Austin Parks and Recreation

A City within a Park

Integrated Pest Management Program

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July 30, 2010

** This document is a modification of the City of Portland's Integrated Pest Management Program document and the City of Austin's May 2007 Integrated Pest Management Plan draft.*

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General Information

The purpose of this document is to provide Austin Parks and Recreation Department (PARD) employees with an overview of integrated pest management principles and specific policy-based direction for implementing those principles.

Mission Statement

The mission of the Parks and Recreation Pest Management Program is to manage pests that are harmful to the health, function or aesthetic value of park landscapes in a manner that is efficient, effective, environmentally responsible, and with careful attention to public and employee safety.

To accomplish this, the principles of Integrated Pest Management are endorsed. This approach uses multi-faceted strategies that minimize economic, health, and environmental risks.

Asset

Austin Parks and Recreation Department is part of the City of Austin and is the steward of over 17,576 acres of land containing 206 parks, 12 preserves (sanctuaries for native plants, native animals and unique natural features), and 26 greenbelts (parkland on creeks and canyons). It also offers a wide array of recreation and enrichment opportunities for people of all ages.

Austin Parks and Recreation is charged with maintaining these diverse park landscapes in a safe, attractive, healthy, and useful condition. Park properties represent a major component of the city's capital assets and PARD recognizes its responsibility to protect and preserve this economic investment to the best of its abilities. PARD also recognizes its responsibilities to its employees, park users, and the general public, and seeks to employ the highest professional standards in the performance of its duties. To manage pests in park lands, PARD personnel utilize the principles of Integrated Pest Management (IPM).

Integrated Pest Management

On March 2, 1988, Austin City Council passed a resolution that directed Austin Parks and Recreation to "adopt and begin implementation of a grounds maintenance policy embodying the principles of Integrated Pest Management." Integrated Pest Management is one of the major strategies used by PARD in the maintenance of park lands. Although there are numerous definitions of IPM, the following is from the U.S.Environmental Protection Agency for its publication, *IPM for Turfgrass and Ornamentals*: IPM is the coordinated use of pest and environmental information with available pest control methods to prevent unacceptable levels of pest damage by the most economical means with the least possible hazard to people, property, and the environment. The goal of IPM is to manage pests and the environment so as to balance costs, benefits, public health, and environmental quality. IPM systems use all available technical information on the pest and its interactions with the environment. Because IPM programs apply a holistic approach to pest management decision making, they take advantage of all appropriate pest management options, including, but not limited to pesticides. Thus IPM is: a system using multiple methods, a decision-making process, a risk reduction system, information intensive, cost-effective, and site specific.

The following definition is from the Operational Guidelines for Grounds Management (APPA, 2001): “Integrated pest management” means a coordinated decision-making and action process that uses the most appropriate pest control methods and strategies in an environmentally and economically sound manner to meet pest management objectives. The elements of integrated pest management include: (a) preventing pest problems; (b) monitoring for the presence of pests and pest damage; (c) establishing the density of pest population, which may be set at zero, that can be tolerated or corrected with a damage level sufficient to warrant treatment of the problem based on health, public safety, economic or aesthetic threshold; (d) treating pest problems to reduce population below those levels established by damage thresholds using strategies that may include biological, cultural, mechanical and pesticidal control methods and that shall consider human health, ecological impact, feasibility and cost effectiveness; and (e) evaluating the effects and efficacy of pest treatments." In relation to IPM programs specifically for landscape trees, “the goals of IPM are also to prevent predisposition of host trees to other pests and noninfectious disorders.” The IPM process first determines if a pest needs to be managed, and if so, how best to do it. Key elements are information gathering, well-informed decision making and monitoring of results. The IPM process promotes effective, low-risk management strategies to manage pests. The controls used in this program include cultural, physical, mechanical, manual, biological and pesticidal methods and materials; often a combination of methods is used. Methods selected to manage specific pest populations are evaluated by licensed and trained PARD professionals on a case-by-case basis. The methods employed conform to recognized standards established and endorsed by state and federal regulatory agencies, state educational institutions and organizations such as the Western Integrated Pest Management Center. A few examples of IPM activities within the PARD program:

• Utilizing plants with natural resistance to pests.

• Mulching of planting beds to reduce establishment of weeds.

• Proper mowing and irrigation of park turf to increase vigor and reduce weed populations.

• Application of selected herbicides to control invasive weeds before seed formation to prevent future weed infestations.

• Release of natural biological control insects to control certain infestations. This is not a practice currently supported in PARD.

Key elements of an IPM program are information gathering and informed decision-making. Horticulturists, botanic specialists, park technicians, foresters, and arborists are skilled in identifying and evaluating pest problems. When pest problems occur that are unusual or beyond the scope of in-house experts, advice is obtained from other qualified sources such as state universities, Texas departments of agriculture, and Texas A&M University Extension Service experts. Texas Pesticide Applicators License continuing education courses reinforce employee skills and provide current information concerning laws, safety, pests, and IPM methods.

PARD employees monitor levels of pests in order to arrive at the best solution for managing a pest problem. When pest management methods are implemented by trained IPM personnel, the results are solutions that are economically and environmentally responsible. This provides the public with safe, healthy, and aesthetically pleasing park areas.

Pesticide Use

Pesticide is a general term for any substance intended for preventing, destroying, repelling, or mitigating any pest. Park pests consist primarily of unwanted vegetation and invasive weeds, but can also include insects, disease organisms, rodents, and other organisms. To manage these pests, PARD personnel select the best methods available. When it is necessary to use pesticides as part of an IPM approach, PARD minimizes risk by careful product selection and application. When developing and updating PARD's IPM program the best expert scientific opinion is relied upon on to inform staff about potential materials and methods. Assessments from regulatory agencies, state university departments in Texas, university extension scientists and other experts in the field provide much useful specific information. PARD turns to these recognized experts for credible science-based information. PARD also stays current with the latest pertinent studies as part of our process. By basing decisions on these authoritative sources best solutions can be obtained within the IPM framework. Austin Parks and Recreation has found that as part of a complete IPM approach, judicious use of carefully selected pesticides can sometimes be an important tool in ensuring quality landscapes and healthy and diverse natural areas. The demonstrated benefits of these balanced management practices have made PARD a model of responsible park management throughout the region.

Before an applicator uses a pesticide of any type, the treatment must be approved by the supervisor and documented in the work order system. PARD pesticide applicators are required to comply with all pesticide label directions, federal, state, and local pesticide regulations, applicable safety laws, and PARD policies. Misuse of pesticides will not be tolerated. Pesticides not labeled or listed (refer to Appendix 1) will not be covered in detail within this document, but PARD requires pesticide applicators to use additional precaution and label directions, if present, for all applications. If the pesticide chosen for application poses any health risks to the environment, users, and their pets, it must be approved before application. DOCUMENTED NONCOMPLIANCE WITH STATE AND FEDERAL LAWS OR RULES SET OUT IN THESE POLICIES IS CAUSE FOR DISCIPLINARY ACTION.

Safety

Austin Parks and Recreation has an excellent safety record with respect to the use of pesticides. This record is made possible through appropriate training, careful processes for approving pesticides, and adherence to label directives and safety procedures when employees work with or apply pesticides. When pesticides are being applied in park areas by PARD personnel, notification signs are posted at points of entry to the treated areas. These signs include information about the pesticides being applied, the date, as well as a phone number where additional information can be obtained. When pest management equipment is being used and materials are being applied by PARD employees, all appropriate worker personal protective equipment is provided for use. Use of such

equipment is an important part of safely applying pesticides as well as using mechanical equipment. Austin Parks and Recreation works with the Watershed Protection Department to protect the city water supply from all types of contamination. Park employees do not apply pesticides within Waterways compounds unless proper procedures have been followed and the direct supervisor approves. Procedures regarding the specific details of park maintenance of areas bordering waterways property are found in the Pesticide Use around Watershed Protection Property Policy.

Laws and Regulations

Several Federal and State agencies regulate the use of pesticides. Austin Parks and Recreation conforms to all pesticide laws and regulations. PARD allows only Texas State licensed Pesticide Applicators to apply pesticides of any kind on park land. In this way PARD exceeds the standards established within Texas state law. To obtain a Noncommercial Pesticide Applicator's License, applicators must pass a series of tests given by the Texas Department of Agriculture.

Subjects tested include: Laws and Regulations; Safety and Storage; Use and Disposal of Pesticides; Reading and Understanding Pesticide Labels; Pest Management Methods and Materials, Integrated Pest Management and others. Licensed applicators are legally liable if they apply pesticides contrary to state and federal laws and label directions. Texas State Department of Agriculture certified continuing education can be found online at the TDA's continuing education unit course search, http://www.agr.state.tx.us/internet/ceucourse/search.jsp.

Once licensed, applicators must renew their license, annually for noncommercial applicators, and take the required amount of continuing education units needed for the type of Pesticide Applicator's License held, 5 CEUs for noncommercial applicators annually. Applicators are required by law to record specific information when applying pesticides and keep records for a minimum of 2 years. The Texas Department of Agriculture has designated forms for these purposes, which are included in Appendix 2. Also, applicators are required to submit a work order with a complete description of treatment, equivalent to the standards required by TDA, and supply a copy to the Operations Manager. This helps keep track of previous treatments if adjacent damage becomes visible in the future.

Agricultural Worker Protection Standard

The Worker Protection Standard (WPS) is a federal regulation designed to protect agricultural workers (people involved in the production of agricultural crops) and agricultural pesticide handlers (agricultural workers mixing, loading, or applying pesticides or tasks involving direct contact with pesticides). These rules apply only to agricultural settings, not park use. However, elements of Austin Parks and Recreation nursery and greenhouse operations may fall under the scope of these rules. Applications of pesticides in these two areas are governed by both the PARD policy and the additional rules of the WPS.

These rules require worker training regarding pesticide exposure, protection, and mitigation. They also require specific notification and worker re-entry intervals for pesticide applications in plant production areas.

Integrated Pest Management Methodology

Approved Pest Management Strategies

This is a short list of examples of possible management strategies among the many methods available. Prevention of pest problems through:

• Good policy and planning

• Cultural practices, avoidance measures, and physical means to manage pest problems.

• Mechanical practices, trapping, biological controls, and use of natural and synthetic pesticides.

All of these IPM measures are evaluated and considered together so that the best overall pest problem solutions are chosen and implemented.

Policy

Management of pests through adoption of policy can be highly effective and low in cost. Such policies can often eliminate problems before they begin. Some examples are:

• Prioritization of parks for control measures may be considered. Different park areas may have varying standards of acceptable care and appearance. Determining whether a particular park area requires control of pests and the level of that control must take these differences into account. Careful attention to public desires and public needs must be part of this prioritization process.

• Establishment of thresholds for action and the tolerance level for different pests are part of the IPM process. These thresholds vary according to plant, pest, and site. Determinations of action thresholds are made on a case-by-case basis.

Design

Proper park design is a major way that pest problems can be avoided. While no landscape can be designed to be free of pest management needs, such considerations need to be part of the planning process. Examples are:

• Elimination or modification of problematical areas.

• Avoiding the use of potentially invasive species.

• Proper and adequate spacing of plant material to reduce the incidence of pest problems.

• Maintenance of species diversity and elimination of monocultures in plantings where possible.

• Elimination of alternate hosts for diseases.

• Establishment of overstory, thick groundcovers and other design techniques benefiting both the establishment of plants and the reduction of weed problems.

Plant selection
Plant selection is critical in minimizing pest management needs both short- and long-term. Criteria for plant selection include:

• Use of disease or pest resistant or tolerant plant species or varieties.

• Removal of invasive or pest-susceptible plants, or replacement with native or adapted pest resistant plants or varieties.

Useful resources for choosing native and adapted grasses, groundcover, vines, perennials, shrubs, and trees are the City of Austin's Grow Green website and the Arbor Day Foundation website, http://www.ci.austin.tx.us/growgreen/plants.htm and http://www.arborday.org/trees/righttreeandplace/, respectively.

Cultural practices
Proper cultural practices are essential in establishing healthy landscapes and can often help to maintain their resistance to pest problems. Examples are:

• Knowledge of the cultural requirements of plants to best provide proper conditions for optimum plant health and resistance to pests.

•Adequate site preparation before landscape installation. This can include soil improvements, pruning of surrounding vegetation, grade adjustments, drainage improvements, and installation of irrigation systems.

• Use of disease resistant grafting rootstock or scion wood.

• Proper timing and use of water to reduce over or under watering.

• Proper timing and use of fertilization to eliminate over and under-fertilization.

• Use of cover crops to improve soil structure and reduce soil erosion.

• Rotation of plant species in nursery areas to reduce the buildup of pests.

• Aeration, over-seeding, and top-dressing to improve turf health and suppress weeds.

• Raking and debris removal to remove pest sources.

• Pruning and plant removal to promote air circulation and light penetration for plant health.

• Removal of diseased, infested, damaged, or dead wood.

• Mulching for weed reduction, water retention, winter protection and root zone improvement.

• Fan placement for improved greenhouse air circulation.

Mechanical and physical controls
Mechanical and physical methods are often employed to manage pests. Examples are:

• Mechanical edging of turf.

• Mechanical clearing of weeds in rough areas.

• Hand weeding in shrub beds.

• Weed wrenching or loping, or chain sawing invasive trees.

• Mowing of rough turf areas for vegetation control.

• Traps such as yellow sticky boards for greenhouse insects and traps for mammalian pests.

• String trimming to control unwanted vegetation.

• Disinfecting materials or equipment to prevent spread of pests.

Biological controls
Where applicable, biological control is useful to manage pests. Typically most important is minimizing disruption of natural pest controls that may be present. Examples are:

• Introducing insect or disease parasitoids, predators, and microbial products to control pests.

• Minimizing the use of disruptive techniques and materials in landscapes that may destroy natural pest control organisms.

Naturally derived and synthetically derived pesticides
Pesticides are derived from many sources. They vary widely in their characteristics and must be examined individually to determine their suitability within the IPM approach. Examples are:

• Placement of pheromone traps.

• Disinfecting materials or equipment to prevent spread of pests.

• Application of naturally and synthetically derived pesticides.

Criteria for Choosing a Pest Management Method

When choosing a pest management method or pesticide material from the approved lists located in Appendix 1, all personnel should consider the following factors, and any additional factors relevant to the selection.

Nature of the site

• Erosion susceptibility and potential movement of soil through runoff.

• The intended use and function of the landscape.

• The feasibility of the method given the area and scope of the problem.
• The relative importance and public expectation of a site or plantings.

• Site conditions such as soil type, grade, drainage patterns, and presence of surface water.

Possible health and safety effects

• Consider both short and long term toxicological properties and any other related potential health effects of the materials or methods, both to the applicator and the public.

• Equipment operation safety issues for both the operator and the public.

• Worker safety and worker injury issues involved with carrying out the method.

Possible environmental effects

• Consider both acute and chronic toxicity and any other related potential effects of the material or method to non target organisms including mammals, birds, amphibians, fish, invertebrates and other organisms.

• Environmental effects from potential bioaccumulation.

• Potential impacts to non-target plants and other organisms from materials or methods.

• Potential impacts to federally listed, threatened or endangered species.

• Possible introduction or establishment of invasive plants.

Costs

• Costs of the material or method.

• Application and labor costs.

• Length and quality of pest control.

• Feasibility of using a particular method or product.

Characteristics of the product

• Target pests and target sites of the product being used.

• Possible residual effect, decomposition pathways, rates, and breakdown products.

• Volatility and flammability.

• Product formulation and package size.

• Leachability, solubility, and surface and soil bonding characteristics of the product.

• Ease of cleaning equipment after use.

• Positive and negative synergistic effects of pesticide combinations.

Special considerations

• Application equipment availability.

• Method of delivery.

• Current and anticipated weather conditions.

• Previous pesticide applications to the site and the interval between treatments.

• Possible development of pest resistance to a particular management method or material.

Outline of Policies

Licensing and Training

1. LICENSING, CERTIFICATION AND CONTINUING EDUCATION OF PEST MANAGEMENT PERSONNEL- Defines the required State of Texas licensing requirements and recertification obligations and training for PARD applicator personnel.

Pest Management Procedures

2. MANAGEMENT METHODS FOR PEST PROBLEMS- Establishes the IPM methodology and approved strategies.
3. PESTICIDES APPROVED FOR USE IN PARKS- Describes the approval process for pesticides and details certain pesticides and their control methods. Approved product lists for each unit are located in the appendices.
4. NOTIFICATION OF PESTICIDE USE AT THE SITE- Outlines the on-site notification procedures to be used before, during and after applications.
5. PESTICIDE APPLICATION ON PARK PROPERTY AND STREET RIGHTS OF WAY Establishes procedures on how to apply pesticides on all park lands.
6. PESTICIDE APPLICATION RECORD KEEPING- Outlines record-keeping standards for parks applications. Recording form samples are located in appendices.

Pesticide Material Management

7. USE OF REMAINING PESTICIDE SOLUTIONS AND RINSES- Outlines how residual pesticides and rinsates are handled.
8. STORAGE OF PESTICIDES- Defines methods and procedures for storage of pesticides.
9. DISPOSAL OF EMPTY PESTICIDE CONTAINERS AND UNUSABLE PESTICIDES Establishes the fate of surplus or contaminated pesticides and empty containers**.**

Safety Measures and Emergency Response

10. USE OF PROTECTIVE CLOTHING AND EQUIPMENT- Describes appropriate personal protective clothing and equipment for use by PARD personnel when handling or applying pesticides.
11. EMERGENCY INFORMATION CONCERNING ACCIDENTAL PESTICIDE EXPOSURE- Defines the procedures followed in responding to inquiries from PARD employees and the public regarding pesticide exposure.
12. PESTICIDE SPILL RESPONSE- A policy dealing with any unintended release of pesticides on or off PARD properties. Outlines responsibilities, training, reporting, methods, and materials involved.
13. WORKER PROTECTION STANDARD- Outlines the background of the WPS and how it relates to the nursery and greenhouse operations of Parks and Recreation. Establishes training duties and defines those required to receive training.

Special Situations

14. PESTICIDE APPLICATION BY NON-PARD EMPLOYEES- Establishes the framework for review of all pesticide applications to PARD property proposed by outside contractors.
15. RODENT AND OTHER VERTEBRATE PEST MANAGEMENT- Describes approved methods of rodent management by Parks personnel**.**
16. TURF BROADLEAF WEED MANAGEMENT- Describes procedures, rationale, and approval process for management of broadleaf weeds in maintained park turf areas.
17. PESTICIDE USE AROUND WATERSHED PROTECTION PROPERTY- Explains the joint policy between Parks and Recreation and the Watershed Protection to ensure a safe water delivery system.
18. PESTICIDE USE AROUND COMMUNITY GARDENS- Outlines procedures and limitations of pesticide applications adjacent to PARD Community Garden sites**.**
19. WATERWAYS PEST MANAGEMENT- This policy defines specific practices, methods and materials approved for use alongside, and within aquatic sites. This policy, as well as all of the preceding policies, has been specifically referred to in the National Marine Fisheries Service Federal Endangered Species Listing 4(d) rule.
20. VEGETATION MANAGEMENT IN WOOD CHIPPED CHILD PLAYGROUND AREAS - Defines special pest management practices in chip surfaced playground areas.
21. VENOMOUS INSECT MANAGEMENT - Describes how venomous insects such as wasps, bees and hornets on parkland are addressed.
22. DOG OFF LEASH AREA PEST MANAGEMENT – Specifies how pest management in designated dog off leash areas is carried out.

Policy 1:

Licensing, Certification, and Continuing Education of Pest Management Personnel

PURPOSE

This policy defines the education, training, licensing, and certification requirements for applicators who are applying pesticides, or supervising others applying pesticides.

BACKGROUND

State pesticide applicator licensing assures a level of expertise and familiarity with pest management practices and pesticide materials. While Texas state law does not require this level of licensing for the majority of the kinds of applications carried out on park lands, PARD is committed to maintaining a high level of expertise in our workforce and chooses to exceed the minimum standards. The continuing education requirements of state licensing also help to keep personnel up-to-date on pest management theory and practice. Therefore PARD requires that all personnel applying pesticides on park land maintain a Texas Department of Agriculture applicators license.

POLICY

All Parks and Recreation personnel applying pesticides on park lands shall be certified as state pesticide applicators by passing the Texas Department of Agriculture examinations. Applicators are required to recertify every year by obtaining five continuing education credits; with one credit each from two of the following categories: laws and regulations, integrated pest management or drift minimization. To maximize the value and relevance of the recertification training, PARD will recruit qualified speakers and present its own state certified classes twice yearly. Recertification class hours from other accredited sources may also be used to supplement PARD classes.

Ultimate responsibility for maintaining a valid license lies with the applicator. PARD will keep pesticide applicators informed of approved supplemental education to meet continuing certification and licensing requirements. Unless special arrangements and approvals have been made, all PARD applicators must be permanent status employees. Regardless of licensing status, no seasonally employed staff members shall apply pesticides on park land without special arrangement. This arrangement shall consist of the consent of the Pest Management Coordinator, Preserve Lands Manager, and specific approval from the Operations Manager following a request from the supervisor of the seasonal employee.

Policy 2:
Management Methods for Pest Problems

PURPOSE
This policy establishes the principles governing PARD's approach to pest management for all of its lands.

BACKGROUND
Austin Parks and Recreation utilizes the principles of Integrated Pest Management in managing land under its care. IPM is a coordinated decision making process that uses the most appropriate management strategy on a site specific basis. The IPM process first determines if a pest needs to be managed, and if so, how best to do it. Key elements of an IPM program are information gathering, well-informed decision making and monitoring of results. Through proper decision making, the IPM process promotes effective, low-risk management strategies to manage pests.

The management techniques used in this program include cultural, physical, mechanical, manual, biological and pesticidal. Often a combination of methods is used. The following terms are used as defined. *Threshold* is used to describe a level of pest presence above which unacceptable amounts of negative plant health impacts, negative environmental impacts, negative effects on infrastructure and assets, intolerable aesthetic impacts, or undue safety risks are likely to occur. *Action level* is the point at which control measures are necessary to prevent a pest population or its impact from exceeding the threshold.

