AGENDA

California Environmental Quality Act (CEQA) Scoping Meeting and Public Workshop on the Control of Discharges of Pesticides in the San Joaquin and Sacramento River Basins (February 2006)

1. Introduction/Agenda Review – 10 minutes (Joe Karkoski)
   The agenda will be reviewed and Regional Board staff introduced.

2. Background – 10 minutes (Joe Karkoski)
   Staff will discuss the background that led to the current proposed effort. The audience will have an opportunity to ask questions.

3. Proposed Scope of Amendment – 20 minutes (Joe Karkoski)
   Staff will discuss the proposed scope of the Basin Plan Amendment. The audience will have an opportunity to ask questions and provide comments on the proposed scope.

4. Current Status
   The audience will have an opportunity to ask questions and provide comments.

   a. Risk Assessment Report – 25 minutes (Jamie Lu)
   A draft relative risk assessment of pesticides to surface waters has been prepared for the Sacramento Valley. The approach used to rank relative risk and the results will be presented.

   b. Water Quality Criteria Development – 15 minutes (Paul Hann)
   The Regional Board has a contract with UC Davis to develop pesticide water quality criteria. The scope of work and status will be presented.

   c. Sediment Quality Criteria Development – 10 minutes (Paul Hann)
   The status of efforts to develop narrative and numeric sediment quality criteria will be presented.

   d. Aquatic life use assessment – 10 minutes (Petra Lee)
   The status of efforts to evaluate aquatic life uses will be discussed.

   e. Monitoring – 10 minutes (Petra Lee)
   The status of monitoring efforts to evaluate the presence of pesticides identified in the risk assessment will be reviewed.

5. Next Steps - 10 minutes (Joe Karkoski)

6. Adjourn

See other side for summary of current status and contacts.

This Page Intentionally Blank

California Regional Water Quality Control Board
Central Valley Region
Robert Schneider, Chair

Alan C. Lloyd, Ph.D.
Agency Secretary

Arnold Schwarzenegger
Governor

Sacramento Main Office
11020 Sun Center Drive #200, Rancho Cordova, California 95670-6114
Phone (916) 464-3291 • FAX (916) 464-4645
http://www.waterboards.ca.gov/centralvalley

Sacramento and San Joaquin River Watersheds Pesticide Basin Plan Amendment
Fact Sheet

1 Introduction

This fact sheet outlines an effort to develop a comprehensive pesticide Basin Plan Amendment for the Sacramento and San Joaquin River watersheds, including the Delta. The Amendment would be designed to establish water quality objectives and a program of implementation for pesticides that are impacting or could potentially impact aquatic life uses in surface waters. The focus of this Amendment will be on natural streams that have aquatic life uses.

This comprehensive Basin Plan Amendment is expected to be more cost effective and efficient then other Basin Planning options (e.g. water body by water body). In addition, focusing solely on pesticides on the current Section 303(d) impaired water body list could lead to increased use of other pesticides, which may then cause water quality problems leading to the potential need for further Basin Plan Amendments. Clearly identified numeric water quality objectives should also facilitate the implementation of any Regional Board regulatory programs governing the discharge of pesticides.

The following summarizes a work plan to address pesticide runoff in the Sacramento and San Joaquin River watersheds in a comprehensive manner. The geographic scope of this project and potential number of pesticides addressed may change pending further internal review.

2 Goals and Objectives

2.1 Goals of Pesticide Basin Plan Amendment

The primary goal of the Pesticide Basin Plan Amendment is to provide a clear regulatory framework for the protection of aquatic life from pesticide runoff in the Sacramento and San Joaquin River Watersheds, including the Delta. The Amendment will be focused on those pesticides that have the greatest potential to impact aquatic life. The regulatory framework under consideration will include beneficial uses, site-specific numeric water quality objectives, implementation policies, and monitoring requirements.

Regional Board staff will work closely with the Department of Pesticide Regulation, County Agricultural Commissioners, and U.S. EPA to ensure that efforts to regulate pesticide discharge and pesticide use are as mutually supportive as possible. Interaction with stakeholders will also be critical to ensuring the Basin Plan Amendment is clear, technically valid, and achievable.

A secondary goal is to establish clear procedures that can be used to develop numeric water quality objectives for pesticides that may be registered in the future. Such a procedure would facilitate development of numeric objectives, as well as assisting DPR in the evaluation of pesticides going through the registration process.

