City of Davis
Integrated Pest Management Policy and Procedures

Purpose

The Integrated Pest Management (IPM) policy is intended to provide a basis for a pest management program that will protect public health, as well as water quality, and non-target plants and animals. The goal of the City's IPM policy is to utilize the most environmentally sound approaches to pest management, and to reduce the volume and toxicity of chemical pest control treatments.

Key objectives of the IPM policy are:

1. to require planning, development and coordination of the IPM program for all City departments; and
2. to provide procedural guidelines for implementation of a coordinated IPM program.

Scope and Application

The IPM Policy shall apply to all pest control activities by the City of Davis, including activities at public buildings and related facilities; grounds and open space; urban forestry, and other property owned or managed by the City of Davis and conducted by City staff and/or contractors. It is expected that all pest management on City property will adhere to industry best practices, reduce or eliminate pesticide applications to the maximum extent feasible, and include all reasonable measures to protect human and environmental health. It is further expected that all City employees monitoring or treating pest problems, or managing contractors who are conducting IPM activities on the City's behalf, are familiar with the content and principles of the policy, receive on-going annual training, provide accurate, well-documented records and conduct annual evaluations of the IPM program and practices.

Policy

The City of Davis, in planning for and implementing its pest management operations, shall:

1. assume that all pesticides (organic and conventional) are potentially harmful to the health of humans and the environment (ex. water quality and non-target species);
2. adhere to the tenets of IPM including focusing on long-term pest prevention or suppression, giving preference to reasonable non-pesticide alternatives such as cultural, mechanical and/ or biological control;

3. employ an IPM Specialist to monitor and assess pest populations, advise and oversee citywide IPM planning and pest management activities and contracts; and keep record of and report on city IPM activities;
4. pursue an organizational structure that allows the IPM Specialist to make recommendations on pest control that are independent of divisional operational constraints;
5. transition all parks and greenbelts to “green”/ least-toxic pest management;
6. ensure consistency and full compliance with federal, state and county regulatory requirements related to pest control;
7. contract with pest control contractors that utilize least-toxic pest control methodology and ensure contracts have language that upholds the IPM Policy and identifies damages for any violations of the Policy;
8. conduct Pesticide Hazard and Exposure Reduction (PHAER) analysis on all publicly accessible and heavily used areas such as parks, bike/ pedestrian paths, sidewalks, and greenbelts;
9. use pesticide risk assessment guidelines employed by the City and County of San Francisco to create and annually maintain a list of reduced-risk pesticides, and associated limitations for use, which may be applied as necessary within the City of Davis;
10. establish and coordinate a IPM Technical Advisory Committee to assist in creating and updating a Reduced-Risk Pesticide List, provide general guidance on the IPM Program, and ensure transitioning of all parks , greenbelts and other high use areas to “green”/ least-toxic pest management;
11. use a transparent pesticide use exemption process to justify variance from pesticide use restrictions and limitations. Exemptions shall only be considered when addressing health and safety issues, noxious pests, and/ or to test new reduced-risk pesticide products;
12. promote public transparency and education via noticing of all pest management activities, engaging residents with outreach and education regarding less toxic pest control methodology, and annual reporting to advisory commissions.

The goals of this policy are to:

1. Create awareness among City staff, contractors and citizens of IPM techniques and environmental stewardship.
2. Provide a means of educating all City maintenance crews and contractors to practice the most appropriate approach to managing pests on City property.
3. Work toward transitioning all parks, greenbelts and other high use areas to “green”/ least-toxic pest management.
4. Reduce and/or eliminate pesticides that pose known significant human or animal health, or environmental risks based on the best available scientific information.
5. Establish a program where pesticides categorized as having a reduced-risk to human and environmental health may be used within the City of Davis only after other

alternatives have been attempted and are ineffective. If pesticides are used, provide guidelines on safe storage, handling, use, and application.

IPM Procedure

Definitions

I. Biological Control - Biological technologies to manage unwanted pests. Examples of this type of control include, but would not be limited to, the use of pheromone traps for management of Indian meal moth in food storage/preparation areas, or beneficial insect release for control of certain types of weeds or invasive insects in landscapes.

II. Chemical Control - The use or application of a chemical pesticide (green or conventional) to manage pests.

III. Contractor - A person, firm, corporation, or other entity, including a governmental entity, which enters into a contract with the City of Davis.

IV. Cultural Control - The practice of modifying the growing environment to reduce the prevalence of unwanted pests. Examples include: irrigation practices, improved and reduced fertilization applications, proper mowing practices that include mulching, and regular aeration to improve the soil.

V. Green Park – A park, greenbelt, or high public use area where pest management is limited primarily to cultural, mechanical, and biological control methods. When chemical control methods are necessary, only "green"/ least-toxic (i.e. Tier 1) pesticides may be used.

VI. Green Pesticide - A material that is generally considered to have minimal adverse environmental or chronic health and safety impacts. Such chemicals are synonymous with Tier 1 chemicals identified on the Reduced-Risk Pesticide List. Some materials in this category contain strong acids and are not necessarily safer for the applicator.

VII. IPM - A decision-making process that analyzes, selects, and implements pest control strategies to prevent or control pest populations. IPM uses a "whole systems" approach that employs monitoring and extensive knowledge about pests, such as infestation thresholds, life histories, environmental requirements, and natural enemies to compliment and facilitate biological, cultural, mechanical and other natural control of pests. Chemical control methods are considered only when necessary.

VIII. Mechanical Control - Utilizes hand labor or equipment such as mowers, graders, weed-eaters, and chainsaws. Crack and crevice sealants and closing small entryways (e.g., around pipes and conduits) into buildings for insect and rodent management would also be mechanical methods.

IX. PCA - Pest Control Advisor: an individual licensed by the California Department of Pesticide Regulations according to Title 3, Article 5 of the California Code of Regulations. Only a licensed PCA, who is registered with the County Agricultural

Commissioner may provide written pest control recommendations for agricultural pest management, including parks, cemeteries, golf courses, and rights-of-way.

X. Pest - Fungus, insect, nematode, rodent, weed, or other form of terrestrial or aquatic life form that is injurious to human or farm animal health, or interferes with economic activities such as agriculture, public utilities and landscaping.

XI. Pesticide - Any substance, or mixture of substances, used for defoliating plants, regulating plant growth, or for preventing, destroying, repelling, or mitigating any pest, which may be detrimental to vegetation, humans, animals or structures.

XII. PHAER Zone - A strategy giving structure to the implementation process of the IPM policy in parks and greenbelts by allowing supervisors the needed flexibility in their management options and informing the citizens about the general level of pesticide hazard on a site-by-site basis. PHAER zones are designated as Green, Yellow and Special Circumstance Zones, with Green Zones providing the lowest potential for pesticide hazard and exposure. Each Zone has limitations based on the Reduced-Risk Pesticide List and associated product tiers.

XIII. Precautionary Principle - This states that in the absence of scientific consensus, if an action or policy has a suspected risk of causing harm to the public or environment, the burden of proving the action or policy harmless falls on those implementing the action or policy. The principle implies that there is a social responsibility to protect the public from exposure to harm, when scientific investigation has found a plausible risk. These protections can be relaxed only if further scientific findings emerge that provide sound evidence that no harm will result.

XIV. Reasonable Alternative - A feasible option for pest control that takes into account the environmental, economic, and social costs and benefits of the proposed choices.

XV. Reduced-Risk Pesticide - A material which has been assessed and identified as having a reduced hazard and exposure risk using a ranking system, best available science, and technical advisory body vetting.

XVI. QAC - Qualified Applicators Certificate authorizes and individual to apply pesticides according to Title 3, Article 3 of the California Code of Regulations. Applications may include residential, industrial, institutional, landscape, and right-of-way sites.

Regulation

The following regulations apply to the IPM program:

I. Pesticide Advisor and Application Licensing and Categories

Title 3, Article 3 of the California Code of Regulations requires that individuals who apply or supervise the application of pesticides possess a valid Qualified Applicator Certificate (QAC), issued by the Department of Pesticide Regulation (DPR). QAC certification requires that applicants take training coursework on, and test proficiently in, pesticide laws and regulations, basic principles of pest control, and at least one of the following pest control categories:

1. Landscaping
2. Right of Ways

3. Sewer Line Root Control

A new certificate may be valid for up to two years, depending on when the employee or contractor became certified. Each renewed certificate is valid for two years unless the employee or contractor renews late, in which case the renewal is valid for one year.

Once the employee or contractor passes the examination(s) and receives a certificate, he/she must accumulate a designated amount of approved continuing education (CE) hours. DPR will inform the employee or contractor of the number of approved CE hours they are required to complete. After the first renewal, he/she is required to accumulate at least 20 hours of approved CE hours every two years before certificate renewal. Four of the 20 hours must cover the topic of pesticide laws and regulations.

Similarly, Title 3, Article 3 of the California Code of Regulations requires that individuals who provide pest control recommendations concerning any pesticide use must possess a valid Agricultural Pest Control Adviser (PCA) License. PCAs must have a college degree with minimum coursework in Physical and Biological Sciences, Crop Health, Pest Management Systems and Methods, and Production Systems as well as journey level experience. PCA's are authorized to make pest control recommendation in categories in which they have been found to be qualified through an examination process. Categories include:

1. Insects
2. Mites and Other Invertebrates
3. Plant Pathology
4. Nematodes
5. Vertebrate Pests
6. Weed Control

Before working as a licensed PCA in any county, that individual must register with the County Agricultural Commissioner.

Written recommendations for all pesticide use must be made in writing. Each written recommendation must be signed and dated, with a copy of each written recommendation provided to the QAC prior to the application.

II. Stormwater Pollution Prevention - NPDES MS4 Permit

The City's Phase II MS4 Stormwater Discharge Permit requires that municipal operations include the following Best Management Practices (BMPs) in their pest management programs:

1. Evaluate pesticides, herbicides, and fertilizers used and application activities performed and identify pollution prevention and source control opportunities.
2. Implement practices that reduce the discharge of pesticides, herbicides and fertilizers. At a minimum the Permittee shall:
    - Implement educational activities for municipal applicators and distributors.
    - Implement landscape management measures that rely on non-chemical solutions, including:
        - Create drought-resistant soils by amending soils with compost;
        - Create soil microbial community through the use of compost, compost tea, or inoculation;
        - Use native and/or climate appropriate plants to reduce the amount of water, pesticides, herbicides and fertilizers used;
        - Practice grass-cycling on decorative turf landscapes to reduce water use and the need for fertilizers;
        - Keeping grass clippings and leaves away from waterways and out of the street using mulching, composting, or landfilling;
        - Preventing application of pesticides, herbicides and fertilizers during irrigation or within 48 hours of predicted rainfall with greater than 50% probability as predicted by National Oceanic and Atmospheric Administration (NOAA);
        - Limiting or replacing herbicide and pesticide use (e.g., conducting manual weed and insect removal);
        - Prohibiting application of pesticides, herbicides and fertilizers as required by the regulations DPR 11-004 Prevention of Surface Water Contamination by Pesticides enacted by the Department of Pesticide Regulation;
        - Reducing mowing of grass to allow for greater pollutant removal, but not jeopardizing public safety.
    - Collect and properly dispose of unused pesticides, herbicides, and fertilizers.
    - Minimize irrigation run-off by using an evapotranspiration-based irrigation schedule and rain sensors.

