed after mowing a weedy site.

☐ Hand-pulling, mowing, trimmers/brushcutters, flaming, hoeing, and rototilling around landscape plants are the main methods utilized to control annual weeds and young perennial weeds.

☐ Soil solarization is utilized to control some annual and perennial weed species.

☐ Bare soil areas are covered with a thick layer of mulch to suppress weeds and conserve soil moisture.

X Soil, mulch, and plant material is weed-free before it is introduced into the landscape.

Pesticide Control Methods *(a minimum of three methods must be selected)*

X Spot treatments are utilized rather than broadcast methods.

X Herbicide/fertilizer combinations are only used if appropriate timing for BOTH the herbicide application and the fertilizer application.

☐ Herbicides are utilized according to established thresholds (see Appendix A).

☐ Organically acceptable herbicides (shown to be effective through science-based research) are used where appropriate.

X Herbicides are applied to the stage of weed growth most susceptible to the chemical.

X Equipment is calibrated prior to the application of the herbicide to avoid excess material being applied to the landscape environment.

C. Disease Management Methods

Cultural, Mechanical, and Physical Control Methods *(a minimum of three methods must be selected)*

X Prune out and dispose of localized areas of diseased plants.

☐ Pathogen-infested plant parts are removed from the soil surface area to reduce certain pathogens (e.g. Camellia Petal Blight).

X Pruning tools are sterilized (e.g. a diluted bleach solution) between plants to prevent the spread of pathogen to other plants.

X Proper irrigation and fertilization are maintained to prevent plant stress, water-logging, and subsequent susceptibility to disease.

☐ Soil solarization is utilized to control soil pathogens in annual beds where it is most effective.

☐ Mulch is kept at least 6” from base of plants to avoid excessive moisture around crown possibly resulting in crown rots and is no deeper than 4”

X Replace disease-prone plants with non-susceptible species.

Pesticide Control Methods *(a minimum of two methods must be selected)*

X Preventative fungicides and bactericides are only used where diseases can be predicted from environmental conditions and applied prior to infection or the appearance of symptoms.

X Synthetic fungicides are used sparingly in the landscape and only in high visibility areas in order to minimize development of resistance.

☐ Organic fungicides and bactericides are utilized in combination with cultural, mechanical, and physical control methods in order to improve their effectiveness.

☐ Copper-based fungicides are only utilized in situations where its entry into surface runoff and storm drains is virtually impossible and after consultation with PCA and IPM coordinator.

☐ Mycopesticides, commercially available beneficial microorganisms, are used where appropriate.

X Fungicides classes are rotated to avoid resistance.

D. Vertebrate Management Methods

Cultural and Physical Control Methods *(a minimum of two methods must be selected)*

☐ Groundcovers are maintained such that they do not harbor rats.

☐ Shrubs pruned at least 1 foot from the ground (rats).

☐ Sources of drinking water removed (leaky faucets, puddles).

X Trash cans have lids and are emptied daily (rats).

☐ Screens or other barriers installed under structures that have a space between soil and floor (rabbits).

☐ Habitat modification, based on pest biology is used to reduce shelter.

X Trapping is used for gophers when safe and practical.

☐ Kill traps used for ground squirrels and rabbits, are checked daily, and in places not accessible by children or non-target animals.

☐ Gas cartridges are used for ground squirrels according to UC recommendations.

Pesticide Control Methods *(a minimum of two methods must be selected)*

X Anti-coagulant baits are used and applied according to label and UC recommendations.

X Bait is applied in a manner that non-target animals do not access to it.

X Restricted use rodenticides, aluminum or zinc phosphide, are used only after applicator has been trained for that product or only by a wildlife management contractor.

VI. GENERAL PESTICIDE MANAGEMENT PRACTICES

(all practices listed below must be selected)

X Restricted use pesticides are only used when no other alternatives are practical.

X If pesticides are necessary, CAUTION-labeled pesticides are considered before more toxic alternatives.

X Only small quantities of pesticides are purchased eliminating the need for stockpiling.

X MSDSs are regularly updated to reflect new pesticides or label changes to pesticides in storage.

Appendix A

Ranking public areas for weeds (or other pest) management:

Areas ranked as **HIGH** may include areas that the public sees and expects to be well-maintained. Examples are entrances to public buildings such as city hall and libraries.

These areas are allowed to use pesticides based on established thresholds.

Areas ranked as **MEDIUM** may include areas the public sees but does not expect a high level of maintenance. Examples are landscaped areas away from the entrance, recreational and picnic areas. These areas can tolerate a higher lever of weeds.

*These areas are allowed to use pesticides but the threshold is much higher and pesticides are used infrequently and only after consultation with IPM coordinato*r.

Areas ranked as **LOW** may include areas the public rarely sees or does not expect a high level of maintenance. Examples are medians, landscaped areas in parking lots, wildlands. These areas can tolerate a higher lever of weeds.

These areas are not allowed to use pesticides except in extreme cases and only after consultation with IPM coordinator.