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Improving Urban Pesticide Regulatory Activities to Protect Water Quality

Annual Update 2006

Prepared for the
San Francisco Estuary Project

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PREFACE

This is a report of research performed by TDC Environmental, LLC for the San Francisco Estuary Project. This report was prepared for the San Francisco Estuary Project to fulfill the annual reporting requirement in Task 2.3.3 of its grant agreement with the State Water Resources Control Board (Agreement Number 04-076-552-0) for the Urban Pesticides Pollution Prevention Project (UP3 Project).

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1.0 INTRODUCTION

1.1 Background

The U.S. Environmental Protection Agency (U.S. EPA) has determined that use of some registered pesticides is a source of water quality impairments.[1] This determination demonstrates that current U.S. EPA and California Environmental Protection Agency (Cal-EPA) procedures for regulating pesticides are insufficient to ensure that pesticide use does not cause violations of the Federal Clean Water Act and California Porter-Cologne Water Quality Control Act.

Federal law provides U.S. EPA with the ability to protect surface water from pesticides. California law provides the California Department of Pesticide Regulation (DPR) with the ability to protect surface water from pesticides. The different procedures used by pesticide regulators (i.e., the U.S. EPA Office of Pesticide Programs and DPR) and water quality regulators (i.e., the U.S. EPA Office of Water and California State and Regional Water Quality Control Boards) to manage pesticides create a regulatory gap that leaves states and municipalities responsible for solving water quality problems that could have been prevented at the time a pesticide was registered or re-registered. The agencies that manage California's water quality are working with pesticide regulators to address this regulatory gap.

In California, three types of agencies have water quality protection as their primary responsibility:

- The *State and Regional Water Quality Control Boards* ("Water Boards") are responsible for maintaining water quality in California to protect designated uses of surface and ground waters. Among their important activities are solving water pollution problems ("impairments") with regulatory plans (Total Maximum Daily Loads or TMDLs) and issuing permits for surface water discharges (National Pollutant Discharge Elimination System or NPDES permits).

- *Municipal wastewater treatment plants* are also known as sewage treatment plants or publicly-owned treatment works (POTWs). These plants receive anything that is discharged into urban sewer systems. While they can regulate large industrial dischargers and a few commercial businesses, they cannot readily control most commercial and all residential discharges. They have NPDES permits with specific numeric limits based on water quality standards.

- *Urban runoff management agencies* oversee urban stormwater runoff drainage systems, which generally flow directly to surface waters without treatment. Under the Clean Water Act, municipalities in urban areas are issued permits for their discharges through storm drains, making them legally responsible for any water pollutants that wash off when it rains (or when irrigation, car washing, and other water flows into gutters and storm drains).

This report refers to the above agencies collectively as "California water quality agencies."

[1] Strauss, Alexis, Acting Director, Water Division, U.S. EPA Region 9 (1999). Letter to the California State Water Resources Control Board modifying California's list of impaired water bodies (303[d] list), May 12. An impaired water body is one that does not meet water quality standards.

Since late 1999, California water quality agencies have participated in selected U.S. EPA pesticide regulatory processes. California water quality agencies have also worked less formally with DPR. The goals of these activities are:

1. To prevent surface water impairment.
2. To prevent violations of wastewater and stormwater NPDES permits.

The focus of these activities has been on pesticide use in urban areas. Since mid-2004, the Urban Pesticide Pollution Prevention (UP3) Project has provided scientific and regulatory support to help California water quality agencies achieve these goals.

Although California's long history of pesticide-related water quality and NPDES permit compliance challenges does not appear to be unique, California water quality agencies are apparently currently the only water quality protection agencies in the nation to be working with U.S. EPA on these important issues for urban areas.[2] California water quality agency teamwork with pesticide regulatory agencies and other stakeholders to address pesticide-related water quality problems in urban areas is also unique. To date, the UP3 Project has not identified any other U.S. state or region that has established a program to address pesticide-related water quality issues related to use of pesticides in urban areas, even though California data indicate that at least half of all pesticide use occurs in urban areas.[3]

This is one of three reports prepared annually by the UP3 Project. (The other two reports are a review of California urban pesticide sales and use trends and a summary of recent scientific findings that are relevant to urban surface water quality management activities). The purpose of the UP3 Project is to provide education, outreach, and technical assistance for implementation of the Diazinon and Pesticide-Related Toxicity in Bay Area Urban Creeks Water Quality Attainment Strategy and Total Maximum Daily Load ("Bay Area Urban Creeks Pesticides TMDL").[4] The project is structured to mirror the three major elements of the TMDL Implementation Strategy: Outreach and Education, Science (Research and Monitoring), and Proactive Regulation. The San Francisco Estuary Project (SFEP) has been awarded California water bond grant funds from the State Water Resources Control Board to implement the UP3 Project through early 2007.[5] TDC Environmental is providing technical support for the project.

1.2 Scope of This Report

This is the fourth review of California water quality agencies' urban pesticide water quality regulatory activities. In April 2003, December 2004, and December 2005, TDC Environmental reviewed and evaluated the outcomes of these efforts.[6] This report

[2] The UP3 Project is seeking to identify other agencies working on these issues, but has yet to identify any such group of agencies. The most relevant groups identified to date are the Pacific Northwest Regional Pesticide Coordinating Committee, which focuses on urban pesticides use reduction, but has not generally engaged U.S. EPA on water quality issues, and the State-FIFRA Issues Research and Evaluation Group (SFIREG), which is a group of pesticide regulators that has a water quality subcommittee, but does not generally focus on urban issues.

[3] TDC Environmental (2006). *Urban Pesticide Use Trends Annual Report*, prepared for the San Francisco Estuary Project. June.

[4] Johnson, B. (2005). Diazinon and Pesticide-Related Toxicity in Bay Area Urban Creeks. Water Quality Attainment Strategy and Total Maximum Daily Load (TMDL). Proposed Basin Plan Amendment and Staff report. November.

[5] A follow-up grant in process is anticipated to allow the UP3 Project to continue.

[6] TDC Environmental (2003). "Evaluation of Regional Efforts to Improve Existing Federal Regulatory Processes to Prevent Water Quality Impairment from Pesticides," memorandum from Kelly Moran to Bill Johnson, San Francisco Bay Regional Water Quality Control Board, April 23; TDC Environmental (2004). Improving *Urban Pesticide Regulatory Activities to Protect Water Quality. Annual Update 2004*, prepared for

summarizes California water quality agency input into urban water quality-related pesticide regulatory actions since late 1999 and evaluates the outcomes from that input, focusing on information received since the December 2005 review.

This report summarizes the activities of many organizations. Leaders have included:

- San Francisco Bay Regional Water Quality Control Board
- California State Water Resources Control Board
- California Stormwater Quality Association (CASQA)
- Tri-TAC (the technical advisory committee representing California municipal wastewater management agencies[7])
- Los Angeles County Sanitation Districts (LACSD)
- San Francisco Department of the Environment (SF Environment)

Other members of the Urban Pesticides Committee have also participated in and supported these efforts.

1.3 Data Sources

This report is based on a review of:

- U.S. EPA pesticide risk assessments, registration eligibility decisions, and related documents
- Analysis of written responses to California Water Quality Agency comments
- Other regulatory decisions made by U.S. EPA and DPR relating to urban pesticides and surface water quality
- U.S. EPA and California DPR presentations at interagency and public meetings
- Informal discussion with U.S. EPA and DPR staff.

U.S. EPA's 2006 responses to California water quality agency comments are summarized and analyzed in Appendix B.

1.4 Report Organization

This report is organized as follows:

- *Section 1* (this section) provides the background and scope of the report.
- *Section 2* describes the scope of California water quality agency regulatory activities.
- *Section 3* summarizes past and upcoming regulatory activities.
- *Section 4* evaluates the outcomes of activities to date, to the extent that outcomes are known at this time (many regulatory processes that California water quality agencies have participated in are still underway).
- *Section 5* reviews the progress made to date on the recommendations of the April 2003, December 2004, and December 2005 evaluations.

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the San Francisco Estuary Project, December; TDC Environmental (2005). Improving *Urban Pesticide Regulatory Activities to Protect Water Quality. Annual Update 2005*, prepared for the San Francisco Estuary Project, December.

[7] Tri-TAC is a technical advisory committee on state and Federal regulatory issues affecting publicly owned treatment words that is jointly sponsored by the League of California Cities, the California Association of Sanitation Agencies, and the California Water Environment Association.

- *Section 6* gives the conclusions of this evaluation and provides recommendations for future activities.
- *Appendix A* summarizes U.S. EPA activity for urban pesticides of interest to California water quality agencies.
- *Appendix B* provides an analysis of U.S. EPA's 2006 responses to comments by California water quality agencies.

2.0 SCOPE OF CALIFORNIA WATER QUALITY AGENCY REGULATORY ACTIVITIES

2.1 U.S. EPA

California water quality agencies participate in U.S. EPA pesticide regulatory processes affecting urban surface water quality as follows:

- Identify and track U.S. EPA regulatory processes with implications for urban surface water quality.
    - Keep an updated schedule of anticipated U.S. EPA public comment opportunities.
    - Review *Federal Register* notices, risk assessments, and relevant scientific information and consult with water quality agencies and other experts to determine whether specific pesticides under U.S. EPA review have the potential to affect surface water quality, municipal wastewater, and/or urban runoff NPDES permit compliance.
- Identify specific information that would be valuable for California water quality agencies to share with U.S. EPA.
    - Identify specific shortcomings in U.S. EPA environmental risk assessments for urban pesticide uses that have the potential to adversely affect surface water quality or NPDES permit compliance.
    - Obtain missing information that is available from California or from the literature (e.g., water quality criteria, monitoring data, risk assessment methods, technical reports).
    - Identify critical data gaps in the information available to assess the impacts of urban pesticide use.
- Where potentially significant risks are evident, identify risk mitigation options.
    - Consider changes in allowable pesticide uses, application rates, and label language and develop recommendations for feasible use changes to prevent water quality problems.
- Communicate information to U.S. EPA. Previous activities have determined that the primary mechanism for agencies to share relevant information with U.S. EPA is by writing letters. U.S. EPA's pesticide evaluation processes are set up to accept letters with technical information during public review periods. Less formal communications with U.S. EPA staff (telephone calls and meetings) are important to explain further key points in comments letters for pesticide regulators (who are used to different scientific and regulatory frameworks) and to provide context for comments.
- Review outcomes. U.S. EPA responds to the information provided by California water quality agencies several ways:

    (1) by its actions in registration decisions and risk assessments,
    (2) in formal written responses prepared for some—but not all—actions,
    (3) informally in telephone conversations and e-mails.

Given the time and complexity involved in these tasks, California water quality agencies have found that they need scientific and regulatory support to complete the above tasks.

In 2006, the UP3 Project conducted most of the above activities (with the exception of communications to U.S. EPA about specific regulatory actions) and provided general scientific and regulatory support about pesticides to the California water quality agency community.

2.2 California Department of Pesticide Regulation

Primarily because DPR is a sister agency to the Water Boards within Cal-EPA, California water quality agency interaction with DPR has been relatively informal. For example, water quality agencies have participated in various work groups with DPR, such as the Urban Pesticides Committee and the Copper Antifouling Paint work group. Water quality agency representatives have met with DPR staff and management to discuss specific pesticide-related water quality problems (e.g., pyrethroids) and general regulatory issues (e.g., improving regulatory approaches to preventing water quality problems from pesticides).[8] Not all interactions are informal—water quality agency representatives have been appointed to both of DPR's formal advisory committee, the Pesticide Registration and Evaluation Committee and the Pest Management Advisory Committee.

With the assistance of the UP3 Project, water quality agencies track DPR's routine activities, which include two types of regulatory decisions relevant to urban surface water quality for which public comment opportunities are offered.

1. Annual re-registration of all pesticides. Each year, DPR renews the registration of the more than 11,000 pesticide products registered for use in the state. The process is essentially a formality—public documents include only a short summary of the legal requirements for renewing registrations. Requests for pesticide re-evaluation are commonly made at this time, although such requests can be submitted at any time.
2. Pesticide product registration. Each week, DPR announces which pesticide products it is considering for registration. Most pesticide product registration requests are for products with pesticide active ingredients and uses that have previously been approved in California.

While these routine regulatory decisions offer formal opportunities for public comments on water quality related issues, on a practical basis, monitoring these processes is difficult because public documents do not contain DPR's assessment of the potential water quality impacts from each product. For this reason, water quality agency input to formal DPR regulatory decisions has been limited to a few test cases that were initiated to improve understanding of DPR's registration process (see Section 3.2).

2.3 Other Agencies

When other regulatory agency activities may affect the ability to ensure water quality protection from potentially adverse effects of pesticide use, contacts may be made on a case-by-case basis.

2.4 Coordination Among Agencies

California water quality agency pesticide regulatory activities have been coordinated primarily through the Urban Pesticides Committee (UPC). Since the mid-1990s, the UPC has served as a center for information exchange, coordination, and collaboration

[8] Formally the Copper Antifouling Paint Sub-Workgroup of the Marina and Recreational Boating Workgroup of the Interagency Coordinating Committee (IACC). The IACC is a working group composed of 28 State agencies involved in implementing California's Nonpoint Source Pollution Control Program.

among local, regional, and state agencies seeking to end pesticide-related surface water toxicity problems. Today, the UPC is a collaboration of more than 200 individuals representing water quality regulatory agencies, pesticide regulatory agencies (U.S. EPA and DPR), agricultural commissioners, industry representatives, pesticide/water quality technical experts, municipal wastewater treatment plants, environmental nonprofits, community organizations, and stormwater management agencies. This network, which was organized by the San Francisco Bay and Central Valley Regional Water Quality Control Boards, is currently being managed by the UP3 Project.

The UP3 Project convenes bimonthly UPC meetings (which can be accessed by teleconference). The UP3 Project also maintains an information-filled web site (www.up3project.org) and an announcement-only e-mail list for UPC members to keep them up to date on regulatory, scientific, and educational program developments.

3.0 SUMMARY OF PAST AND UPCOMING REGULATORY ACTIVITIES

3.1 U.S. EPA

Together, California water quality agencies have sent U.S. EPA almost 200 letters since 1999. To participate in U.S. EPA re-registration processes for the following 29 pesticides, California water quality agencies sent more than 160 letters on environmental risk assessments and re-registration decisions (see Appendix A, Table A-2 for details):

- Atrazine
- Carbaryl
- Chlorpyrifos
- Copper compounds
- Cypermethrin
- Diazinon
- Lindane
- Malathion
- Metaldehyde
- Metam sodium
- Permethrin
- Pyrethrins
- Resmethrin
- Zinc pyrithione
- Miscellaneous antimicrobials (PHMB, Halohydantoins, Pine oil, Phenol)
- Phenoxy herbicides (2,4-D, 2,4-DB, Dicamba, and MCPA)
- Other herbicides (Arsenic-containing herbicides; Pentachloronitrobenzene)
- Synergists (Piperonyl butoxide and MGK-264)
- Wood preservatives (Arsenic and chromium compounds, Creosote, and Pentachlorophenol)

California water quality agencies have elected to comment on only a small fraction (<10%) of the pesticides that U.S. EPA is evaluating in its pesticide re-registration process, focusing on those chemicals that have the potential to cause urban surface water impairment and NPDES permit compliance problems. Initially, California water quality agencies focused on diazinon, chlorpyrifos, and lindane, which were proven causes of urban surface water impairment and NPDES permit compliance problems. Once U.S. EPA announced the cancellation of most urban diazinon and chlorpyrifos uses, attention shifted to insecticide replacements that commonly occur in urban surface waters at levels that may cause adverse impacts to aquatic life (e.g., carbaryl, malathion, and pyrethroids).[9] Recognizing that the re-registration process offers a unique opportunity to prevent future water quality problems, agencies recently have begun to comment on pesticides for which there are little or no environmental data, but for which urban uses have the potential to cause exceedances of water quality criteria, aquatic toxicity, or violations of NPDES permits.[10]

[9] These were selected based on a review of the replacement products: TDC Environmental (2003). *Insecticide Market Trends and Water Quality Implications*, report prepared for the San Francisco Estuary Project and the San Francisco Bay RWQCB, April.

[10] Such pesticides are identified on the basis of the UP3 Project's annual review of relevant research and monitoring data and information in U.S. EPA environmental risk assessments.

In addition, agencies have sent almost 30 letters to U.S. EPA regarding 15 other decisions (see Appendix A, Table A-3 for details). The most important of these were:

- Request to regulate washing machines that release silver ions into wash water
- Procedural regulations for pesticide registration review
- Proposed rule: Data requirements for pesticides ("conventional chemicals")
- Organophosphorous pesticide cumulative risk assessment
- Proposed rule: Endangered species act consultations on pesticide registrations
- U.S. EPA guidance on applications of pesticides to surface waters
- Proposed rule: Standards for pesticide containers and containment

3.2 California Department of Pesticide Regulation

Most California water quality agency interaction with DPR has been informal and collaborative in nature. For example, DPR and the Water Boards have coordinated on development of implementation plans for several pesticide-related TMDLs.

Water quality agency representatives have been appointed to both of DPR's formal advisory committees. Representatives of wastewater and stormwater agencies participated in DPR's Pest Management Advisory Committee and its Pest Management in the 21st Century task force. A State Water Board representative is part of DPR's interagency Pesticide Registration and Evaluation Committee.

While it would not be appropriate for the Water Boards to write letters to DPR, other California Water Quality agencies have made written requests to DPR regarding specific actions within its authority:

- Re-evaluation requests.
    - *Diazinon and Chlorpyrifos*. In 2001, the California Stormwater Quality Task Force (the predecessor of CASQA) requested that DPR re-evaluate urban uses of diazinon and chlorpyrifos.
    - *Pyrethroids*. In 2005, water quality agencies discussed possible re-evaluations for pyrethroid insecticides and marine antifouling paints with DPR; both CASQA and Tri-TAC formally requested that DPR place all pyrethroids into re-evaluation. Subsequent to DPR's decision to place pyrethroids into re-evaluation, both Tri-TAC and CASQA sent DPR letters providing recommendations for the re-evaluation data requirements.
- Registration requests.
    - *Impregnated products.* In 2004, Tri-TAC asked DPR to register pesticide-impregnated clothing.
    - *Pesticide-generating products*. In 2006, Tri-TAC asked DPR to register washing machines that release silver ions into wash water.
- Registration water quality assessments. Water quality agencies have asked DPR staff to conduct analyses of water quality impacts of several pesticide products being evaluated for registration. Some of these requests (identified below) were made informally. These products and uses include copper-containing roofing material (2001), permethrin use in floor drains (2005), permethrin impregnated clothing (2005), a variety of products proposed to be used in or that would be discharged to sewers or storm drains (informal, 2004 and 2005), permethrin-impregnated mattress liners (2006), and silver-containing dental biocides (2006).

3.3 Other Agencies

The Structural Pest Control Board (SPCB), which is part of the California Department of Consumer Affairs, regulates professional structural pest control operators (PCOs). One of the SPCB's regulations prohibits PCOs from making any claims of safety or environmental benefits of their services, regardless of the veracity of such claims. In order to remove a potential barrier to reducing runoff from outdoor pesticide applications around buildings (among the most common urban use of pesticides), California water quality agencies have contacted the SPCB.

In 2005, CASQA sent a letter to the SPCB requesting that it review and revise its regulations to allow specific, truthful, and substantiated claims of environmental benefit provided by a bona fide integrated pest management service that is backed by a reputable certification system. CASQA made this request in support of the Ecowise Certified program, which certifies qualified professional structural pest control operators that employ integrated pest management-based structural pest control services, including measures to reduce the threat to urban surface water quality. In response to this letter and a presentation to the Board by the San Francisco Bay Water Board and CASQA, the SPCB established an ad hoc committee dealing with Integrated Pest Management and environmental safety, including water quality. Representatives from the San Francisco Bay Water Board and the Pest Control Operators of California were invited to participate in the committee, which met once in 2006 (DPR was also invited to sit in on this meeting).

3.4 2007 Schedule

3.4.1 U.S. EPA

Federal law requires U.S. EPA to evaluate pesticide registrations periodically based on current scientific information and modern environmental and human health risk assessment methods. In the next several years, U.S. EPA plans to complete a special process of evaluating the registrations of all pesticides registered prior to November 1984 ("re-registration"). Most pesticides commonly used in urban areas were re-registered by August 2006, because U.S. EPA coordinated re-registration with food safety evaluations required by the Food Quality Protection Act to be completed by that date (most pesticides that are commonly used in urban areas are also used on food crops). Remaining pesticides—which include several that are of interest for urban surface water quality—are planned for re-registration in the next several years. For these pesticides, the re-registration will be the first evaluation since the pesticide was originally registered, which may have been decades ago.

In 2007, U.S. EPA plans to initiate a new cycle of pesticide registration evaluations that will include all registered pesticides (not just those registered prior to November 1984). This evaluation cycle is called "registration review." A group of pyrethroids (many, but not all pyrethroids of interest for water quality) is planned to be considered in registration review starting in about 2010.

A schedule of anticipated upcoming U.S. EPA pesticide re-registration activities relevant to urban water quality is in Appendix A, Table A-1. This schedule is subject to change.

The urban use pesticides that may have potential to cause urban water quality problems with anticipated public input opportunities in 2007 are:

- Risk assessments: copper compounds (copper compounds and copper uses that were not included in the 2006 risk assessment), pentachlorophenol, p-

dichlorobenzene, tributyltin, triclosan, zinc borate, two phenoxy herbicides (2,4-DP and MCPP), and the pyrethroids allethrins, sumithrin, and tetramethrin.