3. Record the types and amounts of pesticides, herbicides and fertilizers used in the permit area.

IPM Coordination

I. IPM Specialist

The IPM Specialist's primary function is to develop, review, and implement the City's IPM Program across all departments. The IPM Specialist shall be trained in the principles of low-risk IPM, safe application of pesticides, and alternatives to pesticide use. Responsibilities of the IPM Specialist shall include, but are not limited to, the following:

- Coordinate with city departments on weed and pest control issues
- Ensure that all City IPM activities adhere to local, county, state and federal regulations
- Record keeping, regulatory reporting and preparation and publication of the City's annual IPM report
- Development and coordination of the IPM Technical Advisory Committee
- Coordination of the Interdepartmental IPM Group
- Coordination of the development of departmental IPM plans
- Research, evaluate and make recommendations on IPM methods and materials
- assist with post-treatment monitoring/ evaluation
- Assist city departments with staff and contractor training needs
- Outreach to citizens regarding IPM
- Coordinate volunteer weed management projects.
- Maintain applicable license(s) with state and county regulators

II. IPM Technical Advisory Committee (IPM-TAC)

This group, coordinated by the IPM Specialist, will be composed of four to five City staff (IPM Specialist, Stormwater Program Coordinator, departmental liaisons), one member from each applicable City advisory body (liaisons from the Natural Resource [NRC], Recreation and Parks [RPC], Open Space and Habitat [OS&H] and Tree Commissions), and one to two academics (UC Davis pest control researchers). The pest control researchers will serve as advisors but have no approval/ voting authority. Final composition and authority of the IPM-TAC is subject to Council approval. This group will meet at least quarterly and advise on the City's IPM program. The primary functions of the IPM-TAC will be to help draft and annually maintain a Reduced-Risk Pesticide List, and help guide the transition of parks, greenbelts and other high public use areas to "green"/ least-toxic pest management.

III. Interdepartmental IPM Group

This group, coordinated by the City IPM Specialist, will include at least one liaison from each department or division involved with pest management and other interested city staff. The group shall meet at least quarterly and meetings will

include development of annual City IPM goals, review and evaluation of each department or division IPM plan, as well as opportunities for information exchange, education and cooperation (see Division Responsibilities Section for details on individual IPM plans). The interdepartmental IPM Group shall also review interdepartmental issues and make policy recommendations that advance the objectives of the IPM policy and reduce reliance on chemical pest control.

IV. Annual Reporting

The City IPM Specialist will compile the previous year's IPM data from all city departments and submit an annual report to the NRC. The report may also be presented to the RPC, OS&H, Tree Commission, and City Council if requested. The report will detail the previous year's IPM efforts and shall contain information listed in the IPM Implementation section. Each department using pest control methods shall submit their information through their department IPM liaison to the City IPM Specialist. The report will include a review of new IPM strategies as well as trends in IPM techniques over time.

IPM Implementation

The City assumes that all pesticides are potentially hazardous to human and environmental health. Therefore, reasonable non-pesticide alternatives shall be given preference over chemical controls, by following this implementation process. City staff will evaluate alternatives to chemical treatment, including the cost-effectiveness of the treatments. The following process shall be followed for all pest control activities:

I. IPM Planning

1. ID, Map, Monitor - The IPM Specialist, in coordination with each department or division considering pest control measures, shall collect baseline data on the pest ecosystem(s) to determine pest population(s) occurrence, size, density and presence of any natural enemy population(s); gather information on pest biology and different control techniques available; and document sensitive areas and conditions that may limit control options. Data shall be collected in a standardized manner that is repeatable. This information may be included in departmental or divisional IPM plans.

   Ranking, inventory, mapping, monitoring and evaluation are methods used for determining pest management priorities. Maps and inventories depict infestations in terms of pest species, size, location and threats to resources. Departments/divisions shall monitor infestations or pest populations and evaluate treatments over time to assess the effectiveness of various treatment strategies and their effects on target and non-target organisms. GIS mapping software may be a useful tool to database pest occurrence and track problem areas.

All monitoring methods and data shall be specified in the departmental or divisional IPM plan, systematically recorded, and available for review at the Interdepartmental IPM Review Group meetings. Departments shall coordinate and utilize standardized pest mapping protocols.

2. Establish Thresholds - To determine if treatment is warranted, an acceptable threshold level of treatment for each target pest and site should be established. Divisional IPM plans will contain the threshold levels for common pests, determined by individual work groups, in conjunction with the City IPM Specialist. In some instances, treatment may be required by federal or state law or address the concerns of citizens. The assessment will be based on the following:
    a. The tolerable level of environmental, aesthetic and economic damage as a result of the pest population(s) and the tolerable level of risk to human health as a result of the pest population(s); or
    b. The size or density of the pest population that must be present to cause unacceptable environmental, aesthetic and/or economic damage; and the size, density and type of pest population that must be present to create a human health risk.

II. Treatment

1. Treatment Selection and Timing Criteria - Upon determining that treatment is necessary, the following criteria should be used to help select the appropriate IPM treatment strategy:
    a. Consistent with PHAER analysis (See PHAER Analysis Section below)
    b. Least-disruptive of existing biological controls
    c. Least-hazardous to human health, including applicator
    d. Least-toxic to non-target organisms
    e. Least-damaging to the general environment
    f. If pesticides are used, consistent with the Reduced-Risk Pesticide list
    g. Most likely to produce a permanent reduction in the environment's ability to support target pests
    h. Cost-effectiveness in the short- and long-term

2. Treatment Strategies - Each department or division, in consultation with the IPM Specialist, will evaluate and select appropriate and effective treatments, based on site-specific requirements. Commitment to the most environmentally sound approach is expected, with non-chemical methods considered first. Prevention, cultural control, mechanical control, biological control and chemical control are the techniques used in IPM. In general, a

combination of treatments is more effective than a single approach. Departments and divisions are encouraged to seek out and experiment with innovative IPM treatments (and combinations of treatments) and share this information at the Interdepartmental IPM Review Group meetings. The following treatments are listed in the order in which they should be executed:

a. Prevention - This is the most effective pest management strategy. By reducing the capacity of the ecosystem to support target pest populations through design and appropriate management, the opportunities for pest establishment can be reduced or eliminated. Specific examples include the following:

    i. Use strategies that reduce the preferred harborage, food, water or other essential requirements of pests.
    ii. Use weed-free materials (ex. jute and coconut fiber mats, certified weed-free straw, low-no weed seed mixes, etc. for soil stabilization after construction projects or other soil disturbing activities.
    iii. Use landscape and structural design that is appropriate to the specific habitat, climate and maintenance the area will receive.
    iv. When designing projects, consider the potential impacts of pests and mitigate through the use of appropriate landscape design (water requirements, weed barriers, etc.).

b. Cultural - Cultural control is the use of management activities that prevent pests from developing due to enhancement of desired conditions. Specific examples are the following:
    i. Selection and placement of materials that encourages pest enemies and competitors.
    ii. Modification/ removal of pest habitat to reduce pest harborage, food supply and other life support requirements.
    iii. Vegetation management including irrigation, mulching, fertilization, aeration, seeding, pruning and thinning.
    iv. Waste management and proper food storage.
    v. Barriers and traps.
    vi. Heat, cold, humidity, desiccation or light applied to affected regions.
    vii. Prescribed grazing.

c. Mechanical - Mechanical control is accomplished by using physical methods or mechanical equipment to control pest infestations.
    i. Mowing or weed-whacking
    ii. Burning

iii. Hoeing or hand-pulling of weeds
iv. Trapping
v. Flooding

d. Biological - Biological controls include the introduction or enhancement of natural predator populations to target pests. Introduction of non-indigenous organisms has an associated risk factor and should be thoroughly evaluated prior to implementation and be consistent with county, state and federal regulation. Biological controls include:
   i. Conservation and augmentation of the pest's natural enemies
   ii. Introduction of host-specific enemy organisms

e. Chemical – Chemical control includes the application of reduced-risk pesticides to kill target pests. Pesticides are broken into six types:
   i. Herbicides kill, burn-down, or defoliate pest plant species
   ii. Insecticides kill or repel invertebrate pests
   iii. Rodenticides kill rodent pests
   iv. Fungicides kill pest molds and fungus
   v. Nematicides kill pest nematodes
   vi. Molluscicides kill slugs and snails

3. Post Treatment Monitoring/ Evaluation. The IPM Specialist will evaluate areas treated to determine if control practices were effective, and then relay this information to divisional IPM liaison or supervisor with additional actions to improve control or maintain desired results.

III. Record Keeping

1. Work logs shall be kept to record treatment elements such as the method(s) used and personnel hours spent implementing treatment at a given location (see II a. in the Departmental / Divisional Responsibilities Section for all record keeping elements). In addition, a log of public complaints (ex. pest management service level, policy violation, etc.) shall be kept.

IV. Public Education

1. Post annual reports and departmental plans on website.
2. Informational signs at pest management areas about management methods.
3. Provide IPM and less toxic pest management info at public events such as farmers market, arboretum plant sales, and community and Central Park garden events as well as environmental programs put on by the city.

4. Foster participation in community volunteer weed management projects (ex. Adopt-a-Park)
5. Support the Our Water Our World program to educate consumers about less toxic pest control options at retail stores that participate in the program.

V. Staff Training (See subsection III of Pesticide Use and Limitations Section)

VI. Project Review and Annual Reporting

The IPM Specialist shall present an annual report on the City's IPM program to the NRC, and may present to the RPC, OS&H Commission, or other Commissions and City Council if requested.

1. Annual report shall include a summary on everything in this Section, and include specific, measurable goals and objectives for the coming year for each Department/ Division.

Pesticide Use and Limitations

Pesticides will only be used as a final option in situations where other methods, upon assessment of the IPM Specialist, have proven to be ineffective or cost prohibitive (ex. does not work to control the pest or cannot be sustained due to budgetary or other constraints). The following general and specific practices shall be followed:

General

1. Precautionary Principal shall be applied whenever pesticides are considered for pest management.

2. When necessary, only those pesticides listed on the most recent annual Reduced-Risk Pesticide List may be considered for use. In rare cases, an exemption may be requested (See subsection II).

3. Prior approval of a Supervisor, IPM Specialist or their designee is required for all pesticide applications with a written recommendation issued by the IPM Specialist.

4. Applications shall be performed by or under the supervision of a qualified applicator and will avoid direct exposure to any person, animal or property on-site or adjacent areas.

5. Application(s) shall be made to time the treatment to the target species most susceptible stage.

6. Care shall be observed to prevent damage to non-target plants, especially when applying a non-selective herbicide.

Specific

1. No Tier 1 pesticides are to be applied in any City maintained playground, park, greenbelt, or sidewalk unless conditions call for control of a hazardous condition or noxious pest. Such a decision may be made by the IPM Specialist or division manager, with written justification, and approved by the department director (see subsection II below). In this case, the area would be closed until reentry is deemed safe. Tier 3 and 2 pesticides may be used in these locations as per specific use limitations indicated on the Reduced-Risk Pesticide List and PHAER zoning.

2. No pesticides shall be sprayed when weather conditions are:
   a. Winds in excess of 10 mile per hour
   b. Damp or foggy
   c. Rainy or within 48 hours of 50% probability rainfall event.
   d. Temperatures are below 40°F or above 95°F

I. Reduced-Risk Pesticide Evaluation

1. The City will use pesticide assessment methodology similar to the City of San Francisco's Department of the Environment to create a list of reduced-risk pesticides that are approved for use in the Davis IPM program. This approval for use is based on pesticide hazard and public exposure risk, need, and availability of alternatives. The following steps will be implemented in creating this list:

   a. Hazard Assessment - The IPM Specialist will create a list of pesticides that may be needed for pest control. Based on toxicity of active and other ingredients (if identified), the IPM Specialist will place a pesticide product into a hazard tier. The process and criteria for the hazard tier assessment are listed in Attachment A.

   b. Exposure Assessment - The IPM TAC reviews the list of pesticides assessed in step one and reviews/ discusses:
      - The human and environmental exposure potential based on product type, application method and location.
      - Product effectiveness. How well does it work on target pest?
      - Product need. Are there equally effective alternatives? If not, is this product the least-hazardous option for the application?

c. Populating the Reduced-Risk Pesticide List - Based on hazard and exposure assessments, the IPM TAC adds or removes products from the Reduced-Risk List. Products recommend for placement on the list are categorized in one of three ways:

- Least Restricted – Products that are generally the least hazardous pesticides on the list.
- More Restricted – Products have specific restrictions on allowable applications.
- Most Restricted – Pesticides that are considered the least-hazardous chemical alternative for a particular application, but pose the greatest concern to human or environmental health.