2.2 Objectives of Pesticide Basin Plan Amendment

To accomplish its goal, Regional Board staff has the following objectives:

1) Identify those streams in the Sacramento and San Joaquin River watersheds that should fully support aquatic life in the absence of elevated pollutant levels.
2) Identify those pesticides that pose the greatest potential threat to aquatic life, whether in the benthos or water column. At a minimum, diazinon and chlorpyrifos will be addressed.
3) Identify numeric metrics that, when attained, will protect aquatic life from the interactive or individual effects of those pesticides identified in #2.
4) Identify viable management measures to prevent pesticide impacts.
5) Determine the time frame necessary to develop and implement any necessary management measures.
6) Determine the available assimilative capacity for each pesticide or pesticide combination and allocate the assimilative capacity to known sources of those pesticides.
7) Establish a clear process for communicating with stakeholders during the development of the Basin Plan Amendment.
8) Ensure appropriate monitoring of pesticides is conducted

3 Scope of Work

The following technical reports will be produced as part of this Basin Plan Amendment process:

Aquatic Life Beneficial Use Assessment –most streams in the Sacramento and San Joaquin River watersheds are not specifically identified in the Basin Plan. This report will include a review of the aquatic life beneficial uses that apply to streams (not constructed conveyances) that may receive pesticide runoff.

Pesticide Risk Assessment – the number of pesticide active ingredients used on agricultural crops in the Sacramento and San Joaquin Valleys numbers in the hundreds. The risk that a pesticide poses to surface waters depends on a number of factors, including the amount of pesticide used, the timing of use, the physical-chemical properties of the pesticide, the sensitivity of aquatic organisms to the pesticide, whether it can act in an additive or synergistic manner with other contaminants, and the crops upon which it is applied. Pesticides currently on the Clean Water Act Section 303(d) list will be assumed to pose a risk. These factors, along with others, will be evaluated to determine which pesticides pose the greatest potential risk to aquatic organisms in stream sediment or the water column. This is a screening level assessment that will allow Central Valley Water Board staff to determine where to focus efforts for criteria development.

Water Quality Criteria – based on the pesticide risk assessment, water quality criteria will be developed for pesticides that pose a potential water column risk either individually or in combination with other pesticides, depending on availability of funding. At a minimum, criteria for diazinon and chlorpyrifos will be developed. The criteria document will include a summary of the available toxicity test results and a proposed methodology for establishing criteria when limited lab toxicity data is available.

Sediment Quality Criteria – it is anticipated that certain pesticides currently in wide use will not pose the greatest risk in the water column, but in the sediment. This report will summarize any available data on sediment toxicity for those pesticides. Both potential narrative and numeric sediment quality criteria will be considered.

Source Assessment and Loading Capacity Analysis – the sources of the pesticides posing a potential risk to surface water will be identified, and, where possible, the relative contribution of each source will be quantified. Water quality models or other methods will be used to estimate the loading capacity for the "high" risk pesticides and to identify potential urban and agricultural sources. Loading capacity estimates will consider additive or synergistic toxicity effects.

Management Practice Alternatives – for certain pesticides, reductions in pesticide discharge will be required in order to attain water quality objectives. The management practices available to reduce those discharges will be evaluated. Management practices considered may include alternate pest management strategies, practices that reduce runoff or off-site movement of pesticides, and irrigation or water management practices. Management practices will be evaluated by crop, where appropriate. An estimate of the effectiveness of the practice in reducing pesticide runoff will be made when such data is available.

4 Current Status (01/30/06) and Contacts

Project Contact – Joe Karkoski (916) 464-4668; jkarkoski@waterboards.ca.gov

Aquatic Life Use Assessment – Staff have completed an initial literature review of fish distribution in the Central Valley and results of bioassessments. Staff will also conduct a limited bioassessment monitoring effort in 2006 in some streams not currently identified in the Basin Plan. Contact – Petra Lee (916) 464-4603; plee@waterboards.ca.gov

Pesticide Risk Assessment – A draft pesticide risk assessment for the Sacramento Valley has been completed. Staff is working on similar assessments for the Delta and San Joaquin Valley. Contact – Zhimin (Jamie) Lu (916) 464-4830; zlu@waterboards.ca.gov

Water Quality Criteria – The Central Valley Water Board has entered into a contract with the Environmental Toxicology Department of the University of California, Davis to evaluate and develop an aquatic life criteria methodology. The contract has three primary tasks – 1) a review of existing criteria derivation methodologies; 2) identification of a viable existing method or development of a new method using the best available science; and 3) derivation of criteria for at least diazinon and chlorpyrifos – other pesticides will be addressed based on funding availability. Scientific peer review of each of the primary work products will take place. Contact – Paul Hann (916) 464-4628; phann@waterboards.ca.gov.