- Re-registration decisions: allethrins, malathion, metam sodium, tributyltin, triclosan, two phenoxy herbicides (2,4-DP and MCPP), and three types of wood preservatives (arsenic and chromium compounds, creosote, and pentachlorophenol).

3.4.2 California Department of Pesticide Regulation

The primary engagement with DPR in 2007 is anticipated to involve DPR's regulatory process for re-evaluation of pyrethroids and its likely process for re-evaluation of marine antifouling coatings. For pyrethroids, DPR communications with water quality agencies have been more extensive than they have for any previous re-evaluation; however, no formal process for engagement of water quality agencies has been established. Since water quality agencies have information that will be valuable to DPR and pesticide registrants in their work to meet the re-evaluation's goal of preventing adverse impacts from pyrethroid use on California water quality, they are seeking to work with DPR to establish a process for information sharing and collaboration that will be beneficial to both pesticide and water quality agencies throughout the re-evaluation process.

For marine antifouling paint, DPR has established a process for collaboration with other state agencies (including the Water Boards, but not including municipalities) through the Copper Antifouling Paint Sub-Workgroup of the state's Marina and Recreational Boating Workgroup. The State Water Board and several Regional Water Boards participate in this workgroup, which is sharing scientific information regarding the known and potential water quality impacts of marine antifouling coatings.

DPR's routine activities include:

- Annual renewal of all pesticide product registrations (usually in November or December)
- Weekly announcements of pesticide products entering evaluation for registration

When items of interest for urban surface water quality are identified, California water quality agencies will respond to these routine DPR announcements.

Water quality agencies have representatives on two DPR advisory committees:

- Pest Management Advisory Committee meetings (quarterly)
- Pesticide Registration and Evaluation Committee meetings (bimonthly)

Organizational representatives from Tri-TAC and/or CASQA often participate in these meetings when agenda items relevant to pesticides and urban surface water quality are considered.

Other DPR-related activities could occur at any time. For example, under a Management Agency Agreement (MAA) between DPR and the State Water Board, DPR and the State Water Board indicated their intent to hold public meetings to discuss pesticide water quality regulatory issues, including urban issues. No such meetings have been held to date.

DPR and the State Water Board maintain an open line of communication through their MAA coordinators (two staff members, one from DPR and one from the State Water Board who have been designated by their agency to serve as the liaison to the other for purposes of implementing the MAA). While the MAA coordinators work primarily through informal communication, they have arranged formal DPR—State Water Board meetings.

4.0 EVALUATION OF OUTCOMES

U.S. EPA and DPR are changing they way they conduct pesticide regulatory activities based on information from California water quality agencies. In 2005, the primary outcome of California water quality agencies' urban pesticide water quality regulatory activities was that pesticide regulatory agencies reflected a growing understanding of pesticide-related water quality issues by both pesticide and water quality agencies. In 2006, results were more concrete—pesticide regulatory agencies took several specific steps to address pesticide-related urban surface water quality problems. These outcomes reflect meaningful progress toward achieving the goals listed in Section 1.1.

This section employs two approaches to evaluate outcomes. Most of the analysis uses an outcome assessment approach adapted from an approach developed by CASQA[11] that defines outcomes of water quality protection programs in terms of the following six general levels:

- Level 1—Activities were performed
- Level 2—Changes in attitudes, knowledge, and awareness were achieved
- Level 3—Behavioral change occurred
- Level 4—Load reductions occurred
- Level 5—Changes in urban runoff and wastewater Discharge Quality occurred
- Level 6—Changes in receiving water quality occurred

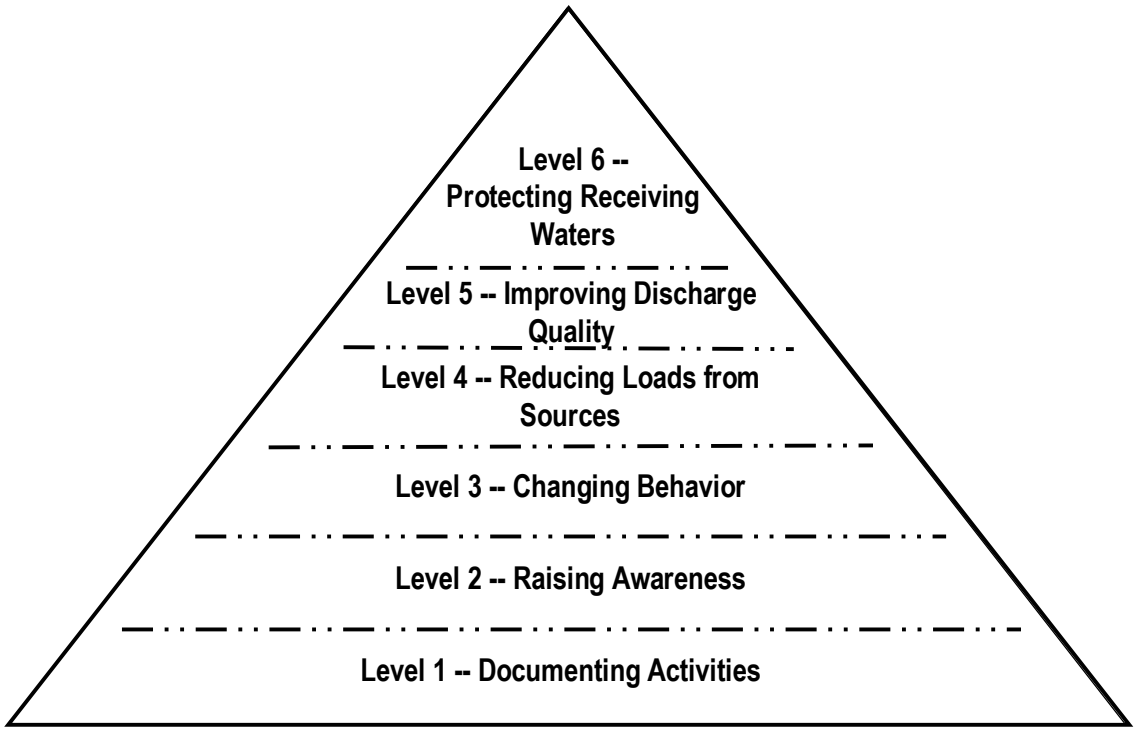
These outcomes are shown graphically in Figure 1 (on the next page). The advantage of this approach is that it allows assessment of outcomes that demonstrate progress toward water quality improvements that may not be immediately measurable. Sections 4.1 through 4.5 present the evaluation based on this approach. Because the evaluation is outcome-based, activities are only presented in the Level 1 assessment. The remaining assessment levels evaluate the outcomes of the activities conducted, but do not attempt to list the specific activities that created each identified outcome (which would generally be challenging, as the types of outcomes being evaluated usually occur in response to multiple individual actions completed over a period of years).

A second evaluation approach is used to look at U.S. EPA pesticide regulatory decisions for pesticides where California water quality agencies participated in the regulatory process. This analysis is necessarily more limited, as it looks only at a specific type of activity by one pesticide agency—and can only be completed for pesticides where U.S. EPA has completed the re-registration process. Section 4.6 presents this analysis.

It is important to recognize that this evaluation is necessarily an interim evaluation. The types of processes that California water quality agencies have engaged in take years to complete—and the systemic changes desired will probably take many years to implement fully. Even interim feedback is delayed—U.S. EPA has not yet responded to many of the comments sent by water quality agencies because the regulatory processes are still underway.

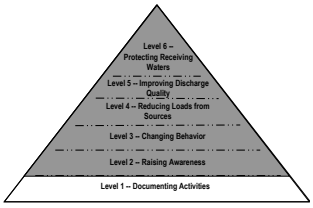
[11] CASQA, "An Introduction to Stormwater Program Effectiveness Assessment" 2005.

Figure 1: Assessment Outcome Levels



Source: Adapted from CASQA, "An Introduction to Stormwater Program Effectiveness Assessment" 2005.

4.1 Level 1 Outcomes: Documenting Activities



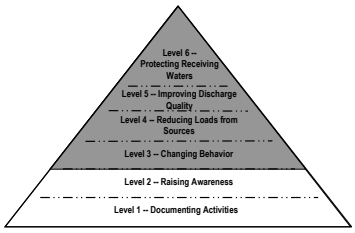
Sections 2 and 3 describe how California water quality agencies have worked with pesticide regulatory agencies. The most important activity accomplishments of California water quality agencies' urban pesticide water quality regulatory activities are listed below. The activities documented below are among the primary means that higher level outcomes (Levels 2 through 6) been achieved.

- Agency team established through UP3 project. California Water Boards (lead by the State and San Francisco Bay Regional Water Boards), wastewater agencies (coordinated by Tri-TAC) and stormwater agencies (coordinated by CASQA) have established a teamwork approach to participation in pesticide regulatory activities. Teamwork is facilitated by the UP3 Project, which provides a cost-effective approach for agencies to complete the scope of activities listed in Section 2.
- Almost 200 unique comment letters submitted. As summarized in Section 3, California water quality agencies have researched, prepared, and submitted almost 200 comment letters to U.S. EPA and several letters to DPR since 1999. Water quality is not regularly raised by other commenters on U.S. EPA pesticides actions. Since 1999, no water quality agency that is not part of the California water quality agency effort has regularly submitted written comments to U.S. EPA regarding pesticides regulatory processes.
- Regular interagency meetings held. California water quality agencies meet with pesticide regulatory agencies and other interested parties bimonthly at UPC meetings. Several California Water Boards participate in bimonthly copper

antifouling paint meetings (see Section 3.4.2). Many other productive meetings were held between DPR and water quality agencies in 2006. The UP3 Project worked with DPR and U.S. EPA staff to help ensure that interagency meetings would be productive.

- Presentations given. California water quality agency representatives gave presentations at regional and statewide water quality and IPM conferences to educate agency representatives and other interested parties about pesticide-related urban surface water quality issues. A few presentations have been given at national water quality events (e.g., a UP3 Project presentation at the U.S. EPA pesticide/water quality Pesticide Registration Education Program [PREP training]). Pesticide regulators have participated in organizing sessions and giving presentations on scientific research on pesticides and surface water quality at national scientific conferences (in 2006, these included conferences of the American Chemical Society and the Society for Environmental Toxicology and Chemistry).

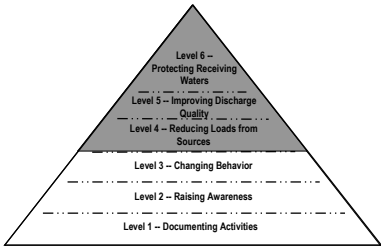
4.2 Level 2 Outcomes: Raising Awareness



Communication with California water quality agencies' has raised pesticide regulators' awareness of urban surface water quality issues. Key outcomes regarding awareness are as follows:

- U.S. EPA Office of Pesticide Programs (OPP) staff are aware of urban pesticides water quality issues. Ongoing communication with California water quality agencies has made the U.S. EPA OPP generally more willing to consider and address water quality issues than it has been in years past. These changes can be directly linked to the efforts of California agencies. California water quality agencies' comment letters have reached a relatively large fraction (but not all) of U.S. EPA OPP environmental risk assessors and risk managers. While there is substantial room for improvement in U.S. EPA risk assessment methods, increased general awareness of water quality concerns has been reflected in the tone and content of recent pesticide environmental risk assessments and re-registration decisions.
- California's SPCB has become aware of urban pesticides water quality issues. In response to a presentation by the San Francisco Bay Water Board and a letter from CASQA, the SPCB established a subcommittee to address water quality issues.

4.3 Level 3 Outcomes: Changing Behavior



Scientific and water quality regulatory information provided by California water quality agencies to pesticide regulators has caused pesticide regulators to change their procedures and to make regulatory decisions to address urban surface water quality:

- DPR initiated re-evaluation of pyrethroid products. In response to research findings of toxicity in urban and agricultural surface water sediments, DPR initiated its regulatory program to respond to environmental problems with currently registered pesticides, which is called "re-evaluation." In re-evaluation, DPR can require manufacturers to complete various actions such

as conducting special studies to elucidate the linkage between pesticide use and water quality problems, developing solutions to pesticide-related water quality problems, supplying product or active ingredient-related data, and completing monitoring to assess efficacy of proposed solutions to water quality problems.

- DPR integrated water quality agencies into its advisory committees. Water quality agency representatives were appointed to the relevant DPR advisory committees and have actively engaged in committee processes. In July 2006, DPR arranged a field trip for its Pest Management Advisory Committee members and other interested parties, including industry and Water Board staff, focused on urban pesticide and water quality issues.
- DPR decided to require registration of pesticide-impregnated fabric products. In early 2006, DPR reversed a prior decision and decided to require registration of pesticide impregnated products like mattress liners and clothing. This decision was made in response to letters from Tri-TAC regarding concerns about wastewater discharges from washing such products.
- DPR has changed the way it works with California water quality agencies in regard to urban pesticide issues. In 2005, DPR management and water quality agencies established multiple lines of productive communication and collaboration. These changes appear to be permanent and have successfully addressed some important information and communication gaps that existed for decades.
- U.S. EPA clarified that its definition of a pesticide includes pesticide-generating devices like silver ion-generating washing machines. In response to a letter from Tri-TAC requesting that U.S. EPA consider registering silver ion generating washing machines (which was followed by a similar letter from NACWA), U.S. EPA reviewed its policies and procedures and determined that it should consider certain items to be pesticides rather than as devices not subject to regulation.[12] Registration provides U.S. EPA the opportunity to evaluate—and mitigate, as necessary—any water quality impacts from the silver wastewater discharges associated the use of these machines.
- U.S. EPA has improved environmental risk assessment procedures. The following significant improvements made in 2005 appear to be linked directly to California water quality agency comments:
    - U.S. EPA has developed a screening-level model (the "down the drain" model) to estimate risks from pesticide discharges to municipal wastewater treatment facilities. In 2006, U.S. EPA completed "down the drain" assessments in the majority of risk assessments reviewed by the UP3 Project that included pesticide uses that involve discharge into sewers (however, the "down the drain" assessment was often in response to comment letters from water quality agencies requesting the analysis be performed).
    - U.S. EPA is willing to use all available scientific data, whether from manufacturers or the published literature, including available surface water monitoring data and aquatic toxicity data from the agency-wide ECOTOX environmental toxicity database. Previously risk assessments relied primarily or exclusively on manufacturer-supplied information.

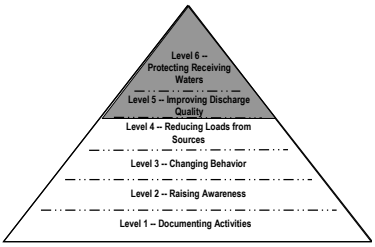
[12] Registration is only required for devices claimed to control pests (this includes biocides, but excludes claims like "freshens your clothes").

- To the extent information is available (which it rarely is), U.S. EPA assesses the environmental risks from pesticide degradates, inert ingredients, formulations, and cumulative exposures to multiple pesticides.
- U.S. EPA identifies uncertainty in its environmental risk assessments.

These improvements increase the potential for U.S. EPA to identify water quality problems in its pesticide registration and re-registration processes. Since risk mitigation measures are only considered when problems are identified, these changes are crucial first steps for water quality protection and Clean Water Act compliance.

- U.S. EPA has begun to improve cooperation between its offices. In response to water quality agencies' requests for cooperation between U.S. EPA OPP and Office of Water, U.S. EPA has tried several initiatives. The primary outcome of these initiatives has been a willingness to improve staff-level communications between the Office of Water and OPP. Office of Water staff have limited interactions with pesticides staff, but there is evidence that relationships are being initiated (e.g., Office of Water staff have provided models and data to pesticides staff, have participated in teleconference meetings between California water quality agencies and U.S. EPA OPP, and have joined with OPP to develop a standard operating procedure for including water quality and impaired water body data in U.S. EPA pesticide registration reviews). These developments are encouraging, but are only the first step on the road to addressing the many fundamental scientific and policy communications gaps that have been identified by California water quality agencies.

4.4 Level 4 Outcomes: Reducing Loads from Sources

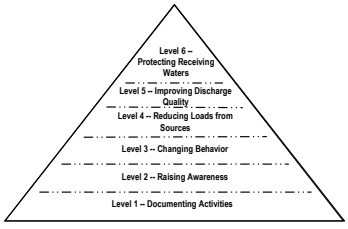


When a pesticide agency regulatory process for a pesticide of interest for urban surface water quality is completed and a decision is made, the UP3 Project qualitatively evaluates the action to determine the potential for changes in pesticide discharges to municipal wastewater treatment plants or releases into urban runoff. Since most regulatory decisions have multi-year implementation time frames and phase-out periods, there is usually a significant time lag between a regulatory decision and its environmental effect (i.e., reducing pesticide loads in surface water discharges). The time lag between decisions and environmental effects increases if the pesticide is environmentally persistent. *Although most of the pesticide regulatory decisions reviewed by the UP3 Project involved pesticides where significant water quality impacts were identified by U.S. EPA, only a few decisions included regulatory actions that have the potential to prevent identified impacts and to create meaningful reductions in wastewater or urban runoff loads*.[13] These are listed below. All of the decisions described below are anticipated to being reducing pesticide loads in the next few years.

[13] Based on data about behavior change due to educational programs See Larry Walker Associates, *Tools to Measure Source Control Program Effectiveness*, prepared for the Water Environment Research Foundation, Project #98-WSM-2, 1999. The data assembled in this report show that even highly targeted, well-designed education programs can only achieve behavior change rates in the 10-15% range. Based on these data, minor wording changes on products for non-professional applicators and general directions other than Best Management Practices for professional products are considered unlikely to generate significant load reductions.

- Arsenic-containing herbicides (MSMA, DSMA, CAMA, and Cacodylic Acid). In 2006, U.S. EPA released a decision calling for the phase out of all urban uses of arsenic containing herbicides to protect water quality.
- Carbaryl. Pet care applications were terminated, apparently partly in response to California water quality agency questions about this use, which involved discharges to municipal wastewater treatment plants. Changes in urban outdoor uses were not significant—in fact, the potential for increased use remains a concern for water quality agencies.
- Cypermethrin. U.S. EPA has decided to change directions for professional use of the pyrethroid cypermethrin significantly (little cypermethrin is used by non-professionals). The changes include Best Management Practices intended to prevent runoff from pre-construction termiticide applications, and limitations on applications to impervious surfaces (where runoff fractions are highest). These changes, which are anticipated to provide meaningful reduction in cypermethrin loads in urban runoff, were made in direct response to California water quality agency comments.
- Lindane. In 2006, U.S. EPA announced plans to phase out all remaining lindane uses. U.S. EPA also asked FDA to enact measures to reduce use of lindane pharmaceuticals (which are not regulated by U.S. EPA). Because lindane pharmaceutical use has already ended in California in response to state legislation, all current lindane sources to municipal wastewater treatment plants and urban runoff are being phased out. Since lindane is environmentally persistent (and since phase outs do not require collection of remaining products), it may continue to be found in discharges for many years to come. These changes—particularly the termination of the pharmaceutical uses—are expected to keep wastewater lindane levels below concentrations needed to comply with water quality based effluent limits.
- Pentachloronitrobenzene (PCNB). In 2006, U.S. EPA decided to terminate all urban uses of the fungicide PCNB due in part to concerns about water quality.

4.5 Levels 5 and 6 Outcomes: Improving Discharge Quality and Protecting Receiving Waters



Most pesticide regulatory decisions that have been made since California Water Quality agencies became engaged in pesticide regulatory programs are too recent to be reflected in the environment—or have involved relatively small load changes that are unlikely to be measurable in receiving water monitoring. Evaluating these changes is challenging because pesticide regulatory programs do not include surface water monitoring to evaluate water quality environmental outcomes of regulatory decisions—and monitoring of the hundreds of currently registered pesticides is not a routine part of water quality agency monitoring programs. No Level 5 outcomes were found; only one Level 6 outcome was identified.

- Diazinon levels in urban surface waters are decreasing and the frequencies of organophosphorous pesticide-related toxicity in urban surface waters is dropping. In response to the U.S. EPA phase out of almost all urban uses of diazinon and most urban chlorpyrifos uses, urban diazinon and chlorpyrifos use has declined. A few potentially problematic uses remain—for diazinon these include cut flower

and nursery uses; for chlorpyrifos these include golf courses and non-residential outdoor uses. Available surface water monitoring data (which is not designed to address remaining potentially problematic uses [see the UP3 Project Annual Research and Monitoring Update]) have shown a decline in diazinon levels and a reduction in the incidence of acute toxicity to aquatic organisms from water column samples (in contrast to the increased toxicity in sediments).

4.6 Evaluation of U.S. EPA Pesticide Regulatory Decisions

Unlike many pesticide regulatory actions, U.S. EPA's pesticide re-registration process has a specific set of steps that lead to a clearly recorded decision that can be directly assessed for its impact on urban surface water quality. An analysis of the 19 U.S. EPA completed pesticide re-registration decisions for pesticides of interest to urban surface water quality (those which California water quality agencies participated in) is in Table 1 (on the next page).

Table 1 contains a summary of the most common urban uses of each pesticide, the urban use changes made in the re-registration process and the likely relevance of water quality agency comments in these changes. The assessment of the relationship of water quality agency comments to urban pesticide use changes was made on the basis of the explanation of U.S. EPA's regulatory rationale in its pesticide re-registration decisions and U.S. EPA's written responses to water quality agency comments. In evaluating regulatory outcomes, it is important to recognize that water quality is but one of many economic, social, and environmental factors that U.S. EPA and DPR consider when making regulatory decisions. The extent that water quality agency comments contributed to U.S. EPA's decision generally cannot be determined with complete specificity based on available documents; however, in a few cases, U.S. EPA clearly made specific changes in response to California water quality agency comments.