The IPM Specialist will present the proposed/ modified Reduced-Risk Pesticide List to the NRC annually for public comment and suggestions prior to final approval by the IPM TAC. An example Reduced-Risk Pesticide list for the City of Davis is provided in Attachment B. It must be noted that the example list is hypothetical, inclusive, and is based on initial chemical hazard assessment and staff estimation of exposure assessment. A final list is subject to review, modification and approval by the IPM TAC.

II. Exemptions and Justification

1. In rare cases, such as those which address public health and safety concerns, noxious pests, or the need to test new products, the IPM Specialist or a division manager may deem it necessary to use a pesticide that is not included on the Reduced-Risk Pesticide List; a pesticide that is included on the list but a variance in restrictions of application is required; and/ or a pesticide that is absent a recommendation from the IPM Specialist. In such cases, the following exemption process will be required:
   a. Contact the IPM Specialist to discuss pest issue, alternative control methods and desired exemption.

   b. Complete the Pesticide Exemption Request form (Attachment C) and submit to the Department Director for approval at least 4 business days prior to desired treatment. The form will also be submitted to the City Manager.

   c. **Exemptions will only be granted in cases of**:
      - Documented and justified need for the variance as it relates to public health and safety and/ or noxious pest control, including alternative control measures implemented and deemed ineffective or impractical; or

- Documented and justified need for trials/ tests, by the IPM Specialist, of new reduced risk products.

d. Approved exemptions and associated justifications shall be submitted to the IPM Specialist for their records and entry into in an active exemptions list that is available for public review on the City website. This list shall be updated as soon as possible after exemption approval and prior to site posting and application.

e. Exemptions and detailed justifications shall be included in annual reporting to advisory commissions.

Exemptions will be for a one-time application and must be renewed for additional applications.

III. Training

1. Certified Applicator - Any person applying pesticides must have pesticide safety training prior to the use of each pesticide, regardless of toxicity. Training must be updated annually. A record must be made of each employee applying pesticides, and evidence of training certified by the trainer/supervisor. Copies of the record form will be kept by the employee and the City department, and be available to local and state officials.

2. Training requirements - Training must be performed by a qualified person and cover the following for each pesticide handled:
    - Information on the pesticide label concerning human health effects
    - Hazards of the pesticide, including acute and long-term effects
    - Pesticide poisoning symptoms and routes pesticides can enter the body
    - Emergency first aid and how to get emergency medical care
    - Routine and emergency decontamination procedures
    - Need for, limitations, use, and cleaning of personal protective equipment (PPE)
    - Prevention, recognition and first aid for heat-related illnesses
    - Safe procedures for handling pesticides, including engineering controls
    - Environmental concerns, such as drift and runoff
    - Warnings against taking pesticides home
    - Regulatory requirements, including Safety Data Sheets (SDS) and Pesticide Safety Information Series (PSIS)
    - Purpose and requirements of medical supervision, when applicable

- Location of hazard communication information
- Employee rights

IV. Application Documents

1. Any person applying a pesticide on City of Davis property must have in their possession the following documents:
    - Pest control recommendation and/or exemption justification
    - Pesticide label
    - Pesticide SDS
    - Medical Emergency Contact Information (posted at worksite or in vehicle)

V. Violation Remediation

1. All employees of the City of Davis who have been trained to apply pesticides may be required to do so as part of their regular duties. Those who possess a QAC are subject to discipline by the DPR via the Yolo County Agricultural Commissioner if they violate various DPR regulations such as improper safety gear, application inconsistent with labels, improper posting, etc. Those employees will also be subject to the City of Davis Personnel Rules and Regulations as outlined in this paragraph below. Those employees who do not possess a QAC will be reprimanded by City of Davis if they violate DPR regulations or City policy. The disciplinary actions for violations will be those provided for in the City of Davis Personnel Rules and Regulations Article VII, sections 7.4, 7.5, & 7.6. Pest control contracts with the City will include penalties (up to contract termination) for contract or policy violation.

VI. Pesticide Storage, Transportation and Disposal

1. Storage - Pesticides used by the City shall be stored in a consolidated manner, where practical. Pesticide storage locations must be posted with visible warning notices legible from a distance of 25 feet from any direction in English and Spanish.

2. Transportation - Pesticides shall not be transported in the same compartment with persons, food or feed. Containers shall be secured to the vehicle during transport in a manner that will prevent spillage into or out of the vehicle.

3. Empty Containers - Empty pesticide containers, other than bags, must be rinsed and drained into the spraying equipment on site by the applicator, at the time of use, using the triple rinse method. Rinse solution should be applied to the treated areas.

4. Required Labels - All pesticide nurse containers must be labeled with the following information:
    - Name of pesticide
    - Category of pesticide
    - EPA registration number
    - Active ingredient
    - Entity

5. Spills - Small spills of pesticides shall be cleaned up immediately, with absorbent material such as cat litter. For major toxic pesticide spills, contact Public Works and request Emergency Response Personnel. Note what pesticide it is, category, and if it is threatening to enter the storm drain system.

PHAER Analysis

The PHAER zone model will be tailored to all City of Davis parks, greenbelts and bike/ pedestrian paths. This model is based on the Pesticide Hazard and Exposure Reduction (PHAER) zone system (Boise 2004, Attachment D). The objectives of the PHAER zone system are to identify concrete reduction goals (green zones), establish a measurable timeline for risk reduction activities (transition to green zones) and to communicate to the public the general level of pesticide hazard on a site-by-site basis through multi-colored zone maps.

- Only Tier 3 pesticides may be used in areas with high traffic and exposure to people and pets.
- Areas with less traffic and exposure can be treated with Tier 3 or 2 pesticides, if needed.
- Tier 1 pesticides are the most restricted and may only be used in areas with no to low public exposure.

In rare cases, the IPM Specialist or a division manager may deem it necessary to use a pesticide that is not included on the Reduced-Risk Pesticide List; is included on the list but a variance in restrictions of application is required, or is inconsistent with the IPM Specialist's pest management recommendation. Such exemptions must be approved as detailed in the above Exemptions and Justifications section (II.1.c).

PHAER analysis will be conducted and implemented at all heavily used public areas such as parks, greenbelts and bike/ pedestrian paths. Consideration for PHAER analysis should be given for other areas that have unique sensitivities or exposure concerns, as necessary.

Departmental/ Divisional Responsibilities

The following departments/divisions and their contractors conduct pest control operations:

- Parks and Community Services Department
    - Parks, playgrounds and greenbelts

- Downtown landscaping
  - Parking lots and structures
  - E Street Plaza
  - Hunt Boyer Mansion
- Playfields Sport Complex

- Community Development and Sustainability Department
  - Open Space Division:
    - South Fork Preserve, Putah Creek Park Way, Wildhorse and El Macero Agricultural buffers, Willow bank, Lincoln Hwy, John Jones Water tank, Mace Ranch Passive Recreation Area, F and Anderson, and other properties as directed.

- Public Works Department
  - Transportation Division:
    - Roadside weed abatement, bike lane maintenance, traffic islands and bulb outs weed control.
  - Stormwater Division:
    - Channels, retention ponds, drainage ditches and pumping facilities.
  - Wastewater Division:
    - Treatment Plant, overland flow, Davis Wetlands, lift stations and sewer line root control
  - Facilities Division:
    - City facilities (i.e. fire stations, office and community buildings, pools)

1. Departmental/ Divisional IPM Plans - Each department or division, and any others using pest control methods in the future, shall do so under the guidance of the IPM Policy, these procedures, and a departmental or divisional IPM plan. This plan shall be developed by the City IPM Specialist with input from department or divisional staff, and approved by the division manager or department head. It shall be the responsibility of departmental or divisional staff to help implement these plans. Plans will be reviewed and adjusted annually and undergo a full update at a minimum of every five years. Each department shall designate at least one staff member as the departmental/divisional IPM liaison to the Interdepartmental IPM Review Group.

2. Record Keeping and Reporting - Each department, division, work group, and contractor shall keep accurate records of all IPM treatments used and the results. Information on all pest management shall include how, when, where

and why the treatment was applied and the name of the person(s) applying the treatment (see example report form in Appendix E). The following information shall be recorded:

a. Target pest
b. Pest population levels or injury thresholds for treatment
c. Treatment selection criteria with final treatment decision (IPM hierarchy checklist)
d. Area treated (including type of location and size of area)
e. Personnel hours (including volunteer) and material costs for treatment
f. If pesticides are used, record the following:
    i. Pest control treatments applied prior to using pesticide (ex. prevention, mechanical, cultural, biological)
    ii. Pesticide (including product trade name, active ingredient, EPA toxicity category and Reduce-Risk Pesticide List hazard tier)
    iii. Quantity of product used
    iv. Treatment method used (i.e. spray, injection)
    v. Location of application
    vi. Time and date of pesticide application
    vii. Name(s) and license number(s) of Pesticide Applicator(s)
    viii. Name of the department contact authorizing work
    ix. Material Safety Data Sheets (MSDS) and labels for all pesticides used

Application records shall be made available to the public upon request in accordance with all applicable state laws governing public access to information.

The above information will be submitted to the City IPM Specialist monthly, as the basis for the monthly pesticide use reports that are submitted to the County Agricultural Commissioner. This data is also compiled for the Annual IPM Report. The City IPM Specialist will review pest management treatments with city departments to evaluate the successes and failures of such treatments, and work with each department to plan more efficient and effective pest management strategies.

3. Public Notification
    a. *Pesticide Noticing* - To inform the public on applications in areas heavily visited by the public: Public Works, Community Development and Sustainability, and Parks and Community Services Department staff, or contractors who apply a pesticide on City of Davis property, must submit a completed Pesticide Application Information form to a Supervisor no less

than 48 hours prior to the desired day of the proposed pesticide application. The information provided includes the pesticide to be applied, the area of the proposed application, and the date of the proposed application. The IPM Specialist provides the information to the public via the pesticide hotline, city webpage, and other appropriate outreach media. If the application is cancelled for any reason, the notification must be completed again, prior to rescheduling the proposed application. Approved and active pesticide use exemptions shall be listed on the City IPM webpage.

Site Posting - All pest management activity should include site notification as to what is being controlled, why and how. This includes activities such as habitat modification, solarization, irrigation adjustment, mulching, etc. When a decision is made for a pesticide application in a heavily visited area such as a park or greenbelt, a notice of a pesticide application must be physically posted at the proposed site at least 24 hours before the treatment. The information on this public notice should have the name of the pesticide, location and the date of the scheduled application, as well as staff contact information. Once the treatment is complete, the sign should remain for at least 24 hours to inform people that the posted area was treated. Small freestanding informational signs indicating that an application is in progress must be placed at each end of the area under treatment, no more than 300 feet apart and moved along as the material dries. This signage shall include appropriate pesticide awareness and shall not be removed from the site until pesticide spray has dried.

4. Contractor Notification
   a. When bidding out contractual work for pest management, notify all bidders of the IPM Policy and include its guidelines in bid specifics. Contractors are encouraged to submit proposals that include nonchemical pest control methods. Proposal that include alternative control measures will receive higher ranking during the proposal review process. Contracts must include damages (up to contract termination) for any violation of the Policy.

5. Personal Protective Equipment
   The City of Davis will provide personal protective clothing and equipment (PPE) and related training to City personnel engaged in pest management on City of Davis property, including PPE for pesticide use as stated on the chemical manufacturer's label. The IPM Handbook also provides information on

appropriate PPE and should be kept up to date and in work vehicles for reference. Contractors are required to provide their own PPE.