POLICY
PARD shall employ integrated pest management principles in managing pest problems. Managers, Supervisors, Arborists, Forestry Technicians, and other licensed applicators shall monitor plant health status, landscape conditions, and the presence of unwanted vegetation. They will assess appropriate thresholds, and determine action levels on a site-by-site basis. All licensed applicators shall use the list of "Approved Management Strategies" to determine an effective, feasible, and economically sound pest management method that does not create undue risk to the public or the environment.

If a pesticide is chosen as the best method for pest management, licensed applicators shall choose appropriate materials only from the list of Approved Pesticides specific to their work unit found in Appendix 1. The suitability of the material, nature of the site, potential health and safety effects, potential environmental effects, overall costs, characteristics of the product and any other special considerations related to the situation shall be taken into account in this process. After control measures have been made, the site should be monitored to assess any impact and the efficacy of the measures taken.

Policy 3:
Pesticides Approved for Use by Austin Parks and Recreation Personnel

PURPOSE
This policy establishes oversight procedures over all pesticide materials available for use on park land by PARD personnel. It defines the process of selection of pesticides that are approved for use on PARD property.

BACKGROUND
Pesticides vary widely in their characteristics and not every legally registered pesticide may be appropriate for use on park land. Pesticides must be carefully evaluated for their suitability for PARD IPM use before they are included on a work unit approved list. Only properly evaluated pesticides are placed on approved lists specific to individual work units.

Parks and Recreation experience and IPM principles show that it is more desirable to have a specialized selection of products that target specific pests, rather than a smaller number of general-purpose pesticides. This aids in limiting the effects of the control to the target pest only. It aids in reducing the number of resistant pests that may arise from continued use of a small number of controls. It also leads to an overall reduction of pesticide usage required.

POLICY
The PARD pest management coordinator or operations manager shall maintain a list of pesticides approved for use by PARD personnel on park property. Once approved, the list "Criteria for Choosing a Pest Management Method," pages 9-10, shall be used in choosing the proper pesticide for a given purpose. Pesticides shall be chosen after assessing toxicological impacts, environmental impacts, efficacy, feasibility, cost, and all other pertinent aspects of their use within an IPM approach.

Only pesticides from the approved lists shall be chosen, unless the chemicals being used do not pose any health risks to the environment, users, and their pets and are cost-effective, such as a vinegar and orange oil mixture containing sodium laureth sulfate. The lists shall be reviewed on an ongoing basis so that they are as up-to-date as possible. Any pesticides that are proposed for addition or deletion from the list shall be approved by a pesticide review committee consisting of these three persons: City Operations Manager, IPM Coordinator, and Preserve Land Manager. The pesticide review committee shall be coordinated by the Pest Management Program Coordinator. The committee will be provided by the Coordinator with adequate science-based research and regulatory material to allow for informed decision-making. The review committee shall have authority to approve requests for new pesticide additions, deletions, and pesticide approvals for special and unusual pest problems. The Coordinator will remain current with EPA registration and review activities. A pesticide deleted from the general approved list but placed on the “Use Up Do Not Restock List” is approved for use within specified units until current supplies are exhausted unless otherwise noted. All federal and state laws having to do with use of pesticides will be upheld. Deletion of a pesticide

due to loss of federal or state registration will be upheld without committee approval as per the schedule set by law.

Use of unauthorized pesticides or use of pesticides for unapproved or illegal applications will be cause for disciplinary action. Parks and Recreation policy adheres strictly to all label requirements concerning safe, legal and effective use of pesticides.

Applicators must ensure that any pesticides utilized conform to the appropriate approved list. Special consideration is to be taken when applications covered under the Waterways Policy take place. Pesticides allowed for those purposes are specifically defined within that policy.

LIST OF COMMON PESTS AND THEIR CONTROL METHOD

1. **Red imported fire ant**, (*Solenopsis invicta Buren)*

Identification: Adult red imported fire ants are red to dark brown and occur in five different forms: minor workers, about a 1/8" long; major workers, about a ¼" long; winged males and females, each about a 1/3" long; and queens, about a 1/3" long. If the mound they occupy is broken, the brood (whitish rice grain-like larvae and pupae) may be found.

General Description/ Biology: Accidentally introduced to the U.S. in the 1920's, the red imported fire ant is a nuisance insect that can inflict painful stings, harm wildlife, and interfere with outdoor activities. Although they can be beneficial in some agricultural practices, the red imported fire ant warrants control in urban areas. Fire ants are highly organized social insects, cooperatively tending and defending colonies and constructing mounds. These mounds can be over 18 inches tall and are usually constructed in open sunny areas. Periodically winged reproductive males and females leave colonies on mating flights. Mated females can fly or drift with the wind for miles and form new colonies wherever they land. They can also be dispersed by flood events, forming floating "mats" of ants and founding new colonies wherever flood waters deposit them. Colonies may be formed by both a single queen or by multiple queens. Single queen colonies may number 40 to 80 mounds per acre whereas multiple queen colonies can build 200 to 800 mounds per acre. These ants develop from egg to adult in about 30 days. They go through four larval stages and one pupal stage. Because there can be hundreds of thousands of worker ants (sterile female ants) in a mound, fast acting contact insecticides may kill workers but usually have no lasting effect on the queen. The queen's egg production must be interrupted for effective control of colonies.

Action Threshold: Measures will be taken to control red imported fire ants only in "active" use areas such as athletic fields, playgrounds, swimming facilities and sun bathing areas, recreation centers or other areas accessible to the public and where routine maintenance or service is performed. As a preventative measure, fire ant baits will be applied in the spring and then again in the fall. Fire ants will be tolerated in natural or non-maintained areas.

Control:

Cultural Control:

- Collect trash at regular intervals with an emphasis on "weekend" generated trash to eliminate as much food source as possible.
- Post and maintain signage to encourage proper disposal of trash.
- Promptly notify irrigation staff about water leaks to eliminate as much water source as possible.
- Where possible, hose down trash receptacles and picnic areas to eliminate food sources.

Physical/ Mechanical controls:

- Provide exclusion measures on facility buildings by sealing cracks and pipe or wiring penetrations.
- Ensure doors and windows seal properly.
- Keep doors closed as much as possible.

Chemical Control

- Baiting – As both preventative and on-going control methods, active use areas may be baited with the following:
  Hydramethylnon, *Amdro*
  Abamectin, *Ascend*
  Fenoxycarb, *Award*
- Persistent mounds may be treated for a quick kill with the following:
  D-limonene, (Citrus oils), *Safer Fire Ant Killer*
  Pyrethrins, Piperonyl butoxide, Silicon Dioxide, *Results*
  Bifenthrin, *Talstar*
- Chemical controls will not be used in areas where the application of the chemical may contact water bodies such as streams, creeks, ponds, lakes etc. Do not spray pesticides if wind is greater than 8 mph. Do not apply pesticides if rainfall is imminent.

Additional Resources: Texas Cooperative Extension Publications B-6043, *Managing Imported Fire Ants in Urban Areas;* B-6076, *Managing Red Imported Fire Ants in Agriculture*; B-6099, *Broadcast Baits for Fire Ant Control*

2. **Paper wasps** (*Polistes spp.)*, **Hornets** *(Dolichovespula maculate),* and **Yellowjackets** *(Vespuls squamosa)*

Identification: The average *paper wasp* is up to a ¾" long, red to brown in color with a long, cylindrical abdomen. A nest is a single comb of hexagonal cells made of a papery material. *Hornets* are about a ¾" long and are black and white, with a white face. They are actually a larger yellow jacket species. Its nest is a basketball-size papery oval hanging from tree limbs and sometimes structures. *Yellowjackets* have a shiny yellow and black striped abdomen and are typically a ½" long, workers, and a ¾" long, the queen.

They are not covered with dense hair, such as bees, and some have yellow on the face. Their nest can range several feet across.

General Description/ Biology: Wasps: Fewer than 40 species of stinging (vespid) wasps are found in the U.S. In Texas, only a handful of those species present a serious health and safety hazard to humans. Although most wasps are considered to be beneficial insects, providing pollination of plants and highly valued predation of many nuisance insects, they can sometimes be a menace and require human control. Two major groups of vespid wasps include social wasps and solitary wasps. Social wasps live in nests that they construct and defend cooperatively. Their stingers are used primarily for defense. Social wasps rarely sting when they are away from the nest but will aggressively defend and attack when the nest or colony is threatened. Most problems with social wasps arise when their nests are constructed too close to human activity areas. Different types of social wasps include paper wasps, yellowjackets and hornets. Solitary wasps do not build communal nests and consequently do not defend their nest. Their stinger is primarily used to subdue prey. Solitary wasps rarely sting people and are almost entirely beneficial. Control is usually not justified unless a nest has been built so close to human activities that it poses and imminent threat. Solitary wasps include cicada killers, cricket hunters and mud daubers.

Action Threshold: Measures will be taken to control wasps only when they are an imminent threat to the safety of facility users or service workers in "active" use areas such as athletic fields, playgrounds, swimming pools, rest rooms, picnic areas, recreation centers or other areas where routine maintenance or service is performed. Co-existence with wasps will be practiced in natural or non-maintained areas.

Control:

Cultural Control:

- Collect trash at regular intervals with an emphasis on "weekend" generated trash to eliminate as much food source as possible.
- Provide lids with all garbage cans to discourage foraging wasps. Keep lids on facility dumpsters closed.
- Post and maintain signage to encourage proper disposal of trash.
- Where possible, hose down trash receptacles and picnic areas to eliminate food sources.

Physical/ Mechanical control:

- Provide exclusion measures on facility buildings by sealing cracks and pipe or wiring penetrations.
- Ensure doors and windows seal properly.
- Keep doors closed as much as possible.
- When possible and during appropriate times when wasps are foraging, physically remove the nest.

Chemical Control:

- An active nest may be dispatched with an application of an aerosol wasp and hornet spray containing the following:
  Tetramethrin, 3-Phenoxbenzl, cyclopropanecarboxylate, petroleum distillates, *Speckoz multicide wasp and hornet killer* or
  Pyrethrins, piperonyl Butoxide, N-octyl Bicycloheptene dicarboximide, phenol methylcarbamate, *Misty Wasp and Hornet Killer*
- Chemical controls will not be used in areas where the application of the chemical may contact water bodies such as streams, creeks, ponds, lakes etc. Do not spray pesticides if wind is greater than 8 mph. Do not apply pesticides if rainfall is imminent.

Additional Resources: Texas Cooperative Extension Publication L-1828, *Paper Wasps, Yellowjackets and Solitary Wasps,* Glen C. Moore and Mike E. Merchant

3. **Ball moss** *(Tillandsia recurvata)*

Identification: Ball moss is about 3" to 9" wide within the Central Texas region and has scaly, recurved, linear leaves 2" to 6" long. It's a grey to greenish color. The blooms are 6" erect spikes with 1 to 7 funnel-shaped, ½" long flowers with pale blue or violet petals. They are present all year long, but bloom in the fall.

General Description/ Biology: Ball moss is an odd nuisance plant that affects the aesthetics of many shade trees throughout the southern half of Texas. As the name implies, it is a ball shaped plant and attaches itself to tree limbs. It belongs to a group of plants known as "epiphytes" which absorb water and nutrients from the air through their leaves and stems. Ball moss thrives in the interior of the canopies of many shade trees where light levels and air circulation is low and relative humidity is high. The plant spreads when windblown seeds are dispersed and land on other limbs. Ball moss is not parasitic and does not directly harm the tree it attaches to. However, the accumulation of the plant can shade out lower limbs or other plant material below. It can also cause property damage when limbs break from the added weight during rain or ice storms.

Action Threshold: In most cases, no control measures will be taken to control ball moss within the parks system except when heavily infested limbs could break and cause property damage or when infestation degrades the aesthetics of certain "signature" trees. Infested limbs may be pruned out as subsidiary work during routine maintenance.

Control:

Physical/ Mechanical control:

- When possible, prune out dead or diseased limbs to eliminate favorable conditions for the ball moss to establish and spread.
- During tree maintenance, hand pick tufts or clumps if numbers are small.
- Prune off heavily infested limbs to reduce population and prevent property damage caused by limb breakage.

- Care should be taken to prevent dispersing the seed heads when disposing of the tufts. Any pruning cuts on oak species susceptible to oak wilt should be painted.

Chemical control:

- Localized spot treatment or individual tree treatment with Copper Hydroxide, *Kocide 101 or Kocide DF*
- Chemical controls will not be used in areas where the application of the chemical may contact water bodies such as streams, creeks, ponds, lakes etc. Do not spray herbicides if wind is greater than 8 mph. Do not apply herbicides if rainfall is imminent.

Additional Resource: Texas Cooperative Extension Publication L- 5353, *Ball Moss*

4. **Johnson grass *(Sorghum halapense)***

Identification: Johnson grass can grow as tall as 8'; it is usually 3' to 6' feet in height and has up to a 1" wide blade. Johnson grass spreads by both seed and underground rhizomes. The seed heads are large, open panicles and are red tinged. The rhizomes are thick, fleshy and segmented.

General Description/ Biology: Introduced into South Carolina in the early 1800's, Johnson grass is a vigorous, coarse textured perennial grass with scaly rootstalks. Johnson grass can grow in a variety of environments but thrives in disturbed soils especially when it has plenty of moisture. During certain climactic conditions, Johnson grass may produce levels of hydrocyanic acid that can be toxic to cattle. Although it has some beneficial aspects for purposes of erosion control, it is a very aggressive, noxious weed in parkland. It is an eye-sore and can rapidly colonize areas that do not receive regular maintenance.

Action Threshold: Measures may be taken to control Johnson grass when infestations degrade the aesthetics of maintained planting beds, when large stands invade routinely maintained areas within the parks system or when native plant communities are established. Johnson grass will be tolerated in non-maintained areas and will be acceptable when providing critical stream bank stabilization until higher quality plants can be established.

Control:

Physical/ Mechanical control:

- Upon initial discovery in planting beds, remove the Johnson grass before seed heads develop by hand weeding or through use of mechanical tools. Care should be taken to prevent dispersing the seed heads when disposing of the vegetation.

- Mow open turf areas at regular intervals to prevent seed head and rhizome development; however, mowing intervals should be scheduled to allow native plants to seed out.
- Promote the competition of desirable turf grasses such as bermudagrass by mowing at 3" high and every 17 to 21 days.

Chemical control:

- If stands of Johnson grass persist, then a trans-locating herbicide such as Glyphosate, *Round Up*, may be used for spot treating.
- Chemical controls will not be used in areas where the application of the chemical may contact water bodies such as streams, creeks, ponds, lakes etc. Do not spray herbicides if wind is greater than 8 mph. Do not apply herbicides if rainfall is imminent.

Additional Resources: Texas Cooperative Extension Publication L- 5339, *Maintaining Bermudagrass Lawns;* Texas Cooperative Extension Publication B- 5038, *Suggestions for Weed Control in Pastures and Forages*; Texas Natural Resource Server, *Toxic Plant Data Base* and *Know Your Grasses*

5. **Poison ivy** *(Toxicodendron radicans, or Rhus radicans)*

Identification: Poison ivy grows as a loose shrub or woody-stemmed, climbing or creeping vine. The leaf consists of three leaflets on long, oppositely placed stems (petioles) and can be 3" to 10" long. Margins of the leaflets may vary from being entirely smooth, slightly toothed or lobed. The leaves can be glossy or dull green.

General Description/ Biology: Poison ivy is a poisonous perennial and can grow in a variety of conditions but thrives in low, moist areas. It can establish itself almost anywhere the seeds may be dropped. Poison ivy climbs by attaching aerial rootlets to trees, fences or other support structures. The plant is aggressive and can take over the canopies of support trees. Without climbing support, it may be found as a loose, semi-erect shrub. Poison ivy has excellent fall color with leaves turning red, yellow, and orange. The cluster forming fruit is a small grayish-white waxy berry that forms in summer and hangs on the vine into the winter months. It is eaten by many species of birds.

Action Threshold: Measures will be taken to control poison ivy when infestations encroach on "active" use areas such as playgrounds, swimming pools, picnic areas, hike and bike trails, recreation centers or other areas where routine maintenance or service is performed. Poison ivy will be tolerated in natural or non-maintained areas especially when it serves to discourage human activity in environmentally "sensitive" areas such as wildlife habitat and stream banks.

Control:

Physical/ Mechanical Control:

- An initial approach to controlling the spread of seedling poison ivy particularly in service areas is to smother the seedlings with a heavy layer of mulch. This can also help prevent seeds from germinating.
- Remove poison ivy before seed clusters can develop by hand weeding or through use of mechanical tools. Care should be taken to prevent dispersing the seeds when disposing of the vegetation.
- When vines have climbed into trees, mechanical removal by hand cutting and removing basal growth may be the only effective means of control without damaging the tree.

Chemical Control:

- Initially a spot treatment of vinegar and surfactant may be used although this has limited effectiveness.
- To control large stands of poison ivy, a trans-locating herbicide such as Glyphosate, *Round Up*, may be used for spot treating. This method in conjunction with hand removing can be very effective in controlling the spread of the plant.
- To eliminate persistent plants a brush-on application of Isopropylamine salt of Imazapyr, *Arsenal,* may be applied. (This product will not be broadcast sprayed.)
- Chemical controls will not be used in areas where the application of the chemical may contact water bodies such as streams, creeks, ponds, lakes etc. Do not spray herbicides if wind is greater than 8 mph. Do not apply herbicides if rainfall is imminent.

Additional Resource: National Park Service Information Sheet – Integrated Pest Management - *Poison Ivy*

6. **Various Invasive Woody Species**

Identification: Refer to Austin "Grow Green" guide.

General Description/ Biology: Invasive plants as described in the Austin "Grow Green" guide are those plants that "are non-native to the Central Texas ecosystem and their introduction causes or is likely to cause economic or environmental harm." These plants may be spread by seeds, berries and spores all of which can be transported long distances. They may also aggressively spread by runners, rhizomes and stems. Invasive trees and shrubs "are typically fast-growing and highly adaptable, but often have weak wood and are short-lived. Most are susceptible to insect and disease problems."
This section will focus on invasive woody species which may include but is not limited to the following:
Running Bamboo – *Phyllostachys aurea*, Chinaberry – *Melia azedarach*, Chinese Photinia – *Photinia spp.*, Chinese Privet – *Ligustrum sinense*, Chinese Tallow – *Sapium*

sebiferum, Wax Leaf Ligustrum – *Ligustrum japonicum,* Japanese Ligustrum – *Ligustrum lucidum*, Nandina – *Nandina domestica*, Paper Mulberry – *Broussonetia papyrifera* and Pyracantha – *Pyracantha spp.*

Action Threshold: Measures may be taken to control invasive woody species when staff determines that significant stands of invasive woody species impede visibility within parks and pose a threat to the safety and welfare of park users and service workers. Invasive species may be removed in efforts to reclaim parkland for "active" use areas such as open fields, playgrounds, picnic areas, hike and bike trails, or maintenance facilities. Finally, invasive woody species may be removed in efforts to improve the environmental quality and encourage the establishment of native plant species.

Control:

Physical/ Mechanical Control:

- An initial approach to controlling the spread of invasive woody species is to mow open areas at regular intervals to discourage vegetative growth and prevent seed head and rhizome development.
- An effective approach to controlling invasive plants in areas too difficult to mow is to smother young vegetation with a heavy layer of mulch. This can also help prevent seeds from germinating.
- Remove invasive species before seed clusters can develop by hand weeding or through use of mechanical tools. Care should be taken to prevent dispersing the seeds when disposing of the vegetation.

Chemical Control:

- To control new growth of invasive woody species, a trans-locating herbicide such as Glyphosate, *Round Up*, may be used for spot treating. This method in conjunction with hand removing can be very effective in controlling the spread of the plants. This includes stump treatment.
- To eliminate persistent invasive plants a brush-on application of Isopropylamine salt of Imazapyr, *Arsenal,* may be applied. (This product will not be broadcast sprayed.)
- Chemical controls will not be used in areas where the application of the chemical may contact water bodies such as streams, creeks, ponds, lakes etc. Do not spray herbicides if wind is greater than 8 mph. Do not apply herbicides if rainfall is imminent.

Additional Resource: Austin "Grow Green" guide - *Native and Adapted Landscape Plants*

Policy 4:
Notification of Pesticide Use at a Site

PURPOSE
This policy establishes procedures for notification of applications for all pesticide materials being applied by PARD personnel.

BACKGROUND
PARD understands that park users may want to be informed of pesticide applications. Label requirements for pesticide applications may also mandate that entry to treated areas be avoided for a specific interval. Park users may also wish to find out further information about pest management activities occurring at a park site. To satisfy these needs, all pesticide applications will be accompanied by on-site notification signage so that park users are made aware of the treatment.

POLICY
It is the policy of the City of Austin to notify park visitors of pesticide application sites through the use of notification signs. These signs are posted 24 hours before an application begins, placed in clearly visible locations, at conspicuous entries, at trail heads, and/or application sites, with a maximum interval of 200 feet between each sign in open areas. The intent of the placement of the signs is that park users will encounter them before they have had an opportunity to enter the treated area.

Street rights-of-way are posted 24-48 hours prior to the application of pesticides to tree canopies. This notification signage will include some basic information about the application and appropriate contact information of the park district applying pesticides for those desiring more information. PARD will supply callers with additional information about the pest problem and the approach being used.

Re-entry specifications will be listed if required by the label. Signs shall be removed after the re-entry specification has been met, the liquid application being used has dried, or at least 12 hours has past since the application. For dry or granular applications this interval is usually after any dust has settled.

Schools, recreation centers, pools, senior centers, and museums should be notified in writing before an application is made to nearby adjacent properties, 500 feet if applying on the ground and 1000 feet if the application is applied on canopies or from the air. School, recreation center, pool, senior center, and museum personnel can then schedule the activities of their users accordingly. The notification letter shall be delivered no less then 24 hours before any applications of pesticides are planned to take place. A form letter for this purpose is provided on Appendix 3. In addition to this letter, a follow-up call is helpful to supply the specific or range of dates and locations of any applications, and to answer any questions raised.