Table 1. Changes in Pesticide Uses of Urban Water Quality Concern, 1999-2006

Pesticide	Most Common Urban Uses	Urban Use Changes	Assessment of Relationship of Water Quality Agency Comments to Urban Use Changes
2,4-D	Lawns	Application rates were reduced.	Comments were not directly related to this change.
2,4-DB	Open land	No changes that would affect water.	None.
Arsenic-containing herbicides	Turf	All urban uses cancelled.	Probably none since comments were not made until after decision was published. Decision included an assessment of alternatives for urban uses, which has been a regular request of water quality agencies.
Atrazine	Lawn	Reduced application rate.	Comments were related to approach to decision, not to specific uses
Carbaryl	Lawn, garden, pets	Pet applications terminated. Residential lawn applications temporarily limited, but may be reauthorized.	Water quality likely a factor in pet care use termination, but does not seem to be a factor in the ongoing evaluation of lawn uses.
Chlorpyrifos	Lawn, garden, around buildings, manholes	Most urban uses terminated, but some potentially problematic uses remain. Applications in storm drain manholes was prohibited.	Water quality was probably not a factor in U.S. EPA's decision, except that applications in storm drain manholes were specifically prohibited in response to California water quality agencies' requests.
Copper (Group 1 of two groups)	Water applications, fungicides, root killer	Application rates and maximum frequencies were set (and in some cases reduced).	Water quality was a factor in U.S. EPA's decision; however, urban uses other than aquatic applications were not assessed or addressed directly in risk management.
Cypermethrin	Around buildings	New label language requires controls on pre-construction termiticide treatments to prevent runoff. Restricted applications to impervious surfaces to spot treatments, except for "foundation treatments" up the walls of buildings. New label language added to prevent outdoor applications when rain is imminent. Added other label instructions to reduce potential for releases to surface water.	Water quality was the basis for the listed changes, which appear to be direct responses to comments, particularly pre-construction termiticide label instructions to prevent cypermethrin wash-off.
Diazinon	Lawn, garden, around buildings	All urban uses terminated; however, cut flower and nursery uses (which are still allowable) could occur in urban areas.	Water quality was probably a minor factor in U.S. EPA's decision. As requested, U.S. EPA added label language to clarify that diazinon trunk wraps should not be used in urban areas. Requested evaluations of nurseries and cut flowers uses were rejected.
Dicamba	Lawns, golf courses	Reduced application rate.	Comments were not directly related to this change.

Table 1. Changes in Pesticide Uses of Urban Water Quality Concern, 1999-2006 (Continued)

Pesticide	Most Common Urban Uses	Urban Use Changes	Assessment of Relationship of Water Quality Agency Comments to Urban Use Changes
Lindane	Lice and scabies treatments	EPA asked FDA to enact measures to reduce use and modified national lindane water quality criteria. In 2006, EPA phased out all remaining pesticidal uses.	Data provided by water quality agencies were critical to the U.S. EPA decision. Water quality agency comments were likely a major factor in the decision to address pharmaceuticals that are not regulated by U.S. EPA and the decision to modify the lindane water quality criteria.
MCPA	Lawns and rights of way	Application rates were reduced.	Comments were not directly related to this change.
MGK-264	Indoors, lawn, garden, around buildings	Label directions to reduce releases were added. Maximum allowable outdoor application rate was reduced.	Water quality agency comments were probably a meaningful factor in the decision to make label direction changes.
Metaldehyde	Garden	Greatly limited the types of plants that can be treated. Required graphic warning of child and pet hazard. Required barriers to prevent child or animal access to treated areas.	Changes were supported by information provided by San Francisco Department of the Environment, which U.S. EPA contacted while developing its risk management strategy.
Permethrin	Indoors, lawn, garden, around buildings	Added label directions to reduce releases, such as directions to clean up granules that land on impervious surfaces, not to overwater after lawn and garden applications, and not to apply prior to heavy rainfall.	Water quality was the basis for the listed changes, which appear to be directly in response to comments; however, measures were relatively minor because U.S. EPA deferred cumulative pyrethroids review until 2010.
PCNB	Turf (particularly golf courses)	All urban uses cancelled.	Probably none since comments not made until after decision was published. Decision included an assessment of alternatives for urban uses, which has been a regular request of water quality agencies.
PBO	Indoors, lawn, garden, around buildings	Label directions to reduce releases were added.	Water quality agency comments were probably a meaningful factor in the decision to make label direction changes.
Pyrethrins	Indoors, lawn, garden, around buildings	Label directions to reduce releases were added.	Water quality agency comments were probably a meaningful factor in the decision to make label direction changes.
Resmethrin	Indoors, lawn, garden, around buildings	Added label directions to reduce releases, such as directions not to overwater after lawn and garden applications, not to apply to drains, and not to apply prior to heavy rainfall.	Water quality was the basis for the listed changes, which appear to be direct responses to comments; however, measures were relatively minor because U.S. EPA deferred cumulative pyrethroids review until 2010.

Source: TDC Environmental evaluation of U.S. EPA Re-registration Eligibility Decisions and related documents.

5.0 PROGRESS ON PREVIOUS RECOMMENDATIONS

The April 2003, December 2004, and December 2005 reviews and evaluations of California water quality agency participation in pesticide regulatory activities included several recommendations, most of which generated follow-up actions. Below is a progress report on each recommendation (with the year and number of the previous recommendation identified).

Previous Recommendations 2003-1, 2004-1, 2004-2, and 2005-1: *Continue to provide U.S. EPA and DPR with information to prevent potential water quality problems associated with urban pesticide use. Continue to press for consistency in implementation of water quality and pesticide regulatory programs within U.S. EPA and California EPA.*

> *Action to date*: California water quality agencies have continued to provide information to U.S. EPA and DPR. Water quality agencies increased their activity level in 2005 and 2006. This increase appears to be a direct result of UP3 Project scientific and regulatory support, which had not previously been available.

Previous Recommendations 2003-2, 2003-3, 2004-3, 2004-4, 2004-6, and 2005-2: *Continue to strengthen the network of water quality agencies working on urban pesticides issues*.

> *Action to date*: The network of California water quality agencies that regularly provide information to U.S. EPA continues to grow. Initially a regional group, the UPC is now a statewide organization that has begun to attract national attention. With UP3 Project support, the two key municipal water quality agency organizations—CASQA and Tri-TAC—have become routinely engaged in work on pesticides.
>
> Priorities for network strengthening include streamlining comment preparation processes and involving national organizations. Through Tri-TAC, wastewater agencies have successfully developed methods for timely processing of letters to U.S. EPA and DPR by state and (to some extent) national wastewater agency organizations. In 2006, CASQA continued to explore ways to streamline its process.
>
> Tri-TAC has begun to engage the national wastewater agency organization the National Association of Clean Water Agencies (NACWA). There is particularly a need to determine whether national coordination of urban runoff and water quality regulatory agencies is possible.
>
> Further strengthening of the network should focus on (1) increasing state and national organization engagement in pesticide/water quality issues and (2) institutionalizing pesticide/water quality activities within these organizations.

Previous Recommendations 2003-3, 2004-6, and 2005-4: *Increase efforts to raise urban pesticide surface water quality issues at the national level*.

> *Action to date*: Action on this recommendation has been limited, but successful. An important next step for national engagement is educating potential allies through presentations at national meetings. For example, in 2006, the UP3 Project gave a presentation at a U.S. EPA-sponsored training for state pesticide and water quality agency staff. Interested agencies have been encouraged to join the UPC. In 2005, a presentation by a Los Angeles County Sanitation

Districts staff member at a national Association of Metropolitan Sewerage Agencies (AMSA, now NACWA) conference generated a flurry of activity by wastewater agency leaders, U.S. EPA Office of Water managers, and the press.

For the coming year, a key step will be to participate in public forums such as national advisory committees and national conferences to enhance nationwide understanding of managing urban pesticides to prevent surface water quality programs. Budget restrictions stemming from the state budget crisis continue to limit out of state travel, making participation in national forums difficult for most state and municipal staff.

Previous Recommendation 2005-6: *Actively seek to strengthen communication between California water quality agencies and California and U.S. EPA pesticide regulators*.

Action to date: In 2005 and 2006, California water quality agencies participated in several teleconference meetings with U.S. EPA to discuss comments on re-registration of pyrethroids and related compounds. Other communications—particularly direct telephone calls and in-person meetings—have been relatively rare. Although communication with U.S. EPA Region 9 has been good, additional effort is needed to improve communication with U.S. EPA headquarters pesticides staff, which will promote improved understanding of scientific and regulatory issues and barriers that agencies are facing in managing pesticide-related urban water quality problems.

At the state level, good progress has been made, often with the assistance of the UP3 Project. In-state communication, which has been strengthened by the commitment of DPR's current senior management to cooperation with water quality agencies, is easier and occurs in a variety of venues, including in-person meetings and telephone calls. A challenge for 2007 will be to strengthen communications in relation to the pyrethroids re-evaluation.

Communication can be improved if water quality agency representatives initiate meetings and telephone calls—and when they do, by providing information using terminology that is accessible for all participants (i.e., not relying on Clean Water Act-based regulatory terminology and approaches).

Previous Recommendations 2003-4, 2004-7, and 2005-5: *Continue efforts to determine possible approaches and next steps toward developing practical methods for U.S. EPA and DPR to address the environmental effects of all ingredients in individual pesticide products when those products are registered or re-registered*.

Action to date: U.S. EPA has indicated that it agrees that additional tools need to be developed—particularly methods to model runoff of pesticides from urban areas. California water quality agencies shared information identified by the UP3 Project about U.S. EPA Office of Water modeling resources and examples of watershed modeling that are analogous to the modeling needed for urban pesticides; however, U.S. EPA stated that no adequate modeling tools exist for urban runoff. Continuing to facilitate the process of finding ways to fill methodology gaps needs to be a priority for California water quality agencies.

U.S. EPA determined that an existing screening model is adequate to assess sewer discharges of pesticides. Because the model employs assumptions that can cause it to estimate pesticide wastewater effluent concerns substantially, Tri-TAC intends to continue to work with U.S. EPA to refine methods used in these "down the drain" assessments.

Previous Recommendation 2004-5 and 2005-3: *Develop a stable funding mechanism to continue scientific and regulatory support for California water quality agency participation in U.S. EPA and California DPR regulatory activities affecting water quality.*

Action to date: Currently, UP3 Project funding provides this technical support. Although current UP3 Project funding ends in early 2007, a follow-up grant application prepared with the support of numerous UPC members has been awarded. Assuming the contracting process is successful, the follow-up grant is anticipated to allow the UP3 Project to continue (however, funding gaps and shortfalls are possible). In the past, California water quality agency participation in California and Federal pesticide regulatory processes has been limited in time periods when there was no or limited funding for technical support for the program. A long-term strategy is needed to provide stable, continuing funding for work on urban pesticides and water quality beyond the life of the follow-up grant.

Previous Recommendation 2004-8: *Strengthen relationships with California DPR's regulatory programs. Water quality agencies need to explore how registration, re-evaluation, and other authorities work.*

Action to date: This recommendation was fully implemented in 2005:

- Communication was improved. In 2005, the UP3 Project opened a dialogue between DPR's regulatory programs and California water quality agencies.
- Complete information on DPR registration reviews was obtained. The UP3 Project facilitated presentation of DPR's pesticide registration review process and other regulatory authorities to the UPC. The presentation specifically explained that DPR reviews aquatic toxicity data, but completes no water quality modeling or environmental risk assessment when pesticide products are registered. Two sets of wastewater agency comment letters[14] prepared at the recommendation of the UP3 Project clarified DPR's registration processes and allowed water quality agencies to obtain and review the water quality related analysis performed by DPR when registering pesticide products.
- Appointments to DPR positions improve consideration of water quality. The Director of DPR appointed a water quality agency representative to the DPR Pest Management Advisory Committee. (The UP3 Project suggested that wastewater and stormwater agencies request this appointment.) A water quality agency representative was also appointed to a special Pest Management in the 21st Century task force established by the DPR Director. A new State Water Board representative was appointed to DPR's other advisory committee, the Pesticide Registration and Evaluation Committee (PREC). Both the Water Board and U.S. EPA Region 9 representatives on the PREC have begun to coordinate with water quality agencies, with the assistance of the UP3 Project. Both DPR and the State Water Board appointed new Management Agency Agreement coordinators with unique backgrounds on urban pesticides and water quality. With the assistance of the UP3 Project, both coordinators are actively working with water quality agencies.
- DPR regulatory authorities clarified. With the assistance of the UP3 Project, California water quality agencies have established that re-evaluation is DPR's preferred regulatory tool for managing surface water quality problems with currently registered pesticide products.

[14] One was on insecticide-impregnated clothing that DPR declined to register. The other was in regard to a pyrethroid product proposed for application in floor drains.

6.0 CONCLUSIONS AND RECOMMENDATIONS

The finding that pyrethroid insecticides are linked to widespread toxicity to sediment-dwelling organisms in Northern California urban creeks has increased the importance of active California water quality agency participation in California and Federal pesticide regulatory processes. Since California law precludes local regulation of pesticides, municipal urban runoff programs and wastewater agencies must rely on pesticide regulators to solve this problem. While pesticide regulators—particularly at the state level—are moving to improve the way they address water quality, *strong participation by water quality agencies is necessary to resolve problems with pyrethroids and to achieve compliance with the Clean Water Act*.

6.1 Conclusions

Conclusion 1: *The most cost-effective approach to protecting surface water from pesticide-related toxicity is to prevent pesticide uses that have significant potential to cause water quality impairment*. The most significant opportunity to prevent problem pesticide uses is the U.S. EPA pesticide re-registration (and registration review) process; it is the only ongoing process that combines an evaluation of the water quality impacts of pesticides with the regulatory authority to terminate or modify any use that causes significant impacts. While DPR has the authority necessary to prevent water quality impacts, its current pesticide registration process does not include evaluation of these impacts. Alternative water quality protection strategies (i.e., public outreach and education) are more expensive and less effective than preventing problematic pesticide uses. Because both professional and non-professional (e.g., residential) pesticide users generally assume that pesticide regulatory programs ensure that pesticides can be used without causing environmental harm, especially if used according to the label, alternative water quality protection strategies can actually be undermined by regulatory decisions allowing continued use of pesticides in manners that cause or contribute to water quality problems.

Conclusion 2: *DPR is taking steps to address urban surface water quality*. DPR brought pyrethroids into re-evaluation, largely because of their impacts on urban surface water quality. In response to a request from Tri-TAC, DPR determined that it will require registration of products where pesticides are impregnated in fabrics that may be washed (e.g., clothing, mattress pads). In response to a recommendation of DPR's Pest Management Advisory Committee, DPR is exploring how it can expand its efforts to address urban pest management.

Conclusion 3: *In response to information from California water quality agencies, U.S. EPA has improved its assessment of surface water quality impacts during pesticide registration and has begun to exercise its authorities to prevent adverse water quality impacts from urban pesticide use*. U.S. EPA staff have indicated that California water quality agency efforts are effective and are changing the way that U.S. EPA assesses the environmental risks of pesticides. Responses to written comments and conversations with staff from U.S. EPA OPP, Office of Water, and Region 9 show that written comments, teleconference meetings, and other interactions have been valuable to achieving California water quality agency goals. Specific, detailed written comments based on scientific information have proven the most effective in achieving water quality agency goals.

Conclusion 4: *Although progress with California and U.S. EPA pesticide regulators provides reason for optimism, the ultimate outcomes of California water quality agency efforts remains uncertain*. Changing California and Federal regulatory processes within

existing law is likely to take years. Recent actions by both U.S. EPA and DPR are encouraging, but final decisions in two critical processes—DPR's pyrethroids re-evaluation and U.S. EPA's planned registration review of pyrethroids—will not be completed for several years.

Conclusion 5: California water quality agencies are the only government agencies calling for changes in pesticide regulatory practices that have proven insufficient to ensure that pesticide use does not cause violations of the Federal Clean Water Act and California Porter-Cologne Water Quality Control Act in urban areas. Although California's long history of pesticide-related water quality and NPDES permit compliance problems does not appear to be unique, water quality agencies from other states apparently have not actively engaged in efforts to ensure that pesticide regulatory processes do not result in water quality problems in urban areas.

Conclusion 6: The Urban Pesticides Committee is the nation's only agency and stakeholder group working to address pesticide-related water quality problems associated with the use of pesticides in urban areas. No other U.S. state or region has established a similar program.

Conclusion 7: *Significant communications gaps remain between California water quality agencies and California and Federal pesticide regulators*. Communication has improved significantly (particularly at the state level, thanks in part to UP3 Project efforts and in part to DPR's increased management commitment to collaboration with water quality agencies); however, fully collaborative relationships do not yet exist. Among the most common—and most readily addressed—communications problems are the differences in terminology and lack of familiarity among pesticide regulators of how pesticides used in urban areas reach surface water. Moreover, Federal pesticide regulators do not often have an appreciation for Federal Clean Water Act regulatory processes, regulatory requirements, and costs for non-compliance. Water quality agencies are not familiar with state and Federal pesticide regulatory processes and requirements. At the state level, many regulatory decisions (e.g., pesticide registration, re-evaluation decisions) are not structured in a manner that functionally provides for meaningful input from water quality agencies. At both the state and Federal levels, communications are complicated by requirements that pesticide regulators protect data that are considered confidential business information—even though such data may be necessary for full evaluation of a pesticide product's water quality impacts.

6.2 Recommendations

Recommendation 1: *Continue to provide U.S. EPA and DPR with information to prevent potential water quality problems associated with urban pesticide use and to press for consistency in implementation of water quality and pesticide regulatory programs within U.S. EPA and California EPA.* U.S. EPA and DPR staff have recommended that water quality agencies continue to communicate information and recommendations to U.S. EPA and DPR and expand efforts to meet in person and via teleconference directly with agency management. Regular communication is important to ensure that U.S. EPA OPP staff (including chemical review managers) and DPR have an appreciation for water quality issues. Regular communication appears to be the most likely way to encourage U.S. EPA management to acknowledge and address the costly regulatory gaps created by uncoordinated implementation of Federal water quality and pesticide laws. At the state level, regular communication can facilitate sharing of scientific information that has the potential to improve the effectiveness of both pesticide and water quality agency regulatory processes.

Recommendation 2: *Continue to strengthen the network of water quality agencies working on urban pesticides issues*. Priorities include involving national organizations and state and local agencies elsewhere in the United States (see Recommendation 4). There is particularly a need to determine whether coordination with urban runoff and water quality regulatory agencies elsewhere in the United States is possible.

Recommendation 3: *Develop a stable funding mechanism to continue scientific and regulatory support for California water quality agency participation in U.S. EPA and California DPR regulatory activities affecting water quality*. Funding is also needed for interagency coordination and communication functions, such as those provided by the UPC and the UP3 Project web site. While the UP3 Project has secured additional grant funds, funding gaps and shortfalls are possible. A long-term strategy is needed to provide stable, continuing funding for work on urban pesticides and water quality.

Recommendation 4: *Increase efforts to raise urban pesticide surface water quality issues at the national level*. It is unlikely that California's experience with pesticide-related surface water quality problems in urban areas is unique. Water quality agency staff should increase efforts to participate in public forums (such as national advisory committees and national conferences) to enhance nationwide understanding of managing urban pesticides to prevent surface water quality problems. Participation in different types of events will be important, as pesticide regulators and industry representatives participate in different conferences than water quality regulators. Becoming involved in U.S. EPA's Pesticide Program Dialog Committee (PPDC) is a priority, because U.S. EPA seeks advice on pesticide regulatory, policy and program implementation issues from this committee. (The PPDC does not currently include any water quality agency representatives or any local government representatives.)[15] While budgets may limit travel, opportunities may exist for scholarships, U.S. EPA-funded travel, attending meetings in California, or participation by teleconference.

Recommendation 5: *Continue efforts to determine possible approaches and next steps toward developing practical methods for U.S. EPA and DPR to address the environmental effects of all ingredients in individual pesticide products when those products are registered or re-registered*. Continuing to facilitate the process of finding ways to fill methodology gaps needs to be a priority for California water quality agencies. Conceptual models of pesticide fate and transport in urban environments may be useful tools to facilitate dialogue between water quality and pesticide regulators.

Although the focus has been on U.S. EPA development of methods, better opportunities may be available at the state level. At the request of the San Francisco Bay Water Board (based on the recently adopted Bay Area Urban Creeks diazinon and pesticide-related toxicity TMDL), in 2005, DPR began to consider how it can modify its regulatory process to prevent future pesticide-related violations of water quality standards. Such restructuring has the potential to achieve the goal of preventing future pesticide-related urban surface water quality problems.

Recommendation 6: *Improve the pesticide registration public involvement process*. At both the state and Federal levels, pesticide registration and re-registration are governed by formalized processes that do not always facilitate sharing of information relevant to identification of and mitigation of urban surface water quality problems. Cooperation among agencies could be improved if pesticide regulatory agencies were able to provide more transparent and straightforward public involvement processes within the constraints of laws and regulations that control their programs.

[15] State Water Board member Art Baggett serves on a spray drift work group under the PPDC's umbrella (but is not a member of the PPDC).