Attachment A

Hazard Tier Review Process (Adopted from the City of San Francisco Department of the Environment's guidelines)

Pesticide products are assigned a hazard tier ranking after evaluating the hazard indices listed in the following section. The product is assigned a ranking of High, Moderate, or Low for each characteristic based on the ranges or values shown in Table 3 below. If any of the criteria are in the High category, the product is placed in Tier 1. If the chemical does not have any criteria in the High category, but does have at least one criteria in the Moderate category, the product is placed in Tier 2. Products with criteria only in the Low category are placed in Tier 3. See Table 1 for a summary of rankings, and Table 2 for a summary of data sources.

Table 1: Tier Rankings Derived from Hazard Screening

TIER	DEFINITION
Tier 1	Highest Concern. At least one criterion in Table 3 placed in highest hazard category
Tier 2	Moderate concern. At least one criterion in Table 3 placed in the moderate hazard category
Tier 3	Lowest concern. No criteria flagged for Tiers 1 or 2

Table 2: Hazards Evaluated and Data Sources Used

HAZARD	SOURCE(S) OF DATA
Acute toxicity	Product label: Signal word (Caution, Warning or Danger)
Restricted use	Product label: Use restricted to professional applicators
Cancer	Cancer classification of ingredient by US EPA, State of California (Proposition 65 list),[20] National Toxicology Program (Report on Carcinogens),[21] or the International Agency for Research on Cancer (IARC Monographs)[22]
Reproductive or Developmental toxicity	Designation of ingredient by the State of California (Proposition 65 list[20]), US EPA on the Toxics Release Inventory list[1]
Endocrine disruption	Designation of ingredient by the European Commission[2] or included in the book *Environmental Endocrine Disruptors* by Lawrence H. Keith[3]
Water pollution potential	Ingredient listed under Clean Water Act Section 303(d)[4]
Hazards to birds	Product label or MSDS: Presence and wording of bird hazard statement or LD_{50} or LC_{50} of product (if available)
Hazards to aquatic life	Product label or MSDS: Presence and wording of fish hazard statement or LC_{50} of product (if available)
Hazards to bees	Product label or MSDS: Presence and wording of bee hazard statement or LD_{50} of product (if available)
Hazards to other wildlife	Product label or MSDS: Presence and wording of wildlife hazard statement or LD_{50} or LC_{50} of product (if available)

Soil mobility	Soil mobility score (Groundwater Ubiquity Score or GUS) calculated from physical properties or CA DPR's assessment of groundwater contamination potential using physical properties. Physical property data available in the OSU Pesticide Properties Database,[5] CA DPR Pesticide Contamination Prevention Act Status Reports,[6] or the EU Footprint Pesticide Properties database[7]
Persistent, bioaccumulative, toxic substances (PBTs)	US EPA Waste Minimization priority chemical[8] or listed by the European Union as fulfilling PBT or Persistent Organic Pollutant (POP) criteria.[9]

Table 3: Criteria for Pesticide Hazard Tier Ranking

HAZARD	HIGH	MODERATE	LOW
Signal word	Danger	Warning	Caution or none
Restricted use	Yes	-	No
Cancer (see Table 1)	Known or Probable	Possible	Unclassified, Not Likely, not listed
Reproductive or developmental toxicity	Listed	-	Not listed
Endocrine disruption	EC category I or II	-	EC category III, not listed
Water pollution	303(d) listed	-	Not listed
Hazard to birds	"Extremely toxic", "highly toxic" or high product toxicity based on LD_{50} or LC_{50} (see below)	"Toxic" or moderate product toxicity based on LD_{50} or LC_{50} (see below)	No warning language or low product toxicity based on LD_{50} or LC_{50} (see below)
Hazard to aquatic life	"Extremely toxic", "highly toxic" or high product toxicity based on LC_{50} (see below)	"Toxic" or moderate product toxicity based on LC_{50} (see below)	No warning language or low product toxicity based on LC_{50} (see below)
Hazard to bees	"Extremely toxic", "highly toxic" or high product toxicity based on LD_{50} (see below)	"Toxic" or moderate product toxicity based on LD_{50} (see below)	No warning language or low product toxicity based on LD_{50} (see below)
Hazard to wildlife	"Extremely toxic", "highly toxic" or high product toxicity based on LD_{50} or LC_{50} (see below)	"Toxic" or moderate product toxicity based on LD_{50} or LC_{50} (see below)	No warning language or low product toxicity based on LD_{50} or LC_{50} (see below)
Soil mobility	-	GUS ≥2 or DPR classifies AI and exceeding SNVs	GUS ≤2 and not listed by DPR as exceeding SNVs
PBT	Listed	-	Not listed

Details on Hazard Indices Used in the Evaluation

Acute Toxicity
EPA assigns every pesticide product to a hazard category based on the results of acute toxicity testing of the full product including inert ingredients. The testing includes the single dose required to cause death in test animals via ingestion, inhalation, and skin absorption. The testing also considers the degree of skin and eye irritation or damage. Based on the results of these tests, EPA assigns the product to a hazard category and requires a signal word such as Caution, Warning, or Danger to be placed on the label. Danger indicates the highest hazard, Warning indicates moderate hazard, and Caution indicates a lower hazard.

Restricted Use
Some pesticides are restricted to use only by certified pesticide applicators and are not available to the general public because of high toxicity, particularly hazardous ingredients, or environmental hazards. Pesticides designed as restricted use are so indicated on the product label.

Cancer (known ingredients only)
Various state, federal, and international organizations evaluate or list chemicals for carcinogenicity, their potential to cause cancer. [19, 20, 21, 22] Due to the expense and difficulty of such evaluations, not all agencies have reviewed the same chemicals and not all reach the same conclusions on a given chemical. For this reason, we use the ratings of several agencies whenever possible. These ratings indicate the strength of the scientific evidence that a particular chemical can cause cancer in humans, but they do not consider the potency of the chemical, i.e. the number of cancers that will result from a standard level of exposure to a population. The various agencies use different words to describe the strength of evidence, such as possible, probable, likely, known, etc. In order to simplify the rating, we have assigned the various phrases used by the different agencies to a standard phrase used in the Hazard Tier assessment (see Table 4). The tier rating is based on the highest likelihood assigned by any agency that has evaluated the chemical.

Table 4: Standardized Cancer Rankings Used in the Hazard Tier Assessment

ORGANIZATION	ORGANIZATION RATING	STANDARDIZATION FOR HAZARD TIER
US EPA[19]	**Group A**: Known Carcinogen	Known or Probable
	Known/ Likely	Known or Probable
	Likely to be Carcinogenetic to Humans	Known or Probable
	Group B: Probable Human Carcinogen	Known or Probable
	B1: Sufficient evidence of carcinogenicity from animal studies with limited evidence of carcinogenicity from epidemiologic studies in humans	
	B2: Sufficient evidence of carcinogenicity from animal studies with inadequate or no data from epidemiologic studies in humans	
	Group C: Possible Human Carcinogen	Possible
	Likely to be Carcinogenic to Humans at High Doses, but Not Likely at Low doses	Possible
	Suggestive Evidence of Carcinogenicity to Humans	Possible
	Group D: Not classifiable as to human carcinogenicity	Unclassifiable
	Data are inadequate for an assessment of human carcinogenic potential	Unclassifiable
	Group E: Not Likely to be Carcinogenetic to Humans	Not Likely
IARC[22]	**Group 1**: Carcinogenic to Humans	Known or Probable
	Group 2A: Probably Carcinogenic to Humans	Known or Probable
	Group 2B: Possibly Carcinogenic to Humans	Possible
	Group 3: Unclassifiable as to Carcinogenicity to Humans	Unclassifiable
	Group 4: Probably not Carcinogenic to Humans	Not Likely
NIH/ NTP[21]	Known to be a Human Carcinogen	Known or Probable
	Reasonably Anticipated to be a Human Carcinogen	Known or Probable
	Reviewed but not listed	Not Listed
Prop 65[20]	Known to the State of California to Cause Cancer	Known or Probable

Reproductive/Developmental Toxicants (known ingredients only)

Known ingredients in the products are screened against the State of California lists of known reproductive and developmental toxicants,[20] the US EPA Toxics Release Inventory (TRI) chemical hazard list,[32] or the list from the National Toxicology Program's Health Assessment and Translation (formerly the Center for Evaluation of Risks to Human Reproduction).[33]

Endocrine Disruptors (known ingredients only)

Under the Food Quality Protection Act, the EPA is required to screen pesticide ingredients for endocrine system effects. Until that screening is done, a comprehensive list of endocrine disruptors will not be available. For purposes of this screening, we used the list of endocrine disruptors compiled by the European Commission[24] and in the book Environmental Endocrine Disruptors by Lawrence Keith.[25] Chemicals on the EU list are classified for both humans and wildlife as Category I: evidence for endocrine disruption in living organisms, Category II: evidence of potential to cause endocrine disruption, or Category III: low exposure concern, no scientific basis for inclusion, or insufficient information. The list of endocrine disruptors will likely be expanded at a later date, when US EPA publicizes the results of the Endocrine Disruptor Screening Program.

Water Pollution (known ingredients only)

Section 303(d) of the federal Clean Water Act requires states to compile a list of water bodies with excessive contamination. The list of impaired water bodies in the area where the product will be used (available from the US EPA 303(d) web site[34]) is searched for pesticide active ingredients. Based on a site-specific analysis of the water bodies, products are assessed as to whether they contain priority 303(d) pollutants for that area.

Hazards to Birds, Aquatic Life, Bees, and Other Wildlife

The US EPA requires particular hazard warning statements on pesticide product labels depending on the toxicity of the active ingredients and the formulated product to particular off-target species, evidence that adverse effects have occurred, and the use for which the product is intended. The hazard assessment is based on whether such warnings appear on the specific product label or the acute toxicity of the product as described in the MSDS. This toxicity is expressed as an LC_{50} (or LD_{50}) that is the lethal concentration (or dose) to 50% of the test organisms in a laboratory test. The criteria for defining toxicity for different species are shown in Table 5 below.

Table 5: Toxicity Reference Values of Terrestrial and Aquatic Wildlife

Category	Mammal and Bird LD_{50} (mg/kg)[35]	Mammal and Bird LC_{50} (mg/kg of food)[36]	Aquatic LC_{50} (mg/L)[36]	Bee LD_{50} (g/bee)[37]
High Toxicity	< 50	< 500	< 1	< 2
Moderate Toxicity	50-500	500-1,000	1-10	2-11
Low Toxicity	>500	>1,000	>10	>11

Mobility in Soil (known ingredients only)

The potential for ground-water or surface-water pollution by pesticides is dependent on many factors, including persistence of the ingredients, water solubility, soil binding, amount of rainfall or irrigation, soil properties, amount and frequency of applications, soil slope, vegetation present, proximity to ground- or surface-water, etc. The hazard assessment only considers the properties that relate strictly to the pesticide itself. The potential for a pesticide moving to surface water or groundwater is thus assessed in one of three ways:

1. The Ground-water Ubiquity Score (GUS) is an empirically derived index that relates pesticide persistence and soil binding to mobility. The GUS index is defined mathematically as:

   $$GUS = \log_{10}(\text{half-life}) \times [4-\log_{10}(K_{oc})]$$

   where K_{oc} is the soil sorption coefficient and half-life is the soil half-life in days. Information on pesticide K_{oc} values can be found in the OSU Pesticide Properties database,[27] the California Department of Pesticide Regulation groundwater Status Reports,[28] or in the EU Footprint Pesticide Properties database.[29]

   A pesticide movement rating ranging from "extremely low" to "very high" has been assigned to the numerical values by the researchers in the OSU Extension Pesticide Properties Database.[27] The values are shown in Table 6.

