California School IPM Model Program Guidebook

4th Edition

STATE OF CALIFORNIA
Gavin Newsom Governor

CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY
Jared Blumenfeld Secretary

CALIFORNIA DEPARTMENT OF PESTICIDE REGULATION
Teresa Marks Acting Director

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California Department of Pesticide Regulation
1001 I Street
P.O. Box 4015
Sacramento, California 95814
www.cdpr.ca.gov

Pest Management and Licensing Branch
School and Child Care IPM Program

This guidebook was edited by:

Belinda Messenger, Ph.D.
Staff Environmental Scientist
Department of Pesticide Regulation

Tanya Drlik, Ph.D.
Technical Writer
Bio-Integral Resource Center

Madeline Brattesani, Ph.D.
Staff Environmental Scientist
Department of Pesticide Regulation

Ann Hanger
Environmental Scientist
Department of Pesticide Regulation

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Nan Gorder
Lyn Hawkins
Eileen Mahoney
Margie Read
Regina Sarracino
Ada Ann Scott
Jay Schreider
Sewell Simmons
Mac Takeda
Angelica Welsh

Dear IPM Coordinator and School District Staff:

This letter introduces you to the California School IPM model program guidebook. Please review this guidebook and use it as a reference tool as you implement integrated pest management (IPM) in your school district.

Who Developed This Guidebook?

The California Department of Pesticide Regulation (DPR) developed this model program guidebook, as required by the Healthy Schools Act of 2000, for use by school districts that wish to adopt a least-hazardous IPM program. The authors drew their information from federal school IPM guidelines, other states' IPM programs, California state laws and regulations, the University of California Statewide IPM program, California school districts that have already implemented IPM programs, the pest control industry, and public interest groups.

What Is the Purpose of the Guidebook?

This guidebook is designed to help you use IPM in your school's pest management program. The guidebook serves as a guide and provides models for schools that choose to implement IPM. IPM is not required in California schools. We intend this guidebook to be useful as both a companion manual for the DPR California School IPM workshop and as a reference tool for your school district when implementing IPM. IPM coordinators can use this text to train school district personnel in IPM theory and practices. School staff can refer to it for day-to-day pest management questions.

Why Use the Guidebook?

Whether you are just starting to implement an IPM program or want to improve an existing program, this guidebook will serve as a useful resource to answer your IPM questions and to provide practical, hands-on steps that can be implemented as part of your IPM program. The first part of this book lays out the essential elements of a least-hazardous IPM program and the steps to adopting an IPM program. Specific strategies for pest management indoors and outdoors are covered in the accompanying attachment to the guidebook entitled "Part 2: Pest Management," arranged by individual pests.

We hope you find this guidebook to be useful and we encourage your input into the next edition. Please send your suggestions to school-ipm@cdpr.ca.gov.

CALIFORNIA SCHOOL IPM MODEL PROGRAM GUIDEBOOK

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SECTION 1

Introduction to California School IPM

1.1 What is Integrated Pest Management (IPM)?

Integrated pest management (IPM) is an approach to pest control that uses regular monitoring and recordkeeping to determine if and when treatments are needed. It employs a com- bination of strategies and practices to keep pest numbers low enough to prevent unacceptable annoyance or damage. IPM does not eliminate the use of chemical pesticides, but instead uses them only when needed. There are many definitions of IPM; the Healthy Schools Act (Food and Agricultural Code section 13181) defines IPM as:

> "...a pest management strategy that focuses on long-term prevention or suppression of pest problems through a combination of techniques such as monitoring for pest presence and establishing treatment threshold levels, using non-chemical practices to make the habitat less conducive to pest development, improving sanitation, and employing mechanical and physical controls. Pesticides that pose the least possible hazard and are effective in a manner that minimizes risks to people, property and the environment, are used only after careful monitoring indicates that they are needed according to pre-established guidelines and treatment thresholds."

At its most basic, IPM is a common-sense pest management approach that requires pest management action only when necessary and with the least-hazardous method. Many pest management methods, such as biological, cultural, physical, educational, and chemical methods, can be used in a least-hazardous IPM program. Educational methods are used to enhance pest prevention, and to build support for the IPM program. Chemical controls are used only when needed, and in the least-hazardous formulation that is effective against the pest.

Pest prevention begins with correct identification of the pest and knowledge of its needs and entry points. Available food, water, hiding places, and entry points must be eliminated for long-term suppression of a pest. Use of least-hazardous IPM has been shown to dramatically reduce the use of chemical pesticides, while providing better, longer-lasting control of pests.

Box 1-1: What is a pesticide?

A pesticide is any substance intended to control, destroy, repel, or attract a pest. Some common pesticide types include herbicides (for control of weeds and other plants), insecticides (for control of insects), disinfectants and sanitizers (to control disease-causing microo ganisms on inanimate objects), and rodenticides (for control of rats, mice and other rodents).

Box 1-2: Principles of IPM

1. Perform thorough in-field or on-site assessments of each pest problem.
2. Establish scouting or inspection procedures to monitor pest population levels and severity of the pest problem.
3. Use appropriate control action thresholds, if available, for each (combination of) pest problem(s) to determine when corrective action(s) must be implemented.
4. Determine corrective action(s) when a control action threshold is reached. Use the following objectives in the selection of specific reduced-risk practices: least disruptive of natural controls, least hazardous to human health, least toxic to non-tar get organisms, least damaging to the environment, most likely to produce a permanent reduction in the supportive environment for the target pest(s), and most cost-effective considering both short- and long-term objectives.
5. Establish and maintain an accurate record-keeping system to catalog monitoring information and document management procedures.
6. Evaluate the effectiveness of the IPM program and make adjustments as needed

1.2 Why implement an IPM program?

IPM is an accepted method of pest management in schools (Stauffer et al., 1998; Grant and Woodsen, 2001). Using least-hazardous IPM techniques can save time, money, and energy, as well as decrease the use of pesticides. In a 2007 California Department of Pesticide Regulation (DPR) survey of California school districts, 57% of the respondents stated that IPM reduced or had no impact on cost (Cowles, et. al, 2008). IPM practitioners prevent pest problems by eliminating the conditions that allow pests to flourish, detecting pests early before the population grows, and by establishing records so that outbreaks can be predicted. Other school concerns, such as sanitation, maintenance, and energy usage can be addressed with proper IPM practices.

Using fewer pesticides in an IPM approach addresses the growing concern for the health and safety of school children and other building occupants. Many parents, community organizations, and advocacy groups have become more aware, and more cautious, of pesticide use around children. A desire to know that schools are using pesticides safely and judiciously has been expressed to legislators all over the United States and as a result, laws concerning pesticide use in schools are in place in several states including California.

1.3 What is DPR's role in California school IPM?

In 1993, DPR began a pilot program to work with interested school districts to provide them information about IPM practices and assist them in developing an IPM program. DPR also conducted an extensive survey of school districts in 1996 to gain information about their IPM policies and practices (Simmons et al., 1996). Governor Davis felt that IPM in schools was important enough to add a school IPM program to DPR's budget in July 2000, as part of his Children's Health Initiative. Governor Davis later signed Assembly Bill 2260 (the Healthy Schools Act of 2000, Education Code sections 17608–17613 and Food and Agricultural Code sections 13180–13188) into law on September 25, 2000. This law, authored by Assembly Member Kevin Shelley, put into code DPR's existing voluntary school

IPM program and added some new requirements regarding pesticides, such as notification, posting, and recordkeeping for schools, and enhanced pesticide use reporting. The law was subsequently amended to prohibit the use of certain pesticides (Assembly Bill 405, Chapter 566, Statutes of 2005) and include private child day care facilities (Assembly Bill 2865, Chapter 865, Statutes of 2006). In response to AB 2865, DPR established a Child Care IPM program to specifically focus on outreach and education to child day care facility providers. This guidebook addresses IPM in the school district setting. A guidebook addressing IPM in the child care setting is available from the University of California at San Francisco's California Childcare Health Program https://cchp.ucsf.edu/. The Healthy Schools Act makes IPM the preferred pest management method in California schools. Most provisions of the law took effect January 1, 2001.

Through its school IPM program, DPR is committed to facilitating voluntary establishment of IPM policies and programs in schools throughout California, while assisting school districts with implementation of the new Education Code requirements. DPR also works with other boards and departments of the California Environmental Protection Agency and with the California Department of Education to tie IPM into related areas such as school gardens and environmental education.

1.3.1 DPR's School IPM Web Site

DPR has established an IPM in Schools Web site at www.cdpr.ca.gov as a source of information on school IPM. The site includes home pages customized for parents/ teachers, school administrators, maintenance and operations staff, and pest management contractors. Resources available include summaries of the Healthy Schools Act, frequently asked questions, new regulations on school pesticide use reporting, an exhaustive listing of pest prevention techniques, sample notification letters to parents about expected pesticide use, a worksheet to determine whether specific pesticide products are exempt from HSA requirements, and many other items. The Web site also allows school districts to compare the health and environmental impacts of management practices used for specific pests, and to identify the active ingredients associated with pesticide products schools may use. In addition, the Web site provides extensive links, to other IPM resources.

1.3.2 School IPM Workshops

The Healthy Schools Act directs school districts to designate IPM coordinators to carry out requirements of this law. DPR offers voluntary train-the-trainer workshops so that those who carry out the IPM program understand principles of IPM and can train their staff. These regional workshops showcase model IPM programs and provide hands-on experience.

1.3.3 Assisting Districts to Establish IPM Policies and Programs

Some school districts already are working with DPR to establish IPM programs. Currently, DPR is working with California Department of Education and has information on its Web site about model programs. In addition, DPR publicizes its school IPM program at meetings attended by maintenance and operations directors and their staff, school administrators, educators, and parents.

1.3.4 School IPM Guidebook

This guidebook is the result of an effort to tailor an existing school IPM guidebook to conditions in California. The Healthy Schools Act requires DPR to include specified IPM program elements. These program elements are covered in Part 1.

1.3.5 Evaluating IPM Adoption in Schools

Baseline and follow-up surveys help DPR to measure IPM adoption in schools, to evaluate what kind of outreach school districts need, and to see whether this outreach has been effective.

1.4 What are the requirements of the Healthy Schools Act for school districts?

All public school districts are required to comply with the Healthy Schools Act. These requirements include identifying an IPM coordinator; Developing an IPM Plan; providing annual written notification with specified information on pesticides to all school staff and parents or guardians of students; providing the opportunity for interested staff and parents to register with the school district if they want to be notified of individual pesticide applications at the school before they occur; posting warning signs at the entrance to each area of the school where pesticides will be applied; maintaining records of all pesticide use at the school for four years; reporting pesticide use to DPR; ensuring that prohibited pesticides are not used in schools; and that all individuals using pesticides on a schoolsite has completed training. Sample letters, templates, and posting signs are included in **Appendix A** to help schools comply with these requirements.

1.4.1 Identify an IPM Coordinator

Each school district shall designate an individual (who may be the IPM coordinator) to carry out the requirements of the Healthy Schools Act.

1.4.2 Develop an IPM Plan

Each school district must create an IPM plan using the template developed by Department of Pesticide Regulation; or get the IPM plan approved by DPR. It must be posted on the school district website or sent home with all students and staff, and made available to view at the school district office.

1.4.3 Notification (Education Code section 17612(a))

Each school district is required to "annually provide to all staff and parents or guardians of pupils enrolled at a schoolsite a written notification of the name of all pesticide products expected to be applied at the school facility during the upcoming year." This notification must include the active ingredient(s) in each pesticide product and the Internet address used to access information on pesticides and pesticide use reduction strategies developed by DPR (pursuant to section 13184 of the Food and Agricultural Code). The notification may contain other information deemed necessary by the school district. Adding information about the target pest and the application method can be helpful to parents or staff unfamiliar with pests and pesticides, although this is not required by the Healthy Schools Act. These notification requirements are intended to be inexpensive for school districts. Annual notification to parents and guardians may be included as part of any other written communication provided to individual parents or guardians. Registrants can be notified by U.S. mail, e-mail, or telephone. Notice through first-class mail is not required. If districts contract for monthly or periodic pest management services, people on the registry may be notified of each pesticide application by the contractor, if this is agreed to as part of the contract.

1.4.4 Establish a Notification Registry

Recipients of the annual pesticide notice may register with the school district if they wish to receive notification of individual pesticide applications at the school facility. People who register for such notification must be notified of individual pesticide applications at least 72 hours before the application. This notice shall include the product name, the active ingredient or ingredients in the product, and the intended date of application. If a pesticide product is not included in the annual notification but is later intended for use at the school site, the school district must provide written notification of its proposed use at least 72 hours before application.

The notification procedures described above are not required for pest control measures taken during an emergency condition, but the school district shall make every effort to provide the required notification for an application of a pesticide under emergency conditions. The notification and posting requirements described above also do not apply to activities by participants in the state program of agricultural vocational education. School farms are regulated by another set of posting and notification requirements (California Code of Regulations 6618). The notification and posting requirements do not apply to agencies that have a cooperative agreement with the Department of Public Health (Education Code section 17613).

1.4.5 Posting (Education Code section 17612(d))

School districts are required to post a warning sign in each area of a school site where pesticides will be applied. The sign must prominently display the term "Warning/ Pesticide Treated Area," and will 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 must be visible to everyone entering the treated area and must be posted 24 hours prior to the application and remain posted until 72 hours after the application. One option is to silk screen the text onto metal signs with blanks for the product name, manufacturer's name, and other information. Specifics of each application can then be filled in with a grease pencil.

1.4.6 Exemptions to Notification and Posting Requirements

The requirements for notification and posting change in a pest control emergency. See section 4.2 of this guidebook, under "Declaring an Emergency Under the Healthy Schools Act," for more details. "Emergency conditions" are defined in the law as "circumstances in which the school district designee deems that the immediate use of a pesticide is necessary to protect the health and safety of pupils, staff and other persons, or the school site." (Education Code section 17608[c]) In an emergency, staff, parents, and guardians need not be notified 72 hours in advance; however, every effort must be made to provide the notification. The warning sign must be posted immediately upon an emergency application and remain posted until 72 hours after the application. (Education Code section 17612.2(c)).

Pesticides used in an emergency should pose the least possible hazard to people, property, and the environment, and be used only after the emergency has been documented (including type of problem, associated risks, and pest management alternatives considered but not used). Pesticide products selected for use must be registered with DPR to control the pest and be effective for the intended purpose.

1.4.7 Maintain Records

Each school shall maintain records of all pesticide use at the school for four years and make the records available to the public upon request. Records can be computerized but paper copies kept in a file provide easy access. Records can simply be a copy of the posted warning sign with the amount of the pesticide used noted on the copy.

1.4.8 Report Pesticide Usage to DPR

The Healthy Schools Act requires DPR to prepare school pesticide use reporting forms to be used by any school site employee, community member, volunteer, or licensed pest control businesses when they apply any registered pesticide at a school site. The school pesticide use reports must be submitted to DPR at least annually. This form can be downloaded from the DPR School IPM Web site at www.cdpr.ca.gov.

1.4.9 Don't Use Prohibited Pesticides

AB 405 prohibits the use of certain pesticides at schools because they are registered for use in the State of California either: (1) conditionally, (2) as an interim registration, or (3) under an experimental use permit (EUP), and contain either a new active ingredient or are intended for a new use.

All pesticide products that DPR has canceled, suspended, or required phaseout of use are also prohibited. The list of pesticide products prohibited under AB 405 is available at http://www.cdpr.ca.gov. To assist school districts, DPR has posted on its Web site samples of the annual notification and the register, and a template of the warning sign. These documents can be downloaded at www.cdpr.ca.gov. These forms are included in **Appendix A**.

1.4.10 Complete IPM Training

Anyone who applies pesticides on school grounds must complete a DPR-approved training course. The DPR-approved courses that meet this requirement are listed on the DPR website. Training must focus on IPM on schoolsites and safe use of pesticides in relation to the unique nature of schoolsites and children's health. This training must be completed annually by school staff, and per license renewal period by license holders.

1.4.11 Exemptions from the Requirements

The Education Code (section 17610.5) notification and posting requirements described above do not apply to "a pesticide product deployed in the form of a self-contained bait or trap, to gel or paste deployed as a crack and crevice treatment, to any pesticide exempted from regulation by the United States Environmental Protection Agency pursuant to the Federal Insecticide, Fungicide, and Rodenticide Act (7 U.S.C. Sec. 25 (b)), or to antimicrobial pesticides, including sanitizers and disinfectants." (For more information on exempt pesticides, see DPR's School IPM Web site at www.cdpr.ca.gov or **Appendix B**.)

The notification and posting requirements do not apply to schools operated by the Division of Juvenile Justice. The Healthy Schools Act however does require that "the school administrator of a school operated by the Division of Juvenile Justice shall notify the chief medical officer of that facility at least 72 hours prior to application of pesticides. The chief medical officer shall take any steps necessary to protect the health of pupils in that facility." (Education Code section 17612.2 (e)). See **Appendix C** and **Appendix D** for more details.

1.5 What are the Healthy Schools Act requirements for licensed pest control businesses?

This law (Food and Agricultural Code section 13186) requires that:

Licensed pest control businesses shall report pesticide applications at schools annually (no later than January 3rd of each year) to the Director of DPR beginning with applications made on or after January 1, 2002. A downloadable copy of the Pesticide Use Reporting form for School Sites can be found in the laws and regulations section at www.cdpr.ca.gov/schoolipm or email school-ipm@cdpr.ca.gov.

SECTION 2

Adopting an IPM Program

One of the characteristics of an IPM approach that makes it so effective is that the basic decision-making process is the same for any pest problem in any location. The strategies and practices may change, but the steps taken to decide when action is needed, and which methods are appropriate, are the same each time. Thus, the pest manager does not need to memorize reams of pest control "recipes" for specific pests. Instead, it is an understanding of the components of an IPM program that must be mastered.

2.1 How to Develop an IPM Program

There are key components to the development of an IPM program. The adoption of an IPM policy by school administration is the most important, followed by educating key decision-makers about the need for the program and identifying the roles and responsibilities of the various members of the school community. IPM operations involve designing and implementing IPM programs for specific pests; training the pest management, custodial, grounds maintenance, and teaching staff in IPM methods; and institutionalizing the IPM program.

2.1.1 Adopting an IPM Policy

The first step towards implementation of an IPM program is the adoption of an IPM policy by the school board. See section 2.2 on "Developing an IPM Policy Statement for School Pest Management." A model school IPM policy and some California school IPM policies are provided in **Appendix E**.

BOX 2-1: Components of an IPM Program

Technical components include:

- Pest monitoring.
- Pest identification.
- Determining injury and action levels that trigger treatments.
- Timing treatments to the best advantage.
- Spot-treating the pest (in order to minimize human and other non-target organism exposure to pesticides).
- Selecting the least-disruptive practices.

Administrative components include:

- Adopting an IPM policy.
- Establishing a recordkeeping system.
- Evaluating the effectiveness of treatments to fine-tune future actions.
- Educating all people involved with the pest problem and with efforts for resolution.

Each of these components is discussed in detail in later sections of this manual.

2.1.2 Educating Key Decision-Makers

The key to a successful program is education of the school board, superintendent, business operations manager, principals, PTA officers, and other decision-makers about benefits from adopting an IPM approach.

Box 2-2: Identifying Pest Management Roles*

In successful school IPM programs, students, staff, parents, pest managers, and decision-makers all have important roles. These functions and responsibilities are identified below.

Students and Staff—The Occupants
Students and staff play major roles in keeping the school clean. Sanitation should not be viewed as only the custodian's job. If students and staff learn the connection between food, garbage and pests such as cockroaches, ants, flies, and rodents, they are more likely to take sanitation measures seriously and comply with them.

The Pest Manager/IPM Coordinator
The pest manager (often called the IPM coordinator) is the person who observes and evaluates the site (or directs others to do so) and decides what needs to be done to achieve the pest management objectives. This person is often the school site designee who is responsible for complying with the requirements of the Healthy Schools Act. The pest manager designs the IPM program and keeps accurate records of the amount and location of all treatments.

Decision-Makers
Generally, people who authorize the IPM program and control the funding for the pest management program are people involved in the school administration, such as a superintendent or assistant superintendent of schools. However, a person indirectly involved with the site may become a pest management decision- maker, e.g., the Health Department inspector. On other occasions, the purchasing agent or contracting officer for a school system or district may be a major decision-maker for a school site. Decision-makers also determine if the pest manager is performing at an acceptable level and if the pest management objectives are being met. Decision-makers must also provide the necessary level of financial commitment for any IPM program to succeed.

*Adapted from U.S. EPA, 1993

2.1.3 Identifying Pest Management Roles and Responsibilities

It is critical to have the support of representatives from all segments of the school community and that they be involved from the beginning in setting up the IPM program. This includes school board members, administrators and their staff, teachers, students, parents, custodians, food service workers, ground maintenance personnel, school nurses, and pest control professionals. When the respective pest management roles of those involved directly or indirectly with pests in the school system are identified and agreed upon, and when these people communicate well with each other, an effective IPM program can progress. A discussion of pest management roles and responsibilities is provided in **Box 2-2**.

2.2 Developing an IPM Policy Statement for School Pest Management

Schools need a clear policy statement to secure agreement about how pest control will be performed. The policy statement should include a statement of pest management goals, a set of roles and responsibilities for occupants, pest management personnel and key decision makers, and a set of pest management guidelines.

Districts develop and adopt written policies on many topics, including pest management, and make them available to all interested persons. Policies serve as direction for the operation and successful and efficient functioning of the district's schools. The Board policies provide direction to the district. Policies include the general goals and acceptable procedures for the school district. District policies are framed in terms of state laws and regulations and other regulatory agencies within state and federal levels of government.

Box 2-3: Tips for Starting an IPM Program

The following suggestions can help overcome barriers and smooth the transition to IPM implementation.

■ Require staff training in IPM. When writing the IPM policy document, include a requirement for the continuing education of pest management personnel. Ensure that budgetary allocations are made to assist them in obtaining the information, skills, and equipment they need to carry out the policy.

■ Start small. Begin IPM implementation in one location (e.g., a kitchen in a single school or a section of lawn at a single school) and include short-term objectives. For example, when dealing with a number of pest problems, identify one of the pests likely to respond quickly to an IPM approach, such as cockroaches, so a short-term objective can be realized. Test the IPM practices and fine-tune them. When the program is working successfully in one area, or against one pest, expand the program further.

■ Develop a list of resources. Know where information is available when needed, and know when to seek outside help. County Cooperative Extension personnel, teaching staff in the biology or entomology departments of a nearby university, staff at the local zoo, and even the high school biology teacher can help identify pests and their natural enemies. Ask these people if they know of experts in the particular pest problem. Gradually compile a list of people to call for advice. **Appendix G** can be the beginning of a resource list.

■ Always post the telephone number for the local poison control center in a prominent place.

■ Build a library for pest management personnel, staff, and students to use. Cooperative Extension publications are usually free or inexpensive and can be good sources of information on pest biology. Even though these publications do not always recommend the least-hazardous approach, they are still useful. The recommended reading section of this manual, **Appendix H,** lists many useful books.

■ Don't change everything at once. To the degree possible, retain communication and accountability procedures already in use. Tailor new record keeping and reporting forms to fit existing agency formats.

■ Recycle existing equipment to uses consistent with IPM methods rather than immediately eliminating the equipment.

■ Share the process. Involve members of the student body and staff, especially pest management personnel, in the day-to-day IPM program process as early as possible so they will understand and support the program during the sometimes difficult transition period.

■ Emphasize communication and plan for future training. During the IPM transition period, keep all personnel informed about what is planned, what is currently happening, the expected outcome, and what will happen next. Prepare written records and visual aids that will remain in the school when persons associated with development of the IPM program are no longer there.

■ Publicize the program. Develop good rapport with district public relations personnel and with the local news media. For interviews and photo sessions, include pest managers, custodians, and landscape maintenance personnel as well as principals, school board members, and the superintendent.

■ Involve the community. Form an IPM advisory committee (see section 2.4 for more information) composed of interested parents, school staff, community organizations, health specialists, and pest control professionals. They can help make IPM implementation a budgetary priority in the district, and can donate or locate resources that may not otherwise be available to the school.

*Adapted from Flint et al., 1991

The district also develops written administrative regulations and procedures, when such are required, to carry out the provisions of policies adopted by the board.

The California School Boards Association (CSBA) (http://www.csba.org) develops and provides sample policies and administrative regulations for its members, which include most of the school districts in the state. Contact CSBA to see the CSBA Sample Board Policy Business and Noninstructional Operations Environmental Safety (BP 3514(a)) and CSBA Sample Administrative Regulation Business and Noninstructional Operations Integrated Pest Management (AR 3514.2(a)), which include provisions and procedures that fulfill the requirements of the Healthy Schools Act.

See **Appendix E** for a model policy and examples of school board policies and administrative regulations from several Californian school districts.

2.3 IPM Operations

The operation of an IPM program involves designing IPM programs for specific sites and pests, delivering IPM services, and evaluating program costs. Fully developed, multitactic IPM programs are generally implemented in three stages, although components of each stage often overlap.

Monitoring and pest action thresholds should take the place of routine pesticide applications, and preliminary pest management objectives should be developed.

Box 2-3 outlines tips for getting programs started. The initial IPM program focuses primarily on moving away from routine use of pesticides by instituting a pest monitoring program to collect data and establish pest treatment (action) thresholds based on pest population levels (see sections 3 and 4 in part 1). A pilot program can be initiated at one school site, so new skills can be gained and techniques fine-tuned before the program is expanded throughout the system. Pesticides may remain the primary control agents used during this stage, but applications are made only when pest numbers reach action levels. Spot treatments rather than area-wide applications are stressed, nonvolatile baits and dusts are substituted for vaporizing sprays, and less hazardous soaps, oils, and microbial materials replace compounds that are more hazardous. At the same time, a planning process is established to set pest management objectives, identify the fundamental causes of pest problems in the school system, and assess methods to address these causes with primarily non-chemical solutions.

Pest management plans are formalized as a program becomes more mature. A concerted effort to maximize pest proofing, non-chemical pest suppression and education should be made as well as incorporating physical, mechanical, biological, and educational strategies and practices into the pest management program. Most pests found in school buildings can be attributed to faulty building design, lack of structural repairs, accumulation of clutter and paper, poor food handling and poor waste management practices. To achieve permanent solutions to pest problems, pest management staff must devote time to educating building maintenance and custodial staff, food handlers, and teachers and students about their role in attracting or sustaining pests, and enlisting their participation in solving the problems.

A similar process is needed to solve outdoor pest problems. For example, pest managers need cooperation from physical education and coaching staff to reduce stress on athletic turf that leads to weed problems. Landscape maintenance staff need encouragement to locate pest-resistant plant materials, increase diversity in the plantings to attract natural enemies of pests, and experiment with non-chemical pest control methods. Assistance from playground supervisors is needed to ensure that food debris and other wastes are placed inside waste receptacles where pests such as rats and yellow jackets cannot gain access to them.

The primary activities during this stage include developing site-specific pest management plans and educating all participants about their roles and responsibilities in helping to implement the IPM plans

2.3.1 Developing Site-Specific Pest Management Plans

Written plans help move school pest control from a reactive system to a prevention-oriented system. Annual plans enable pest managers to prioritize use of resources, justify planned expenditures, provide accountability to IPM policies, and coordinate with other components of the school system. These plans emphasize repairing buildings, changing waste management procedures to deny food, water, and shelter to indoor pests, and modifying plant materialsand landscape maintenance practices to relieve plant stress and improve plant health.

Costs of these repairs and changes may fall within ongoing operating expenses in existing budgets, or may require a one-time expenditure. In the long-term, however, these activities will reduce overall pest control costs as well as other maintenance and operating budget expenses.

2.3.2 Educating Participants

Food service and custodial staff, clerical and administrative staff, teaching staff, and students must be educated about their role in reducing pest presence and the necessity of a cooperative effort to control a pest.

Everyone must understand the basic concepts of IPM, who to contact with questions or problems, and their role in the program. Specific instructions should be provided on what to do and what not to do.

Teachers and other staff should be notified that applying pesticides (except those pesticides exempt from Healthy School Act requirements in **Appendix B**, such as baits) on school sites falls under the Healthy Schools Act and must meet all posting, notification, training, reporting, and record-keeping requirements. They should be provided with clear instructions on how and to whom to report a pest problem, rather than attempting to control the pest themselves. One option is to provide teachers and others with “pest alert” cards on which they can write the date, location, and pest problem. The card can be returned to the teacher with a notation of what was (or will be) done about the problem and what, if any, assistance is requested of the teacher and students (e.g., better sanitation in the classroom).

If information on IPM can be woven into the current curriculum, students and teachers will better understand their roles and responsibilities in the program, but more than this, students will carry these concepts into their adult lives. The following ideas are just a few of the ways that this information can be included in the school curriculum:

- Involve science classes in identifying pests and beneficial insects, and in researching IPM strategies.
- Involve art classes and English classes in developing simple fact sheets and other educational materials on various school pests. Use information from the individual pest management sections in this manual.
- Involve vocational classes in making site plans of the school to use for monitoring, site inspections for structural defects that may exacerbate pest problems, and suggestions for structural modifications to eliminate the problems.
- Involve journalism classes in reporting on the new IPM program.
- Use some of the innovative curricula available that emphasize IPM (see **Appendix F** for a list).

A mature IPM program may become institutionalized. This includes developing ongoing incentives and reward systems for achieving IPM objectives, establishing an IPM library of educational materials and staff training programs, and writing operations manuals that describe IPM policies and procedures to be followed by pest management personnel.

2.3.3 Develop Incentives and Rewards

Involve staff in establishing benchmark objectives (e.g., 20% pesticide reduction the first year, testing of boric acid in wall voids in place of broadcast spraying for cockroaches, raising of mowing height on turf to shade out weeds).

Reward staff for innovations and for achieving objectives (e.g., a letter of commendation, ognition at a staff awards picnic, article in local news media, travel authorization to an out-of-town IPM conference.).

Provide IPM educational materials and staff training programs.

IPM programs are information-intensive rather than treatment-intensive. This necessitates motivating pest control staff to try new approaches and broaden their professional skills.

Build an IPM library of literature and training videos, and provide time for staff to attend training seminars or take courses in pest identification.

2.3.4 Prepare an IPM Operations Manual

Written policies and procedures are needed to ensure clarity about responsibilities, authorized activities, permitted materials, and other program elements. A manual serves as an accountability mechanism, and helps ensure program continuity despite personnel changes. A loose-leaf binder that allows for addition or deletion of materials over the years is a convenient format. In addition to official policies and procurement practices, the manual should specify the following:

- Pest management objectives.
- The overall IPM process for managing each pest.
- Biological and ecological information on the pest and its natural enemies.
- The monitoring system for each pest (and natural enemies when appropriate).
- Injury levels (i.e., damage by pests) and action thresholds for pests.
- The method of recordkeeping system to be used (e.g., paper or electronic).

- How to interpret field data.
- How to obtain, use, and maintain equipment and supplies required to carry out monitoring and treatment activities.
- The range of treatment practices authorized for use against the pest and how to employ them.
- A list of pesticides authorized for use in the district and the Material Safety Data Sheet (MSDS) for each pesticide.
- Safety procedures and resources for emergencies.
- How to evaluate treatment effectiveness.

2.3.5 Building Support for the IPM Program

Once an IPM policy has been adopted by a school board, implementation is usually the responsibility of the IPM coordinator, who will instruct the in-house pest control staff or outside contractors (see section 2.7 on contracting for pest management services and **Appendix I** for sample IPM contract specifications).

Change never comes easily, and a number of predictable obstacles may exist within a school system—both psychological and institutional—to be overcome when initiating IPM programs. At the same time, even if the public has been involved with development of a policy, there are likely to be occasional complaints and controversies, especially as pests, pest control practices, and public concerns change.

For more information on how to develop a program and how to overcome barriers to adoption, read the UC IPM Publication 12 "Establishing Integrated Pest Management Policies and Programs: A Guide for Public Agencies" (see **Appendix J**).

2.4 Community-Based School District Advisory Committee

Many school districts have established an IPM advisory committee to assist with developing and implementing the district's pest management policy. This committee can be very useful in making suggestions, doing research, and bringing in new information, but it need not have authority to make policy. It is helpful if the committee also has an independent pest management expert (preferably one trained in IPM). This group can be a valuable resource for tracking and evaluating the progress of the IPM program in meeting the district-wide pest management goals. Involving diverse representatives of the community in policy development is a good way to draw together vast support for the policy and program later. Periodic reevaluation and advice of the committee on implementation will be very helpful to ensure that the district's IPM goals and objectives are achieved while providing the best support possible for constituent groups within the district. The committee can help make IPM implementation a budgetary priority in the district, and can donate or locate resources that may not otherwise be available to the district.

Ideally the advisory committee should include concerned parents, school administrators, faculty, staff, pest control operators, maintenance and operations staff, other professionals with pest management experience, physicians with toxicological expertise, environmental organizations, health advocates, interested organizations, and other members of the community.

The committee should meet at least once each year. Regularly scheduled IPM committee meetings are necessary to monitor and evaluate progress, correct inefficient procedures that hinder meeting the stated goals of the school IPM policy statement, and educate concerned individuals involved with the program.

2.5 Community-Based Standard for Notification and Posting

More stringent standards for notification and posting than those required by the Healthy Schools Act can be recommended by stake-holders such as the community-based advisory committee, the IPM coordinator, interested parents, or the School Board. The law states that warning signs must be posted around each area of the schoolsite where pesticides will be applied. It does not, for instance, specify how many signs are required or exactly where those signs should be placed. The law also does not describe exactly how parents are to be notified of pesticide applications. The stakeholders mentioned above may develop and recommend more detailed procedures to the School Board regarding posting or notification of pesticide applications.

2.6 Selecting and Training an IPM Coordinator

2.6.1 Healthy Schools Act Responsibilities of the IPM Coordinator

Under the Healthy Schools Act of 2000, Education Code section 17609(d), each school district is required to appoint a "school designee" who is responsible for carrying out the requirements of the Healthy Schools Act at the schools within the district. These duties include notification, posting, recordkeeping, and reporting. See section 1.4 for the requirements of the Healthy Schools Act.

If the school district decides to implement an IPM program, the school designee may be known as the IPM coordinator. Often the director of maintenance and operations is chosen as the designee or IPM coordinator. For districts where the IPM coordinator is not experienced in least-hazardous IPM, a professional IPM consultant may be hired to assist in implementing a least-hazardous IPM program.

2.6.2 Other Responsibilities of the IPM Coordinator Within an IPM Program

The IPM coordinator will acquire a number of responsibilities, some of which are not directly related to pesticide applications. The school district must ensure that the IPM coordinator is trained in least-hazardous IPM concepts and methods, as defined by the Healthy Schools Act. The IPM coordinator's duties may include some or all of the following:

- Serving as a primary contact for pest control matters and coordinating all pest control decisions for the school district.
- Leading the development and implementation of an IPM policy and program.
- Scheduling and facilitating pest management advisory committee meetings.
- Monitoring pest problems or areas where pest problems may occur (see section 3).
- Recording monitoring data.
- Setting pest management action levels.
- Recording all pest sightings by school staff and students.
- Facilitating communication about pest management among all personnel levels in the district.

- Having school pests accurately identified (this can be accomplished with the aid of the County Department of Agriculture, University of California Cooperative Extension, and the entomology or botany departments of local universities or community colleges, see also **Appendix K**, How to Collect and Preserve Specimens for Identification).
- Devising IPM plans for school pests.
- Making decisions about appropriate pest management actions.
- Recording all pesticide use and other pest management actions.
- Sending Pesticide Use Reports to the California Department of Pesticide Regulation.
- Evaluating the effectiveness of pest management procedures and revising IPM plans accordingly.
- Ensuring the completion of work orders for structural repairs and housekeeping and sanitation measures intended to reduce or prevent pest problems.
- Ensuring that all staff using pesticides have completed DPR Healthy Schools Act training.
- Coordinating with principals and district administration to carry out the education and IPM training provisions of the district's IPM policy.
- Coordinating the collection and dissemination of current information on pest management and pesticides or pest-related health and safety issues to staff and faculty.
- Overseeing pest management contractors.
- Informing contractors of the district's IPM policy and pest management procedures.
- Assuring that all of the contractor's recommendations on maintenance and sanitation are carried out where feasible.
- Ensuring that pest management implications are considered when planning new construction or site modifications.
- Meeting with the press and/or community groups about pest management issues.

An individual selected to be a school IPM coordinator must be knowledgeable in many areas. The school district should ensure that the IPM coordinator is trained in IPM concepts and methods. The IPM coordinator must be conversant in the following:

- The nature and benefits of IPM.
- IPM policy implementation.
- Components critical for success of an IPM program.
- Recordkeeping, notification, posting, reporting, and training requirements pursuant to the Healthy Schools Act.
- Pest control measures including prevention, and mechanical, cultural, biological, and chemical controls.
- Pest identification and reporting.
- Monitoring and inspection for pest problems.
- Program evaluation and quality control.
- Communication and interaction with the school community.
- Communication with mass media, the community, and parents.
- Community outreach and interaction.
- Liability issues in pest management and the operation of schools.
- Bids and contracts.
- Pesticide Safety Information Series leaflets, published by DPR.

2.7 IPM Contract Performance Specifications

Integrated pest management conducted by professionals should lead to a safe school free from significant pest problems and potentially harmful pesticide residues. Hiring a professional service to conduct pest management relieves the school district from the responsibility of having trained staff, storing potentially harmful chemicals, and continually maintaining a set of complex records. However, hiring a professional service does not exclude the importance of communication, follow through, and making sure that the contracting process achieves the desired result. This includes hiring a pest management company that is truly service-based and experienced in least-hazardous integrated pest management.

There are several categories of pest management services available for hire, primarily general pest control (indoors and around the perimeter of a structure), termite inspection and control, vertebrate pest control (birds and mammals such as skunks, ground squirrels, and feral dogs and cats), and weed management. There are also IPM consultants that schools can contract with to help develop an IPM plan, educate school personnel and evaluate pest control contractors. Clearly, not all companies offer the same range of service. More often than not, companies (usually the smaller companies) are not licensed in both agricultural and non-agricultural categories. Companies licensed by the structural pest control board usually do termite management, general pest management, and some vertebrate pest management (rats, mice, and some birds). Companies licensed by DPR generally do weed management and some vertebrate pest management. Finally, DPR licenses companies that do maintenance gardening and some insect and weed management. Note that when it comes to mold in buildings, different licenses are required. Consideration should be given to what is likely to be encountered in the task. For example, assume mold is the problem to be remedied, but in the process of reconstruction, dry rot is found. Does the process stop because the company is not licensed to handle dry rot or can the company handle both types of problems? The pest manager must determine whether the contractor is qualified to handle both problems.

2.7.1 In-House or Contracted Services?

IPM programs can be successfully implemented by "in-house" school employees or by contracting with a pest control company. A combination of in-house and contracted functions may also suit the needs and capabilities of the school system. Each approach has advantages and disadvantages. Individual school systems must decide what is best for them given their unique circumstances. Whether using in-house or contracted services, pest management personnel should be trained to:

- Understand the principles of IPM.
- Identify pests and associated problems or damage.
- Monitor infestation levels and keep records.
- Know cultural or alternative methods.
- Know recommended methods of judicious, least-hazardous pesticide application.
- Know the hazards of pesticides and the safety precautions to be taken.
- Know the pesticide label's precautionary statement(s) pertaining to exposure to humans or animals.

2.7.2 In-House Services

One of the most important tasks for an in-house program is training staff to function within an IPM framework. Universities and State Cooperative Extension Services have the expertise to meet most IPM training needs. The Department of Pesticide Regulation has a School IPM training program to help train school districts. This guidebook is the basis of this training program. A Web site is also available with information and links for School IPM. See www.cdpr.ca.gov/schoolipm.

2.7.3 Contracted Services

Pest control firms should work with the pest manager and the responsible school official to solve pest control problems. Use of an outside pest control firm may increase costs but eliminate the need to hire and train personnel and store pesticides. The contract should specify the use of least-hazardous IPM principles and practices in meeting pest management objectives.

When choosing a pest control firm, request references that attest to their knowledge and experience with least-hazardous IPM, as well as previous experience in schools. Contact the local Better Business Bureau for information about whether they have received complaints about a pest control company. State regulatory agencies can also provide information on pesticide applicator certification

The pest management services contract should include IPM specifications. Contracts should be written to provide expected results. Pest management objectives specific to the site should be jointly developed, agreed upon, and written into the contract. Any special health concerns (such as those for old or young persons, for pets, or for individuals who are allergic) should be noted and reflected in the pesticides that can be used, or excluded from use.

If the school district is considering or has decided to use a contractor to implement an IPM program, the sample contracts in **Appendix I** can be used or adapted.

2.8 The IPM Decision-Making Process

This decision-making process, basic to IPM, helps answer four key pest management questions: IF treatment action is necessary, WHERE treatment activity should take place, WHEN action should take place, and WHICH mix of treatment practices are the best to use. See **Figure 2-1** for a flowchart of the IPM decision-making process.

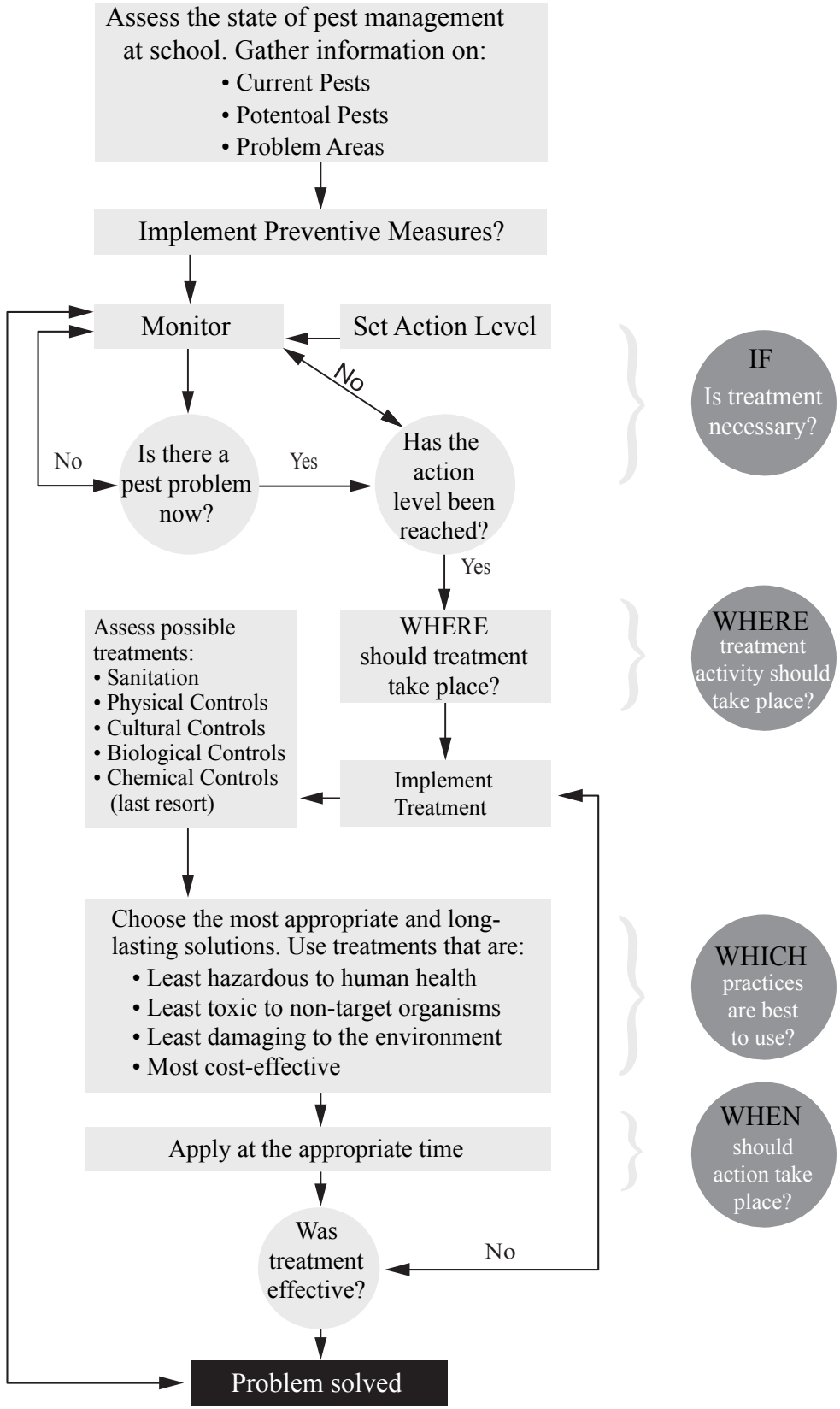
2.8.1 IF Treatment Action Is Necessary

Instead of taking action at the first sign of a potential pest, the IPM process begins with asking whether any actions at all are needed (see section 4 for a discussion of injury and action levels). Sometimes, even a fairly large population of pests can be tolerated without causing a problem. In other cases, the presence of a single pest organism is considered intolerable. In still other cases, what is considered a pest by one group in society may be considered innocuous by another.