The most significant opportunities for improvement exist at the state level. While DPR's pesticide registration process technically provides public input opportunities, the way it is structured virtually precludes meaningful input. DPR's public notices provide little information about products entering DPR's registration process and do not explain how to provide scientific information or other comments to assist it during the registration process.[16] When a pesticide product is proposed for registration, DPR's normal procedure does not involve making its assessment of the product's potential water quality impacts readily available (in contrast to U.S. EPA, which posts its assessments on the Internet). It is possible to obtain documents associated with DPR's registration water quality review (those that do not contain confidential business information) upon written request. The time required for the written request makes it difficult for an agency to make such requests regularly and makes it difficult for agencies to obtain the documents and provide meaningful comments on proposed registrations within DPR's standard 30-day comment period.

Making changes could be challenging, because DPR's public involvement process is constrained by current laws and regulations. For example, DPR must protect confidential business information, must carefully document its decisions, and it is required to process registration applications in a timely manner. These constrain opportunities for process improvement.

Recommendation 7: Restore and enhance DPR funding for programs that prevent or solve pesticide-related urban surface water quality problems. DPR's resource limitations could restrict its ability to complete actions necessary to protect water quality. For example, DPR currently must divert staff resources from other activities to support its involvement in pesticide re-evaluations, because it has no dedicated funding for the labor-intensive activities it needs to conduct to support a re-evaluation. DPR does not currently have staff that routinely conduct environmental risk assessments or urban watershed modeling. These functions are necessary for predicting water quality problems from pesticides. Further, most of DPR's programs that supported California water quality agency pesticide activities were cut in response to DPR budget cuts in the late 1990s and early 2000's. For example, DPR:

- Eliminated its contracts for water quality investigations. DPR still issues a few small contracts and conducts a few investigations of its own. (Consultation with water quality agencies about monitoring and research project plans would maximize the opportunity for DPR to generate useful information with its limited resources.)
- Reduced its water quality monitoring activities. In-house staff conduct a few investigations a year, primarily in agricultural areas.
- Terminated its pest management alliance grant programs. These grant programs were DPR's primary method of developing and promoting less toxic pest control methods.

Eliminating these programs has left California water quality agencies without some previously valuable assistance for their efforts to address urban pesticide-related water quality problems.

[16] DPR registers every individual pesticide product separately. U.S. EPA focuses on registering pesticide active ingredients; it registers individual products primarily by reviewing and approving their labels. When a pesticide enters DPR's registration process, the public notice usually provides relatively limited information: the product name, manufacturer name, a simplified one-sentence description of the general type of use proposed for the product, the name of the registration action being considered, and the pesticide active ingredient.

Recommendation 8: *Actively seek to strengthen communication between California water quality agencies and California and U.S. EPA pesticide regulators*. Enhanced communication will increase pesticide regulator appreciation for and consideration of the scientific and regulatory issues around pesticides and water quality. Water quality agencies can facilitate communication by initiating requests for dialogue and becoming familiar with pesticide regulatory processes and terminology.

The UP3 Project recommends that the following communications strategies be considered, because it appears that these activities would enhance cooperative efforts to address water quality problems from urban pesticide use.

- Establish a process for dialogue on pyrethroids in California. Regular interagency meetings on marine antifouling coatings convened by DPR have afforded valuable opportunity for water quality and pesticide regulatory agencies to share scientific information and to improve stakeholder understanding of the regulatory context for managing water quality problems associated with marine antifouling coatings. These meetings have demonstrated the value of communication and collaboration for both pesticide and water quality agencies—both in enhancing the value and quality of the scientific information they are collecting and in designing their work to address regulatory needs. A similar regular opportunity for productive engagement of pesticide regulatory agencies, water quality agencies, and other interested parties (e.g., pesticide registrants, environmental community members) could enhance the effectiveness of agency responses to water quality problems from pyrethroids.
- Engage DPR's Pesticide Registration and Evaluation Committee (PREC) in the effort to prevent water quality problems from pesticides. The PREC is an interagency advisory committee that includes representatives from both the State Water Board and U.S. EPA.[17] Its mission is to foster communication about cross-agency pesticides issues and to provide advice and guidance to DPR on regulatory initiatives, scientific information, and public policy options. DPR expects the PREC to develop practical approaches to addressing pesticide issues. One of the PREC's major roles is provide interagency consultation to DPR on pesticide registration.
- Identify mechanisms for regular communication with U.S. EPA OPP. Because communication between California water quality agencies and U.S. EPA has primarily been in writing, it is no surprise that difficulties interpreting comments have generated U.S. EPA responses that sometimes appear irrelevant or inappropriate from the water quality agency perspective. Physical distance and programmatic differences are barriers to improving communication quality. Forms of engagement other than letters will be helpful in working with U.S. EPA to address systemic issues like how U.S. EPA can assess urban surface water risks in pesticide environmental risk assessments.

  Structuring interactions around individual regulatory decisions is somewhat limiting, as this is not the context where U.S. EPA normally considers procedure changes. U.S. EPA obtains advice for the design and operation of its pesticide regulatory programs from committees that do not currently include urban water

[17] PREC membership currently includes a representative of county agricultural commissioners, but does not include representatives of other types of local government agencies that are engaged in pesticides issues (e.g., wastewater treatment plants, urban runoff programs, IPM programs). The DPR Director has the authority to appoint a representative of any other public agency that she deems appropriate after consultation with the existing committee membership.

quality agency representatives or urban surface water quality scientific experts. California agencies should evaluate potential options for participation in one of the groups that currently advise U.S. EPA OPP and/or collaboration with national organizations (e.g., NACWA) to create a new forum for engaging OPP on urban surface water quality issues.

APPENDIX A. U.S. EPA PESTICIDE REGULATORY ACTIVITY

Tables in this appendix:

Table A-1. List of U.S. EPA Pesticide Re-Registration Comment Letters by California Water Quality Agencies
Activities of Urban Surface Water Quality Interest

Pesticide	Preliminary Risk Assessment	Revised Risk Assessment	Registration Eligibility Decision	Notes
Arsenic-containing herbicides	--	Skipped	CCSF, SFBRWQCB	RED complete
Atrazine	--	SFBRWQCB	SFBRWQCB	Revised IRED and water quality criteria: SFBRWQCB, CASQA, LACSD, AMSA
Carbaryl	SWQTF, SFBRWQCB	CASQA, SFBRWQCB, LACSD	SFBRWQCB, CASQA, LACSD	RED complete
Copper compounds	SFBRWQCB, Tri-TAC, LACSD, CASQA	Plan to Skip	SFBRWQCB, SWRCB, Tri-TAC, LACSD, CASQA	RED complete
Lindane	LACSD	SFBRWQCB, LACSD	SFBRWQCB, LACSD	RED complete
Organophosphates				
Diazinon	SWQTF, ACCWP, CCCSD	SWQTF, SFBRWQCB, CVRWQCB, SWRCB, SFEI	SFBRWQCB, BASMAA, CCSF	Interim RED (IRED) revised 5/04, but no public comment period was noticed
Chlorpyrifos	SWQTF, CCSF, SFBRWQCB, CCCSD	SWQTF	SWQTF, SFBRWQCB	IRED process completed. Also commented on FR Notice changing manufacturer agreement: SWQTF, SFBRWQCB, Tri-TAC
Malathion	None	SFBRWQCB, SWQTF		Re-revised risk assessment was issued: SFBRWQCB, CASQA, LACSD
MGK-264	SFBRWQCB, CASQA, Tri-TAC, LACSD	SFBRWQCB, CASQA, Tri-TAC, LACSD	SFBRWQCB, CASQA, LACSD	RED complete
Metaldehyde	CCSF	Plan to Skip	CCSF	RED complete
Metam Sodium	SFBRWQCB, CASQA, LACSD	SFBRWQCB, CASQA, LACSD		Re-revised human health risk assessment: LACSD
PCNB	--	Skipped	CCSF, SFBRWQCB	RED complete
Phenoxy herbicides				
2,4-D	SFBRWQCB, CCSF	SFBRWQCB, CASQA, CCSF	None	RED complete
2,4-DB	SFBRWQCB	Skipped	None	RED complete
Dicamba	CCSF	Plan to Skip	CCSF	RED complete
MCPA	SFBRWQCB	Skipped	None	RED complete
Piperonyl Butoxide	SFBRWQCB, CASQA, Tri-TAC, LACSD	SFBRWQCB, CASQA, Tri-TAC, LACSD	SFBRWQCB, CASQA, LACSD	RED complete
Pyrethrins	SFBRWQCB, CASQA, Tri-TAC, LACSD	SFBRWQCB, CASQA, Tri-TAC, LACSD	SFBRWQCB, SWRCB, CASQA, LACSD	RED complete
Pyrethroids				
Cypermethrin	SFBRWQCB, SWRCB, CASQA, CCSF, San Jose	EPA to skip	SFBRWQCB, SWRCB, CASQA, CCSF	RED complete
Permethrin	SFBRWQCB, CASQA, CCSF, Tri-TAC, LACSD, NACWA	EPA to skip	SFBRWQCB, SWRCB, CASQA, CCSF, Tri-TAC, LACSD	RED complete
Resmethrin	SFBRWQCB, Tri-TAC, LACSD	EPA to skip	SFBRWQCB, CASQA, CCSF, Tri-TAC, LACSD	RED complete
Wood Preservatives				
As/Cr Compounds	SFBRWQCB, CCSF			
Creosote	SFBRWQCB, CCSF, Tri-TAC			
Pentachlorophenol	SFBRWQCB, CCSF			Separate risk assessment on dioxins and HCB in penta: SFBRWQCB, CCSF
Zinc Pyrithione	SFBRWQCB	EPA to skip		
Antimicrobials				
PHMB	SFBRWQCB, CASQA, LACSD, CCSF	EPA to skip	SFBRWQCB, SWRCB, Tri-TAC, LACSD, CASQA	RED complete
Pine Oil	SFBRWQCB, LACSD	EPA to skip		
Phenol	SFBRWQCB, LACSD	EPA to skip		
Halohydantoins	SFBRWQCB, LACSD	EPA to skip		

Table A-2. List of U.S. EPA Pesticide Regulatory Activity Comment Letters by California Water Quality Agencies

Activities of Urban Surface Water Quality Interest

Pesticide Regulatory Activity	Who Commented
Cumulative risk assessment for organophosphorous pesticides	SWQTF
OPP Strategic Plan, 2002	SFBRWQCB
Methodology for lower toxicity chemicals (risk assessments)	SFBRWQCB
Endangered species consent decree	SFBRWQCB
ANPRM: Endangered species act consultations	SFBRWQCB
Proposed rule: Endangered species act consultations	SFBRWQCB
Interim statement & guidance: application of pesticides to waters of the U.S.	SFBRWQCB, SWRCB, CASQA
S. 1664, Pesticide registration improvement act of 2003	CASQA
Proposed rule: Standards for pesticide containers & containment	LACSD
Globally Harmonized System for Pesticide Hazard Classification and Labeling	CCSF
Rodenticides: Revised Risk Assessment for Rodenticides Cluster	CCSF
Registration of Antimicrobial Products Containing New Active Ingredients	LACSD
Procedural Regulations for Registration Review	SFBRWQCB, CASQA, LACSD, Tri-TAC, CCSF
Data Requirements for Conventional Chemicals	SFBRWQCB, CASQA, LACSD, CCSF, LACSD, Tri-TAC, San Jose, NACWA
Request to Require Registration of Samsung Silver Wash clothing washing machine and Silver Ion Pesticide products	Tri-TAC, NACWA

Table A-3. U.S. EPA Pesticide Re-Registration Schedule

Pesticides of Urban Surface Water Quality Interest

Pesticide	Preliminary Risk Assessment	Revised Risk Assessment	Registration Eligibility Decision	Notes
Atrazine				EPA attempted to integrate water & pesticide regulatory actions
Carbaryl				
Copper				
Copper compounds		Skipped		Includes most copper-containing pesticides
Other copper compounds	Planned in 2007		Planned by 10/3/08	Copper pesticides without food uses like marine antifouling paint and wood preservatives were excluded from first process; no dates for this second group of copper compounds are on EPA's schedule
Dicamba		Skipped		
p-Dichlorobenzene			Planned for 12/07	Possibly important for POTWs
Lindane				All remaining pesticidal uses cancelled 8/06
Organophosphates				
Diazinon				
Chlorpyrifos				
Malathion			*Comments due 1/07*	
MGK-264		Plan to skip		Synergist for pyrethrins & pyrethroids
Metam Sodium		Planned for 2/07	Planned for 6/07	Plan to release re-revised risk assessment; not clear if environmental risks will be updated
Phenoxy herbicides				
2,4-D				
2,4-DB		Skipped		
2,4-DP	Planned for 2/07		Planned by 6/07	
MCPA		Skipped		
MCPP	Planned for 2/07		Planned by 6/07	
Piperonyl Butoxide				Synergist for pyrethrins & pyrethroids
Pyrethrins				
Pyrethroids				
Allethrins	Planned for 12/06	Plan to skip	Planned by 5/07	
Cypermethrin		Skipped		
Permethrin		Skipped		
Resmethrin		Skipped		
Sumithrin			Planned for 9/08	
Tetramethrin			Planned for 9/08	
Tributyltin			Planned for 9/08	
Triclosan			Planned for 9/07	EPA is calling it Irgasan
Wood Preservatives				
As/Cr Compounds			Planned for 12/07	Arsenic and chromium-containing wood preservatives like CCA
Creosote			Planned for 12/07	
Pentachlorophenol	?		Planned by 12/07	Plan to re-release preliminary risk assessment; not on current public participation schedule
Zinc Pyrithione		Skipped	*Planned by 9/04*	Marine antifouling paint use of interest; no dates on EPA re-reg schedule
Antimicrobials				
PHMB		Skipped		
Pine Oil		Skipped	*Planned by 9/04*	No dates on EPA re-reg. schedule
Phenol		Skipped	*Planned by 9/04*	No dates on EPA re-reg. schedule
Halohydantoins		Skipped	*Planned by 9/04*	No dates on EPA re-reg. schedule

Other Priority items:

Comparative Assessment for synthetic pyrethroids (was expected 4/04)

Pesticides entering "registration review"--in FY 2007, anticipate starting 25 pesticides; of interest Zinc Borate (fungicide & flame retardant)

Note: "Plan to skip" means that U.S. EPA plans to omit this public input step and move straight to the decision.

APPENDIX B. ANALYSIS OF U.S. EPA RESPONSES TO CALIFORNIA WATER QUALITY AGENCIES

Tables in this appendix:

These tables are intended to provide the reader with brief summaries of comments and responses. Readers interested in the details of a comment or response should consult the original water quality agency letters and U.S. EPA response documents, which are available in U.S. EPA's electronic dockets (go to www.regulations.gov, select "Advanced Search" from the menu at the top of the page, and search on the pesticide active ingredient name). The "U.S. EPA Response" column contains verbatim excerpts from U.S. EPA response documents. These excerpts were occasionally summarized or edited to clarify content but were not edited for style. U.S. EPA responses use many acronyms that are not defined in the response excerpts. These include:

EFED — U.S. EPA Office of Pesticide Programs Environmental Fate & Effects Division
PWG — Pyrethroids Working Group
OPP — U.S. EPA Office of Pesticide Programs
WQC — Water Quality Criteria
POTWs — Publicly Owned Treatment Works (municipal wastewater treatment plants)
LOCs — Levels of Concern (risk assessment significance threshold)
TGAI — Technical Grade Active Ingredient
SDLAC — Sanitation Districts of Los Angeles County (LACSD)
EECs — Estimated Environmental Concentrations
SRRD — U.S. EPA Office of Pesticide Programs Special Review and Reregistration Division

Note: In the tables that follow, "Water Board" refers to the California Water Quality Control Board, San Francisco Bay Region, which normally submits the most detailed comment letters. "State Water Board" refers to the California State Water Resources Control Board.

Table B-1. Copper Preliminary Risk Assessments Comment Summary
Comments from California Water Quality Agencies

Comment	U.S. EPA Response (Excerpt)	Notes
1. Water quality criteria should be used to assess copper risk. (Water Board, State Water Board, Tri-TAC, LACSD, SF Environment, CASQA)	EFED has coordinated closely with the Office of Water in development of the ecological risk assessment. The Daphnia acute LC50 used in EFED's aquatic assessment is essentially the same value used for the establishment of the Aquatic Life Criteria, and both programs have used the BLM to incorporate copper speciation effects. The two programs have different procedures to determine final values. OW uses a community-based approach, and sets the value to be protective of 95% of the organisms in the species sensitivity distribution. EFED determines risk quotients based on estimated environmental concentrations (EECs) and the most sensitive species within a particular taxa group (i.e., fish, aquatic invertebrates, aquatic plants). The Criterion Maximum Concentration (CMC) of 2.1 ppb derived for copper is based on LC50 values normalized to laboratory water, which represents a situation where copper is readily bioavailable, and thus, lower concentrations are more toxic. As the water quality criteria document (EPA 2003, pg 14) notes, "site-water chemistry parameters are needed to evaluate a criterion." The copper pesticide ecological risk assessment is a site-specific evaluation using actual water chemistry data, and results are presented in terms of number of sites exceeding the EFED pre-established levels of concern (LOC) for various concentrations of copper introduced into the system due to use of a pesticide. Thus, the process of the evaluations is different, but the end results are consistent. The explanation of how the evaluation methods compare has been clarified in the revised ecological risk assessment. Once the revised Federal copper criterion for fresh water is completed, states will be able to use the BLM to derive consistent, site-specific standards that meet local needs.	Bottom line: OPP doesn't use water quality criteria to assess pesticide risks. OPP's values used to assess risks are higher than water quality criteria. OPP believes the difference is unimportant. U.S. EPA plans to issue Biotic Ligand Model (BLM)-based fresh water criteria for copper, but does not plan to modify California's standards. Costs for development of site-specific standards are significant.
2. Risks to salt water organisms are not assessed. (Water Board, State Water Board, LACSD, Tri-TAC, CASQA)	The Biotic Ligand Model (BLM), as it currently exists, is not appropriate for evaluation of saltwater environments. A section addressing these effects has been added in the revised document. The saltwater assessment includes risk quotients (RQs) derived from total dissolved copper rather than activity based RQs like the freshwater assessment	

Table B-1. Copper Preliminary Risk Assessments Comment Summary (Continued)
Comments from California Water Quality Agencies

Comment	U.S. EPA Response (Excerpt)	Notes
3. Risks are understated because they are assessed on the basis of median (rather than worst case) conditions. (Water Board)	In order to account for variations in water chemistry on a national basis, EFED used median water quality data from USGS water monitoring sites. Because water chemistry conditions at a particular site can vary both temporally and spatially, the selection of median water chemistry parameters at each site was used to represent the most likely water or typical water quality conditions. This approach limits consideration of temporal variations in water chemistry parameters. It was assumed that variations in water quality conditions within a monitoring site (temporal scale) is lower than variation in water quality conditions among water monitoring sites (spatial scale). The use of USGS water quality data, however, allowed a spatially explicit assessment because all the monitoring sites are geo-referenced, which promotes GIS analysis for regional and local effects from water quality conditions on copper speciation. The distribution of monitoring sites encompassed a range of conditions, including some very vulnerable water chemistries. OW is currently working on implementation guidance for calculating site-specific criteria for use of water quality data in the BLM model.	
4. Cumulative risk assessment needed for all copper-containing pesticides. (Water Board, State Water Board, LACSD, Tri-TAC, CASQA, SF Environment)	In general, OPP does not conduct cumulative ecological risk assessments. For copper, because it has so many potential routes for introduction into the environment, a cumulative assessment would go well beyond the scope of authority granted to OPP under FIFRA.	Comment was misinterpreted (response is about a cumulative risk assessment for all copper sources).

Table B-1. Copper Preliminary Risk Assessments Comment Summary (Continued)
Comments from California Water Quality Agencies

Comment	U.S. EPA Response (Excerpt)	Notes
5. Complete risk assessment for copper-based root control products if they are included in this RED. (Water Board, Tri-TAC, LACSD)	The assessment has been updated to include an analysis of copper input into sewer systems due to its use as a root-killer. The currently existing "Down the Drain" model previously used by the Agency to address chemicals such as permethrin was used for the analysis.	The Down-the-Drain analysis found significant risks from use of copper-based root killer. The RED notes the compliance challenge that caused DPR to prohibit use of copper-based root control products in the SF Bay Area.
6. Complete risk assessment for urban landscaping applications if they are included in this RED. (Water Board, CASQA)	In RED: "The ecological risk assessment addresses the root-killer and lawn uses to a limited degree." "…the Agency does not currently have a model capable of predicting concentrations of pesticides that might occur because of outdoor urban uses, such as the use of copper as a lawn fungicide. Furthermore, the amount of copper used by homeowners for this use cannot be precisely determined. The relative importance of lawn uses of copper as a potential source of loading to surface water will vary between different watersheds, as there are many other potential urban sources of copper, as described above. No mitigation is proposed for other urban or suburban uses of copper at this time."	
7. Complete risk assessment for marine antifouling coatings; swimming pool, spa, and fountain algaecides; and wood preservatives. (Water Board, State Water Board, SF Environment, Tri-TAC, LACSD, CASQA)	No response in response to comments document. The RED indicates that these uses will be considered in a separate, subsequent risk assessment and RED.	