   Table 6: Pesticide Mobility in Soil as a Function of Groundwater Ubiquity Score

GUS VALUE	PESTICIDE MOVEMENT RATING
<2	Low
>2.0-3.0	Moderate
>3.0	High

2. The California Department of Pesticide Regulation (DPR) lists pesticide active ingredients as potential groundwater contaminants when physical properties exceed Specific Numeric Values (SNVs). In order for a chemical to be listed, one of the following must be true:

   Water solubility: > 3 ppm (mg/L), or
   Soil adsorption coefficient (Koc): < 1,900 cm3/g

   AND one of the following must be true

   Hydrolysis half-life: > 14 days, or
   Aerobic soil metabolism half-life: > 610 days, or
   Anaerobic soil metabolism half-life: > 9 days

   The list of pesticides that exceed SNVs is available from DPR's annual Groundwater Status Reports.[28]

3. In addition to the GUS index and DPR's assessment, information on pesticide water contamination potential is noted from product label warnings. EPA requires two levels of warnings for products with characteristics that have been determined to result in likely contamination of groundwater from use as labeled. A lower level of warning is required if no actual detections have occurred or no field studies have been done. A higher level of warning is required if detections have occurred or field studies have shown that the chemical leaches. For purposes of the initial screening, the presence of either warning is considered an indication that the chemical has high mobility. In rare cases where a label ground-water advisory occurs but the GUS index or DPR assessment did not indicate high mobility, the label advisory is given priority.

Pesticides that have high soil mobility according to the criteria above, but are not otherwise toxic or bioaccumulative are classified as Tier 2.

Persistent, Bioaccumulative, Toxic Chemicals (PBTs)

In recent years much attention has been paid to toxic chemicals that persist in the environment and bioaccumulate. PBTs pose a serious threat because they can build up in ecosystems, wildlife, and humans even when deposited slowly. Many organizations including the United Nations, International Joint Commission on the Great Lakes, U.S. EPA, and Washington State Department of Ecology have proposed strategies to reduce or eliminate them. The list used for this evaluation is EPA's Waste Minimization Priority Chemicals list or listed by the European Union as fulfilling PBT or Persistent Organic Pollutant (POP) criteria. New lists will be added as more information becomes available.

References

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[3] Keith LH. 1997. *Environmental Endocrine Disruptors: A Handbook of Property Data*. Wiley Interscience (New York, 1997)

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[37] US EPA 2012. *Label Review Manual, Chapter 8: Environmental Hazards*. http://www.epa.gov/oppfead1/labeling/lrm/

Attachment B

Preliminary* Reduced-Risk Pesticide List for City of Davis

PRODUCT NAME	TYPE	INGREDIENT	HAZARD TIER	USE LIMITATION TYPE	POSSIBLE USE LIMITATIONS
Arena	Insecticide	Clothianidin	Most Hazardous (Tier I)	Most limited	No use in green PHAER zones. Significant ecological toxicity- **phase out and find alternative**
Cayuse Plus	Adjuvant	Ammonium sulfate, Ethylene glycol	Most Hazardous (Tier I)	More limited	No use in green PHAER zones.
Direx	Herbicide (Pre emergent)	Diuron	Most Hazardous (Tier I)	Most limited	No use in green PHAER zones. Significant human and ecological toxicity- **phase out and find alternative**
Fusilade II	Herbicide (Grass selective)	Fluazifop p Butyl	Most Hazardous (Tier I)	Most limited	No use in green PHAER zones. Significant human and ecological toxicity- **phase out and find alternative**
Garlon 4 Ultra	Herbicide	Triclopyr, butoxyethyl ester 60.45%	Most hazardous (Tier I)	Most Limited	No use in green PHAER zones. Use only for targeted treatments of high profile or highly invasive exotics via dabbing or injection. May use for targeted spraying only when dabbing or injection are not feasible. **HIGH PRIORITY TO FIND ALTERNATIVE**
Goal 2XL	Herbicide	Oxyfluorfen	Most Hazardous (Tier I)	Most limited	No use in green PHAER zones. Targeted treatment of WWTP OLF process. **HIGH PRIORITY TO FIND ALTERNATIVE**.
Malaice	Insecticide	Imidacloprid	Most Hazardous (Tier I)	Most limited	No use in green PHAER zones. Significant ecological toxicity- **HIGH PRIORITY TO FIND ALTERNATIVE**
Roundup Custom	Herbicide	Glyphosate	Most Hazardous (Tier I)	Most Limited	No use in green PHAER zones. Other limitations: For aquatic uses, use for emergent plants in ponds, lakes, drainage canals, and areas around water or within watershed areas.

PRODUCT NAME	TYPE	INGREDIENT	HAZARD TIER	USE LIMITATION TYPE	POSSIBLE USE LIMITATIONS
Roundup Pro	Herbicide	Glyphosate	Most Hazardous (Tier I)	Most Limited	No use in green PHAER zones. **Do not use on over or near water.**
Snap Shot	Pre Emergent herbicide	Trifluralin Isoxaben	Most Hazardous (Tier I)	Most limited	No use in green PHAER zones. Limited to areas of low public access
Turflon Ester	Herbicide	Triclopyr, butoxyethyl ester 61.6%	Most hazardous (Tier I)	Most Limited	No use in green PHAER zones. Targeted treatment of WWTP OLF process. **HIGH PRIORITY TO FIND ALTERNATIVE.**
Volunteer	Herbicide	Clethodim	Most Hazardous (Tier I)	Most limited	Subject to "Limitations on most hazardous pesticides". **Do not use on over or near water.**
Activator 90	Adjuvant	Alkylphenol ethoxylate	More Hazardous (Tier II)	More limited	Ok for most applications. Avoid non-target exposure.
Capstone	Herbicide (Broadleaf selective)	Aminopyralid	More Hazardous (Tier II)	More limited	Ok for most applications. Avoid non-target exposure. **No use over/ near water.**
Choice	Adjuvant	Propionic acid ammonium salt, Ammonium sulfate	More Hazardous (Tier II)	More limited	Ok for most applications. Avoid non-target exposure.
Final - San -O	Herbicide	Ammoniated Soap of fatty acid	More Hazardous (Tier II)	More limited	Ok for most applications. Avoid non-target exposure.
Liberate	Adjuvant	Lecinthin, methyl esters of fatty acids, alcohol ethoxylate	More Hazardous (Tier II)	More limited	Ok for most applications. Avoid non-target exposure.
Milestone	Herbicide	Aminopyrali, trii-sopropanola mine salt (5928) 40.6%	More hazardous (Tier II)	More Limited	For invasive species in natural areas or parklands where other alternatives are ineffective, especially for invasive legumes and composites such as yellow star thistle and purple star thistle.

PRODUCT NAME	TYPE	INGREDIENT	HAZARD TIER	USE LIMITATION TYPE	POSSIBLE USE LIMITATIONS
MSO	Adjuvant	Methylated vegetable oil, alcohol ethoxylate, phosphatidyl choline	More Hazardous (Tier II)	More limited	Ok for most applications. Avoid non-target exposure.
R-11	Adjuvant	Alkylphenol ethoxylate, butyl alcohol, dimethylpoly siloxane	More Hazardous (Tier II)	More limited	Ok for most applications. Avoid non-target exposure.
Razo-rooter	Herbicide (sewer root intrusion)	Diquat dibromide	More Hazardous (Tier II)	More limited	Limited to sewer line root control.
Sapphire	Herbicide	Penoxsulam	More hazardous (Tier II)	More Limited	Ok for most applications. Avoid non-target exposure. **No use over/ near water.**
Scythe	Herbicide	Pelargonic Acid	More Hazardous (Tier II)	More limited	Ok for most applications. Avoid non-target exposure.
Sedge-hammer	Herbicide (Nutsedge selective)	Halosulfuron methyl	More Hazardous (Tier II)	More limited	Ok for most applications. Avoid non-target exposure. **No use over/ near water.**
Suppress	Herbicide	Capric Caprylic Acids	More Hazardous (Tier II)	More limited	Ok for most applications. Avoid non-target exposure.
Transline	Herbicide	Clopyralid	More Hazardous (Tier II)	More limited	For invasive species in natural areas or parklands where other alternatives are ineffective, especially for invasive legumes and composites such as yellow star thistle and purple star thistle.
Telar	Herbicide	Chlorsulfuron	More Hazardous (Tier II)	More limited	For invasive species in natural areas or parklands where other alternatives are ineffective, especially for invasive pepperweed.

* Inclusive list based on chemical hazard assessment of existing pesticide inventory with staff assumptions on human and environmental exposure risk. This list is not final and requires review, modification and approval of the IPM TAC.

Attachment C

Pesticide Exemption Form

This form is to be used to request an exemption for use of a pesticide product that is: a) not included on the Reduced-Risk Pesticide List, b) included on the list but a variance in restrictions of application is desired, or c) absent a recommendation from the IPM Specialist. The form shall be submitted to the department director for approval at least 4 days in advance of desired application. The IPM Specialist will post the exemption data on the City's website at least 48 hours prior to application.

Applicant Information

Name_____

Department/ Division_____

Phone_____

Email_____

Pesticide

Date(s) of Proposed Use_____

Product Name_____

Active Ingredients_____

EPA Registration #_____

Pesticide Type
(Insecticide, Herbicide, Fungicide, etc.) _____

Use Category (Approved-least hazardous/ Limited Use-more hazardous/ Limited Use Special Concern-Most hazardous/ Not Listed)_____

+ Attach product Label and MSDS Sheets

Use Location

Street Address_____

Detailed location on
site_____

Justification

Target Pest_____

Date discussed with IPM Specialist_____

Justification for Use

_____
_____
_____
_____
_____
_____

Explanation of Alternative Controls Tried

_____
_____
_____
_____
_____
_____
_____

Strategies to Prevent Future Exemptions

_____
_____
_____
_____
_____

Additional Comments

_____
_____
_____

Department Director Approval: _____ Date:_____

City Manager Approval: _____ Date:_____

Attachment D

Pesticide Hazard and Exposure Reduction Analysis

PHAER Zones

PESTICIDE HAZARD AND EXPOSURE REDUCTION (*PHAER*) ZONES IN THE LANDSCAPE

A guidebook for schools, parks, childcare providers, landscape professionals and environmental managers.

Phil Boise
Urban / Ag Ecology
Consulting Services
Gaviota, CA

October 2004
v 1.2

PHAER Zones

Pesticide Hazard And Exposure Reduction (PHAER) Zone System for Landscapes
V 1.2

Author

Phil Boise
Urban / Ag Ecology Consulting Services

Editing and Formatting

Jana Carey
Masters of Environmental Science and Management
Bren School, University of California, Santa Barbara

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Temporary website: www.home.earthlink.net/~phaerzones

Contact Information:

Phil Boise
Urban/Ag Ecology Consulting Services
41 Hollister Ranch, Gaviota CA 93117
pboise.ipm@earthlink.net

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Karl Bruskotter Prog. Specialist, Santa Monica Dept. of the Environment

David Chatfield Executive Director, Californians for Pesticide Reform

Jonathan Cook UCSB Associate Director of Facilities Landscape, Custodial, & Environmental Services

Jeff Cope Assistant Director, City of Santa Barbara Parks & Recreation Department

Karen Feeney Director of Community Programs, Community Environmental Council

Glenn Franklin Parks Services. Manager, City of Santa Maria Recreation & Parks Dept.

Julie Hendricks Director of Facilities, Santa Barbara City College

Debbie Raphael Program Manager, San Francisco Department of the Environment Toxics Reduction

Phil Rossi IPM Coordinator, San Francisco Recreation & Park Department

Deanna Simon Toxics Reduction Specialist, San Francisco Department of the Environment

Jay Sullivan Director of Maintenance, Operations, Transportation, Goleta Union School District

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Executive Summary

The Pesticide Hazard and Exposure Reduction (PHAER) Zone System arose out of a need for a standardized, results-based reduced-risk pest management strategy, and addresses several common challenges faced by many Integrated Pest Management (IPM) programs.

Decision and policy makers seek a way to measure progress towards risk reduction goals, grounds managers need flexibility in their management options, the community is entitled to information about the general level of pesticide hazard that could be present on a site-by-site basis, and children and the environment deserve the highest degree of safety possible.

