

Section VI. - IPM Protocol

IPM protocol is a written procedural method used to determine the proper plant and/or pest management tactic for each particular situation.

A. Monitoring

In an IPM program, monitoring is the repeated observation of site conditions. These conditions are a key factor in determining the diagnosis and treatment of pest problems. Site conditions to observe are weather patterns, cultural practices, and site disturbances that occurred in the area; past or present. These site conditions can manipulate plant vitality and pest activity.

Plant knowledge is also important. Understanding the amount of injury from pests a plant can sustain before action is needed. Important plant information includes species, condition, and developmental stage. All plants are unique in their susceptibility to injury, but plants are similar in the fact that their condition and developmental stage can affect how susceptible they are.

Finally, pest information is a crucial part of the monitoring process. When a pest is discovered, several observations should be made. These include pest identification, pest population, life stage of the pest, and potential for natural control. Interpretation of this data will assist in determining the best possible treatment option for controlling the pest.

Monitoring of site conditions, plant and pest information will help determine the best control option to use for current and ongoing maintenance situations. This will also allow staff to detect a potential pest problem prior to its becoming a major problem.

B. Action Threshold

An action threshold will help the staff determine when a pest population, or the injury it causes, exceeds a tolerable level. A high action threshold level means pests will be tolerated longer vs. a low action threshold level where pests will be tolerated for a shorter period of time before action is taken. The threshold level will vary depending upon the location of the site and the amount of use by the public. Determining the appropriate threshold requires knowledge, experience, and foresight and can be revised based on continued observations and experience. Several aspects go into determining the action threshold for a site including aesthetics, purpose and safety of the site, and value of plants.

Aesthetic thresholds are difficult to establish because tolerance will vary among staff and the public, as well as vary from site to site. Aesthetic thresholds will in large be set by the public and their expectations in the appearance of landscaped areas. The public generally has a low acceptance for aesthetic plant injury and as a result, thresholds will be set accordingly.

Plant value will also determine an action threshold. For example, a tree will gain functional and aesthetic attributes through its maturity. These attributes include shade, air quality, water quality, and habitat. The value of these attributes increases over time and can be assessed as a monetary worth. With this in mind, if a pest population reaches a point where the injury level causes the health or structure of a tree to be compromised and pesticides can be applied in order to save the plant, then careful attention to the monetary value of the tree against the risk of pesticide application will be

evaluated. If pesticide application is limited in these situations, budget adjustments will be needed to assist in the process of removing and replacing dead or dying plant material.

The purpose and safety of a site will drastically affect the threshold levels. For example, a soccer field needs to be maintained at a high level to reduce injury to users. Therefore it will have a low action threshold (pests will not be tolerated). On the other hand, a wilderness area with a nature trail has a high action threshold. The management and role of these two sites is entirely different. Any pest that creates a degraded or unsafe playing surface will not be tolerated because the public has greater expectations in consideration to athletic fields. In addition to safety on playing surfaces any pest at a site creating a risk to the public, and staff, will be dealt with in an urgent manner. For example, poison ivy in a high-traffic area will have a low action threshold, as this poses health risk.

Finally, these action thresholds will also be based upon what zone the pests are located in at each park. If the pest problem is in a green zone, the tolerance of the pest will have to be higher than if the pest were in a yellow zone. When pests are located in a green zone, alternative methods will be exhausted. Green zone areas protocol will follow the vegetation management action plan and exemption policies. In a yellow zone, the area can be treated with a pesticide at the discretion of the staff in accordance with the IPM policy.

Appropriate threshold levels may vary at each location and is subject to staff experience and knowledge. The amount of damage that can take place before pest infested plants become aesthetically intolerable, are a safety issue, take away from the purpose of the site, or become an economic threat will determine the action threshold.

Green Zone Pest Management Exemptions and Vegetation Management

The majority of pest management efforts performed by the Recreation and Parks Department are in the control of weeds and other unwanted vegetation in various areas of responsibility for the purposes of aesthetics, playground, pedestrian and vehicular safety, reduce plant competition and erosion control.

- AESTHETICS - Uncontrolled weed growth throughout the city in general and in the parks, traffic medians and other landscapes in particular lead to an unkempt appearance.
- VISUAL SAFETY - Uncontrolled weed growth can interfere with visibility along our streets and create unsafe situations for pedestrians, cyclists and motorists.
- COMPETITION - Those plants commonly referred to as weeds are well known for their ability to adapt to a variety of environments and out-compete landscape plants for water and nutrients. In order for landscape plant materials to become established, weed control efforts are necessary.