Sediment Quality Criteria – Staff has begun to review available sediment criteria methodologies. Contact – Paul Hann (916) 464-4628; phann@waterboards.ca.gov.

Source Assessment and Loading Capacity Analysis – This analysis will be conducted after completion of the pesticide risk assessment.

Management Practice Alternatives – A review of management practices has been conducted for management of pesticide runoff during the dormant and irrigation seasons (http://www.waterboards.ca.gov/centralvalley/programs/tmdl/sjrop/ag_practices_report.pdf). Based on the pesticide risk assessment, the report will be reviewed and potentially updated to reflect any new information on management practices. Contact – Joe Karkoski (916) 464-4668.

For more information, please see: http://www.waterboards.ca.gov/centralvalley/programs/tmdl/pest-basinplan-amend/index.html

To sign up on our e-mail subscription list, please go to:
http://www.waterboards.ca.gov/lyrisforms/reg5_subscribe.html

Sacramento River and San Joaquin River Basin Plan Amendment to Control Discharges of Pesticides

Mailing List Sign-up

In order to continue to receive notices regarding this issue, interested parties must notify the Central Valley Regional Board by subscribing to the electronic mailing list at:

http://www.waterboards.ca.gov/lyrisforms/reg5_subscribe.html

(NOTE: Check the box titled "Central Valley Pesticide TMDL and Basin Plan Amendment")

Alternatively, fill out and returning the form below to:

Paul Hann
California Regional Water Quality Control Board
Central Valley Region
11020 Sun Center Drive, #200
Rancho Cordova, CA 95670

Name _____

Affiliation _____

Address _____

_____

Phone Numbers _____

E-mail _____

_____ Yes, please send notifications to my e-mail address:

_____ Yes, please send notifications to my Postal address:

_____ I have received multiple paper notifications; please remove duplicates from your database.

_____ No, I am not interested in this issue but would like to remain on the mailing list.

- _____ You can send notifications to my e-mail address.
- _____ Continue sending notifications to my postal address.

_____ No, I am not interested in Basin Plan Amendments; please remove me from this mailing list.

_____

_____

_____

Place
Stamp
Here

Paul Hann
Regional Water Quality Control Board
11020 Sun Center Drive, #200
Rancho Cordova, CA 95670

Central Valley
Regional Water Quality Control Board
California Environmental Quality Act
(CEQA) Scoping Meeting for the Control
of Pesticide Discharges

Introduction

- Joe Karkoski, Chief, Pesticide TMDL Unit
- Jamie Lu, Ph.D., Water Resources Control Engineer
- Paul Hann, Environmental Scientist
- Petra Lee, Environmental Scientist

Meeting Agenda

- Introduction/Agenda Review
- Background
- Proposed Scope of Amendment
- Current Status
- Next Steps
- Adjourn

Introduction of Terms

- Regional Board – 9 regional boards; our Board covers the Central Valley
- Basin Plan – contains water quality regulations & policies adopted by the Regional Board
- TMDL – "total maximum daily load" – the maximum amount of a pollutant that can be in the water without exceeding water quality standards

Where are we in the process?

Draft Risk Evaluation Report	November 2005
Monitoring Plan/ Criteria Development Contract	December 2005
CEQA Scoping Meeting	February 2006
Draft BPA Staff Report to Peer Review	March 2007
Regional Board Hearing	December 2007
State Board Approval	Mid 2008
Office of Administrative Law Approval	Late 2008
USEPA Approval	Early 2009

Previous Regional Board Efforts

- Diazinon/chlorpyrifos had been identified as significant water quality problems
- Basin Plan Amendments adopted for:
  - Sacramento/Feather Rivers
  - Sacramento urban creeks
  - San Joaquin River
  - Delta (pending peer review)

Lessons Learned

- Key regulatory provisions are similar for each water body
- Alternatives to the pesticides we focus on may cause water quality problems
- Close communication and collaboration w/ DPR & Ag Commissioners was important
- Pesticide manufacturers can play positive role to protect water quality through label changes and provide scientific/technical information

Comments from Public

- Tributary streams are important
- Potential impacts of alternative pesticides should be evaluated
- Additive or synergistic impacts should be considered
- Numeric water quality objectives should be established
- Consider alternatives to US EPA's method for deriving water quality criteria