Table B-1. Copper Preliminary Risk Assessments Comment Summary (Continued)
Comments from California Water Quality Agencies

Comment	U.S. EPA Response (Excerpt)	Notes
8. Risk management is needed due to significant water quality risks. Risk management decision should consider costs for Clean Water Act compliance and the safety of alternatives. (Water Board, State Water Board) Non-pesticidal alternatives (biological, physical, and mechanical controls) can at least partially replace copper algaecides. For water applications, limit application number or frequency (SF Environment)	No response in Response to Comments documents. In RED: "A risk-benefit decision for the root control use of copper sulfate pentahydrate would therefore require consideration of the additional burden placed on POTWs to remove excess copper from the waste stream in addition to the potential risk to aquatic animals and plants. Use data is not available to allow such an evaluation on a nationwide scale. Therefore, no changes will be made to the copper sulfate pentahydrate label for root control use at this time. The Agency will solicit comments on the extent of copper use as a root killer, and the potential burden placed on POTWs by this use, during the comment period which will follow publication of the copper RED." "No mitigation is proposed for other urban or suburban uses of copper at this time." [UP3 Project Note: Alternatives assessments that considered pesticide alternatives were completed for aquatic and agricultural uses of copper-containing pesticides (the aquatic assessment was particularly limited; neither considered mechanical or other non pesticide controls). No alternatives assessment was completed for landscaping or root control copper uses.]	Lack of urban modeling capability is being used to postpone risk management actions for urban areas. This approach is consistent with other REDs. Application rates & maximum frequencies are being set (and in some cases reduced). Urban alternatives and urban costs/benefits were not considered.
9. Labels should preclude application prior to rain. (Water Board, SF Environment)	No use 96 hours prior to rain may be considered as a mitigation measure but could seriously affect the effectiveness of copper-containing compounds on agricultural crops.	Response did not address urban uses.
10. Labels should inform users of hazards to aquatic organisms. (Water Board)	Currently, labels contain an aquatic hazard statement, and will continue to do so.	Aquatic hazards language is not very clear (better language for was proposed for Resmethrin.) Not clear if required on root control products.

Table B-1. Copper Preliminary Risk Assessments Comment Summary (Continued)
Comments from California Water Quality Agencies

Comment	U.S. EPA Response (Excerpt)	Notes
11. Labels for copper-based root control products should be modified to ensure that they are not used in storm drain systems. (CASQA)	No response.	Not included in the label table. This request should be repeated, because a similar request for chlorpyrifos was successful.
12. Data requirements should provide sufficient information to support risk assessment of all copper-containing pesticide uses. (Water Board, SF Environment)	No response.	The RED lists a set of data gaps that preclude urban risk assessment; these should be included in the data call-in.
13. Copper algaecides may contribute to fishery decline. (Water Board)	No response.	
14. Please coordinate with Office of Water on review of copper. (Water Board, State Water Board, CASQA)	EFED has coordinated closely with the Office of Water in development of the ecological risk assessment.	
15. Public participation process should not be truncated—full 6-phase process is warranted. (Water Board, SF Environment, CASQA)	No response.	U.S. EPA's actions showed that it did not accept this request.

Table B-2. Cypermethrin Preliminary Risk Assessments Comment Summary
Comments from California Water Quality Agencies

Comment	U.S. EPA Response (Excerpt)	Notes
1. Need comprehensive pyrethroids review. Pyrethroids are widespread. Concerned that risks are underestimated. (Water Board, State Water Board)	The EFED recognizes the issues brought up by the CRWQCB. The pyrethroids are relatively persistent, and some are highly persistent. For that reason, they may be observed in a variety of locations. The Agency would be happy to have access to any monitored data for use in its risk assessments. The Agency has been conducting national-level, aquatic exposure/risk assessments for the pyrethroid insecticides since the early 1990's and is continuously working to refine its risk assessment methods and chemical environmental fate and toxicity databases. The EFED has been working with the PWG to obtain sediment toxicity data and to strengthen its environmental fate and ecotox database for many years. RED says: "The pyethroids are tentatively scheduled for re-evaluation under the proposed Registration Review program in 2010." "It is important, as some commenters have suggested, to perform a risk assessment for all of the pyrethroids at the same time."	The pyrethroids risk assessment that has been worked on for the last decade is being completed in cooperation with pyrethroids manufacturers. It does not yet seem to have been released to others. Once initiated, registration review would likely take 1-2 years to complete. The soonest that the planned U.S. EPA review would generate additional action to address toxicity in surface water sediments from pyrethroids would be about five years from now.
2. Cypermethrin use estimates needed. (Water Board)	As indicated, of the common urban cypermethrin use patterns described in the Water Board's letter, only "spraying in a band around the exterior of the structure to control nuisance insects such as ants" has a high potential to be washed into urban creeks.	

Table B-2. Cypermethrin Preliminary Risk Assessments Comment Summary (Continued)
Comments from California Water Quality Agencies

Comment	U.S. EPA Response (Excerpt)	Notes
3. Pyrethroid-related toxicity to sediment dwelling organisms in urban and agricultural surface waters is documented and widespread. Relevant publications are enclosed. (Water Board, State Water Board)	The EFED/OPP appreciates the fact that the CRWQCB has shared the data with the EFED/OPP. U.S. EPA interpretation of Amweg et al. 2006: The results of this study show that the problem of pyrethroid contamination may not be "widely spread," as it is indicated in numerous comments. Two cities of similar size in different locations yield contrasting results making the interpretation of the data very difficult. It is rather localized and dependent on factor still to be determined. The EFED/OPP will continue to gather information as it becomes available, and investigating the extent to which this problem is site specific or more general across pyrethroid usage area. U.S. EPA interpretation of other Weston group papers: Their contribution is appreciated. The EFED was working on the issue prior to the publication of the documents. Sediment toxicity and new mobility data had been required to the PWG. These data have been received and are currently in review.	Interpretation is out of context of other submitted data, which demonstrate toxicity in many Northern California urban creeks (not just in Roseville). .
4. Environmental risk assessment should use all available scientific data. (Water Board)	Data submissions are always welcome. The latest version of the EFED risk assessment included the ECOTOX database. The submitted Medina et al. 2002 paper contains some useful information for further characterizing ecological hazard; however, more sensitive data were already incorporated and used to determine risk to estuarine/marine invertebrates. Therefore, adequate protection has been given to this taxonomic group based on the best available data, and the inclusion of this study would not affect the conclusions of this risk assessment.	For risk management purposes the absence of data is not overly critical, as the risk assessment concluded that risks to sediment-dwelling organisms were significant.

Table B-2. Cypermethrin Preliminary Risk Assessments Comment Summary (Continued)
Comments from California Water Quality Agencies

Comment	U.S. EPA Response (Excerpt)	Notes
5. Aquatic toxicity data set remains incomplete. (Water Board)	EFED required data under the authority of FIFRA. The Agency is continuously working to refine its pyrethroid chemical environmental fate and toxicity databases.	
6. Water quality criteria should be used to assess cypermethrin risk (copy of criteria developed by CDFG using U.S. EPA method was provided). Values used by OPP are higher than criteria. (Water Board, SF Environment)	It was observed that the WQC were incomplete, while the risk assessment toxicity reference values were available. At this time, the methodology described in the EFED's guidelines for a deterministic risk assessment, call for the use of toxicity reference values, not WQC. The water quality criteria were developed by the California Department of Fish and Game (DFG), not the EPA. The dataset is incomplete (no saltwater data). It is noticeable that the document is a hazard assessment of synthetic pyrethroids and there is no monitoring data in the Sacramento-San Joaquin River system. The decision to advance cypermethrin for consideration in establishing a Water Quality Criteria (WQC) lies within the purview of USEPA Office of Water (OW). The OPP stands ready to collaborate with the OW within the confines of Confidential Business Information (CBI).	Gaps in available aquatic toxicity data preclude calculation of chronic freshwater and all saltwater water quality criteria. Lack of monitoring data in the DFG document that was submitted to U.S. EPA was because no monitoring method existed to measure environmentally meaningful concentrations of cypermethrin when the report was published. U.S. EPA response indicates that OPP standard risk assessment procedures need to be modified if water quality criteria (or values calculated by OW water quality criteria methods) are to be used in pesticide risk assessments.
7. Chemical analytical methods are needed. (Water Board)	It is OPP's understanding that new methods have recently been developed by the pesticide registrants.	There are research-level methods available, but not methods practical for most commercial labs. If the manufacturers have developed practical methods, these methods need to be made widely available in a timely manner.

Table B-2. Cypermethrin Preliminary Risk Assessments Comment Summary (Continued)
Comments from California Water Quality Agencies

Comment	U.S. EPA Response (Excerpt)	Notes
8. Sediment toxicity data are available and should be used to improve sediment toxicity analysis in risk assessment, which is based on extrapolation from water column data (Water Board)	The EFED is aware of this toxicity endpoint from the Maund *et al.* (2002) paper. In fact, the data from this open literature study had already been submitted to the Agency prior to publication (MRID 44074402 and 44074406). However, rather than use the average sediment 10-day LC50 (µg/g organic carbon), the EFED used the most sensitive 10-day LC50 (3.6 µg/kg sediment) to determine risk to aquatic benthic invertebrates in the risk assessment. Toxicity data were used to evaluate acute risk to benthic invertebrates exposed to cypermethrin in the sediment based on what was considered to be the most appropriate and sensitive available data (see above). However, the LC50's were based only on concentrations of cypermethrin in bulk sediment. EFED also estimates risk to benthic invertebrates resulting from exposure to cypermethrin in pore water. Therefore, the equilibrium partitioning approach had to be employed in this instance because toxicity data based on pore water concentrations were not available; in one study pore water concentrations were not measured (MRID 44074402), and in the other the concentrations were below the LOD (MRID 44074406). The EFED recognizes that additional sediment toxicity data with LC50's based on both sediment and pore water concentrations have been submitted by the PWG for use in this assessment. However, these data are currently under review and may be incorporated at a later date if deemed appropriate.	The toxicity endpoint selected by U.S. EPA is more conservative only if organic carbon concentrations are greater than about 1%. Some sediments have lower organic carbon concentrations. (For example, the Weston group survey of CA agricultural areas found that 1% was a typical concentration; many samples were lower). U.S. EPA's argument that its extrapolation method is preferable to using actual toxicity data is unusual. It is not clear if the agency recognizes that the whole sediment toxicity values include exposure to both sediment and pore water (there is no differentiation in any of the public toxicity data or field studies).

Table B-2. Cypermethrin Preliminary Risk Assessments Comment Summary (Continued)
Comments from California Water Quality Agencies

Comment	U.S. EPA Response (Excerpt)	Notes
9. Urban runoff risks need to be assessed. Most use is in urban areas. (Water Board, SF Environment)	One of the risk assessment goals of the Office of Pesticide Programs (OPP) is to estimate pesticide exposure through all significant routes of exposure in both rural and urban areas. For aquatic ecological exposure assessments for pesticides which have urban uses, OPP assumes separate routes for exposure for indoor and for outdoor uses. For indoor uses that may result in pesticide residues in wastewater (treatments to insects, pets, clothing, etc.), it is assumed that wash water containing pesticide residue flows into a building drain and passes through a sanitary sewer and publicly owned treatment works (POTW) before being discharged to surface water. For outdoor urban uses (applications to home lawns, gardens, parks, etc.), it is assumed that runoff water from rain and/or lawn watering may remove pesticide to storm sewers and then directly to surface water. Simulation of each of these routes of exposure is important to the overall assessment. OPP has developed methods and carried out assessments for indoor uses which ultimately discharge through a POTW to surface water, but has made less progress in estimating discharges resulting from urban outdoor uses. Where applicable, monitoring data from urban areas, such as that collected by the USGS NAWQA program and others, are regularly included in OPP risk assessments. Estimating pesticide in runoff from urban areas through computer simulation modeling has proven more difficult. Developing methods for modeling aquatic ecological pesticide exposure in urban areas is difficult due to lack of a model specifically developed to simulate pesticide fate and transport in a complex urban landscape. Data for model input (pesticide application amount and timing; physical representation of the urban landscape, storm sewer and receiving water configuration) and for model calibration (past history of flow and pesticide concentrations) is also generally unavailable. OPP is aware that pesticide aquatic simulations have been performed by the EPA Office of Water (OW) and has discussed the technical feasibility of their methodology for national-scale assessments required under FIFRA. The OW modeling efforts have been extremely time-consuming requiring collection of specific use information and extensive data for parameterization for the simulated watershed. OPP has identified limitations and deficiencies in existing models and data as part of the methods-development process. These include the following: [Continued on next page]	Lack of urban modeling capability is being used to postpone full risk management for urban areas. This RED does, however, include measures that should meaningfully reduce urban runoff risks.

Table B-2. Cypermethrin Preliminary Risk Assessments Comment Summary (Continued)
Comments from California Water Quality Agencies

Comment	U.S. EPA Response (Excerpt)	Notes
(9 Continued)	• OPP conducts national-level exposure/risk assessments for pesticide registration. Supporting models need to be flexible enough to simulate large numbers of sites nationally. Simulations of a single site for which there may be existing data would be unlikely to provide useful information for a national registration. Local, site-specific exposure assessments are only performed for endangered species risk assessments. • Many urban runoff models were designed primarily as water quantity rather than water quality models and do not have water quality modeling capabilities sophisticated enough to simulate pesticide fate and transport (e.g. HEC2, SWMM). Models that simulate pesticides need components to handle runoff and leaching as well as chemical degradation, dissipation, volatilization and adsorption/desorption for both the land and the water components of the model. • Models used for simulating pesticide use in agricultural areas (e.g. PRZM, GLEAMS, SWRRBWQ, EPIC/APEX, SWAT, etc) typically do not include features needed to simulate urban areas. Urban settings include impermeable surfaces; storm sewer networks; pumping stations; temporary holding ponds; individual, small-scale lawn irrigation systems; and experience multiple, relatively small temporally and spatially variable applications that are not simulated in agricultural models. • Some commonly used models need extensive monitoring data for calibration (e.g. HSPF included in the OW BASINS platform) and therefore can only be used to simulate sites and pesticides for which extensive flow and pollutant data has been collected in advance. This type of model cannot be used to simulate unmonitored sites or pesticides. • Homeowner application data is not readily available and is difficult to estimate with any degree of confidence. Estimates of the pesticide application area and rate as well as its temporal and spatial distribution are needed to simulate pesticide in runoff in an urban area. [Continued on next page]	

Table B-2. Cypermethrin Preliminary Risk Assessments Comment Summary (Continued)
Comments from California Water Quality Agencies

Comment	U.S. EPA Response (Excerpt)	Notes
(9 Continued)	• Unlike scenario sites for agricultural simulations; representative, high-exposure, urban watersheds and water bodies that can be used in national-scale, pesticide exposure assessments in urban landscapes have not been developed. Receiving water bodies developed for use in simulating aquatic ecological exposure of pesticides used in agricultural scenarios were designed based on USDA farm pond construction guidelines. These guidelines were used in the mid-1900s to design and build hundreds of thousands of rural water bodies. These agricultural modeling sites represent a common feature in rural areas. • It is likely that pesticide runoff in urban areas is impacted by inadvertent application of lawn-care products to impermeable surfaces (driveways, sidewalks or road surfaces adjacent to lawns). Crack and crevice applications are specifically designed to be applied to these hard surfaces. Data on deposition/degradation/resuspension and washoff from impermeable surfaces are not available. OPP has, and continues, to consult with other offices within EPA as well as other federal, state and local agencies on available tools and methodologies for assessing aquatic exposure from urban/suburban pesticide use. However, until such time as a reasonable modeling approach which is appropriate for a national-scale risk assessment is developed, OPP will continue to rely predominantly on available monitoring data for characterizing aquatic exposure from urban runoff. Risk assessments indicate that these data provide estimates of a lower bound of potential exposure. In RED: "The Agency will also continue in its efforts to develop a screening-level model for urban pesticide uses. Advances in the resolution of GIS databases may allow better representation of the impervious and pervious portions of a typical urban landscape. As it becomes clearer which uses are most likely to lead to transport of pyrethroids to surface water, the conceptual model of how urban transport should be simulated will be more focused."	

Table B-2. Cypermethrin Preliminary Risk Assessments Comment Summary (Continued)
Comments from California Water Quality Agencies

Comment	U.S. EPA Response (Excerpt)	Notes
10. U.S. EPA should monitor pesticides in surface water. (Water Board)	Surveillance monitoring is one possible outcome of reregistration activities.	The RED did not include a plan for monitoring.
11. Complete laboratory and field studies to fill data gaps that coordinate pyrethroids use patterns (both Ag. & urban) with field chemical measurements at important fish spawning & rearing areas. (State Water Board)	No response.	
12. Concerned that agricultural risks are understated. (State Water Board)	The Agency finds this comment difficult to address without having more information. We are unaware that our modeling produces concentration values that underestimate exposure. If the SWRCB has data that would indicate underestimation, we would appreciate that data being presented to us.	
13. Temperature needs to be considered (toxicity increases as the temperature decreases). (Water Board)	The EFED is aware that pyrethroids have exhibited a negative temperature coefficient of toxicity and would consider incorporating evidence that substantiates this behavior if such data become available for cypermethrin. However, at this time, acceptable substantive data are not available for quantitative use in this risk assessment.	Citations documenting toxicity change with temperature need to be sent to U.S. EPA.
14. Cypermethrin may contribute to Delta fishery decline. (Water Board)	The suggested type of analysis is beyond the scope of this national screening-level risk assessment.	
15. Please coordinate with Office of Water on review of cypermethrin. (Water Board, San Jose, CASQA, State Water Board)	No response.	

Table B-2. Cypermethrin Preliminary Risk Assessments Comment Summary (Continued)
Comments from California Water Quality Agencies

Comment	U.S. EPA Response (Excerpt)	Notes
16. Cumulative risk assessment needed. Look at cumulative effects with other pesticides, including other pyrethroids and synergists. (Water Board, SF Environment, San Jose, CASQA, State Water Board)	The EFED does not conduct cumulative environmental risk assessments with regard to individual REDs; however, at this time, the Division is conducting a comparative assessment of selected synthetic pyrethroids. The toxicity of pyrethroids and PBO is considered in the individual risk assessments of the pyrethroids, according to the data available. Dr. Weston was contacted on Jan. 5, 2006 regarding two forthcoming papers. The first, to be published in *Environmental Toxicology & Chemistry*, deals with the occurrence of PBO alone, and indicates little potential for synergism. The second, which has yet to be submitted for publication, indicates some potential for synergism from mosquito spraying of PBO with pyrethrins. Typically, the cypermethrin products employed for agricultural uses that bring major exposure to wildlife do not contain PBO. In RED: "It is important, as some commenters have suggested, to perform a risk assessment for all of the pyrethroids at the same time."	U.S. EPA needs copies of Weston team's PBO papers. It appears that they didn't realize that the main point was that PBO applied in a pyrethrins-containing mosquito abatement application may have synergized cypermethrin and other pyrethroids already present in creek sediments.
17. Alternative ant control approaches exist. Information on EcoWise Certified was submitted.	This is an appealing approach to the use of pesticides. The City of San Francisco appears to have gone a long way towards the use of fewer and safer chemicals. Nevertheless, the Agency would be interested in which approach the city has used for termiticides.	Responder apparently did not understand that the program covers Northern California, not just San Francisco, and that it targets outdoor insect control, not termite control.

Table B-2. Cypermethrin Preliminary Risk Assessments Comment Summary (Continued)
Comments from California Water Quality Agencies

Comment	U.S. EPA Response (Excerpt)	Notes
18. Risk mitigation should be thorough, should ensure safer alternatives will be used. Restrict above-ground, urban, outdoor uses of cypermethrin. • Eliminate or limit to spot treatments. • Require BMPs for pre-construction termiticide treatments. • End ill-defined "swimming pool water systems" use. (Water Board [all points], SF Environment; San Jose, CASQA, State Water Board [most points])	The SWRCB comment assumes that it is the aboveground, outdoors uses which cause runoff from pre-construction termiticide applications and are the direct cause of the toxicity to sediment-dwelling organisms in urban creeks. The Agency, however, is required to take a more comprehensive national view of the uses of cypermethrin. Other uses or mis-uses may be the cause of exposure and toxicity to sediment-dwelling organisms in California and/or other parts of the nation. In RED: "… the lack of knowledge which makes it difficult to develop an urban pesticide transport model also makes it difficult to identify meaningful mitigation at this time. The Agency has developed some initial mitigation options during the reregistration process, and intends to identify steps which can be taken to allow a greater understanding of potential ecological risk from urban pyrethroid uses." "One reason that broad mitigation measures cannot be adopted during reregistration is that only three pyrethroid insecticides are required to be reviewed for reregistration in accordance with FQPA. If use restrictions were placed on one of these three pesticides, one of the other pyrethroids would likely replace it for that use."	All 3 specific requests received positive responses in the RED: --Outdoor, above-ground urban outdoor uses of cypermethrin on impervious surfaces are being limited to spot and crack-and-crevice treatments (except up the walls of buildings). --BMPs for pre-construction termiticide treatments will be required. --The "swimming pool water systems" use is being terminated and label language will be added to define allowable applications near swimming pools.

Table B-2. Cypermethrin Preliminary Risk Assessments Comment Summary (Continued)
Comments from California Water Quality Agencies

Comment	U.S. EPA Response (Excerpt)	Notes
19. Alternatives analysis needed for urban risks. Cost-benefit analysis should include state & municipal compliance costs. Complete a use cluster assessment (e.g., ants) to support risk management decisions for urban uses. (Water Board, SF Environment, San Jose, CASQA, State Water Board)	No response.	No cost-benefit analysis was done for urban uses. No use cluster assessment.
20. Alternatives analysis needed for agricultural cypermethrin uses. Cost-benefit analyses need to include costs for Clean Water Act non-compliance. (State Water Board)	No response.	The risk assessment includes a one-paragraph description of alternatives in the context of cypermethrin's benefits. It doesn't meaningfully evaluate alternatives for specific uses nor does it consider costs.
21. Risk mitigation needed for agricultural uses of cypermethrin. (State Water Board)	No response.	The RED includes requirements that should meaningfully reduce releases to surface water by reducing spray drift and requiring a vegetated buffer between treated areas and surface waters.