Green Zone Vegetation Management Action Plan will be utilized for Landscape, Turf, Playgrounds, Insects, Diseases, Weeds and other special circumstances requiring an exemption for noxious and significant invasive weeds such as poison ivy. Below is a detailed action plan for each different green zone area exemption.

GREEN ZONE AREA EXEMPTIONS AND VEGETATION MANAGEMENT ACTION PLAN

General Landscaped Areas

LOCATION	ACTION THRESHOLD	ACTION
All areas of departmental responsibility.	Weeds covering 10% or less of the ground where not desired.	Mechanically remove. Use weed burner. Where possible use sheet mulching in combination with mulch to a minimum depth of 2 inches. Consider use of densely growing plant materials.
	Weeds cover more than 10% of the ground where not desired.	Any of the above non-chemical tactics. Spot treat with appropriate herbicide.
	Weeds cover 5% or less of the ground in planter beds.	Mechanically remove. Use weed burner. Where possible, add mulch to a minimum depth of 2 inches. Consider use of densely growing plant materials.
	Weeds cover more than 5% of the ground in planter beds.	Any of the above non-chemical tactics. Spot treat with appropriate herbicide.
	Any area historically requiring weed control measures.	Possible spring and/or fall application of pre-emergent herbicide in limited areas.

Turf Areas

LOCATION	ACTION THRESHOLD	ACTION
Turf areas – Parks	Broadleaf or grassy weeds cover less than 20% of the turf area	Observe proper mower sanitation. Remove mechanically. Re-evaluate cultural practices, test soil fertility.
	Broadleaf or grassy weeds cover 20% or more of the turf area.	Any of the above tactics. Spot treat with appropriate herbicide. Fall Overseed
Turf edges that can be edged with power edger.	Any time edging is necessary.	Use power edger or string trimmer.
Turf edges that cannot be edged with power edger.	Turf growing up to 3 inches over pavement edge.	Remove mechanically. Use weed burner.
	Turf growing more than 3 inches over pavement edge.	Any of the above tactics. Spot treat with appropriate herbicide and remove debris.
Turf reclamation	Any area requiring weed control measures during turf establishment.	Possible Spring or Fall application of pre-emergent herbicide in selected areas for a limited duration until turf is established (1-3 years).

Playgrounds/Shelter

LOCATION	ACTION THRESHOLD	ACTION
All Park Areas.	Weed removal for pre-season preparation of summer playground events	Mechanically remove weed growth with equipment.
	Weed encroached up to 12 inches into mulched areas of playground.	Mechanically remove of filler, edger or string trimmer.

	Weed encroached 12 inches or more into mulched areas of playground.	<p>Any of above tactics. Close playground for 7-10 days during procedural.</p> <p>Close public access by fencing and signage.</p> <p>Spot treat with appropriate Herbicide.</p> <p>Follow up to remove mulch and debris.</p> <p>Replenish new mulch and re-open area.</p>
	Weed removal in landscaped shelter areas.	<p>Mechanically remove or use sheet mulching</p> <p>Weed barrier cloth under 2” mulch.</p>

Miscellaneous Areas

LOCATION	ACTION THRESHOLD	ACTION
Asphalt or concrete roads, trails, pathways or other paving and hard surfaces.	Weeds growing in joints or cracks.	<p>Mechanically remove.</p> <p>Use weed burner.</p> <p>Any of above tactics.</p> <p>Spot treat with appropriate herbicide.</p>

C. Control technique selection

When a pest problem goes beyond its set threshold, staff will choose the appropriate pest control action based on the following guidelines:

- a. least hazardous to the applicator
- b. least hazardous to the public and the environment
- c. cost-effectiveness in the short and long-term
- d. least hazardous to non-target organisms

D. Control tactics

There are three types of pest control used in an IPM strategy: cultural, biological, and chemical controls. IPM implements the use of cultural and biological controls first, with chemical controls as a last resort. Often a combination of these can be the most effective.

1. Cultural controls- Cultural control tactics are physical adjustments made to the landscape to promote plant health and reduce pest activity, reproduction or survival. The adjustments can be made by hand or with mechanical devices.