Proposed Scope of Basin Plan Amendment

- Geographic scope – Sacramento and San Joaquin watersheds
- Waterways - Natural streams below major reservoirs that could receive pesticide discharge from urban or agricultural areas
- Pesticides to address – currently registered on 303(d) list plus an additional 3-5 identified as potentially “high” risk to aquatic life

Project Area

Proposed Scope of Basin Plan Amendment

- Natural streams not identified in Basin Plan – review appropriate aquatic life beneficial uses
- Establish numeric water quality objectives for pesticides that impact water column
- Establish narrative sediment quality objectives and policies for determining compliance

Proposed Scope of Basin Plan Amendment

- Establish "Total Maximum Daily Loads" and any other regulatory provisions to ensure attainment of objectives
  - Provisions will consider how to effectively implement through existing NPDES and Irrigated Lands programs
- Consider and estimate cost of any proposed regulations
- Establish any necessary monitoring provisions

Scoping Comments

- Looking for comments on range of actions, alternatives, mitigation measures, and significant effects
- Requesting written comments by March 17, 2006
- Comments can be e-mailed to Joe Karkoski at jkarkoski@waterboards.ca.gov

Questions?

Current Status

- Work products that are being developed
  - Pesticide Risk Assessment report
  - Water quality criteria
  - Sediment quality criteria
  - Aquatic life use assessment
  - Water quality monitoring

What will Work Products Provide?

- Technical reports will:
  - identify pesticides to focus on
  - define acceptable levels through development of criteria
  - identify streams to focus on
  - describe current conditions through monitoring

Relative Risk Evaluation for Pesticides Used in the Sacramento Valley

Zhimin (Jamie) Lu
Gene Davis
Joe Karkoski

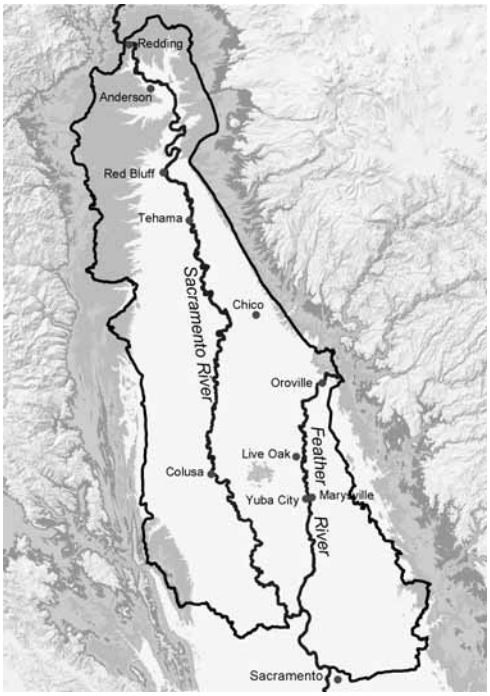
Introduction

- Over three hundred pesticides were applied in the Sacramento valley
- Several pesticides are included on 303(d) list (e.g. diazinon, chlorpyrifos, malathion, molinate)
- Most pesticides have not been evaluated for risk to surface water quality in the Sacramento River watershed

Objective

Determine the RELATIVE RISK for selected pesticides

- Evaluate the risk to surface water quality
- Evaluate the risk for sediment contamination