Example: Occasionally when the weather is hot and dry, field cockroaches (Blattella vaga), small brown roaches that resemble the German cockroach, visit schools. Field cockroaches actually prefer to live outdoors in leaf litter and are only occasional indoor guests. By monitoring them with sticky traps, you'll see that their population is not increasing and they do not become established indoors.

Figure 2-1: Flowchart of the

IPM Decision-Making Process



Example: Large rodent droppings and grease trails suggest there is a rat in a crawl space under the eaves. Even one rat can be a problem because it can gnaw on electric wires causing fires and leave fleas that can transmit pathogens to humans. Treatment action is usually required even if only one rat is suspected.

2.8.2 WHERE Treatment Activity Should Take Place

If it is decided that some treatment action is necessary, the IPM process encourages pest managers to look at the whole system for the best place to solve the problem. Treatment should take place where actions will have the greatest effect.

Example: When Argentine ants invade classrooms, it's tempting to douse them with an aerosol spray. Only a fraction of the worker ants are actually out foraging at any one time, and if these foragers are instantly killed, the pesticide doesn't poison nest mates and queens. It is more effective to eliminate indoor ant trails with soapy water and place self-contained baits out- doors. Ants will aggregate around the baits, so if you locate these indoors, you'll attract even more ants from outlying areas in the place where you don't want them.

2.8.3 WHEN Action Should Take Place

The timing of treatments is important. Often there is an optimal time in the life cycle of the plant or the pest to apply control measures. Conversely, there may be times when treatments actually increase pest problems. The human social system will also affect the timing of treatments. The IPM process encourages managers to discover the best timing for treatment actions (see section 5.2, "Timing Treatments") since long-term success of any treatment depends on timing..

Example of timing in the life cycle of a plant: Yellow starthistle, Centaurea solstitialis, is an annual weed that grows in disturbed areas. As with many weed species, mowing before the plants flower is much more effective than battling seed head-laden plants later in the season.

Example of timing in the life cycle of a pest insect: In the spring, yellowjacket queens are busy establishing nests. It's much more effective to trap these queens and the first flush of foraging workers then, rather than waiting until summer or fall when putting out traps will barely make a dent in the population.

Example of timing in the social system: When switching to IPM, it is essential to coordinate the IPM program plan with the overall budget process of the school district. For example, improving rodent and fly management may require modifications in food storage facilities or in the disposal of kitchen garbage. Substantial repair to windows or plumbing may be needed. Requesting funds for activities such as minor construction or new containers must be done at the appropriate time in the school district's budget development process.

2.8.4 WHICH Mix of Treatment Practices Are the Best to Use

There are three guiding principles to use when choosing treatments: conserve and enhance naturally occurring biological controls; use a multitactic approach; and view each pest problem in its larger context.

Conserve and Enhance Naturally Occurring Biological Controls

In a landscape setting, when we kill the natural enemies of pests, we inherit their work. In many cases, the combined action of all natural enemies present may result in substantial pest control. Even when they are not able to do the complete job, natural enemies are nonetheless providing some help in protecting school landscape plants from pest insects. The IPM program should be designed, when possible, to avoid damaging natural enemies.

(See "Biological Controls" in section 5.3 for more information).

Example: Many spider mite populations on various trees and shrubs are kept under control by naturally occurring predatory mites. In fact, the predators keep them under such good control we may never be aware of their presence until we spray a pesticide intended to kill more obvious pests, such as aphids. For a number of reasons, most pesticides are more harmful to the predatory mites then the pest mites. The pesti- cide kills almost all of the predators, the spider mites are only slightly affected, and now that they are free from their natural enemies, the pest mites quickly multiply and devastate the plant. By changing the practices for controlling the aphids, a spider mite problem can be avoided.

Use a Multi-Tactic Approach

Every source of pest mortality, no matter how small, is a valuable addition to the program. Biological systems are so complex, rarely will a single practice, such as the application of a pesticide, solve the problem for long. As many non-hazardous practices as needed should be combined to manage the pest problem.

Example: Controlling cockroaches requires direct practices such as applying boric acid dust to cracks, crevices, and wall voids; placing baits in areas inaccessible to students; using an insect- growth regulator and boric acid water washes in areas not in direct contact with food or people; and releasing parasitoids for certain roach species. But long-term cockroach control must also include habitat modification such as caulking or painting closed cracks and crevices; screening vents that may be used by cockroaches to travel between adjacent areas; eliminating water leaks and cracks around plumbing fixtures; and im- proving the storage of food supplies and organic wastes.

View Each Pest Problem in Its Larger Context

Each pest problem must be considered within the framework of the larger system in which it has arisen. Textbooks and manuals commonly treat pest problems one by one. However, in the real world setting of a school and the grounds around it, pest problems occur several at a time or in a sequence in which the management of one influences the others. In addition, pest problems are influenced by other human activities such as waste disposal and food handling indoors, and mowing, fertilizing, and irrigating outdoors, as well as the attitudes of the many people who work and study within the district. Using IPM means taking a whole system or ecosystem management approach to solving a pest problem.

A successful IPM program considers all of the components of an ecosystem. As biologists and ecologists use the term, an ecosystem is usually thought of as containing non-living (abiotic) and living (biotic) components. For instance, if one considers a school building as an ecosystem, the abiotic components of the building would be the building itself and the equipment and furnishings within it.

The biotic components would be the people, insects, spiders, and other creatures that live or work in the building.

It is essential to consider who is involved in an IPM program—the social/political components. In a school system, this category includes teachers, students, custodians, grounds maintenance staff, food handlers, clerical staff, health personnel, carpenters, plumbers, pest control companies, refuse collectors, and other outside service providers who might be contracted for specific work in or around the school. The school district administration and school board, school neighbors or adjacent landowners, associated public agencies or institutions, professional associations and community groups, and the public must be included. The political and legal constraints of society should also be taken into consideration.

The many components of the school ecosystem can be thought of as a series of systems, each having an impact on the other and all potentially impacted by a pest management program. To design and implement a successful IPM program, it is necessary, at least to some degree, to be aware of and obtain information from each of these components.

This raises the classic problem in systems management: where to draw the boundary of the system. If the boundaries are drawn too narrowly and include only the pest, something important may be missed, like the fact that people are leaving food out at night that feeds the pest. It is better to read, question, and observe as much as possible about the larger system in which the pest problem exists. Otherwise, there is a risk that the solution to the pest problem will be overlooked.

Example: A nuisance fly problem inside the school may prompt use of space sprays or pesticide-impregnated plastic strips. A less hazardous quick fix might be to purchase and install electric insect traps. A broader view could lead to the observation that some window screens need repair and could be improved by the addition of weather-stripping around the frames to exclude flies. A still-larger view might include the observation that the outdoor trash containers on the school grounds are inappropriately placed or not adequately cleaned after being emptied each week, thus attracting flies.

Changing these conditions will involve cooperation from the custodial and maintenance staff. Perhaps the outdoor trash receptacle needs to be moved a greater distance from the door. Perhaps more frequent removal and replacement of the outdoor trash receptacle may be desirable. This will undoubtedly have budgetary consequences and will involve negotiations outside immediate school personnel. Ultimately it may be discovered that the flies are part of a community-wide problem. Complaints from the school system to the local municipal government may help in changing area-wide waste management practices. At first it may seem that there is little that a few individuals can do to influence the process of change in the larger ecosystem; however, the individual schools and the school district can assume a leadership role in educating their community about safer and more lasting methods of pest management. This can be done indirectly by educating the student population, and directly through the participation of school personnel in community forums on pest management-related matters.

Please see section 5, “Selecting Least-Hazardous Pest Control Practices” for more detailed information on the IPM decision-making process.

2.9 IPM Program Evaluation

An IPM-oriented program views the need to regularly apply pesticides as an indication that the program isn't working efficiently, and seeks other solutions in order to reduce pesticide use. One of the most important components of an IPM program is evaluating whether the IPM policy is being implemented and that specific pest problems are being solved. Evaluation is rarely done in conventional pest control. Evaluation should occur after each treatment and may involve monitoring.

For purposes of overall evaluation, it is helpful to view the IPM program as composed of many simultaneously occurring, interacting systems or processes. These can be either technical or administrative in nature.

Technical aspects to consider include:

- Prevention of pest infestations.
- Pest monitoring.
- Recordkeeping.
- Decision-making regarding pest treatment activities.
- Delivery of pest treatments.
- Evaluation of treatments.

Administrative aspects to consider include:

- Collection and cataloging of reference materials on management of the pests.
- Education and training of school personnel in IPM.
- Communication to school personnel regarding IPM program plans and progress.
- Budgetary planning.

Each of these components should have, as part of the development of the initial program plan, some expressed objectives or criteria by which the component is judged successful or not. Nevertheless, in addition, it is important to determine the following:

- Were all the necessary components to the program actually developed?
- Were they integrated successfully?
- Were the right people involved in the integration of the components into a whole program?

2.9.1 Questions to Ask After Treatment Action

At the end of the year, use monitoring data to answer the questions below and make any necessary adjustments in methods for the next season. After two or three seasons of fine-tuning, including modifying the habitat, redesigning parts of the school facility, or changing behavioral practices to discourage pests, it is reasonable to expect problems to have lessened considerably, and in some cases disappear. After reaching this point, periodic monitoring rather than active management may be all that is needed. See also **Appendix L**, *Pest Management Assessment Tool.*

- Was the pest population adequately suppressed below the set injury level?
- Was the pest population suppressed in a timely manner?
- Was the planned procedure used? If not, what was different?
- What damage was produced? What damage was tolerable?
- In the landscape, were natural enemies affected by treatments? How?

- If natural enemies were killed by a pest management treatment, will this cause a problem elsewhere or at a later period?
- Were there any other side effects from the IPM treatments? Were there any unanticipaed consequences (good or bad)?
- If ineffective, should the treatments be repeated or should another kind of treatment be evaluated?
- Is the plant or structure worth maintaining? Can the site be changed to eliminate or reduce the problem for the same costs of treatment?
- What were the total costs of the treatment—costs of suppression vs. cost of damage, costs of unexpected consequences, costs of risks from pesticides or benefits from reduction of pesticides.

2.9.2 Assessing Cost-Effectiveness

Cost-effectiveness is crucial to continuation of an IPM program. According to U.S. EPA (U.S. EPA, 1993), "preliminary indications from IPM programs in school systems suggest that long-term costs of IPM may be less than a conventional pest control program." Data from IPM programs in school systems and park districts across the country show that IPM can cost no more than conventional spray programs, and often costs considerably less. A DPR survey conducted in 2002 received responses from more than 400 school districts in California (Geiger and Tootelian, 2002). Some examples of cost-effectiveness are discussed below.

Two schools in Santa Barbara County, Peabody Charter School and Vista de Las Cruces, were demonstration sites in the Pesticides Reduction in Schools Project. The project was funded by U.S. EPA and the Santa Barbara Foundation, and managed by the Community Environmental Council and Organic Consulting Services (Boise and Feeney, 1998). They found that an IPM-based system was more effective in controlling pests, while saving money.

Staff time devoted to controlling ants at Peabody Charter School was reduced from eight hours per week to two and a half hours per week, a reduction of 70 percent. Long-term control of cockroaches required an initial investment of 14 hours to caulk cracks and crevices and to apply boric acid. These treatments for cockroaches did not have to be repeated and pest populations decreased. The cost of these treatments was $705.

Vista de Las Cruces School contracted for their pest control services prior to the IPM program. The monthly perimeter sprays to control indoor pests cost $1,740 per year. The school chose to cancel the contract and assign all pest management duties to the head custodian. The expenditures for pest management were reduced to $270 for a two-year period and the head custodian did not spend any additional time on pest management. Weeds are another pest management challenge at Vista de Las Cruces School. An application of mulch is expected to control weeds for three to five years and to cost $2,170. The previous cost of chemical herbicides was $934 per year, not including labor.

The Ventura Unified School District has reduced its reliance on herbicides by 95 percent while staying within historical spending limits for weed control materials. The money saved on herbicides was used to purchase mulch and a steam weeder with money left over for a contingency fund.

The Ann Arbor School District in Michigan found that hiring a contractor to monitor 35 schools on a regular basis, and treat only if action levels were reached, resulted in only a single treatment (a crack-and-crevice application of boric acid for cockroaches) during the course of a full year. In the first IPM year, this program cost the same as the previous conventional program. Costs were expected to drop the second year when in-house staff were scheduled to assume monitoring responsibilities (Cooper, 1990). In the 1999-2000 school year, 9 percent of the total budget for the Ann Arbor School District was used for operations and maintenance (Ann Arbor Public School District Web site at http://www.a2schools.org.

A conventional pest control program at the Monroe County School District in Indiana, a 19-school district cost $34,000 annually. After an IPM program was implemented, the cost dropped to $28,000 (Forbes, 1991). As of 1998, the district realized a 35 percent reduction in pest management costs ("Cost of IPM in Schools).

Whether an IPM program raises or lowers costs depends in part on the nature of the current housekeeping, maintenance, and pest management operations. The costs of implementing an IPM program can also depend on whether the pest management services are contracted out, performed in-house, or both.

Before 1985, Maryland's Montgomery County Public Schools had a conventional pesticide-based program. More than 5,000 applications of pesticides were made to school district facilities that year. Public concerns about potential hazards to students and school personnel led to development of an IPM program that emphasized prevention through sanitation and habitat modification, and less hazardous baits and dusts in place of conventional sprays. By 1988, annual pesticide applications had dropped to 600, and long-term control of pests had improved. According to William Forbes, pest management supervisor for the district, under conventional pest control in 1985, the district spent $513 per building per year. This covered two salaries, two vehicles, and materials for two employees who serviced 150 sites. Only crawling insects and rodents were managed by in-house staff. The IPM program serviced 200 school buildings (a 33 percent increase in the number of sites) for a cost of $575 per building per year, which covered three salaries, three vehicles and supplies. Contracting services, however at 11 of the sites cost an additional $2,400 per building per year under the conventional program. By 1988, under an IPM program, those same eleven sites were being managed by in-house staff at a cost of only $500 per site per year. In addition, no outside contracting was needed and the program covered virtually every structural pest, from pigeons to termites (Forbes, 1991). In 2002, operations and maintenance costs were $1.7 million out of a total budget of $1.4 billion (Montgomery County Public School District Web site).

During the start-up phase, there are usually costs associated with conversion to IPM. This is particularly true in schools that have not been well-maintained. Examples of these one-time expenses that may produce future budgetary savings include:

- Installing physical barriers such as air curtains over the outside entrances to kitchens to reduce flying insect problems. This is a one-time cost and results in fewer flying insect problems and a savings in years to come.

- Stepping up structural maintenance to correct such situations as leaky pipes. This effort reduces future maintenance problems, prevents pest problems, and saves money and energy in the long term.
- Training and/or certifying staff in IPM. The amount of information necessary to implement IPM is greater than that required for conventional pest control. As a consequence, training or certifying staff in IPM will probably increase costs.
- Re-landscaping the area adjacent to buildings to discourage pests.

Other expenses might include building repair and maintenance, new waste storage containers, screening, traps, and/or a turf aerator. These expenses are usually recouped within the first few years of the program, and benefits continue to accrue for years.

Whether such costs are budgeted as a pest control expense or distributed to the building maintenance budget or the landscaping account depends on the budgetary format of the school system. In the long term, training, repair and maintenance activities, and equipment purchases will reduce overall costs of the pest control operations, as well as other maintenance and operating budgets.

2.9.3 Efficient Procurement

Some non-pesticide products, such as traps, can be stocked to reduce purchases in future years, but few savings can be realized by purchasing pesticides in bulk. It is probably best to keep no more than a 60-day pesticide inventory to assure product freshness and to avoid limiting cash flow. Pest managers should be able to anticipate needs to fit a 60-day buying schedule.

Successful practice of IPM relies on accurate recordkeeping, which leads to procurement that is more efficient. As the IPM program progresses, predictable events and pest control needs will be identified. Close consultation with the pest management specialist is essential for good decisions on purchases within the budget.

SECTION 3

Monitoring Pest Populations and Damage

IPM is based on consistently inspecting and monitoring for pests. The purpose of monitoring is to supply recent, accurate information with which appropriate decisions for managing pests can be made. Guidelines for making appropriate decisions can be established prior to monitoring (see section 4 on "Seting Injury and Action Levels"). Since each site is different, pest management decisions will depend on the circumstances encountered.

Monitoring as part of IPM was originally developed for agriculture. Over the years, this concept has been adapted for gathering information on pests of landscapes and structures in urban settings.

A regular and ongoing monitoring program will help answer the following questions:

- What is the extent of existing pest problems?
- Where are they located?
- What other pest problems exist?
- How are pests entering the building?
- What are the pests' sources of food, water, and shelter?
- Are there conditions conducive to future pest problems that can be corrected?

This section provides a general overview of how to set up and operate a monitoring program. Detailed discussions on monitoring techniques for individual pests are provided in Part 2.

3.1 What Is Monitoring?

Monitoring is the planned, regular visual inspection of an ornamental planting, landscape or structure for detecting pests, pest damage or conditions conducive to pests or pest damage. Monitoring should take place in areas where pest problems do or might occur. Monitoring frequently includes the use of pest traps, such as sticky traps for cockroaches. Information gathered from these inspections is always written down to help determine what actions to take. Examples of monitoring forms are provided in **Appendix M**. An inspection checklist for detecting structural decay and structural pest damage is provided in **Appendix N**.

3.1.1 Not Enough Time or Money?

Time and money will constrain what will realistically be possible. The most important thing is to go out and look at the problems, and write down what is observed. Figure out how monitoring can be included along with routine maintenance activities to ensure that this will be done. Make sure that personnel who are asked to monitor understand what to look for and how to record the information. Supply them with easy-to-use monitoring forms whenever they go out. If the school is contracting out its pest control services, give the pest control company copies of these forms to use or have them develop their own forms subject to the approval of the school's pest manager.

3.1.2 Levels of Effort Used in Monitoring

Monitoring need not be time consuming. The idea is to match the level of monitoring effort to the importance of the problem. Monitoring can vary from the extremely casual to the statistically strict, depending on what is most appropriate. The levels of effort are:

1. Reports from other people's (e.g., teachers) informal observations. This can be useful if used with a pest-sighting log to record verbal reports.
2. Monitoring as part of other tasks, with written observations. This serves to catch pest problems as they begin.
3. Careful inspection with written observations should be conducted when pest problems are significant.
4. Regular written observations and quantitative descriptions are appropriate when working on a pest problem related to public health.

3.2 Why Monitor?

A monitoring program increases familiarity with the workings of the target system. This knowledge allows anticipation of conditions that can trigger pest problems, and thus prevent them from occurring or catch them before they become serious. Monitoring enables intelligent decisions to be made about pest management actions, such as sealing cracks or setting traps.

Monitoring helps determine if action is needed. Is the pest population getting larger or smaller? If plants are being monitored, is the natural enemy population getting larger or smaller? These questions affect whether or not treatment is needed. These answers depend on inspection of the problem sites on several different occasions. How many pests or how much pest damage can be tolerated? This is also referred to as setting injury and action levels, which is discussed in detail in section 4. Even when tolerance for pest presence is at or near zero, as in the case of rats, monitoring will result in early pest detection, reducing the likelihood of unexpected pest outbreaks.

Monitoring helps determine where, when, and what kind of treatments are needed. This includes preventive treatments such as pest proofing and sanitation. Monitoring will show where these are most needed. It is unnecessary (and expensive) to treat all parts of a building or all plants on the school grounds for a pest when not all areas may be equally infested. Monitoring will pinpoint infestations and problem areas. On plants, monitoring will help time treatments to target the most vulnerable stage of the pest. The vulnerable stage may vary depending on the type of treatment used.

Monitoring allows evaluation of pest management actions. Monitoring after an action will show the success or failure of that action, so that future actions can be modified.

- Did the action reduce the number of pests below the level that causes intolerable damage?
- How long did the effect last?
- Did the action have to be repeated?
- Were there undesirable side effects?
- Do pest management action plans need to be adjusted?

3.3 What to Monitor?

Monitoring plants and their pests includes the regular observation and recording of:

- The condition of the plants (their vigor and appearance).
- The kind and abundance of pests (e.g., insects, mites, moles, and weeds) as well as natural enemies (e.g., ladybugs, spiders, lacewing larvae, and syrphid fly larvae).
- The amount of plant damage.
- Weather conditions (record any unusually dry, hot, wet, or cold weather in the last few weeks).
- Human behaviors that affect the plants or pests (e.g., foot traffic that compacts the soil, physical damage to plants caused by people, and insistence on having certain plants grow in inappropriate situations).
- Cultural practices (e.g., pruning, fertilizing, mulching, and treating pests) and their effects on the plants and the pest population.

Tables 3-1 and **3-2** provide more information to help quantify monitoring information. Using the abundance ratings in **Table 3-2** will make monitoring faster and easier, and will help standardize observations. If data that is more precise is needed, count the number of pests or their signs in a given area or on a certain number of leaves.

Monitoring weeds should be a seasonal activity timed to determine new weed pests or those that escaped treatment.

- Evaluate cultural practices that may favor weeds such as mowing, aeration, fertilizer use and irrigation practices.
- Review foot traffic patterns that may increase weeds.
- Monitor in spring and summer when most weeds are present and can be identified.

Monitoring structures involves the regular observation and recording of:

- The conditions of the building inside and out (e.g., structural deterioration, holes that allow pests to enter, and conditions that provide pest harborage).
- The level of sanitation inside and out (e.g., waste disposal procedures, level of cleanliness inside and out, and conditions that supply food to pests).
- The amount of pest damage and the number and location of pest signs (e.g., rodent droppings, termite shelter tubes, and cockroaches caught in traps).
- Human behaviors that affect the pests (e.g., working conditions that make it impossible to close doors or screens, food preparation procedures that provide food for pests, etc.).
- Management activities (e.g., caulking, cleaning, setting out traps, and treating pests) and their effects on the pest population.

Table 3-3 provides specific information on monitoring tools for both plants and structures.

3.4 Identifying the Target Pest

It is extremely important to correctly identify the problem pest and the cause of the pest problem. A pest cannot be effectively managed without knowing what it is or why it is present. For instance, putting out mousetraps to control what is really a rat problem can only result in failure. Setting out ant baits without caulking their entry point will not prevent more ant problems later.

The UC IPM Pest Notes in Part 2 provide information that will help identify some of the most common pests found in and around schools. Take a specimen to a professional for identification for unusual pests. **Appendix K** describes how to properly collect and preserve an insect or plant specimen when seeking identification.

Once the pest is identified, read about its life cycle, food sources, habitat preferences, and natural enemies. Part 2, the UC IPM Pest Notes, will provide this information for the common pests, but if the pest is not included here, check the Recommended Reading section, **Appendix H**, at the end of this manual for books that can help. Knowing the life habits of the pest will give clues about what to look for when monitoring and help decide how to best manage the pest.

If only damage symptoms and not the pest itself are visible, a sleuthing job is in order. More observation or observation at a different time of day may be necessary. Talk to other pest management professionals, local gardeners, nursery personnel, Cooperative Extension staff, or university researchers.

3.5 Timing Monitoring Activities

Timing and frequency of monitoring differs depending on the site and the pest(s). Outdoors, monitoring usually begins when plants put out new leaves in spring, and ends when leaves fall in autumn. Plants with annually recurring pest problems receive more attention than relatively pest-free plants. Monitoring can be incorporated into routine grounds maintenance activities such as weekly mowing, or can be a separate activity that occurs bi-weekly, monthly, or less frequently, depending on plant, pest, site, weather, and other factors.

Indoors, monitoring might occur weekly during the early stages of solving a serious pest infestation, then taper off to monthly, once the pest problem is under control. Some pests are more active at night than during the day, thus, some monitoring may need to occur after dark. This is usually only necessary when trying to identify a nocturnal pest or trying to determine its travel routes and feeding habits. Once this is known, nighttime monitoring can often be replaced by daytime inspection of traps and plant foliage for signs of pest presence.

3.6 Recordkeeping

A monitoring program is only as useful as its recordkeeping system. Records serve as the memory of the IPM program and are more accurate and detailed than human memory. Written records must be kept and made available by request for at least 4 years. Use of written records can avoid erroneous conclusions when comparing effects of treatment or other variables on the pest problem.

Recordkeeping is important to the pest manager because:

- Written observations about the specific pests and their management increase the pest manager's knowledge.
- More can be learned about the specific pest problems because details, such as past treatment success or failure, won't be forgotten.

Recordkeeping is important to the school system and the IPM program because:

- Monitoring records form the basis for making decisions on the most sensible distribution of available resources to the areas most in need of attention or observation.

- Information can be easily and accurately passed from one employee to another.
- Information is not lost when employees leave or retire

What Should the Records Show?

- What is being monitored—name of the pest (common name and scientific name, if possible), stage of the pest (immature, adult), and for landscape pests, the name of the plant.
- Where monitoring is done—a map is always useful.
- When monitoring occurs—date and time.
- Who is doing the monitoring?

The rest of the information to record is listed under "What to Monitor," above. As mentioned before, the information in **Tables 3-1** and **3-2** will help to standardize some of the observations. **Table 3-1** is specifically for plants, but **Table 3-2** can be used for structural pests as well as plant pests.

It is also important to standardize the format and the process by which the records are kept in order to maintain continuity from season to season and person to person. See **Appendix M** for sample forms. Design forms with boxes to be checked off so less writing will be necessary.

Pest patterns emerge quickly when data gathered during monitoring are made visual, facilitating decision-making. This can be done by hand on graph paper, or by using one of the many graph-making features included in spreadsheet software. **Figure 3-1** shows fluctuations in cockroach trap counts.

3.7 Evaluating the Actions

Without evaluating the actions taken to reduce the pest problem, it will not be possible to improve the management program from year to year. Ask the following questions:

- Was the pest problem a significant one?
- Were the actions taken necessary or would the problem have gotten better if left alone?
- Did the actions taken and the least-hazardous treatments used adequately solve the problem?
- Could the problem be managed better next time? If so, how?
- Is more or better information needed to make treatment decisions in the future?

See **Appendix L** for sample pest management assessment of a school IPM program.

Table 3-1: Plant Condition Rating*

	Indicators of Plant Condition			
Plant Condition	Leaf Color	Amount/Size	Damaged Plant	Presence of Pest
EXCELLENT	Good	Adequate	None to few	No major ones
GOOD	Good	Slightly reduced	Few to common	A few minor ones
FAIR	Poor	Much reduced	Common to abundant	Either major or minor ones occurring frequently
POOR	Poor	Severely reduced	Innumerable	Both major and minor ones occurring frequently

Leaf Color: Note that there are healthy plants that do not have bright green leaves. Leaves can be purple, yellow, or sometimes a mottled yellow and green (variegated). "Good" leaf color will not always be the same; it will depend on the kind of plant.

Amount/Size of Growth: This refers to the length of the new growth for the season as well as the number of new leaves, and the size of the leaves, flowers, or fruit.

Damaged Plant Parts: Look at the whole plant. Are there leaves with holes, spots, or discolorations? Are there wilted or dead leaves? Are there dead twigs or branches? Is the damage only on old leaves while new leaves look perfectly healthy?

Presence of Pest Problems: A major pest problem is one that has seriously affected or injured the plant and requires management. A minor pest problem may or may not have affected or injured the plant and may or may not require management.

*Adapted from Michigan State University, 1980

Table 3-2: Pest and Plant Damage Abundance Rating*

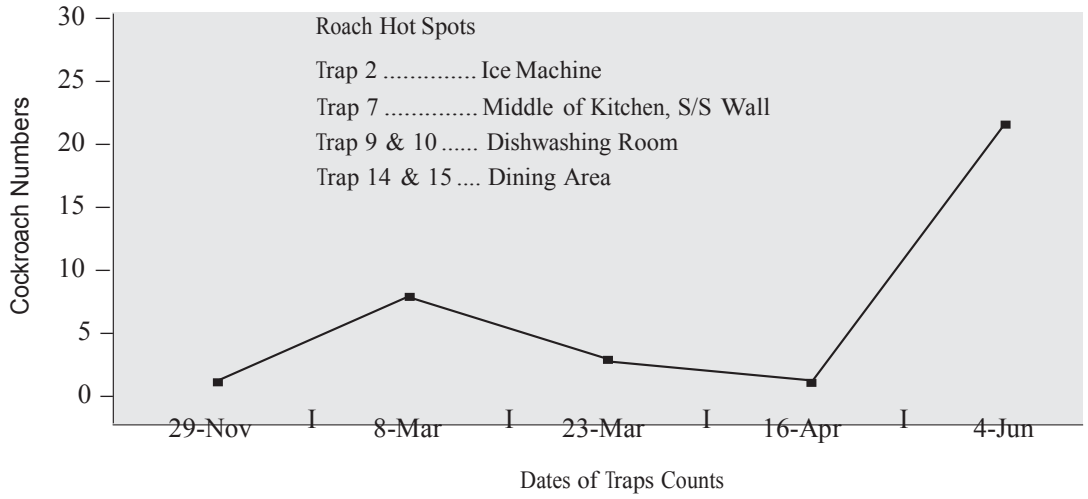
Abundance Rating	Indicators of Abundance
Few	Organisms or plant damage occasionally found, but only after much searching
Common	Organisms or plant damage easily found during typical searching
Abundant	Organisms or plant damage found in large numbers—obvious without searching
Innumerable	Organisms or plant damage extremely numerous—obvious without searching

*Adapted from Michigan State University, 1980

Table 3-3: Tools Used in Monitoring

Tools	Use	Plants	Structures
Monitoring forms	to write down what is seen	X	X
Maps or site plans of the buildings or grounds	to mark where pests are found and where traps are placed	X	X
Clipboard	to hold the monitoring forms and maps	X	X
Flashlight with a halogen bulb	to detect nighttime pest activity and for viewing darkened areas (e.g. under counters, in closets) during the day. A black light bulb can be substituted to detect scorpions.	X	X
Sticky traps (for many insects the color of the trap is important, e.g., thrips are attracted to blue; whiteflies prefer yellow). Glue boards are used for monitoring rodents.	to monitor a variety of insects, mites, and small rodents.	X	X
Hand lens (a small magnifying glass)	to help to see mites and small insects A lens that magnifies things at least 10 times (=10X) is usually adequate. A 15X lens can be used to distinguish among various mite species and other similarly small pest organisms such as thrips.	X	X
Plastic bags or small vials	to hold specimens for later examination or identification.	X	X
Small knife or screwdriver	to dig up weeds for specimens or for control, to probe damaged wood and to extract insect droppings from wood.	X	X
Ladder	for examining hard-to-reach spaces	X	X
Camera	for documenting pest damage to plants or structures before and after IPM methods have been applied	X	X

Figure 3-1: Fluctuating Cockroach Trap Counts



SECTION 4

Setting Injury and Action Levels

Total eradication of pest organisms is virtually impossible to achieve. A more realistic goal is to determine the injury level—the number of pests or the amount of pest-related damage that can be tolerated without suffering an unacceptable medical, economic, or aesthetic loss. The action level—the number of pests necessary for treatment to occur to prevent the injury level being reached—depends largely on pest biology and environmental conditions supporting the pest.

4.1 Determine Injury Levels First

Before determining the action level, first determine the injury level. This is the level of damage or the level of the pest population that causes unacceptable injury. The injury level will be higher than the action level (see **Figure 4-1** for sample thresholds).

4.1.1 Three Types of Injury

There are three types of injury relevant to school IPM programs:

- Aesthetic injury applies mainly to plants. This refers to injury that affects the appearance without affecting the health of the plant. There are few indoor pests or pests of structures that cause only aesthetic damage.
- Economic injury refers to pest damage that causes monetary loss, e.g., clothes moths destroying band uniforms or a plant disease that causes the death of a tree.
- Medical injury relates to human health problems caused by pests such as rodents, flies, yellowjackets, and poison oak.

4.1.2 Injury Levels Differ Depending On The Pest And Its Location

The number of pests or amount of pest damage that can be tolerated (another way to think of injury level) will depend on the kind of pest and its location. A column of ants marching through an unused outbuilding is an entirely different situation from an ant invasion in the cafeteria. Many thousands of aphids can usually be tolerated on a tree, but one louse or nit on a child's head cannot.

Some pests are perceived as more frightening or disgusting than other pests, which in turn influences the number people will tolerate. Most people prefer crickets to cockroaches and find pigeons more acceptable than rats. Education and information can sometimes modify a person's tolerance level of a particular pest.

State, county, or local public health codes will have an impact on injury and action levels for pests such as rats, mice, cockroaches, and flies in areas where food is stored or prepared. In a public health emergency such as an outbreak of rabies or bubonic plague, government agencies may legally mandate control of certain pests. Consult the County Health Department for more information.

Box 4-1: Is a Response to an Existing Pest Population Needed?

To determine whether a response is needed, ask the following questions:

- Are there state or county health codes requiring control of the pest problem (i.e., pests in areas where food is stored, prepared, or served)?
- Is the pest population growing?
- Are the pests located in a sensitive area (i.e., kitchens, cafeteria, or sick rooms)?
- Are the pests posing a health threat to humans?
- Are the pests damaging school property?
- Are the pests annoying or worrying students, faculty, and staff?
- Are the pests causing unacceptable aesthetic damage?

4.1.3 Don't Set the Level Too Low

One of the major causes of unnecessary treatments for pests is an unrealistically low tolerance level. Obviously, there is little leeway in tolerance for pests that have consequences for human health or the school budget, but for many other pests, the range of tolerance can be very wide. By understanding what damage is serious and by simply changing the way we view pests and pest damage, we can avoid many unnecessary treatments. For instance, most trees and shrubs can support substantial populations of caterpillars, aphids, psyllids, or leafhoppers without coming to any harm. Lawns can still be very attractive and functional even though the grass is not all of one kind and there are a number of weeds mixed in (as long as they don't pose a tripping hazard).

4.1.4 Determining the Injury Level

We all have intuitive, unspecified notions of injury level in various pest management situations, but these may not be accurate. In an IPM program, the aim is to try to make injury levels clear and precise. Monitoring is the only way to do this. It also takes knowledge and experience to understand the life cycles of pests, how fast their populations grow, and whether their damage will have serious consequences.

Example: Weeds in lawns are often only an aesthetic problem, but in other instances weaken ornamental plants. You may decide to set an aesthetic injury level in a lawn at 15 percent, or treat weeds in landscaped areas as soon as they begin to compete with ornamentals.

4.2 Determine Action Levels Based on Injury Levels

The action level is the level of pest damage or number of pests that triggers a pest management action to prevent pest numbers from reaching the injury level. The action is not necessarily a pesticide application. The action level will be lower than the injury level (see **Figure 4-1** for sample thresholds). Determining action levels involves making educated guesses about the likely impacts of numbers of pests present in a given place at a given time. In other words, an estimate of how high the pest population can grow before action is needed to prevent unacceptable injury. The action level must be determined and treatments applied before the injury level is reached.

Example: From previous experience, if more than ten cockroaches are found in a sticky trap in a classroom, teachers and students will complain. At one cockroach per trap, no one notices that roaches are present. When there are between

two and ten roaches per trap, the treatment may consist of tracking down the infestation, sealing holes and cracks near the infestation, fixing leaks, and applying cockroach bait. At the same time, review food storage, sanitation, and trash handling procedures with the teacher. If catches exceed ten roaches per trap, check equipment and other inaccessible areas for harborage; vacuum and thoroughly clean the room; and ask the teacher to remove clutter and straighten all storage areas.

4.2.1 Set Conservative Action Levels in the Beginning

During the beginning phase of an IPM program, it is wise to be conservative when establishing an initial action level. Set it low enough (i.e., low numbers of pests trigger treatments) to insure a wide margin of safety while learning monitoring methods. The initial action level should then be compared with other action levels for the same pest at different sites or locations. This is necessary to determine if the action level is set too high or too low, if treatments were necessary or not, and if they were properly timed.

The easiest way to collect comparative data is to set aside a portion of a school that remains untreated at the time another area is treated, or to monitor two schools where different action levels are applied to the same pest. By monitoring both sites, and comparing records, adjustment of the initial action level up or down can be evaluated.

Periodically, the action level should be re-evaluated for each pest and for each site. Changes in weather conditions, plant cultivars grown, horticultural practices, level of IPM experience of employees and building renovations can affect the setting of injury levels.

4.2.2 Avoid "Revenge" Treatments

Sometimes action takes place after the injury level has been reached and the pest population has begun to decline naturally, such as with seasonal changes (**Figure 4-2**). These "revenge" treatments are generally useless at controlling pests, are damaging to the environment, and an unnecessary expenditure of time and resources.

4.3 Declaring an Emergency Under the Healthy Schools Act

In the Healthy Schools Act, "emergency conditions" are defined as "circumstances in which the school designee deems that the immediate use of a pesticide is necessary to protect the health and safety of pupils, staff, or other persons, or the schoolsite." (Education Code section 17608(c)).

Before an emergency occurs, the IPM coordinator (pest manager) must establish a communication "tree" with the names and phone numbers of people to contact in a crisis. Each contact should have a set of clearly defined responsibilities. For instance, the IPM coordinator notifies the public information officer who then handles the concerns of parents and the public. The IPM coordinator also notifies school administrators who decide who to notify at higher levels. The IPM coordinator must communicate effectively with all those involved in the emergency and must choose information that is appropriate for each person with whom he or she communicates. For instance, the superintendent will not need to be informed of specific mixing instructions for the pesticide, and the pesticide applicator will not need to know the names of the students and staff involved.

It is important to thoroughly document the emergency condition. Ask the following questions:

- Who is the person who is warning about the emergency? Is the person credible? Does he or she have the necessary knowledge to make a determination of an emergency?
- What is the problem? Find out as much as possible about the problem and what is causing it. What kind of pest is involved? Is the problem one of health and/or safety?
- Where is the problem? Is the location such that it is an immediate threat to health and safety? Can the area be cordoned off to prevent further problems?
- When did the problem occur? Is it happening at this moment, or did it happen two weeks ago, and is just now being reported?
- How did the problem occur? What are the circumstances surrounding the incident?
- Why did the problem occur? What factors contributed to the creation of the problem?

Once an emergency is declared and the channels of communication are open, the next step to take is assessing the possible options for solving the problem and choosing the most effective one. Once the treatment has been chosen, the IPM coordinator should communicate this decision. When the emergency is over, it is important to assess the effectiveness of the chosen course of action (see section 5 for more information) and to make adjustments in the pest management system so that the problem doesn't recur. This evaluation and the changes that are made should be reported to those involved in the emergency.

IPM is not simply a matter of substituting "good" pesticides for "bad" pesticides. Too often, we want an easy solution, a magic bullet that will solve all our problems in one shot. Unfortunately, pest management is complicated, and we cannot always expect a simple solution to pest problems. IPM works because combined strategies for pest management are more effective in the end than a single strategy. A good pest manager considers as many options as possible and tries to combine them into an effective program. The best pest managers have ideas for new and creative ways to solve pest problems. As defined by the Healthy Schools Act, IPM takes a preventive approach by identifying and removing, to the degree feasible, the basic causes of the problem rather than merely attacking the symptoms (the pests). This prevention-oriented approach is also best achieved by combining a number of treatment strategies.

Figure 4-1: Injury and Action Levels

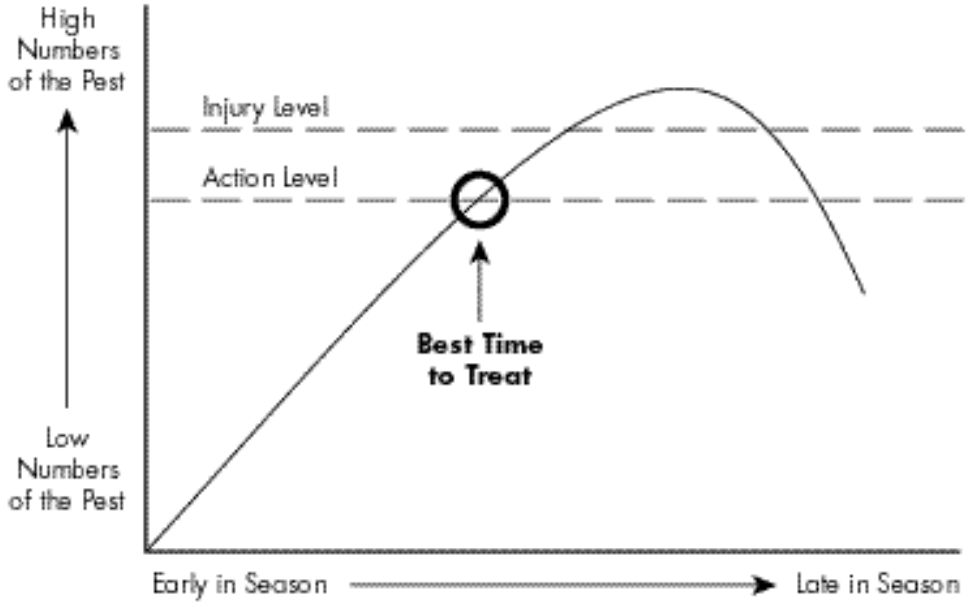
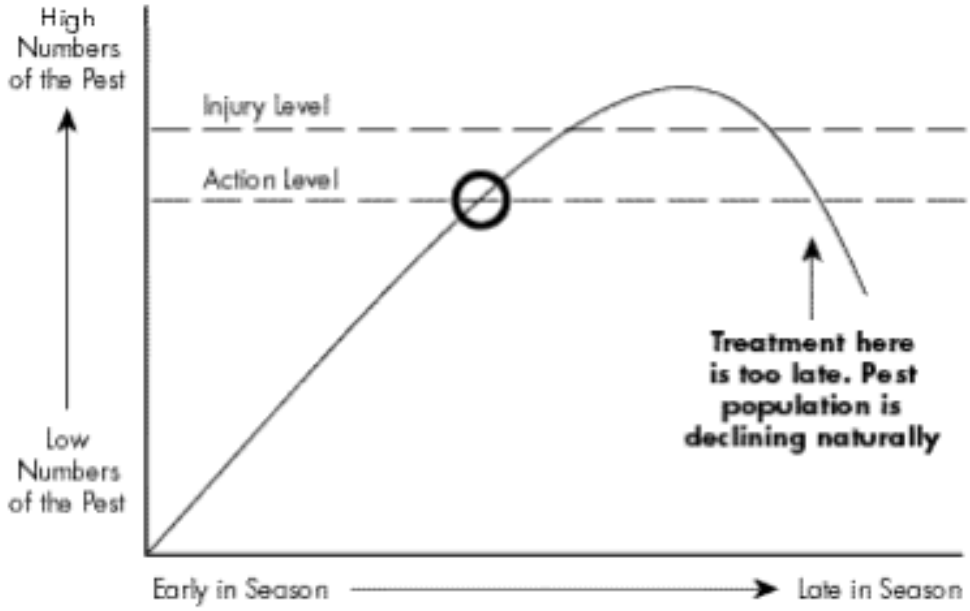


Figure 4-2: Effect of "revenge" treatments.