Cultural control tactics include but are not limited to:

- Mulching
- Pruning
- Removal of pest infected debris in park areas
- Overseeding
- Appropriate plant selection
- Watering practices
- Mowing frequency
- Soil considerations

2. Biological controls- Biological control is managing pests by using their natural enemies – predators, parasites, and pathogens. Biological control is often natural and maintains pest populations at a tolerable level. If pests are not naturally maintained the habitat of the landscape may need to be altered to attract the natural enemies. Also, the predators, parasites or pathogens could be physically introduced into the landscape. Other biological control tactics include:

- Introduction, conservation, and augmentation of natural pest enemies
- Use of plant materials that are disease and insect resistant
- Biological/organic products and alternative chemical controls
- Create and preserve biological diversity using landscape design

3. Chemical controls- managing pests by use of pesticides. Chemical controls are only allowed when cultural or biological controls are ineffective. Chemical controls should be employed as a last resort and should follow these guidelines:

- Prior to making any application, the location of the pest problem and host should be evaluated and then use the least toxic pest control action.
- Least toxic compounds, pesticides in the EPA Toxicity Category III & IV, and those that are found on the Allowed Pesticide List will be considered first.
- Before the application of a pesticide, all labels and warnings should be read and pesticides should be applied in a manner consistent with labeling and applied only to target pest.
- All pesticide applications will comply with signage and notification procedures as specified in this policy. Accurate records of pesticide applications should be kept and include the target pest, type and quantity of pesticide used, EPA registration number, location of application, date, time, and weather conditions at time of application.

E. Exemptions

**SPECIAL CIRCUMSTANCES EXEMPTIONS VEGETATION
MANAGEMENT ACTION PLAN**

Poison Ivy- Noxious Weeds – Significant Invasive Weeds

LOCATION	ACTION THRESHOLD	ACTION
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All areas of departmental responsibility.	Poison ivy growing in any area with potential for contact.	Remove mechanically.
	Noxious weeds to be fully controlled by Kansas law.	Treat spot growth with appropriate least toxic herbicide. Treat regrowth with appropriate less toxic herbicide.
	Significant invasive species: weeds, including clover, Bermuda grass, Nut Sedge, Sandbar and Dandelions.	Remove mechanically. Treat regrowth with appropriate herbicide.
	Unwanted tree or shrub species: Bush Honeysuckle, Elm, Ash, Honeylocust, and Mulberry	Remove and stump treat with appropriate herbicide. Pre-establish appropriate ground cover.

INSECT PEST MANAGEMENT

Insect pest management involves controlling damaging insects as well as those causing nuisance problems. These pests can cause significant flower and foliar damage, physically weaken plants, spread disease and provide opportunities for disease and other insects to invade plants. Control is achieved through a variety of methods. Insect problems identified include: two spotted spider mite, bagworms, scale, caterpillars, borers, grubs, aphids. While the vast majority of the landscape plants in this area suffer from insect infestation at some time or other, the typical insect pest problems that are found in the landscapes maintained by the Recreation and Parks Department generally involve only a few insect pests and a handful of plant species. This is true for the trees and landscaping that are maintained by the Department. Whether this is fully attributable to beneficial insect diversity or because the plants that remain are those that suffer fewer insect pest problems and/or can tolerate higher insect populations is not known.

Mechanically, pests and/or infested plant parts should be removed by hand when possible. Removal of affected is effective in controlling certain insect species. Periodic, high pressure water washes can be used when insect populations are low.

Culturally, maintenance of plant health is of great importance in insect pest control. Properly cared for plants are less stressed and therefore less susceptible to insect (and disease) attack. Along the same lines, plant materials should be selected with care, matching species to conditions present at the site.

Biologically, beneficial insects provide the single greatest effort in controlling plant pests. This is why we have few insect pest outbreaks many of which require no attention on our part. Maintenance of beneficial insects is the key to controlling pest problems. This is accomplished by judicious use of pesticides and encouraging additional habitat.

Chemicals are used in the control of plant damaging pests and, where effective alternative control methods exist, pesticides are used as a last resort. Those pesticides that are reduced risk are to be used.

PLANT DISEASE MANAGEMENT

With few exceptions plant diseases do not constitute a severe enough problem to require extensive control efforts on our part. We have adopted a non-chemical approach in dealing with these diseases. In the parks & public landscapes many pines are diseased and dying. They are being systematically removed and replaced with other native and adaptable materials.

INSECT PEST MANAGEMENT ACTION PLAN

LOCATION	ACTION THRESHOLD	ACTION
All City maintained trees and landscape plants 2 nd flowers.	APHIDS: Less than 10 aphid of any growth stage found on any 10 leaves OR less than 10 aphid found on the terminal 6 inches of growth on any 10 terminals OR foliar distortion visible on less than 20% of foliage.	Address cultural needs, avoid high nitrogen levels. Prune out infested areas. Use high pressure water wash. Control ants where present. Use reduced-risk insecticide (soaps, oils).
	APHIDS: 10 aphid of any growth stage found on any 10 leaves OR 10 or more aphid found on the terminal 6 inches of growth on any 10 terminals OR foliar distortion visible on 20% or more of foliage.	Any of above tactics. Treat with insecticide.
	SCALE: Scale visible on less than 20% of plants branches.	Address cultural needs. Control ants where present. Prune out infested areas.
	SCALE: Scale visible on 20% or more of plants branches.	Any of above tactics. Treat with insecticide.