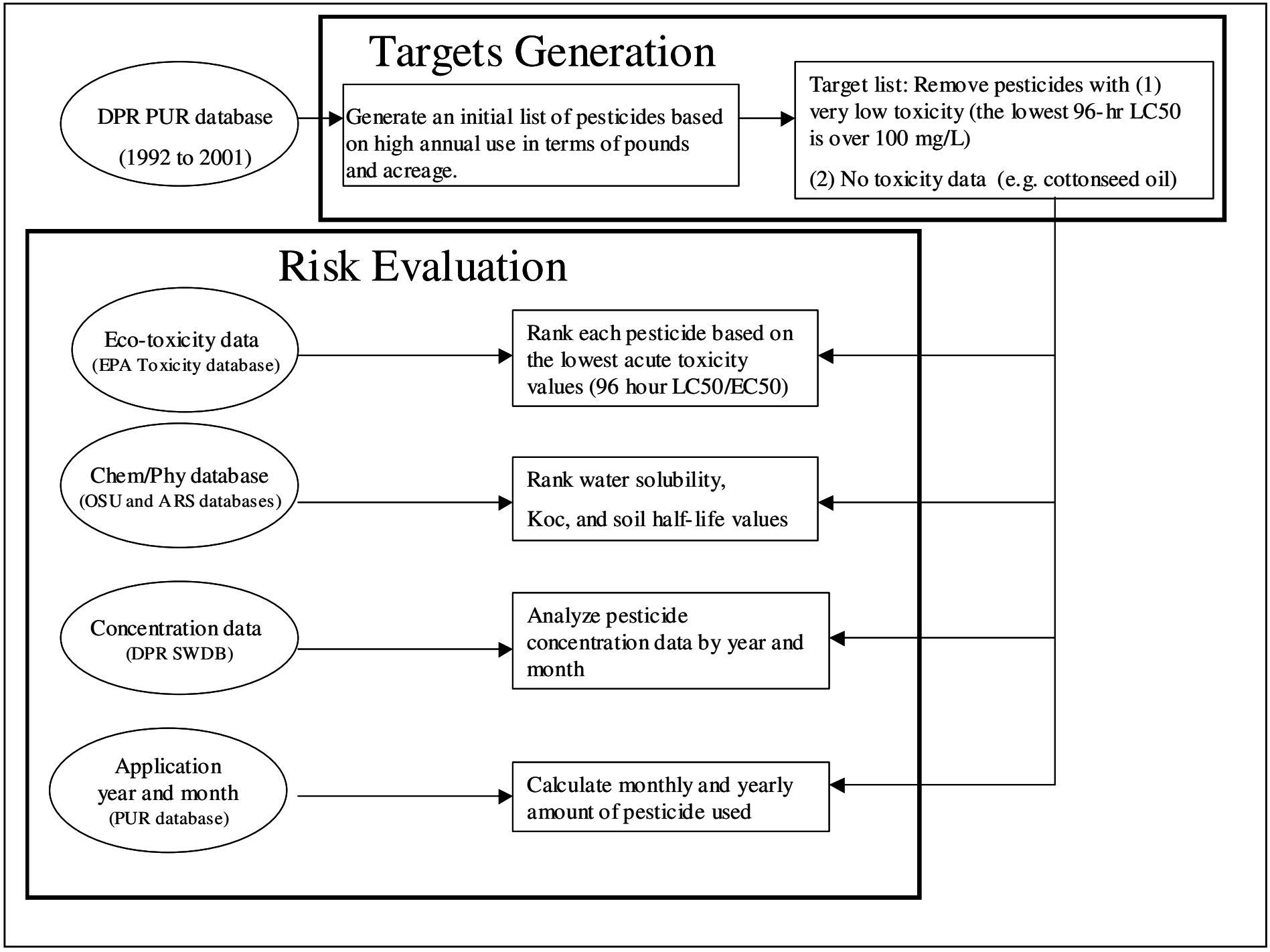


Introduction of Terms

- LC50/EC50 values: Lethal Concentration to 50% of tested population (LC50); Effect Concentration at 50% of tested population (EC50)
- Water Solubility: the maximum amount of the pesticide that will dissolve in one liter of water
- Soil absorption coefficient, Koc: the ratio of the mass of pesticide adsorbed per unit mass of soil to the mass of the pesticide remaining in solution at equilibrium
- Half-life in soil: time required for half of the pesticide to degrade in soil

Data

- Pesticide use database (DPR PUR database)
- Toxicity database (EPA toxicity database)
  (The lowest 96/48 hour LC/EC50 values for aquatic animals and the lowest 5-d/4-d EC50 values for aquatic plants were used for toxicity evaluation)
- Chemical and physical properties (USDA ARS database) (water solubility, Koc, half-life in soils)
- Pesticides Concentrations (DPR SWDB)


Targets Generation
DPR PUR database
(1992 to 2001)
Generate an initial list of pesticides based on high annual use in terms of pounds and acreage.
Target list: Remove pesticides with (1) very low toxicity (the lowest 96-hr LC50 is over 100 mg/L)
(2) No toxicity data (e.g. cottonseed oil)
Risk Evaluation
Eco-toxicity data
(EPA Toxicity database)
Rank each pesticide based on the lowest acute toxicity values (96 hour LC50/EC50)
Chem/Phy database
(OSU and ARS databases)
Rank water solubility,
Koc, and soil half-life values
Concentration data
(DPR SWDB)
Analyze pesticide concentration data by year and month
Application year and month
(PUR database)
Calculate monthly and yearly amount of pesticide used

Initial List

- Created an initial list based on the high uses in terms of weight and acreage for each year
- Top 30 pesticides were used in high amounts (pounds)
- Top 30 pesticides were used in high application area (acres)

Results: Initial list

- A total of 71 pesticides were selected in the initial list
- By weight, over 90% of the pesticides used were selected
- By area, over 60% of pesticides used were selected