Selecting Least-hazardous Pest Control Practices

SECTION 5

5.1 Criteria for Selecting Least Hazardous Pest Control Practices

Once the IPM decision-making process is in place and monitoring indicates a pest treatment is needed, the choice of specific practices can be made. Choose practices that are:

- Least hazardous to human health.
- Least disruptive of natural controls in landscape situations.
- Least toxic to non-target organisms.
- Most likely to be permanent and prevent recurrence of the pest problem.
- Easiest to carry out safely and effectively.
- Most cost-effective in the short and long term.
- Appropriate to the weather, soils, water, and the energy resources of the site and the maintenance system.

5.1.1 Least Hazardous to Human Health

It is particularly important around children to take the health hazards of various strategies into consideration. Hazard refers to the extent and type of negative effects of the strategy in question.

Example: Aerosol sprays can kill cockroaches; however, they can also pose potential hazards to humans because the pesticide volatilizes in the air, increasing the likelihood of respiratory or lung exposure of students and staff. In addition, aerosol sprays may leave residues on surfaces handled by students and teachers. When cockroach baits are used instead, the pesticide is confined to a much smaller area, and if applied correctly, the bait will be out of reach of students and staff. Baits volatilize very little so lung exposure is not a problem. Cockroach baits manage cockroach populations much more effectively than aerosol sprays.

5.1.2 Least Disruptive of Natural Controls

In landscape settings, try to avoid killing off the natural enemies that aid in controlling pest organisms. Unfortunately, and for a number of reasons, natural enemies are often more easily killed by pesticides than are the pests. When choosing treatment strategies, always consider how the strategy might affect natural enemies. When choosing a pesticide, try to use one that has less effect on natural enemies. For help in determining this, see the resources listed in **Appendix G**.

5.1.3 Least Toxic to Non-Target Organisms

The more selective the control, the less harm there will be to non-target organisms in the environment.

Example: Aphid populations in trees often grow to high numbers because ants harvest the honeydew (sweet exudate) produced by the aphids, and protect them from their natural enemies. The ants that protect these aphid pests are often beneficial in other circumstances, aerating the soil and helping to decompose plant and animal debris.

By excluding the ants from the tree with sticky bands around the trunk, it is often possible to achieve adequate suppression of the aphids without harming the ant populations.

5.1.4 Most Likely to Be Permanent and Prevent Recurrence of the Pest Problem

Finding treatments that meet this specification is at the heart of a successful IPM program because these controls work without extra human effort, costs, or continual inputs of other resources. These treatments often include changing the design of the landscape, the structure, or the system to avoid pest problems. The following are examples of preventive treatments:

- Educating students and staff about how their actions affect pest management.
- Caulking cracks and crevices to reduce cockroach (and other insect) harborage and entry points.
- Instituting sanitation measures to reduce the amount of food available to ants, cockroaches, flies, rats, mice, and other pests.
- Cleaning gutters and directing their flow away from the building to prevent moisture damage.
- Installing a sand barrier around the inside edge of a foundation to prevent termites from crawling up into the structure.
- Applying an insect growth regulator to prevent fleas from developing in an area with chronic problems.

5.1.5 Easiest to Carry out Safely and Effectively

While the application of pesticides may seem comparatively simple, in practice it may not be the easiest tactic to carry out safely or effectively. Use of conventional pesticides often involves wearing protective clothing, mask, and goggles. In hot weather, people are often reluctant to wear protective gear because of the discomfort this extra clothing causes. By choosing not to wear the protective clothing, applicators not only violate the law but also risk exposure to hazardous materials.

5.1.6 Most Cost-Effective in the Long Term

In the short term, use of a pesticide often appears less expensive than a multi-tactic IPM approach; however, closer examination of the true costs of pesticide applications over the long term may alter this perception. In addition to labor and materials, these costs include licensing, maintaining approved pesticide storage facilities, disposing of unused pesticides, liability insurance, and environmental hazards.

Other factors to consider are whether a particular tactic carries a one-time cost, a yearly recurring cost, or a cost likely to recur a number of times during the season. When adopting any new technology (whether it be computers or IPM), there will be some start-up costs. IPM frequently costs less than, or about the same, as conventional chemically based programs, once the program is in place (see section 2.9.2 for a discussion on "Assessing Cost-Effectiveness").

In addition, parental and community concern about the use of conventional pesticides may make any use of pesticides in and around schools problematic. A public relations headache can develop over comparatively innocuous incidents, and require substantial amounts of time from the highest paid employees of the school district to attend meetings, prepare policy statements and other pest management duties. These costs should also be factored into the pest control equation.

5.1.7 Appropriate to the Weather, Soils, Water, and the Energ y Resources of the Site and the Maintenance System

Skillfully designed landscapes can reduce pest problems as well as use of water and other resources. We cannot stress enough the importance of choosing the right plant for the right spot. Plants that are forced to grow in unsuitable sites where they are unable to thrive will be a continual source of problems. When plants die on the school site, take the time to find a replacement that is suited to the landscape. UCCE Master Gardeners are available in many counties for local planting recommendations. Look in the Yellow Pages under Government or go to http://ucanr.edu/sites/ to find the local County Cooperative Extension Office.

5.2 Timing Treatments

Treatments must be timed to coincide with a susceptible stage of the pest and, if possible, a resistant stage of any natural enemies that are present. Sometimes the social system (i.e., the people involved or affected) will impinge on the timing of treatments. Only monitoring can provide the critical information needed for timing treatments and thereby make them more effective.

Example: To control ground squirrels using traps or bait stations, it is usually best to focus control in mid-May through mid-July, as native vegetation and food sources are drying. In some areas, ground squirrels aestivate (summer sleep) during the hottest summer months (mid-July through August). This is a poor time to attempt control. Fall is also a good time for baiting as ground squirrel foraging activity peaks in September and October prior to hibernation.

5.2.1 Spot Treatments

Treatments, whether pesticides or non-hazardous materials, should be applied only when and where needed. It is rarely necessary to treat an entire building or landscape area to solve a pest problem. By using monitoring to pinpoint where pest numbers are beginning to reach the action level and confining treatments to those areas, costs and exposure to hazardous materials can be kept to a minimum.

5.3 Summary of Available Treatment Options

The following is a list of general categories of treatment strategies. We have included some examples to help illustrate each strategy. The list is not intended to be exhaustive since products change, new ones are discovered or invented, and ingenious pest managers develop new solutions to old problems every day.

5.3.1 Education

Education is a cost-effective pest management strategy. Information that will help change people's behaviors—particularly how they store food and dispose of garbage—plays an invaluable part in managing pests like cockroaches, ants, flies, yellow jackets, and rodents. Education can also increase people's willingness to share their environment with other organisms so that people are less likely to insist on hazardous treatments for innocuous organisms. Teaching children about IPM will have a long-term effect on the direction of pest management as these students grow up to become consumers, educators, policy makers, and researchers. See **Appendix O** for training and licensing opportunities and **Appendix F** for IPM-related curricula and resources for the classroom.

5.3.2 Habitat Modification

Pests need food, water, and shelter to survive. If the pest manager can eliminate or reduce even one of these requirements, the environment will support fewer pests.

Design or Redesign of the Structure

Design changes can incorporate pest-resistant structural materials, fixtures, and furnishings. Sometimes these changes can eliminate pest habitat. For example, buildings designed witout exterior horizontal ledges will reduce pigeon problems. Inside, heavy-duty, stainless steel wire shelving mounted on rolling casters helps reduce roach habitat and facilitates cleanup of spilled food. For more information, a guide to pest management through prevention, "Pest Prevention: Maintenance Practices and Facility Design," can be located on the DPR School IPM Web site at www.cdpr.ca.gov.

Sanitation

Sanitation can reduce or eliminate food for pests such as rodents, ants, cockroaches, flies, and yellowjackets.

Eliminating Sources of Water for Pests

This involves fixing leaks, keeping surfaces dry overnight, and eliminating standing water. Fixing any leaks has the added benefit of saving water.

Eliminating Pest Habitat

How this can be done will vary depending on the pest, but some examples are caulking cracks and crevices to eliminate cockroach and flea harborage, removing clutter that provides roach habitat, and removing dense vegetation near buildings to eliminate rodent harborage.

5.3.3 Modification of Horticultural Activities

Planting techniques, irrigation, fertilization, pruning, and mowing can all affect how well plants grow. A great many of the problems encountered in school landscapes are attributable to using the wrong plants or failing to give them proper care. Healthy plants are likely to have fewer insect, mite, and disease problems. It is very important that the person responsible for the school landscaping knows (or is willing to learn) about the care required by the particular plants at the school.

Designing/Redesigning of Landscape Plantings

- Choose the right plant for the right spot and choose plants that are resistant to or suffer little damage from local pests. This will take some research. Ask advice of landscape maintenance personnel, local nurseries, local pest management professionals, and County Extension agents or the master gardeners on their staffs.

- Include in the landscape flowering plants that attract and feed beneficial insects with their nectar and pollen, e.g., sweet alyssum (Lobularia spp.) and flowering buckwheat (Eriogonum spp.), species from the parsley family (Apiacae) such as yarrow and fennel, and the sunflower family (Asteraceae) such as sunflowers, asters, daisies, marigolds and zinnias.

- Diversify landscape plantings. A pest can devastate the entire area when large areas are planted with a single species of plant.

5.3.4 Physical Controls

Vacuuming

A heavy-duty vacuum with a special filter fine enough to screen out insect effluvia (one that filters out particles as small as 0.3 microns) is a worthwhile investment for a school. Some vacuums have special attachments for pest control. The vacuum can be used not only for cleaning, but also for directly controlling pests. A vacuum can pull cockroaches out of their hiding places and can capture adult fleas, their eggs, and pupae. A vacuum used outside can be used to collect spiders, box elder bugs, and cluster flies.

Trapping

Traps play an important role in least-hazardous pest control; however, in and around schools, traps may be disturbed or destroyed by students who discover them. To prevent this, place them in areas out of reach of the students in closets or locked cupboards. Another strategy is to involve students in the trapping procedures as an educational activity so they have a stake in guarding against trap misuse or vandalism.

Today a wide variety of traps is available to the pest manager. Some traps are used mainly for monitoring pest presence. These include cockroach traps and various pheromone (insect hormone) traps, although if the infestation is small, these traps can sometimes be used to control the pest. Other traps include the familiar snap traps for mice and rats, electric light traps for flies, and flypaper. There are also sticky traps for whiteflies and thrips, cone traps for yellowjackets, and box traps for skunks, raccoons, and opossums.

Barriers

Barriers can be used to exclude pests from buildings or other areas. Barriers can be as simple as a window screen to keep out flying and crawling insects or sticky barriers to exclude ants from trees. Barriers that are more complicated include electric fences to keep out deer and other vertebrate wildlife and L-shaped footings in foundations to exclude rodents.

Heat and Cold

Commercial heat treatments can be used to kill wood-destroying pests such as termites. A propane weed torch can be used to kill weeds coming up through cracks in pavement. Freezing can kill trapped insects such as yellowjackets before emptying traps, kill clothes moths, and kill the eggs and larvae of beetles and moths that destroy grain.

Removing Pests by Hand

In some situations removing pests by hand may be the safest and most economical strategy. Tent caterpillars can be clipped out of trees, and scorpions can be picked up with kitchen tongs and killed in soapy water or in alcohol.

5.3.5 Biological Controls

Biological control uses a pest's natural enemies to attack and control the pest. We use the word "control" rather than "eliminate" because biological control usually implies that a few pests must remain to feed the natural enemies. The exception to this is a separate category of biological control called microbial control, which includes the use of plant and insect pathogens. Microbial controls are generally used like conventional chemical pesticides to kill as many pests as possible. Biological control strategies include conservation, augmentation, and importation.

Conservation

Conserving biological controls means protecting those already present in the school landscape. To conserve natural enemies you should do the following:

- Treat only if injury levels will be exceeded.
- Spot treat to reduce impact on non-target organisms.
- Time the treatments to be least disruptive in the life cycles of the natural enemies.
- Select the most species-specific, least-damaging pesticide materials, such as Bacillus thuringiensis, insect growth regulators that are specific to the pest insect, and baits formulated to be attractive primarily to the target pest.

Augmentation

This strategy artificially increases the numbers of biological controls in an area. This can be accomplished by planting flowering plants (also called insectary plants) to provide pollen and nectar for the many beneficial insects that feed on the pest insects or purchasing beneficials from a commercial insectary. Examples of the best-known commercially available natural enemies include lady beetles, lacewings, predatory mites, and insect-attacking nematodes. These are but a very small part of the large and growing number of species now commercially available for release against pests. Learning when to purchase and release them and how to main- tain them in the field should be emphasized in any landscape pest management program. See the DPR Publication "Suppliers of Beneficial Organisms in North America" for commercial suppliers of biocontrol organisms.

Importation

People often ask if parasites or predators can be imported from another country to take care of a particularly disruptive pest in their area. It is true that the majority of pests we have in North America have come from other parts of the world, leaving behind the natural enemies that would normally keep them in check. "Classical" biological control involves searching for these natural enemies in the pest's native area and importing these natural enemies into the problem area. This is not a casual venture: it must be done by highly trained specialists in conjunction with certain quarantine laboratories approved by the United States Department of Agriculture. Permits must be obtained and strict protocols observed in these laboratories. Once the imported natural enemies become established in their new home, they usually provide permanent control of the pest. Patience is needed, however, because establishment of the natural enemies can take several years.

5.3.6 Microbial Controls

Microbial controls are naturally occurring bacteria, fungi, and viruses that attack insects and weeds. A growing number of these organisms are being sold commercially as microbial pesticides. Non-target organisms are much less likely to be affected because these microbial pesticides selectively attack pests.

The most well known microbial insecticide is Bacillus thuringiensis, or B.t. The most widely sold strain of B.t. kills caterpillars. Another strain kills only the larvae of black flies and mosquitoes, and a third strain kills only certain pest beetles.

Microbial herbicides made from pathogens that attack weeds are commercially available for use in agricultural crops. In the near future, there may be commercial products for use in urban horticultural settings.

5.3.7 Least-Hazardous Chemical Controls

The health of school occupants and long-term suppression of pests must be the primary objectives that guide pest control in school settings. To accomplish these objectives, an IPM pro- gram must always look for alternatives first and use pesticides only as a last resort. There are many chemical products to choose from that are relatively benign to the larger environment and at the same time effective against target pests. To find out whether a specific pesticide product is exempt from the right-to-know requirements of the Healthy Schools Act, see **Appendix B**.

"Least-hazardous" pesticides are those with all or most of the following characteristics: they are effective against the target pest, have a low acute and chronic toxicity to mammals, biodegrade rapidly, kill a narrow range of target pests, and have little or no impact on non-target organisms. There are many least-hazardous products being registered in California, including materials such as the following:

- Pheromones and other attractants.
- Insect growth regulators (IGRs).
- Repellents.
- Desiccating dusts.
- Pesticidal soaps and oils.
- Some botanical pesticides.

Pheromones

Animals emit substances called pheromones that act as chemical signals. The sex pheromones released by some female insects advertise their readiness to mate and can attract males from a great distance. Other pheromones act as alarm signals.

A number of pheromone traps and pheromone mating confusants are now commercially available for some insect pests. Most of the traps work by using a pheromone to attract the insect into a simple sticky trap. The mating confusants flood the area with a sex pheromone, overwhelming the males with stimuli and making it very difficult for them to pin-point exactly where the females are.

Insect Growth Regulators (IGRs)

Immature insects produce juvenile hormones that prevent them from metamorphosing into adults. When they have grown and matured sufficiently, their bodies stop making the juvenile hormones so they can turn into adults. Researchers have isolated and synthesized some of these chemicals and when they are sprayed on or around certain insects, these insect growth regulators prevent the pests from maturing into adults. Immature insects cannot mate and reproduce, so eventually the pest population is eliminated. These hormones do not affect us since humans and other mammals don't metamorphose as insects do.

Repellents

Some chemicals repel insects or deter them from feeding on treated plants. For example, a botanical insecticide extracted from the neem tree (Azadirachta indica) can prevent beetles and caterpillars from feeding on treated rose leaves. Current research shows that neem has a very low toxicity to mammals.

Desiccating Dusts

Insecticidal dusts such as diatomaceous earth and silica aerogel, made from natural materials, kill insects by absorbing the outer waxy coating that keeps water inside their bodies. With this coating gone the insects die of dehydration. Silica aerogel dust can be blown into wall voids and attics to kill drywood termites, ants, roaches, silverfish, and other crawling insects. Although these materials are not poisonous to humans directly, the fine dust travels freely through the air and can be irritating to the eyes and lungs: always use a dust mask and goggles during application.

Pesticidal Soaps and Oils

Pesticidal soaps are made from refined coconut oil and have a very low toxicity to mammals. They can be toxic to fish, so they should not be used around fishponds. Researchers have found that certain fatty acids in soaps are toxic to insects but decompose rapidly leaving no toxic residue. Soap does little damage to lady beetles and other hard-bodied insects but may be harmful to some soft-bodied beneficials. A soap-based herbicide is available for controlling seedling stage weeds; the soap kills the weeds by penetrating and disrupting plant tissue. Soap combined with sulfur is used to control common leaf diseases such as powdery mildew.

Insecticidal oils (sometimes called dormant oils or horticultural oils) also kill insects and are gentle on the environment. Modern insecticidal oils are very highly refined. Unlike the harsh oils of years ago that burned leaves and could only be used on deciduous trees during the months they were leafless, the new oils are so light they can be used to control a wide variety of insects even on many bedding plants.

Note: it as always wise to test a material on a small portion of the plant first to check for damage before spraying the entire plant.

Botanical Pesticides

Although botanical pesticides are derived from plants, they are not necessarily better or safer than synthetic pesticides. Botanicals can be easily degraded by organisms in the environment; however, plant-derived pesticides tend to kill a broad spectrum of insects, including beneficials, so they should be used with caution. The most common botanical is pyrethrum, made from crushed petals of the pyrethrum chrysanthemum flower. “Pyrethrins” are the active ingredient in pyrethrum, but “pyrethroids” have been synthesized in the laboratory, and are much more long lasting and powerful than the pyrethrins. Pyrethroids are toxic to fish and other aquatic invertebrates. Neem, another botanical pesticide, is discussed previ- ously under “Repellents.” Some botanicals, such as nicotine or sabadilla, can be acutely toxic to humans if misused, and rotenone is very toxic to fish. The same care must be used with these materials as with conventional pesticides.

5.4 How to Select a Pesticide for an IPM Program

When contemplating the use of a pesticide, it is prudent to acquire a Material Safety Data Sheet (MSDS) for the compound. MSDS forms are available from pesticide suppliers and contain some information on potential hazards and safety precautions. See **Appendix H**, the Recommended Readings section of this manual, for other reference materials on pesticides. **Appendix G**, Pesticide Information Resources, lists organizations that provide information on pesticide toxicity.

You will find links to MSDS sites on the California School IPM Web site at www.cdpr.ca.gov. Some pesticide products are exempt from the recordkeeping, notification, and posting requirements of the Healthy Schools Act. Use the worksheet "Pesticides exempted from Healthy Schools Act right-to-know requirements" (**Appendix B**) to determine if a specific product is exempt. DPR's School HELPR Web page is a guide to choosing the optimal pest management action, depending on the situation. In addition, there are some pesticides that are prohibited from use in schools. See www.cdpr.ca.gov to view the list of pesticide products prohibited from use in schools and child care facilities.

The following criteria should be used when selecting a pesticide: safety, species specificity, effectiveness, endurance, speed, and cost.

5.4.1 Safety

This means safety for humans (especially children), pets, livestock, and wildlife, as well as safety for the overall environment. Read the pesticide label. Pesticide labels contain information to protect your health. Every label displays a "signal word" that indicates the level of acute (immediate) toxicity of the formulated pesticide product. See Box 5-1 for explanations of the signal words. Questions to ask about safety are:

- What is the acute (immediate) and chronic (long-term) toxicity of the pesticide?

Acute toxicity is the toxicity of the chemical after a single or limited exposure. It is measured by the lethal dose (LD50) or the lethal concentration (LC50) which causes death in 50 percent of the test animals (measured in milligrams of pesticide per kilogram of body weight of the test animal). The higher the LD50/LC50 value, the more poison it takes to kill the target animals and the less toxic the pesticide. In other words, a high LD50/LC50 value equals low toxicity. The LD50/LC50 does not reflect any effects from long-term exposure that may occur at doses below those used in short-term studies.

Chronic toxicity refers to potential health effects from exposure to low doses of the pesticide for long periods. Chronic effects can be carcinogenic (cancer-causing), mutagenic (causing genetic changes), or teratogenic (causing birth defects). Sources of information on health effects of pesticides are provided in **Appendix G** or online at www.cdpr.ca.gov

- How mobile is the pesticide? Is the compound volatile, so that it moves into the air breathed by people in the building? Can it move through the soil into the groundwater? Does it run off in rainwater to contaminate creeks and rivers?

- What is the residual life of the pesticide? How long does the compound remain toxic in the environment?

- What are the environmental hazards listed on the label? What are the potential effects on wildlife, beneficial insects, fish, or other animals?

BOX 5-1: Definitions of signal words for pesticides

Federal law and the acute toxicity data determine the signal words and precautionary statements that must appear on pesticide labels (40 Code of Federal Regulations 156.10). Always read pesticide labels thoroughly before using and be sure to follow label directions. Misuse of any pesticide is not only illegal, but may create a dangerous situation.

The signal word (see below) indicates the most severe level of anticipated acute (immediate) toxicity of the formulated pesticide product to humans based on at least one of five to six tests conducted with laboratory animals. The chronic (long-term) toxicity is not indicated on the label. Note that chronic toxicity may be important for pesticide products used frequently. You can obtain chronic toxicity information from several reputable sources such as U.S. EPA (http://www.epa.gov/) or the National Pesticide Information Center (http:/npic.orst.edu). Pesticide labels always bear the warning "Keep out of reach of children."

Signal Word	**Toxicity Category**	**Precautionary statements by toxicity category** Oral, inhalation or dermal toxicity	**Precautionary statements by toxicity category** Skin and eye local effects
Danger — Poison Danger	I	Fatal (poisonous) if swallowed [inhaled or absorbed through skin]. Do not breathe vapors [dust or spray mist]. Do not get in eyes, on skin, or on clothing. [Front panel statement of practical treatment required].	Corrosive, causes eye and skin damage [or skin irritation]. Do not get in eyes, on skin, or on clothing. Wear goggles or face shield and rubber gloves when handling. Harmful or fatal if swallowed. [Appropriate first aid statement required].
Warning	II	May be fatal if swallowed [inhaled or absorbed through skin]. Do not breathe vapors [dust or spray mist]. Do not get in eyes, on skin, or on clothing. [Appropriate first aid statement required].	Causes eye [and skin] irritation. Do not get in eyes, on skin, or on clothing. Harmful if swallowed. [Appropriate first aid statement required].
Caution	III	Harmful if swallowed [inhaled or absorbed through skin]. Avoid breathing vapor [dust or spray mist]. Avoid contact with skin [eyes or clothing]. [Appropriate first aid statement required].	Avoid contact with skin, eyes or clothing. In case of contact, immediately flush eyes or skin with plenty of water. Get medical attention if irritation persists.
[No signal word]	IV	[No precautionary statements required]	[No precautionary statements required]

If no signal word occurs on the label, then the product has the lowest toxicity category or contains active ingredients that are exempt from federal and California registration; however, it may cause slight skin or eye irritation.

Products you select must be registered or exempted from registration*. Note that some products are neither registered nor exempted, and are, therefore, illegal to use. If chemical control is necessary, select legal products with no signal word or with caution as a signal word when available.

**For information about products exempt from registration, see Appendix B and California Notice to Registrants 2000-6, which is available on our Web site at www.cdpr.ca.gov under Programs and Services, Pesticide Registration Branch.*

5.4.2 Species Specificity

The best pesticides are species-specific; that is, they affect just the group of animals or plants you are trying to suppress. Avoid broad-spetrum materials that kill many different organisms because they can kill beneficial organisms that keep pests in check. When broad-spectrum materials must be used, apply them in as selective a way as possible by spot treating.

5.4.3 Effectiveness

This issue is not as straightforward as it might seem since it depends on how effectiveness is being evaluated. For example, a pesticide can appear to be very effective in laboratory tests because it kills 99 percent of the test insects. In field tests under more realistic conditions, however, it may also kill 100 percent of the pest's natural enemies. This will lead to serious pest outbreaks later.

5.4.4 Endurance

A pesticide may have been effective against its target pest at the time it was registered, but if the pest problem is now recurring frequently, it may be a sign that the pest has developed resistance to the pesticide, in other words, that the pesticide has lost its endurance.

5.4.5 Speed

A quick-acting, short-lived, more acutely toxic material might be necessary in emergencies; a slow acting, longer lasting, less-hazardous material might be preferable for a chronic pest problem. An example of the latter is using slower-acting boric acid for cockroach control rather than a quicker-acting but more hazardous organophosphate.

5.4.6 Cost

This is usually measured as cost per volume of active ingredient used. Some of the newer, less-hazardous microbial and botanical insecticides and insect growth regulators may appear to be more expensive than some older, more hazardous pesticides. The newer materials, however, tend to be effective in far smaller doses than the older materials—one container goes a long way. This factor, together with their lower impact on the environment, often makes these newer materials more cost-effective.

5.5 Pesticide Use, Disposal, and Storage

In California, pesticide use, disposal, and storage are governed by laws in the California Food and Agricultural Code (FAC) and regulations in Title 3 of the California Code of Regulations (CCR). The laws and regulations concerning pesticide use have become increasingly complicated over the past few years. See the Pesticide Safety Information Series N in **Appendix P** for more detailed information regarding pesticide use in California schools. Pesticide applicators in schools must follow state and federal laws regarding pesticide use, disposal and storage in addition to following the requirements of the Healthy Schools Act.

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GLOSSARY

Abiotic: Nonliving component of an ecosystem, such as temperature, soil type or amount of sunlight.

Action level: The number of pests or level of pest damage that triggers a control action.

Action threshold: (see Action level)

Active ingredient: Chemicals in a pesticide formulation that are biologically active, i.e., responsible for killing or repelling the pest.

Acute toxicity: The degree to which a substance is poisonous or injurious to an organism after short-term exposure.

Adjuvant: chemicals added to a pesticide product to improve its effectiveness.

Aesthetic injury: Visually displeasing damage to plants or structures. Annoyance or embarrassment from visibility of a pest, or damage to the appearance of plants which may reduce aesthetic appeal but does not necessarily adversely affect plant health.

Annual: A plant that completes its life cycle in one year and then dies.

Antimicrobial: Pesticides that are intended to disinfect, sanitize, reduce, or mitigate growth or development of microbiological organisms; or protect inanimate objects (for example floors and walls), industrial processes or systems, surfaces, water, or other chemical substances from contamination, fouling, or deterioration caused by bacteria, viruses, fungi, protozoa, algae, or slime, such as sanitizers and disinfectants. Although sanitizers and disinfectants are exempt from notification and posting requirements under the Healthy Schools Act, they are not exempt from licensed pest control business requirements to report pesticide use.

Augmentation: Releases of beneficial insects to establish or increase a natural population.

Bacillus thuringiensis: Insect pathogenic bacteria. A microbial insecticide effective against larval stages of many species of lepidoptera.

Bait: A food or other substance used to attract a pest to a pesticide or trap.

Barrier: Something material that prevents entry by pests into an area, such as screens on windows.

Beneficial insect: An insect that feeds on pest organisms.

Biennial: A plant that completes its growth in two years. The first year it produces leaves and stores food; the second year it produces fruits and seeds.

Biological control: Managing pests by using natural enemies such as predators, parasites and disease-causing organisms.

Biotic: The living components of an ecosystem, such as plants, animals and microorganisms.

Botanical pesticide: Pesticides derived from plants rather than synthesized.

Broad-spectrum: A pesticide effective against many species of pests.

Carcinogen: Any substance that can cause or aggravate cancer.

Chemical control: The use of a pesticide to reduce pest populations or activity.

Chronic toxicity: The capacity of a substance to demonstrate toxic effects as a result of repeated exposures over a period of time.

Common name: A name given to a pesticide active ingredient by a recognized committee on pesticide nomenclature.

Control action threshold: Pest population level at which treatment is necessary to prevent economic loss.

Corrosive: A chemical that causes visible destruction of, or irreversible alterations in, living tissue by chemical action at the site of contact.

Crack-and-crevice treatment: As defined by the Healthy Schools Act, "the application of small quantities of a pesticide consistent with labeling instructions in a building into openings such as those commonly found at expansion joints, between levels of construction and between equipment and floors." The application of pesticides in the form of gels or pastes into cracks and crevices is exempt from the notification, posting and record keeping requirements of the Healthy Schools Act.

Cultural control: pest management practices which make the environment less favorable for pests. In schools, it involves changing people's behaviors and habits such as sanitation and garbage pickup schedules. It also refers to alterations in landscape design and installation and maintenance of grounds to reduce pest activity and damage.

Desiccating dust: A pesticide that dehydrates living tissues.

Disinfectant: An agent that kills or controls vegetative forms of bacteria, molds, and mildews but does not ordinarily kill bacterial spores.

Dormant oil: An oil-based pesticide applied during the dormant stage of plant growth.

Economic injury level: Pest population level sufficient to cause economic losses greater than the cost of control.

Ecosystem: A self-sufficient habitat where living organisms and the abiotic environment continuously exchange matter and energy.

Emergency condition: As defined by the Healthy Schools Act, "any circumstances in which the school district designee deems that the immediate use of a pesticide is necessary to protect the health and safety of pupils, staff, or other persons, or the schoolsite."

EPA registration number: A number assigned to a pesticide product when U.S. EPA registers the product for use. The number must appear on all labels for the product. This number must appear on the pesticide application warning sign that must be posted when applying most pesticides on schools grounds. California uses U.S. EPA registration numbers for all products except adjuvant, which are given a California registration number.

Eradication: Control of diseases or pests by their complete elimination after introduction into a certain area.

Evapotranspiration: The total water loss from a soil by being drawn up through plant tissue and evaporated from leaf and soil surfaces.

Exclusion: A quarantine, usually defined by a legislative order, to prevent entry of certain exotic pests.

Exotic: referring to a species that is not indigenous to a region.

Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA): The federal law and its amendments that regulate pesticide registration and use.

Flushing: The use of an aerosol pesticide to drive a pest out of its hiding place.

Frass: The combined feces, shed skins and particles of food left by an insect pest; or the combined feces and wood fragments left by a wood-boring beetle.

Hand lens: A small, portable magnifying lens used to look at small insects.

Harborage: The hiding places or protected areas, such as cracks and crevices, which cockroaches and other pests inhabit.

Healthy Schools Act: A California right-to-know law that requires all public K-12 schools to notify, post and keep records of pesticide use (see Section One for more detail).

Herbaceous: Plants having fleshy tissues rather than persistent woody tissues.

Herbicide: Pesticide to control unwanted vegetation either before or after its emegence from the ground.

Horticultural oil: Highly refined petroleum (or seed derived) oils that are manufactured specifically to control pests on plants.

Indigenous: Native to a specified area or region.

Inert ingredient: A material in a pesticide formulation that does not have antipest activity.

Insect growth regulator (IGR): An insecticide that interferes with insect hormones, affecting the insect's ability to develop from pupa to adult or to reproduce.

Insecticide: A substance that kills or controls insects.

Integrated pest management: As defined by the Healthy Schools Act, a pest management strategy that focuses on long-term prevention or suppression of pest problems through a combination of techniques such as monitoring for pest presence and establishing treatment threshold levels, using non-chemical practices to make the habitat less conducive to pest development, improving sanitation, and employing mechanical and physical controls. Pesticides that pose the least pos- sible hazard and are effective in a manner that minimizes risks to people, property and the environment, are used only after careful monitoring indicates that they are needed according to pre-established guidelines and treatment thresholds. (Food and Agricultural Code section 13181).

Invertebrate: An animal without a spinal column (backbone). Examples: insects, spider, mollusks.

IPM coordinator: The school employee responsible for day-to-day interpretation of the IPM policy for a school or school system. The IPM Coordinator may or may not be a pest management professional, but is the decision-maker who receives specialized training in IPM, accesses the advice of professionals and chooses a course of action. In many districts, an IPM coordinator is equivalent to the school district designee.

IPM policy: A written document stating a school's commitment to IPM and defining overall IPM goals. This document is updated periodically, and used to guide decision-making as the IPM program is implemented.

LC^{50}: The concentration of a substance in air that causes death in 50% of the animals exposed by inhalation. A measure of acute toxicity.

LD^{50}: The amount of a substance which, when taken orally or absorbed through the skin, kills half of the test animals. An expression of a compound's acute toxicity.

Least hazardous: Referring to a pest management treatment that causes the least exposure or harm to humans and the environment.The pest management method, toxicity of pesticides used and exposure to the occupants are all considered.

Life cycle: The time of development of an organism from egg or birth to reproductive capacity.

Mechanical control: Pest control methods including cultivation and burning.

Metamorphosis: To change in form, as an insect does when developing from larva to adult.

Microbial control: Pest management using a pesticide whose active ingredient is a bacteria, virus, fungus, protozoa or nematode.

Monitoring: A systematic pest inspection that is conducted at regular intervals to determine the numbers of a pest, the amount of pest damage, access to food, water and harborage sites and the effectiveness of treatment methods.

Mulch: A layer of material placed on the soil surface to prevent weed growth.

Mutagen: A chemical that is able to induce significant and permanent change in hereditary material thereby causing mutation in the succeeding generation.

Natural enemy: A predator or parasite that prey on or live in organisms in the natural habitat, thereby limiting their population.

Niche: An organism's place and role in its environment.

Nontarget species: Any plant, animal or other organism that may be accidentally damaged during a pesticide application.

Notification: A formal notice in writing to all parents and staff of a school district of expected pesticide use on a schoolsite.

Organic matter: A soil component resulting from the decay of plant and animal materials.

Perennial: A plant that lives from year to year.

Pest: Any living organism that interferes with or threatens human, animal or plant health, property or the environment. A pest in one environment may be beneficial in another.

Pest control: The use of any substance, method or device to prevent, destroy, repel, mitigate, or correct a pest infestation or inhibit, regulate, stimulate, or alter growth of plants (desirable or undesirable).

Pest proofing: A non-chemical, physical control measure to prevent the entry or movement of pests into or out of a structure or area. This includes sealing and caulking of crevices and holes, installation of screens, etc.

Pesticide: Any substance used to control, prevent, destroy, repel, attract or mitigate any pest. Pesticides include insecticides, insect repellents, miticides, herbicides, fungicides, fumigants, nematicides, rodenticides, avicides, plant growth regulators, defoliants, desiccants, antimicrobials, and algicides. Note: In California, adjuvants also must be registered as pesticides.

Pesticide application warning sign: A sign identifying the location, time and identity of a pesticide (including product name, manufacturer's name and the U.S. EPA's product registration number) that will be applied on a schoolsite. Signs must be posted 24 hours before a pesticide application and 72 hours afterward.

Pheromone: A substance released by one organism that modifies the behavior of another of the same species. Synthetic pheromones are used in traps and lures as control or monitoring devices for some insect pests.

Physical control: Habitat alteration or changes in physical structure to reduce pest populations or their activity.

Phytotoxic: Causing injury or death to plants or portions of plants.

Population: A group of the same organisms living in a defined area.

Posting: The act of placing pesticide application warning signs in the location of a future pesticide application.

Prevention: The act of forestalling pest problems by taking actions such as sanitation.

Pyrethrins: Botanical insecticides, known collectively as pyrethrum, extracted from crysanthemums, having quick knockdown and short residual insecticidal effects.

Pyrethroid: Any of the various synthetic insecticidal compounds that are related to the pyrethrins.

Reduced-risk pesticide: a pesticides which: (1) reduce pesticide risks to human health; (2) reduce pesticide risks to non-target orgaisms; (3) reduce the potential for contamination of valued, environmental resources, or (4) broaden adoption of IPM or makes it more effective.

Repellent: Materials that keep pests away from plants or animals in need of protection, e.g. to protect humans from mosquitoes.

Residual pesticide: A pesticide that continues to be actively pesticidal on a treated surface or area for an extended time period after application.

Restricted use pesticide: A pesticide that can be sold to or used by only certified applicators.

Rodenticide: A pesticide used to control mice, rats, gophers and other rodents.

Runway: A path that rats and mice use to move to and from their burrows or nests. Runways usually follow along the base of a wall, building foundation or fence line.

Sanitation: Measures that promote cleanliness and pest-free surroundings. In pest management, steps taken to remove the source of a pest's food or harborage.

Sanitizer: A chemical that reduces, but does not necessarily eliminate, microorganisms from the inanimate environment to levels considered safe as determined by public health codes or regulations.

School district designee: As defined by the Healthy Schools Act, "the individual identified by the school district to carry out the requirements of this article at the school- site." This person may also be called the IPM Coordinator.

Schoolsite: As defined by the Healthy Schools Act, "any facility used as a child day care facility, or for kindergarten, elementary, or secondary school purposes. The term includes the buildings or structures, playgrounds, athletic fields, vehicles, or any other area of property visited or used by pupils. ''School- site'' does not include any postsecondary educational facility attended by secondary pupils or private kindergarten, elementary, or secondary school facilities."

Scouting: Planned, routine monitoring for the purpose of detecting pests or pest damage.

Self-contained bait or trap: Tamper-and child-resistant bait stations for rodents, general pests, or termites.

Spot treatment: Treatment of localized or restricted patches within an area not to exceed two feet square.

Sticky trap: Traps containing a sticky substance that holds insects so they can be counted.

Teratogen: A substance or agent capable of producing or inducing functional deviations or developmental anomalies not heritable, in or on an animal embryo or fetus.

Thatch: An accumulation of partially decomposed dead stems, roots, rhizomes or leaves on the soil surface below the green top growth of turf.

Toxicity: The degree to which a material (such as a pesticide) is poisonous to an organism; the ability of a material to cause harmful, acute, delayed or allergic effects.

Transect: A sample area of vegetation usually in the form of a long continuous strip.

Vertebrate: An animal with a spinal column (backbone).

Volatile: Describing the quality in which a substance, usually a liquid, evaporates at ordinary temperatures if exposed to the air.

APPENDIX A

Sample Forms for Fulfilling the Requirements of the Healthy Schools Act

HEALTHY SCHOOLS ACT COMPLIANCE PACKET FOR SCHOOL DISTRICTS

Contents

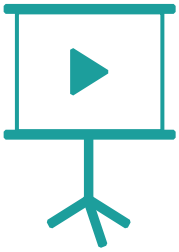
Healthy Schools Act Requirements for Public K-12 Schools and Child Care Centers

IDENTIFY

Choose an IPM coordinator who will make sure the requirements of the HSA are met.

PLAN

Create a plan for IPM and publish it on the school, district, or child care center website. If a website does not exist, include the plan in the annual written notification.

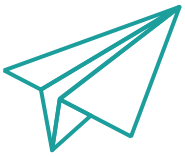


TRAIN

Provide annual Healthy Schools Act training to all teachers, staff, and volunteers who use any pesticides, including exempt pesticides.

POST

Post warning signs in the area where a pesticide will be applied, at least 24 hours before and 72 hours after the application.



NOTIFY

Send an annual notification to all parents, guardians, and staff of all pesticides expected to be applied during the year.

RECORD

Keep records of pesticide applications, and file these records for at least 4 years.

REGISTER

Give parents, guardians, and staff the opportunity to register to be notified 72 hours in advance of individual pesticide applications.

REPORT

Submit annual pesticide use reports to DPR by January 30 for the previous year's applications. Only report pesticide use by school personnel.

Visit our website: www.cdpr.ca.gov

Questions? Email us at: school-ipm@cdpr.ca.gov

California Environmental Protection Agency
dpr Department of Pesticide Regulation

School District Integrated Pest Management Plan

When completed, this template meets the Healthy Schools Act requirement for an integrated pest management (IPM) plan.
An IPM plan is required if a school district uses pesticides[1]

Contacts

School District Name _____ Address _____

District IPM Coordinator _____ IPM Coordinator's Phone Number _____ Email Address _____

IPM statement

It is the goal of _____ to implement IPM by focusing on long-term prevention or suppression of pests through accurate pest identification, by frequent monitoring for pest presence, by applying appropriate action levels, and by making the habitat less conducive to pests using sanitation and mechanical and physical controls. Pesticides that are effective will be used in a manner that minimizes risks to people, property, and the environment, and only after other options have been shown ineffective.

Our pest management objectives are to: *(Example: Focus on long-term pest prevention)*

IPM team

In addition to the IPM Coordinator, other individuals who are involved in purchasing, making IPM decisions, applying pesticides, and complying with the Healthy Schools Act requirements, include:

Name and/or Title	Role in IPM program

Pest management contracting

☐ Pest management services are contracted to a licensed pest control business.
Pest Control Business name(s): _____

☐ Prior to entering into a contract, the school district has confirmed that the pest control business understands the training requirement and other requirements of the Healthy Schools Act.

Pest identification, monitoring and inspection

Pest Identification is done by: _____
(Example: College/University staff, Pest Control Business, etc.)

Monitoring and inspecting for pests and conditions that lead to pest problems are done regularly by _____ and results are communicated to the IPM Coordinator.
(Example: District staff title, e.g. Maintenance staff)

Specific information about monitoring and inspecting for pests, such as locations, times, or techniques include:
(Example: Sticky monitoring boards are placed in the kitchen and are checked weekly by custodial staff.)

Pests and non-chemical management practices

This school district has identified the following pests and routinely uses the following non-chemical practices to prevent pests from reaching the action level:

Pest	Remove food	Fix leaks	Seal cracks	Install barriers	Physical removal	Traps	Manage irrigation	Other
	❑	❑	❑	❑	❑	❑	❑	
	❑	❑	❑	❑	❑	❑	❑	
	❑	❑	❑	❑	❑	❑	❑	
	❑	❑	❑	❑	❑	❑	❑	
	❑	❑	❑	❑	❑	❑	❑	
	❑	❑	❑	❑	❑	❑	❑	

Chemical pest management practices

If non-chemical methods are ineffective, the school district will consider pesticides only after careful monitoring indicates that they are needed according to pre-established action levels and will use pesticides that pose the least possible hazard and are effective in a manner that minimizes risks to people, property and the environment.

This school district expects the following pesticides (pesticide products and active ingredients) to be applied during the year. (This list includes pesticides that will be applied by school district staff or licensed pest control businesses.):

Healthy Schools Act

❑ This school district complies with the notification, posting, recordkeeping, and all other requirements of the Healthy Schools Act. (Education Code Sections 17608 - 17613, 48980.3; Food & Agricultural Code Sections 13180 - 13188)

Training

Every year school district employees who make pesticide applications receive the following training prior to pesticide use:

❑ Pesticide specific safety training (Title 3 California Code of Regulations 6724)

❑ School IPM training course approved by the Department of Pesticide Regulation (Education Code Section 16714; Food & Agricultural Code Section 13186.5).

Submittal of pesticide use reports

❑ Reports of all pesticides applied by school district staff during the calendar year, except pesticides exempt[1] from HSA recordkeeping, are submitted to the Department of Pesticide Regulation at least annually, by January 30 of the following year, using the form provided at www.cdpr.ca.gov/schoolipm. (Education Code Section 16711)

Notification

This school district has made this IPM plan publicly available by the following methods (check at least one):

❑ This IPM plan can be found online at the following web address: _____

❑ This IPM plan is sent out to all parents, guardians and staff annually.

Review

❑ This IPM plan will be reviewed (and revised, if needed) at least annually to ensure that the information provided is still true and correct.

Date of next review: _____

I acknowledge that I have reviewed this school district's IPM Plan and it is true and correct.