LOCATION	ACTION THRESHOLD	ACTION
All City maintained trees and landscape plants.	MITES: Mite damage visible on less than 25% of foliage.	Address cultural needs, avoid high nitrogen levels.

		Address site conditions that promote population build-ups. Use high pressure water wash.
	MITES: Mite damage visible on 25% or more of foliage.	Any of above tactics. Treat with miticide.
	WHITEFLY: Whitefly of any growth stage present 10% or more of foliage.	Any of above tactics. Treat with insecticide.
	CATERPILLARS:Lepidopteran larvae causing damage to less than 10% of foliage.	Remove pests/prune out infested areas. Treat with B.t. if 1 st or 2 nd instar.
	CATERPILLARS:Lepidopteran larvae causing damage to 10% or more of foliage. Included yellow necked caterpillars; fall web worm; tent caterpillars; petunia budworm.	Any of above tactics. Spot treat with insecticide.

LOCATION	ACTION THRESHOLD	ACTION
All City maintained trees and landscape plants.	BORERS: Signs of boring insects apparent.	Provide cultural needs. Specifically address drought stress. Prune to remove infested wood. Routine pruning only when adult borers are not present. Remove Abroad wood@ or those plants with sufficient infestation that threaten other plants. Select proper replacement plant species.

GREEN ZONE INSECT PEST MANAGEMENT EXEMPTIONS ACTION PLAN

LOCATION	ACTION THRESHOLD	ACTION
All City maintained Locust, Honeylocust and Ash trees.	LEAFHOPPER/PLANTBUG: (may exist singly or in combination) Trees show 20% or greater defoliation.	Use high pressure water wash. Treat with insecticide.
All City maintained trees and shrubs.	Bagworm infestation of any size and quantity. Historically may cause significant plant damage and infestations to many species of plants and spread to adjacent property. Unique to Kansas with large Eastern Red Cedar Populations.	Mechanical removal to destroy egg masses. Treat actively feeding stage with insecticides at any time. Timing sprays related to egg hatch is critical.
All City maintained Elm and Zelkova species.	ELM LEAF BEETLE: Less than 10% of foliage showing feeding damage.	Address sanitation; debris removal. Treat with B.t. if 1 st or 2 nd instar. Use sticky material to trap larva.
	ELM LEAF BEETLE: 10% or more of foliage showing feeding damage.	Any of above tactics. Treat with insecticide.

VERTEBRATE PESTS

Rats & Mice

Though typically viewed as being quite similar there are considerable physiological and behavioral differences between rats and mice. Generally speaking, mice are found indoors while rats are found out of doors. While a mouse will make its presence known through noise or droppings, the presence of rats is sometimes harder to determine. If a rat is seen indoors or outside in the daytime it can be safely assumed there is a large rat population.

LOCATION	ACTION THRESHOLD	ACTION
All areas of departmental responsibility.	Evidence of mice are observed or one has been seen.	Eliminate entry sites. Eliminate food sources, provide proper sanitation. Safely set traps in areas of activity. Safely set bait stations in areas of activity.
	Evidence of rats are observed or one has been seen.	Eliminate entry sites. Eliminate food sources, provide proper sanitation. Evaluate habitat for modification or removal. Safely set traps in areas of activity. Safely set bait stations in areas of activity.

Moles

Though quite difference in appearance, diet and behavior, most people cannot differentiate the mounds caused by a gopher from those of a mole. Though beneficial in the sense that they aerate and turn the soil, both animals can be damaging to the landscape and, in the case of gophers, create holes that are tripping hazards. Oftentimes these holes are enlarged by dogs.

LOCATION	ACTION THRESHOLD	ACTION
All areas of departmental responsibility.	Evidence of mole is observed.	Physically remove mole. Trap; to be set only where it can be done safely. Safely set burrow baits in areas of activity.

MISCELLANEOUS AND NUISANCE PESTS

Bees

Bees are a beneficial insect of immeasurable value because of their pollination efforts. Bees in general are not viewed by the department as threatening though bee stings are painful and cause extreme allergic reaction in some people. Management activities are designed to eliminate plant materials that are attractive to bees.

Where possible, every effort should be made to preserve bee populations both in physical activities as well as in the selection and use of pesticides. Occasionally situations arise when the relocation hive is necessary and local bee keepers will be contacted.