Table B-2. Cypermethrin Preliminary Risk Assessments Comment Summary (Continued)
Comments from California Water Quality Agencies

Comment	U.S. EPA Response (Excerpt)	Notes
22. Labels should be modified: • To inform users of the hazards to aquatic organisms. • To limit number of applications per year. • To preclude application prior to rain. (Water Board, SF Environment)	The number of applications influences the amount of cypermethrin that may reach nearby bodies of water.	The RED includes improved label language. --Most products (except impregnated materials) will explain that cypermethrin has aquatic hazards. --Agricultural products will limit the quantity of pyrethroid applied in a year. Urban applications do not have limits on number or quantity of applications. --Labels will prohibit application when raining or when rain is expected within 8 hours. (This is helpful but the 8-hour time period is probably too short.)

Table B-2. Cypermethrin Preliminary Risk Assessments Comment Summary (Continued)
Comments from California Water Quality Agencies

Comment	U.S. EPA Response (Excerpt)	Notes
23. Public participation process should not be truncated—full 6-phase process is warranted. (Water Board, SF Environment, San Jose, CASQA, State Water Board)	No response.	U.S. EPA's actions made it clear that it denied this request.
24. All stakeholders deserve meaningful and equal opportunity for public participation. (SF Environment)		

Table B-3. Permethrin Preliminary Risk Assessments Comment Summary
Comments from California Water Quality Agencies

Comment	U.S. EPA Response (Excerpt)	Notes
1. Need comprehensive pyrethroids review. (Water Board, CASQA)	No response in response to comments document. RED says: "The pyethroids are tentatively scheduled for re-evaluation under the proposed Registration Review program in 2010." "It is important, as some commenters have suggested, to perform a risk assessment for all of the pyrethroids at the same time."	Once initiated, registration review would likely take 1-2 years to complete. The soonest that the planned U.S. EPA review would generate any action to address toxicity in surface water sediments from pyrethroids would be five years from now.
2. Water quality criteria should be used to assess permethrin risk (copy of criteria developed by CDFG using U.S. EPA method was provided). (Water Board, CASQA, SF Environment)	The Agency's pesticide risk assessment process is based on benefit and risk from a nationwide assessment.	Implication is that criteria developed by a California agency would be inappropriate to use, even though U.S. EPA procedures were used to develop the criteria.
3. Sediment toxicity data are available and should be used to improve sediment toxicity analysis in risk assessment, which is based on extrapolation from water column data (Water Board, CASQA)	The EFED will incorporate the results from Dr. Weston's paper and estimate the risk quotient of representative runs.	Not reflected in RED. For risk management purposes this work is not necessary, as the conclusion was that risks to sediment-dwelling organisms were significant.
4. Permethrin use estimates need to be modified (low, breakout inappropriate) (Water Board)	No response.	

Table B-3. Permethrin Preliminary Risk Assessments Comment Summary (Continued)
Comments from California Water Quality Agencies

Comment	U.S. EPA Response (Excerpt)	Notes
5. Urban runoff risks need to be assessed. Most use is in urban areas. Washoff fractions are higher. Application rates & frequencies are higher. Modeling should consider transport of permethrin bound to solids. Use around buildings should be assessed. Modeling needs to account for lower degradation rates on impervious surfaces. (Water Board, CASQA, SF Environment)	The Office of Pesticide Programs (OPP) is in regular contact with modelers in the EPA Office of Water (OW). Neither OPP nor the OW are aware of an appropriate model to use for simulating environmental fate and transport of pesticide use in urban areas. There are a number of deficiencies with the models to develop an urban pesticide risk assessment. Deficiencies include the following: • Many urban runoff models were designed as water quantity rather than water quality models and do not have water quality modeling capabilities sophisticated enough to simulate pesticide fate and transport (e.g. HEC2, SWMM). Pesticide simulation models require runoff and leaching as well as chemical degradation, dissipation, volatilization and adsorption routines for both the land and the water components of the model. • Models used for simulating pesticide use in agricultural areas (e.g. PRZM, GLEAMS, EPIC, etc) typically do not include features needed to simulate urban areas. Urban settings include impermeable surfaces, storm sewers, pumping stations, holding ponds, and individual, small scale lawn irrigation systems that are not included in agricultural models. • Some commonly used models require extensive monitoring data for calibration (e.g. HSPF/NPSM) and therefore can only be used to simulate sites and pesticides for which extensive flow and pollutant data has been collected in advance. These models cannot be used to simulate new, unmonitored sites or pesticides. • Estimates of the pesticide application area and rate as well as its temporal and spatial distribution are needed to accurately simulate pesticide in runoff in an urban area. Homeowner application data is not available and is difficult to estimate with any degree of confidence. [Continued on next page]	Lack of urban modeling capability is being used to postpone meaningful risk management actions for urban areas.

Table B-3. Permethrin Preliminary Risk Assessments Comment Summary (Continued)
Comments from California Water Quality Agencies

Comment	U.S. EPA Response (Excerpt)	Notes
(5 Continued)	• Pesticide concentrations in surface water depend on the volume and variable flow conditions of vulnerable receiving water bodies. Receiving water bodies for exposure assessments in agricultural settings have been designed based in USDA guidelines for farm ponds construction which were used to design and build hundreds of thousands of rural water bodies. Representative, high exposure, urban watersheds and receiving water bodies that can be used in pesticide exposure assessments have not been developed. • OPP conducts national exposure/risk assessments for pesticide registration. Simulation of a single site for which there may be existing data would be unlikely to provide useful information for a national registration. Local, site specific exposure assessments are only performed for endangered species risk assessments. • Much of pesticide in runoff in urban areas is expected to be caused by inadvertent application of products to impermeable surfaces (driveways, sidewalks or road surfaces adjacent to lawns). Crack and crevice applications are purposely applied to hard surfaces. Data on deposition/degradation/resuspension from impermeable surfaces is not available. The description of how permethrin is transported in urban runoff was changed to read “primarily in runoff events accompanied by erosion.” In RED: “The Agency will also continue in its efforts to develop a screening-level model for urban pesticide uses. Advances in the resolution of GIS databases may allow better representation of the impervious and pervious portions of a typical urban landscape. As it becomes clearer which uses are most likely to lead to transport of pyrethroids to surface water, the conceptual model of how urban transport should be simulated will be more focused.”	

Table B-3. Permethrin Preliminary Risk Assessments Comment Summary (Continued)
Comments from California Water Quality Agencies

Comment	U.S. EPA Response (Excerpt)	Notes
6. Modify wastewater risk assessment. Question estimated discharge quantities. Look at sewage sludge reuse. Stream dilution factor unrealistic. (Water Board, Tri-TAC, LACSD, NACWA)	The technical basis for the stream dilution factors is provided in the E-FAST manual: USEPA, Office of Pollution Prevention and Toxics, Exposure Assessment Branch. 1999. Exposure and Fate Assessment Screening Tool (EFAST) Beta Version Documentation Manual. Prepared by Versar Inc. Springfield, VA 22151, page 19. *[This manual explains that the model provides a range of factors and that zero dilution POTWs were specifically excluded from its analysis of dilutions.]* For zero dilution POTWs, U.S. EPA performed manual calculations, and the concentrations obtained ranged from 10.1 to 81.1 ppb (depending on the value of the removal); however, the solubility limit of permethrin is 5.5 ppb, therefore, the concentration is not expected to exceed the latter value. The remaining permethrin may be bound to particulates or to organic matter (not available or dissolved in the water). A value of 5.5 ppb is of the same order of magnitude as the peak estimated environmental concentration for Maine potatoes. The use information utilized in the "down-the-drain" assessment is protected under FIFRA CBI (Confidential Business Information). The Agency cannot disclose detailed information, other than what was provided in the review; however, it utilized all sources of permethrin of which information was available.	Approach assumes that most wastewater is diluted at least 75 times in receiving waters and that permitting authorities include this dilution in setting effluent limits. This is unrealistic in large portions of the nation. The exclusion of zero dilution credit POTWs significantly skews the results. For example, municipal wastewater treatment plants in the San Francisco Bay area are normally not afforded dilution credits greater than 10:1; many have "zero dilution" credit. These POTWs serve >2% of the nation's population.
7. Consider combined sewer discharges. (SF Environment)	Since all the amount of permethrin that could possibly go "down-the-drain" was assumed to go that route, this exercise would yield similar results, except that the dilution model per capita does not apply, instead, the dilution would refer to runoff.	Assumes that runoff has lower concentrations of pyrethroids than sewage (probably correct).

Table B-3. Permethrin Preliminary Risk Assessments Comment Summary (Continued)
Comments from California Water Quality Agencies

Comment	U.S. EPA Response (Excerpt)	Notes
8. Wastewater concentrations appear to be underestimated (Water Board, Tri-TAC, LACSD, NACWA)	The risk assessment demonstrated that in the "down-the-drain" model there were exceedances in the LOCs for aquatic organisms.	Modeling deficiencies are moot for risk management purposes, as the conclusion was that risks were significant.
9. In wastewater assessment, consider unusual use patterns (e.g., lice breakouts). (Water Board, Tri-TAC, LACSD, NACWA)	Since all the amount of permethrin that could possibly go "down the-drain" was assumed to go that route, this exercise is not needed. The E-FAST "down-the-drain" module is designed for national assessments. Furthermore, E-FAST is a screening model because it does not take into consideration degradation and partitioning with the sediment.	Response does not address the fact that the effects of concentrated use in one location are not accounted for by the modeling approach (which is conservative in its approach to use data, but probably not conservative enough to cover dramatic use variations, such as occur with lice outbreak incidents).
10. Request to revise the Use Characterization section, which incorrectly characterizes environmental hazards from urban uses. (Tri-TAC, LACSD, NACWA)	The Agency has revised the permethrin RED to reflect the recent data from Don Weston that shows pyrethroid residues from nonagricultural runoff into adjacent streams.	Risk assessment now recognizes significant risks from pyrethroids to sediment-dwelling organisms in urban surface waters.
11. Temperature needs to be considered (toxicity increases as the temperature decreases). (Water Board)	This is an interesting approach. However, the Agency's data base regarding permethrin does not address this negative temperature effect. Nevertheless, the Agency will address this effect qualitatively.	Citations documenting toxicity change with temperature need to be sent to U.S. EPA.
12. Endangered species analysis does not consider urban areas. (Water Board, SF Environment)	Non agricultural areas are being considered with regard to endangered species.	The risk assessment for the RED is simply a screen to determine if future species-specific risk assessments are needed. Species-specific assessments will be conducted separately at an unspecified future time.

Table B-3. Permethrin Preliminary Risk Assessments Comment Summary (Continued)
Comments from California Water Quality Agencies

Comment	U.S. EPA Response (Excerpt)	Notes
13. Cumulative risk assessment needed. Look at cumulative effects with other pesticides, including other pyrethroids and PBO. (Water Board, CASQA, SF Environment)	EFED does not conduct cumulative environmental risk assessments with regard to individual REDs; however, the Division is conducting a comparative assessment of selected synthetic pyrethroids at this time. EFED will request formulation data because permethrin may reach small bodies of water. Data on formulation of other pyrethroids indicate that the chemical may be up to 10 times more toxic in the presence of PBO. The same may be true for permethrin and the risk picture may change if the data proves that. In RED: "It is important, as some commenters have suggested, to perform a risk assessment for all of the pyrethroids at the same time."	
14. Permethrin may contribute to Delta fishery decline. (Water Board)	No response.	
15. Oppose re-registration of permethrin for uses that result in sewer discharges. (NACWA)	No response.	
16. Please coordinate with Office of Water on review of permethrin. (Water Board, CASQA)	No response.	

Table B-3. Permethrin Preliminary Risk Assessments Comment Summary (Continued)
Comments from California Water Quality Agencies

Comment	U.S. EPA Response (Excerpt)	Notes
17. Risk mitigation should be thorough, should ensure safer alternatives will be used. • Alternatives analysis needed for urban risks. • Cost-benefit analysis should include state & municipal compliance costs. • Labels should be modified to inform users of the hazards to aquatic organisms. • Labels should limit number of applications per year. • Mosquito abatement products should specify application restrictions. • Labels should preclude application prior to rain. • Complete a use cluster assessment (e.g., ants) to support risk management decisions for urban uses. (Water Board, SF Environment) (also Tri-TAC, NACWA & LACSD made some of the above comments)	U.S. EPA OPP's BEAD prepared a memorandum looking at alternatives for mosquito abatement. According to the memorandum, "BEAD believes that the availability of numerous alternatives and the relative interchangeability of the pyrethroid insecticides would limit the biological and economic impacts of the loss of permethrin for residential outdoor use to negligible levels." The memorandum also states, "In the absence of permethrin, homeowners and PMP's would most like substitute other pyrethroid insecticides such as cyfluthrin, cypermethrin, deltamethrin, esfenvalerate, lambda cyhalothrin, pyrethrins, resmethrin, sumithrin, tetramethrin, and tralomethrin. Users may also substitute insecticides from other chemical classes (e.g. organophosphates, carbamates, and neonicotinoids) and nonchemical control techniques (e.g. sanitation or exclusion). In RED: "… the lack of knowledge which makes it difficult to develop an urban pesticide transport model also makes it difficult to identify meaningful mitigation at this time. The Agency has developed some initial mitigation options during the reregistration process, and intends to identify steps which can be taken to allow a greater understanding of potential ecological risk from urban pyrethroid uses." " One reason that broad mitigation measures cannot be adopted during reregistration is that only three pyrethroid insecticides are required to be reviewed for reregistration in accordance with FQPA. If use restrictions were placed on one of these three pesticides, one of the other pyrethroids would likely replace it for that use." [Continued on next page.]	• No alternatives analysis was done for urban uses other than mosquito abatement. • No cost-benefit analysis was done for urban uses. • No use cluster assessment. • Outdoor—but not indoor or clothing—products will include environmental hazard language that mentions hazards to fish. • Ag. labels say runoff would occur "primarily in runoff events accompanied by erosion". There is no scientific basis for this statement—fine particles are the most likely transport pathway; visible erosion is not needed for fines to run off. • Mosquito abatement products will specify application restrictions.

Table B-3. Permethrin Preliminary Risk Assessments Comment Summary (Continued)
Comments from California Water Quality Agencies

Comment	U.S. EPA Response (Excerpt)	Notes
(17 Continued)	**Requirements for Granular Formulations labeled or intended for outdoor uses:** "Do not apply directly to or near water, storm drains, or drainage ditches. Do not apply when windy. Apply this product directly to your lawn or garden, and sweep any product landing on the driveway, sidewalk, or street, back onto the treated area. To prevent product run-off, do not over water the treated area or apply when heavy rain is expected." **Requirements for Liquid and Dust products labeled or intended for outdoor uses (excludes Ready to Use Products):** "Do not apply directly to or near water, storm drains, or drainage ditches. Do not apply when windy. To prevent product run-off, do not over water the treated area(s) or apply when heavy rain is expected. Rinse applicator over lawn or garden area only." **Requirements for Ready to Use Formulations labeled or intended for outdoor use:** "Do not apply directly to or near water, storm drains, or drainage ditches. Do not apply when windy. To prevent product run-off, do not over water, or apply prior to heavy rainfall."	• No changes in allowable application rates or frequencies ("minimum re-treatment interval") in outdoor urban areas. (These were reduced for agricultural applications). • Application label language is an improvement. Should mention sewers and gutters. • Reference to "heavy" rain is unclear. Rain in any quantity can cause runoff. There is no consensus for what constitutes "heavy" rain.
18. Public participation process should not be truncated—full 6-phase process is warranted. (Water Board, CASQA, SF Environment, Tri-TAC, LACSD, NACWA)	No response.	U.S. EPA's actions showed that it did not accept this request.

Table B-4. Pyrethrins, PBO, & MGK-264 Revised Risk Assessments Comment Summary
Comments from California Water Quality Agencies[18]

Comment	U.S. EPA Response (Excerpt)	Notes
1. Mosquito abatement use modeling could underestimate risks. Model foreseeable use rates and consider sediments as well as water column. Consider realistic PBO degradation rate (modeled rate probably overstates actual rate). (Water Board)	Modeling of mosquito adulticides was conservative for evaluating aquatic exposure in that it addressed the maximum number of applications and the application that would result in the highest load to water (i.e. boom height of 25 feet) FIFRA regulates on the label language. EFED must evaluate at a minimum what the label allows. In this comment period, information from the mosquito control districts suggests that there may be up to 25 applications. The Agency is requesting for pyrethrins whole sediment acute toxicity test for freshwater and estuarine benthic species, which will allow a quantitative evaluation. The revised risk assessment will contain a sensitivity analysis to help identify which application parameters may contribute the most to risks. Among these variables there are the boom height, the droplet size, the wind speed, the application rate (pounds per acre), the interval between applications, and the maximum number of applications allowed per year. <u>For PBO</u>: USGS Open-File report 2005-1384 (“Concentrations of Insecticides in Selected Surface Water Bodies in Suffolk County, New York, Before and After Mosquito Spraying, 2002-4”) indicated that PBO and resmethrin rapidly dissipate after spraying. Thus, peak and chronic concentrations are no higher than those derived from the Interim Rice Model, which was used to estimate environmental concentrations from mosquito adulticide.	Due to lack of data, evaluation of potential risks to sediment dwelling organisms was not conducted. PBO partitions into sediment (log Kow 4.75). This was documented experimentally (Amweg et al. 2006). Compare PBO-only portion of this response with response #2, below, which reflects a higher level of concern.

[18] Note: This is a joint summary because U.S. EPA generated one unified set of responses for pyrethrins, PBO, and MGK-264.

Table B-4. Pyrethrins, PBO, & MGK-264 Revised Risk Assessments Comment Summary (Continued)
Comments from California Water Quality Agencies

Comment	U.S. EPA Response (Excerpt)	Notes
2. Risk assessments for PBO and MGK-264 should evaluate synergistic effects. (Water Board, CASQA)	<u>For PBO</u>: Dr. Weston was contacted on Jan. 5, 2006 regarding two forthcoming papers. The first, to be published in Environmental Toxicology & Chemistry, deals with the occurrence of PBO alone, and indicates little potential for synergism. The second, which has yet to be submitted for publication, indicates some potential for synergism from mosquito spraying of PBO with pyrethrins. USGS Open-File report 2005-1384, a study of mosquito spraying on Long Island, NY, indicates that PBO and resmethrin, a pyrethroid, do occur in the same water samples at levels sufficient to cause synergism, at least immediately after spraying. In addition, the Agency may request data showing the toxic effect of products containing PBO as well as sediment toxicity of the products. The Agency has not performed cumulative assessments of synthetic pyrethroids; however, it is working on a comparative assessment of selected synthetic pyrethroids. The toxicity of pyrethroids and PBO is considered in risk assessments of the pyrethroids (section 3.2.3.3 Synergistic Effects with Pyrethroid Insecticides in EFED's risk assessment). The potential for synergistic toxicity was addressed in the pyrethrins RED chapter with formulated product toxicity data. As noted above, USGS has documented the simultaneous occurrence of PBO and a pyrethroid (resmethrin) after mosquito spraying. EPA is concerned about this issue, and will keep abreast of the scientific literature to gauge the magnitude of the problem. <u>For MGK-264</u>: Due to low annual production and low use within any particular watershed, monitoring data have shown that the level of MGK-264 in water is well below 0.1-1.0 ppb. Synergistic effects are not considered to be significant at these levels. EPA acknowledges that synergism is possible. We have requested formulated product toxicity data for fish and aquatic invertebrates to evaluate the magnitude of this effect.	Send U.S. EPA copies of Weston team's PBO papers. Check data call-ins to ensure that they require "data showing the toxic effects of products" and sediment toxicity data.

Table B-4. Pyrethrins, PBO, & MGK-264 Revised Risk Assessments Comment Summary (Continued)
Comments from California Water Quality Agencies

Comment	U.S. EPA Response (Excerpt)	Notes
3. Critical aquatic toxicity data for PBO are lacking. Please obtain PBO data from ECOTOX, which differs from data described in the response to comments. If ECOTOX or OPP's databases regarding PBO toxicity testing are in error, please correct the database. (Water Board)	<u>For PBO</u>: A review of the ECOTOX database shows *Oncorhynchus mykiss* (rainbow trout) 96 hr LC50 of 2.4 ppb was for the piperonyl butoxide (PBO) and resmethrin mixture. Most of the toxicity is attributed to resmethrin (rainbow trout LC50 = 0.28 ppb to 2.4 ppb) There is no PBO toxicity value alone for freshwater fish that is substantially lower than 1.9 ppm for *Oncorhynchus mykiss* (rainbow trout) value used in the risk assessment. There is no PBO toxicity value for estuarine invertebrates that is substantially lower than 0.49 ppm for PBO (*Mysidopsis bahia*) for estuarine invertebrate which is used in the risk assessment. A review of the ECOTOX database show *Penaeus duorarum* (pink shrimp) 96 hr EC50 = 1.25 ppb for PBO and resmethrin mixture, and 2.2 ppm (2200 ppb) for PBO. Most of the toxicity of PBO and resmethrin mixture is attributed to resmethrin (*Penaeus duorarum* EC50 = 1.34 ppb) The ECOTOX database does have *Ceriodaphnia dubia* (water flea) 48 hr LC50 = 330 ppb from a publication: Bailey, H.C., C. DiGiorgio, et. al. (1996). "Development of Procedures for Identifying Pesticide Toxicity in Ambient Waters: Carbofuran, Diazinon, Chlorpyrifos," Environ. Toxicol. Chem., 15(6):837. In this publication, the PBO test concentrations were not measured but nominal. The test concentrations of the other pesticides were measured. Although the toxicity value is more sensitive than toxicity value cited in the RED for freshwater invertebrates (EC50 = 510 ppb), the 330 ppb toxicity value for *Ceriodaphnia dubia* would be considered as supplemental at best because of uncertainty that exist from using nominal test concentrations. This value cannot be used for risk assessment, quantitatively. Based on the above findings, no change will be made in the risk assessment. <u>For MGK-264</u>: EFED has requested studies to fill the aquatic toxicity data gaps.	ECOTOX and an OPP database disagree; one is clearly in error. From the response, it is not clear which database was in error or whether the error was fixed. Check data call-in to ensure that missing aquatic toxicity data are included.