Signature: _____ Date: _____

[1] These pesticides are exempt from all Healthy Schools Act requirements, except the training requirement: 1) products used in self-contained baits or traps, 2) gels or pastes used as crack and crevice treatments, 3) antimicrobials, and 4) pesticides exempt from U.S. EPA registration. (Education Code Section 17610.5)

Annual Notification Form

Dear Parent or Guardian,

The Healthy Schools Act requires all California school districts to notify parents and guardians of pesticides they expect to apply during the year. We expect to use the following pesticides in your school this year:

Name of Pesticide (Common Name)	Active Ingredient(s)

You can find more information regarding these pesticides and pesticide use reduction at the Department of Pesticide Regulation's Web site at www.cdpr.ca.gov.

You may view a copy of the district's integrated pest management plan in the schoolsite office. It is located online at:

If you have any questions, please contact:

Dear Parent or Guardian,

The Healthy Schools Act of 2000 requires that all schools provide parents or guardians of students with annual written notification of expected pesticide use on school sites. The notification will identify the active ingredient or ingredients in each pesticide product and will include the Internet address (http://www.cdpr.ca.gov) for further information on pesticides and their alternatives.

Parents or guardians may request prior notification of individual pesticide applications at the school site. People listed on this registry will be notified at least 72 hours before pesticides are applied. If you would like to be notified every time we apply a pesticide, please complete and return the form below and mail it to:

If you have any questions, please contact

Sincerely,

Request for Individual Pesticide Application Notification

I understand that, upon request, the school district is required to supply information about individual pesticide applications at least 72 hours before application. I would like to be notified before each pesticide application at this school.

I would prefer to be contacted by (check one): U.S. Mail ☐ E-mail ☐ Phone ☐

Please print neatly:

Name of Parent/Guardian: _____ Date: _____

Address: _____

Day Phone:( ) _____ Evening Phone:( ) _____

E-mail: _____

Return to:

WARNING:

PESTICIDE TREATED AREA

Name of Pesticide:

_____

Name of Manufacturer:

_____

US EPA Registration No.:

_____

Intended Application Date_____ Treated Areas

Actual Application Date_____ Reason for Treatment

For more information about this pesticide application contact:

Name Title

For recordkeeping purposes per the Healthy Schools Act: Amount of Pesticide Used_____

STATE OF CALIFORNIA
DPR-HSA-118 (REV. 12/16)

PESTICIDE USE REPORTING FOR SCHOOL AND CHILD DAY CARE CENTER EMPLOYEES

DEPARTMENT OF PESTICIDE REGULATION
PEST MANAGEMENT & LICENSING BRANCH

APPLICATION YEAR	SCHOOL DESIGNEE (IPM COORDINATOR)	DISTRICT / CENTER NAME	LICENSE / CERTIFICATE NUMBER (OPTIONAL)
REPORT PREPARED BY:		E-MAIL ADDRESS	CITY	PHONE NUMBER

School CDS #/Child Day Care Facility # OR Name & Address AND Specify if School or Child Day Care Facility	County Code	Date & Time Application Completed	Location (# from list on back)	Manufacturer & Name of Product Applied	EPA REG. Number on Label or CA Reg. Number for adjuvants (include alpha code, if listed)	Amount of Pesticide Product Used (check or write in unit from label)	Pest Control Code (from list on back)
☐ School ☐ Day Care						(vol.) ☐ OZ ☐ ML ☐ PT (wt.) ☐ GR ☐ OZ ☐ LB	
☐ School ☐ Day Care						(vol.) ☐ OZ ☐ ML ☐ PT (wt.) ☐ GR ☐ OZ ☐ LB	
☐ School ☐ Day Care						(vol.) ☐ OZ ☐ ML ☐ PT (wt.) ☐ GR ☐ OZ ☐ LB	
☐ School ☐ Day Care						(vol.) ☐ OZ ☐ ML ☐ PT (wt.) ☐ GR ☐ OZ ☐ LB	
☐ School ☐ Day Care						(vol.) ☐ OZ ☐ ML ☐ PT (wt.) ☐ GR ☐ OZ ☐ LB	

Use this form ONLY to report pesticide applications made by schoolsite employees, staff, and volunteers at schools and child care centers. DO NOT report pesticide use by pest management professionals contracted to apply pesticides at schoolsites. They will report their own use. Report must be submitted no later than January 30th of the year following the year of use to:
School Pesticide Use Reporting, Department of Pesticide Regulation, P.O. Box 4015, Sacramento, CA 95812-4015

INSTRUCTIONS:

1. Each line is an individual pesticide application. Report only one schoolsite, date/time, and pesticide per line. Multiple pages will be needed if you need to report more than 5 pesticide applications.

2. A name and address is required for each schoolsite. A cover sheet with all schoolsite names/addresses can be included with your report to prevent repetitive writing/typing.

3. Applicators: If you are mixing a concentrate with a liquid, report the amount of concentrate applied. For products that don't require dilution, report the amount of finished product applied.

PEST CONTROL CODES:

Code 10 - Structural Pest Control ..... includes pest control work performed within or on buildings or other structures

Code 30 - Landscape Maintenance Pest Control... includes pest control work performed on landscape plantings around buildings

Code 80 - Vertebrate Pest Control ..... includes pest control work performed by public agencies or work under the supervision of the State or county agricultural commissioner

LOCATION CODES:

1	Administration Bldg	5	Cafeteria/Kitchen	9	Landscape (indoor)	13	Multipurpose Room	17	Vehicle
2	Athletic Field	6	Classroom	10	Landscape (outdoor)	14	Playground	18	Multiple Locations
3	Auditorium	7	Gymnasium	11	Library	15	Pool	19	Other (Please indicate)
4	Bldg, Exterior	8	Hardscape (parking lot, sidewalk, etc.)	12	Locker Room	16	Restroom		_____

Reason for application is not required for reporting. This form, when filled out completely, can be used as the pesticide use record required under HSA.
Reasons for application (required for Healthy Schools Act recordkeeping).

Application 1:

Application 2:

Application 3:

Application 4:

Application 5:

APPENDIX B

Pesticides Exempted from the Healthy Schools Act Right-to-Know requirements

Supplemental Information
- **Registered product:** A product is registered if you see the "EPA Reg. No." or "CA Reg. No." on the label. - **Self-contained bait/trap:** Since the law does not specify a definition, determining whether a bait or trap is "self-contained" is the responsibility of the user. When making this determination, consider whether the self-contained bait/trap is child-resistant and tamperproof. - **"Gel or paste":** refers to formulation type. - **Crack and crevice treatment:** The application of small quantities of a pesticide consistent with labeling instructions in a building into openings. See California Education Code, Section 17609 (b). - **Antimicrobial:** Pesticides intended to disinfect, sanitize or reduce growth of microbiological organisms; or protect inanimate objects or surfaces from contamination or deterioration. See U.S. Code, Title 7, Chapter 2, Subchapter II, § 136. - **Integrated pest management:** IPM focuses on long-term prevention of pests or their damage by combining management methods to reduce or eliminate risks to human health, beneficial and non-target organisms and the environment. Pesticides are used only after monitoring indicates they are needed according to the established guidelines.

Exemptions notwithstanding, DPR recommends that schools and child care centers keep complete records of all pest management activities as part of a sound integrated pest management program.

For more details about pesticides exempt from registration or if one or some of the ingredients are not listed in these appendices and you believe the product is not illegal to use as a pesticide, check the California Code of Regulations (CCR), Code of Federal Regulations (CFR) and Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), and additional references below and on the appendices:

Code	Explanation
CCR § 6147	Exempt products in California Code of Regulations
CFR § 180.950	Exempt products in Code of Federal Regulations
FIFRA 25(b)	Exempt products from federal registration
CFR § 152.25	Exemptions from pesticides of a character not requiring FIFRA regulation. *Note: the items listed in CFR § 152.25 may not be included in the appendices as many require conditions.
Education Code § 17610.5	Exempt products from some HSA requirements

Contact the Department of Pesticide Regulation at school-ipm@cdpr.ca.gov for any questions.

APPENDIX 1: Exempt Active Ingredients

Active Ingredients Allowed in Exempted Pesticide Products under FIFRA 25(b) and the California Code of Regulations (CCR) § 6147

CAS #	Chemical Name	CAS #	Chemical Name
8001-79-4	Castor oil (U.S.P. or equivalent)	6915-15-7	Malic acid [1]
N/A	Cedar oil [1]	N/A	Mint
N/A	Cinnamon	N/A	Mint oil [1]
N/A	Cinnamon oil [1]	N/A	Peppermint [2]
77-92-9	Citric acid 1	8006-90-4	Peppermint oil [1, 2]
N/A	Citronella (non-topical uses only)	122-70-3	2-Phenethyl propionate [1]
8000-29-1	Citronella oil (non-topical uses only)	122-70-3	2-phenylethyl propionate [1]
N/A	Cloves [2]	590-00-1	Potassium sorbate [1]
8000-34-8	Clove oil [1, 2]	N/A	Putrescent whole egg solids
N/A	Corn gluten meal	N/A	Rosemary [2]
8001-30-7	Corn oil	8000-25-7	Rosemary oil [1, 2]
N/A	Cottonseed oil	N/A	Sesame (includes ground sesame plant)
N/A	Dried blood	8008-74-0	Sesame oil
97-53-0	Eugenol [1, 2]	7647-14-5	Sodium chloride (common salt)
N/A	Garlic	151-21-3	Sodium lauryl sulfate [1, 2]
8008-99-9	Garlic oil [1]	8001-22-7	Soybean oil
106-24-1	Geraniol [2]	N/A	Thyme [2]
8000-46-2	Geranium oil [2]	8007-46-3	Thyme oil [1, 2]
N/A	Lauryl sulfate [1]	N/A	White pepper [1]
8007-02-1	Lemongrass oil [1]	7440-66-6	Zinc metal strips (consisting solely of zinc metal and impurities)
8001-26-1	Linseed oil	N/A	N/A

[1] Products containing 8.5% or more of this active ingredient in the formulated product must at a minimum bear the signal word "CAUTION," the phrase "Keep Out of Reach of Children," appropriate precautionary language, and a requirement for appropriate protective eyewear and gloves.

[2] Products containing this active ingredient intended for topical application to human skin must at a minimum bear the signal word "CAUTION," the phrase "Keep Out of Reach of Children," a dermal sensitization precautionary statement, a prohibition against application to the hands of children, and use directions requiring adult supervision during application to children.

The list above was generated using the following resources:

- 3 CCR § 6147
- 40 CFR § 152.25 (f)

If an active ingredient in your product is not included on the list above, please consult the most recent ingredient lists and reference materials, which can be found at the following websites:

- U.S. EPA Minimal Risk Pesticides Web page: https://www.epa.gov/pesticides#activeingredients

- California Code of Regulations § 6147 at: http://www.cdpr.ca.gov/docs/legbills/calcode/25.htm

APPENDIX 2: Exempt Inert (inactive) Ingredients

Includes ingredients from: FIFRA List 4A "Minimal Risk Inerts" and 40 CFR 180.950

Exempt Inert Ingredients

CAS #	Chemical Name	CAS #	Chemical Name
5743-26-0	Acetic acid, calcium salt, monohydrate	7585-39-9	beta-cyclodextrin
	[Calcium acetate monohydrate]	68409-75-6	Bone meal
127-08-2	Acetic acid, potassium salt	N/A	Bran
	[Potassium acetate]	N/A	Bread crumbs
127-09-3	Acetic acid, sodium salt	34451-19-9	(+)-Butyl lactate
	[Sodium acetate]		[Lactic acid, n-butyl ester, (S)]
77-90-7	Acetyl tributyl citrate	138-22-7	Butyl lactate
	[Citric acid, 2-(acetyloxy)-, tributyl ester]		[Lactic acid, n-butyl ester]
9002-18-0	Agar	123-95-5	Butyl stearate
N/A	Almond hulls		[Octadecanoic acid, butyl ester]
N/A	Almond shells	57455-37-5	C.I. pigment blue 29
10016-20-3	alpha-cyclodextrin		[Ultramarine blue]
1327-36-2	Aluminatesilicate	N/A	Calcareous shale
1327-43-1	Aluminum magnesium silicate	13397-26-7	Calcite ($Ca(Co_3)$)
	[Silicic acid, aluminum magnesium salt]	62-54-4	Calcium acetate
12736-96-8	Aluminum potassium sodium silicate	5743-26-0	Calcium acetate monohydrate
	[Silicic acid, aluminum potassium sodium salt]		[Acetic acid, calcium salt, monohydrate]
1335-30-4	Aluminum silicate	2090-05-3	Calcium benzoate
1344-00-9	Aluminum sodium silicate		[Benzoic acid, calcium salt]
	[Silicic acid, aluminum sodium salt]	471-34-1	Calcium carbonate
12003-51-9	Aluminum sodium silicate (1:1:1)	7693-13-2	Calcium citrate
	[Silicic acid (H_4SiO_4), aluminum sodium salt (1:1:1)]	7693-13-2	[Citric acid, calcium salt]
1863-63-4	Ammonium benzoate	6107-56-8	Calcium octanoate
	[Benzoic acid, ammonium salt]	12168-85-3	Calcium oxide silicate ($Ca_3O(SiO_4)$)
1002-89-7	Ammonium stearate	1344-95-2	Calcium silicate
	[Octadecanoic acid, ammonium salt]		[Silicic acid, calcium salt]
113894-85-	Amylopectin, acid-hydrolyzed, 1-octenylbutanedioate	1592-23-0	Calcium stearate
125109-81-	Amylopectin, hydrogen 1-octadecenylbutanedioate		[Octadecanoic acid, calcium salt]
N/A	Animal glue	7778-18-9	Calcium sulfate
N/A	Anise	10101-41-4	Calcium sulfate dihydrate
N/A	Apple pomace	10034-76-1	Calcium sulfate hemihydrate
50-81-7	L-Ascorbic acid	N/A	Canary seed
	[Vitamin C]	7440-44-0	Carbon
137-66-6	Ascorbyl palmitate	124-38-9	Carbon dioxide
12174-11-7	Attapulgite-type clay	546-93-0	Carbonic acid, magnesium salt (1:1)
N/A	Basil Beeswax		[Magnesium carbonate]
8012-89-3	Bentonite	298-14-6	Carbonic acid, monopotassium salt
1302-78-9	Bentonite, sodian		[Potassium bicarbonate]
85049-30-5	Benzaldehyde, 4-hydroxy-3-methoxy-	144-55-8	Carbonic acid, monosodium salt
121-33-5	[Vanillin]		[Sodium bicarbonate]
	Benzoic acid, ammonium salt	9000-11-7	Carboxymethyl cellulose
1863-63-4	[Ammonium benzoate]		[Cellulose, carboxymethyl ether]
	Benzoic acid, calcium salt	N/A	Cardboard
2090-05-3	[Calcium benzoate]	8015-86-9	Carnauba wax
	Benzoic acid, potassium salt	9000-40-2	Carob gum
582-25-2	[Potassium benzoate]		[Locust bean gum]
	Benzoic acid, sodium salt	9000-07-1	Carrageenan
532-32-1	[Sodium benzoate]	9000-71-9	Caseins
		8001-79-4	Castor oil

APPENDIX 2: Exempt Inert (inactive) Ingredients

Includes ingredients from: FIFRA List 4A "Minimal Risk Inerts" and 40 CFR 180.950

CAS #	Chemical Name	CAS #	Chemical Name
8001-78-3	Castor oil, hydrogenated	6132-04-3	Citric acid, trisodium salt, dihydrate
N/A	Cat food		[Trisodium citrate dihydrate]
9004-34-6	Cellulose	6858-44-2	Citric acid, trisodium salt, pentahydrate
9004-35-7	Cellulose acetate		[Trisodium citrate pentahydrate]
9000-11-7	Cellulose, carboxymethyl ether	N/A	Citrus meal
	[Carboxymethyl cellulose]	9000-69-5	Citrus pectin
9004-32-4	Cellulose, carboxy methyl ether, sodium salt	68514-76-1	Citrus pulp
	[Sodium carboxymethyl cellulose]	N/A	Clam shells
9004-62-0	Cellulose, 2-hydroxyethyl ether	N/A	Cloves
	[Hydroxyethyl cellulose]	8002-31-1	Cocoa
9004-64-2	Cellulose, 2-hydroxypropyl ether	N/A	Cocoa shell flour
	[Hydroxypropyl cellulose]	N/A	Cocoa shells
9004-65-3	Cellulose, 2-hydroxypropyl methyl ether	8001-69-2	Cod-liver oil
	[Hydroxypropyl methyl cellulose]	68916-18-7	Coffee grounds
9004-67-5	Cellulose, methyl ether	N/A	Cookies
	[Methylcellulose]	61789-98-8	Cork
51395-75-6	Cellulose, mixture with cellulose carboxymethyl ether,	N/A	Corn cobs
	sodium salt	N/A	Cotton
65996-61-4	Cellulose, pulp	68424-10-2	Cottonseed meal
68442-85-3	Cellulose, regenerated	N/A	Cracked wheat
N/A	Cheese	50-70-4	D-glucitol
479-61-8	Chlorophyll a		[Sorbitol]
519-62-0	Chlorophyll b	26402-22-2	Decanoic acid, monoester with 1,2,3-propanetriol
N/A	Cinnamon	9004-53-9	Dextrins
77-92-9	Citric acid	50-99-7	Dextrose
77-90-7	Citric acid, 2-(acetyloxy)-, tributyl ester	61790-53-2	Diatomaceous earth (less than 1% crystalline silica)
	[Acetyl tributyl citrate]		[Kieselguhr; Diatomite]
7693-13-2	Citric acid, calcium salt	61790-53-2	Diatomite
	[Calcium citrate]		[Diatomaceous earth (less than 1% crystalline silica)]
813-94-5	Citric acid, calcium salt (2:3)	49553-76-6	Diglyceryl monooleate
	[Tricalcium citrate]		[9-Octadecenoic acid, ester with 1,2,3-propanetriol]
3609-96-9	Citric acid, dipotassium salt	12694-22-3	Diglyceryl monostearate
	[Dipotassium citrate]		[9-Octadecanoic acid, monoester with
144-33-2	Citric acid, disodium salt		oxybis(propanediol)]
	[Disodium citrate]	27638-00-2	Dilaurin
5949-29-1	Citric acid, monohydrate		[Dodecanoic acid, diester with 1,2,3-propanetriol]
866-83-1	Citric acid, monopotassium salt	108-32-7	1,3-Dioxolan-2-one, 4-methyl-
	[Monopotassium citrate]		[1,2-Propylene carbonate]
18996-35-5	Citric acid, monosodium salt	26657-95-4	Dipalmitin
	[Monosodium citrate]		[Hexadecanoic acid, diester with 1,2,3-propanetriol]
7778-49-6	Citric acid, potassium salt	3609-96-9	Dipotassium citrate
	[Potassium citrate]		[Citric acid, dipotassium salt]
77-93-0	Citric acid, triethyl ester	144-33-2	Disodium citrate
	[Triethyl citrate]		[Citric acid, disodium salt]
866-84-2	Citric acid, tripotassium salt	7727-73-3	Disodium sulfate decahydrate
	[Tripotassium citrate]	142-18-7	Dodecanoic acid, 2,3-dihydroxypropyl ester
6100-05-6	Citric acid, tripotassium salt, monohydrate		[1-Monolaurin]
	[Tripotassium citrate monhydrate]	53998-07-1	Decanoic acid, diester with 1,2,3-propanetriol
994-36-5	Citric acid, sodium salt		[Monomyristin]
	[Sodium citrate]	27215-38-9	Dodecanoic acid, monoester with 1,2,3-propanetriol
68-04-2	Citric acid, trisodium salt	16389-88-1	Dolomite
	[Trisodium citrate]	N/A	Douglas fir bark

APPENDIX 2: Exempt Inert (inactive) Ingredients

Includes ingredients from: FIFRA List 4A "Minimal Risk Inerts" and 40 CFR 180.950

CAS #	Chemical Name	CAS #	Chemical Name
N/A	Eggs	26657-95-4	Hexadecanoic acid, diester with 1,2,3-propanetriol
N/A	Eggshells		[Dipalmitin]
687-47-8	(+)-Ethyl lactate	26657-96-5	Hexadecanoic acid, monoester with 1,2,3-propanetriol
	[Lactic acid, ethyl ester (S)]		[Monopalmitin]
97-64-3	Ethyl lactate	68514-28-3	Humic acid, potassium salt
	[Lactic acid, ethyl ester]		[Potassium humate]
68476-25-5	Feldspar	1413-93-6	Humic acid
N/A	Fenugreek	68131-04-4	Humic acid, sodium salt
N/A	Fish meal		[Sodium humate]
8016-13-5	Fish oil [not conforming to 40 CFR §180.950]	68334-00-9	Hydrogenated cottonseed oil
57-48-7	Fructose	84681-71-0	Hydrogenated rapeseed oil
8031-18-3	Fuller's earth	8016-70-4	Hydrogenated soybean oil
110-17-8	Fumaric acid	9004-62-0	Hydroxyethyl cellulose
17465-86-0	gamma-cyclodextrin		[Cellulose, 2-hydroxyethyl ether]
9000-70-8	Gelatins	9004-64-2	Hydroxypropyl cellulose
71010-52-1	Gellan gum		[Cellulose, 2-hydroxypropyl ether]
68476-37-9	Glue (as depolymd. animal collagen)	9004-65-3	Hydroxypropyl methyl cellulose
56-81-5	Glycerin		[Cellulose, 2-hydroxypropyl methyl ether]
	[1,2,3-propanetriol]	8013-17-0	Invert sugar
56-81-5	Glycerol	12068-86-9	Iron magnesium oxide (Fe_2MgO_4)
	[Glycerin; 1,2,3-propanetriol]	1309-37-1	Iron oxide (Fe_2O_3)
111-03-5	Glycerol monooleate	12259-21-1	Iron oxide (Fe_2O_3), hydrate
	[9-Octadecenoic acid (Z)-, 2,3-dihydroxypropyl ester]	1317-61-9	Iron oxide (Fe_3O_4)
36354-80-0	Glyceryl dicaprylate	1345-25-1	Iron oxide (FeO)
	[Octanoic acid, diester with 1,2,3-propanetriol]	67-63-0	Isopropanol
53563-63-6	Glyceryl dimyristate		[Isopropyl alcohol]
	[Tetradecanoic acid, diester with 1,2,3-propanetriol]	67-63-0	Isopropyl alcohol
25637-84-7	Glyceryl dioleate		[2-Propanol]
	[9-Octadecenoic acid (9Z)-, diester with 1,2,3-propanetriol]	110-27-0	Isopropyl myristate
1323-83-7	Glyceryl distearate	1332-58-7	Kaolin
27214-38-6	Glyceryl monomyristate	61790-53-2	Kieselguhr
	[Tetradecanoic acid, monoester with 1,2,3-propanetriol]		[Diatomaceous earth (less than 1% crystalline silica)]
26402-26-6	Glyceryl monooctanoate	97-64-3	Lactic acid, ethyl ester
	[Octanoic acid, monoester with 1,2,3-propanetriol]		[Ethyl lactate]
25496-72-4	Glyceryl monooleate	687-47-8	Lactic acid, ethyl ester, (S)
	[9-Octadecenoic acid (9Z)-, monoester with 1,2,3-propanetriol]		[(+)-Ethyl lactate]
		138-22-7	Lactic acid, n-butyl ester
31566-31-1	Glyceryl monostearate		[Butyl lactate]
	[Octadecanoic acid, monoester with 1,2,3-propanetriol]	34451-19-9	Lactic acid, n-butyl ester, (S)
11099-07-3	Glyceryl stearate		[(+)-Butyl lactate
	[Octadecanoic acid, ester with 1,2,3-propanetriol]	63-42-3	Lactose
N/A	Granite	64044-51-5	Lactose monohydrate
N/A	Grape pumice	8006-54-0	Lanolin Latex
7782-42-5	Graphite	N/A	rubber Lauric
9000-30-0	Guar gum	143-07-7	acid Lecithins
9000-01-5	Gum arabic	8002-43-5	Lecithins, soya
9000-65-1	Gum tragacanth	8030-76-0	[Soya lecithins]
13397-24-5	Gypsum		Licorice extract
1317-60-8	Hematite (Fe_2O_3)	68916-91-6	Lime (chemical) dolomitic
N/A	Herbs, food commodity	12001-27-3	Limestone
57-10-3	Hexadecanoic acid	1317-65-3	Linseed oil
	[Palmitic acid]	8001-26-1	

APPENDIX 2: Exempt Inert (inactive) Ingredients

Includes ingredients from: FIFRA List 4A "Minimal Risk Inerts" and 40 CFR 180.950

CAS #	Chemical Name	CAS #	Chemical Name
9000-40-2	Locust bean gum (Carob gum)	557-04-0	Octadecanoic acid, magnesium salt [Magnesium stearate]
553-70-8	Magnesium benzoate	31566-31-1	Octadecanoic acid, monoester with 1,2,3-propanetriol
546-93-0	Magnesium carbonate		[Glyceryl monostearate]
	[Carbonic acid, magnesium salt (1:1)]	593-29-3	Octadecanoic acid, potassium salt
1309-48-4	Magnesium oxide		[Potassium stearate]
12207-97-5	Magnesium oxide silicate ($Mg_3O(Si_2O_5)_2$), monohydrate	36354-80-0	Octanoic acid, diester with 1,2,3-propanetriol
1343-88-0	Magnesium silicate Magnesium		[Glyceryl dicaprylate]
1343-90-4	silicate hydrate Magnesium silicon	26402-26-6	Octanoic acid, monoester with 1,2,3-propanetriol
14987-04-3	oxide ($Mg_2Si_3O_8$) Magnesium		[Glyceryl monooctanoate]
557-04-0	stearate	764-71-6	Octanoic acid, potassium salt
	[Octadecanoic acid, magnesium salt]	1984-06-1	Octanoic acid, sodium salt
7487-88-9	Magnesium sulfate	822-16-2	Octadecanoic acid, sodium salt
10034-99-8	Magnesium sulfate heptahydrate		[Sodium stearate]
6915-15-7	Malic acid	557-05-1	Octadecanoic acid, zinc salt
8002-48-0	Malt extract		[Zinc stearate]
N/A	Malt flavor	12694-22-3	9-Octadecanoic acid, monoester with oxybis(propanediol)
9050-36-6	Maltodextrin		[Diglyceryl monostearate]
N/A	Meat meal [As described in 40 CFR §180.950(b)]	25637-84-7	9-Octadecenoic acid (9Z)-, diester with 1,2,3-propanetriol
9004-67-5	Methylcellulose		[Glyceryl dioleate]
	[Cellulose, methyl ether]	25496-72-4	9-Octadecenoic acid (9Z)-, monoester with 1,2,3-propanetriol
12003-38-2	Mica		[Glyceryl monooleate]
12001-26-2	Mica-group minerals	71012-10-7	9-Octadecenoic acid (9Z)-, monoester with tetraglycerol
8049-98-7	Milk		[Tetragylceryl monooleate]
N/A	Millet seed	143-18-0	9-Octadecenoic acid (9Z)-, potassium salt
8012-95-1	Mineral oil (U.S.P.)		[Potassium oleate]
142-18-7	1-Monolaurin	111-03-5	9-Octadecenoic acid (Z)-, 2,3-dihydroxypropyl ester
	[Dodecanoic acid, 2,3-dihydroxypropyl ester]		[Glycerol monooleate]
589-68-4	1-Monomyristin	7492-30-0	9-Octadecenoic acid, 12-hydroxy-, monopotassium salt, (9Z,12R)-
	[Tetradecanoic acid, 2,3-dihydroxypropyl ester]		[Potassium ricinoleate]
53998-07-1	Monomyristin	5323-95-5	9-Octadecenoic acid, 12-hydroxy-, monosodium salt,(9Z,12R)-
	[Decanoic acid, diester with 1,2,3-propanetriol]		[Sodium ricinoleate]
26657-96-5	Monopalmitin	49553-76-6	9-Octadecenoic acid, ester with 1,2,3-propanetriol
	[Hexadecanoic acid, monoester with 1,2,3-propanetriol]		[Diglyceryl monooleate]
866-83-1	Monopotassium citrate	1592-23-0	Octadecanoic acid, calcium salt
	[Citric acid, monopotassium salt]		[Calcium stearate]
18996-35-5	Monosodium citrate	8007-69-0	Oils, almond
	[Citric acid, monosodium salt]	68917-73-7	Oils, wheat
1318-93-0	Montmorillonite	112-80-1	Oleic acid
544-63-8	Myristic acid	N/A	Oyster shells
37244-96-5	Nepheline syenite	8002-75-3	Palm oil
7727-37-9	Nitrogen	68514-74-9	Palm oil, hydrogenated
N/A	Nutria meat Nylon	57-10-3	Palmitic acid
N/A	Octadecanoic acid		[Hexadecanoic acid]
57-11-4	[Stearic acid]	N/A	Paper
	Octadecanoic acid, ammonium salt	8002-74-2	Paraffin wax
1002-89-7	[Ammonium stearate]	N/A	Peanut butter
	Octadecanoic acid, butyl ester	N/A	Peanut shells
123-95-5	[Butyl stearate]	N/A	Peanuts
	Octadecanoic acid, ester with 1,2,3-propanetriol	N/A	Peat moss
11099-07-3	[Glyceryl stearate]	9000-69-5	Pectin
		130885-09-5	Perlite

APPENDIX 2: Exempt Inert (inactive) Ingredients

Includes ingredients from: FIFRA List 4A "Minimal Risk Inerts" and 40 CFR 180.950

CAS #	Chemical Name	CAS #	Chemical Name
93763-70-3	Perlite, expanded	1327-43-1	Silicic acid, aluminum magnesium salt
26499-65-0	Plaster of paris		[Aluminum magnesium silicate]
9002-88-4	Polyethylene	12736-96-8	Silicic acid, aluminum potassium sodium salt
9007-48-1	Polyglyceryl oleate		[Aluminum potassium sodium silicate]
9009-32-9	Polyglyceryl stearate	1344-00-9	Silicic acid, aluminum sodium salt
127-08-2	Potassium acetate		[Aluminum sodium silicate]
	[Acetic acid, potassium salt]	12003-51-9	Silicic acid (H_4SiO_4), aluminum sodium salt (1:1:1)
1327-44-2	Potassium aluminum silicate, anhydrous		[Aluminum sodium silicate (1:1:1)]
582-25-2	Potassium benzoate	1344-95-2	Silicic acid, calcium salt
	[Benzoic acid, potassium salt]		[Calcium silicate]
298-14-6	Potassium bicarbonate	13776-74-4	Silicic acid (H_2SiO_3), magnesium salt (1:1)
	[Carbonic acid, monopotassium salt]	63231-67-4	Silica gel
7447-40-7	Potassium chloride	112926-00-8	Silica gel, precipitated, crystalline free
7778-49-6	Potassium citrate	10279-57-9	Silica, hydrate
	[Citric acid, potassium salt]	60676-86-0	Silica, vitreous
68514-28-3	Potassium humate	N/A	Soap (The water soluble sodium or potassium salts of
	[Humic acids, potassium salts]		fatty acids produced by either the saponification of
13429-27-1	Potassium myristate		fats and oils, or the neutralization of fatty acid)
	[Tetradecanoic acid, potassium salt]	1393-03-9	Soapbark
143-18-0	Potassium oleate		[Quillaja saponin]
	[9-Octadecenoic acid (9Z)-, potassium salt]	308076-02-0	Soapstone
7492-30-0	Potassium ricinoleate	127-09-3	Sodium acetate
	[9-Octadecenoic acid, 12-hydroxy-, monopotassium		[Acetic acid, sodium salt]
	salt, (9Z,12R)-]	9005-38-3	Sodium alginate
24634-61-5	Potassium sorbate	532-32-1	Sodium benzoate
	[Sorbic acid, potassium salt]		[Benzoic acid, sodium salt]
593-29-3	Potassium stearate	144-55-8	Sodium bicarbonate
	[Octadecanoic acid, potassium salt]		[Carbonic acid, monosodium salt]
7778-80-5	Potassium sulfate	9004-32-4	Sodium carboxymethyl cellulose
7646-93-7	Potassium sulfate		[Cellulose, carboxymethyl ether, sodium salt]
	[Sulfuric acid, monopotassium salt]	7647-14-5	Sodium chloride
56-81-5	1,2,3-Propanetriol	994-36-5	Sodium citrate
	[Glycerol; Glycerin]		[Citric acid, sodium salt]
67-63-0	2-Propanol	68131-04-4	Sodium humate
	[Isopropyl alcohol; Isopropanol]		[Humic acids, sodium salts]
108-32-7	1,2-Propylene carbonate	143-19-1	Sodium oleate
	[1,3-Dioxalan-2-one, 4-methyl-]	5323-95-5	Sodium ricinoleate
1332-09-8	Pumice		[9-Octadecenoic acid, 12-hydroxy-, monosodium
1393-03-9	Quillaja saponin		salt,(9Z,12R)-]
	[Soapbark]	822-16-2	Sodium stearate
N/A	Red cabbage color (expressed from edible red cabbage heads		[Octadecanoic acid, sodium salt]
N/A	a pressing process using only acidified water)	7757-82-6	Sodium sulfate
N/A	Red cedar chips	24634-61-5	Sorbic acid, potassium salt
N/A	Red dog flour		[Potassium sorbate]
N/A	Red pepper	50-70-4	Sorbitol
9006-04-6	Rubber		[D-glucitol]
N/A	Sawdust	N/A	Soy protein
N/A	Shale	8030-76-0	Soya lecithins
7631-86-9	Silica (crystalline free)		[Lecithins, soya]
112945-52-	Silica, amorphous, fumed (crystalline free)	N/A	Soybean hulls
7699-41-4	Silica, amorphous, precipitated and gel	68308-36-1	Soybean meal

APPENDIX 2: Exempt Inert (inactive) Ingredients

Includes ingredients from: FIFRA List 4A "Minimal Risk Inerts" and 40 CFR 180.950

CAS #	Chemical Name	CAS #	Chemical Name
68513-95-1	Soybean flour	6132-04-3	Trisodium citrate dihydrate
8001-22-7	Soybean oil [As described in 40 CFR §180.950(c)(1)]		[Citric acid, trisodium salt, dihydrate]
N/A	Spices [as defined in 40 CFR §180.950(a)]	6858-44-2	Trisodium citrate pentahydrate
57-11-4	Stearic acid		[Citric acid, trisodium salt, pentahydrate]
	[Octadecanoic acid]	57455-37-5	Ultramarine blue
57-50-1	Sucrose		[C.I. pigment blue 29]
7704-34-9	Sulfur	57-13-6	Urea
7646-93-7	Sulfuric acid, monopotassium salt	121-33-5	Vanillin
	[Potassium sulfate]		[Benzaldehyde, 4-hydroxy-3-methoxy-]
N/A	Syrup [As described in 40 CFR §180.950(a)]	1318-00-9	Vermiculite
68425-17-2	Syrups, hydrolyzed starch, hydrogenated	8028-52-2	Vinegar (maximum 8% acetic acid in solution)
589-68-4	Tetradecanoic acid, 2,3-dihydroxypropyl ester	50-81-7	Vitamin C
	[1-Monomyristin]		[L-Ascorbic acid]
53563-63-6	Tetradecanoic acid, diester with 1,2,3-propanetriol	1406-18-4	Vitamin E
	[Glyceryl dimyristate]	N/A	Walnut flour
27214-38-6	Tetradecanoic acid, monoester with 1,2,3-propanetriol	N/A	Walnut shells
	[Glyceryl monomyristate]	7732-18-5	Water
13429-27-1	Tetradecanoic acid, potassium salt	N/A	Wheat Wheat
	[Potassium myristate]	N/A	flour Wheat
71012-10-7	Tetragylceryl monooleate	8006-95-9	germ oil Whey
	[9-Octadecenoic acid (9Z)-, monoester with tetraglycerol]	92129-90-3	White mineral oil (petroleum)
813-94-5	Tricalcium citrate	8042-47-5	Wintergreen oil
	[Citric acid, calcium salt (2:3)]	68917-75-9	Wollastonite ($Ca(SiO_3)$)
77-93-0	Triethyl citrate	13983-17-0	Wool
	[Citric acid, triethyl ester]	N/A	Xanthan gum
866-84-2	Tripotassium citrate	11138-66-2	Yeast
	[Citric acid, tripotassium salt]	68876-77-7	Zeolites (excluding erionite (CAS # 66733-21-9))
6100-05-6	Tripotassium citrate monohydrate	1318-02-1	Zeolites, NaA
	[Citric acid, tripotassium salt, monohydrate]	68989-22-0	Zinc iron oxide
68-04-2	Trisodium citrate	12063-19-3	Zinc oxide (ZnO)
	[Citric acid, trisodium salt]	1314-13-2	Zinc stearate
		557-05-1	[Octadecanoic acid, zinc salt]

NOTE: This list is only for non-food use products. If your product is intended for use on or around food, food crops, food contact surfaces, or animal feed, or if you have general questions about the list, please contact the Department of Pesticide Regulation at school-ipm@cdpr.ca.gov

The list above was generated using the following resources:

- "Inert Ingredients Eligible for FIFRA 25(b) Pesticide Products, Last Updated December 20, 2010"
- 40 CFR §180.950

If an inert ingredient in your product is not included on the list above, please consult the most recent ingredient lists and reference materials, which can be found at the following websites:

- Inert Ingredients Eligible for FIFRA 25(b) Pesticide Products at: https://www.epa.gov/pesticide-registration/inert-ingredients-overview-and-guidance
- Code of Federal Regulation, Title 40, Chapter 1, Subchapter E, Part 180, Subpart D, §180.950 at:https://www.epa.gov/laws-regulations

APPENDIX C

Division of Juvenile Justice Guidelines

Excerpt from the Healthy Schools Act, California Education Code, section 17612:

(e) Subdivisions (a) and (d) shall not apply to schools rated by the Division of Juvenile Justice. The school administrator of a school operated by the Division of Juvenile Justice shall notify the chief medical officer of that facility at least 72 hours prior to application of pesticides. The chief medical officer shall take any steps necessary to protect the health of pupils in that facility.

For reference, subdivisions (a) and (d) of section 17612 include the notification and warning sign requirements of the Healthy Schools Act.

The following information will help Division of Juvenile Justice facilities to comply with the Healthy Schools Act (HSA) and to achieve effective, low-risk pest management.

- The school administrator must notify the Chief Med cal Officer (CMO) of the facility at least 72hours prior to pesticide applications. The CMO is required to take all necessary steps to protect pupil health.
- The school administrator should provide a list of all pesticides anticipated to be used during the calendar year to the CMO. The list should include a copy of the product label, EPA registration number, and Safety Data Sheet (SDS) for each item.
- The CMO should review the labels, SDS information, and consult the Department of Pesticide Regulation's website to determine if the listed pesticides are acceptable and appropriate for use. At their discretion, the CMO may restrict use.
- The CMO should investigate any complaints and suspected illnesses due to pesticide applications, take appropriate action, and report incidents to the local County Agricultural Commissioner's (CAC) office.
- To achieve the desired level of pest management, facilities may institute an integrated pest management (IPM) policy that promotes reduced risk pest management, such as improved sanitation and exclusion measures.
- Staff assigned pest management duties should keep detailed records of each pesticide application including the brand name and EPA registration number of the product, amount used, date and location of application, and targeted pests.
- Staff assigned pest management duties should contact the CAC to determine applicable local pesticide restrictions.
- The Healthy Schools Act exempts certain pesticide product from some requirements. The exempt categories include: pesticides deployed in the form of self-contained baits or traps, gels or pastes deployed indoors as "crack and crevice" treatments, pesticides exempt from registration by the U.S. EPA, and antimicrobial pesticides, including sanitizers and disinfectants. Annual HSA training is still required when using any pesticides, including the exempt products listed above.
- Employees are required to take a DPR-approved HSA training course annually before applying any pesticides. Employers will provide training. [California Education Code section 17614.]
- A written notification of all listed and approved pesticides anticipated to be used should be posted at the facility entryway and a copy should be provided to all staff annually.
- Existing federal and state law requires any user of a pesticide to comply with the label.
- The existing requirements for licensed Pest Control Businesses regarding training and reporting for pesticide applications made at schoolsites are detailed in the California Code of Regulations section 6625; Food and Agricultural Code sections 13186 and 13186.5; and Business and Professions code section 8593.2.

Fitzmaurice, P., "Implementation of Healthy Schools Act-You Authority," August 27, 2001, office communication (2001).

APPENDIX D

Text of the Healthy Schools Act of 2000

HEALTHY SCHOOLS ACT

The Healthy Schools Act (AB 2260, Statutes of 2000, Ch. 718) was signed into California law in September 2000; amended by AB 405 (Statutes of 2005, Ch. 566) in October 2005; amended by AB 2865 (Statutes of 2006, Ch. 865) in September 2006; and amended by SB 1405 (Statutes of 2014, Ch. 848) in September 2014.

The complete text of the Healthy Schools Act is located in four different California codes:

Education Code, Division 1, Part 10.5, Chapter 5, Article 4 (commencing with Section 17608; and add Sections 17611.5 and 17614) and Division 4, Part 27, Chapter 6, Article 4 (Section 48980.3)	Pages 1-6
Food and Agricultural Code, Division 7, Chapter 2, Article 17 (commencing with Section 12996; and add Section 13186.5)	Pages 6-11
Business and Professions Code, Division 3, Chapter 14, Article 5 (addition of Section 8593.2)	Page 11
Health and Safety Code, Division 2, Chapter 3.4, Article 1 (Section 1596.794) and Article 2 (Section 1596.845)	Page 11

These codes can be accessed by going to http://leginfo.legislature.ca.gov/

CALIFORNIA CODES

EDUCATION CODE
SECTIONS 17608-17614 & SECTION 48980.3

17608. This article and Article 17 (commencing with Section 13180) of Chapter 2 of Division 7 of the Food and Agricultural Code shall be known and cited as the Healthy Schools Act of 2000.

17609. The definitions set forth in this section govern the construction of this article unless the context clearly requires otherwise:

(a) "Antimicrobial" means those pesticides defined by the Federal Insecticide, Fungicide, and Rodenticide Act (7 U.S.C. Sec. 136(mm)).

(b) "Crack and crevice treatment" means the application of small quantities of a pesticide consistent with labeling instructions in a building into openings such as those commonly found at expansion joints, between levels of construction, and between equipment and floors.

(c) "Emergency conditions" means any circumstances in which the school designee or a property owner of a property where a privately operated child day care facility is located, or the property owner's agent, deems that the immediate use of a pesticide is necessary to protect the health and safety of pupils, staff, or other persons, or the schoolsite.

(d) "Integrated pest management plan" means a written plan based on a template provided or approved by the Department of Pesticide Regulation that outlines a strategy for integrated pest management, as described in Section 13181 of the Food and Agricultural Code.

(e) "School designee" or "IPM coordinator" means a schoolsite or school district employee identified by a schoolsite or school district to carry out the requirements of this article or to ensure that the requirements of this article are carried out.

(f) "Schoolsite" means any facility used as a child day care facility, as defined in Section 1596.750 of the Health and Safety Code, or for kindergarten, elementary, or secondary school purposes. The term includes the buildings or structures, playgrounds, athletic fields, vehicles, or any other area of property visited or used by pupils. "Schoolsite" does not include any postsecondary educational facility attended by secondary pupils or private kindergarten, elementary, or secondary school facilities. For child day care facilities, the State Department of Social Services shall serve as the liaison to these facilities, as needed.

17610. (a) It is the policy of the state that effective least toxic pest management practices should be the preferred method of managing pests at schoolsites and that the state, in order to reduce children's exposure to toxic pesticides, shall take the necessary steps, pursuant to Article 17 (commencing with Section 13180) of Chapter 2 of Division 7 of the Food and Agricultural Code, to facilitate the adoption of effective least toxic pest management practices at schoolsites. It is the intent of the Legislature that all schoolsite personnel involved in the application of a pesticide at a schoolsite be trained in integrated pest management and the safe use of pesticides in relation to the unique nature of schoolsites and children's health.