Applications to Austin Public School owned property must adhere to the APS notification requirements. PARD will work in cooperation with APS to ensure notification that satisfies established APS policy. Any work unit that intends to apply pesticides to APS property will coordinate with the APS Manager of Environmental Health and Safety before any application takes place.

Policy 5:
Pesticide Application on Park Property and Street Rights-of-Way

PURPOSE
This policy establishes procedures for applications for all pesticide materials being applied by PARD personnel.

BACKGROUND
It is the policy of Austin Parks and Recreation for their employees to apply pesticides in a legal manner and to adhere strictly to all precautionary requirements for their use. This policy outlines procedures for pesticide application in parks and street rights-of-way that are maintained by PARD employees. All EPA registered pesticides are accompanied by a legal label specific to each product that defines all legal uses. Pesticides must be used according to these label directions.

POLICY
The pesticide must be used only on sites and targets specified in the label. Higher dosages, higher concentrations, or more frequent applications than the label allows for are not permitted. Directions for use, safety, mixing, diluting, storage, and disposal, as well as any restrictions on re-entry must be met.
The following criteria shall be met when applying pesticides. Some of these are addressed more specifically in other policies.

• The label is the law.

• Personal Protective Equipment shall be used wherever indicated and it must be maintained in a workable and safe condition.

• Spray equipment shall be maintained in a safe and operational condition. Where applicable, spray equipment shall be calibrated regularly.

• Anti-siphoning devices shall be used when filling large spray tanks.

• "Criteria for Choosing a Pest Management Method," as outlined on pages 9-10, shall be considered in making choices.

• Pesticides used shall be chosen from the approved lists as provided for the appropriate work units.

• Pesticides shall be applied only when appropriate weather conditions exist.

• Notification signs shall be posted in areas where pesticides are being applied.

• All applications shall be recorded on approved application record forms.

The law does allow an applicator to:
• Apply a pesticide at any dosage, concentration, or frequency less than that listed on the labeling,

• Apply a pesticide on any target pest not listed on the labeling if the application is to a crop, animal, or site that is listed on the label,

• Use any equipment or method of application not prohibited by the labeling,

• Mix a pesticide or pesticides with a fertilizer if the mixture is not prohibited by the labeling,

• Mix two or more pesticides, if all the dosages are at or below the recommended rates and such combinations are not contraindicated on the label.

Process for Utilizing Pesticides on Park Property or Street Rights-of-Way
1. A park employee identifies or is informed of a pest problem.
2. Thresholds and action levels are determined by a licensed applicator or supervisor for the specific pest problem in question.
3. Management strategies are determined by a licensed applicator. Special situations may require expertise from outside PARD such as university diagnostic laboratories.
If pesticides are to be used:
4. Choose the pesticide using the "Criteria for Choosing a Pest Management Method, and "Approved List of Pesticides" for the appropriate work unit.
5. Check application equipment for safety and mechanical problems, calibrate if necessary.
6. Check weather conditions. Applications should be done when appropriate wind conditions exist to minimize drift. Adjustments should be made for spray droplet size and pressure if conditions warrant. No application should take place where there is unacceptable drift. Application is allowed outside park curfew hours.
7. Post notification signs 24-48 hours before use to inform the public of the application. For specific rules, see the Notification Policy.
8. List re-entry specifications on the signs if required by the label.
9. Apply material according to the label and in accordance with state and federal regulations.
10. Record applications of pesticides on the approved forms and send a copy to the Operations Manager. See appendices.
11. Remove signs after the label designated re-entry requirements have been met or after 12 hours has past since the application. This is usually when the liquid pesticide has dried, unless indicated otherwise on the label.
12. Evaluate the results of management measures.

Policy 6:
Pesticide Application Record Keeping

PURPOSE
This policy establishes recording and reporting procedures for all pesticide applications taking place on park land by PARD personnel, or any other agency, department, company or individual whether they are acting as a contractor or acting in a voluntary manner.

BACKGROUND
PARD finds that detailed record keeping is an essential part of IPM implementation, and is vital in communicating, reporting, and analysis of pest management activities. State law requires that written records be kept for pesticide applications. The law requires that licensed applicators record the details of pesticide applications and keep these records for two years. These records must be stored in a central location and be available for review.

POLICY
It is the policy of Austin Parks and Recreation to record and retain records of all pesticide applications performed on park land. Appropriate forms for this use will be provided in Appendices 2 through 5.

Each application event will require an application form to be completed. Copies of completed application records should be sent to the Pest Management Program Coordinator on a monthly basis. A master file of these records shall be kept at a central location and maintained by the Coordinator. Each operating unit shall keep a record file related to pesticide applications by their own personnel. These records shall be retained for no less than two years.

Information regarding application of pesticides to park lands by state certified applicators who work for a bonded company and who have been contracted for application shall also be recorded including all information fields required by the TDA. Copies of these records must be provided to the Operations Manager.

The following information must be included on the recording forms for each pesticide application by an PARD employee: Date of application, name of applicator, state license number, spray permit number, work unit, application start and end time, temperature, wind conditions, equipment used, park or site, specific area treated, target pest, total area treated if applicable, names and EPA numbers of all products applied, total amount of dilute pesticide applied, coverage rate where applicable, mix ratio or percentage of dilute mixture, and aquatic buffer designation where applicable.

Applications on different dates or at different locations must have their own application record. They cannot be combined on one record. (See the appendices for examples of record keeping forms.)

Policy 7:
USE OF REMAINING PESTICIDE SOLUTIONS AND RINSES

PURPOSE
This policy establishes procedures for the use and disposal of any pesticide remains generated by PARD applicators. It outlines methods for use of remaining pesticide solutions and rinses in a legal and safe manner.

BACKGROUND
Applicable laws require that all pesticide solutions and rinses be applied to target areas according to label directions. These solutions and rinses may also be disposed of at an authorized pesticide disposal site. It is the goal of PARD to conduct our pesticide operations so that disposal of remaining material is not necessary.

POLICY
Pesticide solutions and rinses should be applied according to the label directions, and to legal target sites so there are no pesticides remaining. This shall be accomplished by accurately gauging the amount of pesticide needed for the job. PARD promotes the use of advance planning to minimize the number of times it is necessary to switch pesticides in spray equipment. In order to reduce the amount of excess rinsate, it is the policy of PARD to rinse equipment only at the end of the spray cycle or when changing to pesticides that are incompatible with those in the tank. It is a legal requirement to fully label all tanks and sprayers containing leftover pesticides at the end of each day.

PROCEDURES
Following are some considerations to make before beginning an application to assure the proper amount of pesticide is mixed. Advance considerations:

• Weather conditions and predictions.

• Acreage/square footage of the job site.

• Calendar: special events, mowing, irrigation, etc.

• Type and size of the equipment appropriate to do the job.

When applying the pesticide use the following procedures to reduce and safely store the rinse solution. These are secondary to label information and State and Federal regulation.

• Mix only enough pesticide solution to do the job that day.

• Use up all pesticide, applying until the tank is empty, or no more solution is coming through the nozzle.

• If pesticide mix remains, completely label the tank or sprayer with legal labels for the products used. Also mark the current concentration for each product, the date, and the name of the applicator.

• When resuming spray applications the next time, either use the leftover material, or add dilution water and circulate the mix thoroughly before adding new concentrate.

• If spray tank rinsate is created, store the rinsate as make-up water for the next day. The next day's pesticide should be compatible or the same. The same labeling requirements pertain to the rinsate mix.

Rinse the sprayer if the following conditions apply:

• It is necessary to use a pesticide incompatible with that previously used.

• It is the end of a spraying cycle.

Use the following rinse process:
1. Read the pesticide label. The following should not conflict with label information or State or Federal regulations. Contact your supervisor if you see a conflict or have questions.
2. Wear protective clothing, as listed on the label when handling pesticides, pesticide containers, or pesticide equipment.
3. Fill the spray equipment approximately 1/4 full with clean water. Shake or agitate so that all inside surfaces are washed. If possible use the spray hose to rinse the inside surface of the tank.
These procedures should coincide with all labels.
4. Spray the rinse water out of the spray equipment onto an approved target area. Rinse water should be run through all hoses, booms, etc. Filters should be cleaned. Because of the dilute nature of the pesticide in the rinse water, a coarse spray can be used and is recommended to save time. Do not "pond" or saturate the soil.
5. If the tank is to be stored, repeat step 3 and 4 above two times until the tank is clean.

Policy 8:
STORAGE OF PESTICIDES

PURPOSE
This policy defines the method and procedure for storage of pesticide materials for all PARD locations and personnel.

BACKGROUND
Attention to the proper storage is vital to assure public and employee safety, as well as to protect the investment in their purchase. Several agencies are involved in regulating aspects of pesticide storage. No single agency has comprehensive authority. Agencies involved include State of Texas Department of Agriculture, Texas Commission on Environmental Quality, U. S. Environmental Protection Agency, Texas State Fire Marshall, and the Austin Fire Department.

Pesticides will be stored and transported in a manner that reduces the risk of spills, exposure, theft, degradation, contamination, or loss.

POLICY
Pesticides or pesticide containers shall be kept in secure and safe locations in accordance with existing laws. They shall be kept in a secure location and, if possible, in a temperature controlled, well-ventilated area. Areas used for storage shall be labeled and designated for use by work unit supervisors.

Pesticides shall be safeguarded from environmental damage such as extreme temperature, photodecomposition or moisture. All pesticides in storage shall be inspected regularly and, if necessary, rotated on the shelf to assure that the oldest dated items are used first.

Central warehousing of pesticides shall take place at the Central Maintenance Complex. In the fall of each year, satellite pesticide storage areas for individual zones and work units shall return unused quantities of pesticides to the central warehouse for winter storage unless there is an anticipated need for near term use.

Pesticides being transported shall be appropriately and safely secured in the vehicle. Only licensed applicators shall transport pesticides. Appropriate spill response supplies must be immediately available. Pesticides shall not be transported in passenger cabs of vehicles where alternatives exist, such as truck beds, truck boxes or vehicle trunks.

Policy 9:
DISPOSAL OF EMPTY PESTICIDE CONTAINERS AND UNUSABLE PESTICIDES

PURPOSE

This policy defines the method and procedures for the disposal of pesticide containers and unusable pesticides or those pesticides whose registrations have been totally or partially suspended.

BACKGROUND

Austin Parks and Recreation considers proper disposal of unusable pesticides and pesticide containers of the utmost importance to the safety of employees, the public, and the environment.

Several governmental agencies regulate pesticide disposal. No one agency has comprehensive authority. Agencies involved include the Texas State Department of Agriculture, Department of Environmental Quality, Environmental Protection Agency, and Occupational Safety and Health Administration. PARD will comply with all relevant laws governing the proper disposal of these materials.

POLICY

PARD shall dispose of pesticides and empty pesticide containers in accordance with all State and Federal regulations and label recommendations. Disposal of pesticide containers and unusable pesticides not in accordance with this policy will be cause for disciplinary action.

PROCEDURES

Read the pesticide label. The following steps should not conflict with label information or state and federal regulations. Contact your supervisor if you determine a conflict or have other questions. Always wear protective clothing when handling pesticides or pesticide containers, as directed on the label.

For non-rigid containers including bags, sacks, and boxes

1. Pesticide material must be emptied into application equipment to the extent made possible by physical agitation of the container.
2. Visually verify that residues have been removed.
3. Multiple-rinse non-rigid containers such as paper lined with plastic or foil.
4. Place in a plastic bag and mark as to contents.

For rigid containers such as plastic, glass, or metal

1. Pesticide material must be emptied into application equipment to the extent possible by pouring, then visually verifying that the residues have been removed.
2. The container must be rinsed with clean water until clean; the rinse water being poured into the spray equipment. Empty the pesticide and all rinsates into the sprayer before the full amount of diluting water is added to the spray equipment.
3. Place in a plastic bag and mark as to contents.

Storage of Containers

1. Containers must be stored in plastic bags in a secure area until they can be taken to a secure collection site. The Central Maintenance Complex is a designated secure collection site.
2. Containers must be transported to, and placed in the designated secure container box at the Central Maintenance storage area. Each container product name and size must be recorded by a licensed applicator on the designated form at that time.
3. For each container, record the date, name of the pesticide, quantity and size of the container, park area used, and the applicator signature. These records shall be maintained at the site, and copies forwarded to the Pest Management Policy Coordinator on a twice yearly basis.

Disposal of Unusable Pesticides

Unusable pesticides are ones that: 1) are damaged through vaporization, freezing, infiltration of moisture to containers or photo decomposition; 2) have exceeded their shelf life; or 3) have visually changed their composition or structure in some manner.
1. The Pest Management Program Coordinator should be informed of plans to dispose of pesticides and of results of the disposition.
2. The Coordinator will contact the TDA, the manufacturer or dealer and/or a licensed consultant and find out if the product is still usable.
3. If the pesticide has less activity due to long storage, moisture, or freeze damage, follow the recommendations of the dealer, manufacturer, or licensed consultant and use procedures in this policy as they apply. One option could be to apply the material realizing that full control is not achievable using the damaged pesticide.
4. If this option cannot be followed legally, follow recommendations of the dealer or manufacturer or licensed consultant. It is not legal to transfer damaged or altered pesticides to another party for use. It may be necessary to arrange for disposal of the pesticide in a manner recommended by TCEQ.
5. The Pest Management Coordinator is responsible for disposing of pesticides. A record of these disposals should be kept on file for three years.

Disposal of Pesticides with Totally or Partially Canceled Registrations (or those which have been removed from approved use by PARD.)

1. The coordinator shall keep up-to-date on the pesticide regulatory news and respond to pending actions appropriately to minimize or eliminate stocks of unusable pesticides.
2. If unusable pesticides remain in stock, PARD will follow recommendations of the regulatory agencies, manufacturer or dealer in finding a legal user for the pesticide. If the pesticide is unopened and/or still retains its integrity it may be possible to transfer the pesticide to a legally registered bureau, agency, or group to use.
3. It may be necessary to dispose of the pesticide in a manner recommended by TCEQ.

Policy 10:
USE OF PROTECTIVE CLOTHING AND EQUIPMENT

PURPOSE
This policy outlines the requirements for the use of protective clothing and equipment by PARD personnel when undertaking pest management activities.

BACKGROUND
Use of pest management tools, equipment, and materials may require the use of personal protective equipment (PPE). Use of such equipment is necessary to provide an adequate measure of safety for the applicator. This protective equipment will be clearly defined in the legal pesticide label directions or directives in equipment manuals. When such directives exist they must be adhered to. Use of appropriate protective equipment may not be so clearly defined for all pest management methods, and in such cases it is the responsibility of the applicator to determine and employ adequate safety equipment.

POLICY
Personnel engaged in the use of pest management tools, equipment, or materials shall follow all clothing and equipment requirements required to ensure their safety. When using pesticides, the label directives for use of PPE must be adhered to. Use of related power and mechanical equipment must be accompanied by appropriate PPE as determined by equipment manuals or supervisor's directives.

Required personal protective equipment appropriate to satisfy specific pesticide label requirements shall be provided by PARD to employees for their use. This may include, but is not limited to: respiratory protection, eye protection, coveralls, rain gear, mixing aprons, chemically resistant boots, gloves, head protection, and hearing protection. Time will be made available to wash up before lunch and at the end of the work shift. The applicator is responsible for cleaning, storing, and maintaining PPE and equipment in a safe and useful manner. Applicators may also provide their own additional PPE if desired, if such equipment and its use has been previously approved by their supervisor.

If applicators apply organophosphate and carbamate insecticides in amounts and frequencies determined by health professionals to require cholinesterase blood tests, PARD will provide for these tests. This testing monitors the potential depletion of the enzyme cholinesterase in the blood, an indicator of exposure to these materials.

Policy 11:
EMERGENCY INFORMATION CONCERNING ACCIDENTAL PESTICIDE EXPOSURE

PURPOSE
This policy establishes procedures for the proper response to employee and citizen inquiries regarding accidental exposure to any pesticide material used by PARD staff. It defines PARD's response to inquiries concerning adverse health effects as a possible result of accidental exposure to pesticides.

BACKGROUND
PARD's handling of public inquiries should be prompt, professional, and well supported. While PARD can answer general questions, PARD does not have medical professionals on staff to address specific medical questions relevant to accidental exposure. This expertise is readily available in the health care community. Therefore, concerns of this nature will be referred to qualified medical personnel for resolution.

POLICY
PARD will inform applicators of proper procedures to be taken in case of pesticide exposure. Anyone inquiring about pesticide exposure will be referred to his or her own personal physician, the Central Texas Poison Center (CTPC), or the Texas Department of State Health Services (DSHS). A list of these authorities and their phone numbers are listed in the appendices.

Material Safety Data Sheet information about all hazardous substances in the workplace is available to all personnel for their own use. This information includes symptoms of exposure, and procedures for handling overexposure to individual pesticides. If symptoms of illness occur during or shortly after applying pesticides, the CTPC should be contacted or the individual should receive medical attention immediately.

Non-emergency questions received by PARD shall be referred to the Pest Management Program Coordinator. The Coordinator will provide information to the questioner or refer them to qualified individuals or sources for further information.

PROCEDURES
• Use planning to avoid emergencies and to expedite aid should an accident occur.

• Be informed of the symptoms of exposure and the decontamination steps necessary in case of accidental exposure.

• Use all safety procedures and protective gear as recommended on the label.

• Have a copy of the appropriate label available when applying or transporting pesticides (concentrated and dilute.)

In case of a medical emergency related to suspected pesticide exposure

• Handle any emergency situation as per First Aid instructions, or label and MSDS.

• Call for emergency backup if necessary.

• Refer to Central Texas Poison Center.

• Take a label for reference for medical personnel if it is necessary to leave the site.

• Inform your supervisor as soon as possible.

• Inform the Pest Management Program Coordinator as soon as possible.

In response to a non-emergency inquiry

• Respond to questions to the best of your ability.

• Refer detailed or technical questions to the Pest Management Program Coordinator.

• Inform your supervisor.

Policy 12:
PESTICIDE SPILL RESPONSE

PURPOSE
This policy outlines the objectives, training requirements and procedures Austin Parks and Recreation personnel should follow in response to an emergency release of pesticides. This applies to all PARD staff involved in applications of pesticides, handling of pesticides, or acting in a communications response role during a spill incident.

BACKGROUND
Several state and federal regulations apply to an emergency release of hazardous materials. The Department of Transportation (DOT) and the Public Utilities Commission (PUC) regulate the transport of hazardous waste resulting from a spill and the release of chemicals if it occurs when they are being transported. The Environmental Protection Agency (EPA) and the Texas Commission of Environmental Quality (TCEQ) protect the environment through regulation concerning prevention of and response to the contamination of water, land, and air resulting from an emergency release of a hazardous material. They are also concerned with proper disposal of waste generated from a spill. The Occupational Safety and Health Administration (OSHA) is concerned with the proper training and protection of workers handling hazardous materials. These regulations are incorporated into the procedures outlined here. Through its Pesticide Spill Response policy, PARD strives to take a leadership role as a steward of public land and of the environment.

POLICY
The primary method by which Austin Parks and Recreation reduces pesticide spills is through prevention. Through planning, preparation, adherence to good work practices, and increased awareness of the potential results of a spill, the possibility of a spill occurring is minimized.

Should an emergency release of a pesticide occur, Parks and Recreation personnel will respond in accordance with all governmental regulations, including those of DOT, EPA, TCEQ, OSHA, and this policy. In performing emergency activities following a spill, protection of both employees and the public, is of great concern, as is protection of property and the environment.

Anyone liable for a spill shall immediately clean up the spill or release. The cleanup must use the best available methods to achieve the lowest practicable level of contamination.

OSHA, which is concerned with worker protection, has two regulations governing spills. One, Hazard Communication, applies to incidental spills that present a low potential of hazard to the worker, the public and the environment. Included are small spills of dilute pesticides, spills of material with granular formulations, and lower toxicity materials. The other regulation, Emergency Response, applies to incidents with a high degree of hazard such as large spills of dilute material, pesticides with higher toxicity, and concentrates in a confined space.

An incidental spill becomes an Emergency Response when:
1. The release or spill significantly impacts another agency's functions;
2. The incidental spill precipitates evacuation or curtailing of work;
3. The event causes a negative impact on neighboring facilities or the community;
4. The spill involves a coordinated effort by local first responders.
Only licensed pesticide applicators can transport or apply pesticides. They will receive training and equipment that will allow them to respond to incidental spills. Spills that require an Emergency Response will be handled by a local HAZMAT team.

TCEQ enforces several regulations pertaining to spill reporting and clean up, and hazardous waste storage and disposal. If a serious emergency occurs and the local fire department has been called in, or if there has been a spill that extends outside Parks facilities or could reach surface water, the National Response Center and the Texas Division of Emergency Management (TDEM) must be called.

If the amount of pesticide spilled exceeds one pound in any 24 hour period the release must be reported to TDEM. If it exceeds the amount listed in the Code of Federal Regulations List of Hazardous Substances and Reportable Quantities, the spill must be reported to the National Response Center.

The spill need not be reported immediately if it occurs on a surface impervious to the hazardous material and is fully contained, and if it is completely cleaned up without further incident, including repairing the cause of the spill. The Pest Management Coordinator will determine whether these agencies should be contacted.

Particular attention should be paid to ensure that a pesticide does not pollute the water supply. A primary aim in following the procedures outlined here is to recover and reuse as much of the spilled pesticide as possible. Any absorbent or other contaminated material from which the spilled pesticide cannot be recovered is hazardous waste and must be labeled, stored and disposed of properly.

Responsibility and Training

Parks and Recreation has identified three levels of spill response. The levels and their training requirements are described below.