Table B-4. Pyrethrins, PBO, & MGK-264 Revised Risk Assessments Comment Summary (Continued)
Comments from California Water Quality Agencies

Comment	U.S. EPA Response (Excerpt)	Notes
4. Water quality based targets should be used to assess risk. (Water Board)	The decisions to advance pyrethrins, PBO, and MGK-264 for consideration in establishing a Water Quality Criteria (WQC) lies within the purview of Office of Water (OW). The OPP stands ready to collaborate with the OW within the confines of Confidential Business Information (CBI).	U.S. EPA response indicates that OPP standard risk assessment procedures need to be modified if water quality criteria (or values calculated by OW water quality criteria methods) are to be used in pesticide risk assessments.
5. Please examine potential for MGK-264 to bioaccumulate in aquatic organisms. (LACSD, Tri-TAC)	The bioconcentration factor (BCF) was estimated from the log KOW of 3.70 with the BCF v2.14 program in EPI-Suite. The estimated BCF = 140.9. Because the expected concentration in water is low, the bio-concentration is not of concern.	
6. We do not understand EPA's logic in weighing wildlife exposures from agricultural uses and mosquito abatement more heavily than exposures from indoor uses when 85% of the pyrethrins are used in indoor settings. EPA should not ignore potential adverse water quality impacts from the largest uses of pyrethrins. (LACSD, Tri-TAC)	The important thing to evaluate is the potential exposure to the wildlife. An agricultural application may affect terrestrial and aquatic plants and animals in and in the vicinity of the application area. Products applied indoors may also cause impact on aquatic plants and animals, but the route of exposure for the potential effect is different and should be considered in a different manner.	The main point of this comment was to substantiate the need for a sewer discharge assessment, which was conducted.
7. Rinse water from pet shampoos could also reach storm drains and flow directly to creeks and rivers. (LACSD, Tri-TAC)	The EPA recommended labeling "Do not contaminate water when disposing of equipment wash-waters or rinsate," does not offer any suggestions for disposal of the rinses. EFED believes that this labeling comment should be addressed by SRRD.	

Table B-4. Pyrethrins, PBO, & MGK-264 Revised Risk Assessments Comment Summary (Continued)
Comments from California Water Quality Agencies

Comment	U.S. EPA Response (Excerpt)	Notes
8. Complete wastewater discharge risk assessments. (Water Board, Tri-TAC, LACSD)	For pyrethrins: This issue is addressed in the current revision of the risk assessment. The "down-the-drain" assessment was conducted with the pyrethrins. Very crude and conservative assumptions were utilized. It was assumed that 100% of the pyrethrins produced were going "down-the-drain" (including the production for agricultural products). The level of removal was modeled by EPIWIN, v. 3.12. It offers two levels of removal upon treatment of wastewaters; the values were 92.70% and 98.83%. EFED used the most conservative 92.70%. As a result of the modeling the acute concentration was 2.42x10-3 µg/L and the chronic concentration was 1.86x10-4 µg/L. These values are three orders of magnitude smaller than those obtained for agricultural products. The Risk Quotients were less than 0.05, which is below the Agency's Level of Concern for endangered aquatic species. For PBO: The Down-the -Drain model in E-FAST was used to address water quality impacts from drain disposal. Very crude and conservative assumptions were utilized. It was assumed that 100% of the PBO produced were going "down-the-drain" (including the production for agricultural products). If a sewage treatment removal efficiency of 0 (zero)% is assumed, then 6,033,688 lb/year disposal is required to reach 1 ppb in receiving waters for the low dilution case (75x), and 79,568,289 lb/year are required for the median dilution case (980x). The annual production of PBO is far too low to reach this level. The fate database for PBO is insufficient to conclude that it will not degrade in sewage treatment. Its structural similarity to several natural products (e.g., safrole in sassafras oil) indicates that it should be biodegradable. For MGK-264: The Down-the-Drain model in E-FAST was used to address water quality impacts from drain disposal. Very crude and conservative assumptions were utilized. It was assumed that 100% of the MGK 264 produced was going "down-the-drain" (including the production for agricultural products). If a sewage treatment removal efficiency of [Continued on next page]	Few details of modeling provided, but it looks like the same approach as permethrin was used, so the same problems with the modeling exist. The concentrations are so low in this case that the modeling problems are unlikely to modify the risk assessments' conclusions. Note list of environmental fate databases for PBO and MGK-264; these should be addressed in the data call-in.

Table B-4. Pyrethrins, PBO, & MGK-264 Revised Risk Assessments Comment Summary (Continued)
Comments from California Water Quality Agencies

Comment	U.S. EPA Response (Excerpt)	Notes
(8 Continued)	0 (zero)% is assumed, then 6,033,688 lb/year disposal is required to reach 1 ppb in receiving waters for the low dilution case (75x), and 79,568,289 lb/year are required for the median dilution case (980x). The annual production of MGK 264 is far too low to reach this level. MGK-264 is not necessarily persistent in the environment. There are several important fate processes for which we have no data, including aerobic aquatic metabolism, indirect photolysis, and reaction with free radicals.	
9. U.S. EPA should reassert its control over pediculicides (head lice treatments) under FIFRA. At a minimum, it should consider the environmental impacts of these treatments in its risk assessments. (Tri-TAC, LACSD)	No direct response.	Response #8 above indicates that 100% of pyrethrins and PBO production were the volumes used in the down the drain assessments, suggesting that it accounted for pediculicides.

Table B-4. Pyrethrins, PBO, & MGK-264 Revised Risk Assessments Comment Summary (Continued)
Comments from California Water Quality Agencies

Comment	U.S. EPA Response (Excerpt)	Notes
10. Risk mitigation should ensure that water quality will not be at risk, recognizing that products containing pyrethrins, PBO, and MGK-264 are often considered "safer substitutes" for OPs and pyrethroids. U.S. EPA should ensure safer alternatives are really safer. (CASQA, Water Board)	No response in response to comments document. All 3 REDs have language similar to that in the pyrethrins RED, which says: "…the lack of data and information to develop an urban pesticide transport model also makes it difficult to identify whether risks may exceed some LOCs, and appropriate mitigation at this time. The Agency is committed to develop mitigation options during the reregistration process, and to identify steps which can be taken to allow a greater understanding of potential ecological risk from urban pyrethrins and pyrethroid uses." Environmental Hazards Statements Required on Labels *"Occupational use" products that have outdoor use sites (excludes residential and mosquito abatement products)* **[PBO & Pyrethrins]** This product is toxic to aquatic organisms, including fish and invertebrates. Drift and runoff may be hazardous to aquatic organisms in water adjacent to treated areas. This product may contaminate water through runoff. This product has a potential for runoff for several weeks after application. Poorly draining soils and soils with shallow water tables are more prone to produce runoff that contains this product." "Do not apply directly to water, to areas where surface water is present or to intertidal areas below the mean high water mark. Do not contaminate water when disposing of equipment wash-waters or rinsate." [MGK-264] This product may contaminate water through runoff. This product has a potential for runoff for several months or more after application. Poorly draining soils and soils with shallow water tables are more prone to produce runoff that contains this product. Do not apply directly to water, to areas where surface water is present or to intertidal areas below the mean high water mark. Do not contaminate water when disposing of equipment wash-waters or rinsate. [Continued on next page]	• No alternatives analysis was done for urban uses. • No cost-benefit analysis was done for urban uses. • No use cluster assessment. • Outdoor—but not indoor—products will include environmental hazard language that mentions hazards to fish. • Application label language is an improvement. Should mention sewers (or "gutters and drains"). • Reference to "heavy" rain is unclear.. • No rain application restrictions on professional products. • No environmental hazards statement for MGK-264 because there is almost no aquatic toxicity data—lack of data doesn't mean no risk.

Table B-4. Pyrethrins, PBO, & MGK-264 Revised Risk Assessments Comment Summary (Continued)
Comments from California Water Quality Agencies

Comment	U.S. EPA Response (Excerpt)	Notes
(10 Continued)	*"Occupational use" products for indoor use:* [PBO; Pyrethrins similar] This product is toxic to fish and aquatic invertebrates. Do not contaminate water when disposing of equipment, washwater, or rinsate. See Directions for Use for additional precautions and requirements." [MGK-264] "Do not contaminate water when disposing of equipment, washwater, or rinsate. See Directions for Use for additional precautions and requirements. Products labeled solely for indoor use may omit the Environmental Hazards statements above. *All residential use products:* PBO & Pyrethrins] This product is toxic to aquatic organisms, including fish and invertebrates. Do not contaminate water when disposing of equipment, washwater, or rinsate. See Directions for Use for additional precautions and requirements" *Residential outdoor use products must also say:* [PBO & Pyrethrins] Do not apply directly to or near water. Drift and run-off may be hazardous to fish in water adjacent to treated areas." Products labeled solely for indoor use may omit the Environmental Hazards statements above. <u>Directions for use</u> [All] Liquid products labeled for use in outdoor use sites, except for Ready to Use formulations: "Do not apply directly to or near water, storm drains, or drainage ditches. Do not apply when windy. To prevent product run-off, do not over water the treated area(s) or apply when heavy rain is expected. Rinse applicator over lawn or garden area only." Ready to use liquid or dust products labeled for outdoor use sites: "Do not apply directly to or near water, storm drains, or drainage ditches. Do not apply when windy. To prevent product run-off, do not over water the treated area(s) or apply prior to heavy rainfall."	• For MGK-264, maximum allowable outdoor application rate was reduced from 2.2 lbs a.i./acre to 0.3 lbs a.i./acre. Some other changes were made in allowable application rates and frequencies (primarily for agricultural products).

Table B-4. Pyrethrins, PBO, & MGK-264 Revised Risk Assessments Comment Summary (Continued)
Comments from California Water Quality Agencies

Comment	U.S. EPA Response (Excerpt)	Notes
11. Risk assessment should include urban runoff modeling. (Water Board, CASQA)	The Office of Pesticide Programs (OPP) is in regular contact with modelers in the EPA Office of Water (OW). Neither OPP nor the OW is aware of an appropriate model to use for simulating environmental fate and transport of pesticide use in urban areas. There are a number of deficiencies the models proposed by CRWQCB and others prevent their use for simulating fate and transport in urban areas. Deficiencies include the following: • Many urban runoff models were designed as water quantity rather than water quality models and do not have water quality modeling capabilities sophisticated enough to simulate pesticide fate and transport (e.g. HEC2, SWMM). Pesticide simulation models require runoff and leaching as well as chemical degradation, dissipation, volatilization and adsorption routines for both the land and the water components of the model. • Models used for simulating pesticide use in agricultural areas (e.g. PRZM, GLEAMS, EPIC, etc) typically do not include features needed to simulate urban areas. Urban settings include impermeable surfaces, storm sewers, pumping stations, holding ponds, and individual, small-scale lawn irrigation systems that are not included in agricultural models. • Some commonly used models require extensive monitoring data for calibration (e.g. HSPF/NPSM) and therefore can only be used to simulate sites and pesticides for which extensive flow and pollutant data has been collected in advance. These models cannot be used to simulate new, unmonitored sites or pesticides. • Estimates of the pesticide application area and rate as well as its temporal and spatial distribution are needed to accurately simulate pesticide in runoff in an urban area. Homeowner application data is not available and is difficult to estimate with any degree of confidence. • Pesticide concentrations in surface water depend on the volume and variable flow conditions of vulnerable receiving water bodies. Receiving water bodies for exposure assessments in agricultural settings have been designed based in USDA guidelines for farm ponds construction, which were used to design and build hundreds of thousands of rural water bodies. Representative, high-exposure, urban watersheds and receiving water bodies that can be used in pesticide exposure assessments have not been developed. [Continued on next page]	Lack of urban modeling capability is being used to postpone meaningful risk management actions for urban areas.

Table B-4. Pyrethrins, PBO, & MGK-264 Revised Risk Assessments Comment Summary (Continued)
Comments from California Water Quality Agencies

Comment	U.S. EPA Response (Excerpt)	Notes
(11 Continued)	• OPP conducts national exposure/risk assessments for pesticide registration. Simulation of a single site for which there may be existing data would be unlikely to provide useful information for a national registration. Local, site-specific exposure assessments are only performed for endangered species risk assessments. • Much of pesticide in runoff in urban areas is expected to be caused by inadvertent application of products to impermeable surfaces (driveways, sidewalks or road surfaces adjacent to lawns). Crack and crevice applications are purposely applied to hard surfaces. Data on deposition/degradation/resuspension from impermeable surfaces is not available.	
12. Please coordinate with Office of Water on reviews. (Water Board)	No response.	
13. For PBO, allowable urban application rates are higher than agricultural application rates; environmental fate differs in urban areas (Water Board, CASQA).	PRZM/EXAMS was not used for urban modeling, as there are no approved urban PRZM scenarios. While urban rates may be higher, it is unlikely that PBO would be used in 87 to 100% of an urban watershed at such rates, which is the default assumption for agricultural, drinking water and ecological assessments, respectively. Thus, the environmental water concentrations resulting from urban and agricultural uses cannot be compared directly on the basis of use rate.	

Table B-5. Pesticide Registration Review Rule Comment Summary
Comments from California Water Quality Agencies

Comment	U.S. EPA Response (Excerpt)	Notes
1. Schedule—Group pesticides into classes, prioritize problems including water quality problems, pyrethroids top priority. (Water Board, CASQA, LACSD, SF Environment, Tri-TAC)	While the Agency appreciates that there is a range of views as to how to set schedules for the registration review program, the establishment of schedules is within the Agency's discretion. EPA believes that reviewing similar cases together facilitates decision making for pesticides with similar scientific or regulatory issues and would be an efficient use of resources. Registrants or other stakeholders may notify the Agency regarding particular issues that could impact the schedule. The Agency would consider such issues as appropriate. The Agency has a continuing obligation to respond to emerging risk concerns (discussed in Unit XI.B. of the preamble of the proposed rule). At any time, the Agency may receive new information that suggests that the Agency should reevaluate a previous decision to register a pesticide. After the registration review program begins, the Agency will continue to address emerging risk concerns. If a pesticide presents an urgent potential risk of concern, the Agency may opt to review all other aspects of the pesticide's registration at that time, rather than only looking at the risk of concern. In such cases, the Agency may update the registration review schedule by announcing the new date of the registration review of this case.	
2. Risk Management—Implement it, address alternatives, consider Clean Water Act-related costs, complete timely phase-outs, improve phase-out procedures (disposal) (Water Board, CASQA, LACSD, SF Environment, Tri-TAC)	EPA agrees that it should evaluate the risks posed by urban uses and on a case-by-case basis it would consider water-treatment facilities' costs in assessing various options for risk management of a pesticide that poses risks of concern. EPA agrees that mitigation should be implemented as promptly as possible. EPA agrees that phased-out products should be disposed of appropriately. Municipalities should not have the burden of collecting and disposing of unsold phased-out pesticides.	Given the terminology used in the notice, it is likely that the commitment to consider "water treatment facilities' costs" is intended to cover wastewater treatment and stormwater program costs.

Table B-5. Pesticide Registration Review Rule Comment Summary (Continued)
Comments from California Water Quality Agencies

Comment	U.S. EPA Response (Excerpt)	Notes
3. Data for Registration Review—U.S. EPA should do literature search, be inclusive on data submittal, collect monitoring data, fill all data gaps. (Water Board, CASQA, Sacramento, SF Environment)	The Agency finds that it is not necessary to develop new procedures for calling in data for registration review because FIFRA section 3(g) requires the Agency to use section 3(c)(2)(B) to collect the data, and that section provides EPA with sufficient authority to obtain any necessary data. In response to comments that the proposed 60-day time frame for the initial request for data in registration review would not be long enough, the Agency is modifying this paragraph to specify that the time frame for such comment periods will be ‘‘at least 60 calendar days.’’ The Agency will consider late data submissions if the Agency believes that the new data or information are critical for the regulatory decision, such as health effects or ecological effects data or exposure data that the EPA could use to refine a risk assessment. If a person has data or information that he/she believes that Agency should consider during the pesticide’s registration review, but the data or information will not become available before the expiration of the comment period, he/she may either request an extension of the comment period, or in accordance with §155.52, consult with the Agency regarding a submission date for these materials. When a chemical poses a significant water quality concern EPA may require registrants to conduct monitoring, or to conduct analyses of samples collected by states. For example, EPA required registrants to monitor vulnerable watersheds for atrazine, and required the registrant of a new chemical -- isoxaflutole -- to conduct sample analyses for states. Although the Agency does not have the resources to support each state's efforts to assess water quality impacts, OPP has recently entered into an agreement with the U.S. Geological Survey to jointly plan for additional projects to assess pesticide impacts on water quality. EPA believes that information on water quality may be useful in registration review and will make efforts to obtain State data for CWA section 303(d) listings due to pesticides. When evaluating such data, EPA will take into account the procedures used to develop the data to assess the quality and usefulness of the data.	Note that there was no commitment to complete a literature review (which is not currently part of U.S. EPA’s standard risk assessment procedures). The commitment to obtain water quality monitoring data from sources other than USGS extends only to 303(d) listings that are already in place. Until procedures are improved, it may be useful to submit monitoring data and/or references to publications with monitoring data to the docket.

Table B-5. Pesticide Registration Review Rule Comment Summary (Continued)
Comments from California Water Quality Agencies

Comment	U.S. EPA Response (Excerpt)	Notes
4. Incorporation of Water Quality into Environmental Risk Assessments—Review urban pesticide use, consider formulations; inerts, degradates and cumulative effects; use water quality based targets, evaluate sewer discharge. (Water Board, CASQA, Sacramento, LACSD, Tri-TAC)	The Office of Pesticide Programs (OPP) will manage water-related issues within the framework of the registration review of pesticides. OPP expects that its capacity for characterizing risk will continue to improve as it works with the Office of Water to refine its models for estimating exposures and as more monitoring data become available. EPA's risk assessment process remains the same whether EPA is reviewing a new registration action or conducting a review of a registered pesticide. EPA involves the public in the development of risk assessment procedures, including procedures for estimating exposures from water, cumulative risk assessments or endangered species assessments. EPA may hold public workshops to develop approaches, consult with experts, convene advisory committees under the Federal Advisory Committee Act, or ask the FIFRA Scientific Advisory Panel (SAP) authorized by FIFRA to peer review proposed risk assessment procedures. EPA agrees that it should evaluate the risk posed by pesticide products, including the active ingredient, other ingredients in the pesticide product, and degradates and metabolites of these ingredients. To the extent practicable, the Agency's test guidelines take these aspects into account. In addition to data on the active ingredient, EPA requires, where applicable, information regarding environmental fate, residue chemistry and toxicological effects of typical end-use products, toxicity data for end-use products, i.e., formulations containing active and inert ingredients. These studies address, albeit to a limited extent, potential synergistic effects of mixtures of active and inert ingredients in a pesticide product. However, to test and review all of the potential combinations of ingredients would require significant resources. The Agency will consider new scientific methodologies to identify potential interactions among chemicals, should they become available. As required under section 408(p) of the Federal Food, Drug and Cosmetic Act, EPA is developing a program to assess endocrine disruption potential of pesticides. As explained in the preambles to the proposed and final rules, EPA intends to use registration review as the framework for managing the endocrine screening and testing program for pesticides.	The introduction to this response characterized agencies as "water treatment agencies," referred to "storm sewers" and mentioned potential NPDES permit violations at sewage treatment plants.

Table B-5. Pesticide Registration Review Rule Comment Summary (Continued)
Comments from California Water Quality Agencies

Comment	U.S. EPA Response (Excerpt)	Notes
5. Public Participation—Support process goals, more comment opportunities, minimum 60 day comment periods; announce all comment opportunities in Federal Register; improve document format; respond to all comments (Water Board, CASQA, LACSD, SF Environment, Tri-TAC)	Under the proposed procedures, the Agency would generally establish comment periods of ''at least 60 calendar days,'' except in § 155.53(c) [draft risk assessment & revised risk assessment] where the comment period is "at least 30 calendar days." The Agency is revising § 155.53(c) so that it may provide the public an opportunity to comment on possible risk mitigation when a revised risk assessment shows risks of concern. However, if immediate action is warranted, the Agency may initiate cancellation or suspension procedures under FIFRA section 6. In this event, the Agency would not provide the opportunities for public comment described in § 155.53(c) but would follow procedures in FIFRA section 6, as appropriate. EPA has modified the proposed public participation procedures for registration review to generally add a public comment period when a pesticide poses risks of concerns so members of the public can provide suggestions for reducing the risk. This procedure provides registrants and other stakeholders an opportunity to provide input on the Agency's risk management decisions. Generally, where EPA publishes a document for comment, the Agency considers requests for extension if a reasonable basis for extension is provided. It is not necessary to modify these regulations to provide for extending comment periods. The Agency generally does not announce in the Federal Register meetings with registrants or other stakeholders because it needs the flexibility to hold such meetings when the need arises. EPA may meet privately with industry to discuss proprietary or other confidential business information. Under § 155.52(a) and (b), EPA will place in the docket minutes of meetings with registrants or other stakeholders. In comments on the proposed rule, various stakeholders advised the Agency of their expectations and needs regarding the documentation of registration review decisions and suggested how this documentation might be presented. EPA appreciates these suggestions. The Agency has consulted the Pesticide Program Dialogue Committee and has considered their recommendations together with comments submitted on the proposed procedural regulations. Nothing in the comments indicates the need to modify the regulation to specify the format of the registration decision document.	Procedures were changed to provide for public input into risk mitigation measure selection. The language about extensions should be quoted in future extension requests. To date, no comment period extension request made by a California water quality agency has been granted.