(b) (1) (A) A property owner of a property where a child day care facility is located, or the property owner's agent, who personally applies any pesticides on any area listed in paragraph (2) shall provide notice to the child day care facility as described in paragraph (3) at least 120 hours before the application, unless an emergency condition, as defined in Section 17609, exists.

(B) An owner of property on which a child day care facility is located shall be subject to the requirement to provide notice pursuant to this subdivision 30 days after it has received notice from a child day care facility of its presence at the property, unless the property owner, or his or her agent, received that notice pursuant to paragraph (1) of subdivision (d) of Section 1597.40 of the Health and Safety Code before the effective date of this subdivision in which case the property owner shall be subject to the notice requirements on and after the effective date of this subdivision.

(2) This subdivision applies when a property owner or his or her agent intends to personally apply pesticides on any of the following:

(A) Inside the rented premises on which child day care facility is located.
(B) Upon a designated child day care facility playground designated by the property owner.
(C) Upon an area designated for use by the child day care facility
(D) Upon an area within 10 feet of the perimeter of the child day care facility.

(3) The notice required by paragraph (1) shall include the following:

(A) The product name.
(B) The manufacturer's name.
(C) The active ingredients of each pesticide.
(D) The United States Environmental Protection Agency's product registration number.
(E) The intended date of application.
(F) Those areas of application listed in paragraph (2).
(G) The reason for application.

(4) A notice of pesticide application provided to a tenant pursuant to subdivision (d) of Section 13186 of the Food and Agricultural Code shall satisfy the notice requirements of this section.

(5) If the child day care facility ceases to operate on the property, the provisions of this act shall no longer apply to the property.

17610.1. (a) (1) The use of a pesticide on a schoolsite is prohibited if that pesticide is granted a conditional registration, an interim registration, or an experimental use permit by the Department of Pesticide Regulation, or if the pesticide is subject to an experimental registration issued by the United States Environmental Protection Agency, and either of the following is applicable:

(A) The pesticide contains a new active ingredient.

(B) The pesticide is for a new use. This paragraph does not apply to a conditionally registered pesticide that is approved for other uses that has fulfilled all registration requirements that relate to human health, including, but not limited to, the completion of mandatory health effect studies pursuant to the Birth Defect Prevention Act of 1984 (Art. 14 (commencing with Sec. 13121), Ch. 2, Div. 7, F. & A.C.). The requirements of this section are not intended to impose any new labeling requirements. (2) The use of a pesticide on a schoolsite is prohibited if the Department of Pesticide Regulation cancels or suspends registration, or requires phase out of use, of that pesticide.

(b) Vendors or manufacturers of pesticides that are prohibited for use on a schoolsite pursuant to subdivision (a) are prohibited from furnishing those pesticides to school districts or schoolsites either by sale or by gift.

(c) This section does not apply to public health pesticides or antimicrobial pesticides registered pursuant to Section 12836 of the Food and Agricultural Code.

17610.5. Sections 17611 and 17612 shall not apply to a pesticide product deployed in the form of a self-contained bait or trap, to gel or paste deployed as a crack and crevice treatment, to any pesticide exempted from regulation by the United States Environmental Protection Agency pursuant to the Federal Insecticide, Fungicide, and Rodenticide Act (7 U.S.C. Sec. 136 et seq.), or to antimicrobial pesticides, including sanitizers and disinfectants.

17611. (a) Each schoolsite shall maintain records of all pesticide use at the schoolsite for a period of four years, and shall make this information available to the public, upon request, pursuant to the California Public Records Act (Chapter 3.5 (commencing with Section 6250) of Division 7 of Title 1 of the Government Code). A schoolsite may meet the requirements of this section by retaining a copy of the warning sign posted for each application required pursuant to Section 17612, and recording on that copy the amount of the pesticide used.

(b) (1) If a schoolsite chooses to use a pesticide not included within Section 17610.5, at the end of each calendar year, or more often at the discretion of a school designee, the school designee shall submit to the Director of Pesticide Regulation a copy of the records of all pesticide use at the schoolsite for the calendar year. The records submitted to the Director of Pesticide Regulation shall be submitted using a form prepared by the Department of Pesticide Regulation similar to that prepared pursuant to subdivision (b) of Section 13186 of the Food and Agricultural Code, and shall include all of the following:

(A) The name of a school designee for the schoolsite.

(B) The name and address of the schoolsite, or the department code of licensed child day care facility number indicating if the site is an elementary or secondary school facility, or a child day care facility.
(C) The product name, manufacturer's name, the United States Environmental Protection Agency's product registration number, and the amount used, including the unit of measurement.
(D) The date, time, and location of application.

(2) The report submitted pursuant to paragraph (1) shall not include pesticide use reported pursuant to subdivision (c) of Section 13186 of the Food and Agricultural Code.

17611.5 (a) The school designee may develop and post on the Internet Web site of the schoolsite, or, if the schoolsite does not maintain an Internet Web site, the school district, an integrated pest management plan for the schoolsite or the school district. If neither the schoolsite nor the school district maintains an Internet Web site, the school designee may include the integrated pest management plan with the annual notification sent to staff and parents or guardians of pupils enrolled at the schoolsite pursuant to Section 17612. The integrated pest management plan shall include the name of the school designee or IPM coordinator, include the pesticides expected to be applied at the schoolsite by schoolsite or school district employees and hired pest control applicators, and include a date when the plan shall be reviewed and, if necessary, updated.

(b) If a schoolsite chooses to use a pesticide not included within Section 17610.5, the school designee shall post on the Internet Web site of the schoolsite, or, if the schoolsite does not maintain an Internet Web site, the school district, an integrated pest management plan for the schoolsite or the school district. If neither the schoolsite nor the school district maintains an Internet Web site, the school designee shall include the integrated pest management plan with the annual notification sent to staff and parents or guardians of pupils enrolled at the schoolsite pursuant to Section 17612. The integrated pest management plan shall include the school district employees and hired pest control applicators, and include a date when the plan shall be revised, and if necessary, updated.

(c) Nothing in this section shall limit or otherwise change the requirements of Section 17612.

17612. (a) The school designee shall annually provide to all staff and parents or guardians of pupils enrolled at a schoolsite a written notification of the name of all pesticide products expected to be applied at the schoolsite during the upcoming year. The notification shall identify the active ingredient or ingredients in each pesticide product. The notice shall also contain the Internet address used to access information on pesticides and pesticide use reduction developed by the Department of Pesticide Regulation pursuant to Section 13184 of the Food and Agricultural Code and may contain other information deemed necessary by the school designee. No other written notification of pesticide applications shall be required by this act except as follows:

(1) In the written notification provided pursuant to this subdivision, the school designee shall provide the opportunity for recipients to register with the schoolsite if they wish to receive notification of individual pesticide applications at least 72 hours before the application. The notice shall include the product name, the active ingredient or ingredients in the product, and the intended date of application.

(2) If a pesticide product not included in the annual notification is subsequently intended for use at the schoolsite, the school designee shall, consistent with this subdivision and at least 72 hours prior to application, provide written notification of its intended use.

(b) The school designee shall make every effort to meet the requirements of this section in the least costly manner. Annual notification by a school district to parents and guardians shall be provided pursuant to Section 48980.3. Any other notification shall, to the extent feasible and consistent with the act adding this article, be included as part of any other written communication provided to individual parents or guardians. This section shall not require the school designee to issue the notice through first-class mail, unless he or she determines that no other method is feasible.

(c) Pest control measures taken during an emergency condition as defined in Section 17609 shall not be subject to the requirements of paragraphs (1) and (2) of subdivision (a). However, the school designee or property owner shall make every effort to provide the required notification for an application of a pesticide under emergency conditions.

(d) The school designee shall post each area of the schoolsite 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.

(e) Subdivisions (a) and (d) shall not apply to schools operated by the Division of Juvenile Justice. The school administrator of a school operated by the Division of Juvenile Justice shall notify the chief medical officer of that facility at least 72 hours prior to application of pesticides. The chief medical officer shall take any steps necessary to protect the health of pupils in that facility.

(f) This section and Section 17611 shall not apply to activities undertaken at a school by participants in the state program of agricultural vocational education, pursuant to Article 7 (commencing with Section 52450) of Chapter 9 of Part 28 of Division 4 of Title 2, if the activities are necessary to meet the curriculum requirements prescribed in Section 52454. Nothing in this subdivision relieves schools participating in the state program of agricultural vocational education of any duties pursuant to this section for activities that are not directly related to the curriculum requirements of Section 52454. This subdivision does not relieve schools participating in the state program of agricultural vocational education of any duties pursuant to this section for activities that are not directly related to the curriculum requirements of Section 52454.

(g) Sections 17610 to 17614, inclusive, shall not apply to family day care homes or property owners of day care homes, as defined in Section 1596.78 of the Health and Safety Code, or their agents who personally apply any pesticides.

(h) If pesticide is applied by a property owner or his or her agent, or by a pest control operator, failure to provide notice pursuant to subdivision (b) of Section 17610 or subdivision (d) of Section 13186 of the Food and Agricultural Code shall relieve a privately operated child day care facility from the requirements of this section.

17613. Section 17612 shall not apply to any agency signatory to a cooperative agreement with the State Department of Health Services pursuant to Section 116180 of the Health and Safety Code.

17614. (a) Commencing July 1, 2016, and except as provided in subdivision (b), the school designee, and any person, including, but not necessarily limited to, a schoolsite or school district employee, who, in the course of his or her work, intends to apply a pesticide at a schoolsite subject to this article, shall annually complete a training course provided by the Department of Pesticide Regulation or an agent authorized by the Department of Pesticide Regulation. The training course shall include integrated pest management and the safe use of pesticides in relation to the unique nature of schoolsites and children's health.

(b) (1) Commencing July 1, 2016, any person hired to apply a pesticide at a schoolsite subject to this article shall complete at least a one-hour training course in integrated pest management and the safe use of pesticides in relation to the unique nature of schoolsites and children's health before applying pesticides at a schoolsite subject to this article and during each subsequent licensing period in which the person applies a pesticide at a schoolsite subject to this article. The training course may be applied to his or her professional continuing education requirement required by the Structural Pest Control Board or the Department of Pesticide Regulation.

(2) The training course required by paragraph (1) shall be developed by the Department of Pesticide Regulation and may also be developed by a provider approved by the Structural Pest Control Board is the training course has been approved by the Department of Pesticide Regulation.

(3) The Department of Pesticide Regulation shall ensure that the training course it develops or approves pursuant to paragraph (2) meets the requirements for continuing education credit required by the Structural Pest Control Board and the Department of Pesticide Regulation.

SECTION 48980.3

48980.3. The notification required pursuant to Section 48980 shall include information regarding pesticide products as specified in subdivision (a) of Section 17612.

FOOD AND AGRICULTURAL CODE
SECTIONS 12996-13188

12996. (a) Every person who violates any provision of this division relating to pesticides, or any regulation issued pursuant to a provision of this division relating to pesticides, is guilty of a misdemeanor and upon conviction shall be punished by a fine of not less than five hundred dollars ($500) nor more than five thousand dollars ($5,000), or by imprisonment of not more than six months, or by both the fine and imprisonment. Upon a second or subsequent conviction of the same provision of this division relating to pesticides, a person shall be punished by a fine of not less than one thousand dollars ($1,000) nor more than ten thousand dollars ($10,000), or by imprisonment of not more than six months or by both the fine and imprisonment. Each violation constitutes a separate offense.

(b) Notwithstanding the penalties prescribed in subdivision (a), if the offense involves an intentional or negligent violation that created or reasonably could have created a hazard to human health or the environment, the convicted person shall be punished by imprisonment in a county jail not exceeding one year or in the state prison or by a fine of not less than five thousand dollars ($5,000) nor more than fifty thousand dollars ($50,000), or by both the fine and imprisonment.

(c) This section does not apply to the violations of Chapter 7.5 (commencing with Section 15300) or Section 13186.5.

12999.4 (a) In lieu of civil prosecution by the director, the director may levy a civil penalty against a person violating Sections 1215, 12116, 12671, 12992, 12993, Chapter 10 (commencing with Section 12400) of Division 6, Article 4.5 (commencing with Section 12841), Section 13186.5, Chapter 7.5 (commencing with Section 15300), or the regulations adopted pursuant to those provisions, of not more than five thousand dollars ($5,000) for each violation.

(b) Before a civil penalty is levied, the person charged with the violation shall be given a written notice of the proposed action, including the nature of the violation and the amount of the proposed penalty, and shall have the right to request a hearing within 20 days after receiving notice of the proposed action. A notice of the proposed action that is sent by certified mail to the last known address of the person charged shall be considered received even if delivery is refused or the notice is not accepted at that address. If a hearing is requested, notice of the time and place of the hearing shall be given at least 10 days before the date set for the hearing. Before the hearing, the person shall be given an opportunity to review the director's evidence. At the hearing, the person shall be given the opportunity to present evidence on his or her own behalf. If a hearing is not timely requested, the director may take the action proposed without a hearing.

(c) If the person against whom the director levied a civil penalty requested and appeared at a hearing, the person may seek review of the director's decision within 30 days of the date of the decision pursuant to Section 1094.5 of the code of Civil Procedures.

(d) After the exhaustion of the review procedure provided in this section, the director, or his or her representative, may file a certified copy of a final decision of the director that directs the payment of a civil penalty and, if applicable, any order that denies a petition for a writ of administrative mandamus, with the clerk of the superior court of any county. Judgment shall be entered immediately by the clerk in conformity with the decision or order. No fees shall be charged by the clerk of the superior court for the performance of any official service required in connection with the entry of judgment pursuant to this section.

(e) Any money recovered under this section shall be paid into the Department of Pesticide Regulation Fund for use by the department, upon appropriation, in administering this division and Division 6 (commencing with Section 11401).

13180. This article, Article 4 (commencing with Section 17608) of Chapter 5 of Part 10.5 of the Education Code, and Article 2 (commencing with Section 105500) of Chapter 7 of Division 103 of the Health and Safety Code, shall be known and may be cited as the Healthy Schools Act of 2000.

13181. (a) Notwithstanding any other provision of law, for purposes of this article, "integrated pest management" means a pest management strategy that focuses on long-term prevention or suppression of pest problems through a combination of techniques such as monitoring for pest presence and establishing treatment threshold levels, using nonchemical practices to make the habitat less conducive to pest development, improving sanitation, and employing mechanical and physical controls. Pesticides that pose the least possible hazard and are effective in a manner that minimizes risks to people, property, and the environment, are used only after careful monitoring indicates they are needed according to pre-established guidelines and treatment thresholds. This definition shall apply only to integrated pest management at school facilities and child day care facilities.

(b) For purposes of this article "IPM coordinator" has the same meaning as school designee or IPM coordinator, as those terms are defined in subdivision (e) of Section 17609 of the Education Code.

13182. It is the policy of the state that effective least toxic pest management practices should be the preferred method of managing pests at schoolsites and that the state, in order to reduce children's exposure to toxic pesticides, shall take the necessary steps, pursuant to this article, to facilitate the adoption of effective least toxic pest management practices at schoolsites. It is the intent of the Legislature that all school personnel involved in the application of pesticides at a schoolsite be trained in integrated pest management and the safe use of pesticides in relation to the unique nature of schoolsites and children's health.

13183. (a) The department shall promote and facilitate the voluntary adoption of integrated pest management programs for schoolsites, excluding privately operated child day care facilities, as defined in Section 1596.750 of the Health and Safety Code, that voluntarily choose to do so. For these schoolsites, the department shall do all of the following:

(1) Establish an integrated pest management program for schoolsites consistent with Section 13181. In establishing the program, the department shall:

(A) Develop criteria for identifying least-hazardous pest control practices and encourage their adoption as part of an integrated pest management program at each schoolsite.

(B) Develop a model program guidebook that prescribes essential program elements for schoolsites that have adopted a least-hazardous integrated pest management program. At a minimum, this guidebook shall include guidance on all of the following:

(i) Adopting an IPM policy.
(ii) Selecting and training an IPM coordinator.
(iii) Identifying and monitoring pest populations and damage.
(iv) Establishing a community-based school district advisory committee.
(v) Developing a pest management plan for making least-hazardous pest control choices.
(vi) Contracting for integrated pest management services.
(vii) Training and licensing opportunities.
(viii) Establishing a community-based right-to-know standard for notification and posting of pesticide applications.
(xi) Recordkeeping and program review.

(C) Develop a template for an integrated pest management plan to be used by schoolsites or school districts. The template shall outline a strategy for integrated pest management as described in Section 13181.

(2) Make the model program guidebook available to schoolsites and establish a process for systematically updating the guidebook and supporting documentation.

(b) The department shall promote and facilitate the voluntary adoption of integrated pest management programs at child day care facilities, as defined in Section 1596.750 of the Health and Safety Code, through the following:

(1) Modifying the department's existing integrated pest management program for schoolsites as described in subdivision (a) of Section 13183 for the child day care setting.
(2) Creating or modifying existing educational and informational materials on integrated pest management for the child day care setting.
(3) Making the materials available to child day care facilities and establishing a process for systematically updating them.

(c) The department shall develop a training course to train any person who intends to apply pesticides on a schoolsite. The training course shall cover integrated pest management and the safe use of pesticides in relation to the unique nature of schoolsites and children's health. The training course shall be provided by the department of an agent authorized by the department.

13184. (a) In implementing Section 13183, the department shall establish and maintain an Internet Web site as a comprehensive directory of resources describing and promoting least- hazardous practices at schoolsites. The Web site shall also make available an electronic copy of the model program guidebook, its updates, and supporting documentation. The department shall also establish and maintain on its Web site an easily identified link that provides the public with all appropriate information regarding the public health and environmental impacts of pesticide active ingredients and ways to reduce the use of pesticides at school facilities.

(b) It is the intent of the Legislature that the state assist school districts to ensure that compliance with Section 17612 of the Education Code is simple and inexpensive. The department shall include in its Web site Internet-based links that allow schools to properly identify and list the active ingredients of pesticide products they expect to be applied during the upcoming year. Use of these links by schools is not mandatory but shall be made available to all schools at no cost. The department shall ensure that adequate resources are available to respond to inquiries from school facilities or districts regarding the use of integrated pest management practices.

13185. (a) The department shall establish an integrated pest management training program in order to facilitate the adoption of a model IPM program and least-hazardous pest control practices by schoolsites. In establishing the IPM training program, the department shall do all of the following:

(1) Adopt a "train-the-trainer" approach, whenever feasible, to rapidly and broadly disseminate program information.
(2) Develop curricula and promote ongoing training efforts in cooperation with the University of California and the California State University.
(3) Prioritize outreach on a regional basis first and then to school districts. For outreach to child day care facilities, the department shall participate in existing trainings that provide opportunities for disseminating program information broadly on a regional basis.

(b) Nothing in this article shall preclude a schoolsite from adopting stricter pesticide use policies.

13186. (a) The Legislature finds and declares that the Department of Pesticide Regulation, pursuant to Section 12979 of the Food and Agricultural Code and Sections 6624 and 6627 of Title 3 of the California Code of Regulations, requires persons engaged for hire in the business of pest control to maintain records of pesticide use and report a summary of that pesticide use to the county Agricultural commissioner or director. The Legislature further finds and declares that it is in the interest of the state, in implementing a school integrated pest management program pursuant to this article, to collect specified information on the use of pesticides at schoolsites.

(b) The Department of Pesticide Regulation shall prepare a school pesticide use form to be used by licensed and certified pest control operators when they apply any pesticides at a schoolsite. The form shall include, for each application at a schoolsite, the name and address of the schoolsite, date and location of application, pesticide product name, and the quantity of pesticide used. Nothing in this section shall change any existing applicable pesticide use reporting requirements.

(c) Persons who are required to submit pesticide use records to the county agricultural commissioner or director shall complete and submit to the director the school pesticide use forms established pursuant to this section. The forms shall be submitted annually and may be submitted more often at the discretion of the pest control operator maintaining the forms. Child day care facilities, excluding family day care homes, as defined in Section 1596.78 of the Health and Safety Code, which are subject to the Healthy Schools Act of 2000, shall inform contractors hired to apply pesticides at the schoolsite that the facility must comply with the Healthy Schools Act of 2000.

(d) Any person who is hired to apply pesticides at a child day care facility, excluding family day care homes, as defined in Section 1596.78 of the Health and Safety Code, shall provide that facility's school designee with all of the following information at least 120 hours in advance of any pesticide application, except in the case of an emergency condition, as defined in Section 17609 of the Education Code:

(1) The pesticide product name.
(2) The pesticide manufacturer's name.
(3) The United States Environmental Protection Agency's product registration number.
(4) The active ingredient or ingredients in the pesticide product.
(5) The areas of application.
(6) The intended date of application.
(7) The reason for the pesticide application.

(e) If a person hired to apply pesticides contracts directly with the property owner or his or her agent rather than directly with the child day care facility, excluding family day care homes, as defined in Section 1596.78 of the Health and Safety Code, the property owner or his or her agent must notify the contractor that a child day care facility is being operated on the property at which the pesticides are to be applied to enable the contractor to comply with subdivision (d).

13186.5. (a) Commencing July 1, 2016, and except as provided in subdivision (b), a school designee, as defined in Section 17609 of the Education Code, and any person, including, but not necessarily limited to, a schoolsite or district employee, who in the course of his or her work, intends to apply a pesticides at a schoolsite subject tto this article, shall annually complete a training course provided by the department or an agent authorized by the department. The training course shall include integrated pest management and the safe use of pesticides in relation to the unique nature of schoolsites and children's health.

(b) (1) Commencing July 1, 2016, any person hired to apply to a pesticide at a schoolsite subject to this article shall complete at least a one-hour training course in integrated pest management and the safe use of pesticides in relation to the unique nature of schoolsites and children's health before applying pesticides at a schoolsite subject to this article and during each subsequent licensing period in which the person applies a pesticide at a schoolsite subject to this article. The training course may be applied to his or her professional continuing education requirement required by the Structural Pest Control Board or the department.

(2) The training course required by paragraph (1) shall be developed by the department and may also be developed by a provider approved by the Structural Pest Control Board if the training course has been approved by the department.

(3) The department shall ensure that the training course it develops or approves pursuant to paragraph (2) meets the requirements for continuing education credit required by the Structural Pest Control Board and the department.

13187. Section 13186 and 13186.5 shall not apply to any agency signatory to a cooperative agreement with the State Department of Health Services pursuant to Section 116180 of the Health and Safety Code.

13188. The Director of Pesticide Regulation may adopt regulations to implement this article.

BUSINESS AND PROFESSIONS CODE
SECTION 8593.2

893.2. Commencing July 1, 2016, a licensee shall comply with the training requirements of the Healthy Schools Act of 2000 (Article 4 (commencing with Section 17608) of Chapter 5 of Part 10.5 of Division 1 of Title 1 of the Education Code and Article 17 (commencing with Section 13180) of Chapter 2 of Division 7 of the Food and Agricultural Code) if the licensee intends to apply a pesticide at a schoolsite, as defined in subdivision (f) of Section 17609 of the Education Code. Courses completed in furtherance of the training requirements of the Healthy Schools Act of 2000 shall count toward the continuing education requirements of the board and shall qualify as continuing education in integrated pest management.

HEALTH AND SAFETY CODE SECTIONS
1596.794 and 1596.845

1596.794. The department [Department of Social Services] shall serve as the liaison to child day care facilities for the purposes of Sections 17608 to 17613, inclusive, of the Education Code.

1596.845. Prior to the issuance of a new license or special permit pursuant to this chapter, Chapter 3.5 (commencing with Section 1596.90), or Chapter 3.6 (commencing with Section 1597.30) the applicant shall attend an orientation given by the department [Department of Social Services]. The orientation given by the department shall outline all of the following:

(a) The rules and regulations of the department applicable to child day care facilities.
(b) The scope of operation of a child day care facility.
(c) The responsibility entailed in operating a child day care facility.
(d) Information about the Healthy Schools Act of 2000 and integrated pest management practices.

Additional Definitions:

1596.750. "Child day care facility" means a facility that provides nonmedical care to children under 18 years of age in need of personal services, supervision, or assistance essential for sustaining the activities of daily living or for the protection of the individual on less than a 24- hour basis. Child day care facility includes day care centers, employer-sponsored child care centers, and family day care homes.

1596.76. "Day care center" means any child day care facility other than a family day care home, and includes infant centers, preschools, extended day care facilities, and school-age child care centers.

1596.78. (a) "Family day care home" means a home that regularly provides care, protection, and supervision for 14 or fewer children, in the provider's own home, for periods of less than 24 hours per day, while the parents or guardians are away, and is either a large family day care home or a small family day care home.

APPENDIX E

School District IPM Policies: Model Policy and Examples

Model School IPM Policy

This policy is based on IPM. It does not prohibit pesticide use. IPM does not exclude the use of pesticides, but it does encourage minimizing their use and using those that pose the least hazard. This language may be used as it appears here or it may be adapted. Some IPM policies are long and very detailed; others are more succinct. Samples in use in some California schools follow this model policy. The examples policies included are a fraction of the model policies in use by California schools. See our Web site at http:/www.cdpr.ca.gov/schoolipm for more examples.

Introduction

The {insert name} School District recognizes that maintenance of a safe, clean and healthful environment for students and staff is essential to learning. It is the goal of the District to provide safe and effective, pest control while protecting students, staff, the environment, and District properties and assets.

The District adopts a Least-Hazardous Integrated Pest Management (IPM) Policy. It is the policy of the District to focus and develop long-term pest prevention methods and give "non-chemical" methods first consideration when selecting appropriate control measures. The full range of alternatives will be considered, giving preference to non-chemical methods, and then chemicals that pose the least hazard to people and the environment.

Comment: This paragraph states the intention of the district to adopt IPM.

Pest management objectives

Pests will be controlled to protect the health and safety of the students and staff; to maintain a productive learning environment; and, to maintain the integrity of the school buildings and grounds. Pest control will be economically feasible over the long term and efficacious. The Superintendent or designee shall ensure that the district follows IPM procedures so as to use the most appropriate and least-hazardous method of control. Sanitary measures shall be enforced and buildings regularly cleaned and repaired in order to prevent infestations, minimize the use of pesticides, and eliminate routine spraying.

Comment: This paragraph states that, to protect human health and environmental safety, the district plans to prevent pest infestations through sanitation and other practices consistent with IPM methods, and to eliminate routine spraying. It also notes that pest control should be economically feasible.

Definition of IPM

The Healthy Schools Act of 2000 defines IPM as "a pest management strategy that focuses on long-term prevention or suppression of pest problems through a combination of techniques such as monitoring for pest presence and establishing treatment threshold levels, using non-chemical practices to make the habitat less conducive to pest development, improving sanitation, and employing mechanical and physical controls. Pesticides that pose the least possible hazard and

are effective in a manner that minimizes risks to people, property and the environment, are used only after careful monitoring indicates that they are needed according to pre-established guidelines and treatment thresholds." (Food and Agricultural Code section 13181)

Comment: This section defines IPM according to the Healthy Schools Act.

Elements of the Least-Hazardous IPM Policy

- Identifying and monitoring pests to determine pest population levels and identify decisions and practices that could affect pest populations.
- Setting of action levels to determine when vegetation or a pest population at a specific site cause(s) unacceptable economic or medical damage wherein corrective action should be taken.
- Modifying and/or eliminating pest habitats to deter pest populations and minimize pest infestations.
- Considering use of a range of potential treatments for the pest problem, including physical, horticultural, and biological methods of pest control.
- Using chemical controls only as a last resort, and only those chemicals that pose the least possible hazard to people and the environment.

Comment: Monitoring, and the other elements listed, are keystones of IPM and should be an integral part of pest management procedures.

Decision-Making Process

IPM Committee

The District shall establish an IPM Committee to provide guidance, education and advice regarding implementation of the IPM policy. The committee will review and approve the IPM Coordinator's plan and recommendations to the School Board regarding all pest management practices. The Superintendent will appoint members of the committee which will be comprised of at least the following: Superintendent or designee, one member of the Board of Trustees, the IPM Coordinator, a parent of District-enrolled student(s) and one community member at large.

Comment: This committee can be very useful in making suggestions, doing research, and bringing in new information, but it need not have authority to make policy. It is helpful if the committee also has an independent pest management expert (preferably one trained in IPM). Having a teacher and/or principal from the district can also be helpful.

IPM Coordinator

The Superintendent shall designate a staff person to coordinate the IPM program. The IPM coordinator shall be educated in the principles and practice of least-hazardous IPM and be responsible for:

- Oversight for the successful implementation of the program consistent with this policy and coordinate all District efforts to adopt IPM.
- Overall program management and providing proposed regulations or procedures and products for use in managing pest populations.
- Formal annual notification to parents, staff and students of any chemical pesticide application not exempt from requirements of the Healthy Schools Act.
- Posting warning signs for pesticide applications.
- Establishing and maintaining a registry of parents, staff and students who have indicated that they desire prior notification of each pesticide application.
- Recordkeeping guidelines for any chemical pesticide application.
- Education and training for IPM personnel.
- *Optional: A list of approved procedures and products.*

Comment: The Healthy Schools Act requires school districts to designate a person to carry out the provisions of the law. If the district chooses to adopt IPM, this person may be called the IPM Coordinator. An IPM program will work more smoothly if someone has the job of coordinating its various elements. See also section 2.6 of this guidebook for more information on selecting and training an IPM Coordinator.

Training

Training of personnel is critical to the success of an IPM program. Staff, students, pest managers and the public shall be educated about potential school pest problems, the IPM Policy, and procedures that will be used to achieve the desired pest management objectives. Within five months of district adoption of this policy, the IPM Committee will agree on a plan to educate and train these constituencies.

Comment: Training must be included in an IPM program so that staff and students understand the changes that will be taking place, and so that personnel that must deal directly with pest management can easily secure information, tools, and techniques that will help them make the transition to IPM.

Contractors

All pest control companies contracted by the District shall follow all provisions of the policy. Licensed and certified pest control operators are required to include information on any school pesticide application that they perform as part of their otherwise applicable reporting requirements.

Comment: This paragraph states that contractors will use pest management practices consistent with IPM methods, and their pesticide use reporting will conform with the Healthy School Act requirements.

Notification, Recordkeeping and Reporting

Annual notification

The District shall annually provide to all staff, parents or guardians of pupils, enrolled at a school site, a written notification of all pesticide products to be used during the upcoming year. The notice shall identify the ingredients in each pesticide. The notice shall also contain the Internet address used to access information on pesticides and pesticide use reduction developed by the Department of Pesticide Regulation pursuant to Section 13184 of the Food and Agriculture Code.

Individual notification of pesticide application

The annual written notification shall provide the opportunity for recipients to receive notification of individual pesticide application at the school facility. The designee shall notify persons who register for such notification of individual pesticide applications at least 72 hours prior to the application. The notice shall include the product name, the active ingredients and the intended date of application.

Posting pesticide applications

The District designee shall post warning signs at each area to be treated. The sign shall include the term "Warning/Pesticide Treated Area," the product name, manufacturers name, the EPA product registration number, date of application, area of application and the target pest. These signs shall be posted 24 hours prior to the application and remain for 72 hours after the application.

Posting approved & banned product lists {optional, see next page}

Application records

Each school site shall maintain records of pesticide use for a period of 4 years. This requirement can be met by retaining a copy of the posting sign for individual applications. These records shall be made available to the public upon request, pursuant to the California Public Records Act. (Legal Reference: Education Code, section 17611)

Emergency pesticide applications

Pest control measures taken during an emergency, i.e., wherein the school district designee deems that the immediate use of a pesticide is necessary to protect the health and safety of pupils, staff or other persons, or the school site, shall not be subject to the notification requirements herein. However, the District designee shall make every effort to provide the required notification for an application of a pesticide under emergency conditions.

Exemptions from Notification, Recordkeeping and Reporting

Some pesticide products are exempt from notification, recordkeeping and reporting requirements. Pesticide products used as a self-contained bait or trap, gel or paste deployed as a crack and crevice treatment, any pesticide exempted under FIFRA (7 U.S.C. Sec. 25 (b)), or antimicrobial pesticides, including sanitizers and disinfectants, are exempt.

Comment: This section outlines requirements of the Healthy Schools Act that all schools must implement. Notification, posting and recordkeeping addresses the public's right-to-know. In addition, written records serve as the memory of an IPM program; thus, documenting all pest management action is very important.

Optional: Product Selection and Use Approval

Some districts have also included in their policy an additional section on Product Selection and Use Approval. Examples of these sections can be found in the Oakland Unified and Kentfield school district policies that follow.

Kentfield School District
Least-Toxic Integrated Pest Management Policy

The Kentfield School District ("District") recognizes that maintenance of a safe, clean and healthful environment for students and staff is essential to learning. It is the goal of the District to provide for the safest and lowest risk approach to control pest problems while protecting students, staff, the environment, and District property.

The District adopts a Least-Toxic Integrated Pest Management (IPM) Policy. Pests and weeds will be controlled: to protect the health and safety of students and staff; to maintain a productive learning environment; and, to maintain the integrity of school buildings and grounds. It is the policy of the District to focus on long-term pest prevention and give non-chemical methods first consideration when selecting appropriate control techniques. The full range of alternatives will be considered, giving preference to no use of chemicals and then chemicals that pose the least possible hazard to people and the environment.

A Least-Toxic Integrated Pest Management (IPM) policy contains the following elements:

1. Monitoring to determine pest population levels and identify decisions and practices that could affect pest populations.
2. Setting of injury and action levels to determine when vegetation or a pest population at a specific site cause(s) unacceptable economic or medical damage wherein corrective action should be taken.
3. Modification of pest habitats to deter pest populations and minimize pest infestations.
4. Consideration of a range of potential treatments for the pest problem, including physical, horticultural, and biological methods of pest control, using synthetic chemical controls only as a last resort and only those chemicals that pose the least possible hazard to people and the environment. Without prior approval by the Board, in an emergency, the District will not use any Toxicity Category I or Toxicity Category II Pesticide product, any pesticide product containing an ingredient known to the State of California to cause cancer, developmental toxicity, or reproductive toxicity, pursuant to the California Safe Drinking Water and Toxic Enforcement Act of 1986, or any pesticide product containing an ingredient classified by the United States Environmental Protection Agency as a known, possible or probable human carcinogen, reproductive toxin, developmental toxin or known possible or probable endocrine disrupter.

The Superintendent shall designate a staff person to coordinate the IPM program. The IPM coordinator shall be educated in the principles and practice of least toxic IPM and be responsible for:

1. Recommending a plan to the Board in July for the following school year. Included in this plan will be:
   - Overall turf management and facilities plan listing all proposed products and methods proposed for use
   - Procedures for formal notification to parents, staff and students of any chemical pesticide application which will include pre-and-post signage and written notice
   - Recordkeeping guidelines for any chemical pesticide application
   - Education and training for IPM personnel
   - List of products on an Approved List, Limited Use and Use Banned and a process to make exceptions in case of emergency to use a product not on the Approved List.
2. Overseeing implementation of the program consistent with this policy and coordinating all District efforts to adopt IPM.
3. Tracking all pesticide use and ensuring that records of pesticide use are made available to the public.
4. Presenting an annual report in June to the School Board evaluating the progress of the IPM program.

Business BP 3514

PESTICIDE MANAGEMENT PRACTICES— Policy

Policy Statement

The Governing Board believes that students and employees have the right to learn and work in a safe, clean and healthy environment. The District has an obligation to locate and reduce or eliminate potential risks to health and the environment, to use environmental resources in a responsible way, and to educate students and staff about environmental issues. It is the goal of the District to provide for the safest and lowest-risk approach that is effective and economically feasible and protects students, staff, the environment and District property.

The Precautionary Principle, which is the long-term objective of the District's Least Toxic Integrated Pest Management policy, states that when an activity raises threats of harm to the environment or human health, precautionary measures will be considered. The District's objective in adopting this policy is to institutionalize the ongoing practice of , whenever possible, not using pesticides at District operated school sites and implementing a Least Toxic Integrated Pest Management approach.

Pest Management

District buildings and grounds shall be regularly cleaned and repaired in order to prevent infestations, minimize the use of pesticides, and eliminate routine spraying.

The District adopts a Least Toxic Integrated Pest Management (IPM) Policy. Pests and weeds will be controlled to protect the health and safety of students and staff, to maintain a productive learning environment and to maintain the integrity of school buildings and grounds. It is the policy of the Board to focus on long-term pest prevention and give non-chemical methods first consideration when selecting appropriate control techniques. The full range of alternatives, including no action, will be considered first, with chemical controls used only as a last resort, giving preference to chemicals that pose the least possible hazard to people and the environment.

Integrated Pest Management Policy

The elements of the Least Toxic Integrated Pest Management (IPM) Policy are as follows:

- **Monitoring** to determine pest population levels and identify decisions and practices that could affect pest populations.
- **Setting of action levels** to determine when vegetation or a pest population at a specific site cause(s) unacceptable economic or medical damage wherein corrective action should be taken.
- **Modifying and/or eliminating pest habitats** to deter pest populations and minimize pest infestations.
- **Considering use of a range of potential treatments** for the pest problem, including physical, horticultural, and biological methods of pest control.
- **Using chemical controls only as a last resort**, and only those chemicals that pose the least possible hazard to people and the environment. The District will not use any Toxicity Category I or Toxicity Category II pesticide product, any pesticide product containing an ingredient known to the state of California to cause cancer, developmental toxicity or reproductive toxicity pursuant to the California Safe Drinking Water and Toxic Enforcement Act of 1986 or any pesticide product containing an ingredient classified by the United States Environmental Protection Agency as a known, possible or probable human carcinogen, reproductive toxin, developmental toxin or endocrine disruptor,except when used in conjunction with an enclosed bait or trap on the Limited Use Products List. Prior authorization must be obtained from the Board of Trustees before any application of pesticides not on the Approved Product List (see AR, pg. 2) to District property. Board authorization will be based on the Superintendent's recommendations incorporating the IPM Committee's advice and review of proposed products. The Superintendent or designee may grant an emergency exemption and authorize application of pesticides pursuant to the guidelines contained in AR 3514 when IPM Committee review is not practicable.

The IPM Coordinator and Annual IPM Plan

The Superintendent shall designate a staff person to coordinate the IPM program. The IPM Coordinator shall be educated in the principles and practices of least toxic IPM and shall be responsible for providing a status report and recommended plan in April of each year to the IPM Committee. The IPM Coordinator shall provide the report and plan, incorporating the IPM Committee's findings, to the Superintendent for submission to the Board. Included in this plan will be administrative regulations for:

- An overall IPM plan listing all proposed products and methods proposed for use.
- Procedures for formal notification to parents, staff and students of any chemical pesticide application, which will include pre- and post-application signage, written notice and a notification registry.
- Record keeping guidelines for any chemical pesticide application and ensuring that records of pesticide use are made available to the public.

- Education and training for District personnel.
- Emergency exemption process.
- Record keeping guidelines for pest monitoring and for non-chemical methods used for pest control.

IPM Committee

The District shall establish an IPM Committee to provide guidance, education and advice regarding IPM policy procedures and practices. The Committee will meet at least annually to review and make recommendations to the Superintendent for submission to the Board regarding all pest management practices. The Committee shall be appointed by the Superintendent and will be comprised of at least the following representatives: Superintendent or designee, the District IPM Coordinator, one IPM professional, one parent of enrolled student(s), and one community and/or environmental organization representative.

Notification

All staff and parents or guardians of students will receive annual written notification addressing, among other things, expected use of pesticide products not on the Approved Use Products List as set forth in the IPM Coordinator's annual turf management and facilities plan.

The District shall provide the opportunity for students, parents, staff and community members to register with the District if they wish to receive notification of planned pesticide applications at a school site. People who register for such notification shall be notified of individual pesticide applications at least 72 hours prior to application. The notice shall include the product name, the active ingredient or ingredients in the product, the intended date of application, target pest and contact with telephone number for more information. The written notice requirement is suspended in emergency situations requiring immediate action of the Superintendent or IPM Coordinator. Warning signs will be posted at the pesticide application site at least 72 hours before the application and remain posted for 72 hours after the application.

These procedures shall be regularly reviewed and updated in order to reflect changed circumstances and to assess progress in achieving District objectives. The Board encourages staff to exchange information with other districts and the County Office of Education about programs, options, and strategies for implementing this policy.

Products on the Approved Use Products List are exempt from the above-stated notification requirements.

Legal References

Education Code: EC 17609 Chapter 5, Part 10.5, Article 4 commencing with Section 17608
Food and Agricultural Code: Article 17 of Chapter 2 of Division 7
Health Safety Code: Chapter 76 Division 103
Board Adopted: August 23, 2001

Board Policy #B-3613

Pesticide Management Practices

Assembly Bill 2260 (Shelley) Stats 2000, Ch. 718, effective January 1, 2001 establishes the Healthy Schools Act of 2000.

The Governing Board of the New Haven Unified School District intends to implement policies and procedures consistent with AB2260. These policies and procedures shall include strategies and methods to:

1. Use the effective, least toxic method of pest control.
2. Maintain pesticide use records at each site for a period of not less than 4 years.
3. Annually provide a list to each school district site of pesticides expected to be used during the forthcoming school year to staff, parents or guardians.
4. Prior to any pesticide application, post warning signs at a the school site.
5. Perform emergency applications.
6. Require that licensed and certified pest control operators include information on any school pesticide application that they perform as part of their otherwise applicable reporting requirements.

These procedures shall be regularly reviewed and updated to achieve the District objectives.

Definitions:

For the purpose of this policy, school site shall mean: any facility used for public daycare, kindergarten, elementary and secondary school purposes. The term includes the buildings, structures, playgrounds, athletic fields, school vehicles, or any other school property visited or used by pupils. Pesticide shall be defined as any economic poison.

Least Toxic Method:

The District designee shall develop an Integrated Pest Management (IPM) program and periodically review the program to ensure that the least toxic, economically feasible methods are used for pest control. This program shall incorporate both chemical and non-chemical procedures.

Notification:

1. The District shall annually provide to all staff, parents or guardians of pupils, enrolled at a school site, a written notification of all pesticide products to be used during the upcoming year. The notice shall identify the ingredients in each pesticide. The notice shall also contain the internet address used to access information on pesticides and pesticide use reduction developed by the Department of Pesticide Regulation pursuant to Section 13184 of the Food and Agriculture Code.

2. The written notification shall provide the opportunity for recipients to receive notification of individual pesticide application at the school facility. The designee shall notify persons who register for such notification of individual pesticide applications at least 72 hours prior to the application. The notice shall include the product name, the active ingredients and the intended date of application.
3. If a pesticide product, not included in the annual notification, is subsequently intended for use at a school site, the District designee shall, at least 72 hours prior to the application, provide written notification of its use.

Notification pursuant to this policy shall be by the least costly manner pursuant to Education Code Section 48980.3, and shall to the extent feasible be included as part of any other written communication provided to individual parents or guardians.

Records Maintenance:

Each school site shall maintain records of pesticide use for a period of 4 years This requirement can be met by retaining a copy of the posting sign for individual applications. These records shall be made available to the public upon request, pursuant to the California Public Records Act. (Legal Reference: Education Code, Section 17611)

Posting Requirements:

The District designee shall post warning signs at each area to be treated. The sign shall include the term "Warning/Pesticide Treated Area", the product name, manufacturers name, the EPA product registration number, date of application, area of application and the target pest. These signs shall be posted 24 hours prior to the application and remain for 72 hours after the application.

Emergency Pesticide Applications:

Pest control measures taken during an emergency, i.e., wherein the school district designee deems that the immediate use of a pesticide is necessary to protect the health and safety of pupils, staff or other persons, or the school site, shall not be subject to the notification requirements herein. However, the District designee shall make every effort to provide the required notification for an application of a pesticide under emergency conditions.