Level Description and Training

Level I is for individuals who come into indirect contact with pesticides and their use. They must be able to recognize and respond to an emergency situation by obtaining and passing on information, and by making the appropriate notifications. They will not take an active role in containment and clean up procedures. People at this level will have sufficient training to acquire competency in the following areas:
1. Familiarity with CHEMTREC, and an understanding of their own role in an emergency.
2. An understanding of pesticides as hazardous substances, and the risks associated with them in a spill.
3. The ability to recognize the presence of hazardous material in an emergency.

4. The ability to recognize the need for additional resources, and to make appropriate notifications.

People in this category include those assigned to the Parks and Recreation Urban Forestry Department, and Division Managers supervising Park and Preserve Operations. These individuals will receive additional training to familiarize them with their role in case of an emergency.

Level II is for licensed applicators that apply or transport small volumes of low to moderately toxic pesticides. This level includes response to incidental spills. Individuals at this level are trained to prevent spills from occurring. Should one occur, they are trained to stop the release, keep it from spreading, and do cleanup. Most of PARD's licensed pesticide applicators are in this category.

Individuals at this level will receive training in addition to pesticide applicators, along with hazard communication and respiratory protection training. They must exhibit competency in the following areas as well as those listed in the base level.

1. Familiarity with activities which promote spill prevention.
2. Familiarity with the Spill Response Program and their own role in an emergency.
3. Knowledge of safety and health hazards of hazardous materials in a spill.
4. An understanding of basic chemical and toxicological terminology and behavior.
5. Knowledge of work practices that employees can use to minimize risks from hazards.
6. Selection and use of proper personal protective equipment.
7. Identification of symptoms that may indicate overexposure to hazards.
8. Implementation of basic decontamination procedures.
9. Performance of basic control, containment, and clean-up techniques.
10. Skill in determining when a spill is fully cleaned up.

Level III training includes individuals who apply or transport over 50 gallons of dilute pesticides, or more than 1 gallon or 10 pounds of concentrate with a danger label. They are trained to stop the release, keep it from spreading and do cleanup. They will receive 9 hours of training additional to that for the second level to develop competency in the following areas:

1. Knowledge and use of spill prevention techniques for larger equipment.
2. Knowledge of hazard and risk assessment techniques.
3. An understanding of basic hazardous materials terms.
4. An understanding of basic chemical and toxicological terminology and behavior.
5. Selection and use of proper personal protective equipment appropriate for more toxic pesticides.
6. Implementation of decontamination procedures.
7. Performance of control, containment and clean up techniques.

This level includes the Pest Management Program Coordinator who will be responsible for notifying regulatory agencies, documenting incidents, ensuring that the cleanup is complete, and for making arrangements for disposal of hazardous waste.

Spill Prevention

PARD personnel will employ a variety of practices to reduce the potential of a pesticide spill.

These will include the following:

Purchasing

When procuring chemicals, a factor in determining which chemical formulation to purchase will be the ease with which it can be cleaned up in the event of a spill. Types of packaging and formulations that may help to prevent a spill from occurring will be factors as well.

Characteristics of the pesticide, such as toxicity and reactivity that may affect the seriousness of a spill, will also be considered.

Preparation

Planning, training of personnel, and acquisition and maintenance of equipment and supplies will be done to reduce the risk of a spill occurring, and to minimize damage should one occur. For example, regular preventative maintenance will be done on sprayers, replacing hoses and valves before they wear out.

Work Practices

PARD personnel will use practices to minimize the potential for a spill to occur, and to ease clean up should one occur. For example, pesticides should be placed in a leak-proof container while being transported.

PROCEDURES

Should a release of a pesticide occur, the following guidelines should be used. Do not clean up the spill if you are not properly trained, if you don't have proper protective equipment or if doing so would endanger your health or safety.

I. Assess the Situation

A. If the **release is out of control:**

1. Tell bystanders to remain at a safe distance.
2. Call 911. Ask for fire, describe the situation as a hazardous materials spill. If there are injured people, ask for an ambulance. If chemical injury is involved, be certain that a copy of the label accompanies the victim.
3. Assist injured people. Remove contaminated clothing immediately.
4. Determine whether there is an imminently hazardous situation that you can take steps to correct. (For example it may be appropriate to move the truck away from a waterway or heat source.)

5. Call Austin HAZMAT Cleanup at 1-888-897-7455. Request any needed resources or assistance.
6. If the spill is on a roadway, set up DOT reflectors upwind of spilled materials and divert traffic if possible.
7. Remain on site and update the Austin HAZMAT Cleanup every 15 minutes.
B. If the **release is controllable** and there are no injuries, tell bystanders to remain at a safe distance and initiate control and clean up procedures outlined in **II**.

II. Control the Spill
1. Put on protective equipment.
2. Do not allow the material to enter a drain. Survey the area to see if there is a need to place a dam to protect a sewer drain or other waterway. If the pesticide does enter a drain, reduce the flow as much as possible, and call TCEQ at 512-239-1000, immediately.
3. Stop the flow of the chemical.
If the spill is from a leaky container, position the container to prevent additional spillage.
If the spill is from a leaky valve, isolate the valve and depressurize the tank.
If the spill is from a broken hose shut off valve or pump it may help to loop the hose back into the tank.
If there is a rupture, use duct tape or any other material (such as rags or a patch) to stop the flow of a chemical.
4. Contain the spill using absorbent material. Call the Austin HAZMAT cleanup to request additional supplies, resources, and assistance if needed.
5. Change or add to your protective equipment as necessary. Put contaminated protective equipment in a plastic bag to transport to your work unit for cleaning. Follow proper decontamination procedures for protective equipment.

III. Clean Up the Spill
1. For dry material, sweep up the pesticide.
2. For a liquid spill, remove material using a wet vacuum where possible. Other useful materials include absorbent dikes, pillows, and towels.
3. For concentrate spills on pavement, after picking up as much as possible, contain the area and wash the pavement with a small amount of water. Absorb or vacuum this diluted pesticide and reclaim it.
4. If the soil has been contaminated, contact the Austin HAZMAT Cleanup. The Pest Management Coordinator, your supervisor, and you will determine to what degree cleanup should proceed using park staff. You may be asked to remove the contaminated soil. If so, scoop up enough soil to completely remove the pesticide. Place unusable material in a container labeled "Hazardous Waste". Up to 220 pounds, about half a barrel, of hazardous waste resulting from a spill can be transported by the applicator or transporter to their unit base. The Pest Management Coordinator may sample the soil on site to determine if it has been sufficiently cleaned up.
5. Contact the Austin HAZMAT cleanup if it has not been done already. Have the Spill Incident Report ready so that your supervisor and the Pest Management Program Coordinator can evaluate the situation.

IV. Reclaim the Pesticides

1. Reclaim the chemical on site if possible. Sift dried material to remove debris and return it to its proper packaging. Reclaim liquid material that has been absorbed through rinsing the absorbent material. Use the rinsate on a target site, or properly label and store it for future application.
2. Any pesticide recovered but not reclaimed on site will be processed at the work unit base. The absorbent material will be dried and reused.
3. Hazardous waste must be stored in a labeled container at the work unit headquarters. It will be transported to a waste management facility for disposal, arranged for by the Pest Management Coordinator.

V. Document the Incident

1. Complete a Pesticide Spill Incident Report.
2. File one copy of the report with the Pest Management Program Coordinator, one copy with your unit headquarters, and keep one copy for your personal records.
3. All Pesticide Spill Incident Reports will be reviewed by the Loss Control Committee.

VI. Restock the Spill Kit

The Pest Management Program Coordinator will go to all problem spill sites, supplying materials requested by the crew. He/she will assist in cleanup, if it has not yet been completed, ensure that the site has been cleaned up completely, help recover the pesticide and arrange for disposal. He/she will document the scene, talk to homeowners and emergency response crews, and photograph the site.

Communication Center Procedures

Should a crew member call the Austin HAZMAT cleanup to report an emergency release of a pesticide, it is a priority call. Use the top part of the Pesticide Spill Incident Report to gather information on the release.

A. If the incident is **under control***:*
1. Ask the caller what assistance he or she needs.
2. Contact the Pest Management Program Coordinator and supervisor of the applicator or transporter and relay the information.
B. If the incident is **out of control:**
1. Ask the caller to call back every 15 minutes to update the situation.
2. Ask the caller what assistance he or she needs.
3. Immediately contact the Pest Management Program Coordinator, then the supervisor of the applicator or transporter and relay the information.
4. You may be asked to call other emergency response services. To ensure continuity, the person who took the original call must remain available until the incident is concluded.

Pesticide Spill Kit Response Equipment

The following items must be immediately available to all persons applying or transporting pesticides:
1. A binder that includes:

• Chemical labels for materials being transported

• MSDS for chemicals being transported clipped to front of binder

• Shipping papers when necessary

• Pesticide Spill Response Procedures and Incident Report

• A DOT Emergency Response Guidebook

• Emergency phone numbers

2. A cellular phone, if there is the potential of a spill occurring that would require assistance.
3. Personal protective equipment appropriate for handling the pesticides being applied or transported in the event of a spill.
4. An eyewash either on the truck or on site and immediately available in the case of an emergency.
5. Tools and supplies to make repairs to the application equipment and to stop leaks.
6. A means of picking up spilled material. Depending on the formulation this may include absorbent material, broom and dustpan, or shovel.
7. Plastic recovery bags and ties for the material and for contaminated personal protective equipment.
8. A jug of water and detergent.

Following is a list of equipment and supplies that may be necessary to carry depending on the type of pesticide and its volume:
An extra protective suit
Extra gloves
An extra set of clothing
Waterless soap
Absorbent dikes, pillows and towels
Squeegee
Whisk broom
Dust pan
Hard bristle brush to loosen material
Duct tape for temporary repair
Patching material
Quill and hose
2 freestanding signs warning of danger
Warning tape
DOT reflectors or flares
Strainers
Bucket
Flat and pointed shovels
It is the responsibility of the applicator or transporter to ensure that he/she is carrying the items necessary should there be a spill.

Materials for the Communication Center
Binders that include:
Spill Incident Reports
MSDS for all materials used
Labels for all materials used
Emergency phone numbers
Communication Center Procedure sheet
Current phone numbers of supervisors

PESTICIDE SPILL INCIDENT REPORT

Name_____Date_____Phone number_____
Location of incident_____
Timerelease occurred_____Temperature_____Weather_____
Chemical(s)_____Dilute____Concentrate____
Approximate amount released_____
What caused the release?_____
Are there any injuries or chemical exposures? Y/N_____Has 911 been called? Y/N_____
Are there any emergency response personnel on the scene? Y/N_____
Who? Fire____Police____Ambulance____HAZMAT____
Is the pesticide near a drain or other waterway? Y/N___Is the drain protected? Y/N_____
Surface spilled on (soil, asphalt etc.)_____
Are there any special problems?_____
_____
_____
_____
Other applicators/transporters on site?_____
Approximate amount recovered_____
Witnesses
Name_____Address_____Phone_____
Name_____Address_____Phone_____
Name_____Address_____Phone_____
Injuries or exposures
Name_____Address_____Phone_____
Name_____Address_____Phone_____
Name_____Address_____Phone_____
Has an accident report been filled out? Y/N____Type_____
Other_____
_____
Name of person filing this report_____Date_____

Policy 13:
WORKER PROTECTION STANDARD

PURPOSE
This policy covers appropriate standards for Federal Agricultural Worker Protection Standard compliance for the nursery and greenhouse facilities and their associated personnel within PARD only, and does not apply to pesticide applications outside of these areas.

BACKGROUND
The **Worker Protection Standard (WPS)** is a regulation issued by the US Environmental Protection Agency. It covers pesticide application and notification issues for agricultural and commercial nursery operations. To reduce the risk of pesticide related illness and injury in nursery and greenhouse workers standards for training, protection, and mitigation were adopted.

As they are currently operated, operations of the PARD may fall under the scope of these standards. PARD employs seasonal workers as well as licensed pesticide applicators. In the scope of this policy, the WPS term "Employer" refers to PARD, the term "Handlers" refers to state licensed pesticide applicators, and "Workers" refer to seasonal maintenance workers without an applicator license.

POLICY
The WPS require that steps are taken to reduce the potential risk of pesticide-related illness and injury to handlers and workers with possible exposure to pesticides. It is therefore essential that all WPS requirements be satisfied for all City of Austin Park and Urban Forestry employees involved with entry into areas where pesticides may be applied.

This is accomplished by the following:

Training

- Pesticide safety training.
- Display of WPS safety poster.
- Access to labeling information.
- Access to application records.

Practices

- Proper pesticide applications.
- Exclusion of workers from areas being treated.
- Adherence to the Restricted-entry Interval (REI).
- Notification of treatments.

• Provision and use of Personal Protective Equipment (PPE).

Mitigation

• Provision of decontamination sites for handlers and workers.

• Emergency medical and transportation assistance availability.

Training and Resources
All City of Austin Park and Urban Forestry employees who work where pesticides are applied must receive the following:

• Employees without pesticide applicator licenses will receive approved WPS training within the time prescribed by WPS regulations. They will be afforded all the WPS worker protections.

• Employees with pesticide applicator licenses need not receive the entire special WPS training. However they should be familiarized with all special WPS requirements and be aware of locations of all the elements required to satisfy the standards. They must also to be afforded all the WPS handler protections.

• The Pest Management Program Coordinator will maintain complete WPS records and keep them up to date. Urban Forestry personnel will be trained by a designee determined by the Urban Forest Manager.

• Resource material regarding the WPS standards shall be maintained by the Pest Management Program Coordinator. This material will be available for reference at the City of Austin Urban Forestry facility.

Policy 14:
PESTICIDE APPLICATIONS BY NON-PARKS AND RECREATION EMPLOYEES

PURPOSE

This policy establishes oversight procedures over all pesticide applications taking place on park land carried out by non-Austin Parks and Recreation personnel, such as other city departments, private companies or individuals, excluding volunteers or volunteer groups. Anticipated applications by these entities must undergo a special approval process to satisfy certain licensing and other requirements before the work can take place. This oversight is essential to ensure that all pest management activities occurring on park land adhere to established IPM based goals and principles and address environmental and safety concerns.

BACKGROUND

Without proper oversight, pest management activities undertaken by non-PARD personnel may lead to regulatory, environmental or safety problems. Park infrastructure, landscapes, and the public may be put at risk, or IPM principles may not be adequately adhered to. The approval process within this policy is not intended to be a hindrance to appropriate and timely work. These procedures are intended to ensure that the best practices are used and problems avoided.

POLICY

Contractors, other city departments, partner organizations, state and county agencies desiring to apply pesticides to park property shall submit a completed *Application for Pesticide Use on Park Land* form to the IPM Program Coordinator or PARD Representative for evaluation before any pesticide application takes place.

This form can be found in Appendix 4 or it can be obtained by contacting the coordinator at 512-974-3543 or representative at 512-974-9510. Required information details license numbers, materials, methods, equipment, purpose, notification, reporting, and more.

After receiving the completed form, the coordinator shall review the proposal, contact any affected PARD staff, and approve or deny the request based on PARD IPM program principles.

Details of the required licensing and department oversight for various categories follow.

Employees from other city departments with an adopted IPM program:
Full time employees of other city departments possessing valid state pesticide applicator licenses will be considered for approval to apply pesticides to PARD property. The applicators license in the state-defined category appropriate for the particular application is required.

Employees of commercial pesticide operator companies:
Employees of commercial pesticide operator companies possessing valid state pesticide applicator licenses will be considered for approval to apply pesticides to PARD property.

The applicator license in the state-defined category appropriate for the particular application is required. Applicators from ECorp must have a license and previous experience and have the division manager approve the treatment plan. The work must occur under the direction of a licensed supervisor.

Contractors must satisfy all of the standard applicable city contractual language pertaining to pesticide applications. These subjects may include safety precautions, liability issues, and other responsibilities. These issues are dealt with in the contract language agreed to before the project commences by both city representatives and the contractor. The performance record of contracting businesses applying pesticides to PARD lands shall also be regularly reviewed by PARD and any other city departments involved. This review shall include an examination of past work and safety performance. All involved departments will disclose pertinent information regarding any performance or safety issues raised from prior projects.

Employees of partner organizations:
Full time employees of partner organizations possessing valid state pesticide applicator licenses will be considered for approval to apply pesticides to PARD property. The applicator license in the state-defined category appropriate for the particular site is required and trainee license designations are not sufficient. There must also be direct on-site supervision from a fully licensed city department representative for the duration of the application, e.g. PARD staff.

Employees of state agencies:
PARD understands that there may be situations where state agencies need to apply pesticides to city property as part of their mandate to perform early detection and control of invasive species.

PARD is supportive of early detection and rapid response to serious invasive species threats, and communications from the state regarding their need for pesticide use for these purposes on park land will be responded to by the coordinator in a timely manner.

Employees of the county vector and nuisance control agency:
PARD understands that there may be situations where the county vector and nuisance control agency has the need to apply pesticides to city property as part of their mandate to further public health goals. Communications from this agency stating their need for pesticide use for these purposes on park land will be responded to by the coordinator in a timely manner. Licensed public health endorsed applicators will be considered for approval to apply pesticides to PARD property. PARD and the county will work together to arrive at mutual agreements for activities that address public health goals and good environmental stewardship.

Policy 15:
RODENT AND OTHER VERTEBRATE PEST MANAGEMENT

PURPOSE
This policy establishes management procedures for rodents and other vertebrate pests such as mice. Management of these pests differs greatly from typical landscape pest management and brings with it a specific set of issues that must be addressed.

BACKGROUND
The presence of rats and mice in park structures and landscapes is considered a health and safety problem, due to the fact that these rodents can vector diseases to humans. Rodent tunneling and hilling can be tolerated in many park areas; however, in some sites the damage from rodent activities cannot be tolerated. Such soil disturbance can also present safety hazards for park users, particularly in turf areas.

BACKGROUND
Rat and mouse control within structures such as community centers should be carried out by a qualified structural pest management contractor that utilizes sound IPM principles. Where there is a need for rat and mouse control in areas adjacent to park structures or their landscapes, PARD shall first refer to the primary responsible regional vector response agency which is Travis County Animal Control or 512-974-2000. Any further control methods employed by PARD personnel or licensed contractors must be arranged through the Park District Manager.

Rodent IPM is best addressed through reduction in available food and harborage; however, there may be situations where other measures are necessary. Use of pesticides for rodents and other vertebrate pests must occur within an IPM framework and employ materials and methods established and approved by the program coordinator. Rodenticides and other vertebrate pesticides may have potential for secondary toxicity to non-target organisms and may pose a potential threat to park users with access to baited areas. Therefore, if rodenticides are used by PARD it will occur only through means such as locked bait boxes and not through general or rodent burrow distribution. If PARD employees wish to utilize rodenticides, they must maintain a valid Texas Department of Agriculture pesticide license.

Policy 16:
TURF BROADLEAF WEED MANAGEMENT

PURPOSE
This policy defines the management of weeds in the managed turf areas in Austin parks and the use of any selective turf herbicides by any applicator.

BACKGROUND
For turf to function in the manner it was intended, appropriate maintenance standards may require management of weeds within these sites. While the subject of overall turf health is a topic too complex to cover in detail within this policy, the management of weeds is designated turf sites shall be regulated by this policy.

The establishment and maintenance of quality turf requires a proper site, good root zone conditions, optimum fertility levels, adequate irrigation, correct mowing practices, and other factors. PARD relies primarily on attention to these siting and cultural factors in maintaining turf and minimizing the density of weeds. Adherence to good cultural practices aids in development of healthy stands of turf which resist establishment of weeds. Selective herbicides can also be used as effective tools to reduce or eliminate populations of weeds in turf as part of an overall program of turf health maintenance.
Examples of turf health practices currently employed by PARD:

- Proper siting
- Site and soil preparation
- Drainage improvements
- Pruning of adjacent plants for increased sunlight penetration
- Proper selection of grass seed varieties
- Core aeration
- Overseeding
- Mulch mowing to leave clippings on site
- Mowing at the proper height and frequency
- Proper irrigation practices
- Proper fertilization
- Application of selective broadleaf herbicides

POLICY

Turf plays various important functions in our parks. When an area has been determined to be maintained as turf, it is the policy of PARD to do so primarily through the implementation of proper planning, cultural, and mechanical practices. These practices are generally adequate to keep the population of turf broadleaf weeds at acceptable levels. At certain sites these practices alone may not be adequate to keep broadleaf weeds at acceptable levels. An acceptable level of turf quality and tolerance of weed infestation varies with the site. The threshold at which controls may be necessary shall be determined on a case-by-case basis taking into consideration such factors as location, public expectation, the manner of activities taking place on the turf, the history of previous control attempts, and stresses placed upon the site. Before applications of broadleaf herbicides take place at a general park or athletic field turf site, a Turf Broadleaf Herbicide Application Approval Request form must be submitted by the requestor to the appropriate manager or supervisor listed in the procedures section of this policy (refer to Appendix 5). The supervisor will then consult with the IPM coordinator to assess the proposed application for program compliance. All related turf maintenance issues must be considered by the supervisor and coordinator during this approval process. The management effort must consider and employ all applicable cultural and mechanical methods as components of a plan to return the turf to an acceptable level of quality. Goals of these methods may include reducing soil compaction, improving soil structure, seeding, increasing drainage capacity, and encouraging healthy and vigorous turf growth through proper fertilization. Once an application is approved, only turf labeled herbicides on the approved list for a given unit may be utilized.

PROCEDURES

For proper IPM, it is essential that there be proper coordination between all the components of turf health management. To ensure this coordination, all applicators must first obtain authorization from the appropriate supervisor listed below before broadleaf herbicides are used.

City Parks and Recreation applicators:

Sports Complex applicators: Program Supervisor
City Forestry applicators: Forestry Program Supervisor
Golf course applicators: Golf Division Manager
City Parks: Parks Division Manager

Special Considerations

By its nature, the use of broadleaf herbicides in turf requires their application to sites that have varied and direct public uses, often involving children and pets. These applications must be carefully planned to allow for careful adherence to the pesticide label directives, and to minimize any potential impacts on these users.