The PHAER Zone System establishes management zones on each site based upon the unique risk reduction goals of individual jurisdictions. These zones are designated as Green, Yellow, and Special Circumstance Zones, with Green Zones providing the lowest potential for pesticide hazard and exposure. Each Zone has a corresponding pesticide list determined by existing toxicological data.

The objectives of the PHAER Zone System are to

- Identify concrete risk reduction goals (Green Zone management)
- Establish a measurable timeline for risk-reduction activities (transition to Green Zones or other management goals)
- Communicate to the public the general level of pesticide hazard on a site-by-site basis through colored zones maps
- Provide a platform for public education through a regional adoption of the PHAER Zone System

This guidebook has evolved through the efforts of many jurisdictions throughout California and is designed to allow self-implementation. However, a multiple jurisdiction, regional approach may simplify adoption and maximize the program benefits.

Section 1

Introduction

Adoption of Integrated Pest Management (IPM) programs has increased in the past several years. We see schools and public parks striving to provide a safer environment for their users, and to prevent chemical contamination of public land and water. Each entity that creates an IPM program sets goals and creates a unique implementation plan to achieve them. Challenges arise, however, in meeting the needs of the many groups interested in the IPM process and outcome. These diverse stakeholders and jurisdictions, be they schools, childcare facilities, advocacy groups, policy makers, or park managers, have distinct interests and needs from the IPM process.

A parent with a child in a childcare facility might want to know what materials the facility is using to care for its landscaping and lawn. A park manager may need to determine her budget for the next year, and how she'll allocate funding to manage pests in different areas. A school groundskeeper might need a specific list of what compounds are safe to use around children, and what protocols should be used in their application.

We saw a need to create a decision-making model that levels the playing field, a system that *anyone* interested in planning and implementing an IPM program can use. For the model to be effective there must be consistency in its use among managers, but equally important there must be a method to communicate the process, implementation, and outcome to end users (parents, park users, and the general public).

We designed the Pesticide Hazard and Exposure Reduction (PHAER) Zone System to fill this need. All jurisdictions that use the PHAER method will evaluate their sites by the same standards. They will have the flexibility to choose which areas justify immediately transition to reduced-risk management, and which areas to transition more slowly, depending upon resources, policy and social needs. Further, all participants will be able to utilize a common pesticide screening, language, and decision making process.

This system was first piloted at the Ventura Unified School District beginning in 2001. The application was broadened and refined with input from the Santa Barbara County Regional IPM Coalition, funded by the California Department of Pesticide Regulation in 2002. Finally, with funding from the National Foundation for IPM Education and support from stakeholders throughout the state, the program and handbook have been formalized.

Section 2

Background

The Pesticide Hazard and Exposure Reduction (PHAER) Zone System is a tool that guides, prioritizes, and clearly communicates pesticide use decisions in the outdoor landscape setting. It is designed to minimize human and environmental exposure to pesticides that have elevated safety concerns. The method helps to achieve the following:

- Improve pesticide use communication to the public
- Provide flexibility to managers
- Shift limited resources to areas of greatest need
- Create measures of IPM improvement for budgeting purposes
- Prioritize risk-reduction activities
- Promote the good stewardship of public lands by the agencies that manage them

Risk = Exposure X Hazard

Phil Boise, the method's designer, based this intuitive mapping system on the formula for 'risk,' which includes:

The potential for human and environmental exposure[1] to pesticides

The hazard[2] presented by a pesticide.

The higher the potential for exposure in an area, the more vital it is to use a very low-hazard pest management material. In areas where there is little or no potential for exposure, pest managers have more flexibility to use a higher-hazard compound to treat pests.

[1] Exposure: When we speak of 'exposure' we mean contact with a pesticide or pesticide residue—this contact can be direct or indirect contact to humans or sensitive habitats or species. 'Exposure' may come through direct skin or clothing contact with pesticides or residues applied to surfaces, or through indirect contact from volatilization, drift, sub-soil movement, or run-off.

[2] Hazard: The hazard is the level of harm that can come from a pesticide. Determined by existing data reflecting the potential for the material to cause neural, dermal, ocular or inhalation damage ('signal word'), or to cause cancer, reproductive harm, endocrine (hormone) disruption, eco-toxicity, or water contamination. This evaluation process is described in Appendix B.

While 'zero' pesticide exposure is not the goal of this system, we believe that it is an achievable goal to limit exposure to pesticides that are carefully screened, and avoid exposure to pesticides that have documented health risks.

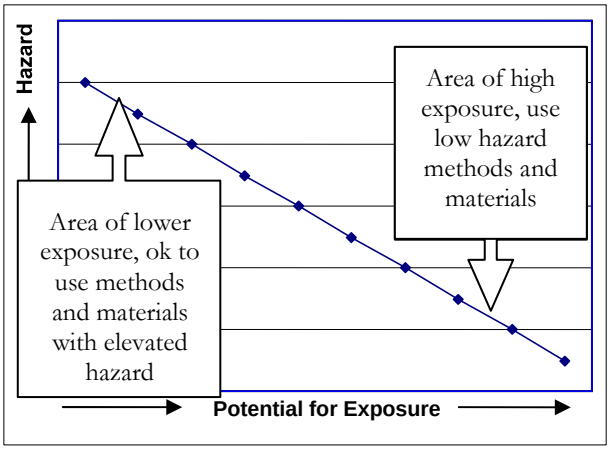


Figure 1: Risk as a relationship between exposure and hazard.

Who Benefits from PHAER Zones?

As mentioned in the introduction, diverse groups will use the PHAER System. There are three broad categories of users: grounds managers, citizens (including children), and decision-makers. The PHAER method provides a common platform for each group to achieve varied objectives.

Grounds Managers. Grounds managers work with various property types, uses, and needs, and require flexibility in their pest management planning. They must be able to shift resources as necessary to meet established priorities, and they must be able to communicate their actions and objectives to diverse stakeholders.

Citizens. Citizens seek information about the potential risks of materials used at a particular site; this information is most valuable if it is clear and consistent between jurisdictions.

Children. Children do not have a voice in the process, so we've factored their needs into the system. All children deserve a clean and healthy place to play and learn. The PHAER System builds extra precaution into the pesticide screening protocols, and clearly communicates the level of potential risk from pesticides used on each site to parents in advance of use.

Decision-Makers. Decision-makers need achievable, measurable risk-reduction objectives for time and budget planning. They often have difficulty responding effectively to public concerns and pressures because of a lack of common definitions and objectives. They might want to adopt IPM strategies, but do not want to compromise efficiency and safety. Decision-makers also recognize that a common, regional, and systematic approach will be the most efficient method of achieving environmental protection goals.

Why the PHAER Zone System Was Developed

The PHAER system was originally developed to help prioritize IPM activities and expenses at Ventura Unified School District while providing the highest level of protection.

A difficult issue with IPM implementation is the measure of compliance. The concept of Integrated Pest Management casts a wide net, and generally describes the process of pest management rather than final risk-reduction objectives. For example, most definitions of IPM encourage sanitation and sound cultural practices to reduce the presence of pests. Therefore, emptying trashcans and managing irrigation practices could be considered IPM implementation, regardless of whether or not the goals of risk-reduction are advanced.

It could be said that if risk reduction is the destination, then IPM would be a vehicle used to move towards it. The PHAER Zone System would be the map providing guidance and gauging progress towards the goal.

With the PHAER method, we provide a framework for setting measurable risk-reduction goals. The system provides clear measures of compliance combined with management flexibility. It should be simple enough to determine if 'Green Zones' have been managed with GREEN LIST materials. The method allows policy makers, advocates, and managers to clearly set and understand risk-reduction objectives, as well as to ascertain if these objectives have been met.

Assumptions

Five fundamental assumptions form the base of this method:

1. Jurisdictions with diverse sites will have a need for diverse materials, some of which may pose a greater health and environmental risk than others.

2. To reduce *risk* we must understand the *hazard* of the material, and the potential for *exposure* to the material from drift, run-off, volatilization, or contact with residues. In areas with a high potential for exposure (where children play, for example), we must strive to use only low hazard materials and methods.

3. Sustained risk reduction requires a shift in current management models and systems. Very few existing school or park settings have been designed, or are currently operating, with pest prevention as a primary design factor.

4. This shift in management models should allow for incremental steps towards risk reduction while alternative practices are tested and habitat modification practices are put into place to prevent future pest problems.

5. The most effective method of transition will be to prioritize areas of the greatest need based upon the highest potential exposure. Resources should be directed towards these areas, while areas of low potential exposure could be conventionally managed.

Benefits of the PHAER Zone System

The benefits of the method are extensive and should offer positive incentives to diverse stakeholders.

Flexibility of Implementation

The system allows decision makers to designate management priorities based upon their own needs. For example, a school may choose to map a parking lot as a Yellow Zone if the risk of exposure to children is low. A pollution prevention officer, however, working on behalf of a city park regulated by the Clean Water Act might choose to map a parking lot as a Green Zone to prevent herbicides of concern from moving into a nearby creek system.

The people carrying out pest management (grounds managers and technicians) will be able to choose from a list of materials that is common between jurisdictions and has been carefully screened for hazards.

Budgeting Flexibility

Decision-makers have the opportunity to set their risk-reduction goals and use their pest management budgets to accomplish what they deem most important. If a decision- or policy-maker wishes to designate partial or entire sites as Green Zones, this system will provide measurable goals for long-term budgeting, as well as justification for budget requests.

Highest Standard of Safety in Areas of Greatest Need

When decision-makers map their site and choose which areas should become Green Zones, they are identifying areas with the highest potential for users to be exposed to pesticides. Every area that is transitioned to a Green Zone will offer the highest standard of safety for both its users and applicators.

Communication Tool

End-users of PHAER-managed sites will know what degree of pesticide hazard to expect in any location they visit, whether a school, a park, or playground. The transparency of full disclosure that will be available and posted on-site will allay concerns, answer questions, and potentially educate the public about reduced-risk practices.

Further, during the testing of this system in various settings we have discovered that many parks and schools are already using reduced-risk methods in a majority of their sites. This system has appeal to these entities as a tool to publicly demonstrate current good stewardship practices.

Guidance for Material Selection

The tiered pesticide list system allows applicators to clearly and simply evaluate the short and long term hazards of a material. This system helps applicators select safer materials that meet the same management goals (e.g. selecting a YELLOW LIST selective herbicide instead of a SPECIAL CIRCUMSTANCE material).

Incremental

The PHAER System allows for incremental movement towards reduced-risk practices at a pace established by the involved stakeholders. This provides a fair starting point for new IPM programs, and a manageable timeline for improvement.

Measurable

A significant disadvantage of current IPM systems is the lack of measurement standards that are essential to gauging progress towards risk-reduction objectives. The PHAER System provides these measures in the form of expansion of Green Zones. An increase in the total area of Green Zones means a decrease in exposure to hazardous pesticides for humans and the environment. These standards can be measured, budgeted, and evaluated for compliance.

Results-Based, Process Flexible

The PHAER System addresses the final objectives of IPM programs, reducing exposure to hazardous pesticides while providing flexibility in the implementation. Implementers would utilize IPM practices to achieve their measurable PHAER risk reduction goals.

Public Education through Demonstration / Clean Water Compliance

Many municipalities are obligated to provide outreach to the public about reducing impacts of pesticides on water quality. PHAER provides education through demonstration by showing the public attractive landscapes managed with reduced-risk materials. Regional municipalities would have a platform to jointly encourage utilization of the GREEN LIST materials, pre-screened for water quality impairment.

Section 3

Assigning Zones

As mentioned earlier, any participant using the PHAER System will begin the process the same way: by characterizing the site. This entails obtaining a map, walking the property, and distinguishing between areas of high and lower exposure.