Legal Reference:

California Education Code 17612. Notification of pesticide use 48980.3 Required notification of rights (Chapter 5 Part 10.5, Article 4 of the Education Code commencing with Section 17608; Article 17 of Chapter 2 of Division 7 of the Food and Agricultural Code; Chapter 76 Division 103 of the Health and Safety Code)

Revised	First Reading	Second Reading
	July 17, 2001	August 21, 2001

Series 3000 Bp 3514.3

Business Services

Integrated Pest Management Policy

The Novato Unified School District recognizes that maintenance of a safe, clean and healthful environment for students and staff is essential to learning. It is the goal of the District to provide the safest and lowest risk approach to control pest problems while protecting students, staff, the environment and District properties and assets.

The District adopts a Least-Toxic Integrated Pest Management (IPM) Policy. Pest will be controlled: to protect the health and safety of the students and staff; to maintain a productive learning environment; and, to maintain the integrity of the school buildings and grounds. It is the policy of the District to focus and develop long-term pest prevention methods and give "non-chemical" methods first consideration when selecting appropriate control measures. The full range of alternatives will be considered, giving preference to non-chemical methods, and then chemicals that pose the least hazard to people and the environment.

A Least-Toxic Integrated Pest Management (IPM) Policy contains the following elements:

1. Monitoring to determine pest population levels and identify decisions and practices that could effect pest populations.

2. Setting of injury and action levels to determine when vegetation or a pest population at a specific site cause(s) unacceptable economic or medical damage wherein corrective action should be taken.

3. Modification of pest habitats to deter pest populations and minimize pest infestation.

4. Consideration of a range of potential treatments for the pest problem, including prevention, mechanical, cultural, and biological methods of pest control, using synthetic chemical controls only as a last resort and only those chemicals that pose the least possible hazard to people and the environment.

5. Establish a committee to provide guidance, education and support regarding IPM procedures. Members of the committee will be appointed by the Superintendent and may include the following: Superintendent or designee, Board Member, IPM Coordinator, parent, certificated staff member, classified staff member and one community member at large.

6. Abstain from using any pesticide product containing an ingredient known to the State of California to cause cancer, developmental toxicity, or reproductive toxicity, pursuant to the

California Safe Drinking Water and Toxic Enforcement Act of 1986, or any pesticide product containing an ingredient classified by the United States Environmental Protection Agency as a known human carcinogen, reproductive toxin, developmental toxin or endocrine disrupter.

The Superintendent shall designate a staff person to coordinate the IPM program. The IPM coordinator shall be educated in the principles and practice of least toxic IPM and be responsible to provide:

- Oversight for the successful implementation of the program consistent with this policy and coordinate all District efforts to adopt IPM.
- Overall program management and provide proposed procedures and products for use in managing pest populations.
- Formal notification to parents, staff and students of any chemical pesticide application including pre-and-post signage.
- Establish and maintain a registry of parents, staff and students that have indicated they desire notification 72 hours prior to pesticide applications.
- Record-keeping guidelines for any chemical pesticide application.
- Education and training for IPM personnel.
- A list of approved procedures and products.

Legal References:

EDUCATION CODE

17608 - 17613 Healthy Schools Act of 2000

48980.3 Healthy Schools Act of 2000

FOOD AND AGRICULTURAL CODE

13180 Healthy Schools Act of 2000

San Diego Unified School District
IPM Policy

(This policy was adopted on October 22, 1991, by the San Diego Unified School District.)

Structural and landscape pests can pose a significant problem to people and the environment. Hazardous pest control chemicals can also pose a significant problem to people and the environment. It is therefore the policy of the San Diego Unified School district to incorporate Integrated Pest Management (IPM) procedures for the control of structural and landscape pests. IPM means that pest problems will be alleviated with the least possible hazard to people, property, and the environment by using IPM methods that are safe, effective and economically feasible. Pesticides will be carefully evaluated before use and will only be used after non-hazardous and other safer methods have been considered.

Integrated Pest Management will include the following components:

1. Educate staff, students and the public about school pest problems and the Integrated Pest Management policies.
2. Develop plant inventory and pest problem survey procedures.
3. Identify pests that are considered public health problems and methods to prevent them in the least hazardous way from becoming a health problem.
4. Identify and evaluate cultural/environmental conditions on the grounds that encourage pest problems. Make recommendations for remedial action.
5. Monitor population levels of pests to determine treatment procedures.
6. Review all available options for acceptability and/or feasibility before the use of a chemical pesticide; cost of staffing considerations alone will not be the sole justification for use of chemical control agents. Records of IPM strategies considered prior to chemical treatment will be maintained.
7. Ensure that pesticide applicators whether in-house or contracted are educated and trained in the use of current pesticides approved for use by the SDUSD and that they follow label precautions and application regulations. Contracted companies are to be in compliance with the San Diego Unified School District's Integrated Pest Management policy.
8. Establish and maintain pesticide use reporting and recordkeeping procedures.
9. Establish system to evaluate and measure control success.
10. Make information accessible to the public and employees regarding pesticides used and area treated.
11. Eliminate fire potential (e.g. tall, dry grass, dead trees) in the safest and most timely manner using available resources.

Additional Model School IPM Policies are available by viewing the following links:

Los Angeles Unified School District IPM Policy
http://www.calisafe.org/pdf/policy_and_forms.pdf

Marin County Model IPM Policy Statement for Schools
http://www.co.marin.ca.us/depts/AG/main/ipm/policystatement.pdf

Nevada County School District
http://www.beyondpesticides.org/schools/schoolpolicies/local%20policies/NevadaCountyCA.pdf

Oxnard Union High School District
http://www.beyondpesticides.org/schools/schoolpolicies/local%20policies/Oxnard_CA.pdf

Ventura Unified School District
http://www.beyondpesticides.org/schools/schoolpolicies/local%20policies/Ventura.pdf

APPENDIX F

IPM-Related Curricula and Resources for the Classroom

IPM-Related Curricula and Resources for the Classroom

BugPlay
For grades K through 3. Hands-on experiences with harmless insects help students develop an appreciation for these amazing creatures. Lessons, with accompanying music cassette, include the use of poems, songs, and drawings. Item is no longer available from Addison Wesley Publishing Co. but may be found by searching for ISBN 0201215403.

Environmental Health Science Education (National Institute of Environmental Health Sciences—National Institutes of Health Curricular Material)
Provides educators, students, and scientists with easy access to reliable tools, resources and classroom materials. <http://www.niehs.nih.gov/health/scied>

Information for Kids, Students, and Teachers (United States Environmental Protection Agency (U.S. EPA) Office of Pesticide Programs)
This Web site contains many pesticide and bug related activities including pesticide safety bingo, a roach prevention activity Web site for kids, a backyard pest patrol activity book, and ways of learning about IPM around the home. <https://www.epa.gov/pesticides>

IPM Curricula Teacher Resources (Clemson University)
IPM curriculum ranging from grades 2 through 7.
<https://www.clemson.edu/cafls/research/ipm/>

IPM Curriculum for Grades 9-12 (Bio-Integral Resource Center)
A 200-page book including IPM basics such as monitoring, least-toxic control, insect profiles, study programs, case studies, lab experiments, resource list, and glossary. Designed to be part of a science, chemistry, or biology course with an emphasis on agricultural, horticultural, and garden pests. <http://www.birc.org/pubrep.htm>

IPM for Teachers Curriculum (Penn State University IPM Program)
An annual IPM for Teachers summer course is taught at Penn State University Park campus to help teachers learn IPM principles and how to incorporate IPM into their school curriculum. A course packet, including many IPM lessons plans to use in the classroom, is available.
<https://extension.psu.edu/pests-and-diseases/pest-management-and-education>

K-12 Recommended Insect-Related Resources (Iowa State University Department of Entomology)
Contains lesson plans, image galleries, and other insect-related resources for the K-12 level.
<http://www.ent.iastate.edu/list/directory/158/vid/5>

Legacy of a Pest (Illinois Natural History Survey)
A science, technology, and social studies curriculum guide for understanding and dealing with pest problems. There are over 50 teacher-tested activities dealing with the gypsy moth problem, its life cycle, IPM control strategies, and more. 243 pp.

Available from: Illinois Natural History Survey, 1816 South Oak Street, Champaign, IL 61820 or call (217) 333-6880. <http://www.inhs.uiuc.edu/resources/howtoorder.html>

Pest Private Eye (University of Nebraska)
An educational video game that allows children to test their own skills as a pest private eye by learning about pests and IPM tools to solve their own case. The game is available and will work best with the CD version or loaded directly on a hard drive. <http://schoolipm.unl.edu/pestpi/>

Teacher's Resources (University of Florida Institute of Food and Agricultural Sciences)
Provides links to various IPM sources for teachers.
<http://schoolipm.ifas.ufl.edu/teacherresources.htm>

What's Bugging You? (California Foundation for Agriculture in the Classroom)
Through a variety of activities, students reinforce their skills of reading, writing, designing, investigat-ing, and problem-solving while learning about pest management. Students develop a definition for the word "pest," learn about agricultural pests in a cooperative setting, observe insects in student-made insect observation chambers, learn about the life cycles of certain pests, and create individual and class poems. In a concluding activity, students create an imaginary pest and discuss its hypothetical habitat. <https://learnaboutag.org/>

Additional Resources:

The IPM Institute of North America, Inc. provides several sources of IPM curricula and workshop ideas. <http://www.ipminstitute.org/school_biblio.htm#Curricula>

The California Regional Environmental Education Community (CREEC) Network has an online, searchable resource directory including over 1,000 environmental education providers and over 2,000 programs/resources available to educators in California. <http://www.creec.org/>

APPENDIX G

Pesticide Information Resources

Product manufacturers can provide information on hazards, efficacy, and safe disposal of pesticides. They are required to provide the public with a sample label and an MSDS (material safety data sheet) on request.

The Department of Pesticide Regulation (DPR) is responsible for regulating pesticides in California. This includes product evaluation and registration, environmental monitoring, residue testing of fresh produce, and local use enforcement through the county agricultural commissioners. DPR's home page is http://www.cdpr.ca.gov/.

DPR's School IPM Web site contains school-specific information regarding pest management, pesticide safety and environmental and health impacts of pesticide use. It can be found at http://www.cdpr.ca.gov/.

DPR Pesticide Databases—Look up pesticide products by active ingredient, product name, and other criteria, and then select "full report" for a brief summary of toxicity information. The databases contain only California-registered products. Follow the "Product and Use Data" link at http://www.cdpr.ca.gov/.

For more information, call (916) 324-4100, visit http://www.cdpr.ca.gov/ or write to DPR at 1001 I Street, P.O. Box 4015, Sacramento, CA 95812-4015.

Cooperative Extension personnel (look in the government section of the phone book under Cooperative Extension or visit http://ucanr.org/ can provide information on the hazards and efficacy of pesticides. They can provide up-to-date information about pesticides registered for a particular pest. The Cooperative Extension office also provides services for insect identification.

Each county in California has a County Office of Agriculture that is available to give assistance. Visit http://www.cdfa.ca.gov/exec/county/County_Contacts.html and select your county for contact information.

The National Pesticide Information Center (NPIC) operates a toll-free hotline, staffed by toxicologists, to provide the general public as well as the medical, veterinary, and other professional communities with information on pesticide poisonings, correct use of pesticides, referrals for laboratory analyses and investigation of pesticide incidents, emergency treatment information and pesticide clean-up and disposal procedures.

For more information, call NPIC at (800) 858-7378 (hotline), visit http://npic.orst.edu/ or write to NPIC, Oregon State University, 333 Weniger, Corvallis, OR 97331-6502.

US EPA Office of Pesticide Programs—This site includes consumer alerts, health and environmental effects of pesticides, pesticide fact sheets, educational materials and information on pesticide registrations.

For more information, visit http://www.epa.gov/pesticides/ or write to US Environmental Protection Agency, Office of Pesticide Programs, 1200 Pennsylvania Ave. NW, Washington, D.C. 20460.

Compendium of Pesticide Common Names—Find active ingredients associated with pesticide common names. This electronic compendium is intended to provide details of the status of all pesticide common names, together with their systematic chemical names, molecular formulae and Chemical Abstracts Registry Numbers.
http://www.alanwood.net/pesticides/

An Introduction to Insecticides—A summary of common insecticides, written by Professor Emeritus George Ware of University of Arizona. It is somewhat technical.
http://ipmworld.umn.edu/chapters/ware.htm

See also Ware, G.W. (2004). The Pesticide Book, 6th Ed. MeisterPro Information Resources, A division of Meister Media Worldwide, Willoughby, Ohio. 488 pp.

EXTOXNET—Look up many (not all) pesticide active ingredients, and check toxicology information. "Pesticide Information Profiles" can be searched or browsed. This Web site is produced by a consortium of universities.
http://www.ace.orst.edu/info/extoxnet/ghindex.html

APPENDIX H

IPM for Schools Recommended Reading

School IPM Manuals

Daar, S., Drlik, T., Olkowski, H., and Olkowski, W. 1997. IPM for Schools: a How-To Manual. Bio-Integral Resource Center, Berkeley, CA. 215 pp.

The California School IPM Guidebook was based in part on this publication. It was published in association with U.S. EPA region IX and can be found online at http://www.birc.org/SchoolManual.pdf

Pennsylvania Department of Agriculture and the Pennsylvania State University College of Agricultural Sciences Cooperative Extension. 2007. IPM for Pennsylvania Schools: a How-To Manual. The Pennsylvania State University, University Park, PA. 144 pp.

This manual was based in part on the IPM for Schools: A How-to Manual, published by U.S. EPA region IX in association with the Bio-Integral Resource Center. It can be accessed at https://extension.psu.edu/ipm-for-pennsylvania-schools-a-how-to-manual

Regents of the University of Wisconsin System. 2000. Wisconsin's School Integrated Pest Management Manual.

This School IPM Manual is under revision and is not currently available online. If you would like a bound copy of the manual ($10 per manual) contact the School IPM Program at 608-224-4547. It may be available at a later date at http://www.ncef.org/content/wisconsins-school-integrated-pest-management-manual

Stauffer, S., Ferrentino, R., Koplinka-Loehr, C., and Sharpe, K. 1998. IPM Workbook for New York State Schools. Cornell Cooperative Extension. IPM Publication Number 605. 155pp.

This is an excellent, easy-to-read school IPM manual. It can be found online at https://www.northeastipm.org/neipm/assets/File/bmps/general/IPM_Schools_Workbook_NYS.pdf

General IPM

Dreistadt, S.H., J.K. Clark, and M.L. Flint. 2004. Pests of Landscape Trees and Shrubs: an integrated pest management guide, 2nd Ed. University of California Statewide Integrated Pest Management Program, Division of Agriculture and Natural Resources (Publication 3359), Davis, CA. 501 pp.

Excellent guide for managing problems on a wide variety of plants; each pest is illustrated with a color plate.

Ebeling, W. 1975. Urban Entomology. University of California, Division of Agricultural Sciences, Los Angeles. 695 pp.

A classic text on the biology and management of urban pests, including rats and mice. Excellent drawings and photographs and a readable text make it outstanding. Dr. Ebeling is the U.S. expert on the use of silica gel, boric acid, and other least-toxic pesticides for insect control in urban and suburban environments. Only available online at http://entomology.ucr.edu/ebeling/.

Flint M.L. 1998. Pests of the Garden and Small Farm: a grower's guide to using less pesticide, 2nd Edition. University of California Statewide Integrated Pest Management Project, Division of Agriculture and Natural Resources (Publication 3332), Davis, CA. 286 pp.

Summarizes IPM approaches to more than a hundred pest insects, weeds, and plant diseases found in the U.S. and Canada. Beautifully illustrated with color plates.

Hygnstrom, S.E., R.M. Timm, and G.E. Larson, eds. 1995. Prevention and Control of Wildlife Damage. University of Nebraska, Institute of Agriculture and Natural Resources, Lincoln. 250 pp.

This loose-leaf book is the most comprehensive source of information available on managing wildlife pest problems. The groups covered include rodents, bats, deer, birds, reptiles, and others.

Leslie, A.R. 1994. Handbook of Integrated Pest Management for Turf and Ornamentals. Lewis Publishers, Boca Raton, FL. 660 pp.

The EPA assisted in the development of this book with the stated purpose of reducing pesticide pollution. It is intended for professionals who deal with urban landscaping and turf management of all kinds.

Madison, J.H. 1971. Practical Turfgrass Management. PWS Publishers, Boston. 466 pp.

This is the best lawn management text yet written.

Mallis, A. 2003. Handbook of Pest Control 9th ed. CIE Publications, Cleveland, OH. 1,400 pp.

A classic work on urban pests. Excellent reference book.

Marer, P.J. 2000. The Safe and Effective Use of Pesticides, 2nd Ed. University of California Statewide Integrated Pest Management Program, Division of Agriculture and Natural Resources (Publication 3324), Davis. 352 pp.

This book provides updated and detailed information for selecting, using, handling, storing, and disposing of pesticides. It is the study guide for all categories of DPR's Qualified Pesticide Applicator License and Qualified Pesticide Applicator Certificate exams.

Moore, H.B. 1995. An Introduction to Wood Destroying Insects: their identification, biology, prevention, and control. Pest Control Magazine, Cleveland, OH. 120 pp.

Good descriptions of and control information for termites, wood-boring beetles, wood wasps, carpenter bees, and carpenter ants.

Olkowski, W., S. Daar, and H. Olkowski. 1991. Common-Sense Pest Control: Least-toxic solutions for your home, garden, pets and community. Taunton Press, Newtown, CT. 715 pp.

An excellent, comprehensive resource book on IPM. Illustrated with photos, drawings, tables, and charts.

Schultz, W. 1989. The Chemical-Free Lawn. Rodale Press, Emmaus, PA. 194 pp.

An excellent primer on lawn care without the use of synthetic chemical products.

Ware, G.W. 2004. The Pesticide Book. 6th ed. MeisterPro Information Resources, a division of Mesiter Media Worldwide, Willoughby, Ohio. 488 pp.

This valuable reference is arranged by type of pesticide: insecticide, rodenticide, avicide, herbicide, etc. It includes discussions on modes of action, pesticide resistance, toxicity and hazards, and safe handling and storage.

Other Resources:

-Anderson, J., Ashley, P., Gaitens, J., Nishioka, M., Wooton, et. al. 2006. Healthy Homes Issues: Pesticides in the Home--Use, Hazards, and Integrated Pest Management. Version 3. Prepared for the U.S. Department of Housing and Urban Development. 42 pp. Available by searching https://www.hud.gov/sites/documents/DOC_12484.PDF

-Green, T.A., and D.H. Gouge, eds. 2009. School IPM 2015: A Strategic Plan for Integrated Pest Management in Schools in the United States. 286 pp. http://www.ipmcenters.org/pmsp/pdf/usschoolspmsp.pdf

-Greene, A., Breisch, N. 2002. Measuring Pest Management Programs for Public Buildings. Journal of Economic Entomology, Vol. 95, No. 1, pp. 1-13. Available at https://academic.oup.com/jee/article-abstract/95/1/1/2217504?redirectedFrom=fulltext

-Radcliffe, E.B., Hutchison, W.D., Cancelado, R.E. Radcliffe's IPM World Textbook, URL: https://ipmworld.umn.edu/, University of Minnesota, St. Paul, MN.

-A comprehensive listing of IPM administration & policy, school landscapes & grounds, as well as pest-specific resources and links are listed at The IPM Institute of North America, Inc.'s Web site at http://ipminstitute.org/wp-content/uploads/2016/05/IPM-Standards-for-Schools/

APPENDIX I

Sample IPM Contracts & Other Guidance When Hiring a Pest Control Company

Sample IPM Contract Language for Landscape Contracts and Structural Contracts

The following sections include sample language and components of a contract specific to an IPM service contract. This model provides program descriptions and statements of work. This is not intended to be a ready-to-go contract since certain sections that may be required for use in individual districts is not included, such as General Terms and Conditions, Disputes, etc. Contact the school district contracts manager for assistance.

Landscape IPM: Contract Components and Sample Language

adapted from the State of Maryland's School IPM Contract Manual

Background

The basis of the [Name School] school district IPM services is the use of IPM strategies that emphasize pest prevention and the safe and effective management of pest problems. This involves the regular monitoring for the presence of pests in the landscape, in turf and surrounding grounds of school buildings and, when necessary, implementation appropriate control measures. The goal of the IPM program is to provide effective, long-term pest control, while minimizing the use of pesticides. The Contractor must exhibit awareness and sensitivity to the fact that the school environment cannot be compromised through deliberate or inadvertent contamination by pesticides.

Scheduled, routine pesticide treatments in any area of the school are prohibited. Pesticides should be applied only when nonchemical methods have proven ineffective or are impractical, and only in areas of known infestation. It is essential to the success of the IPM program that the Contractor provides proactive services that identify landscape design deficiencies, plant maintenance practices, and plant choices that contribute to pest problems.

All IPM services and activities shall be planned and performed with the needs of the school children and staff as the foremost priority, working with school site staff to coordinate pest management activities to avoid disruption of school activities.

Description of Service

The Contractor shall furnish all labor and materials for the development and implementation of a comprehensive IPM program in designated schools and facilities. The Contractor shall demonstrate an understanding of the concept of IPM. The implementation of management practices in an IPM program is not based on the routine application of pesticides, but on monitoring and inspecting for pests, modifying landscapes and plant selection, and changing landscape and plant maintenance practices that can contribute to pest problems. Pest control is achieved in an IPM program by emphasizing pest prevention and making informed and accurate decisions as to when control measures are needed and the type of control measures to be used.

At a minimum, the IPM program shall consist of the development and implementation of routine pest management services; routine and special meetings among pest management personnel and school staff; routine and specially scheduled training; and written reports describing program status and recommendations for the corrective actions that need to be implemented by the school, the Contractor, or the school board.

IPM Coordinator and Liaison

To provide the degree of oversight and consistency of services necessary for a successful IPM program, the school districts shall designate an IPM Coordinator for the school district and an IPM liaison for each individual school. The IPM Coordinator is responsible for the notification, posting and recordkeeping requirements of the Healthy Schools Act {See section 1.4 of the guidebook for the requirements of the Healthy Schools Act}. These people should have the interest and capability to address all pest management issues, regardless of the pest involved or the area affected. The IPM Coordinator should participate in all decisions that may directly or indirectly affect pest management. A list of personnel designated as school liaisons should be provided to the Contractor by the school district. The Contractor's pest management technician should meet with the school liaison, upon initiation of the contract, and prior to performing pest management services. The Contractor and school liaison will:

1. Identify and discuss specific problem areas in the landscape and turf areas;
2. Facilitate access to all management areas on school property;
3. Identify and discuss landscape features or maintenance practices that might contribute to pest infestations;
4. Discuss effectiveness of previous control efforts; and
5. Notify pest management personnel of any new restrictions or special safety precautions.

Routine Services

Routine IPM Services shall include the control of all landscape and turf pests such as, but not limited to, defoliating insects, sucking insects and mites, wood-boring insects, leaf mining insects, gall-forming insects and mites, root-feeding insects, diseases of ornamental landscape plants and turf grass, weeds, and vertebrate pests including gophers, ground squirrels, voles, moles, birds, deer and other vertebrate pests. Preventive recommendations for control of these pests are included as Routine IPM Services.

Additional Services

The school district reserves the right to negotiate with the Contractor for the purchase of related pest control services not specifically covered, such as pruning, tree removal, and other plant maintenance practices, and to add or delete grounds or fields to or from the Contract.

Special Service Request and Emergency Services

Routine IPM services shall consist of performing all components of an IPM program, as described in the Contractor's Pest Management Plan and Service Schedule (see Pest Management Plan and Service Schedule below) for each school management area during the period of this contract.

Requests for corrective action, special services, or emergency service shall be placed with the IPM Coordinator. The Contractor shall respond to a request for emergency services on the day of the request. In addition, the Contractor shall respond to special service requests within one (1) working day after receipt of request. If the special service or emergency service request entails the application of pesticides, applications will take place in the minimum time allowable by law. All emergency and special services should be recorded in the school IPM logbook. In the event that such services cannot be completed within the required time frames, the Contractor shall immediately notify the IPM Coordinator and indicate an anticipated completion date. The Contractor shall describe, in the proposal, his/her capability to meet this requirement (e.g., radio-dispatched service, names of office personnel handling the account, availability of technical and on-site personnel assigned to this program).

Pest Management Plan and Service Schedule

The Contractor shall survey all management areas covered under this contract and develop a written Pest Management Plan. This plan shall provide detailed information on areas of pest infestation; landscape design, plant selection deficiencies, and plant maintenance practices that contribute to pest infestation; and recommendations for correcting those conditions.

This plan should include a detailed description of the monitoring program that will be used to identify pest infestations in landscape and turf areas. It may include the use of traps, visual inspections, degree-day accumulations and other environmental indicators, and staff interviews. Other appropriate IPM activities, including decision making, intervention tactics and strategies, and evaluation methodologies should be included. A school system-approved pesticide list with labels and Material Safety Data Sheets (MSDS), if available, should be included in the management plan. The Contractor also shall submit a written Service Schedule to the IPM Coordinator and other school personnel for approval. This schedule will be structured so that the entire school grounds, landscapes, and turf areas are surveyed routinely.

The frequency of service visits for each management unit should be specified. This document should be included with the IPM service records of each school and revised as necessary.

The Pest Management Plan and Service Schedule must be approved by the school district before implementation of the program. This specifically includes approval for any proposed pesticide usage. Any subsequent changes to the Plan and Schedule and/or additions to the approved pesticide list must be requested in writing and receive the concurrence of the school district.

Structural and Procedural Recommendations

Landscape maintenance practices that may contribute to structural pest infestations shall be reported, in writing, to the building liaison and the IPM Coordinator by the Contractor at the completion of each inspection.

Recordkeeping

The Contractor shall provide and maintain a complete and accurate pest management logbook. The logbook shall permit efficient evaluation and management of the program, accurate information retrieval, and adhere to recordkeeping required by California law. The logbook shall be kept in a designated location at the facility and a copy sent to the IPM Coordinator following each service visit. Clear and concise records shall reflect the common names of pests monitored at the school as well as turf and landscaping maintenance deficiencies, problem plants, nonpesticidal and pesticidal control measures applied, immediate and long-term recommendations regarding pest management, communications with students and staff, MSDS, and labels for all products that may be used at the facility. A section of the logbook shall be allocated for school personnel to report pest sightings and other information that shall be reviewed by that Contractor during regular service visits. The Contractor shall provide, in the proposal, an example of the logbook format with a detailed explanation of how it will be used, the structure of the book, and information that has to be recorded in the logbook.

Contractor Licensing

Each Contractor submitting a proposal for consideration by the school district shall have and maintain, during the life of the contract, a California Pesticide Business License issued by DPR or the Structural Pest Control Board.

A copy of the current valid license shall be submitted with the Contractor's proposal and no consideration will be given to proposals that lack evidence of licensing. Failure to maintain the Pesticide Business License with all necessary pest control categories shall be sufficient grounds for immediate termination of the contract. It shall be the Contractor's responsibility to immediately notify the IPM Coordinator of any change in status.

Personnel

The Contractor shall provide, under this contract, only qualified pest management personnel with adequate and verifiable experience in the conduct of IPM programs. All on-site personnel must understand current pest management practices and be able to make decisions and field diagnoses regarding the use of IPM practices and techniques. The proposal shall present a plan or method for assuring continuity of pest management personnel assigned to this contract, and knowledge and sensitivity to the needs of the schools. The Contractor should understand that quality assurance and daily pest management services are two activities that are separate and distinct from one another, and require sufficient time and manpower.

The Contractor shall designate a Program Technical Supervisor (PTS), who shall have primary responsibility for the conduct of this pest management contract, ensure that all required reports are submitted to the IPM Coordinator on time, and be available for routine and emergency consultation. The following minimum requirements regarding this individual's experience and training shall be provided in the proposal:

1. Resume, including current home address.

2. Current certification or licensure in California as a Pest Control Applicator. Certification as a Pest Control Advisor also is acceptable.

The PTS shall provide on-site supervision to assure safety, carry out coordination and continuity of program services, and fulfill special requests from the IPM Coordinator. The responsibilities of the on-site supervisor will be carried out by the PTS, not the pest management technician. A pest management technician shall provide on-site pest management services.

Manner and Time to Conduct Services

Routine services should be performed during the late afternoon hours, Monday through Friday, excluding holidays, except when school is not in session or as specifically approved by the IPM Coordinator. Pesticides shall not be applied while foods are being prepared, served, or put away, or when the school building is open for business.

The Contractor shall observe all safety precautions throughout the performance of this contract. Certain areas within some facilities may require special instructions for persons entering the area. Any restrictions associated with special areas will be explained to the Contractor and the IPM Coordinator by the school building liaison. These restrictions shall be adhered to and incorporated into the Contractor's Pest Management Plan and Service Schedule for the school building.

All contracted personnel shall wear an identification card in a clearly visible manner during the performance of their duties. Vehicles used by the Contractor or the contractor's personnel shall be identified. The Contractor must park in designated areas in close proximity to each school building. At a minimum, the Contractor shall provide his/her personnel with clean uniforms to be worn while performing their duties. Additional personal protective equipment required for the safe performance of work shall be determined and provided by the Contractor in compliance with California law.

Nonchemical Alternatives

Nonchemical pest management alternatives include biological, physical, cultural and mechanical methods. Nonchemical management of weeds may include the repair of cracks and crevices in sidewalks, playgrounds, and parking lots to reduce germinating seeds. Weeds in planted beds may be managed through the use of mulching or mechanical removal such as hoeing or hand picking. In some cases, biological control agents may be released to help control weeds. Nonchemical control of weeds in lawns and playing fields may include alterations of turfgrass variety, or changes

in mowing heights or in fertilization and irrigation regimes. Nonchemical management of insect and disease pests of landscape plants may include the removal of pest-prone plants and replacement with pest resistant varieties, the addition of plants to the landscape that encourage the activities of beneficial insects or discourage the activities of pests, the physical removal of pests by pruning or hand picking, the use of barriers to prevent colonization of plants, the use of various traps to capture pests or disrupt activities such as mating, the release of biological control agents, and the alteration of practices such as fertilization, irrigation, mulching, and pruning to discourage pest activity.

Pesticide Alternatives

Pesticide applications shall be made only to areas of known pest infestation or activity, and where nonchemical control measures, such as plant selection, habitat modification, physical, mechanical, and biological control were not successful or are not feasible.

Application of pesticides shall not occur until a full inspection has been completed. If chemicals are needed, least-hazardous pesticides and formulations, such as boric acid, silica gels, and diatomaceous earth should be considered whenever possible.

Pesticide applications that may impact the operations or occupants of a school building shall be permitted only during hours when the school building is closed and after all notification procedures have been met. See Part One in this guidebook for a summary of regulations pertaining to notification. A contingency plan for performing pesticide applications on school grounds should be part of the Pest Management Plan and Service Schedule. This should include a list of pests, pesticide products, formulations, application methods, timing of application, and other relevant information that may be needed in specific situations and landscape areas.

Thresholds for pests of landscape plants are generally lacking. However, several studies indicate that insect and mite pests cause noticeable aesthetic injury to plants when approximately 10 percent of the plant is affected. Treatments should be considered when 10 percent of a plant's foliage is removed or discolored, or if the pest has the potential to kill the plant, as is the case with some boring and scale insects. Controls should be initiated against weeds in sidewalks, play areas, parking areas, and driveways when they pose a threat to safe pedestrian traffic or create serious structural damage to these surfaces. Insect, disease, and weed pests of turfgrass in playing fields should be controlled when the associated loss of turfgrass poses a threat of injury to children engaged in sports activities. Insect, disease, and weed pests of school lawns should be controlled only when the damage caused by these pests is intolerable.

The Contractor shall minimize the use of and potential exposure to pesticides wherever possible.

For example:

1. Use nonchemical control methods and materials.

2. Use spot treatments of pesticides. Treat only heavily infested plants.

3. Integrate control methods (i.e., plant selection, timing of watering, mechanical weed control, etc.).

4. Use reduced-risk pesticide application techniques, such as soil injections, rather than foliar applications, when possible.

5. Routine preventive pesticidal spray treatments are prohibited. Cover or barrier treatment of grounds with a pesticide must be specifically requested by the Contractor and approved by the IPM Coordinator, prior to performing the treatment. Preventive pesticide treatments are acceptable only on a case-by-case basis. The Contractor must provide detailed plans; list the rationale for the treatment, and the methods of application if preventive treatment is warranted for a specific school building or landscape area. Preventive treatments are subject to review by the IPM Coordinator and can be eliminated at any time.

Reporting

The Contractor's Program Technical Supervisor shall, at a minimum, provide annual written reports to the school district and attend regular meetings with the IPM Coordinator, school administration, school liaisons, and other concerned individuals. These reports and meetings will address all pest management activities provided by the Contractor for each facility's grounds and evaluation of the IPM program's progress. These reports should identify landscape conditions or personnel practices that require correction by the school district in order to promote the program' s overall effectiveness. In addition, the Contractor shall provide monthly service reports to the IPM Coordinator within 15 days following the end of each month. The service reports shall include, but not be limited to, the following:

1. Landscape and turf areas serviced.

2. Man-hours for each facility's grounds for Routine Services.

3. Location, man-hours, and work description of Special, Emergency, and Additional Services.

4. Results of monitoring and inspections, including accepted common names of pests, numbers of each pest, and the location on each facility's grounds.

5. Written evaluation of turf conditions, landscape problems, specific plant infestation, and immediate and long-term program goals for either resolving pest problems or improving the IPM program for each facility's grounds.

6. Identification and listing of pesticides used by common/generic name (no codes), concentration and quantity of finished spray used, and other pest management techniques used for each school building and management area.

Evaluation

Monthly service reports during the growing season and annual reports will be used by the IPM Coordinator and the Contractor to develop a tangible means for evaluating the overall IPM effort

on the facility's grounds. The Contractor's Program Technical Supervisor shall meet as needed with the IPM Coordinator to discuss the status of the pest management program and review program activities and reports, or resolve ongoing or special problems. If the school district hires an outside evaluator, the contractor may be required to meet with this person or provide information.

Training

The Contractor shall include, in the bid proposal, a detailed description of the in-service training programs provided to their personnel, including pertinent documentation and records. In addition, the Contractor should be able to provide training or develop a plan to use outside expertise to provide training on all aspects of IPM program design and implementation to a wide array of school-associated personnel, including school administrators, maintenance and housekeeping staff, the IPM Coordinator and school liaisons, and community members.

Notification

The Contractor shall provide the IPM Coordinator and school liaisons with a list of pesticides that may be used on school grounds before the school year begins. Product labels and Material Safety Data Sheets for all pesticides shall be provided to the IPM Coordinator and made available in the school IPM program logbook for review by school liaisons, parents, and other interested parties.

The Contractor shall notify the IPM Coordinator and school building liaisons in advance of all pesticide applications to ensure that all provisions of the State and school district's advance notification policies are met. Although each school district is ultimately responsible for student notification of pesticide use and for sending notification home with students, the Contractor will be responsible for satisfying all legal requirements for posting. The Contractor will notify the IPM Coordinator upon completion of pesticide applications made to school grounds.

Inspections

Throughout the duration of this contract, school facilities (or grounds) will be inspected periodically by school district personnel to determine the effectiveness of the IPM program and Contractor compliance with the contract. Inspection results will be documented in writing and submitted to the Contractor. The Contractor shall initiate actions promptly to correct all deficiencies found.

It shall be the Contractor's responsibility to furnish an adequate supply of materials necessary for school personnel to inspect the interior of all rodent bait stations. These materials may include Allen wrenches to loosen and retighten fasteners, keys to open locks, or replacement self-locking plastic ties. Implements to cut plastic ties are not included under this provision.

Purchase of Ancillary Services/Equipment

The Contractor may need to purchase additional equipment or provide additional services to ensure that the IPM program is fully implemented. The school district has the right to negotiate the purchase of ancillary equipment and services with the Contractor and adjust the contract accordingly.

Structural IPM: Contract Components and Sample Language

adapted from the State of Maryland's School IPM Contract Manual

Background

The basis of the [Name School] school district IPM services is the use of IPM strategies that emphasize pest prevention and the safe and effective management of pest problems. This involves the regular monitoring for the presence of pests inside and around the structures of school buildings and, when necessary, implementation of appropriate control measures. The goal of the IPM program is to provide effective, long-term pest control, while minimizing the use of pesticides. The Contractor must exhibit awareness and sensitivity to the fact that the school environment cannot be compromised through deliberate or inadvertent contamination by pesticides. Scheduled, routine pesticide treatments in and around any area of the school are prohibited. Pesticides should be applied only when nonchemical methods have proven ineffective or are impractical, and only in areas of known infestation.

It is essential to the success of the IPM program that the Contractor provides proactive services that identify housekeeping and structural design deficiencies that contribute to pest problems. All IPM services and activities shall be planned and performed with the needs of the schoolchildren and staff as the foremost priority, working with school site staff to coordinate pest management activities to avoid disruption of school activities.

Description of Service

The Contractor shall furnish all labor and materials for the development and implementation of a comprehensive IPM program in designated schools and facilities. The Contractor shall demonstrate an understanding of the concept of the IPM method of pest control. The implementation of management practices in an IPM program is not based on the routine application of pesticides, but on monitoring and inspecting for pests, modifying structures, improving sanitation, and changing personnel practices that can contribute to pest problems. Pest control is achieved in an IPM program by emphasizing pest prevention and making informed, accurate decisions as to when control measures are needed and the type of control measures to be used.

The Contractor also shall provide evidence, in the proposal, of an understanding of the principles and practices governing sanitation in food service areas, in addition to other areas of the school, and the impact of pests and pest management methods on the ongoing activities of a food service facility. At a minimum, the IPM program shall consist of the development and implementation of regularly scheduled pest management services; routine and special meetings among pest management personnel and school staff; routine and specially scheduled training; and written reports describing program status and recommendations for the corrective actions that need to be implemented by the school, the Contractor, or the school board.

IPM Coordinator and School Liaison

To provide the degree of oversight and consistency of services necessary for a successful IPM program, the school districts shall designate an IPM Contact Person (IPM Coordinator) for the

school district and an IPM liaison for each individual school. The IPM Coordinator is responsible for the notification, posting and recordkeeping requirements of the Healthy Schools Act {See section 1.4 of the guidebook for the requirements of the Healthy Schools Act}. These people should have the interest and capability to address all pest management issues, regardless of the pest involved or the area affected. The IPM Coordinator should participate in all decisions that may directly or indirectly affect pest management. A list of personnel designated as school liaisons should be provided to the Contractor by the school district. The Contractor's pest management technician should meet with the school liaison, upon initiation of the contract, and prior to performing pest management services. The Contractor and school liaison will:

1. Identify and discuss specific problem areas in the facility;

2. Facilitate access to all management areas on school property;

3. Identify and discuss building features or personnel practices that might contribute to pest infestations;

4. Discuss effectiveness of previous control efforts; and

5. Notify pest management personnel of any new restrictions or special safety precautions.

Routine Services

Routine IPM Services shall include the control of all pests in and around school buildings such as, but not limited to, cockroaches, ants, fleas, stinging insects and nests accessible from the ground or from windows, rats and mice, flies, fruit flies, silverfish, stored products pests; and incidental invaders, such as crickets, earwigs, midges, millipedes, centipedes, ground beetles, clover mites, birds, bats, and squirrels.

Preventive recommendations for control of these and other pests, including wood-destroying insects like termites, carpenter ants, and wood-boring beetles also are included as Routine IPM Services. Treatment for the wood-destroying insects mentioned above is considered an Additional Service (see the section on Additional, Special, and Emergency Services below).

Additional Services

The school district reserves the right to negotiate with the Contractor for the purchase of related pest control services not specifically covered, such as subterranean and structural control of termites and other wood-boring insects, bird control, and to add or delete buildings or parts of buildings to or from the contract.

Special Service Request and Emergency Services

Routine IPM services shall consist of performing all components of an IPM program, as described in the Contractor's Pest Management Plan and Service Schedule (see the section on Pest Management Plan and Service Schedule below) for each school management area during the period of this

contract. Requests for corrective action, special services, or emergency service shall be placed with the IPM Coordinator. The Contractor shall respond to a request for emergency services on the day of the request. In addition, the Contractor shall respond to special service requests within one (1) working day after receipt of request. If the special service or emergency service request entails the application of pesticides, applications will take place in the minimum time allowable by law. All emergency and special services should be recorded in the school IPM logbook. In the event that such services cannot be completed within the required time frames, the Contractor shall immediately notify the IPM Coordinator and indicate an anticipated completion date. The Contractor shall describe, in the proposal, his/her capability to meet this requirement (e.g., radio-dispatched service, names of office personnel handling the account, availability of technical and on-site personnel assigned to this program).

Pest Management Plan and Service Schedule

The Contractor shall survey all management areas covered under this contract and develop a written Pest Management Plan. This plan shall provide detailed information on areas of pest infestation; structural, housekeeping, maintenance, and design deficiencies that contribute to pest infestation; and recommendations for correcting those conditions. This plan should include a detailed description of the monitoring program that will be used to identify infested areas. It may include the use of traps, visual inspections, and staff interviews. Other appropriate IPM activities, including decision making, intervention tactics and strategies, and evaluation methodologies should be included.

A school system-approved pesticide list with labels and Material Safety Data Sheets should be included in the management plan. The Contractor also shall submit a written Service Schedule to the IPM Coordinator and other school personnel for approval. This schedule will be structured so that the entire school building, trash room, exterior, and support areas of the building are monitored routinely. The frequency of service visits for each management unit should be specified. This document should be included with the IPM service records of each school and revised as necessary.

The Pest Management Plan and Service Schedule must be approved by the school district before implementation of the program. This specifically includes approval for any proposed pesticide usage. Any subsequent changes to the Plan and Schedule and/or additions to the approved pesticide list must be requested in writing and receive the concurrence of the school district.

Structural and Procedural Recommendations

Structural deficiencies and poor housekeeping practices that may contribute to structural pest infestations shall be reported, in writing, to the building liaison and the IPM Coordinator by the Contractor at the completion of each inspection.

Recordkeeping

The Contractor shall provide and maintain a complete and accurate pest management logbook. The logbook shall permit efficient evaluation and management of the program, accurate informa-

tion retrieval, and adhere to recordkeeping required by law. Each facility shall have its own logbook that will be updated during each service by the pest management technician. The logbook shall be kept in a designated location at the facility and a copy sent to the IPM Coordinator following each service visit. Clear and concise records shall reflect the common names of pests monitored at the school, as well as structural, maintenance, and housekeeping deficiencies, nonpesticidal and pesticidal control measures applied, immediate and long-term recommendations regarding pest management, communications with students and staff, Material Safety Data Sheets (MSDS), and labels for all products that may be applied at the facility. A section of the logbook shall be allocated for facility personnel to report pest sightings and other information that shall be reviewed by the Contractor during regular service visits. The Contractor shall provide, in the proposal, an example of the logbook format with a detailed explanation of how it will be used, the structure of the book, and information that has to be recorded in the logbook.

Contractor Licensing

Each Contractor submitting a proposal for consideration by the school district shall have and maintain, during the life of the contract, a California Pesticide Business License. A copy of the current valid license shall be submitted with the Contractor's proposal and no consideration will be given to proposals that lack evidence of licensing. Failure to maintain the *Pesticide Business License* shall be sufficient grounds for immediate termination of the contract. It shall be the Contractor's responsibility to immediately notify the IPM Coordinator of any change in status.

Personnel

The Contractor shall provide, under this contract, only qualified pest management personnel with adequate and verifiable experience with implementing IPM programs. All on-site personnel must understand current pest management practices and be able to make decisions and field diagnoses regarding the use of IPM practices and techniques. The proposal shall present a plan or method for assuring continuity of pest management personnel assigned to this contract, and knowledge and sensitivity to the needs of the schools. The Contractor should understand that quality assurance and daily pest management services are two activities that are separate and distinct from one another, and require sufficient time and manpower.

The Contractor shall designate a Program Technical Supervisor (PTS), who shall have primary responsibility for the conduct of this pest management contract, ensure that all required reports are submitted to the IPM Coordinator on time, and be available for routine and emergency consultation. The following minimum requirements regarding this individual's experience and training shall be provided in the proposal:

1. Resume, including current home address.

2. Current certification or license in California as a Pest Control Applicator or as an Agriculture Pest Control Advisor.