Time of Day

Applications should be made during the best time of day to avoid public use, high temperatures, and wind. For most situations this requires applications to be made as early in the day as possible. Applicators should consider off schedule timing, such as shifting

work hours to begin several hours early so that spraying can be completed before conditions and park use makes applications problematic. Applications may also need to take place over several days to avoid spraying too late in the day. Minimizing public inconvenience and public concern should be of paramount importance and should supersede other considerations.

Scheduling Conflicts
Any proposed applications should take into account the expected use of the area for that date and time, such as nearby school activities, recreation activities, athletic field scheduling, and all other anticipated uses. Applicators must contact these schools and departments when scheduling treatments.

Signage
Notification signage is of utmost importance in turf applications. The nature of a typical turf site is open and with easy public access. This may necessitate the placement of many notification signs around the perimeter. As stated in the Pest Management Program *Notification of Pesticide Use at a Site* policy, signage should be adequate to inform any park user approaching the area.

Applications of herbicides to our park turf sites are uncommon and may not be anticipated by park users. They should receive adequate notice that an application is taking place before they reach the site. Signs must remain in place and the public must be kept out of treated areas until the sprayed surfaces are completely dry or 12 hours has past since the application. This may take a considerable amount of time but this effort must be made by the applicators to inform and keep people and their pets out of these treated areas until these re-entry requirements have been met. Application is allowed outside park curfew hours.

Seasonal Timing
Wherever possible, applications should be timed to coincide with the ideal time for turf weed control. This is typically during the spring and fall months, where weed growth is active and conditions leading to turf stress, such as dry and hot weather, are not present.

Drift
Minimizing drift is critical in turf broadleaf weed applications. Use of boom sprayers instead of backpack sprayers may increase the potential for drift. Great care should be taken to minimize any possible drift. Applications should cease if any drift inducing condition becomes apparent.

Use of appropriate pressure, correct nozzles and other techniques should be employed to minimize creation of small spray particles that may drift.

Targeted applications
Where warranted spot spraying for turf weeds should be employed. While there are sites that will require an overall broadcast application, there are sites where only certain areas will require treatment. Applications should be focused on the target weed as much as practicable.

Policy 17:

PESTICIDE USE AROUND WATERSHED PROTECTION PROPERTY AND WATERWAYS

PURPOSE

This policy establishes procedures for use of any pesticide materials being applied by PARD personnel adjacent to, or upon Watershed Protection Property.

BACKGROUND

This policy was written in conjunction with Watershed Protection personnel. It is the intent of PARD to cooperate with the Watershed Protection to ensure a safe drinking water supply. This policy is written to help explain and more fully establish procedures for the "Joint Water Quality - Parks and Recreation Pesticide Use Policy."

POLICY

It is the policy of PARD to use all measures to protect the city water supply from contamination through pesticides. PARD employees will provide any information needed by the Watershed Protection to test the water for the presence of pesticides. Park employees will follow all the regulations and policies set out in the "Joint Watershed Protection -Parks and Recreation Pesticide Use Policy". Some of the regulations in the policy deal with the following:

• No pesticide applications will be made in the "No Pesticide Use Zone" as listed in the spray maps.

• Applications of pesticides will not be made if there is unacceptable drift.

• The Watershed Protection will be notified if there is a spill or accident that causes unplanned release of pesticides into the environment in no pesticide use zones. Refer to the Parks and Recreation Spill Policy for appropriate response actions.

• Spray Program plans will be sent to the Watershed Protection for known pesticide applications made to areas in the Pesticide Use Notification Zone or the Special Precautions Zone. These plans will describe the pesticides expected to be used, the locations of use, and the frequencies of application.

• Any emergency or unplanned pesticide application needs to have prior approval from the Watershed Protection. These notifications must be made at least 48 hours before the planned application.

Policy 18:
PESTICIDE APPLICATIONS AROUND COMMUNITY GARDENS

PURPOSE
This policy defines acceptable and unacceptable use of pesticides within and near park areas designated as community gardens.

BACKGROUND
Pest management in or near park areas designated as community gardens necessitates special considerations. Community Gardens program participants have varying levels of knowledge about pest management methods, and have differing views about the use of pest management materials. Community Gardens plots are in close proximity to one another and may change ownership from year to year. Community gardens also produce edible crops which dictate special constraints in managing pests. For these reasons a special policy defines acceptable use of pesticides within Community Gardens.

POLICY
• Garden guidelines state that no herbicides can be used on Community Garden sites. This specifically refers to garden plots, pathways, fence lines, and any areas within the garden boundary. Spraying perimeters of the gardens from outside the fence is not permitted.

• Park employees are asked to keep applications of all pesticides at least 50 feet from the outside perimeter of Community Garden sites.

• Mechanical means, such as cutting, hoeing and mulching, can be used to remove or control weeds in the Community Garden sites and perimeters.

• Any pesticide application, public or private, that may affect the gardens will be of concern to the staff and participants of the program.

• The Community Gardens staff shall establish internal guidelines regarding pesticide use by participants of the program.

Policy 19:
WATERWAYS PEST MANAGEMENT

GENERAL GOALS AND PHILOSOPHY

Austin Parks and Recreation recognizes the special importance of the rivers, streams, ponds, water quality facilities and wetlands that fall under our stewardship. The sensitive nature of such habitats, their plant and animal communities, and their direct link with other waterways require that we establish specific policies to ensure their health. This addition to the PARD Pest Management Program outlines this special treatment. It establishes clear guidelines and limitations regarding maintenance methods and materials for both these waterways and the park lands adjacent to them.

As in the rest of the Pest Management Program, Integrated Pest Management principles will be employed in all landscape management decision making. Management of unwanted vegetation, diseases, and pests will follow the IPM decision making rationale.

• Proper planning and management decisions begin the IPM process.

• Cultural methods of vegetation and pest management are preferred and will next be employed.

• Mechanical means of vegetation and pest management are next in line of preference, and will be utilized where feasible.

• Biological methods of vegetation and pest management are to be considered before chemical means, where they are feasible.

• Botanical and synthetic pesticides will be used only when no other feasible methods exist.

MANAGEMENT PRACTICES, MATERIALS AND LIMITATIONS FOR PARKS WATERWAYS AND BUFFERS

Definitions

The *buffer zone* referred to in this policy is defined as a corridor of land that is 25 feet in width on the sides of a stream or other body of water. Measurement of this buffer zone begins at the edge of the water line at the time of application. Anticipated seasonal or weather related changes affecting water level will be included in the decision making process when dealing with buffer zones. The *high water line* as defined in this policy refers to the highest possible water level that would be expected in a given body of water during a 5-year period.

Application Equipment Used

Pesticide delivery for all listed areas in this policy will be carried out by hand with directed, low volume, single wand sprayers, wiping, daubing and painting equipment, injections systems, or drop spreaders. Typically this is done by backpack sprayers, but may also include sprayers with larger fill tanks as long as the same kind of hand application methods is used. These methods of delivery result in low volume applications and low pressure spraying. This minimizes the formation of fine mists that might be

carried off target. These practices ensure that applied materials will reach targeted plants or targeted soil surfaces.

Pesticide Drift

When applications of pesticides are being made within the buffer zone, great care will be exercised in the process. Managing drift is of particular importance when surface waters are nearby. Equipment used in the application shall employ all necessary methods to limit drift.

Nozzle size, pressure regulation, droplet size, and height of spray wand, are all techniques that can be modified to reduce unwanted drift of pesticides.

Spray applications will not be allowed in the buffer area when:

Wind speed is above 5 mph

Wind direction or activity would carry pesticides toward, or deposit them upon open water.

Pesticides Available

To more clearly regulate any possible aquatic impacts, the pesticides available for use in buffers and aquatic sites will be reduced in scope from the general park list. Only the pesticides specifically listed within this policy may be used within buffer zones or waterways. Choice of pesticides utilized take into account any possible effects on aquatic life as well as tendencies to move in the environment. In addition, applicators must research the impacts of each pesticide before use and get approval from the direct supervisor.

Materials allowed in certain circumstances (see matrix) in buffer zones:

Post-emergent herbicides:

Glyphosate products: Roundup Pro, Rodeo

Triclopyr products: Garlon 3A, Brush-B- Gone, or other amine formulations only, (not Garlon 4 or other ester forms)

Surfactant (i.e. LI 700)

Pre-emergent herbicides:

Devrinol WP (napropamide)

Materials allowed in certain circumstances in aquatic sites, aquatic labeled only:

Glyphosate (Rodeo)

Approved surfactant (R-11 or equivalent)

Copper (Cutrine Plus)

Aquashade (acid blue 9, acid yellow 23)

Materials available for tree injections in buffer zones:
In the event a pest or disease threatens the health of important and valuable trees within a buffer zone, there may be a need to treat them. Instances of this occurring are rare. However, in these special cases, the use of injectable pesticides may be employed when necessary, with the following limitations. The pesticide applied must be delivered by methods that inject or otherwise distribute the material entirely within interior tree tissues. Pesticides will not be injected into the soil surrounding the tree. Tree surfaces will not be sprayed or treated with pesticides. The insecticides and fungicides used in these injection systems shall be approved by the PARD Pesticide Approval Committee, the Pest Management Coordinator, Operations Manager and Preserve Lands Manager. The intent and limit of this exception to the approved buffer zone pesticide list is to allow only the insecticides or fungicides necessary to combat direct threats to the health of valuable trees.

Materials for all other areas:
PARD general Pest Management Policy approved pesticides may be used outside the waterway and buffer zones, where not otherwise prohibited by this policy.

Record Keeping Requirements
All regular application record keeping requirements will be adhered to for all pesticide applications. This includes date and the time intervals of the application, temperature and wind conditions, location of application, materials used, concentrations used, amount applied, coverage rate, equipment used, applicator information and license number.

Additionally, record keeping requirements will be amended for applications within the buffer zone or for aquatic situations. Standard application record forms will have space added to denote these special treatments. These special treatments will then be separately tracked and monitored by the Pest Management Program Coordinator. An annual report will be made summarizing all applications to these special areas. This report will be made available to the Water Protection Department.

Personnel Requirements
All those applying pesticides to PARD lands must be Texas Department of Agriculture licensed applicators. Application of pesticides to aquatic sites will only be done by licensed personnel who have received an additional aquatics license certification.

Changes to the Policy
A need may arise for modifications or additions to the PARD Waterways Policy. There are several methods available to accomplish this.

PARD representatives will develop an IPM strategy to deal with the threat. If this strategy involves the need for any pesticide applications within buffer zones or waterways that are not already outlined in the current policy, AUSTIN PARD will contact Watershed Protection and LCRA as appropriate for approval before implementing the plan.

A review process will be conducted one year from the initial adoption of this policy. This review process will involve PARD. Subsequent reviews will take place every two years. Adjustments and changes to the policy can be made during this process.

A similar need for short time frame changes would occur when a new product might appear on the market that is demonstrably safer and more efficacious. It would therefore make sense to add this new material to the list of approved Waterways Policy pesticides. AUSTIN PARD representatives will contact Watershed Protection and LCRA for approval before addition of new pesticides to the buffer zone/waterways approved list.

PARD Buffer Zone Landscape Classification and Practices

Classification of Buffer Zone Landscapes Near Waterways, Lakes and Ponds

Park landscapes near waterways, lakes and ponds are divided into four classifications (A,B,C,D) that describe their current features, as well as define the differing objectives and maintenance rationales of their care.

A. Highly Managed Areas
Example: Emma Long Park

Features of Highly Managed Areas:
Ornamental landscape
Public access and activity
High public use
Mowing of turf, sometimes to edge of waterway
May have facilities adjacent to water
May have highly modified stream banks
Often limited plantings in buffer

Objectives for Highly Managed Areas:
Healthy plants and turf
Maintain ability to handle high use
Minimize need for chemical intervention
Control invasive plants
Safe access
No bare soil areas
Low tolerance for weeds
May have high expectation for aesthetics in general

B. Intermediate Managed Areas
Examples: Town Lake and Zilker Park

Features of Intermediate Areas:
Stream banks have some buffering with predominately native plants
Some impacts from use and park development apparent
Managed landscapes may be nearby
Stream bank erosion may be occurring due to use

Objectives for Intermediate Areas:
Maintain healthy plant buffers
Minimize need for chemical intervention
Control invasive plants where feasible
Minimize impact on buffer
No bare soil areas
Tolerance for natural appearance and weeds

C. Impacted Natural Areas
Example: Walnut Creek Park

Features of Impacted Areas:
Very limited impact to these areas.
Stream banks have buffering with predominately native plants
Limited impacts from use and park development apparent
Managed landscapes are not nearby

Objectives for Impacted Areas:
Maintain healthy plant buffers
Minimize need for chemical intervention
Lower tolerance of invasive plants, non- natives
Minimize any impacts on buffer
No bare soil areas

D. Intact Natural Areas
Example: Indiangrass Wildlife Sanctuary

Features of Intact Natural Areas:
Very limited visitor impact
Native plant communities exist
No nearby developed park areas

Objectives for Intact Natural Areas:
Maintain healthy plant buffers
No tolerance of invasive plants, non-natives
Minimize any impacts from activities

Management Practices for Buffer Zones of Waterways, Lakes and Ponds

The following matrix gives specific guidelines for use of pesticides and fertilizers in the buffer zones of waterways that have varying levels of management. Use of pesticides and fertilizers also vary depending on whether they are being used for routine maintenance or for restoration and construction projects.

Chemical Used	Activity	D Areas	C Areas	B Areas	A Areas
Pre-emergent herbicide use possible?	Routine Maintenance	No	No	No	Only in shrub beds above high water line
	During Construction/ Restoration	No	No	No	Only in shrub beds above high water line
Glyphosate use possible?	Routine Maintenance	*Spot spray for target list weeds only**	Spot spray and broadcast spray	Spot spray and broadcast spray	Spot spray and broadcast spray
	During Construction/ Restoration	*Spot and broadcast spray for non-natives**	Spot spray and broadcast spray	Spot spray and broadcast spray	Spot spray and broadcast spray
Triclopyr use possible?	Routine Maintenance	No	Cut and treat stems	Cut and treat stems	Cut and treat stems. Spot spray
	During Construction/ Restoration	No	*Spot spray to establish monocots** Cut and trat stems. *Spot spray/ broadcast spray to establish monocots**	Spot spray Cut and treat stems *Broadcast spray**	Cut and treat stems. *Broadcast spray**
Fertilizer Use					
Slow release fertilizer use possible?	Routine Maintenance	No	No	No	Directed applications to shrub beds if no flooding possible
	During Construction/ Restoration	Directed applications if no flooding possible	Directed applications if no flooding possible	Directed applications if no flooding possible	Directed applications if no flooding possible

** requires approval of supervisor and division manager*

Use of Mulches

Mulches and other ground coverings are often employed during the installation and restoration of landscapes as well as their ongoing maintenance. They are utilized for a variety of reasons.

Mulches suppress weeds, help to retain moisture around plants, reduce possible erosion, and provide visual enhancement.

Use of landscape mulches in buffer areas should take into account any possible impacts to the buffer as well as nearby waterways. These impacts may include:

- Inadvertent introduction of non-native weeds to the site.

- Leaching of substances such as tannins from the mulch into nearby waterways.

- Migration of mulch material into waterways.

- Nutrient leaching into waterways.

Choices of mulches should take these concerns into account. Routine maintenance in A, B, and C class area buffers should minimize the use of mulches. Class D area buffers should use mulches only as a part of restoration activity. Mulching in areas that are below typical high water lines is discouraged in any buffer areas. Seeding of cover crops for erosion control is allowed in buffer zones. Use of cover crops in class D areas should never introduce any persistent non-native plant species.

Management Practices Within Bodies of Water, Biofilters and Wetlands

The following describes specific practices that may be used within the actual bodies of water.

Within Streams

In the rare need for control of noxious weeds and invasive non-native plants within a stream itself, mechanical and biological means will be utilized where possible. When these methods are not feasible, emergent weeds only may be controlled with Rodeo and an approved surfactant if needed. Although rare, control of noxious and invasive weeds may be needed to maintain a healthy environment. These treatments will take place at mid-summer. Frequency of these treatments shall not exceed once a year even in the worst of infestations. Applicable permits from appropriate outside agencies will be obtained before this kind of treatment takes place. Submerged weeds will not be controlled by chemical means in streams and rivers or other moving waters.

Within Pond and Lake Areas

Within the pond or lake itself, herbicides will be used only for the control of noxious weeds and non-natives that threaten the health of the habitat. A list of these potential target weed species shall be developed by the Watershed Protection biologists and landscape architects.

When chemical methods are necessary within the pond itself, only Rodeo (glyphosate) and an approved aquatically labeled surfactant shall be employed. In the event an

emergency situation arises where habitat is endangered by non-native invasive submerged weeds in ponds and lakes, staff will confer with Watershed Protection scientists for herbicide recommendations. This will only be allowed where there is no direct outflow of the treated water to fish bearing streams or waterways. The herbicide utilized shall be of very low toxicity to aquatic organisms, and be applied in such a way that there are no appreciable negative effects on the health of the aquatic environment.

Within Wetland Areas
Examples: Shoal Creek, small wetlands at numerous sites.
Within the wetland itself, herbicides will be used only for the control of noxious weeds, and nonnatives that threaten the health of the habitat. A list of these potential target weed species shall be developed by the Watershed Protection IPM represernative, or be qualified as circumstances warrant. When chemical methods are necessary within the wetland itself, only Rodeo (glyphosate) and an approved aquatic surfactant (such as R-11) shall be employed.

Within Biofilters and Pollution Reduction Facilities (PRFs)
Examples: Lundelius tract, Fort Branch Creek.
Biofilters and PRFs intercept storm water run-off of surfaces before it reaches the waste water system or other drainages. Pre-emergent herbicides will be allowed where necessary only in shrub beds above the high water line. For post-emergent applications, PRF buffers will be treated as a class B streamside buffer.

Within Bioswales
Bioswales are planted areas consisting primarily of grasses that act as a filter for run off water moving towards a body of water or drainage system. If bioswales lie within the buffer area of any of the above listed waterways, they will have the same maintenance restrictions upon them as any other buffer zone. If the bioswale has an outlet to any surface water, its treatment will follow the same restrictions as a B class streamside buffer. If there is no outlet to surface water, the buffer may receive the same treatment as general park lands.

Special Exception Areas

Special exception areas not covered under the preceding descriptions are the municipal golf courses.

Golf Course Streams, Lakes and Their Buffers

The nature of the current layout of the golf courses places golf greens and other finely manicured areas near waterways in some limited instances. In these specific areas, the buffers are variable in width, and may be smaller than 25 feet. In limited areas, buffers may be reduced to as little as 10 feet due to proximity of golf greens to waterways. Special golf course buffer widths shall never be less than 10 feet. Locations of these variances will be mapped and recorded. These variance areas are few in number and amount to a very small percentage of overall water frontage. In new construction and design of golf courses, placement of greens to allow establishment of standard width buffers is encouraged where feasible. Incorporation of intercepting buffers will also be encouraged where feasible. These intercepting buffers can be situated so that any possible

runoff flowing towards open water is diverted into planted drainage systems and biofilters.

Golf Course Waterways Testing

Waters adjacent to treated areas within the golf courses shall be tested on a regular basis for both fertilizer and pesticide levels. Frequency of the testing will depend upon the scheduling of applications, but shall occur no less than twice per year. This testing shall follow applications, irrigation or rain events, and/or be timed to best to detect any potential leaching or run-off problems. The Watershed Protection Department will recommend an adequate regimen of testing that is sufficient to monitor levels of potential concern. PARD and WPD will work in conjunction in this testing process.

Routine Golf Buffer Maintenance Practices

There will be no fertilizer application to turf in buffer. Only directed, slow release fertilizer may be applied to shrub beds in buffer areas.

There will be no application of broadleaf herbicides to turf in buffer. Use of pre-emergent herbicides is acceptable in shrub beds above high water line. Use of glyphosate and triclopyr will follow the same limits as "C" areas in the matrix.

Golf Buffer Construction/Establishment Practices

Pre-emergents are allowed only in shrub beds above high water line. Use of glyphosate and triclopyr will follow the same limits as "C" areas in the matrix. Only slow release fertilizer using a directed application method can be used.

Policy 20:
VEGETATION MANAGEMENT IN WOOD CHIPPED CHILD PLAYGROUND AREAS

PURPOSE
This policy defines acceptable practices for managing vegetation in specially designated child play areas in developed parks. Consisting of play structures underlayed by deep wood chip surfaces, these playground areas function in special roles that heighten sensitivity to our pest management practices and materials. This policy addresses approved vegetation management methods and materials in these specific areas.

BACKGROUND
In all of our IPM activities, PARD seeks to minimize any potential impacts to our park users while still providing responsible, effective, and efficient care for our facilities. Chipped playground areas in particular focus attention on our activities and require a special set of best management practices to benefit both PARD and park users.

POLICY
All PARD personnel are required to adhere to this policy when they are undertaking weed management activities in chipped playground areas and their immediate borders or margins. The deep chip layers that serve as a safety cushion for falls also act as effective weed control mulch and reduce the need for other active weed control measures. Herbicides will not be used to control vegetation in chipped play areas or their margins. Weed control in these play areas will be accomplished primarily through the use of the wood chip mulch itself. To function as both a safe surface for play and as an effective weed barrier, this chip layer should be kept at the established minimum depth. If the mulch layer is not adequate for weed control it should be amended as soon as is practicable. Mulch layers that have broken down over time and provide a medium for good weed growth should be replaced or amended with fresh chips.

Manual weeding is usually adequate to keep weeds from establishing within the chipped areas. Effort shall be made to respond quickly to weed presence so that this kind of control will be feasible and efficacious.

Use of powered weed control equipment, such as line trimmers and tillers, may be used in chipped areas to control weeds, but careful attention to the dangers they present must be taken. This kind of equipment should not be used when nearby park users may be put at risk. Playground/turf interface borders will be maintained by hand or mechanical means. Establishment of a structured border is preferred and encouraged for installation where possible as it provides a lower maintenance interface between play areas and turf. These structures also reduce weed and turf infiltration.