Table B-5. Pesticide Registration Review Rule Comment Summary
Comments from California Water Quality Agencies (Continued)

Comment	U.S. EPA Response (Excerpt)	Notes
6. Goals—A key goal of the registration review process should be to protect water quality and minimize the need to mitigate pesticide impacts through Clean Water Act mechanisms. (CASQA)	The Agency believes that the goal of registration review is set forth in FIFRA section 3(g) and reiterated in §155.40. Registration review is a determination whether a pesticide continues to meet the FIFRA standard for registration, including, among other things, that the pesticide does not cause unreasonable effects on the environment. As part of this review, EPA will assess the effects of pesticides on water quality. However, while meeting Clean Water Act standards is important, it is not the only goal of registration review.	
7. New Environmental problems—This topic was not specifically discussed in water quality agency comments on this rule, but subsequent letters request timely action to respond to the pyrethroids problem.	In the preamble of the proposed rule, the Agency explained that it will continue to give priority to emerging risk concerns. While reviewing the new risk concern, the Agency may find that it would be more efficient to review all other aspects of the pesticide's registration at the same time. The procedural regulations for registration review provide flexibility to amend the schedule to advance the registration review of a pesticide in this circumstance. The Agency would provide as much advance notice as possible regarding such changes in the schedule. Commenters took exception to EPA's approach for managing emerging issues arguing that newly discovered risks of potential concern should be dealt with outside of registration review if the risks are urgent. The commenters believe that registration reviews should not be rescheduled under this circumstance. The Agency does not agree that it should reassess the approach described in the preamble of the proposed rule. EPA fully explained its reasoning in the proposed rule and the comments do not persuade it otherwise. This is not to say that the Agency will not address urgent risks of concern outside the registration review process if the Agency determines that to be the appropriate course of action.	

Table B-6. Resmethrin Preliminary Risk Assessments Comment Summary
Comments from California Water Quality Agencies

Comment	U.S. EPA Response (Excerpt)	Notes
1. Need comprehensive pyrethroids review. (Water Board)	No response in response to comments document. RED says: "The pyethroids are tentatively scheduled for re-evaluation under the proposed Registration Review program in 2010." "It is important, as some commenters have suggested, to perform a risk assessment for all of the pyrethroids at the same time."	Once initiated, registration review would likely take 1-2 years to complete. The soonest that the planned U.S. EPA review would generate any action to address toxicity in surface water sediments from pyrethroids would be five years from now.
2. Water quality criteria should be used to assess resmethrin risk. (Water Board)	The decision to advance resmethrin for consideration in establishing a Water Quality Criteria (WQC) lies within the purview of Office of Water (OW). The Office of Pesticides Program (OPP) stands ready to collaborate with the OW within the confines of Confidential Business Information (CBI).	U.S. EPA response indicates that OPP standard risk assessment procedures need to be modified if water quality criteria (or values calculated by OW water quality criteria methods) are to be used in pesticide risk assessments.
3. Chemical analytical method to measure environmentally relevant concentrations of resmethrin is needed. (Water Board)	It is noted the US Geological Survey publication cited elsewhere in this document (Abbene, I.J. *etal*. 2005 Concentrations of Insecticides in Selected Surface Water Bodies in Suffolk County, New York, Before and After Mosquito Spraying 2002-04, Open-File Report 2005-1384, 14 p. online only). This publication consists of limited monitoring of areas where resmethrin was applied. The method consists of liquid-liquid extraction and GC/MS. It is cited (Zimmerman, L.R., *etal*. 2001 and can be found in the web at http://ks.water.usgs.gov/Kansas/pubs/reports/ofr.01-273.html The method is available both from the web or in convenient pdf format.	The cited method is a USGS method with an MDL of 5 ng/L, which should be sufficient.

Table B-6. Resmethrin Preliminary Risk Assessments Comment Summary (Continued)
Comments from California Water Quality Agencies

Comment	U.S. EPA Response (Excerpt)	Notes
4. Surveillance monitoring data for resmethrin in surface water are needed. (Water Board)	The requested monitoring appears to be a requirement for all pesticides. However, for resmethrin, this decision is deferred to SRRD. [No response from SRRD].	
5. Sediment toxicity data should be obtained for *Hyalella azteca*. Require chronic toxicity testing for fresh water sediment-dwelling organisms. (Water Board)	The request has been changed; the testing should now be done with *Hyalella azteca* instead of *Chironomus tentans.* It is true that no sediment data are presently available for inclusion in this assessment; however, we are currently requesting acute sediment studies for freshwater and estuarine/marine benthic organisms that will be incorporated into the assessment. At this time, we are also requesting chronic sediment studies with estuarine/marine benthic organisms but not with freshwater organisms because the estuarine organisms appear to be more sensitive based on water column toxicity tests. Chronic sediment studies with freshwater organisms will be in reserve pending the results of the acute sediment studies with freshwater organisms and the chronic sediment studies with estuarine/marine organisms. All sediment studies will be performed with the TGAI because only the TGAI (and not PBO) is expected to bind to sediment. The risk assessment will be updated when the data are received.	Freshwater is a critical endpoint; need data to assess pyrethroids cumulative risks. PBO does partition into sediment (log Kow 4.75). This was documented experimentally (Amweg et al. 2006). No timeline for risk assessment update (unlikely to occur prior to registration review).
6. Should use data from literature, ECOTOX ("cursory review" insufficient). (Water Board)	The open literature from the ECOTOX database has been reviewed and the appropriate data have been included in the revised risk assessment.	Note that OPP isn't accepting all data in ECOTOX—it has different standards that cause it to exclude some data that other EPA programs find acceptable.

Table B-6. Resmethrin Preliminary Risk Assessments Comment Summary (Continued)
Comments from California Water Quality Agencies

Comment	U.S. EPA Response (Excerpt)	Notes
7. Risks may be understated because toxicity data are based primarily on nominal concentrations. (Water Board, LACSD, Tri-TAC)	The EFED is aware of the uncertainty posed because some of the data were based on nominal concentrations and the toxicity may have been underestimated and has indicated it in the risk characterization.	
8. Require acceptable acute & chronic aquatic toxicity data for both a.i. and formulations. (Water Board, Tri-TAC, LACSD)	Acute risk to aquatic organisms in the water column due to exposure to both the TGAI and formulation is being requested by the EFED because the end-use products may be applied directly to aquatic environments when used as directed, aquatic acute LC_{50} or EC_{50} values based on exposure to resmethrin TGAI may be equal to or less than the maximum expected environmental concentration or the estimated environmental concentration in aquatic systems when the product is used as directed, and resmethrin formulations often include a synergist (PBO) that is expected to enhance the toxicity of the active ingredient and may be toxic to aquatic organisms on its own. Chronic risk to aquatic organisms in the water column as a result of exposure to formulated resmethrin will not be determined in this risk assessment because the varying physical-chemical properties of the individual components of resmethrin formulations (e.g., the lipophilic nature of resmethrin and its affinity for adsorbing to particulate and sediment) are expected to result in progressively different formulation constituents in environmental media over time. As the proportions of formulation components in environmental media are expected to differ from the proportions in the formulation tested in laboratory toxicity studies, the assumption that environmental residues are toxicologically equivalent to tested formulations cannot be supported beyond the time period immediately following product application.	The request for acute sediment toxicity test data for freshwater organisms is being "held in reserve." This would mean that EPA would not be requiring acute toxicity data for Hyalella azteca (which currently do not exist). The DCI does not call out aquatic toxicity testing requirements for formulated products.

Table B-6. Resmethrin Preliminary Risk Assessments Comment Summary (Continued)
Comments from California Water Quality Agencies

Comment	U.S. EPA Response (Excerpt)	Notes
9. Complete wastewater discharge risk assessment. (Water Board, Tri-TAC, LACSD)	The SRRD provided the total volume data to the EFED. That is the maximum amount of resmethrin that could potentially reach the "drain." In the absence of a level of removal, the EFED modeled it with the help of the computer program EPIWIN. The Estimations Programs Interface for Windows (EPIWIN) is an interface program that transfers a single SMILES notation to ten separate structure estimation programs. The interface works among those programs with STPWIN (Sewage Treatment Plant Fugacity Model), and LEVEL3NT (Level III Fugacity Model) by transferring the molecular weight, the Henry's Law Constant, log octanol/water partition coefficient and various volatilization parameters. In the end, the EPIWIN program offers two levels of removal, estimated by two different methods. The EFED used the most conservative value (the lowest level of removal). With the aid of the "down-the-drain" module of E-FAST, acute and chronic EECs were obtained. The resulting EECs were compared against the toxicity reference values and it was found no exceedances in the levels of concern on an acute or chronic basis for any of the species checked (freshwater or estuarine/ marine). SDLAC and Tri-TAC do not consider a major route of dissipation for most of the synthetic pyrethroids. Resmethrin binds to sediments and organic matter, and it is likely that at least during sedimentation and filtration it will be reduced substantially. The EPIWIN program predicted two levels of removal for this chemical as follows: 98.82% and 92.67%. Note that very low levels of resmethrin were calculated for acute and chronic EECs.	Pyrethroids that bind to sewage sludge may not be "dissipated"; they may remain in sludge. Sludge was not evaluated. Few details of modeling provided, but it looks like the same approach as permethrin was used, so the same problems with the modeling exist. The concentrations are so low in this case that the modeling problems are unlikely to modify the risk assessment's conclusion. There appears to be some mixing of sewer and urban conclusions in the risk assessment (some language assumes that sewer discharge is the only urban pathway to surface water; other language reflects issues with urban runoff).
10. Bioaccumulation is a concern. (Tri-TAC, LACSD)	With respect to the bioaccumulation, that is a non issue.	Response did not include a citation (but neither did comment).

Table B-6. Resmethrin Preliminary Risk Assessments Comment Summary (Continued)
Comments from California Water Quality Agencies

Comment	U.S. EPA Response (Excerpt)	Notes
11. Need environmental fate data for resmethrin in aquatic sediments. (Water Board)	No response.	Should request that these data be included in the U.S. EPA's Data Call In requirement (they are not currently in EPA's data requirement list).
12. Temperature needs to be considered (toxicity increases as the temperature decreases).. (Water Board)	The EFED is aware that pyrethroids have exhibited a negative temperature coefficient of toxicity and would consider incorporating evidence that substantiates this behavior if such data become available for resmethrin. However, at this time, acceptable substantive data are not available for quantitative use in this risk assessment.	Citations documenting toxicity change with temperature need to be submitted to U.S. EPA.
13. Cumulative risk assessment needed. Look at cumulative effects with other pesticides, including other pyrethroids and PBO. (Water Board; Tri-TAC, LACSD assessment for formulated products)	EFED does not conduct cumulative environmental risk assessments with regard to individual REDs; however, the Division is conducting a comparative assessment of selected synthetic pyrethroids at this time. Dr. Weston was contacted on Jan. 5, 2006 regarding two forthcoming papers on synergism of pyrethroids with PBO. The first, to be published in *Environmental Toxicology & Chemistry*, deals with the occurrence of PBO alone, and indicates little potential for synergism. The second, which has yet to be submitted for publication, indicates some potential for synergism from mosquito spraying of PBO with pyrethrins. In RED: "It is important, as some commenters have suggested, to perform a risk assessment for all of the pyrethroids at the same time."	Send U.S. EPA copies of Weston team's PBO papers.
14. Please coordinate with Office of Water on review of resmethrin. (Water Board)	No response.	

Table B-6. Resmethrin Preliminary Risk Assessments Comment Summary (Continued)
Comments from California Water Quality Agencies

Comment	U.S. EPA Response (Excerpt)	Notes
15. Risk mitigation should be thorough, should ensure safer alternatives will be used. • Alternatives analysis needed for urban risks. • Cost-benefit analysis should include state & municipal compliance costs. • Labels should be modified to inform users of the hazards to aquatic organisms. • Labels should limit number of applications per year. • Mosquito abatement products should specify application restrictions. • Labels should preclude application prior to rain. • Complete a use cluster assessment (e.g., ants) to support risk management decisions for urban uses. (Water Board)	No response in response to comments document. RED says:: "… the lack of knowledge which makes it difficult to develop an urban pesticide transport model also makes it difficult to identify meaningful mitigation at this time. The Agency has developed some initial mitigation options during the reregistration process, and intends to identify steps which can be taken to allow a greater understanding of potential ecological risk from urban pyrethroid uses." " One reason that broad mitigation measures cannot be adopted during reregistration is that only three pyrethroid insecticides are required to be reviewed for reregistration in accordance with FQPA. If use restrictions were placed on one of these three pesticides, one of the other pyrethroids would likely replace it for that use." <u>Environmental Hazards Statements Required on Labels</u> *"Occupational use" products that have outdoor use sites (excludes residential & mosquito abatement products)* This pesticide is toxic to fish, aquatic invertebrates, and oysters/shrimp. Do not apply directly to water, or to areas where surface water is present or to intertidal areas below the mean high water mark. Do not contaminate water when disposing of equipment washwater or rinsate. Drift and runoff may be hazardous to aquatic organisms in water adjacent to treated areas. This product may contaminate water through runoff. This product has a potential for runoff for several days after application. Poorly draining soils and soils with shallow water tables are more prone to produce runoff that contains this product. A level, well maintained vegetative buffer strip between areas to which this product is applied and surface water features such as ponds, steams, and springs will reduce the [continued on next page]	• No alternatives analysis was done for urban uses other than mosquito abatement. • No cost-benefit analysis was done for urban uses. • No use cluster assessment. • Outdoor—<u>but not indoor</u>—products will include environmental hazard language that mentions hazards to fish. • Mosquito abatement products will specify application restrictions. • Allowable application rates set for the first time. No specification of allowable application frequencies ("minimum re-treatment interval") in outdoor urban areas.

Table B-6. Resmethrin Preliminary Risk Assessments Comment Summary (Continued)
Comments from California Water Quality Agencies

Comment	U.S. EPA Response (Excerpt)	Notes
(15 Continued)	potential for contamination of water from rainfall-runoff. Runoff of this product will be reduced by avoiding applications when rainfall is forecasted to occur within 48 hours. Sound erosion control practices will reduce this product's contribution to surface water contamination." Products labeled solely for indoor use may omit the Environmental Hazards statements above. *Residential use products* "This product is extremely toxic to fish, aquatic invertebrates, and oysters/shrimp. Do not apply directly to or near water. Drift and run-off may be hazardous to fish in water adjacent to treated areas. Do not contaminate water when disposing of equipment, washwater, or rinsate. See Directions for Use for additional precautions and requirements." Products labeled solely for indoor use except as noted below may omit the Environmental Hazards statements above. <u>Directions for use</u> Products labeled for use in outdoor use sites, except for Ready to Use Formulations: "Do not apply directly to or near water, storm drains, or drainage ditches. Do not apply when windy. To prevent product run-off, do not over water the treated area(s) or apply when heavy rain is expected. Rinse application equipment over lawn or garden area only." Ready to use products labeled for outdoor use sites: "Do not apply directly to or near water, storm drains, or drainage ditches. Do not apply when windy. To prevent product run-off, do not over water the treated area(s) or apply when heavy rain is expected."	• Application label language is an improvement. Should mention sewers (or "gutters and drains"). • Reference to "heavy" rain is unclear. Rain in any quantity can cause runoff and there is no consensus for what constitutes "heavy" rain.

Table B-6. Resmethrin Preliminary Risk Assessments Comment Summary (Continued)
Comments from California Water Quality Agencies

Comment	U.S. EPA Response (Excerpt)	Notes
16. Public participation process should not be truncated—full 6-phase process is warranted. (Water Board, Tri-TAC, LACSD)	The EFED defers the decision to conduct a full six-phase RED for resmethrin to SRRD. The USEPA ECOTOX database was incorporated into the risk assessment. [No response from SRRD.]	U.S. EPA's actions showed that it did not accept this request.
17. Pyrethroids have been found to cause toxicity in creek sediments in California urban areas (Water Board)	One of the risk assessment goals of the Office of Pesticide Programs (OPP) is to estimate pesticide exposure through all significant routes of exposure in both rural and urban areas. For aquatic ecological exposure assessments for pesticides which have urban uses, OPP assumes separate routes for exposure for indoor and for outdoor uses. For indoor uses that may result in pesticide residues in wastewater (treatments to insects, pets, clothing, etc.), it is assumed that wash water containing pesticide residue flows into a building drain and passes through a sanitary sewer and publicly owned treatment works (POTW) before being discharged to surface water. For outdoor urban uses (applications to home lawns, gardens, parks, etc.), it is assumed that runoff water from rain and/or lawn watering may remove pesticide to storm sewers and then directly to surface water. Simulation of each of these routes of exposure is important to the overall assessment. OPP has developed methods and carried out assessments for indoor uses which ultimately discharge through a POTW to surface water, but has made less progress in estimating discharges resulting from urban outdoor uses. Where applicable, monitoring data from urban areas, such as that collected by the USGS NAWQA program and others, are regularly included in OPP risk assessments. Estimating pesticide in runoff from urban areas through computer simulation modeling has proven more difficult. Developing methods for modeling aquatic ecological pesticide exposure in urban areas is difficult due to lack of a model specifically developed to simulate pesticide fate and transport in a complex urban landscape. Data for model input (pesticide application amount and timing; physical representation of the urban landscape, storm sewer and receiving water configuration) and for model calibration (past history of flow and pesticide [Continued on next page]	Lack of urban modeling capability is being used to postpone meaningful risk management actions for urban areas.

Table B-6. Resmethrin Preliminary Risk Assessments Comment Summary (Continued)
Comments from California Water Quality Agencies

Comment	U.S. EPA Response (Excerpt)	Notes
(17 Continued)	concentrations) is also generally unavailable. OPP is aware that pesticide aquatic simulations have been performed by the EPA Office of Water (OW) and has discussed the technical feasibility of their methodology for national-scale assessments required under FIFRA. The OW modeling efforts have been extremely time-consuming requiring collection of specific use information and extensive data for parameterization for the simulated watershed. OPP has identified limitations and deficiencies in existing models and data as part of the methods-development process. These include the following: • OPP conducts national-level exposure/risk assessments for pesticide registration. Supporting models need to be flexible enough to simulate large numbers of sites nationally. Simulations of a single site for which there may be existing data would be unlikely to provide useful information for a national registration. Local, site-specific exposure assessments are only performed for endangered species risk assessments. • Many urban runoff models were designed primarily as water quantity rather than water quality models and do not have water quality modeling capabilities sophisticated enough to simulate pesticide fate and transport (e.g. HEC2, SWMM). Models that simulate pesticides need components to handle runoff and leaching as well as chemical degradation, dissipation, volatilization and adsorption/desorption for both the land and the water components of the model. • Models used for simulating pesticide use in agricultural areas (e.g. PRZM, GLEAMS, SWRRBWQ, EPIC/APEX, SWAT, etc) typically do not include features needed to simulate urban areas. Urban settings include impermeable surfaces; storm sewer networks; pumping stations; temporary holding ponds; individual, small-scale lawn irrigation systems; and experience multiple, relatively small temporally and spatially variable applications that are not simulated in agricultural models. • Some commonly used models need extensive monitoring data for calibration (e.g. HSPF included in the OW BASINS platform) and therefore can only be used to simulate sites and pesticides for which extensive flow and pollutant data has been collected in advance. This type of model cannot be used to simulate unmonitored sites or pesticides. • Homeowner application data is not readily available and is difficult to estimate with any degree of confidence. Estimates of the pesticide application area and rate as well as its temporal and spatial distribution are needed to simulate pesticide in runoff in an urban area. [Continued on next page]	

Table B-6. Resmethrin Preliminary Risk Assessments Comment Summary (Continued)
Comments from California Water Quality Agencies

Comment	U.S. EPA Response (Excerpt)	Notes
(17 Continued)	• Unlike scenario sites for agricultural simulations; representative, high-exposure, urban watersheds and water bodies that can be used in national-scale, pesticide exposure assessments in urban landscapes have not been developed. Receiving water bodies developed for use in simulating aquatic ecological exposure of pesticides used in agricultural were designed based on USDA farm-pond construction guidelines. These guidelines were used in the mid-1900s to design and build hundreds of thousands of rural water bodies. These agricultural modeling sites represent a common feature in rural areas. • It is likely that pesticide in runoff in urban areas is impacted by inadvertent application of lawn-care products to impermeable surfaces (driveways, sidewalks or road surfaces adjacent to lawns). Crack and crevice applications are specifically designed to be applied to these hard surfaces. Data on deposition/degradation/resuspension and washoff from impermeable surfaces are not available. OPP has, and continues, to consult with other offices within EPA as well as other federal, state and local agencies on available tools and methodologies for assessing aquatic exposure from urban/suburban pesticide use. However, until such time as a reasonable modeling approach which is appropriate for a national-scale risk assessment is developed, OPP will continue to rely predominantly on available monitoring data for characterizing aquatic exposure from urban runoff. Risk assessments indicate that these data provide estimates of a lower bound of potential exposure.	