The PTS shall provide on-site supervision to assure safety, carry out coordination and continuity of program services, and fulfill special requests from the IPM Coordinator. The responsibilities of the on-site supervisor will be carried out by the PTS, not the pest management technician. A pest management technician shall provide on-site pest management services

Manner and Time to Conduct Services

Routine services should be performed during the late afternoon hours, Monday through Friday, excluding holidays, except when school is not in session or as specifically approved by the IPM Coordinator. Pesticides shall not be applied while foods are being prepared, served, or put away, or when the school building is open for business. The Contractor shall observe all safety precautions throughout the performance of this contract. Certain areas within some facilities may require special instructions for persons entering the area. Any restrictions associated with special areas will be explained to the Contractor and the IPM Coordinator by the school building liaison. These restrictions shall be adhered to and incorporated into the Contractor's Pest Management Plan and Service Schedule for the school building. All contracted personnel shall wear an identification card in a clearly visible manner during the performance of their duties. Vehicles used by the Contractor or the contractor's personnel shall be identified in accordance with state regulations. The Contractor must park in designated areas in close proximity to each school building. At a minimum, the Contractor shall provide his/her personnel with clean uniforms to be worn while performing their duties. Additional personal protective equipment required for the safe performance of work shall be determined and provided by the Contractor in accordance with California law.

Nonchemical Alternatives

Caulking and sealing pest harborages and pathways is the preferred method for preventing or controlling an infestation and shall be part of the routine IPM services. The Contractor shall make limited applications of approved sealants and other exclusion materials under sinks, as well as around cabinets, pipe chases, windows and doors, exterior areas, etc., in lieu of or to augment other pest management methods. The Contractor shall make recommendations to the IPM Coordinator for any large-scale application (i.e., whole room, exterior of building, etc.) of sealants and other exclusion materials. In addition, the use of vacuum cleaners, mechanical traps, insect light trapping devices, and glue boards used for rodent management should be fully integrated into the day-to-day operations of the program. The Contractor must be proactive at identifying and, in some cases, correcting known or suspected problem areas that provide food, water, harborage, and access for pests in and around the school building. Snap traps, trapping devices, and glue boards used for rodent management or monitoring activities must be intensively maintained. The Contractor shall discard rodents killed or trapped within 24 hours. Trapping should not be performed during periods when maintenance will be delayed by holidays, weekends, etc. Traps shall be placed out of general view and away from any access by children or staff for safety and aesthetic purposes, and located where they will not be affected by routine cleaning procedures. The Contractor shall describe in the proposal their organization's approach to meeting these requirements.

Pesticide Alternatives

Pesticide applications shall be made only to areas of known pest infestation or activity, and where nonchemical control measures, such as traps, caulking, sealing, cleaning, habitat modification, physical, mechanical, and biological control were not successful or are not feasible. Application of pesticides shall not occur until a full inspection has been completed. If chemicals are needed, least-hazardous pesticides and formulations, such as boric acid, silica gels, and diatomaceous earth should be considered whenever possible.

Pesticide applications that may impact the operations or occupants of a school building shall be permitted only during hours when the school building is closed and after all notification procedures have been met. A contingency plan for performing pesticide application in the school building should be part of the Pest Management Plan and Service Schedule. This should include a list of pests, pesticide products, formulations, application methods, timing of application, and other relevant information that may be needed in specific situations and school buildings. The following shall be used as thresholds for the initiation of control actions in the school building:

1. An average of two cockroaches per trap within an area during each service interval.
2. One mouse or rat dropping per room.
3. One rat burrow or runway in outside areas of the school building.
4. Any stinging insect nest within reach from the ground.
5. Recurring problems with other pests, e.g., flies, spiders, or stored product pests, which cannot be resolved using nonchemical techniques.

The Contractor shall minimize the use of and potential exposure to pesticides wherever possible.

For example:

1. Use nonchemical control methods and materials.
2. Use crack and crevice or bait application of pesticides in pest harborage areas.
3. Integrate control methods (i.e., structural repairs, trapping, sanitation, etc.).
4. Pesticide space sprays (including fogs and ultra-low volume applications) will be restricted to unique situations for which no alternative measures are practical or effective. Because notification must be sent home 72 hours prior to spraying, the Contractor must confer with the IPM Coordinator to develop a specific plan.
5. Routine preventive spray treatments are prohibited. The broadcast or barrier treatment of an interior or exterior area with a pesticide must be specifically requested by the Contractor and approved by the IPM Coordinator, prior to performing the treatment. Preventive treatments are acceptable only on a case-by-case basis. The Contractor must provide detailed plans; list the

rationale for the treatment, and the methods of application if preventive treatment is warranted for a specific school building or landscape area. Preventive treatments are subject to review by the IPM Coordinator and can be eliminated at any time.

Reporting

The Contractor's Program Technical Supervisor shall, at a minimum, provide annual written reports to the school district and attend regular meetings with the IPM Coordinator, school administration, school liaisons, and other concerned individuals. These reports and meetings will address all pest management activities provided by the Contractor for each school building and evaluation of the IPM program's progress. These reports should identify school building conditions or personnel practices that require correction by the school district in order to promote the program's overall effectiveness. In addition, the Contractor shall provide monthly service reports to the IPM Coordinator within 15 days following the end of each month. The service reports shall include, but not be limited to, the following:

1. Facilities serviced.
2. Man-hours for each school building for Routine Services.
3. Location, man-hours, and work description of Special, Emergency, and Additional Services.
4. Results of monitoring and inspections, including accepted common names of pests, numbers of each pest, and the location in the school building.
5. Written evaluation of sanitation conditions, structural deficiencies, repairs needed, repairs completed, and immediate and long-term program goals for either resolving pest problems or improving the IPM program within each school building and management area.
6. Identification and listing of pesticides used by common/generic name (no codes), concentration and quantity of finished spray used, and other pest management techniques used for each school building and management area.

Evaluation

Monthly service reports and annual reports will be used by the IPM Coordinator and the Contractor to develop tangible means for evaluating the overall IPM effort in school facilities. The Contractor's Program Technical Supervisor shall meet as needed with the IPM Coordinator to discuss the status of the pest management program and review program activities and reports, or resolve ongoing or special problems. If the school district hires an outside evaluator, the contractor may be required to meet with this person or provide information.

Training

The Contractor shall include, in the proposal, a detailed description of the in-service training programs provided to their personnel, including pertinent documentation and records. In addi-

tion, the Contractor should be able to provide training or develop a plan to use outside expertise to provide training on all aspects of IPM program design and implementation to a wide array of school-associated personnel, including school administrators, maintenance and housekeeping staff, the IPM Coordinator and school liaisons, and community members.

Notification

The Contractor shall provide the IPM Coordinator and school liaisons with a list of pesticides that may be used in school before the school year begins. Product labels and Material Safety Data Sheets for all pesticides shall be provided to the IPM Coordinator and made available in the school IPM program logbook for review by school liaisons, parents, and other interested parties. The Contractor shall notify the IPM Coordinator and school building liaisons in advance of all pesticide applications to ensure that all provisions of the State and school district's advance notification policies are met. Although each school district is ultimately responsible for student notification of pesticide use and for sending notification home with students, the Contractor will be responsible for satisfying all legal requirements for posting. The Contractor will notify the IPM Coordinator upon completion of pesticide applications made in and around school buildings.

Inspections

Throughout the duration of this contract, school district personnel will periodically inspect school facilities to determine the effectiveness of the IPM program and Contractor compliance with the contract. Inspection results will be documented in writing and submitted to the Contractor. The Contractor shall initiate actions promptly to correct all deficiencies found. It shall be the Contractor's responsibility to furnish an adequate supply of materials necessary for school personnel to inspect the interior of all rodent bait stations. These materials may include Allen wrenches to loosen and retighten fasteners, keys to open locks, or replacement self-locking plastic ties. Implements to cut plastic ties are not included under this provision.

Purchase of Ancillary Services/Equipment

The Contractor may need to purchase additional equipment or provide additional services to ensure that the IPM program is fully implemented. The school district has the right to negotiate the purchase of ancillary equipment and services with the Contractor and adjust the contract accordingly.

Additional information on developing School IPM contracts is available at the following Web sites:

University of Florida's School IPM Model Contract:
http://schoolipm.ifas.ufl.edu/Florida/contract.htm

Safer Pest Control Project's Guidelines for IPM in School & Childcare Pest Management Contracts: https://utahpests.usu.edu/schoolipm/files-ou/school-ipm-documents/ipm-general-info/how_do_I_know_I_am_receiving_IPM.pdf

Texas A&M's School Integrated Pest Management Service Agreement:
http://schoolipm.tamu.edu/files/2010/11/IPM_Contract_generic_template1.pdf

U.S. General Services Administration's Integrated Pest Management Program Contract Guide Specification:
http://dph.illinois.gov/sites/default/files/publications/gsa-contract-041216.pdf

City and County of San Francisco's Request for Proposal—Integrated Pest Management Service for City Owned Buildings and Properties:
https://sfenvironment.org/sites/default/files/fliers/files/sfe_th_ipm_contract_model_language.pdf

UC Davis Pest Notes "Hiring a Pest Control Company":
http://ipm.ucanr.edu/PDF/PESTNOTES/pnhirepestcontrol.pdf

IPM Institute's Model IPM Contract:
https://articles.extension.org/sites/default/files/w/7/7b/schoolipm_model_contract.pdf

Virginia School IPM--Develop an IPM Pest Control Contract or Plan of Work:
https://www.sites.ext.vt.edu/schoolipm/howtoapplyipm/contract.shtml

EcoWise IPM Contracting Toolkit: http://ecowisecertified.org/toolkit/

Urban Pesticide Pollution Prevention (UP3) Project's Key Points—Contracting for Structural IPM Services: http://www.tdcenvironmental.com/UP3Partnership.html

Our Water Our World's Finding a Company That Can Prevent Pest Problems:
http://www.ourwaterourworld.org/Portals/0/documents/pdf/hiring_pestco.pdf

City of Santa Monica's IPM Contract and Policy Information:
https://www.smgov.net/Departments/OSE/Green_Office_Buying_Guide/Break/Pest_Control.aspx

State of California, Department of General Services' Building Maintenance - Structural Integrated Pest Management Vendor Hiring Information:
https://1pdf.net/sample-ipm-contracts-pdf-state-of-california_58fa1236f6065d423b340b6d

APPENDIX J

Establishing Integrated Pest Management Policies and Programs:

A Guide for Public Agencies

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Establishing Integrated Pest Management Policies and Programs: *A Guide for Public Agencies*

MARY LOUISE FLINT, University of California Statewide Integrated Pest Management Program, UC Davis; **SHEILA DAAR**, Daar Consulting Group, Berkeley, CA; and **RICHARD MOLINAR**, University of California Cooperative Extension, Fresno.

UNIVERSITY OF CALIFORNIA
Division of Agriculture and Natural Resources
http://anrcatalog.ucdavis.edu

INTRODUCTION

As a result of growing concerns about health and environmental problems associated with pesticides, public agencies are facing increasing demands from their employees, their clientele, and the general public to explain and justify their use of these materials. Agencies must be able to respond with careful, thoughtful answers. Managing insects, plant pathogens, weeds, rodents, and other organisms that become pests is a complex science; applying pesticides safely and effectively in public areas requires substantial expertise and skill. Responses to the public's questions must communicate an understanding of this complexity and a genuine concern for health and environmental problems.

Adoption of a written policy and procedures for making pest management decisions provides an agency with an effective way to respond to the questioning public and at the same time improves the agency's internal decision-making process, resulting in more efficient, more effective, and safer resolution of pest problems. Involving the public and employees in the development and evolution of a pest management policy can help educate everyone on the potential hazards and benefits of pest management practices.

What Is Integrated Pest Management?

Integrated pest management (IPM) is a pest management strategy that focuses on long-term prevention or suppression of pest problems with minimum impact on human health, the environment, and nontarget organisms. Preferred pest management techniques include encouraging naturally occurring biological control; using alternate plant species or varieties that resist pests; selecting pesticides with a lower toxicity to humans or nontarget organisms; adopting cultivating, pruning, fertilizing, or irrigation practices that reduce pest problems; and changing the habitat to make it incompatible with pest development. Pesticides are used as a last resort when careful monitoring indicates that they are needed according to preestablished guidelines. When treatments are necessary, the least toxic and most target-specific pesticides are chosen. Implementing an integrated pest management program requires a thorough understanding of pests, their life histories, environmental requirements, and natural enemies, as well as establishment of a regular, systematic program for surveying pests, their damage, and other evidence of their presence.

What Are Special Issues for Public Agencies?

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For many years, integrated pest management programs have been implemented in agricultural cropping systems. IPM programs in schools, parks, and other public places have been a bit slower to be adopted. Public agencies face infrastructure complexities and public relations issues that are not a concern for individual farmers making pest management decisions.

Pest management programs in public agencies rely on the coordinated activities of many individuals. Often, several different departments and supervisors are involved in activities that affect pest problems and their management. There may be different supervisors for janitorial staff, pesticide application staff, plant maintenance staff, landscape maintenance staff, and landscape design staff—yet all have critical roles in a pest management program. Each group may have different priorities and a different way of doing business; there may not be effective communication between departments. However, these divisional barriers must be broken down and all employees must be enlisted in a program that shares common goals and approaches to achieve success.

In addition, public agencies must be accountable and responsive to the public. People in the community often want justification for the use of certain types of pesticides and at the same time may demand to know why the agency isn't doing a better job of controlling organisms that they consider pests. A written IPM policy enhances an agency's ability to respond to public concerns and coordinate activities within its bureaucracy.

What Will an Integrated Pest Management Policy Do for Your Agency?

Although the initial reason for developing an integrated pest management policy may be to explain and justify your agency's use or nonuse of pesticides, it will provide many other benefits as well. For instance, a written policy provides procedural guidelines for the agency. There are many federal, state, and local regulations that must be followed when storing, transporting, applying, and disposing of pesticides, and there are specific laws regarding who can recommend pesticides and how applicators must be trained in California. Specific safety equipment and procedures are required for the use of many pesticides. A written policy assures that these laws and regulations are adhered to each time a pesticide is used and helps you document that proper procedures were followed.

Developing and establishing a set policy educates applicators, administrators, other employees, and the general public about when and why pesticides are used and when alternative methods might be adopted. It also helps employees gain a better understanding of their jobs. An IPM policy may reduce your agency's reliance on pesticides, protect the environment, and protect applicators, coworkers, their families, and the public. If problems do arise, the policy provides procedures for immediately handling the problem and helps you to document that your agency acted responsibly.

SETTING POLICY GOALS

The first step in establishing an integrated pest management policy is to determine the goals of your pest management program. Policy goals give your agency a framework on which to base individual decisions. All goals may not be met with each and every decision, but established goals will give your agency a set of priorities to work from. *Goals will vary considerably from agency to agency* according to the function of the agency, public and wildlife access to agency grounds, employee concerns, and political priorities. The overall goal for many agencies would be "to establish a more effective and safe pest management program"; however, this type of general goal is not specific enough to guide decision making. More specific goals might be divided into two categories: political, educational, and public relations goals for policy makers; and operational goals for basing individual pest control decisions.

Goals should be set with input from employees and the general public. Establishing goals is one of the most productive ways that people without technical expertise can participate in the policy-making process. Involving various factions of the community in policy development is a good way to garner widespread support for the program and policy later on. Pest management policy goals differ with the function of different agencies; examples of possible goals follow.

Examples of Political-Educational Goals

- Encourage employees to first consider alternatives to pesticides.
- Keep citizen complaints at or below current levels through effective practices and public education.

Examples of Operational Goals

- Design a written plan for implementing IPM procedures throughout the facility and for individual pests.
- Ensure that the public agency's governing board (supervisors, trustees, directors) is kept informed as to the progress of the IPM program. The board's support and encouragement can assure the program's presence and fiscal health.
- Establish procedures (e.g., through a technical review committee and periodic reevaluations) for assuring that the latest information is incorporated into pest management decisions.
- Develop procedures for allowing public input without disruption of the overall program.
- Make information accessible to the public and employees regarding pesticides used and areas treated.
- Ensure that applicators are educated regarding current pesticides, their hazards, and applications.
- Educate employees and the public about pest management problems and solutions.
- Develop protocols for plant inventory and pest problem survey.
- Establish monitoring programs and evaluative criteria to measure control success.
- Maintain pests at levels that prevent them from becoming a health hazard.
- Eliminate fire hazards (such as tall dry grass or dead trees) in a timely manner.
- Reduce or eliminate all use of pesticides in CDFA category I, II, or III (agency choice).
- Establish and maintain pesticide use reporting and recordkeeping.
- Provide employees with pest management training, including diagnostic skills and use of alternative pest control methods.
- Establish and maintain records of pest occurrence and levels at which they become a problem.
- Identify and evaluate cultural and environmental conditions on the grounds that seem to encourage pest problems.
- Use the safest effective practices whenever economically feasible.

PROCEDURES FOR DESIGNING AN IPM PROGRAM

Once policy goals are set, persons with pest management expertise within (and perhaps also outside) your agency must establish reasonable procedures for meeting these goals. At first, some operating guidelines will be crude, but you can refine them with time as your experience grows. However, it is important to have established procedures so you can document and measure their success and improve them with time. The procedures listed below are intentionally generic because of the great variety of pest management situations. Pest control procedures must be developed on a pest-by-pest basis, and procedures will change and evolve over time. You can get help by consulting the resources at the end of this publication, talking with University of California Cooperative Extension staff, consulting private pest management consultants, or talking with other agencies with similar problems. Remember to keep your policy goals in the forefront and to regularly document and reevaluate your program. Keep up with new ideas and practices through continuing education and professional publications.

The success and sophistication of your IPM program will depend on the experience, skill, education, and enthusiasm of your employees. Take these factors into account when establishing procedures. Don't expect employees to perform new tasks without encouragement and training. You may need to bring in outside expertise to assist in the first season of a new program. Expect to implement change over time, incorporating a few major component at a time.

Step-by-Step Procedures for Developing an IPM Program

1. Identify all potential pests (including all life stages) in the system. Verify damage symptoms associated with pests and identify natural enemies. For plant pests, this will require identifying plant species in the management area and developing pest lists for each host. Train all pest management personnel to accurately identify beneficials as well as major pests and their damage, and to seek help when they can't make a conclusive identification. Have materials (e.g., a field manual or identification texts such as those listed in the resources on p.11) and tools (e.g., a dissecting microscope and hand lens) available to assist in pest identification. Make provision for identifying new pests as they are observed (see step 9).

2. For each pest, establish monitoring guidelines. These may be crude at first but can be improved with experience. Monitoring methods vary from pest to pest (for more information, see the resources on p.11), but all involve regular (e.g., weekly) checking, visually or with traps, for pests or damage symptoms, or other evidence of pest presence (e.g., feces); methods also involve some way of quantifying observations. Also provide for monitoring of beneficials and natural enemies. Overall, the objectives of a monitoring program are to pinpoint precisely when and where pest problems may become intolerable and to determine the effectiveness of treatment actions. To determine the need for treatment, the objectives must be used with action thresholds, as discussed in step 3.

3. Establish injury levels and action thresholds for each individual pest species before making any treatment. An injury level is the pest population size (e.g., 10 aphids per leaf or 2 cockroaches per trap) that is associated with intolerable damage. Action thresholds are the set of conditions required to trigger a control action—usually a pesticide application.

Determine the infestation levels that will be intolerable to people or to structures or that will cause unacceptable damage at various times of the year, plant growth stages, situations, and so on. At the same time, devise a monitoring plan for detecting these pest levels and determining when to treat. Over time you will refine the injury levels and action thresholds; however, treatment is usually required when

- a regular monitoring program indicates that the pest population will reach the injury level if left untreated; and
- biological or environmental factors cannot be expected to reduce the pest problem within a reasonable time; and
- treatment cost and health and environmental hazards are considered less than the potential pest damage.

4. Establish a recordkeeping system. Good records are essential for evaluating and improving your IPM program and for reference when the public wants to know how you handle certain types of pests. Any recordkeeping system should include observations such as

- identity of the pest (to species if possible) and how the identification was made
- the size (density) of the pest infestation
- the geographic distribution of the pest problem in the managed area (a map of your facility can be useful for this)
- complete information on how you treated the problem, including what, how much, where, when, who, cost, application difficulties, and the effectiveness of treatment in solving the pest problem (short-term and long-term)
- the side effects of the treatment on nontarget species
- public complaints or other problems that arise, and positive feedback

5. Develop a list of acceptable management strategies for each pest. The preferred methods in an IPM program *prevent* pest problems and therefore eliminate the need for pesticide applications. These methods might include modifying structures or landscaping to be less conducive to pest survival, using pest-tolerant or pest-resistant cultivars, using cultural practices (such as mulches or mowing and the use of pruning and planting times that discourage pests), and educating the public to be more tolerant of pests. Encouragement of naturally occurring biological controls can be very important; in some cases, barriers, traps, or mechanical removal can be effective. Develop a list of pesticides that are effective against each pest but are least disruptive to the environment—for instance, soap sprays, microbials, botanicals, oils, and synthetic pesticides with low LD-50 and short persistence. Investigate and document the potential for using low rates, spot treatments, and other selective ways to integrate pesticides into an IPM program that is least disruptive to biological control agents and nontarget organisms. For instance, using bait stations or other formulations that reduce exposure to humans or nontarget organisms is an important way to reduce potential risks.

6. Develop specific criteria for selection of pest management methods. Make the criteria known to employees and the public. Although all criteria may not be met in every case, choices should meet the majority of the following requirements:

- least disruptive of natural controls
- least hazardous to human health
- least toxic to nontarget organisms and least damaging to the general environment
- most likely to produce permanent reduction of the pest
- easiest to carry out effectively
- most cost-effective in the short- and long-term

For instance, avoid the common practice of regularly scheduled perimeter sprays to keep invading species such as ants, beetles, spiders, or earwigs out of buildings. This strategy does not provide a long-term solution to a problem and may kill beneficials and promote pesticide resistance. Structural changes, habitat reduction around buildings, and the use of baits can provide long-term control in many cases.

7. Develop guidelines to be followed each time a pesticide is used. Prepare a checklist to be used each time an application is made. Important items on the checklist should include:

- choosing the safest material that is effective
- considering label signal words, persistence, impact on nontargets, and potential chronic human health effects
- considering the potential for treating only the most seriously infested areas (i.e., spot treatments) to allow for survival of natural enemies (this works for some insects and mites only)
- making sure the pesticide is registered in California for the situation and that you are aware of all laws regarding its use
- if required, making sure you have in hand a written recommendation for using the pesticide made by a licensed pest control adviser
- checking the pesticide label to make sure all precautions and legal requirements are being carefully adhered to
- making sure all safety equipment and clothing are used
- verifying that the person doing the application is certified and qualified to handle the equipment and material chosen and that the person has been adequately trained
- after the application, monitoring the pest population to see if the treatment was effective
- keeping written records
- obtaining the Material Safety Data Sheet (MSDS) for the pesticide from the manufacturer
- making sure your application equipment is appropriate for the job and calibrated
- being prepared for all emergencies and knowing whom to call for help and interim measures to take before help arrives

8. Designate a person to be responsible for each step along the way. These are the people (e.g., job titles) who will be responsible for making decisions, carrying out the various pest management and emergency operations described in your policy, and regularly evaluating the effectiveness of the program.

9. Develop a list of resources. Know where you can go when information or outside help is needed. Include resources for pest identification, pesticide recommendations, and information about pesticides, pest management, and handling emergencies. Build a library and have employees participate in training and continuing education programs on a regular basis. (See the resources on p.11.)

10. Consider your IPM policy to be a "living document" that changes as you acquire experience and new information. Establish an oversight committee that includes persons with toxicological and pest management expertise to assist with initial review of procedures and future changes in the policy. Review the program regularly (e.g., annually). Involve environmental organizations, worker health advocates, and other interested members of the public or employee representatives from your facility in the development and revision of the IPM policy.

Outside Contractors

Some agencies have no staff or limited staff to devote to pest management activities. Some do not have staff with expertise or appropriate licenses to carry out certain pest management activities. In these cases, agencies will want to hire outside contractors for pest management services.

Contractors differ in their skills and experience, and it is important to hire a company that is reliable and knowledgeable about IPM practices and the goals of your IPM program. Performing appropriate preventive and monitoring activities may take extra time, so the lowest bidder may not always be the best company for your job. Be sure to specify needed IPM practices clearly in your contract and formalize a good communication system. Hire contractors who have appropriate pesticide application and pest control adviser licenses and training and who also have experience in IPM in situations such as yours. Ask them to provide you with their license number.

The first step in hiring a contractor is to prepare a request for qualifications (RFQ) that will allow you to prescreen and ensure that only qualified contractors submit proposals for the bid process. Next, prepare a request for proposals (RFP) that details the terms of your IPM policy. Evaluate the responses to the RFP according to the contractor's ability to meet the goals of your program. As part of the pest management contract, develop a quality assurance form (QAF). The QAF is filled out by the contractor each time a service is provided. It should detail information on pest sightings, sanitation and structural concerns, pesticides applied, traps or monitoring stations installed, pesticide use or other regulatory forms filed, and any additional pest management concerns.

BUILDING SUPPORT FOR YOUR IPM PROGRAM WITHIN AND OUTSIDE YOUR AGENCY

Once an IPM policy has been adopted by a city council, school board, or other policy-making body, it falls to agency staff or pest control contractors to implement the policy. Change never comes easily. There are a number of predictable obstacles within an agency—both psychological and institutional—to be overcome when initiating IPM programs. At the same time, even if the public has been involved with development of a policy, there are likely to be occasional complaints and controversies, especially as pests, pest control practices, and public concerns change.

Psychological Barriers to IPM Adoption

Psychological resistance to change

The problem: When pest control personnel are asked to make pest management decisions in a new way and to use new methods, they may feel that there is a negative implication regarding their past performance.

How to address it: Many factors contribute to the need to change pest management practices. Most of these factors are beyond the control of the individual pest manager. They include loss of effectiveness of many pesticides as pests develop genetic resistance; increased availability of less-toxic products or techniques; increased requirements for documentation, licensing, certification, and continuing education; and public concern about adverse health and environmental effects of pesticides. Adoption of IPM methods enables pest control professionals to respond to these forces for change and at the same time achieve cost-effective control of pests.

Loss of authority

The problem: Adopting an IPM approach may engender fear of many kinds of losses, including loss of personal authority or supervisory authority. In the first case, individuals may fear that their experience in the field will become devalued, particularly if their expertise has been in pesticide application. In the second case, supervisors may fear that the system will become more efficient and they will lose positions.

How to address it: Successful IPM implementation enhances both personal and supervisory authority. Many of the new, less-toxic pest control materials such as pheromones, microbial and botanical pesticides, insect growth regulators, and biological controls require application skills and equipment that are similar to conventional pesticides, and workers can readily learn necessary modifications to conventional practices. Mastery of IPM monitoring skills enhances the professionalization of pest management and can lead to upgrading job classifications. In terms of supervisory authority, IPM programs provide managers with greater decision-making responsibilities and an increase in the flexibility of staff assignments. For example, by emphasizing monitoring rather than prophylactic pesticide applications, staff time previously spent spraying can be redirected to other tasks, increasing overall productivity within a department.

Imagined difficulty in learning new technology

The problem: The techniques used in IPM may initially appear to require conceptual and operational skills beyond those of current staff.

How to address it: This fear can be overcome by building staff training into the IPM implementation program and by establishing a transition period during which pest management personnel experiment with and fine-tune IPM methods. Transition new practices in a step-by-step fashion so that not all changes are made at once.

Fear of IPM program failure

The problem: Supervisory personnel may believe that the IPM program will not work for them even though it has been successful for a nearby agency.

How to address it: IPM programs are specifically designed for the particular circumstances of each location, such as the plants and pests involved, microclimates at the site, and management history. While the IPM decision-making process remains the same no matter what the pest or site, the tactics and products used may vary greatly from one location or circumstance to another. This flexibility usually assures an appropriate solution to the pest problem.

Institutional Barriers to IPM Adoption

Fear that IPM means no access to pesticides

The problem: Some people think that IPM means never using chemical controls.

How to address it: While IPM definitely encourages alternatives to pesticides when feasible, chemical controls are used when necessary. However, in an IPM program, pesticides that are least disruptive, most selective to specific pests, and rapidly biodegradable are preferred over common, broad-spectrum materials. For instance, the microbial insecticide *Bacillus thuringiensis*, a naturally occurring bacteria that kills only certain groups of pest insects, is an example of the type of pesticide preferred for use in IPM programs. When chemical controls are used in an IPM program, every effort is made to reduce human and nontarget exposure, for instance, by putting materials in bait stations or within walls or by "spot-treating" specific areas rather than broadcast spraying.

Fear that IPM is more expensive than traditional pest control

The problem: Until agencies have experience with IPM, they may expect that it will cost more than their current program.

How to address it: While there are short-term start-up costs for any new technology, in the long run IPM has often proven to be more cost-effective than a strictly chemical control program. When possible, IPM programs substitute information gathering (monitoring) in place of other pest control activities. This can be very cost-effective. For example, by monitoring the 1,100 elm trees in their city rather than prophylactically spraying them against elm leaf beetles, the city of San Rafael, California, found that only a small portion of the trees required treatment. As a result, the city saved $1,400 (including costs of monitoring) in the first year of its IPM program compared to the previous year when all trees were sprayed.

Also, IPM methods emphasize reducing the source of pest problems (e.g., eliminating pest habitat and food sources) rather than treating the pests themselves (e.g., spraying). This type of pest prevention program is more cost-effective than a continuing program of pest reduction that does not address the underlying cause of the infestation. For example, by permanently reducing habitats for rats (i.e., by filling rat holes with concrete, changing the design of garbage cans, and increasing frequency of garbage pickup), the National Park Service was able to permanently reduce rat populations in certain parks. Previous rat control programs that had relied on poison baits had not been successful despite large expenditures of labor and money.

Lack of in-house IPM expertise

The problem: Agency staff may be unfamiliar with IPM and not know where to go for information.

How to address it: While it is true that IPM education and training resources are not as widely available as those for chemical controls alone, good resources can be found in any community. Many agencies have found it feasible to hire an IPM specialist to work as a consultant to in-house pest control staff during the initial year or two of IPM implementation, or to create an IPM coordinator position and recruit nationwide. Increasingly, cooperative extension advisors or agents, college horticultural or entomological faculty, pest control advisers, and a nationwide network of nonprofit organizations involved in pest management, sustainable agriculture, and environmental protection are able to provide IPM information and advice. Periodicals and Web sites providing practical technical advice on IPM methods for specific pest problems are increasingly available. The resources at the end of this publication will assist anyone attempting to implement IPM programs.

SOME FINAL HINTS FOR IMPLEMENTING AN IPM PROGRAM

The following suggestions will help overcome barriers and smooth the transition to IPM implementation.

Mandate staff training in IPM. When writing the IPM policy document, include a requirement for the continuing education of pest management personnel. Ensure that budgetary allocations are made to assist them in obtaining the information, skills, and equipment they need to carry out the policy.

Start small. Begin IPM implementation in one location (e.g., one lawn in one park; one kitchen in one school) and include short-term objectives. For example, when dealing with a number of pest problems, identify one of the pests likely to respond quickly to an IPM approach so that a short-term objective can be realized. Test the IPM methods and fine-tune them. When the program is working successfully in one area or against one pest, expand the program.

Don't change everything at once. To the maximum degree possible, retain communication and accountability procedures already in use. Tailor new recordkeeping and reporting forms to fit existing agency formats. Recycle existing equipment to uses consistent with IPM methods rather than immediately eliminating the equipment.

Share the process. Involve all pest management personnel in the day-to-day IPM program process as early as possible so that they will understand and support the program during the sometimes difficult transition period.

Emphasize communication and plan for future training. During the IPM transition period, keep all personnel informed about what is planned, what is happening now, the expected outcome, and what will happen next. Prepare written records and visual aids that will remain in the agency when persons associated with development of the IPM program are no longer there.

Build in a reward system. Identify benchmark objectives (e.g., testing of mechanical weed control methods in one park during a 3-month period or a 10 percent reduction in pesticide use in the first year). Encourage staff to achieve objectives (e.g., a letter of commendation from agency head, recognition at an awards ceremony, an article in an agency bulletin, merit pay increase).

Publicize the program. Develop good rapport with agency public relations personnel and with the local news media. Include field and management staff at photo and interview sessions about the IPM program.

Involve the community. Form an IPM advisory committee composed of interested organizations, members of the public, and pest control professionals. They can help make IPM implementation a budgetary priority in the agency, can donate or locate resources that may not otherwise be available to the agency, and may add needed expertise and experience to the process.

RESOURCES FOR AGENCIES DEVELOPING IPM POLICIES

General Information

In addition to the resources listed in this section, other agencies that deal with problems similar to yours, as well as pest management consultants, can be valuable sources of general information.

The University of California County Cooperative Extension offices are a valuable resource. In California, check your phone book under University of California or Cooperative Extension; or, see the University of California Agriculture and Natural Resources Web site, http://ucanr.org/.

Professional Organizations

- Association of Applied IPM Ecologists (AAIE) http://aaie.net/
- California Agricultural Production Consultants Association (CAPCA) http://www.capca.com/
- California Weed Science Society (CWSS) http://www.cwss.org/
- Pesticide Applicators Professional Association (PAPA) http://www.papaseminars.com/

Web Sites

The University of California Statewide IPM Program Web site at http://www.ipm.ucdavis.edu has information on managing and identifying pests of landscape, structures, agricultural crops, and pests of medical importance. There are links to pages related to pesticide toxicity, water quality, and other related resources.

The California Department of Pesticide Regulation IPM for Schools Web page at www.cdpr.ca.gov/ has complete information on California's IPM in Schools Program as well as links to other information relating to managing pests in public buildings and landscapes.

The U.S. EPA Region 9 has an IPM manual for schools, Integrated Pest Management for Schools: A How-to Manual on its Web site http://www.epa.gov/region09/toxic/pest/school/. The manual includes appendixes that include IPM contract performance specifications and sample monitoring forms.

Many (but not all) pesticide Material Safety Data Sheets (MSDS) and labels are available at the Crop Data Management Systems Web site: http://www.cdms.net/manuf/manuf.asp

Other useful Web sites related to pesticides include:

- National Pesticide Information Center http://npic.orst.edu/links.htm
- Extoxnet (Extension Toxicology Network) http://ace.orst.edu/info/extoxnet/ghindex.html
- U.S. EPA Reregistration Fact Sheets http://www.epa.gov/pesticides/

Books and Other Literature

A free catalog is available from University of California Agriculture and Natural Resources Communication Services (6701 San Pablo Avenue, Oakland, CA 94608-1239; http://anrcatalog.ucdavis.edu; phone 1-800-994-8849/510-642-2431) that lists many publications of value in managing pests, including those listed below as University of California ANR publications.

Dreistadt, S. H. 1994. Pests of landscape trees and shrubs: An integrated pest management guide. University of California ANR Publication 3359.

Flint, M. L. 1998. Pests of the garden and small farm: A grower's guide to using less pesticides. 2nd ed. University of California ANR Publication 3332.

Flint, M. L., and P. Gouveia. 2001. IPM in practice: Principles and methods of integrated pest management. University of California ANR Publication 3418.

Mallis, A. 1997. Handbook of pest control. 8th ed. Cleveland, OH: Mallis Handbook and Technical Training Company.

Marer, P. J. 1991. Residential, industrial, and institutional pest control. University of California ANR Publication 3334.

O'Connor-Marer, P. J. 2001. The safe and effective use of pesticides. 2nd ed. University of California ANR Publication 3324.

Salmon, T. P., and R. E. Lickliter. 1984. Wildlife pest control around gardens and homes. University of California ANR Publication 21385.

Whitson, T. D., L. C. Burrill, S. A. Dewey, D. W. Cudney, B. E. Nelson, R. D. Lee, and R. Parker. 2001. Weeds of the west. 9th ed. Western Society of Weed Science. Available from UC ANR Communication Services as Publication 3350.

Zavala, M. 1991. The illustrated guide to pesticide safety/ Guía ilustrada para el uso seguro de pesticidas. Instructor's Edition. University of California ANR Publication 21489.

FOR MORE INFORMATION

Visit our online catalog at http://anrcatalog.ucdavis.edu. You can also place orders by mail, phone, or fax, or request a printed catalog of publications, slide sets, videos, and CD-ROMs from

University of California
Agriculture and Natural Resources
Communication Services
6701 San Pablo Avenue, 2nd Floor
Oakland, California 94608-1239

Telephone: (800) 994-8849 or (510) 642-2431
FAX: (510) 643-5470
E-mail inquiries: danrcs@ucdavis.edu

An electronic version of this publication is available on the DANR Communication Services Web site at http://anrcatalog.ucdavis.edu.

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This publication has been anonymously peer reviewed for technical accuracy by University of California scientists and other qualified professionals. This review process was managed by the ANR Associate Editor for Human and Community Development.

APPENDIX K

How to Collect and Preserve Specimens for Identification

You can get help with pest identification from your County Department of Agriculture and University of California Cooperative Extension offices (look in your phone book under County Government). Often the entomology or botany departments of local universities and junior colleges can help.

If your pest problem is common in your area, the identification specialist may be able to confirm your identification over the phone just from your description of the organism and/or the damage it caused. Often, however, they must inspect the specimen directly.

Collecting Insects and Mites for Identification

Whenever possible, ask how your identification specialist would like the specimens preserved, and try to collect more than a single specimen. If you aren't able to ask about preservation before you collect, the following are useful guidelines.

Larger insects (those larger than aphids) or insects with hard bodies should be placed in a plastic container, such as a pill bottle, film canister, or other container with a snap-on lid. Crumpled tissue or cotton in the container can keep the insects from rattling around and losing body parts. Mail or hand-deliver the container to the identification specialist. If you are mailing specimens, it is a good idea to put the container in the freezer overnight to kill the insects before they go through the mail.

Very small insects or mites can be collected on plastic tape. Gently pat the insect or mite with the sticky side of the tape and secure the tape to a sheet of white paper. Be careful not to clutter the tape with extraneous debris. The paper with the tape can be mailed or hand- delivered to the identification specialist. Alternatively, insects and mites, even soft-bodied species such as aphids, can be left to dry out in a container and the identification specialist can rehydrate them for study later.

Collecting Plant Specimens for Identification

If you want to have a damaged plant inspected or a weed identified, place the plant between two sheets of paper and enclose in a file folder or place between two pieces of cardboard. If you are unable to deliver the specimen in person immediately, it is likely to shrivel or mold. In that case, use the process outlined below.

Preserving a Plant Specimen

Lay the plant between two sheets of writing paper and place on a flat surface. Try to spread the plant out so that leaves and stems are not covering each other. On top of the paper set several heavy, flat objects (such as phone books) large enough to cover the plant. Press the plant in this manner until it is completely dry. At this point, the specimen can be mailed in a file folder inside a padded envelope.

Plants preserved in this manner can also be kept in a file for future reference regarding weeds, pest damage symptoms, etc. To preserve the plant for your own file, place it on one half of the inside of a file folder. Cut a piece of clear contact paper the size of half the file folder. Separate the backing from the contact paper and lay the contact paper over the plant and folder, pressing out air bubbles by moving your hand from the inside outward. Write the name of the plant (if known), the date, and the location where it was collected on folder.

Keeping a Record

If you send a sample specimen for identification, we suggest you keep another for your own reference, because samples are rarely returned. Along with the sample, you should send records of potentially important information about the situation or problem surrounding the specimen. Keep a copy of this information for yourself. We suggest you follow this format:

- date the specimen was collected
- place or address where the specimen was collected and type of area (e.g., lawn, parking lot, etc.)
- specific area where the specimen was collected (e.g., "north side of building 1A," "under a stone," etc.)
- host plant, if the insect was found on a plant

APPENDIX L

Pest Management Assessment Tool

The Pest Management Assessment Tool is meant to help consultants, pest control operators, or IPM Coordinators understand the pest management system at a school. This includes the organizational structure, pest management policies, key pests and how they are managed, and conditions conducive to pest problems. The Tool can help the assessor remember what to look for and what questions to ask during an initial pest management assessment.

The Assessment Tool can also be used to train school personnel in monitoring procedures and can help remind the IPM Coordinator of the elements of an effective IPM program.

This Assessment Tool consists of a number of forms, all of which can and should be altered to fit your particular situation. Computer software exists that can help you create and modify forms. With an electronic scanner, you can scan in forms from other sources and modify them to fit your needs. You can also find these forms online at www.cdpr.ca.gov/schoolipm.

Forms:

1. Pest Management Summary Form
2. Pesticide Use, Storage, and Disposal Checklist
3. Pest Inspection/Sanitation Report
4. Pest Proofing/Repairs Needed Inside
5. Pest Proofing/Repairs Needed Outside

Pest Management Summary Tool

Date completed_____

School #1 _____
School #2 _____
School #3 _____

GENERAL SCHOOL INFORMATION

School Address _____
School District _____ Last Day of School _____
Superintendent_____ Phone Number _____
Address_____
Address_____
email _____ No. of years in position_____
Principal_____ Phone number _____
email _____ No. of years in position_____
PTA President _____ email_____
No. of Real Buildings_____ No. of Portables _____

POLICY AND PLANNING

IPM Policy for District? _____
Pest management budget?_____
Cost accounting for pest management? _____
IPM Plans for key pests?_____
Annual report on pest management? _____
Approved pesticide list? _____
Restricted pesticide list? _____
Other pesticide lists?_____
Policy on personal ownership/use of pesticide? _____
In compliance with State worker health and safety requirements?_____
What is the attitude toward trial and error and experimentation in pest management:
Attitude of managers?_____
Attitude of administration? _____
Are pest prevention techniques used? _____
Are they encouraged? _____
Are pest management implications considered prior to new construction or building renovation? _____
Are pest management implications considered prior to new landscaping or landscaping renovation? ___

TRAINING

Training in pesticide safety, use, and disposal? _____

Training in pest management is required?_____

How much? _____

IPM training included? _____

How much? _____

Who provides training? _____

Continuing education units offered?_____

Opportunities for pursuing State licensing (QAC, QAL)? _____

MONITORING/RECORDKEEPING

How often and under what circumstances is the campus inspected for pest problems or conditions conducive to pests?_____

Monitoring program in place for key pests? _____

Monitoring data recorded? _____

How: By hand? ____ Computerized? ____

Where are records kept? _____

How are pest sightings or complaints about pests relayed from teachers and admin. staff to pest management staff? _____

Are sightings and complaints recorded? _____

Are pest control treatments evaluated for effectiveness?_____

Are pest control strategies modified to reflect the evaluation? _____

COMPLIANCE WITH THE HEALTHY SCHOOLS ACT (AB2260)

School designee/IPM Coordinator selected?_____

(Include name and other information below under "Organizational Structure for pest management.")