The only pests that will be regularly controlled in wood chipped play areas are weeds and other unwanted vegetation. The need to control other pests, such as insects or diseases, is not expected. One exception would be the presence of venomous stinging insects such as yellowjackets in the play area. In these circumstances the use of a targeted insecticide to eliminate the immediate safety hazard may be required. All other applicable PARD Pest Management Program policies and approved pesticide lists apply in this case.

Policy 21:
Venomous Insect Management

PURPOSE

This policy defines acceptable practices for managing venomous insects such as hornets, wasps, yellowjackets, and honeybees in PARD park landscapes and grounds. While these insects will not always cause problems, their presence in some locations can create immediate and serious public and staff safety issues. Most importantly, individuals with bee and wasp venom allergies may be presented with life threatening situations if they are stung. To properly address these safety concerns, park employees may be faced with the need to apply insecticides within a short time frame. These control activities and use of insecticide require adherence to the special rules outlined in this policy.

BACKGROUND

Wasps, hornets and yellowjackets may quickly establish nests above and below ground in both natural areas and in developed parks. European honeybees form above ground nests, and may also form swarms when seeking new nest sites. Not every wasp or bee nest creates a problem for our users or staff. Public threat is dependent on insect species, nest location, time of year and other factors.

Yellowjackets and some wasp species can be particularly aggressive towards people, especially near their nests. Other wasps, such as paper wasps are less aggressive and are more benign depending on location of their nest. Honeybee swarms generally do not create a large stinging potential as bee behavior is altered during this time. Nest location is also important when determining threat. Nests located near walkways, buildings, playgrounds or similar sites are more problematic than those located in remote areas. Nests in areas where vegetation management or restoration planting is being carried out can also create problems. Wasp behavior may also vary with the time of year. Yellowjackets in particular will exhibit increased defensive behavior as the season progresses. Normally, yellowjacket and paper wasp colonies only live one season. Honeybee nests usually persist from year to year.

POLICY

Evaluation

When wasp or bee nests are discovered on PARD property, staff should evaluate the safety threat they pose. If the nest is considered to create a safety hazard for park users or staff, demarcation and control measures should take place. Nests that create an immediate hazard, such as those near playgrounds, community centers, walkways, trails and work sites, should be addressed as soon as possible. Other criteria that may constitute a hazard are nests that have been disturbed and nests sites with aggressive individuals. Nests occurring within inhabited structures such as community centers create an immediate safety hazard and control of these should be immediately referred to a qualified professional contractor.

Demarcating nests or swarms
Where possible, nests or swarms that present an immediate public hazard should be demarcated by either signage, cones, taping, flagging or by other means so that the area of danger can be avoided by park users. This demarcation should stay in place until the nest is eliminated or the swarm is removed.

Honeybee swarms and nests
When discovered, honeybee swarms should be marked as described above until the bees have been collected. Qualified bee removal businesses should be contacted to collect the swarm. Honeybee swarms should not be sprayed with insecticides. Unless location of the nest presents a hazard, honeybee nests should be tolerated where possible. If removal is required, qualified contractors should physically remove nests when feasible. Spraying of honeybee nests should be a last resort.

Spraying wasp and hornet nests
Aerosol jet stream products labeled for use on wasp and hornet nests can be effective against both yellowjackets and paper wasps, but they must be used with extreme caution. Wasps will attack when they sense an application to their nests, and even freeze-type products are not guaranteed to stop every individual. For this reason extreme caution must be used when nest applications are taking place. The following practices should be adhered to:

• Nests should be sprayed at night or before dawn, when all members of the hive are present and most docile. Daytime spraying is not recommended except in certain emergency cases where the public is not placed at risk from resultant increased hive activity.

• Nests should not be disturbed before treatment. Disturbed nests should not be approached.

• Nest location should be demarcated as described above. Demarcation must be left up until the nest has been eradicated.

• Nests that are situated high in trees, or in otherwise difficult to access locations should be treated by professional contractors, or by qualified staff in the Urban Forestry department. Do not attempt to control a nest if you cannot easily do so.

• Nests in structures, building voids etc., should be treated by professional contractors only.

• Approved PARD staff may use wasp and hornet jet sprays available at Park Stores. Approved sprays will contain synthetic pyrethroids as their active ingredient. Products with other active ingredients are not approved for use by PARD staff.

• Pesticide application notification signage must be placed as per the PARD *Notification Policy*.

• All applications shall be documented as per the PARD IPM Program *Record Keeping Policy*.

Approved applicators

In general, park staff with valid TDA pesticide applicator licenses with an insecticide category endorsement should be the designated employees carrying out applications. However, there may be instances where these employees are not available and a nest presents an immediate health and safety threat to the public or staff. In these instances, available personnel with TDA pesticide applicator licenses of any category are approved to use jet spray wasp and hornet products to treat nests. In rare emergency safety situations where no licensed personnel are able to respond in a timely fashion, other personnel may be approved to carry out an application, but only if they have had prior supervisor approval, prior training in the safe use of these sprays, and instruction in the proper management of wasps and bees. Staff members with known wasp or bee allergies will not carry out any wasp or bee control.

Use of traps

When yellowjackets are a continuing serious problem at a site from year to year, use of commercial traps to target emerging queens in the spring can be considered. Trapping queens during the 30- to 45-day emergence period has the potential to provide an overall reduction in the yellowjacket population for the season, The more traps put out in spring on an area-wide basis, the greater the likelihood of reducing the number of nests later in the summer. Usually one trap per acre is adequate in spring for depletion trapping of queens. Use of traps to reduce yellowjacket numbers later in the season is considered ineffective.

Policy 22:
Designated Dog Off Leash Area Pest Management

PURPOSE

This policy defines acceptable practices for managing pests in the designated dog *Off Leash Areas* (OLAs) in Austin's parks. Park users are invited to bring their dogs to recreate in these sites and with less direct control than in other park areas, therefore pest management in these areas needs to reflect this special use. Pest management decisions, methods, and material use should be carried out in a way that maintains public and dog safety and allows for responsible stewardship of park property.

BACKGROUND

There are many off leash sites in Austin parks, some are fenced, all-day areas. A larger number are unfenced, with seasonal hours compatible with traditional park use patterns and adjacent uses.

All sites are signed, and boundary markers are in place at the unfenced sites. For the purposes of this policy, OLA sites consist of:

1. An officially designated fenced dog off leash area, including the fence line.
2. An officially designated unfenced dog off leash area within the boundary markers.

By their nature, and from the impact of concentrated dog activity, OLAs can create pest management problems such as increased weeds in turf and the need to control weeds along fence lines. Other pest issues that arise in OLAs are the presence of noxious, poisonous, allergenic, or incompatible weeds, and venomous insects and their nests. Proper management of these pests needs to be clearly defined to minimize any potential risks to dogs and their owners and to minimize interference with OLA use by the public.

POLICY

Expected pest management issues arising in the OLAs consist of:

- Weeds along fence lines, in tree circles, in shrub beds, around park structures, and in turf.
- Management of allergenic or poisonous weeds such as poison oak.
- Venomous insect management.

OLAs may need to close temporarily so that necessary maintenance work does not impact owners and pets. Temporary signage will be located at OLA boundaries or fencing to alert users in advance of closures. Pesticide applications will be accompanied by notification signage and mandated reentry intervals as defined in IPM Policy #4.

Herbicide use in fenced OLAs

When it is necessary to apply herbicides within fenced OLAs, great care should be used to time and locate the application to minimize interference with public use. Ideally herbicide use should be as infrequent as possible, and would take place when dogs are not present. When herbicides are to be used inside fenced OLAs or along the interior or immediate exterior of their fence lines, the OLA should be closed and dogs excluded. Closure should be maintained until the reentry requirements as mandated on the product label have been satisfied. This interval typically requires that people and pets be kept out of the area until the sprayed surface has dried. Normal application notification signage as

mandated in Policy #4 should be used. To the extent possible, additional temporary signage will be located outside OLA fencing to alert users in advance of closures.

Herbicide use in unfenced OLAs
When it is necessary to apply herbicides within unfenced OLAs, great care should be used to time and locate the application to minimize interference with public use. Ideally herbicide use should be as infrequent as possible, and would take place when dogs are not present. Standard notification as mandated in Policy #4 must be employed. Label directives for reentry must be adhered to, and dogs and people must be excluded from application areas until the interval has been satisfied. Since unleashed dogs are difficult to exclude from large areas, this may necessitate applications that are small in scope to allow for this level of oversight. To the extent possible, additional temporary signage will be located outside OLA boundaries to alert users in advance of closures.

Turf broadleaf control
No turf will be sprayed for broadleaf weed control in currently active OLAs unless the form found in Appendix 5 has been approved. In unusual circumstances OLAs taken out of service may receive selective herbicides as part of an overall turf renovation program but only within the oversight of the PARD Turf Weed Policy and the specific approval process it requires.

Use of pre-emergent herbicides
To be an effective barrier to weed seed germination, pre-emergent herbicide sites need to be left undisturbed after they are applied. Since the activity of dogs in a OLA disturbs soil surfaces and reduces or eliminates the effectiveness of a pre-emergent application, their use in areas of concentrated disturbance sites, such fenced OLAs, is often not effective; however, pre-emergent use in less intensively impacted areas may be needed.

Insecticide use
As is the case at most park properties, general insecticide use is not expected in OLAs.
However there may be emergency situations created by the presence of venomous insects such as yellow jackets, wasps, bees and their nests. These insects can create serious safety issues for people and their pets. Control of these insects and any use of insecticides must take place as described in the Venomous Insect Management Policy. Nest demarcation guidelines and the response process as described in that policy are of heightened importance in OLAs since dogs not in control by their owners may be at increased risk from an active nest site.

Mechanical equipment
All aspects of park user safety and dog safety should be considered when determining a particular weed control method for a given site. Mechanized weed control equipment such as string trimmers can create hazards such as flying rocks and debris. Off leash dogs may be at risk when they approach the work area. Care should be exercised when using this equipment.
PARD dog Off Leash Committee:
http://www.ci.austin.tx.us/parks/offleashareascommittee.htm

REFERENCES and RESOURCES

1. Leslie, Anne R., Integrated Pest Management for Turf and Ornamentals. Lewis Publishers, 1994.
2. American Phytopathological Society. Compendiums: Flowering Potted Plant Diseases, Ornamental Foliage Plant Diseases, Rhododendron and Azaleas Diseases, Rose Diseases. APS Press, 1983-1995.
3. Dreistadt, S. H., Pests of Landscape Trees and Shrubs, an Integrated Pest Management Guide, University of California, 1994.
4.Bragg, Dave, et al. Pacific Northwest Insect Control Handbook, revised annually. Extension Services of Oregon State University, Washington State University, and University of Idaho.
5. Johnson, W. T., Lyon, H. H., Insects That Feed on Trees and Shrubs. Cornell University Press, 1988.
6. Pscheidt, Jay W. et al. Pacific Northwest Plant Disease Control Handbook, revised annually. Extension Services of Oregon State University, Washington State University, and University of Idaho.
7. McDonald. Sally A., Applying Pesticides Correctly. North Carolina State University, US Department of Agriculture, and US Environmental Protection Agency.
8. Renchie, Don. Pesticide Storage and Facility Storage. Texas A&M University, 2002.
9. Pirone, Pascal P., Diseases and Pests of Ornamental Plants. John Wiley & Sons, 1978.
10. Sinclair, W. A., Lyon, H. H., and Johnson, W. T. Diseases of Trees and Shrubs, 1987. Cornell University Press.
11. Williams Ray D. et al, Pacific Northwest Weed Management Handbook, revised annually, Extension Services of Oregon State University, Washington State University, and University of Idaho.
12. Bobbitt, Van M. et al. Pacific Northwest Landscape Integrated Pest Management Manual. Washington State University, 1999.
13. Byther, Ralph S. et al. Landscape Plant Problems Washington State University, 2000.

Internet Links

Pesticide Information

CDMS Label and MSDS,
http://www.cdms.net/manuf/manuf.asp

EPA Pesticides Program,
http://www.epa.gov/pesticides/

EPA Pesticide registration documents,
http://www.epa.gov/pesticides/reregistration/status.htm

EPA Inerts Program,
http://www.epa.gov/opprd001/inerts/

EXTOXNET, an Internet based pesticide informational site maintained by O.S.U.,
http://ace.orst.edu/info/extoxnet/

National Pesticide Information Center,
http://npic.orst.edu/index.html

Texas Dept. of Agriculture Pesticides Division,
http://www.agr.state.tx.us/agr/program_render/0,1987,1848_5319_0_0,00.html?channelId=5319

Texas AgriLife Extension Service,
http://texasextension.tamu.edu/

Integrated Pest Management Information
Agriculture and Environmental Safety Unit (AESU) Texas A&M University,
http://www-aes.tamu.edu/

City of Austin's Grow Green,
http://www.ci.austin.tx.us/growgreen/plants.htm

IPPC- PNW Handbooks, weather data, IPM links,
http://pnwpest.org/

National Integrated Pest Management Network,
http://www.reeusda.gov/nipmn/

PARD IPM Program website,
http://www.ci.Austin.tx.us/watershed/ipm_info.htm

Texas Invasives,
http://www.texasinvasives.org/

Texas IPM,
http://ipm.tamu.edu/

TNC Invasive Species Initiative,
http://tncweeds.ucdavis.edu/handbook.html

Washington State Pest Management Resource Service,
http://wsprs.wsu

DISCLAIMER

The use of pesticide trade names in this document does not constitute an endorsement by the City of Austin. Descriptions of pesticide use and management practices are provided in this program for PARD employee use, and are not intended as public recommendations.

Appendix 1

Approved Pesticide Lists

Following are lists of pesticides that are approved for use in specific work units in parks. A good IPM approach allows for the choice of ideal materials for specific needs. IPM also anticipates the need to managing pest resistance with rotations of products with differing modes of action rather than relying on a "one material fits all" approach. Despite the lengthy appearance of these approved lists, most of these pesticides are not used in a typical year, or are used in a very minor way.

It is also important to understand that pesticide applications are used after many other IPM strategies have first been either employed, or considered. The vast majority of PARD pest management practices never involve the use of pesticides. Similarly, the vast majority of park acreage never receives any kind of pesticide application. Other IPM strategies PARD employs include prevention of pests through policy, design and selection, and management of pests through cultural practices, physical means, and mechanical methods.

All pesticides available for use within parks must first be placed upon an approved list after undergoing a review process that carefully examines the individual characteristics of the product and whether it would be an appropriate addition within our program. Issues of efficacy, public health and safety, potential environmental impacts, overall plant health requirements, land management needs, and other concerns are taken into account during this process. Applicators within a specific work unit must then make their choices of materials from their own approved list. Individual work units have different responsibilities and pest management requirements for the lands under their care. The individually tailored approved lists reflect these differences.

Occasionally, subsets of work units may receive approval for certain materials that are not on their general approved list. For example, trial uses of products may be focused on a single golf course for demonstration purposes.

All applicators in each work unit are limited to the pesticides appearing on their specific approved list. Pesticides not appearing on their particular list are not available for their use. Careful attention should be paid to the further limitations of pesticides available for use within waterway buffer zones and aquatic sites as outlined and defined in the Waterways Pest Management Policy.

Additions to the approved lists must follow the process as described in the "Pesticides Approved for Use in Parks" Policy.

APPROVED LISTS FOR SPECIFIC WORK UNITS

The following lists of approved pesticide materials are specific to each work unit. PARD applicators must choose only from currently listed products. Only state licensed applicators may apply pesticides in Austin Parks. Use of pesticides must occur under adherence to the PARD Integrated Pest Management Program policies and oversight. Pesticides use must adhere to all product label directions.

Format:

Product trade name (active ingredient) Description of purpose and use within IPM program.

PARK SERVICE ZONES APPROVED LIST

Areas of pest management: General community, neighborhood, regional, and urban parks.

HERBICIDES

Primary choices:

Gallery 75 DF (isoxaben) Used on shrub beds, tree circles, and other areas. Can be used in combination or rotation with oryzalin to broaden the spectrum of weeds prevented.

Garlon 3A, Greenlight Tough Brush Killer (triclopyr amine) Selective products for woody, difficult to control perennials. Used in spray and cut-stem applications, also for invasives and habitat restoration.

Kocide 101, Kocide DF (copper hydroxide) Used on canopies and branches occupied by ball moss.

Roundup Pro, ProDry, Razor Pro, Rodeo, Aquamaster (glyphosate) Primary vegetation control product used with other methods in shrub beds, tree circles, bare ground, and on invasive weeds.

Surflan AS, WDG (oryzalin) Used in shrub beds, tree circles, fence lines and other park areas for weed control. A primary liquid form pre-emergent product.

XL 2G (benefin+oryzalin) Combination product for wider spectrum weed control. Useful in sites where liquid products are more difficult to apply. This is a primary granular pre-emergent product.

Specialty uses:

Arsenal (isopropylamine salt of imazapyrs) A brush-on application used where woody plants and poison ivy persist.

DeMoss, Garden Safe Moss and Algae Killer, others (fatty acids) Moss control desiccant. For structures and non-vegetated surfaces. Not typically used, but possible sporadic use.

Devrinol 50 DF (napropamide) Rare use in park shrub beds, tree circles, and other areas to prevent weed seed germination. Can be used in combination or rotation with oryzalin to broaden the spectrum of weeds prevented.

Manage (halosulfuron-methyl) Specialty systemic weed control for Equisetum and Cyperus species. Use is minor in scope and where control is essential.

Scythe (pelargonic fatty acid) Minor use desiccant used for top-kill of early-stage, easily killed weeds.

FUNGICIDES

Fertilome Liquid Systemic Fungicide (propiconazole) Possible use for disease control for high value plants in short term, special situations where long term plant health is affected. Typically not used, in park zones but retained for unusual circumstances.

Microcop (copper sulfate) **Copper soap** (copper octanoate) Possible use for disease control for high value plants in short term, special situations where long term plant health is affected. Typically not used in park zones, but retained for unusual circumstances.

INSECTICIDES

Aerosol Wasp Sprays, Misty Wasp and Hornet Killer (pyrethroids) Directed jet sprays used for individual wasp and hornet nest treatments posing health and safety threats to park users.

Amdro (hydramethylnon) Used on individual ant mounds in active areas.

PARK SERVICE ZONES APPROVED LIST (cont.)

Ascend (abamectin) Used on individual ant mounds in active areas.
Award (fenoxycarb) Used on individual ant mounds in active areas.
Azatin XL (azadirachtin) Need tree extract used for control through growth regulating and anti-feeding effects. Specialty use product. Typically not used in park zones, but retained for unusual circumstances.
Bacillus thuringiensis Primarily for lepidopterous insects, although subspecies can be used for other targets. Typically not used in park zones, but retained for unusual circumstances.
Beneficial nematodes Predatory nematodes for insect control treatments for susceptible targets where needed. Typically not used in park zones, but retained for unusual circumstances.
M-Pede, Safer Insecticidal Soap, others (soaps) General soft body insect control. Typically not used in park zones, but retained for unusual circumstances.
Merit (imidacloprid) Systemic/Contact product for special plantings and needs. Typically not used in park zones, but retained for unusual, short term use where long term plant health is affected.
Speckoz multicide wasp and hornet killer (tetramethrin) Directed jet sprays used for individual wasp and hornet nest treatments posing health and safety threats to park users.
Sunspray, others (horticultural oils) General insect control both for dormant and growing season use. Typically not used in park zones, but retained for unusual circumstances.

Specialty uses:

Results (pyrethrin) Used on ant mounds in active areas where red fire ants persist.
Safer Fire Ant Killer (D-limonene) Used on ant mounds in active areas where red fire ants persist.

MISCELLANEOUS

Activator 90, R-11, LI 700, Hasten, , Silwet, Syl-Tac, others (spray adjuvant) Surfactant used in solutions to enhance spray coverage and increase efficacy.
Deer-Off (putrescent egg and capsaicin) Deer foliage repellent.
No Foam (anti-foaming agent) Silicon based, reduces foaming, used in large agitated spray tanks.
Sluggo, Escargo (iron phosphate) Slug and snail bait for specialty areas susceptible to unacceptable damage, such as certain perennials, annuals. Not typically used, but retained on list for use if plant loss is unacceptable.
Tanglefoot (barrier product) Physical sticky barrier for crawling insect pests. Not typically used, but retained on list for use if loss is unacceptable.
Turf Trax, Signal, others (marker colorant) Used in spray solutions to temporarily mark area of application.
Wasp/yellow jacket traps (pheromone trap) Yellowjacket trap for certain areas. Not typically used, but retained on list for use if safety issues are created by wasp and yellow jacket presence.

SPECIAL APPROVAL PRODUCTS: Requires manager level/policy approval prior to use.

Aquashade (acid blue 9, acid yellow 23) Blue colorant used to suppress algae growth in certain ponds in developed parks. Used only within approved framework for noxious invasive weeds and algae as part of weed management strategy specific to site as outlined in Waterways Policy.
Cutrine Plus (chelated elemental copper) Aquatic algae control. Used only within approved framework for noxious invasive weeds and algae as part of weed management strategy specific to site as outlined in Waterways Policy. Minor to zero use material retained on list for specific situations.
Horsepower (MCPA,triclopyr,dicamba) Selective weed control in turf. Used for turf renovation as part of overall IPM approach. Turf broadleaf herbicide use must be pre-approved per Turf Broadleaf Weed policy. Used very rarely, primarily for athletic field surface renovation. Not for general use on park turf.
Sonar AS (fluridone) For control of noxious invasive weeds that threaten the health of an aquatic system as part of approved overall IPM management plan specific to site; potential sites and uses outlined in Waterways Policy. Minor to zero use material retained on list for specific situations.
Spotlight (fluroxypyr) Selective weed control in turf. Used for turf renovation as part of overall IPM approach. Turf broadleaf herbicide use must be pre-approved per Turf Broadleaf Weed policy. Used very rarely, primarily for athletic field surface renovation. Not for general use on park turf.