Target List

- Removed the pesticides with very low or no toxicity to aquatic organisms (e.g. sulfur, cottonseed oil)
- Added four pesticides recommended by DPR staff (atrazine, diuron, norflurazon, simazine)

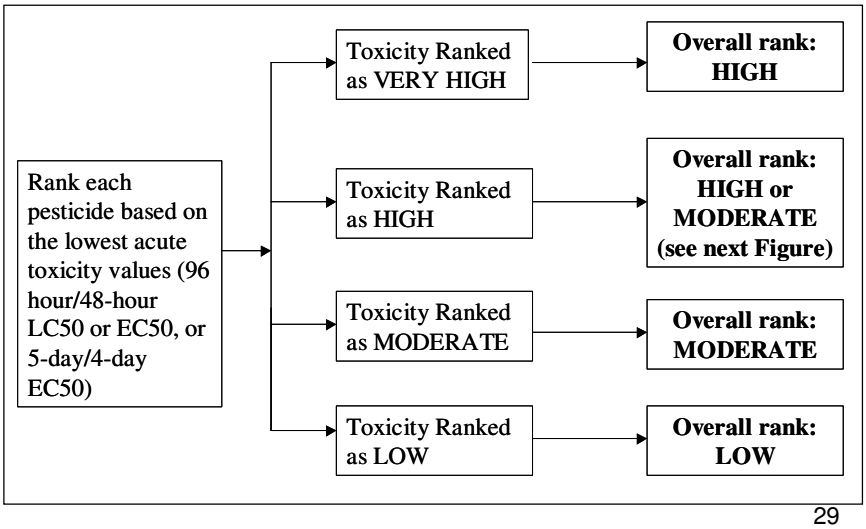
Results: "Target" list

- A total of 49 pesticides were evaluated
- By weight, over 60% of the pesticides used were selected
- By area, about 60% of pesticides used were selected

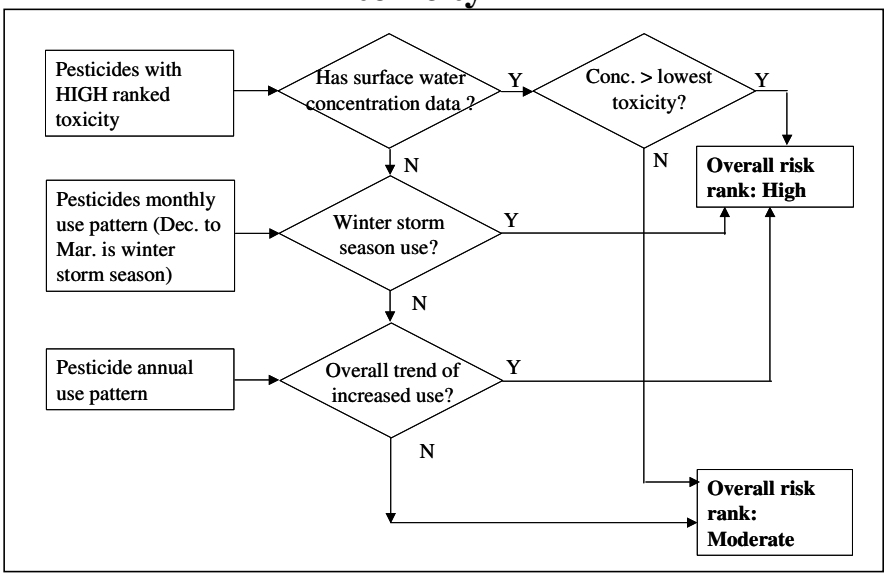
Criteria for Risk Ranking

Parameter	Very high	High	Moderate	Low	Very low
Toxicity (96 hour LC50 or EC50)	<1 µg/L	1 to 99 µg/L	100 µg/L to 999 µg/L	1 mg/L to 99 mg/L	>100 mg/L
Log(water solubility (mg/L))	> 3	2.001 to 3	1 to 2	≥0 and <1	<0 (water solubility less than 10)
Koc	>10,000	1,000 to 9,999	100 to 999	10 to 99	<10
Half-life in soils (day)	>1,000	101 to 1,000	31 to 100	10 to 30	<10

Overall Ranks



Pesticides with High rank of toxicity



Results: Relative Risk

- A total of 48 pesticides were included in the "Target" list (chloropicrin was removed)
- 22 were ranked as high risk
- 18 were ranked as moderate risk
- 8 were ranked as low risk

Overall Rank: High

(Water Column)