Step 1: Characterize Exposure

Obtain at least two copies of a map of the property. Walk the entire property with an individual who is knowledgeable about the uses of the area. For example, at a school, a groundskeeper or teacher would have first-hand information about areas that children use and don't use.

During your walk, categorize areas as either "High Exposure" or "Low Exposure." For ease, mark on a draft copy of the map areas of high exposure with a green highlighting pen, and areas of low exposure with a yellow highlighting pen. Use this draft map during Step 2.

Some examples of high exposure areas include, but are not limited to:

- Recreational turf
- Asphalt play surfaces
- Garden areas
- Bike racks and locker areas (frequent skin contact)
- Six-foot perimeter around opening doors, buildings with windows, air intakes, or HVAC (heating/ ventilation/ air conditioning) systems
- Slopes adjacent to playing fields where pesticides may migrate onto the field with soil or water movement
- Fence lines surrounding playing fields where ball contact is likely (backstops, down-slope fences)
- Curbs and landscapes around bus and vehicle loading areas
- Habitats containing EPA listed sensitive or endangered species
- Other sites as designated by IPM Coordinator (impervious surfaces that drain into regulated waterways, etc.)

Examples of lower exposure areas include, but are not limited to:

- Landscaped islands in parking areas not used for sitting or waiting
- Strips between two fences that are inaccessible to general use
- Tree basins for which GREEN LIST pesticides or alternative practices have not proven effective or are prohibitive and where the public is not likely to rest or recreate
- Storage or valve areas where gates are locked
- Parking lots where skin contact is unlikely
- Areas not adjacent to or draining into habitats containing EPA listed sensitive or endangered species

We have developed a Decision Tree (Appendix C) that helps walk you through each landscape feature to determine if it is a high or low exposure area.

Step 2: Goal-Setting

The second is the PHAER step that provides the greatest flexibility.

Gather a Group of Core Decision-Makers

During Step 2, core stakeholders will sit down with the draft colored map. The group should include those involved with budgeting, maintenance, and any other essential aspect of your jurisdiction. The sites will be evaluated for Green Zone transition based upon site specific conditions such as budget, current management practices, policy or regulatory mandates, and community concern.

Determine Your Risk-Reduction Goals

The most important issue to discuss is what your priorities are. Do you want to immediately manage your site as a reduced-risk area, or do you want to incrementally transition parts of your site over a period of a few years?

Sites of highest exposure and available resources may immediately be designated as Green. Areas not immediately identified as green may be designated as Yellow, with a transition priority of T1 – T5, NT (see Figure 2). Once they decide, they will color-code the map to indicate their risk-reduction plan. This will be the document they refer to over the years to reference their goals and gauge their progress toward achieving them.

Keep in mind whether your jurisdiction fits into one of the following two approaches to goalsetting.

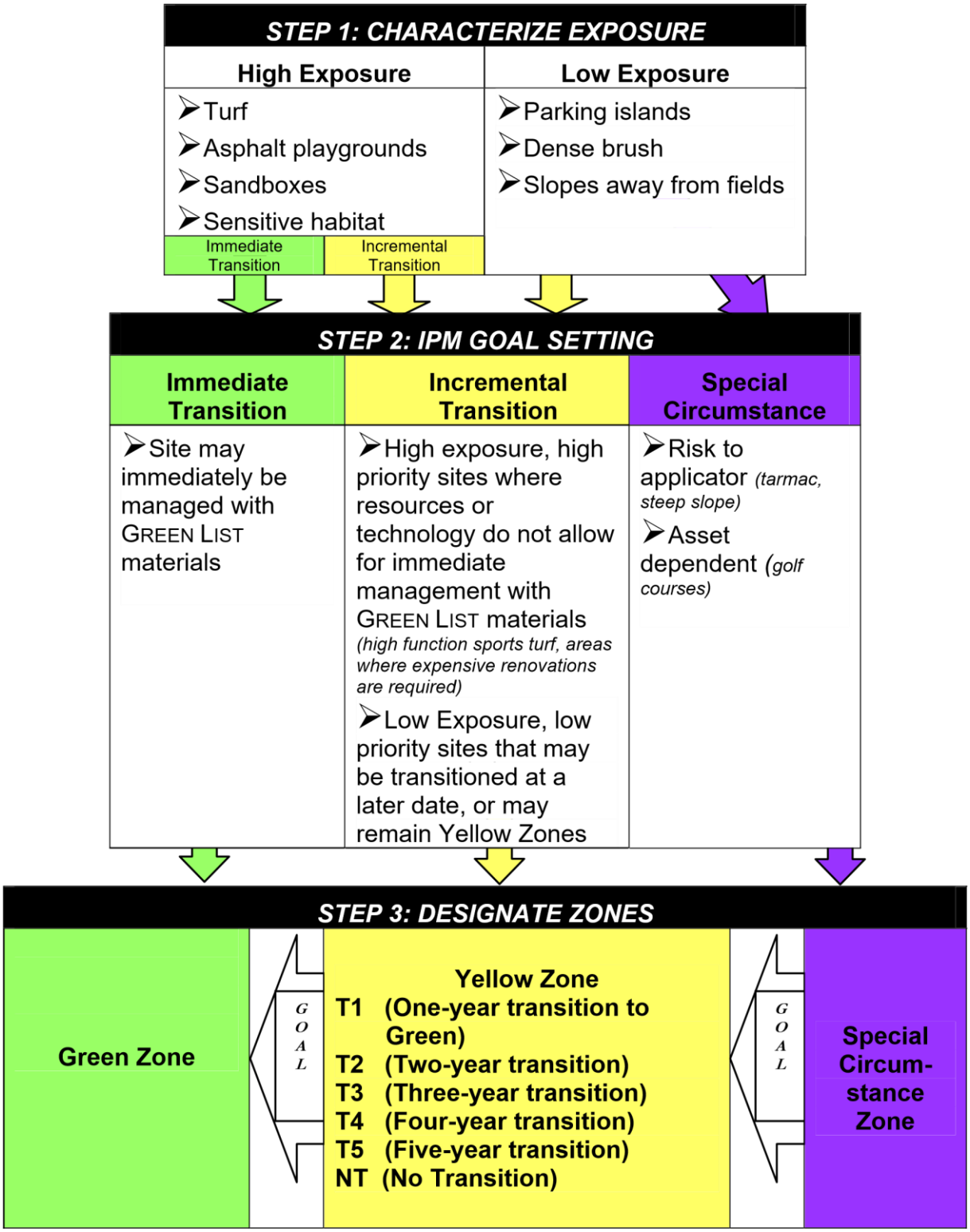
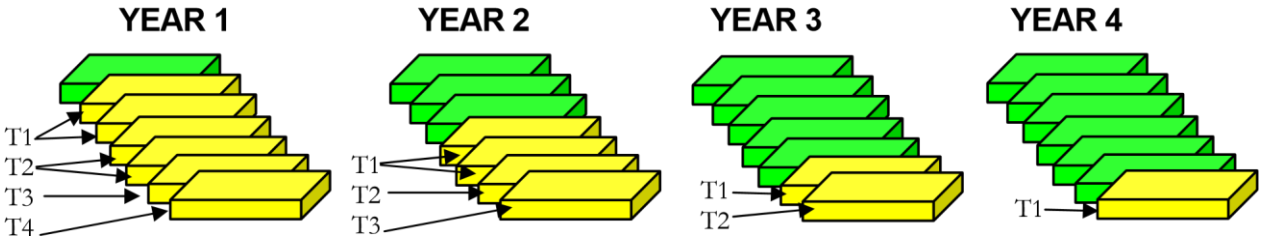


Figure 2: The Three-Step Zone Process

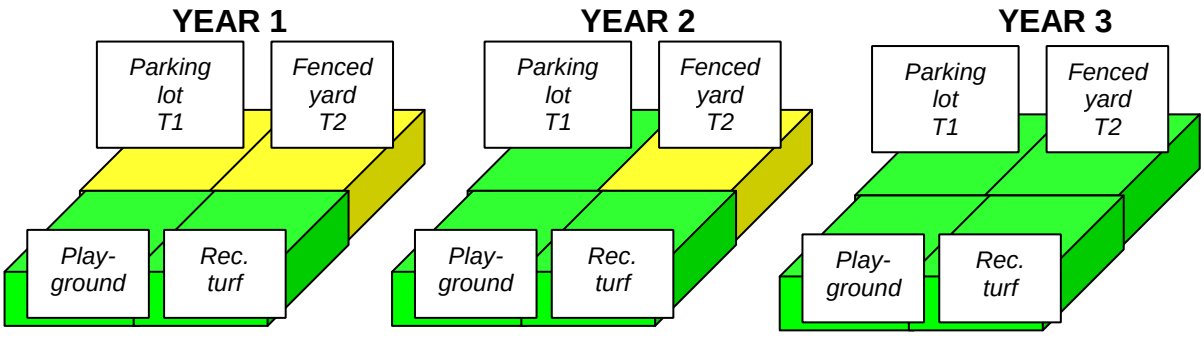
The 'Single Zone per Site' Approach

In our sample school district, there are seven schools. At the beginning of the program, there is one school that can be immediately managed as a Green Zone. The decision makers assign conversion goals to the other six schools, choosing two T1, two T2, one T3, and one T4. The two T1 schools are the highest priority to the school district (perhaps elementary schools), and they want to manage them as Green Zones as quickly as possible. By the end of the fifth year of their plan, all of their schools would be Green.



The 'Multiple Zones per Site' Approach

In some jurisdictions, rather than convert an entire school to a Green Zone, managers will need to work incrementally within each school to transition individual areas. The example below illustrates this incremental approach. In the first year, this school was able to designate the playground and recreational turf as green, with a plan to transition the parking lot in Year 2 and the fenced yard in Year 3. They steadily convert individual areas (highest priority areas first) within the school until by Year 3, everything is Green.



The incremental approach allows limited resources (staff and budget) to be dedicated to the areas of greatest need (Green Zones, e.g. high use parks, elementary schools), while conventional management practices are continued on sites of lower potential exposure (Yellow Zones, e.g. middle/high schools, rural parks). As reduced-risk practices are tested and staff is trained, the total area of Green Zones can be expanded.

Step 3: Designate Zones

The process of assigning zones within your site will reflect the priority level you give to each area. After your group has decided the priorities, color-code the map with green, yellow, or purple to represent Green Zones, Yellow Zones, or Special Circumstance Zones. For any Yellow Zone, please also include a label T1, T2, T3, etc. to express your timeline for conversion to Green.

Green Zones

Green Zones are areas that you will immediately convert to reduced-risk pest management. Only very low-hazard materials will be applied to that area.

Yellow Zones

Yellow Zones are areas that will be managed with higher-hazard materials for some length of time. The goal is to ultimately transition every Yellow Zone into a Green Zone; the variable is how long it takes to undergo that transition. Each Yellow Zone should have a label that indicates the proposed timeline to transition it to a Green Zone. For example, a T1 designation indicates that that Yellow Zone will be converted to Green within one year. A T2 designation indicates it will be converted to Green within two years, etc. An area labeled T1 is consequently a higher priority than an area labeled T4. If the area poses very little exposure potential to humans or wildlife, then the site may be designated as a Yellow Zone indefinitely, unless it is the goal of the jurisdiction to completely transition all areas to Green Zones.

Now that you have met with your core decision-makers and have decided upon your risk reduction strategy, you can assign a label to each area on your map.

Example: An elementary school and playground might be targeted for immediate Green Zone designation, since young children have unpredictable behavior and may not use a site as intended (i.e. playing in a landscape bed while waiting for a bus). However, if resources do not allow immediate transition of **all** areas to Green, then the majority of the high exposure areas will be designated Green. Isolated parking islands, slopes draining away from playing fields, or exterior fence lines can be designated as Yellow Zones T-1 or T-2. High-use performance sports turf may require incremental transitions until resources and technology support management as Green Zones.