SPECIALTY ROSE GARDEN APPROVED LIST

This list does not apply to general parks in service zones. (Specialty Rose Garden sites are also approved for use of Service Zone listed pesticides.)

Integrated pest management activities in rose gardens on park land are highly dependent on factors such as garden location, intent and use of the planting, rose varietal choice, site conditions, and public expectations. Tolerance of disease and insect presence, and intensity of pest control activities and inputs will vary with these factors. PARD IPM inputs at rose garden sites, including the use of pesticides, will reflect these factors and take place only under a carefully considered and planned approach.

FUNGICIDES

Banner Maxx, Fertilome Liquid Systemic Fungicide (propiconazole) For disease control in rotation with other materials on specialty rose gardens.

Bayleton (triadimefon) For disease control in rotation with other materials on specialty rose gardens.

Carbamate 75 WDG (ferbam) For disease control in rotation with other materials on specialty rose gardens.

Clearys 3336 (thiophanate) For disease control in rotation with other materials on specialty rose gardens.

Compass (trifloxystrobin) For disease control in rotation with other materials on specialty rose gardens.

Daconil (chlorothalonil) For control of diseases in rotation with other materials primarily on golf greens, specialty rose gardens, and special situations.

Microcop (copper sulfate) **Copper soap** (copper octanoate) Unlikely, but potential use in cases of clear benefit from dormant season application in special need situations in rose gardens.

Norbac 84c (Agrobacterium radiobacter) Beneficial bacteria for prevention of crown gall disease.

Rubigan AS (fenarimol) For disease control in rotation with other materials on specialty rose gardens.

Zyban WP (thiophanate methyl+zinc and maneb) For disease control in rotation with other materials on specialty rose gardens.

INSECTICIDES and MITICIDES

Avid 1.5 EC (abamectin) Miticide for use as part of a carefully implemented plan to keep mite levels at a non-injurious level in specialty rose gardens.

Azatin XL (azadirachtin) Neem tree extract used for control through growth regulating and anti-feeding effects. Specialty use product.

Conserve (spinosad) Material for specialty rose gardens. Minor use specialty product, not typically used.

Floramite (bifenazate) Miticide for use as part of a carefully implemented plan to keep mite levels at a non-injurious level in specialty rose gardens.

Hexygon (hexythiozox) Miticide for use as part of a carefully implemented plan to keep mite levels at a non-injurious level in specialty rose gardens.

Merit (imidacloprid) Systemic product for specialty rose gardens. Product used primarily for rose midge control.

ATHLETIC FIELD SERVICES APPROVED LIST

Areas of pest management: Athletic fields such as softball, baseball, football and soccer fields.

HERBICIDES

Roundup Pro, ProDry, Razor Pro, Rodeo, Aquamaster (glyphosate) Primary vegetation control product used along with other control methods on infields, fence lines, field lines and other areas.
Scythe (pelargonic fatty acid) Minor use contact herbicide used for top-kill of easily controlled weeds.

INSECTICIDE

Ascend (abamectin) Used on individual ant mounds in active areas.

Specialty uses:

Results (pyrethrin) Used on ant mounds in active areas where red fire ants persist.

MISCELLANEOUS

Activator 90, R-11, LI 700, Hasten, others (spray adjuvant) Surfactant used in solutions to enhance spray coverage and increase efficacy.
Armorex (garlic, sesame oil, white pepper) Goose repellent for stadium turf. Trial use.
Turf Trax, Signal, others (marker colorant) Used in spray solutions to temporarily mark area of application.

SPECIAL USE PRODUCTS: Requires manager level/special policy approval prior to use.

Horsepower(MCPA,triclopyr,dicamba) Selective weed control in turf. Used for turf renovation as part of overall IPM approach. Turf broadleaf herbicide use must be pre-approved per Turf Broadleaf Weed policy. Used very rarely, primarily for athletic field surface renovation. Not for general use on park turf.
Spotlight (fluroxypyr) Selective weed control in turf. Used for turf renovation as part of overall IPM approach. Turf broadleaf herbicide use must be pre-approved per Turf Broadleaf Weed policy. Used very rarely, primarily for athletic field surface renovation. Not for general use on park turf.

CITY URBAN FORESTRY APPROVED LIST

Areas of pest management: trees on streets, parks, other city property, and UF nursery operations.

HERBICIDES

Garlon 3A, Remedy, Greenlight Tough Brush Killer (triclopyr) Selective products for woody, difficult to control perennials, also for invasives and habitat restoration.
Kocide 101, Kocide DF (copper hydroxide) Used on canopies and branches occupied by ball moss.
Manage (halosulfuron-methyl) Specialty systemic weed control for Equisetum and Cyperus species. Use is minor in scope such as in nursery growing areas and where control is essential.
Roundup Pro, ProDry, Razor Pro, Rodeo, Aquamaster (glyphosate) Primary vegetation control product used with other methods in shrub beds, tree circles, bare ground, and on invasive weeds.
Scythe (pelargonic fatty acid) Minor use desiccant used for top-kill of early-stage, easily killed weeds.
Surflan AS, WDG (oryzalin) Used in nursery, shrub beds, tree circles, fence lines and other park areas for weed control. A primary liquid form pre-emergent product.

FUNGICIDES

Alamo (propiconazole) Trunk injection product for certain high value elms.
Arbortect (thiabendazole) Trunk injection product for certain high value elms.
Daconil (chlorothalonil) Disease control on high value trees in special situations. Typically not used, but retained for unusual, short term use where long term plant health is affected.

INSECTICIDES and MITICIDES

(Street trees do not routinely receive scheduled insecticide or miticide treatments.)
Aerosol Wasp Sprays. Misty wasp and hornet killer (pyrethroids) Directed jet sprays used for individual wasp and hornet nest
treatments posing health and safety threats to park users.
Azatin XL (azadirachtin) Neem tree extract used for insect growth regulating and anti-feeding effects. Typically not used, but retained for unusual, short term use where long term plant health is affected.
Bacillus thuringiensis Primarily for lepidopterous insects, although subspecies can be used for other targets. Typically not used, but retained for unusual, short term use where long term plant health is affected.
Beneficial nematodes Predatory nematodes for susceptible targets where needed. Typically not used, but retained for unusual, short term use where long term plant health is affected.
Conserve (spinosad) Typically not used, but retained for unusual, short term use where long term plant health is affected.
Floramite (bifenazate) Miticide as part of a carefully implemented plan to keep mites at non-injurious levels. Typically not used, but retained for unusual, short term use where long term plant health is affected.
M-Pede, Safer Insecticidal Soap, others (soaps) General soft body insect control. Typically not used, but retained for unusual, short term use where long term plant health is affected.
Merit (imidacloprid) Systemic product for specialty or high value plant material. Typically not used, but retained for unusual, short term use where long term plant health is affected.
Sunspray, others (horticultural oils) General insect control both for dormant and growing season use. Not typically used in general parks. Typically not used, but retained for unusual, short term use where long term plant health is affected.
Tempo SC Ultra (cyfluthrin) Contact product for special or high value plant material. Typically not used, but retained for unusual, short term use where long term plant health is affected.

MISCELLANEOUS

Activator 90, R-11, LI 700, Hasten, others (spray adjuvant) Surfactant used in solutions to enhance spray coverage and increase efficacy.
No Foam (anti-foaming agent) Silicon based, reduces foaming, used in large agitated spray tanks.
Turf Trax, Signal, others (marker colorant) Used in spray solutions to temporarily mark application.

CITY PARKS AND RECREATION-HORTICULTURAL SERVICES APPROVED LIST

Areas of pest management: greenhouse management, nursery management, specialty rose and botanic gardens, turf renovation, other specialized pest management needs in all park areas.

HERBICIDES

Primary choices:

Gallery 75 DF (isoxaben) Used on shrub beds, tree circles, and other areas. Can be used in combination or rotation with oryzalin to broaden the spectrum of weeds prevented.

Garlon 3A, **4 Ultra, Greenlight Tough Brush Killer,** (triclopyr) Selective products for woody and other difficult to control broadleaf weeds. For spray and cut-stem applications.

Kocide 101, Kocide DF (copper hydroxide) Used on canopies and branches occupied by ball moss.

Roundup Pro, ProDry, Razor Pro, Rodeo, Aquamaster (glyphosate) Primary vegetation control product used with other methods in shrub beds, tree circles, bare ground, and invasive weeds.

Surflan AS, WDG (oryzalin) Used in nursery, shrub beds, tree circles, fence lines and other park areas for weed control. A primary liquid form pre-emergent product.

XL 2G (benefin+oryzalin) Combination product for wider spectrum weed control. Useful in sites where liquid products are more difficult to apply. This is a primary granular pre-emergent product.

Specialty uses:

Arsenal (imazapyr) Used only for non-landscaped, non-park, intergovernmental contract sites for total vegetation control.

Devrinol 50 DF (napropamide) Used in some nursery areas, and occasional use in park shrub beds, tree circles, and other areas to prevent weed seed germination. Useful on newly planted areas.

DeMoss, Garden Safe Moss and Algae Killer, others (fatty acids) Moss control desiccant. For structures and non-vegetated surfaces. Not typically used, but possible targeted use.

Fusilade II (fluazifop) Trial use. Selective post-emergent for invasive grass species in natural areas only.

Manage (halosulfuron-methyl) Specialty systemic weed control for Equisetum and Cyperus species. Use is minor in scope such as in nursery growing areas and where control is essential.

Scythe (pelargonic fatty acid) Minor use desiccant used for top-kill of early-stage, easily killed weeds.

Milestone (aminopyralid) Invasive broadleaf weed and woody plant control for natural areas.

FUNGICIDES

Banner Maxx, Fertilome Liquid Systemic Fungicide (propiconazole) For control of diseases in rotation with other materials primarily in specialty rose gardens. Not typically used in general parks.

Bayleton (triadimefon) For control of diseases in rotation with other materials primarily in specialty rose gardens and special situations. Not typically used in general parks.

Carbamate 75 WDG (ferbam) For control of diseases in rotation with other materials primarily in specialty rose gardens. Not typically used in general parks.

Clearys 3336 (thiophanate) For control of diseases in rotation with other materials primarily in greenhouse and specialty rose gardens. Not typically used in general parks.

Compass (trifloxystrobin) For control of diseases in rotation with other materials primarily in specialty rose gardens. Not typically used in general parks.

Daconil (chlorothalonil) For control of diseases in rotation with other materials primarily in specialty rose gardens, and special situations. Not typically used in general parks.

Microcop (copper sulfate) **Copper soap** (copper octanoate) Possible use for high value plants. Typically not used but retained on approved list for use where other materials are not appropriate or different mode of action is required.

Subdue Maxx (metalaxyl) For control of diseases primarily in special situations. Not typically used.

CITY PARKS AND RECREATION_HORTICULTURAL SERVICES APPROVED LIST cont.

Systhane (myclobutanil) For control of certain diseases, initial use for Rhod. powdery mildew control.
Zyban WP (thiophanate methyl, + zinc and maneb) For control of diseases in rotation with other materials primarily in specialty rose gardens. Not typically used in general parks.

INSECTICIDES and MITICIDES

Aerosol Wasp Sprays, Misty wasp and hornet killer (pyrethroids) Directed jet sprays used for individual wasp and hornet nest
treatments posing health and safety threats to park users.
Avid 1.5 EC (abamectin) Miticide for use as part of a carefully implemented plan to keep mite levels at a non-injurious level in specialty rose gardens, greenhouse. Not typically used in general parks.
Azatin XL (azadirachtin) Neem tree extract used for insect growth regulating and anti-feeding effects. Typically not used, but retained for unusual, short term use where long term plant health is affected.
Bacillus thuringiensis Primarily for lepidopterous insects, although subspecies can be used for other targets. Insect control not usually done in general parks.
Beneficial nematodes Predatory nematodes for insect control treatments for susceptible targets where needed. Insect control not usually done in general parks.
Conserve (spinosad) Material derived from a bacterial fermentation, for specialty rose gardens. Minor use specialty product, typically not used.
Floramite (bifenazate) Miticide for use as part of a carefully implemented plan to keep mite levels at a non-injurious level in specialty rose gardens and special areas. Not typically used in general parks.
Hexygon (hexythiozox) Miticide, with ovacidal and larvacidal action used as part of a carefully implemented plan to keep mite levels at a non-injurious level in specialty rose gardens.
M-Pede, Safer Insecticidal Soap, others (soaps) General soft body insect control. Not typically used in general parks. Minor use material.
Merit (imidacloprid) Systemic product for specialty areas or for high value plant material. Not typically used in general parks.
Sunspray, others (horticultural oils) General insect control both for dormant and growing season use. Not typically used in general parks. Minor use material.
Tempo SC Ultra (cyfluthrin) Contact product for specialty rose gardens or for special needs. Minor use material for potential rotational needs.

MISCELLANEOUS

Activator 90, R-11, LI 700, Hasten, , Silwet, Syl-Tac, others (spray adjuvant) Surfactant used in solutions to enhance spray coverage and increase efficacy.
Aquashade (acid blue 9, acid yellow 23) Blue colorant used to suppress algae growth in certain ponds in developed parks and golf courses.
Deer-Off (putrescent egg and capsaicin) Deer foliage repellent.
Green Clean (sodium carbonate peroxyhydrate) Algae control on surfaces in greenhouse and nursery.
No Foam (anti-foaming agent) Silicon based, reduces foaming, used in large agitated spray tanks.
PT 2000 (quaternary ammonium chloride salts) Disinfectant for use in greenhouse and propagation.

CITY PARKS AND RECREATION: HORTICULTURAL SERVICES APPROVED LIST cont.

Slug baits, various (metaldehyde) For nursery canyard areas susceptible to unacceptable damage. Not typically used, but retained on list for use if loss is unacceptable.
Sluggo, Escargo (iron phosphate) For specialty areas susceptible to unacceptable damage, such as in some annual flower beds. Not typically used, but retained on list for use if loss is unacceptable.
Tanglefoot (barrier product) Physical sticky barrier for crawling insect pests.
Turf Trax, Signal, others (marker colorant) Used in spray solutions to temporarily mark area of application.
Wasp/yellow jacket traps (pheromone trap) Yellowjacket trap for certain areas. Not typically used, but retained on list for use if safety issues are created by wasp and yellow jacket presence.

SPECIAL APPROVAL PRODUCTS: Requires manager level/policy approval prior to use.
Arsenal (imazapyr) Herbicide for evaluation purposes at Austin International Raceway in nonlandscaped,
non-park areas only as per labeled site directives.
Cutrine Plus (chelated elemental copper) Used only within approved framework for noxious invasive weeds and algae as part of weed management strategy specific to site as outlined in Waterways Policy.
Horsepower(MCPA,triclopyr,dicamba) Selective weed control in turf. Used for turf renovation as part of overall IPM approach. Turf broadleaf herbicide use must be pre-approved per Turf Broadleaf Weed policy. Used very rarely, primarily for athletic field surface renovation. Not for general use on park turf.
Sonar AS (fluridone) For control of noxious invasive weeds threatening the health of an aquatic system. Used as part of approved overall weed management plan specific to site; potential sites and uses outlined in Waterways Policy. Minor to zero use material retained on list for specific situations.
Spotlight (fluroxypyr) Selective weed control in turf. Used for turf renovation as part of overall IPM approach. Turf broadleaf herbicide use must be pre-approved per Turf Broadleaf Weed policy. Used very rarely, primarily for athletic field surface renovation. Not for general use on park turf.
For IPM Enhancement program trials:
EcoEXEMPT HC (2-phenethyl propionate, eugenol) Post-emergent herbicide for trial use.
Natures Glory weed and grass killer (acetic and citric acid) Post-emergent herbicide for trial use.
Blackberry and Brush Blocker (acetic and citric acid) Post-emergent herbicide for trial use.
A-maiz-N (corn gluten) Pre-emergent herbicide for trial use.

Greenhouse production use only:
INSECTICIDES
Distance (pyriproxyfen) Insect growth regulator for greenhouse use only.
Floramite SC (bifenazate) Mite control for greenhouse use.
Marathon and Marathon II (imidacloprid) Systemic product for greenhouse use only.
Margosan-O (azadirachtin) Contact product for greenhouse use.
Orthene (acephate) Systemic product for greenhouse use.
Precision/Award (fenoxycarb) Insect growth regulator for greenhouse use only.
Resmethrin EC 26 (resmethrin) Contact product for greenhouse use only.
Talstar (bifenthrin) Contact product for greenhouse use only.

FUNGICIDES
Chipco 26019 (iprodione) For control of diseases in rotation for greenhouse use only.
Domain (thiophanate) For control of diseases in rotation for greenhouse use only.

GOLF COURSES APPROVED LIST

Areas of pest management: municipal golf courses.

FUNGICIDES

(All golf course fungicide use is focused on greens, not fairways or rough. All fungicide products are used to target various green diseases, and are used in rotation to reduce resistance issues.)
Banner Maxx (propiconazole)
Bayleton, Andersons VII (triadimefon)
Clearys 3336,Fungo Flo,Sc.Systemic,Systec1998 (thiophanate methyl)
Compass (trifloxystrobin)
Daconil (chlorothalonil)
Dithane, Fore (mancozeb)
Endorse (polyoxin D zinc salt)
Heritage (azoxystrobin)
Medallion (fludioxonil)
Penstar Flo, Proscape+PCNB, FFII, TeeTime (PCNB)
Scotts Fluid Fungicide (thiophanate methyl+iprodione)
Scotts Fluid Fung. II (triadimefon+metalaxyl)
Scotts V, Tersan (chloroneb)
Scotts VIII, Subdue Maxx (metalaxyl)
Scotts IX (chloroneb+thiophanate methyl)
Scotts X, **Chipco 26019** (iprodione)
Trinity (triticonazole)

INSECTICIDES

Aerosol Wasp Sprays, Misty wasp and hornet killer (pyrethroids) Directed jet sprays used for individual wasp and hornet nest
treatments posing health and safety threats to park users.
Azatin XL (azadirachtin) Neem tree extract product used for control through growth regulating and antifeeding
effects. Specialty use product for unacceptable insect damage in turf.

HERBICIDES

Primary choices:
Garlon 3A, **Greenlight Tough Brush Killer,** (triclopyr) Selective products for woody and other difficult to control broadleaf weeds. For spray and cut-stem applications.
Kocide 101, Kocide DF (copper hydroxide) Used on canopies and branches occupied by ball moss.
Roundup Pro, ProDry, Razor Pro, Rodeo, Aquamaster (glyphosate) Primary vegetation control product used with other methods in shrub beds, tree circles, bare ground, and on invasive weeds.
Surflan AS, WDG (oryzalin) Used in shrub beds, tree circles, fence lines and other areas for pre-emergent weed control.
XL 2G (benefin+oryzalin) Combination product for wider spectrum weed control. Useful in sites where liquid products are more difficult to apply. This is a primary granular pre-emergent product.

Specialty uses:
Devrinol 50 DF (napropamide) Occasional use in shrub beds, tree circles, and other areas to prevent weed seed germination. Useful on newly planted areas.
Manage (halosulfuron-methyl) Specialty systemic weed control for Equisetum and Cyperus species. Use is minor in scope and where control is essential.
Scythe (pelargonic fatty acid) Minor use contact herbicide used for top-kill of easily controlled weeds.

GOLF COURSES APPROVED LIST (cont.)

MISCELLANEOUS

Activator 90, R-11, LI 700, Hasten, , Silwet, Syl-Tac, others (spray adjuvant) Surfactant used in solutions to enhance spray coverage and increase efficacy.
Deer-Off (putrescent egg and capsaicin) Deer foliage repellent.
Dragonfire CPP (sesame oil) For nematode control.
No Foam (anti-foaming agent) Silicon based, reduces foaming, used in large agitated spray tanks.
Primo Maxx (trinexapac-ethyl) Trial use turf growth regulator at Heron Lakes.
Sluggo, Escargo (iron phosphate) For specialty areas susceptible to unacceptable damage, such as in some annual flower beds. Not typically used, but retained on list for use if loss is unacceptable.
Turf Enhancer 2SC, Trimmit 2SC, Teetime w/TGR (paclobutrazol) Growth regulator for control of Poa annua on bentgrass greens.
Turf Trax, Signal, others (marker colorant) Used in spray solutions to temporarily mark area of application.

SPECIAL USE PRODUCTS: Requires Golf Manager approval prior to use.

Aquashade (acid blue 9, acid yellow 23) Blue colorant used to suppress algae growth in certain ponds in developed parks and golf courses. Use only as allowed in Waterways Policy.
Confront (triclopyr+clopyralid) Broadleaf weed control in fairways as per Turf Weed Control policy.
Cutrine Plus (chelated elemental copper) Aquatic algae control. Used only within approved framework for noxious invasive weeds and algae as part of weed management strategy specific to site as outlined in Waterways Policy.
Nemacur (phenamiphos) Nematicide for use on golf greens when levels of nematodes exceed damage threshold as determined by laboratory testing of the target site. Use of this product is only allowed when loss of golf green is imminent and when all alternatives have failed. Use of this product is extremely rare. Purchasing of this product will end by June 2008 due to loss of registration.

CITY PARKS AND RECREATION-NATURAL AREAS APPROVED LIST

Areas of pest management: natural area parks.

INSECTICIDES

Aerosol Wasp Sprays, Misty wasp and hornet killer (pyrethroids) Directed jet sprays used for individual wasp and hornet nest treatments posing health and safety threats to park or natural area users.

HERBICIDES

Fusilade II (fluazifop) Trial use. Selective post-emergent for invasive grass species in natural areas only.
Garlon 3A, Garlon 4 Ultra (triclopyr) Selective products for woody, difficult to control perennials. Used both in spray and cut-stem applications, also for invasives and habitat restoration.
Roundup Pro, ProDry, Razor Pro, Rodeo, Aquamaster (glyphosate) Primary vegetation control product used with other methods in shrub beds, tree circles, bare ground, and on invasive weeds.
Surflan AS, WDG (oryzalin) Used in some shrub beds, tree circles, and potentially in restoration.
Milestone (aminopyralid) Invasive broadleaf weed and woody plant control for natural areas.