Chem Name	Chem Name
CAPTAN	AZINPHOS METHYL
CHLOROTHALONIL	CARBOFURAN
CHLORPYRIFOS	MALATHION
DIAZINON	METHIDATHION
DIURON	METHYL PARATHION
ESFENVALERATE	
LAMBDA CYHALOTHRIN	
MANEB	
MOLINATE	
OXYFLUORFEN	
PARAQUAT DICHLORIDE	
PERMETHRIN	
PROPANIL	
PROPARGITE	
THIOBENCARB	
TRIFLURALIN	
ZIRAM	

Overall Rank: Moderate

(Water Column)

Chem Name	Rank of toxicity
Atrazine	high
CARBARYL	high
COPPER OXIDE (OUS)	high
MANCOZEB	high
Norflurazon	high
ORYZALIN	high
PHOSMET	high
SIMAZINE	high
2,4-D, DIMETHYLAMINE SALT	moderate
GLYPHOSATE-TRIMESIUM	moderate
MCPA, DIMETHYLAMINE SALT	moderate
METAM-SODIUM	moderate
1,3-DICHLOROPROPENE	moderate
BENSULFURON METHYL	moderate
COPPER SULFATE (BASIC)	moderate
COPPER SULFATE (PENTAHYDR	moderate
CYPRODINIL	moderate
PROPICONAZOLE	moderate

-All pesticides were in the list of top 30 uses between 1998 and 2001

-Eight pesticides with High Rank of toxicity were ranked as moderate overall risk

Overall Rank: Low

(Water Column)

Chem Name
AZOXYSTROBIN
COPPER OXYCHLORIDE SULFATE
EPTC
GLYPHOSATE, ISOPROPYLAMINE SALT
IPRODIONE
METHYL BROMIDE
TRICLOPYR, TRIETHYLAMINE SALT
TRIFORINE

- Not in the list of top 30 uses between 1998 and 2001
- Phase out

Rank of Sediment Risk -Potential

Chem Name	Rank of Koc	Chem Name	Rank of Koc
AZINPHOS METHYL	high	COPPER OXYCHLORIDE SULFATE	very high
CHLOROTHALONIL	high	GLYPHOSATE, ISOPROPYLAMINE SALT	very high
CHLORPYRIFOS	high	GLYPHOSATE-TRIMESIUM	very high
COPPER OXIDE (OUS)	high	LAMBDA CYHALOTHRIN	very high
COPPER SULFATE (BASIC)	high	OXYFLUORFEN	very high
COPPER SULFATE (PENTAHYDRATE)	high	PARAQUAT DICHLORIDE	very high
CYPRODINIL	high	PERMETHRIN	very high
DIAZINON	high		
ESFENVALERATE	high		
MALATHION	high		
MANCOZEB	high		
METHYL PARATHION	high		
PROPARGITE	high		
TRIFLURALIN	high		

Rank of Sediment Risk -Possible

Chem Name	Rank of Koc	Chem Name	Rank of Koc
ATRAZINE	moderate	AZOXYSTROBIN	moderate
BENSULFURON METHYL	moderate	CARBARYL	moderate
CAPTAN	moderate	EPTC	moderate
DIURON	moderate	IPRODIONE	moderate
MANEB	moderate	NORFLURAZON	moderate
METHIDATHION	moderate	ORYZALIN	moderate
MOLINATE	moderate	PHOSMET	moderate
PROPANIL	moderate	PROPICONAZOLE	moderate
THIOBENCARB	moderate	SIMAZINE	moderate
ZIRAM	moderate		

Rank of Sediment Risk -Not likely

Chem Name	Rank of Koc
1,3-DICHLOROPROPENE	low
2,4-D, DIMETHYLAMINE SALT	low
CARBOFURAN	low
MCPA, DIMETHYLAMINE SALT	low
METAM-SODIUM	very low
METHYL BROMIDE	low
TRICLOPYR, TRIETHYLAMINE SALT	low
TRIFORINE	low

Summary

- The relative risk is based primarily on the lowest toxicity (96-hr/48-hr LC50/EC50 for pesticides and 5-d/4-d EC50 for herbicides)
- The pesticides without toxicity data are not ranked – it is unknown whether these pesticides pose a risk
- The effect of runoff is not clearly addressed in the process, such as types of crop, land slope, soil type

Please submit comments by March 31, 2006 to

Zhimin (Jamie) Lu
zlu@waterboards.ca.gov
(916)464-4830

The draft of report is posted on
http://www.waterboards.ca.gov/centralvalley/programs/tmdl/pest-basinplan-amend/index.html

Questions?