Special Circumstance Zones

In some cases, a particular area will be manageable as neither a Green nor Yellow Zone. A Special Circumstance Zone applies where the assets of the site are dependent upon pesticides that pose a high human or environmental hazard and for which no effective reduced-risk substitutes are available (golf greens, for example). A Special Circumstance Zone may also include sites where pest management activities pose a particular risk to the applicator, such as airport tarmacs or busy roadways. These sites require the fewest applications and the least disturbance of the site. Every effort should be made to reduce or eliminate SPECIAL CONSIDERATION materials in favor of YELLOW or GREEN materials.

Section 4

Managing Your Site

After you have color-coded and labeled the map to show which areas will be Green, Yellow, or Special Circumstance Zones, consult the corresponding lists of materials and protocols.

For every type of zone, there are standing exemptions, situations where it would be periodically acceptable to use a material with a higher hazard to protect human health and the value of the asset. We've built the exemptions into the method to provide more flexibility to managers in the execution of their jobs.

The Screening Process

The GREEN, YELLOW, and SPECIAL CIRCUMSTANCE MATERIALS LISTS have been developed using common screening protocols adopted by many municipalities throughout the country. The lists are not intended to be adopted in whole, but rather to serve as a reference list for zone management. For example, if a YELLOW MATERIAL contact herbicide is currently being used, the list may identify a GREEN MATERIAL contact herbicide that may be substituted, thus reducing the risk of the pesticide application.

The justification for these lists is described in detail in Appendix B. However, a summary of the list resources is below:

GREEN PESTICIDES:

- San Francisco Tier 3, Tier 2 Allowed Use
- Seattle Tier 3
- EPA Registration Exempt

YELLOW PESTICIDES:

- San Francisco Tier 2 Limited Use
- Seattle Tier 2

SPECIAL CIRCUMSTANCE PESTICIDES:

- San Francisco Tier 1, Tier 2 Limited Use/Special Concern
- Seattle Tier 1

Efforts are on-going to standardize the hazard screening protocol across California, and the PHAER method will adopt whatever system emerges from these activities.

Managing Green Zones

Management of a Green Zone will rely upon materials from the GREEN LIST, which is included in Appendix B. GREEN LIST materials have been thoroughly screened for their safety. The list contains pesticides that have minimal environmental or human health concerns. If used according to the following Green protocols, GREEN LIST materials can be employed seamlessly **without any disruption in use of an area**.

Because GREEN LIST materials have been carefully screened for human and environmental health concerns, some exposure to them may be tolerated. These materials are mostly comprised of food- or household- grade materials (e.g. corn gluten meal, vinegar, clove oil), biologically based pesticides, or are applied in ways that minimize exposure (e.g. self-contained ant bait stations). As an incentive to encourage the use of GREEN LIST materials, posting requirements are minimal.

Pesticide Communication

A list and description of GREEN LIST pesticides will be posted with a colored zone map of the site at a central location (kiosk, activity board, school office, etc.) with a running list of application dates and materials. Community members who are concerned about pesticide exposure will recognize the reduced impact of Green Zones, and may check the list of applied GREEN materials periodically for more information.

No additional notification or posting will be required of GREEN LIST pesticides, except as required by standing agency policy.[3] The minor posting requirements are an incentive to select reduced-risk materials.

Exemptions

Exemptions are situations where it would be acceptable to use a YELLOW LIST material in a Green Zone[4]. They include:

1. Emergency applications to protect human health and against significant loss of assets.

2. A one-time exemption may be provided by the IPM Coordinator to use a YELLOW LIST pesticide in a Green Zone if ALL of the following conditions are met:

- A plan must be developed prior to application describing activities that will prevent the need for further YELLOW LIST pesticide applications. *(Field staff may be included in this planning to maximize their experience and to invest them in long-term IPM strategies).*

[3] The California Healthy Schools Act of 2000 exempts from posting and notification EPA Registration Exempt pesticides, also included as GREEN LIST pesticides. This Act also exempts pesticides applied in self-contained bait stations and gels/ pastes applied in cracks and crevices. Many of these common reduced-risk pesticides are classified by San Francisco as Allowed materials, also included as GREEN LIST pesticides.

[4] There is no provision to use a SPECIAL CIRCUMSTANCE material in a Green Zone. If a SC material is necessary, the zone designation should be changed to Yellow.

- Application is followed by a 14-day period during which no access is expected, or access to site is restricted by construction fencing, closed gates, etc.
- Site must be posted for 14-day period to the signage standards of the Healthy Schools Act[5].

3. Specific pest situations, as described in Figure 4.

These steps are established to allow management flexibility without compromising confidence in the high standard of safety provided by Green Zones. If the pest situation can not be solved with a one-time YELLOW LIST material and habitat modification, the site zone designation should be changed from Green to Yellow.

Managing Each Zone			
	Green Zone	**Yellow Zone**	**Special Circumstance Zone**
Approved Materials	GREEN LIST	③ GREEN LIST ③ YELLOW LIST	③ GREEN LIST ③ YELLOW LIST ③ SPEC. CIRC. LIST
Posting Requirements	• List of applied GREEN pesticides posted onsite at a central location	• List of YELLOW and GREEN pesticides posted on-site at a central location • Sign announcing application posted 24 hrs prior until 72 hrs after application (or current policy if more stringent), with a preferred 7-day no-use/ limitedaccess window.	• List of YELLOW, GREEN, and SC pesticides posted onsite at a central location • Sign announcing application posted 24 hrs prior until 72 hrs after application (or current policy if more stringent), with a preferred 7-day nouse window.

Figure 3: Managing Each Zone

[5] Sites should be posted to the signage standards, not the timing standards (24/72 hours) of the H.S.A. Application warning sign template: http://www.cdpr.ca.gov/cfdocs/apps/schoolipm/tools_templates/33_posting.pdf Legislative text: "17612. (d) The…designee shall post each area of the…site where pesticides will be applied with a warning sign. The warning sign shall prominently display the term "Warning/Pesticide Treated Area" and shall include the product name, manufacturer's name, the United States Environmental Protection Agency's product registration number, intended date and areas of application, and reason for the pesticide application. The warning sign shall be visible to all persons entering the treated area and shall be posted 24 hours prior to the application and remain posted until 72 hours after the application. In case of a pest control emergency, the warning sign shall be posted immediately upon application and shall remain posted until 72 hours after the application." http://www.cdpr.ca.gov/cfdocs/apps/schoolipm/school_admin/main.cfm?crumbs_list=1,8,11#Posting

Managing Yellow Zones

Yellow Zones will rely upon materials and protocols from either the GREEN LIST or the YELLOW LIST, which are included in Appendix B. YELLOW LIST materials have also been thoroughly screened. These materials, however, carry some elevated environmental or human health concerns and steps should be taken to reduce exposure to them.

Because YELLOW LIST materials have an elevated level of hazard, more information should be provided to site users. Signs should be posted in the immediate vicinity of the application to the standards of the Healthy Schools Act at least 24 hours in advance of an application and remain posted for 72 hours following the application, or in accordance with a standing agency policy if more stringent.
Further, every effort should be taken to make the YELLOW LIST materials applications when seven days of limited site access is expected following the application. This would allow school sites to apply YELLOW LIST materials during summer, fall, winter, and spring breaks of one week or longer. Such periods of limited use may vary more with public parks; however efforts to schedule during areas of limited activity (or to voluntarily increase signage posting to seven days following application) should still be undertaken.

A record of YELLOW LIST material applications should be kept on-site at a central location (kiosk, activity board, school office) along with a colored zone map of the site.

Pesticide Communication

Signs will be posted in the immediate vicinity of the application to the standards of the Healthy Schools Act 24 hours in advance of an application until 72 hours following the application, or in accordance with a standing agency policy if more stringent.

Exemptions

1. Emergency applications to protect human health and against significant loss of assets.

2. A one-time exemption may be provided by the IPM Coordinators to use a SPECIAL CIRCUMSTANCE pesticide if ALL of the following conditions are met:

    - A plan must be developed prior to application describing activities that will prevent the need for further applications. *(Field staff may be utilized in this planning to utilize their experience and invest them in long-term IPM strategies).*
    - Application is followed by a14-day period during which no access is expected, or access to site is discouraged by construction fencing, closed gates, etc.
    - Site must be posted for 14-day period to the signage standards of the Healthy Schools Act[6].

[6] Sites should be posted to the signage standards, not the timing standards (24/72 hours) of the H.S.A. Application warning sign template: http://www.cdpr.ca.gov/cfdocs/apps/schoolipm/tools_templates/33_posting.pdf

Managing Special Circumstance Zones

Special Circumstance Zones may be managed with materials from the GREEN LIST, YELLOW LIST, or the SPECIAL CIRCUMSTANCE LIST.

Pesticide Communication

Applications of SPECIAL CIRCUMSTANCE LIST materials should abide by the same communication requirements as YELLOW LIST materials.

Exemptions

The only exemption necessary in the Special Circumstance Zone is in the case of an emergency pesticide application, the warning signs should be posted immediately following application, and should remain in place for 72 hours following the application.

Legislative text: “17612. (d) The…designee shall post each area of the…site where pesticides will be applied with a warning sign. The warning sign shall prominently display the term "Warning/Pesticide Treated Area" and shall include the product name, manufacturer's name, the United States Environmental Protection Agency's product registration number, intended date and areas of application, and reason for the pesticide application. The warning sign shall be visible to all persons entering the treated area and shall be posted 24 hours prior to the application and remain posted until 72 hours after the application. In case of a pest control emergency, the warning sign shall be posted immediately upon application and shall remain posted until 72 hours after the application.” http://www.cdpr.ca.gov/cfdocs/apps/schoolipm/school_admin/main.cfm?crumbs_list=1,8,11#Posting

Standing Exemptions

The dynamic nature of a landscape system requires additional flexibility with materials. A number of standing exemptions are allowed under the PHAER method to make sure the function and value of a site are not compromised by good intentions.

Standing Exemptions: Summary		
	Situation	**Mitigation**
YELLOW material in Green Zone	Emergency	Post, discourage access for 14 days
	One time for habitat modification	Post, discourage access for 14 days
	Ground Vertebrates	-Application to avoid exposure (subsoil, secure bait station); - Careful monitoring for dead/ dying animals during application period and for 14 days following last application
	Specimen Trees	- Soil, trunk injection only (no spray); - Cover basin (if soil); - Time application to avoid fruit set
	Significant invasive weed	Post, discourage access for 14 days
SPECIAL CIRCUMSTANCE material in Yellow Zone	Emergency	Same as above
	1 time for habitat modification	Same as above
	Specimen Trees	Same as above
	Significant invasive weed	Same as above

Figure 4: Standing Exemptions Summary

Section 5

Conclusions and Recommendations

The development of the PHAER System came out of a need for a standardized, results based reduced risk pest management strategy. A year of field-testing has confirmed that the method can be utilized by diverse users to accomplish their pest management goals.

Provided herein is a program that has been successfully tested and may be immediately put into use. This guidebook has evolved through the efforts of many jurisdictions throughout California and is designed to allow self-implementation. However, a multi-jurisdiction, regional approach may simplify adoption and maximize the program benefits.

It is recommended that several regional jurisdictions convene to discuss a coordinated implementation of the PHAER Zone System. The cooperative effort would make material screening, zone assignments, and Best Management Practices in Green Zones more efficient and consistent throughout the area, while also reducing the effort of individual jurisdictions.

This is a new and evolving method that will improve with each new implementation. Efforts are underway to develop a network of PHAER Zone programs to facilitate the common advancement of these risk reduction goals. Please contact the author for more information.

Attachment E

Monthly IPM Reporting Form

		Integrated Pest Management Practices												
		Handweeding & Hoe	Flamming	Mowing	String Trimmer	Solarization	Mulching	Pre emergent Herbicide	Post emergent Herbicide	Green Herbicide	Selective Herbicides			
Date	**Location**													Comments