MISCELLANEOUS

Activator 90, R-11, LI 700, Hasten, Kinetic, Syl-Tac, others (spray adjuvant) Surfactants used to enhance spray coverage and increase efficacy.
Deer-Off (putrescent egg and capsaicin) Deer foliage repellent.
No Foam (anti-foaming agent) Silicon based, reduces foaming, used in large agitated spray tanks.
Turf Trax, Signal, others (marker colorant) Used to temporarily mark area of application.
Wasp/yellow jacket traps (pheromone trap) Yellowjacket trap for certain areas. Not typically used.
Hoyt Arboretum Only: (Hoyt Arboretum is approved for the list below in addition to the regular City Nature-Natural Areas approved list.)

INSECTICIDES

Azatin XL (azadirachtin) Neem tree extract used for insect growth regulating and anti-feeding effects. Typically not used, but retained for unusual, short term use where long term plant health is affected.
Bacillus thuringiensis Primarily for lepidopterous insects, although subspecies can be used for other targets. Typically not used, but retained for unusual, short term use where long term plant health is affected.
Beneficial nematodes Predatory nematodes for susceptible targets where needed. Typically not used, but retained for unusual, short term use where long term plant health is affected.
M-Pede, Safer Insecticidal Soap, others (soaps) General soft body insect control. Typically not used, but retained for unusual, short term use where long term plant health is affected.
Sunspray, others (horticultural oils) General insect control both for dormant and growing season use. Typically not used, but retained for unusual, short term use where long term plant health is affected.

FUNGICIDES

Fertilome Liquid Systemic Fungicide (propiconazole) For control of diseases in rotation with other materials in special situations in high value plants or specialty plantings. Not typically used.
Microcop (copper sulfate) For control of diseases in rotation with other materials in special situations in high value plants or specialty plantings. Not typically used.

HERBICIDES

Devrinol 50 DF (napropamide) Occasional use in shrub beds, tree circles, and other areas to prevent weed seed germination. Useful on newly planted areas.
XL 2G (benefin+oryzalin) Combination product for wider spectrum weed control. Useful in sites where liquid products are more difficult to apply. This is a primary granular pre-emergent product.

Material	Unit approved for UUDNR
Casoron 4G Ronstar 2G PrePair	Zones, CN-HS, Golf Zones, CN-HS, Golf Zones, CN-HS, Golf
B-Nine Banrot 40WP < 1 lbs. remaining.	CN-Hort. Services greenhouse use only CN-Hort.
Cycocel Terraclor < 2 lbs. Truban WP < 2 lbs.	Services greenhouse use only CN-Hort. Services greenhouse use only CN-Hort. Services greenhouse use only CN-Hort. Services greenhouse use only
Trimec, Teetime w Millenium	Golf

USE UP AND DO NOT RESTOCK (UUDNR) LIST

The listed materials are to be used until remaining stocks are gone and are not to be restocked.

TDA Q527
1/07

Texas Department of Agriculture

Todd Staples, Commissioner

Pesticide Applicator Record

Business Name _____ **Address** _____

Application Date	Time Started	Name of the person for whom the application was made	Location of Land Treated		Site Treated	Wind Direction	Wind Velocity	Air Temp

Product Trade Name	EPA Registration Number	Target Pest	Rate of Product Per Unit	Equipment ID #	Spray Permit Number

Licensed Applicator's Name and License Number	Unlicensed Applicator's Name, if applicable	Total Acres or Volume of Area Treated	Total Volume of Spray Mix, Dust, Granules or Other Materials Applied Per Unit

Additional Information

Note: Records must be kept for 2 years as required by State Law

Application Date	Time Started	Name of the person for whom the application was made	Location of Land Treated		Site Treated	Wind Direction	Wind Velocity	Air Temp

Product Trade Name	EPA Registration Number	Target Pest	Rate of Product Per Unit	Equipment ID #	Spray Permit Number

Licensed Applicator's Name and License Number	Unlicensed Applicator's Name, if applicable	Total Acres or Volume of Area Treated	Total Volume of Spray Mix, Dust, Granules or Other Materials Applied Per Unit

Additional Information

APPENDIX 2

APPENDIX 3

Austin Parks and Recreation

A City within a Park

To:_____ Date:_____
Of:_____
(name of organization)
From :_____

Hello!
To keep public landscapes in your area useful and enjoyable, Austin Parks and Recreation will be applying approved herbicides or other products to control weeds in park land adjacent to your property. The materials to be used have been carefully selected on the basis of reduced public risk and environmental impact, and will be applied by a trained, licensed, state certified applicator.
You will receive a phone call prior to applications being made in your vicinity to make you aware of specific dates and locations. Please look for our notification signs to tell you that an application is taking place, or will be taking place soon.
Please restrict activities in the area of application until the applied materials have dried and the signs have been removed.
If you have concerns or wish additional information please call_____(park district applying pesticides) at _____.

City of Austin Parks and Recreation Department
John Gleason
P.O. Box 1088
Austin, TX 78767
John.Gleason@ci.austin.tx.us
512-974-3543

Troy Houtman
2525 S. Lakeshore Blvd.
Austin, TX 78741
Troy.Houtman@ci.austin.tx.us
512-974-5152

Sustaining a healthy park and recreation system makes Austin a great place to live, work and play.
www.ci.austin.tx.us/parks/

APPENDIX 4

APPLICATION FOR PESTICIDE USE ON PARD PROPERTY			
business or organization			commercial operator license number:
address			applicator(s) names(s) and license number(s):
city state zip			
phone/fax			
Contact individual(s)			
name/address of park or site:	specific are treated (attach Map):	area treated (sq.ft etc.):	date(s) of application:
purpose of application:			
method of treatment: include pesticide formulations, dilutions, and type of equipment used:			
treatment notification procedures: describe signage, fencing, or other public notification plans:			
does any part of application take place within an aquatic site, or within 25 feet of a body of water? if so, describe:			

NOTE: PESTICIDE APPLICATION RECORDS (APPENDIX 1) MUST BE SUBMITTED TO AP&R WITHIN 48 HOURS AFTER AN APPLICATION

Submit to: **Austin Parks and Recreation**
Attention:
John Gleason, IPM Coordinator
P.O. Box 1088 Austin, TX 78767
John.Gleason@ci.austin.tx.us
512-974-3543
OR
Troy Houtman, PARD Representative
2525 S. Lakeshore Blvd., Austin, TX 78741
Troy.Houtman@ci.austin.tx.us
512-974-9510

This application is: APPROVED ☐ DENIED ☐with the following stipulations/explanation:

_____ _____
_____
_____
_____
_____
_____
_____
_____
_____
by: _____

APPENDIX 5

Austin Parks and Recreation

A City within a Park

Turf Broadleaf Weed Herbicide Application Approval Request

Requester name: _____Work Unit: _____Park or site name: _____
Specific area to be treated:

Management
State reason for application. Include all applicable turf IPM methods that have and will be used on site:

Weeds to be controlled:

Estimated percentage of weed coverage in turf:

Herbicide(s) to be used: _____ Application rate: _____

Timing of application
Expected date(s) of application: _____
Expected time interval needed for application: _____ hours
Expected start of application at: ____:__ Complete application at ____:__
Expected post application time interval until re-entry is allowed: _____ hours.

Site and scheduling considerations
List nearby schools, community centers, dog OLAs, playgrounds and other considerations:

State any potential conflicts with this scheduling:

Notification
List all contact persons needed for notification, such as community center, schools etc.:

Describe planned notification signage for site:

Describe on– site notification personnel and locations planned for application:

Drift
What herbicide drift precautions will be taken?:

Approved by Senior Turf Manager: _____

Approved by Supervisor for Work Unit (see Policy) _____

Date: _____

APPENDIX 6

CONTACT INFORMATION

Emergency Phone Numbers

Fire, Ambulance, HAZMAT 911
For Medical Emergencies & Immediate Health Concerns:
Central Texas Poison Center- 24 hours Daily- Austin Area 254-724-7405
Outside Austin Area 1-800-222-1222
TCEQ - Texas Commission on Environmental Quality, 503-229-4263
http://www.tceq.state.tx.us/
Texas Division of Emergency Management,
http://www.txdps.state.tx.us/dem/
National Response Center,1-800-424-8802
http://www.nrc.uscg.mil/nrchp.html
CHEMTREC: an industry emergency spill information service 1-800-262-8200
PARD IPM Coordinator, John Gleason, 512-974-3543
PARD Representative, Troy Houtman, 512-974-5152

Informational Phone Numbers

PARD IPM Coordinator, John Gleason, 512-974-3543
PARD Representative, Troy Houtman, 512-974-9510
The City of Austin Parks and Recreation maintains pesticide management. Inquiries regarding this program and its policies can be directed to this number, or e-mailed to John.Gleason@ci.austin.tx.us or Troy.Houtman@ci.austin.tx.us
NPIC - National Pesticide Information Center,1-800-858-7378
http://npic.orst.edu/
Provides general information on pesticide products, including safety, health, environmental effects, clean up and disposal.
6:30 am - 4:30 PM PDT 7 days a week excluding holidays
Texas Department of Agriculture, 512-305-8907
http://www.agr.state.tx.us/
Provides information on pesticide products and registration, conducts pesticide use investigation, and applicator licensing and certification.
Weekdays 8:00 AM - 5:00 PM.
To Report Pesticide Exposures:
Texas Department of State Health services (DSHS) 512-458-7111
Provides confidential investigations, consults with health care providers and provides clean up and exposure prevention information.
Weekdays 8:00 AM - 5:00 PM.

GLOSSARY

Action level- the point at which control measures are necessary to prevent a pest population or its impact from exceeding the threshold.
Aeration- the provision of air to the soil.
Amphibian- any of a class (Amphibia) of cold-blooded vertebrates (as frogs, toads, or salamanders) intermediate in many characters between fishes and reptiles and having gilled aquatic larvae and air-breathing adults.
Anti-siphon- a device that prevents waste water from being drawn back into supply lines and possibly contaminating the water supply.
Applicator- a person applying a liquid or solid treatment to a landscape.
Ball moss- grey to greenish epiphyte about 3" to 9" wide within the Central Texas region and has scaly, recurved, linear leaves 2" to 6" long.
Basal growth- leaves or stems growing at the base of a stem or tree trunk.
Botanist- a biologist specializing in the study of plants.
Bioaccumulation- the accumulation of a substance, such as a toxic chemical, in various tissues of a living organism.
Backpack sprayer- a sprayer worn on the back, typically used in orchards.
Biofilter- an emission control device that uses microorganisms to destroy volatile organic compounds and hazardous air pollutants.
Bioswale- are landscape elements designed to remove silt and pollution from surface runoff water, usually 6 inches or more deep.
Boom sprayer- a large-scale sprayer associated with a tractor or plane.
Broadcast spray- a wide, circle-shaped spray or spray pattern.
Broadleaf- having relatively broad rather than needle-like or scale-like leaves.
Brood- whitish rice grain-like larvae and pupae found within a fire ant mound.
Buffer zone- a corridor of land that is 25 feet in width on the sides of a stream or other body of water.
Carbamate- a salt or an ester of carbamic acid, especially one used as an insecticide.
Cholinesterase- a family of enzymes that catalyze the hydrolysis of the neurotransmitter acetylcholine into choline and acetic acid, a reaction necessary to allow a cholinergic neuron to return to its resting state after activation.
Contaminate- soil, stain, corrupt, or infect by contact or association.
Core aeration- increasing air penetration of the soil by removing plugs of soil.
Decontamination- to make safe by eliminating poisonous or otherwise harmful substances, such as noxious chemicals or radioactive material.
Dike- contains spills to a confined area.
Disease- any abnormal condition in a plant that interferes with its vital physiological processes, caused by pathogenic microorganisms, parasites, unfavorable environmental, genetic, or nutritional factors, etc.
Dog off leash area- 12 off leash areas in Austin: Auditorium Shores, Bull Creek Park, Emma Long Metropolitan Park, Far West, North East District Park, Norwood Estate, Red Bud Isle, Onion Creek District Park, Shoal Creek Greenbelt, Walnut Creek District Park, West Austin Park, and Zilker Park.
Drainage- the natural or artificial removal of surface and sub-surface water from an area.

Ecosystem- a system formed by the interaction of a community of organisms with their physical environment.
Edging- mechanical means to define borders.
Endangered species- an animal or plant species in danger of extinction throughout all or a significant portion of its range.
Epiphyte- attaches to a host but absorbs water and nutrients from the air through their leaves and stems.
Erosion- the process of weathering and transport of solids (sediment, soil, rock and other particles) in the natural environment or their source and deposits them elsewhere.
Fertilization- the process of making soil more productive of plant growth, as by the addition of organic material or fertilizer.
Fungicide- chemical compounds or biological organisms used to kill or inhibit fungi or fungal spores.
Germinate- to begin to sprout or grow.
Glyphosate- is a broad-spectrum systemic herbicide used to kill weeds, especially perennials.
Grade- the degree of inclination of a slope, road, or other surface.
Grafting- is a method of asexual plant propagation widely used in agriculture and horticulture where the tissues of one plant are encouraged to fuse with those of another.
Granular application- provides a slower release of ingredients, usually used in broadcast or drop applications.
Greenhouse- a building where plants are grown.
Groundcover- any plant that grows over an area of ground, used to provide protection from erosion and drought, and to improve its aesthetic appearance.
Harborage- shelter or refuge, as for a ship, or a place providing shelter.
Herbicide- a chemical substance used to destroy or inhibit the growth of plants, especially weeds.
High water line- the highest possible water level that would be expected in a given body of water during a 5-year period.
Hilling- is the technique in agriculture and horticulture of piling soil up around the base of a plant.
Hornet- a venomous insect about a ¾" long and is black and white, with a white face.
Horticulturalist- practices the science of plant cultivation including the process of preparing soil for the planting of seeds, tubers, or cuttings.
Host- the animal or plant on which or in which another organism lives.
Hydrocyanic acid- an aqueous solution of hydrogen cyanide HCN that is a poisonous weak acid and is used chiefly in fumigating and in organic synthesis.
Infiltration- to cause (as a liquid) to permeate something by penetrating its pores or interstices.
Insecticide- a chemical used to kill or reduce the presence of insects.
Insects- a class within the arthropods that have a chitinous exoskeleton, a three-part body (head, thorax, and abdomen), three pairs of jointed legs, compound eyes, and two antennae.
Integrated Pest Management- a coordinated decision-making and action process that uses the most appropriate pest control methods and strategies in an environmentally and economically sound manner to meet pest management objectives.

Invasive species- introduced species that can thrive in areas beyond their natural range of dispersal.
Invertibrate- an animal without a backbone, which includes 95 percent of all animal species.
Irrigation- an artificial application of water to the soil.
Larvae- the newly hatched, wingless, often worm-like form of many insects before metamorphosis.
Leachability- ability to remove soluble or other constituents from by the action of a percolating liquid.
Listed species- a species, subspecies, or distinct population segment that has been added to the Federal list of endangered and threatened wildlife and plants.
Liquid application- used when the aboveground parts of plants require treatment to control pests. Some liquid formulations come packaged in their own sprayer, ready to use; no dilution is required.
Lobed leaf- leaf having deeply indented margins.
Mammalian- any of various warm-blooded vertebrate animals of the class Mammalia, including humans, characterized by a covering of hair on the skin and, in the female, milk-producing mammary glands for nourishing the young.
Microbial- a minute life form; a microorganism, especially a bacterium that causes disease.
Miticides- a chemical composition that kills or reduces the presence of mites.
Mitigation- to moderate (a quality or condition) in force or intensity; alleviate.
Monoculture- the cultivation or growth of a single crop or organism especially on agricultural or forest land.
Natural area- A natural area is a physical and biological unit in as near a natural condition as possible, which exemplifies typical or unique vegetation and associated biotic, edaphic, geologic and aquatic features. The unit is maintained in a natural condition by allowing physical and biological processes to operate, usually without direct human intervention.
Organophosphate- poison insects and mammals primarily by phosphorylation of the acetylcholinesterase enzyme (AChE) at nerve endings.
Over-seeding- spreading seed over established turf that has been prepared for restoration.
Overstory- also called the canopy is made up of the very tallest trees that stand over the rest of the plants.
Panicle- compound raceme or branched cluster of flowers.
Paper wasp- a venomous insect about a ¾" long, red to brown in color with a long, cylindrical abdomen.
Parasitoids- an organism that spends a significant portion of its life history attached to or within a single host organism, which it ultimately kills (and often consumes) in the process.
Personal protective equipment- includes all types of equipment used to increase individual safety while performing potentially hazardous tasks. This may include safety glasses, hard hats, gloves, lab coats, respirators, or and equipment used to protect against injury or illness.
Pest- an insect or other small animal that harms or destroys garden plants, trees, etc.

Pesticide- any substance or mixture of substances intended for preventing, destroying, repelling or mitigating any pest.
Pesticide applicator license- certification of a person to use a restricted-use or state-limited-use pesticide or regulated herbicides.
Pheromone- is a secreted or excreted chemical factor that triggers a social response in members of the same species.
Photodecomposition- chemical breakdown caused by radiant energy.
Poison ivy- a loose shrub or woody-stemmed, climbing or creeping vine. The leaf consists of three leaflets on long, oppositely placed stems (petioles) and can be 3" to 10" long. Margins of the leaflets may vary from being entirely smooth, slightly toothed or lobed. The leaves can be glossy or dull green.
Post-emergent- a herbicide used to kill weeds after they have germinated.
Predators- an organism that lives by preying on other organisms.
Pre-emergent- chemicals that prevent the germinating weeds from establishing in a lawn.
Prune- to cut off or remove dead or living parts or branches of (a plant, for example) to improve shape or growth.
Pupae- the non-feeding stage between the larva and adult in the metamorphosis of holometabolous insects, during which the larva typically undergoes complete transformation within a protective cocoon or hardened case.
Pyrethroids- chemicals that kill insects, including mosquitoes.
Quill- a hollow shaft or sleeve through which another independently rotating shaft may pass.
Recurved leaf- a leaf curved or bent backwards or downwards.
Red imported fire ant- adults are red to dark brown and occur in five different forms: minor workers, about a 1/8" long; major workers, about a ¼" long; winged males and females, each about a 1/3" long; and queens, about a 1/3" long.
Resistance- the capacity of an organism or a tissue to withstand the effects of a harmful environmental agent.
Restricted-entry interval- the time after a pesticide application during which entry into the treated area is restricted.
Rhizome- a horizontal, usually underground stem that often sends out roots and shoots from its nodes.
Right-of-way- a strip of land that is granted, through an easement or other mechanism, for transportation purposes, such as for a walking path, driveway, rail line or highway.
Rinsates- a dilute mixture of a pesticide or pesticides with water, solvents, oils, commercial rinsing agents, or other substances, that is produced by or results from the cleaning of pesticide application equipment or pesticide containers.
Rodent- any of various mammals of the order Rodentia, such as a mouse, rat, squirrel, or beaver, characterized by large incisors adapted for gnawing or nibbling.
Rodenticide- pest control chemicals intended to kill or reduce the presence of rodents.
Rootstalk- a horizontal plant stem with shoots above and roots below serving as a reproductive structure.
Rootstock- a plant, and sometimes just the stump, which already has an established, healthy root system used for grafting a cutting or budding from another plant.

Runner- slender creeping stem that puts forth roots from nodes spaced at intervals along its length.
Runoff- the occurrence of surplus liquid (as water) exceeding the limit or capacity.
Scion- a detached shoot or twig containing buds from a woody plant which is grafted onto the stock.
Smooth leaf- a leaf having an entire or lobed margin, but is not toothed.
Social wasps- live in nests that they construct and defend cooperatively. ex. paper wasps, yellowjackets, and hornets
Sodium laureth sulfate- detergent and surfactant found in many personal care products. ex. soaps and shampoos
Soil- surface layers of sand, silt, clay, and organic material on the surface of the earth that support plants.
Solitary wasp- do not build communal nests and consequently do not defend their nest
Solubility- the amount of a substance that can be dissolved in a given amount of solvent.
Spill- accidental or unintentional release of hazardous material.
Spot spraying- targeted or direct pesticide application.
Strainer- a device used to separate liquids from solids.
Tank- holds chemical mixtures.
Threatened species- an animal or plant species likely to become endangered within the foreseeable future throughout all or a significant portion of its range.
Threshold- a level of pest presence above which unacceptable amounts of negative plant health impacts, negative environmental impacts, negative effects on infrastructure and assets, intolerable aesthetic impacts, or undue safety risks are likely to occur.
Till- to prepare (land) for the raising of crops, as by plowing and harrowing; cultivate.
Toothed leaf- a leaf that is notched on the outer edge, or margin, of a leaf (serrate).
Top-dressing- material applied to a surface, as fertilizer on land or crops, or stones on a road.
Toxicity- the degree to which a substance is toxic, poisonous or harmful.
Triclopyr- a systemic, foliar herbicide in the pyridine group. It is used to control broadleaf weeds while leaving grasses and conifers unaffected.
Tunneling- process in which an animal makes a hole or passageway underground, usually for shelter.
Turf- surface layer of ground containing a mat of grass and grass roots.
Urban forestry- management, establishment, and protection of trees and forests within cities, suburbs, or towns.
Weeds- any plant that crowds out cultivated and native plants.
Wetland- a lowland area, such as a marsh or swamp, that is saturated with moisture, especially when regarded as the natural habitat of wildlife.
Worker protection standard- is a regulation from the U.S. Environmental Protection Agency (EPA) designed to limit worker's exposure to pesticides.
Vertebrate- a member of the subphylum Vertebrata, a primary division of the phylum Chordata that includes the fishes, amphibians, reptiles, birds, and mammals, all of which are characterized by a segmented spinal column and a distinct well-differentiated head.
Vespid- mostly social nest-building wasps.
Yellowjackets- have a shiny yellow and black striped abdomen and are typically a ½" long, workers, and a ¾" long, the queen.