Wasps, hornets, yellowjackets

These groups of stinging insects are collectively known as wasps. Most of these species are beneficial in they are predatory on soft-bodied insects and are best known for their aggressive, unwanted behavior. Their stings are painful and can cause extreme allergic reaction.

Digger bees (digger wasps, sand wasps)

This is an interesting insect closely related to the wasp group. They are found in large colonies in most of the sand play areas in our parks. This beneficial insect looks and behaves somewhat like a yellowjacket and can be a cause for alarm. Though fully capable of stinging, this insect is not aggressive and is no cause for concern.

Spiders

Spiders are perhaps the most maligned and least understood of the animals found in the environment. Most people have some degree of aversion to spiders though they are extremely beneficial in their control of flies and other small insects. This area is home to large number of spider species found in a variety of habitats. The black widow spider, found in large numbers in this area, is also beneficial though its bite is painful and can be fatal. Because of most people's dislike of spiders, some degree of control is generally desired. With the exception of black widow spiders chemical control is rarely warranted.

Ants

While it might be hard to get many people to agree, ants should be viewed as a beneficial species in the sense of the role they play in the environment. It is when ants get into homes and other structures that people experience the nuisance side of their behavior. An ant invasion into irrigation controllers is the single largest problem with ants experienced by the department.

Fleas

While reports of fleas in the parks or other recreational areas is not common, the potential for flea problems must be anticipated given the numerous dog areas and the possibilities for more in the future.

Birds

Though birds generally are not much of a problem, some species have on occasion become severe enough of a problem to warrant some type of action. The pigeon for example, is one species of bird that has adapted quite well to the urban environment. They are notoriously filthy and are capable of transmitting some extremely serious diseases to humans.

There are only a few control methods available that can be utilized for birds and even fewer in urban settings. While some methods work well with some species, they cannot be counted on to work for all species.

LOCATION	ACTION THRESHOLD	ACTION
All areas of departmental responsibility.	BEES: tree containing a bee hive requires pruning, removal or other work that would disrupt hive.	Have beekeeper remove.
	BEES: A swarm of bees is observed on a plant, structure, etc.	Have beekeeper remove.
	WASPS: wasp, hornet or yellowjacket nest is found anywhere that is potentially threatening to patrons.	Physically remove or destroy nest. Treat nest with insecticide.
	SPIDERS: found in/on buildings.	Use broom, vacuum or water to remove spider and webbing.
	SPIDERS: Black widow is found and is threat to staff or patron.	Use above tactic. Physically kill spider. Use acaricide. Seal area if possible to prevent future infestation.
	TICKS: Observed in parks and along trails and pathways.	Determine extent of infestation. Remind public users the importance of self protection. Use insecticide in limited areas.
	DIGGER BEES: Observed in play areas or other sandy areas.	Rake to discourage nesting.

PEST MANAGEMENT ACTION PLAN

LOCATION	ACTION THRESHOLD	ACTION
ROSES – generally move forward to plant disease resistant varieties most cost effective.	BLACKSPOT: Susceptible varieties showing signs of infection on 10% of foliage, OR Weather conditions favor development of disease ; 55-75EF and wet foliage.	Provide proper soil moisture and fertility. Remove infected plant parts including those which have fallen. Remove infected canes when dormant pruning. Avoid overhead watering. Treat with fungicide. Apply fungicide with dormant spray. Replace with resistant varieties.

LOCATION	ACTION THRESHOLD	ACTION
JUNIPERS, SPRUCE, ROSES, ZINNIA, DAHLIA, CALENDULA, OTHER SUSCEPTIBLE BEDDING PLANTS.	POWDERY MILDEW: Susceptible varieties showing signs of infection on 10% of foliage. Foilar Diseases: Cytosporia canker on spruce. Phomopsis blight on juniper.	Provide proper soil moisture, watering and fertility to improve health of tree. Remove infected plant parts + those which have fallen. Remove infected canes when dormant pruning and sanitize equipment. Prune to promote air circulation. Apply water in mid-afternoon (on roses: only to varieties resistant to Blackspot). Treat with fungicide + with dormant spray.

		Remove and replace with resistant varieties.
ROSES	APHID: 15 aphid found on terminal 6 inches including flower bud.	<p>Insure proper cultural needs, avoid high nitrogen levels.</p> <p>Water wash at any time.</p> <p>Remove infested parts.</p> <p>Control ants if possible.</p> <p>Treat with insecticide, + with oil in dormant spray.</p>
ALL PINES IN PARKS AND PUBLIC AREAS	<p>Dipolidia Tip Blight</p> <p>Dothostroma Blight Pine</p> <p>Wilt Disease</p>	Remove dead/dying infested plants prior to March 1 and grind stump. Replace with native or adapted species.