Annual pesticide use notification letter sent?_____

Number of people on registry? _____

People on registry notified for each pesticide application (including those of contractor)? _____

Pesticide applications posted? _____

ORGANIZATIONAL STRUCTURE FOR PEST MANAGEMENT

Pest management activities carried out by district staff or school staff? _____

IPM Coordinator _____

Address_____

Address_____

Phone number _____ Fax number_____email _____

No. of years in position _____ Licenses held _____

School Designee (if different from above)

Address_____

Phone number _____ Fax number_____email _____

No. of years in position _____ Licenses held _____
District Supervisor for Maintenance (if different from above)_____
Address_____
Address_____
Phone number _____ Fax number_____email _____
No. of years in position _____ Licenses held _____
Other Important District Managers _____
Main Groundskeeper _____ Phone number _____
No. of years in position _____ Licenses held _____
Total No. of Grounds staff _____ No. holding licenses _____
Head CustodianPhone number _____No. of years in position ____Licenses held ____
Total No. of Custodians _____No. holding licenses_____
Outside Contractors_____
Address_____
Address_____
Contact name_____Phone number_____
Outside contractors provide district/school with periodic reports? _____
What frequency? _____
Work orders generated by_____
Work orders approved by _____
Pesticide use records stored_____

FOOD PREPARATION/SANITATION

Cafeteria/Kitchen? _____
Where do children eat?_____
Food Prep on Site? _____
Food in classrooms? _____
Pets in classrooms? _____
Lockers in school? _____
Sanitation for lockers? _____
Dumpster pickup schedule_____
Dumpster clean?_____
Lid on dumpster? _____

LANDSCAPING

No. and size of fields _____
No. and size of lawns _____
Other landscaping of concern_____

KEY PESTS

Insects in and around Structures_____

Primary pest_____

Pesticide(s) used _____

Other control methods_____

Secondary pest _____

Pesticide(s) used _____

Other control methods_____

Other/Comments_____

Conditions conducive to insect pests. (list all) _____

Vertebrates (other than birds) _____

Primary pest_____

Pesticide(s) used _____

Other control methods_____

Secondary pest _____

Pesticide(s) used _____

Other control methods_____

Other/Comments_____

Conditions conducive to vertebrate pests. (list all)_____

_____

_____

Bird pests _____

Pesticide(s) used _____

Other control methods_____

Other/Comments_____

Conditions conducive to bird pests. (list all)_____

Other structural pests_____

Pesticide(s) used _____

Other control methods_____

Turf Pests (other than weeds) _____

Primary pest_____

Pesticide(s) used _____

Other control methods_____

Secondary pest _____

Pesticide(s) used _____

Other control methods_____

Other _____

Conditions conducive to turf pests. (List all) _____

_____

Weed Pests _____

Primary weed _____

Herbicide(s) used _____

Other control methods_____

Secondary weed _____

Herbicide(s) used _____

Other control methods_____

Tertiary weed _____

Herbicide(s) used _____

Other control methods_____

Additional weed(s) _____

Herbicide(s) used _____

Other control methods_____

Conditions conducive to weeds. (List all) _____

_____

Other landscaping pests _____

Pesticide(s) used _____

Other control methods_____

Pesticide Use, Storage, and Disposal Checklist _____

Pesticide Use, Storage and Disposal Checklist

General

❒ Pesticides used in school are registered in California.

❒ Copy of each appropriate label is available at use site.

❒ Applicators using restricted materials are licensed or certified to apply the material or under the direct supervision of someone who is.

❒ Records kept of pesticide use. Records must include the following to comply with the Healthy Schools Act:

- date and place of application
- amount used
- product names
- active ingredient(s)
- manufacturer's name
- U.S. Environmental Protection Agency's product registration number.

❒ Pesticide use records kept for 4 years in an area accessible to the public.

Training

❒ School keeps written records of applicator training.

Applicators are trained in at least the following:

- Meaning of precautionary statements on the pesticide label
- Routes pesticides can enter the body and the signs and symptoms of pesticide over-exposure
- Emergency first aid and how to obtain emergency medical care
- Safety requirements and procedures
- Environmental concerns such as drift, runoff, and wildlife hazards
- Applicable regulations and the Material Safety Data Sheet
- The location of the completed Hazard Communication for Employees Handling Pesticides in Noncrop Settings (Pesticide Safety Information Series N-8 from the Department of Pesticide Regulation **Appendix P** or your County Agricultural Commissioner).

Equipment

❒ Equipment in good repair and safe to operate.

❒ Equipment for mixing, loading, transferring, or applying pesticides is inspected before each day of use.

Emergency Plans

❒ List of emergency phone numbers in vehicles and/or an accessible area near a phone.

❒ List of first aid procedures in vehicles and/or at use sites.

❒ Name, address, and phone number of facility at which medical care is available is prominently posted in vehicles and/or at use sites.

Storage and Disposal

❒ Pesticides with signal words "Danger" or "Warning" stored in locked area that is dry, separate from food and feed, and away from children and pets.

❒ Sign reading "Danger: Poison Storage Area. All unauthorized persons keep out." posted on storage area.

❒ Pesticides with signal word "Caution" stored in dry areas away from children, preferably under lock and key.

Pest Inspection/Sanitation Report

Date _____ School _____

Building#/Location _____

Inspector _____ Inspection Type _____ Initial _____

Quality Control _____ Routine _____

Evidence of Infestation(s) _____

Pest _____ Location _____

Pest _____ Location _____

❒ Ants ❒ Fleas ❒ Cockroaches ❒ Stored Prod. Pests ❒ Mice ❒ Pigeons ❒ Rats

❒ Other _____

Sanitation Survey

Food Preparation: ❒ Yes ❒ No

❒ Equipment clean

❒ Floors clean

❒ Appliance drip pans clean

❒ Area neat and tidy; no clutter

❒ Floors clean

❒ Empty boxes stored in cold storage

❒ Floor drains clean

❒ Empty boxes stored away from kitchen

❒ Sink drains clean

❒ Public and Staff Areas

❒ Counters/Tables clean

❒ Restrooms clean

❒ Food stored pest-proof containers

❒ Plumbing in good repair; no leaks

❒ Perishables stored in refrigerator

❒ Locker room clean

❒ Garbage removed daily at end of day

❒ Locker room free of food and food waste

❒ Spillage cleaned regularly

❒ Employee lounge clean

❒ Floors and counters dry; no standing water

❒ Food stored properly in lounge

❒ Plumbing in good repair; no leaks

❒ Food stored properly in classrooms

❒ Windows/doors screened

❒ Trash removed daily before end of day

Receiving: ❒ Yes ❒ No

❒ Gaps around/under doors or windows repaired
❒ Janitorial closet clean
❒ Pest proofing needed
❒ Pest Proofing needed
❒ Storage Areas
❒ Exterior
❒ Floors clean
❒ Dumpster/garbage cans cleaned weekly
❒ Floor drains clean
❒ Dumpster/garbage cans have lids
❒ Food stored in pest-proof containers
❒ Lids closed on dumpster/garbage cans
❒ Recyclables cleaned before storing
❒ Garbage area downwind from kitchen
❒ Spillage cleaned regularly
❒ Dumpster/Garbage area clean
❒ Items stored 6" to 8" off floor
❒ Garbage removed at least weekly
❒ Items stored 12" to 18" away from wall
❒ Pet waste removed daily
❒ Stock rotated
❒ Loading dock clean
❒ Area neat and tidy; no clutter
❒ Gaps under/around doors repaired
❒ Pest proofing needed
❒ Area is trash- and weed-free
❒ Other_____
❒ Area is dry; no standing water
❒ Pest proofing needed
❒ Comments/Recommendations_____
_____
_____

Pest Proofing/Repairs Needed Inside

Date_____ Inspector _____

Facilities Manager_____

Building#/Location/Address_____

For each repair, specify location and action needed. Draw a floor plan on the reverse side of this form to clarify locations. State priority for each work item.

■ Seal holes in wall around pipes, cables, and wires

■ Seal cracks and crevice with caulk or paint

■ Seal other holes 1/4" or larger

■ Fix leaky plumbing

Doors ❒ Repair ❒ Replace ❒ Weather-strip ❒ Add kickplate

Other _____

❒ Correct excessive moisture problems

❒ Remove clutter

❒ Organize storage rooms/closets

❒ Store rodent nesting material (fabric, paper, rug scraps, plastic, insulation) in rodent-proof containers

❒ Clean drains

❒ Screen drains

❒ Cap drains in basement floors

❒ Store human and pet food in pest-proof containers

❒ Improve sanitation

❒ Dispose of insect- or rodent-infested goods

❒ Remove fecal matter (rodents, bats, birds)

❒ Sanitize animal droppings

❒ Investigate secondary pest potential from rodent infestation (e.g. fleas, mites)

Floor Plan

Building location _____

Draw a floor plan and mark locations for repairs or pest-proofing.

Pest Proofing/Repairs Needed Outside

Date_____ Inspector _____

Building#/Location/Address_____

For each repair, specify location and action needed. Draw a building plan on the reverse side of this form to clarify locations. State priority for each work item.

- Cut vegetation back from building walls at least 18 inches
- Remove ivy or other vines from sides of buildings or nearby trees
- Trim back tree branches that touch or rub against building
- Seal /repair air conditioning units
- Seal holes in wall around pipes, cables, and wires
- Seal other holes 1/4 inch or larger

Doors ❒ Repair ❒ Replace ❒ Weatherstrip ❒ Screen

Other _____

Windows ❒ Repair ❒ Replace ❒ Weatherstrip ❒ Screen

Other _____

❒ Repair roof

❒ Move compost into rodent proof container

❒ Fix leaking irrigation

❒ Eliminate standing water

❒ Improve drainage

❒ Screen drains

❒ Bring order to storage sheds/garages

❒ Store rodent nesting material (fabric, paper, rug scraps, plastic, insulation) in rodent-proof containers

❒ Store grass seed and pet food in rodent-proof containers

❒ Remove debris, lumber or rock piles

❒ Move firewood piles as far away as possible from structure

❒ Cut grass or weeds

❒ Remove fallen fruit or nuts

❒ Remove fecal matter (rodents, bats, birds)

❒ Sanitize animal droppings

❒ Investigate secondary pest potential from rodent infestation (e.g. fleas, mites)

Floor Plan

Building location _____

Draw a floor plan and mark locations for repairs or pest-proofing.

APPENDIX M

Monitoring Forms

Landscape Monitoring

Date 6/15

Name of Person Monitoring John Doe

Describe location of appropriate category:

Ornamental beds _____

Sport turf _____

Ornamental turf _____

Playground _____

Fence Lines _____

Paved Areas _____

Trees Northwest corner of school entrance

Other _____

Name of Plant	Condition* of Plant Excellent Fair Good Poor	Name of Pest (if any are present)	Abundance* of Pests / Plant Damage Few Common Abundant Innumerable	Presence of Natural Enemies	Management Activities	Comments
Blue Spruce	Good	Cooley Spruce Gall Aphid	Common / Common	None	Pruned 80% of Galls out of tree	Continue monitoring
			EXAMPLE			

*See accompanying charts for explanation

Landscape Monitoring

Date_____

Name of Person Monitoring _____

Describe location of appropriate category:

Ornamental beds _____

Sport turf _____

Ornamental turf _____

Playground _____

Fence Lines _____

Paved Areas _____

Trees _____

Other _____

Name of Plant	Condition* of Plant Excellent Fair Good Poor	Name of Pest (if any are present)	Abundance* of Pests Plant Damage Few Common Abundant Innumerable	Presence of Natural Enemies	Management Activities	Comments

*See accompanying charts for explanation

Indicators of Plant Condition

Plant Condition Rating	Leaf Color	Amount/Size of Growth	Damaged Plant Parts	Presence of Pest Problems
Excellent	Good	Adequate	None to few	No major ones
Good	Good	Slightly reduced	Few to Common	A few minor ones
Fair	Poor	Much reduced	Common to abundant	Either major or minor ones occurring frequently
Poor	Poor	Severely reduced	Innumerable	Both major and minor ones occurring frequently

Leaf Color: Note that there are healthy plants that do not have bright green leaves. Leaves can be purple, yellow, or sometimes a mottled yellow and green (variegated). Good leaf color will not always be the same; it will depend on the kind of plant.

Amount/Size of Growth: This refers to the length of the new growth for the season as well as the number of new leaves, and the size of the leaves, flowers, or fruit.

Damaged Plant Parts: Look at the whole plant. Are there leaves with holes, spots, or discolorations? Are there wilted or dead leaves? Are there dead twigs or branches? Is the damage only on old leaves while new leaves look perfectly healthy?

Presence of Pest Problems: A major pest problem is one that has seriously affected or injured the plant and requires management. A minor pest problem may or may not have affected or injured the plant and may or may not require management.

Pest and Plant Damage Abundance Chart

Abundance Rating	Indicators of Abundance
Few	Organisms or plant damage occasionally found, but only after much searching.
Common	Organisms or plant damage easily found during typical searching.
Abundant	Organisms or plant damage found in large numbers – obvious without searching.
Innumerable	Organisms or plant damage extremely numerous – obvious without searching.

These charts were adapted from Michigan State University *Pest Management Manual*

Weed Monitoring Form for Turf

Location of Turf _____ Date _____

Data Collected By _____ Length of Pace _____

Distance between sampling points of transect _____ *(for example every nine paces)*

Number of transects _____ Length of transects _____

Sketch of location of transects

	Transect A				Transect B				Transect C			
	Yes	No	Bare	Weed I.D.	Yes	No	Bare	Weed I.D.	Yes	No	Bare	Weed I.D.
1				1				1				
2				2				2				
3				3				3				
4				4				4				
5				5				5				
6				6				6				
7				7				7				
8				8				8				
9				9				9				
10				10				10				
11				11				11				
12				12				12				
13				13				13				
14				14				14				
15				15				15				
16				16				16				
17				17				17				
18				18				18				
19				19				19				
20				20				20				

Average % weed growth _____ **Average % bare area**_____

Total the number of boxes marked 'Yes' in each column. Multiply this number by 100 and divide by 60 [the total number of samples taken). The result is the average percentage of weeds growing in the turf area. Follow the same procedure to calculate percentage of bare area.

Roach Trap Monitoring

Building # 3

Room or Area Cafeteria

Name of Person Monitoring John Doe

Trap #	Room # or Name	Date Trap was Set	Read	Trap Missing	Location Description	Roaches Adults	Nymphs	Total
1	Kitchen	3/5	3/26		SE Drain, under gate	0	0	0
2	Kitchen	"	"		S Sink under electric box	1	1	2
3	Dishroom	"	"	yes	S under conveyor belt	-	-	-
4	Dishroom	"	"		N under conveyor belt	0	0	0
5	Storage	"	"		left side of door	0	0	0
6	Dining	"	"		W serving counter	0	2	2
			EXAMPLE					

6 **Total # of Traps**

0.66 **Average # of Roaches/Traps**
(Total # of Roaches divided by total # of traps)

Total # of Roaches 4

*See accompanying charts for explanation

Roach Trap Monitoring

Building # _____

Room or Area_____ Name of Person Monitoring _____

Trap #	Room # or Name	Date Trap was Set	Read	Trap Missing	Location Description	Roaches Adults	Nymphs	Total

_____ **Total # of Traps** _____ **Average # of Roaches/Traps** **Total # of Roaches**_____

(Total # of Roaches divided by total # of traps)

*See accompanying charts for explanation

Pest Control Trouble Call Log

TROUBLE CALLS						PEST MANAGEMENT RESPONSE		
Date	Building	Problem Description	Reported by	School Contact	Phone	PCO Name	Action Taken	Materials* Used & Amounts Used

*Pesticides, caulk, traps, etc.

Pest Inspection/Sanitation Report

Date_____Time In _____Out _____

Building#/Location _____

Inspector _____

Inspection Type ❒ Initial ❒ Quality Control ❒ Routine

Evidence of Infestation(s)

Pest	Location(s)	Pest	Location(s)
Ants		Fleas	
Cockroaches		Stored Prod. Pests	
Mice		Pigeons	
Rats		Other	

Sanitation Survey

Food Preparation	**Yes**	**No**	**Receiving**	**Yes**	**No**
Equipment clean			Floors clean		
Appliance drip pans clean			Clutter		
Floors clean			Empty boxes stored in cold storage		
Floor drains clean			Empty boxes stored away from kitchen		
Sink drains clean			**Student and Staff Areas**		
Counters/Tables clean			Restrooms clean		
Food stored in pest-proof containers			Plumbing leaks		
Perishables stored in refrigerator			Locker room clean		
Garbage removed daily before closing			Food stored in locker room		
Spillage cleaned regularly			Teacher's lounge clean		
Standing water			Food stored properly in lounge		
Plumbing leaks			Food stored in student, staff, or teacher desks		
Windows/Door screened			Trash removed daily before closing		
Gaps around/under doors or windows			Janitorial closet clean		
Pest proofing needed			Pest Proofing needed		
Storage Areas			**Exterior**		
Floors clean			Dumpster/garbage cans cleaned weekly		
Floor drains clean			Dumpster/garbage cans have lids		
Food stored in pest-proof containers			Lids closed on dumpster/garbage cans		
Recyclables cleaned before storing			Garbage area downwind from kitchen		
Spillage cleaned regularly			Dumpster/Garbage area clean		
Items stored 6" to 8" off floor			Garbage removed at least weekly		
Items stored 12" to 18" away from wall			Pet waste removed daily		
Stock rotated			Loading dock clean		
Clutter			Gaps under/around doors		
Pest proofing needed			Area is trash- and weed-free		
Other			Standing water		
			Pest proofing needed		
			Outside eating area cleaned daily		
			Other		

Comments/Recommendations _____

_____

APPENDIX N

Inspection Checklist for Detecting Structural Decay and Structural Damage

Check the following locations for structural decay and pest damage. Check both visually and by probing with a pointed tool, such as an ice pick. Look for signs of moisture, damaged wood, insect frass, and termite earthen tunnels and/or fecal pellets.

Roof, Overhangs, Gutters, Eaves, Trim, Attic

Roof Surface

Check the roof for cracks, missing shingles, and other openings where moisture might enter. Shingles should extend 3/4 inch or more beyond the edge of the roof and should form a continuous drip line at the eave and end rafters, or at the rake boards that cover the end rafters.

Remove leaves from the roof surface, and replace any missing shingles. Install flashing or an aluminum drip edge under the first course of shingles to divert rainwater from the fascia board and walls of the building.

Be careful not to block eave vents. Install flashing; it should curl over the forward edge of the fascia board about 2 inches and then run about 6 inches beyond a vertical line drawn from the inside face of the wall studs.

Check for the formation of masses of ice on the roof near the gutters, which can lead to water filtration and/or excessive condensation on interior attic walls.

Gutters

Check for poorly sloped, clogged, rotted, or leaking gutters that can lead to eave, overhang, or siding leaks and rots. Remove leaves and twigs that absorb moisture and cause rot. Flush gutters with a hose prior to the rainy season. Install downspout leaf strainers and gutter guards.

Attics

Extra effort is needed to inspect areas difficult to see or reach. Use a good light source and a probe. Search for rain seepage or decay around vent pipes, antennas, wall top plates, skylights, and other vents.

Eaves, Overhangs, and Fascia Boards

Make sure there is at least 18 inches of overhang to allow proper water runoff. Extend short overhangs. Search for soft, tunneled, cracked, or exposed areas. Check areas where algae, moss, lichens, or discoloration occurs; these symptoms may indicate moisture problems and termites.

Flashings

Make sure areas around vents, chimneys, and dormers are flush and well sealed. Rusty or broken nails can cause problems in flashings. Aluminum or galvanized nails are required to prevent electrolysis (a chemical reaction between dissimilar metals that causes the nails to disintegrate). Seal nail head and flashing joints with marine-quality caulk or silicone (tar preparations are cheapest, but they crack after a few years in the sun).

Damaged or discolored areas

Search for exposed areas that are soft, tunneled, cracked, rotted, or blistered. Check for algae, moss, lichens, or discoloration, since these areas indicate potential openings for fungi and/or insects. Locate the sources of moisture and make the necessary repairs.

Outside Walls

Rusty Nails

Check for rusty nails or nail staining, which indicates moisture within the wall and/or the use of non-galvanized nails. Replace nails with aluminum or galvanized nails or screws.

Deteriorating Paint

Look for signs of deteriorating paint such as loss of paint sheen and bubbling and peeling; scrape and sand

the surface and repaint. If the wood seems soft, weak, or spongy, scrape out the spongy parts. If holes are smaller than 1/2 inch in diameter, fill them with caulk. Larger holes can be filled with epoxy wood-filler. If holes are very large, replace the wood.

Building Siding That is Stained or Buckled

Stained or buckled siding (with or without peeling paint) is a symptom of underlying moisture, rot, or insects. Check for moisture caused by splashing rain or lawn sprinklers. If possible, remove the source of the moisture and refinish or replace the damaged wood. Consider using a more durable material, such as aluminum siding. Pressure-treated woods are treated with toxic materials and their use should be minimized.

Damaged Wood Junctions

Moisture and insect problems often occur where wood pieces join or abut, particularly when there is shrinkage, splintering, or settling. Corners, edges of walls, roof-siding intersections, and siding-chimney contacts are particularly vulnerable. Apply water repellent and caulk to these joints, and monitor them regularly for building movement.

Weathering of Exposed Lumber/Beam Ends

Check for expanded, split, or cracked lumber ends, which provide access for moisture and insects. Even previously treated wood is subject to attack if the openings are deep enough. Caulk cracks and monitor for further developments.

Loose Stucco or Cracks in Stucco

Search for cracks, especially stress cracks around windows and doors. These conditions can provide access to moisture, termites, and decay organisms. Caulk cracks. If they are large, consider replacing the old stucco.

Moisture Accumulation around Laundry Facilities, Especially Dryer Vents

Check for signs of moisture accumulation around the vent. Modify the vent to direct exhaust air away from the building.

Moisture Associated with Pipes and Ducts

Check for moisture where ducts pass through wooden parts of a building. Also, check downspouts during heavy rains for leakage and proper drainage. Insulate ducts, install splashguards below downspouts, repair the spouts, and direct water away from buildings.

Moist Window Sills, Windows, or Doors

Check for cracked sills and casings, and poorly fitted windows and doors. Badly fitted doors may indicate warping of the door or its casing from excessive moisture or uneven house settling. Moisture problems can alter door jambs. Warped and cracked sills and poorly fitted windows and doors allow water access which aids decay and provides initial insect habitat.

Caulk cracks and monitor for further development. Warped door thresholds and jambs may need replacement, and casings may need repair if the cracks are too large to caulk effectively.

Foundation and Grade

Soil Surface

Make sure the soil surface slopes away from the school building in order to carry water away from the foundation. Seepage under the foundation will cause it to crack and settle. Add fill to direct the water away from the house but make sure there is at least 8 inches between the top of the fill and the sill. If clearance is small, consider installing foundation “gutters”. Install splash blocks and perforated pipe. Check their performance during rains or test the system with a hose. A sump pump can also be used to move water away from the foundation.

Low Foundation Walls and Footings Allowing Wood-to-Soil Contacts

Check for wood in contact with the soil. Wood should be at least 8 inches, and preferably more, above the soil surface. Low foundation walls or footings often permit wooden structural members to be exposed to the soil, providing access for subterranean termites. Repair these areas or install subgrade concrete "gutters" where the house sills sit too close to ground level. Remove wood that is exposed to the soil and replace it with concrete.

Foundation Cracks

Check for cracks that allow decay organisms access to wood. Cracking may also indicate uneven house settling. Monitor cracked walls for discoloration and seepage during rains. Termites use cracks to gain access to wood hidden from view. If the problem is serious, the foundation may need repair.

Brick Veneer or Stucco Applied to the Foundation

Check the bond between the veneer or stucco and the foundation wall. If it is failing, moisture and termites may have a hidden entrance to wooden portions of the building. Remove the loose covering and explore the extent of the decay.

Crawl Space, Basement, and Foundation

Make sure enclosed crawl spaces are vented to allow moist air to escape. Milder climates are especially vulnerable to dry-rot fungus. In humid climates, the subfloor can be wet from condensation from interior air-conditioning. Shrubbery or other obstacles that block airflow through foundation vents cause air underneath the house to stay warm and moist-an ideal environment for termites.

Clean existing vents of dust, plants, and debris. Foundation vent openings should equal 2 ft2 of opening for each 25 linear feet of outside wall. An opening should occur within 5 feet of each corner. Add more vents if needed. The top edge of the concrete under all vents should be at least 6 inches above the finished grade to allow sufficient ventilation. Vents located below grade may require wells to prevent surface water from entering subfloor and basement areas. Divert roof drainage away from vents.

Corners of the Building

Check for moisture accumulation and stains at junctions of wood surfaces in these areas. Install additional cellar or crawl space vents.

Enclosed Areas

Check for proper ventilation under staircases, porches, and other enclosed areas, since these are vulnerable to moisture accumulation. Look for decayed, discolored, or stained areas. Adjust or add venting.

Vapor Barriers

Check for condensation on the subfloor and/or sill, which may indicate the need for vapor barriers on the subfloor and on the soil surface in the crawl space. Such barriers can be installed to reduce the moisture resulting from poor soil grading, unexpected seepage, or high rainfall.

Cover the crawl space soil surface with a 6-mil polyethylene vapor barrier. Use polyethylene, not roofing paper, which can rot. A slurry of concrete can be placed over the plastic to protect it from rodents. Where condensation continues, consider installing extra vents or electric-powered vents whose fans and openings are operated automatically. A sump pump can be installed to remove standing water.

Wood-to-Stone or Wood-to-Concrete Contacts

Check to see whether the wood is pressure-treated (look for perforation marks from the chemical injection on the surface of the wood). Replace untreated wood with rot-resistant or pressure-treated wood. Be sure sealing material is used between the wood and stone or concrete, and place a metal washer between posts and footings.

Leaky Pipes or Faucets

Even small leaks keep the wood or soil underneath continuously moist, thereby setting up ideal conditions for termites. Areas where rain splashes on walls should be protected with rain guards. Do not allow sprinklers to spray the side of the building. Fix all leaks, and change irrigation practices where necessary.

Water- or Space-Heating Units

Check to see whether the heating unit is insulated. If the soil near the flame is kept warm throughout the year due to lack of insulation, microbial and insect development will be accelerated. Insulate the heater and cover the soil with concrete.

Paper Collars around Pipes

Since paper is almost pure cellulose, it is extremely attractive to termites and should be removed and replaced with other insulting materials not capable of being eaten by termites.

Miscellaneous Openings

Meter boxes, bathroom inspection doors, pet doors or openings, milk delivery doors, and air exhaust vents should be checked for water access, cracks, termite pellets, and soft areas.

External Areas

Porches

Check for wooden steps touching the soil, and inspect for possible decay or termite access. The porch surface must slope away from the building to carry rain away quickly. If the porch does not slope away from the building, check siding for moisture and termites. Tongue-and-groove flooring is a water trap. If there is a space between the porch and the building, check for drainage problems.

Caulk and repair cracks. Fill spaces between tongue-and-groove floorboards with caulk or resurface and refinish with wood-sealing compounds and appropriate paint. Another floor can be placed over the first.

Earth-Filled Porches

Soil should be at least 8 inches, (optimally 12 to 18 inches) below the level of any wooden members. Remove the excess soil where possible, regrade to enhance drainage and redesign the porch to eliminate earth/wood contact.

Planter Boxes

Check planter boxes that are built against the building. If they are in direct contact with the building, they allow direct termite access to unprotected veneer, siding, or cracked stucco. One remedy is adding 2 to 3 inches of protective concrete wall between the planter and the building. An air space several inches wide must separate the planter wall from the building and must be kept free of dirt or other debris.

Trellises and Fences

Check for wooden portions of the trellis that touch the soil and are connected to the house, since they provide a direct link to the house for wood-rot and termites. Check fence stringers and posts for decay. Cut off the decay and install a concrete footing for trellises and fence posts. Replace decayed stringers and leave a small gap between the stringers to allow air circulation. Separate wood and concrete with metal washers.

Wooden Forms around Drains

These are sometimes left in place after the concrete foundation is poured and provide termites with access routes to inner walls. Areas and joints around pipes rising from slabs should be sealed with tar or other adhesive to prevent water and termite access. Caulk the holes and monitor them for decay and excess moisture.

Gate Posts, Fence Tie-ins, Abutments and Columns

Inspect these for weakness and rot especially around areas adjacent to the soil. Exposed areas can provide

cracks for termite invasion. If wooden posts go through concrete into the soil below, check the posts for evidence of termite attack. The bottoms of these posts should be cut and replaced with a concrete footing. Cut post tops at an angle to promote runoff and prevent water from penetrating the vulnerable end grain.

Balconies and Landings

Surfaces should be sloped away from the building. Check junction of floor and siding for moisture and insects.

Wood Debris under and around Buildings

Pieces of wood, particularly partially buried tree roots or construction lumber, can help support a termite colony until the population grows large enough to attack the house itself. Since cardboard boxes are very attractive to termites, they should be removed from crawl spaces or basements with earthen floors.

Interior Locations

Areas with water stains or mold growth indicate excessive moisture and should be analyzed for corrective action. Pay special attention to areas listed below.

Kitchen Pipes

Look for condensation and leaks, especially where pipes enter walls. Repair leaks and insulate pipes where condensation is excessive.

Counter Areas

Check around and below sink surfaces for moisture and decay. Caulk or otherwise protect wall surfaces from moisture. Subsurface areas damaged by water leaking from above may be tolerated if the surface leaks are repaired.

Exhaust Vents

Check for moisture leaks from outside. Repair with caulk or water-resistant sealing material, or replace the vent and the rotted wood around it. Use extra flashing to fill the gap.

Toilets

Check the integrity of the floor around each toilet base by thumping lightly with a hammer. Check the wax seal for leakage at the floor/toilet pedestal intersection. Check the cellar or crawl space beneath the toilets to see whether the leakage has caused damage. Replace the wax seal if necessary and repair the surrounding water damage.

Showers and Sinks

Check all sinks and showers for a sound caulk seal. Look for splash over on the floors from inadequate water barriers or user carelessness. If moisture is visible from crawl spaces, it may indicate a crack in the floor or in drainage pipes. If moisture is visible in the ceiling, it may indicate cracks in the delivery pipes.

Repair or replace flooring materials, pipes, drains, or sink basins if necessary. Sealing compounds may be useful when leaks are relatively recent and small, especially if termites have not been found; however, regular monitoring is necessary if sealing materials are used.

Tile Walls

Check for mildew stains. Make sure the grout in tile walls has a silicone coating to prevent water penetration. Clean the walls regularly to remove mildew and improve ventilation.

Ceilings

Check for blistered areas, since these can indicate moisture leaks in the area above or inadequate installation of a vapor barrier. Repair leaks and faulty vapor barriers.

Windows

Check for moisture accumulation and/or water stains on window frames and walls. Search for evidence of decay or insect attack next to glass areas where condensation accumulates, at edges where moldings meet walls and casings, and in window channels and door jams. Gaps between window and door casings may be avenues for hidden moisture and insect access. Check interior walls beneath windows, especially if they are regularly wetted by garden sprinklers.

Open windows when feasible to improve air circulation. Install double- or triple-glazed windows when replacement is necessary. Use aluminum frames if wooden frames are decaying. Adjust or move sprinklers so water does not hit windows.

Closets

Check coat and storage closets for dampness. A light bulb left burning continuously in a damp closet will often generate enough heat to dry it out, but make sure the bulb is far enough away from stored materials to avoid creating a fire hazard. Containers of highly absorbent silica gel, activated alumina, or calcium chloride also remove moisture from the air in enclosed spaces. These agents should be placed out-of-reach to avoid accidental exposures. Avoid use of silica gel where children may tamper with the containers. These chemicals can be reused after drying them in the oven. Small exhaust fans can also improve closet ventilation.

Floors

Sagging or buckling floors can indicate shrinkage or rot from excessive condensation or water leaks. Gaps between floor and baseboards can indicate wood damage from insects, fungi, or water-triggered swelling and shrinkage.

APPENDIX O

Licensing and Continuing Education

A variety of pest management licensing and training opportunities exist in California. The following organizations can provide information about licensing and/or training:

- The Department of Pesticide Regulation regulates pesticide use and sales and fosters reduced-risk pest management. For information about any of DPR's programs phone 916-324-4100 or see the Web site at www.cdpr.ca.gov.
  - The School IPM Program offers six-hour IPM workshops in school facilities four times per year in different parts of the state. The workshop present IPM principles, hands-on demonstrations, and pest inspection tours around school buildings and grounds. Check the Web site www.cdpr.ca.gov for current sessions.
  - Licensing: DPR is responsible for examining and licensing qualified pesticide applicators, and for certifying pesticide applicators that use or supervise the use of restricted use pesticides. See the Licensing and Certification Program Web page at www.cdpr.ca.gov. DPR's licenses focus primarily on agricultural uses although maintenance gardeners are licensed by DPR.
  - Pesticide Training: DPR has a list of all approved continuing education classes on the Web site that are frequently updated. Go to www.cdpr.ca.gov and click on either the Licensing and Certification Program link or the School IPM page link.
- The Structural Pest Control Board licenses businesses and individuals to perform control of structural pests. They also offer training. Contact them at 916-561-8700 or online at http://www.pestboard.ca.gov.
- Local community colleges: See the local yellow pages or go to http://www.cccco.edu/ for more information.
- California State University: Visit homepage at https://www2.calstate.edu/ for details.
- UC IPM's Pesticide Safety Education Program. This program develops, tests, evaluates, and disseminates pesticide safety education models and materials in order to promote the safest and most effective use of pesticides. See http://www.ipm.ucdavis.edu/GENERAL/pesticides.html for details and up-to-date class listings or call (530) 752-5273.
- UC Cooperative Extension: Each county has a cooperative extension office that can offer IPM training. You can find your local cooperative extension office at https://ucanr.edu/.
- County Offices of Agriculture: The county offices often offer pesticide and/or IPM training. The County Offices of Agriculture are listed at https://www.cdfa.ca.gov/exec/county/County_Liaison.html
- Many professional associations include IPM training at annual meetings or hold separate IPM training sessions.

APPENDIX P

Pesticide Safety Information Series N

DPR's Worker Health and Safety Branch developed Pesticide Safety Information Series (PSIS) leaflets (available at http://www.cdpr.ca.gov/docs/whs/psisenglish.htm) primarily as a training aid for employees. California regulations require these documents to be part of pesticide handler and field worker training. The "N" series documents are for use in poultry and fish- producing business, structural pest control, landscape and maintenance firms, rights-of-way maintenance organizations, or similar businesses, including school settings.

The documents are available in English, Spanish, and Punjabi.

PESTICIDE SAFETY Information

dpr

CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY

N No. 1

Working Safely With Pesticides in Non-Agricultural Settings

Workers who handle pesticides must be trained how to protect themselves. Handle means to mix, load, or apply pesticides; repair or clean equipment that was used for pesticides; repair or remove tarps (such as with a structural fumigation); or touch unrinsed pesticide containers.

The information in this leaflet will help teach you about working safely with pesticides if you:

- Handle pesticides on a site like a golf course, a park or recreation area, a right-of-way such as a road or ditch-bank, or in an industrial/institutional setting.
- Work for a pest control business applying pesticides in one of these non-agricultural settings, such as structural, landscape maintenance, rights-of-way maintenance, or similar businesses.

WHY SHOULD I WORRY ABOUT PESTICIDES?

Pesticides can get into your body many different ways and can have both immediate (acute) and long-term (chronic) effects on your health.

- Pesticides can make you sick by moving into your body through your skin, mouth, eyes, or your lungs as you breathe.
- If a pesticide can hurt you or make you sick right away, that is an acute health effect.
- If you have to be exposed to a pesticide for a long time (months or years) before it makes you sick, that's called a chronic health effect.

SAFETY TIP

1

KEEP PESTICIDES OFF YOUR HANDS

Always wash your hands before eating, drinking, chewing gum, using your phone, smoking, or going to the bathroom.

WHAT CAN A PESTICIDE LABEL TELL ME?

Most labels have a special word in capital letters on the front of the label. It tells you what the acute health hazard is.

The words you might see are:

- DANGER or DANGER-POISON, this pesticide is extremely harmful.
- WARNING, this pesticide is moderately harmful.
- CAUTION, this pesticide is less harmful, but still can make you sick.

If the label doesn't have one of these words, it means that the pesticide is less likely to harm you. However, you should handle every pesticide carefully.

Additionally, the label provides you with specific information on first aid, personal protective equipment, environmental hazards, storage and disposal, and how to safely and correctly apply the pesticide to the listed sites.

You must use pesticides according to the directions on the label. If you can't read the label, ask your employer to tell you what it says. Sometimes, California has stricter rules for your safety than those on the label. Your employer must know these rules and tell you about them.

WHAT ELSE DOES THE LABEL TELL ME?

- If the pesticide can severely hurt your eyes or skin, the label will say something like "Corrosive, causes eye and skin damage."
- If the pesticide can make you very sick, the label will have a skull-and-crossbones symbol and the word "POISON."
- Words like "FATAL" or "may be fatal if swallowed, inhaled, or absorbed through the skin" mean the pesticide can make you very sick or even kill you.

WHAT SAFETY RULES DO I NEED TO FOLLOW?

1. Look at the Conditions

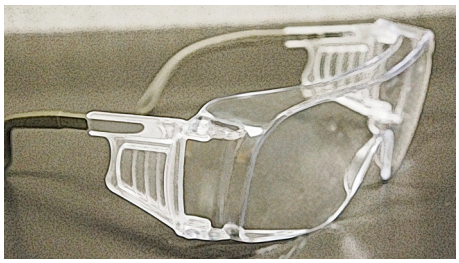
After you read the label, look at your application situation (including your equipment and the weather conditions) for things like sensitive plants, people, buildings, or schools around you. If you are applying the pesticide indoors, the pesticide or its vapors can be moved through the building by the air conditioning or heating system. If you apply pesticides outdoors, if there is no wind it can be dangerous to apply pesticides because pesticides can stay in the air. When the wind picks up, the pesticides can move with the air. Too much wind can make pesticides drift onto people and make them sick, or onto sensitive plants and cause damage. Look at these conditions and decide if it's safe before you apply a pesticide, and be on the lookout during application to see if it is still safe to continue. If you don't think it's safe, stop and talk to your employer before starting or continuing the application.

2. Be Especially Careful With Pesticides Before They Are Mixed With Water

Moving opened pesticide containers before the pesticide is mixed with water, and hand-pouring pesticides from their containers, are the most dangerous parts of working with pesticides. Pesticides that are mixed with water and are in the application equipment may be less dangerous, but can still hurt you. When working with these or any pesticides, you should always try to avoid getting pesticide on yourself. Your employer must train you, in a language you understand, on work procedures and how to protect yourself from pesticides.

3. Wear the Right Kind of Protection

Your employer must give you personal protective equipment when it is required by the label or California's regulations. Your employer must also inspect, clean, repair, and replace this protective equipment, and ensure that it is stored in a pesticide-free place. You must properly wear the equipment provided.



Protecting your EYES:

- You must wear eye protection when you mix, load, or apply pesticides; clean or repair equipment that was used for pesticides; and anytime the label says so.
- The label will tell you what type of protection to wear. If it does not, the eye protection can be safety glasses (with temple and brow protection), goggles, a face shield, or a full-face respirator.

Regular eyeglasses and sunglasses DO NOT provide enough protection. Pesticides can easily get around these glasses and into your eyes.

Protecting your HANDS:

Keeping pesticides off your hands is often the hardest part of working safely with pesticides. Once a pesticide gets on your hands, it can get in your eyes if you rub them or in your mouth if you touch your food. Always wash your hands after handling pesticides and before eating, drinking, smoking, using your phone, or going to the bathroom.

- You must wear gloves when you mix, load, or apply pesticides; clean or repair pesticide application equipment; and anytime the label says so.
- The label will tell you what type of gloves you must wear. If the label does not say what type you need, you must use gloves made of chemical-resistant material like nitrile or neoprene. You cannot use thin disposable gloves when applying pesticides. Never wear fabric-lined or leather gloves unless the label or other rules specifically say you may.
- In a few cases, the label may tell you not to wear gloves. If it does, do not wear them.

dpr Glove Category Selection Key

Label code	Materials Required by Law
A	1,2,3,4,5,6,7,8
B	1,2
C	1,2,3,4,7,8
D	1,2
E	1,3,4,8
F	1,2,3,8
G	1,8
H	1,8

Material Code
1 Laminate
2 Butyl
3 Nitrile
4 Neoprene
5 Natural
6 Polyethylene
7 PVC
8 Viton

All but Laminate and Polyethlene must be 14 mils or thicker.

Protecting your LUNGS:

You must wear a respirator anytime the label or your employer requires one, or if you are mixing, loading, or applying most pesticides on California's list of Minimal Exposure Pesticides. Ask your employer for a copy of the N-5 safety leaflet for more information about respirators or for a copy of the N-6 safety leaflet for more information on Minimal Exposure Pesticides.

Protecting your BODY:

- You must wear clean coveralls (or a long-sleeved shirt and long pants) provided by your employer each day that you work with pesticides with either the word DANGER or WARNING on the label, unless the label says you cannot wear coveralls.
- Your employer must give you other chemical-resistant clothes and equipment (such as a suit that covers your body, an apron, foot and head protection) if the label or other rules call for them.
- If it is hot outside, wearing a chemical-resistant suit that covers your body may make you so hot that you can get sick. If the label or DPR's rules say you must wear a chemical-resistant suit, then you must not work in temperatures above 80°F (27°C) during the day or 85°F (29°C) at night.
- You must use a closed system to mix or load pesticides if the label requires it. Ask your employer for a copy of the N-3 safety leaflet for more information on closed systems.

4. Washing Pesticides Off and Changing Into Clean Clothes

If you work with pesticides that have the signal word DANGER or WARNING on the label more than six times in any 30 day period, your employer must provide you with a clean, pesticide-free place where you may store your personal clothes while not in use, and where you can change clothes and wash up when you are done handling pesticides for the day.

If you work with pesticides that have the signal word DANGER or WARNING on the label, your employer must have a place with extra coveralls, clean water, soap, and paper towels within 100 feet of the mixing or loading site. There must be enough water to flush your eyes and wash off your entire body in case of an accident.

HOW DO I LEARN ABOUT WORKING SAFELY WITH PESTICIDES?

California law requires that you be trained by your employer before you handle pesticides for the first time and every year after that. Safety leaflets N-2 through N-8 also provide helpful information that you must be trained on. Your pesticide handler training must be presented in a way you understand.

Additionally, for each pesticide (or group of pesticides that are alike chemically), your training must include all of these things:

Health Effects:

- Where and how pesticides can get on your body or make you sick.
- How you may feel or look if you get pesticides in or on you.
- How to prevent a heat-related illness, how you may feel or look if you get sick from the heat, and first aid for this illness.
- Ways to clean yourself if you get pesticides on you.
- Hazards of the pesticide, including immediate and delayed effects.

What to Do in an Emergency:

- First aid, emergency decontamination, and eye flushing techniques (the N-4 safety leaflet has more information on this).
- How and where to get emergency medical care.

Personal Protective Equipment (PPE):

- Why you need to wear PPE.
- How to use and take care of the PPE correctly.
- What PPE can and cannot protect you against.

Pesticide Safety:

- Your responsibility to protect people, animals, and property when applying pesticides and not to apply pesticides in a way that may contact people who are not involved in the application.
- The meaning of safety statements on the label.
- Safety rules for handling pesticides (including closed systems and enclosed cabs, pesticide disposal, and spill clean-up).
- Hazard information provided by labels, safety leaflets, and Safety Data Sheets (SDSs). SDSs tell you about pesticide hazards, medical treatment, and other information.
- Why you should not take pesticides or pesticide containers home from work.
- Potential hazards to children and pregnant women, including keeping children and family members away from treated areas, removing boots or shoes before entering your home, and removing your work clothes and washing or showering before contact with your family members.
- Pesticide dangers to the environment, such as drift, runoff, or wildlife hazards.

WHAT ARE MY EMPLOYEE RIGHTS?

You have the right as an employee:

- To know where you can find more information about pesticides, job safety information, safety leaflets, and SDSs.
- To have your physician or authorized representative receive information about pesticides you may have been exposed to.
- To be protected against retaliation for your exercise of these rights.
- To report suspected pesticide problems to the County Agricultural Commissioner or the Department of Pesticide Regulation (DPR).

If you don't get all the information you need in your training or want to make a pesticide use complaint, you should call your County Agricultural Commissioner, or the DPR for more information. You can find the Commissioner's number in your local white pages phone directory, by calling 1-87PestLine, or at: www.cdfa.ca.gov/exec/county/countymap/

DPR's Regional Offices are:

- **Northern (West Sacramento) 916/376-8960**
- **Central (Clovis) 559/297-3511**
- **Southern (Anaheim) 714/279-7690**

Pesticide Complaint?
1-87PestLine
INFORMATION LINE
1-877-378-5463

All safety leaflets are available at:
www.cdpr.ca.gov/docs/whs/psisenglish.htm