Water Quality Criteria Method Development

Paul Hann
phann@waterboards.ca.gov

Introduction of Terms

- Water Quality Objective – Limits on constituents established for the protection of beneficial uses of water or the prevention of nuisance
  - Narrative objectives are expressed in qualitative terms
  - Numeric objectives include a specific concentration
  - Water Quality Objectives consider protection of beneficial uses and other values
- Water Quality Criteria – A numeric level above which beneficial uses may be impaired

Background

- Past water quality criteria have been based on the 1985 EPA Guideline for Derivation of Numeric Water Quality Criteria
- Current EPA Method has been used successfully for many years
- Newer methods have become available and merit review
- Regional Board is looking for a method that can handle limited data sets

Past Public Comments

- Consider Alternatives to US EPA's method for deriving water quality criteria
- Evaluate the potential impacts of alternative pesticides
- Consider additive or synergistic impacts
- Establish numeric water quality objectives rather than narrative

Research Study Overview

- Researchers from UC Davis are under contract to assist with the review of Water Quality Objectives
- Purpose: Identify/develop a method(s) for deriving numerical water quality criteria that are protective of aquatic life and could be used as the basis for pesticide water quality objectives in the Central Valley

Research Study Objectives

- Ensure that criteria are scientifically defensible
- Incorporate current scientific thinking
- Include methodology for establishing numeric criteria for pesticides having limited data
- Provide for comprehensive review of multiple pesticides
  - Diazinon and chlorpyrifos to begin with
  - Additional pesticides as time and funding allow

Work Plan

Phase	Description	Est. Date
Study Phase I	Comparison and evaluation of existing criteria derivation methodology	March 2006
Study Phase II	Development of the criteria derivation methodology	August 2006
Study Phase III	Apply new methodology to diazinon, chlorpyrifos and up to 3 additional pesticides	December 2006

Current Status

- Draft Phase I report has been completed and has been sent to peer reviewers
- Phase I report should be posted on the RWQCB Website around March 2006
  - http://www.waterboards.ca.gov/centralvalley/programs/tmdl/pest-basinplan-amend/index.html
- Phase II (method development) is underway - Internal draft will not be available until May 2006

Questions?

Sediment Quality Objective Development

Paul Hann

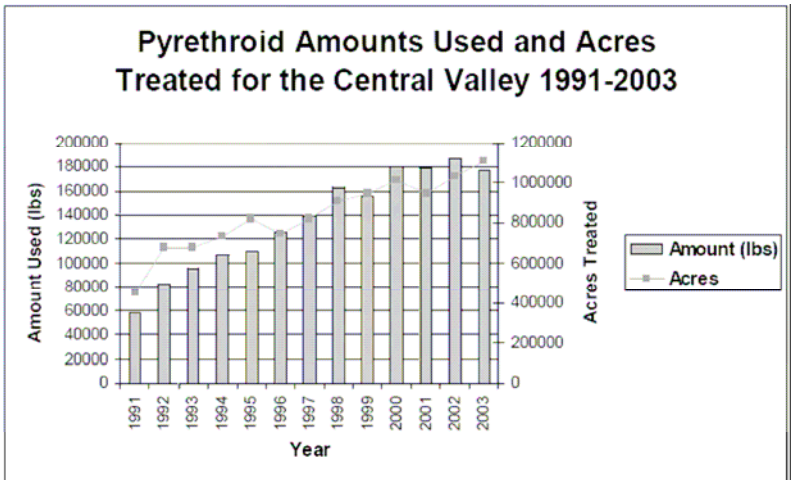
Project Overview

- Identify pesticides which are or could result in aquatic life toxicity through sediment contamination
- Develop narrative sediment quality objectives
- Develop numeric sediment quality objectives if possible

Background

- Previous staff efforts have been directed at organophosphate insecticides
- Organophosphate insecticide use has been decreasing
- Pyrethroid insecticides use has been increasing

Pyrethroid Use Trend



- Source: Oros, Daniel and Werner, Inge, 2005

Background

- Organophosphate insecticides are relatively water soluble and can contribute to water toxicity
- Newer pyrethroid insecticides are water insoluble, but are strongly sorbed onto soil particles
- High concentration of pyrethroid insecticides has resulted in sediment toxicity in some streams (Weston et. al. 2004, 2005)

Work Plan

- Develop work plan (January 2006)
- Evaluation of existing sediment quality in the Central Valley (TBD)
  - Identify pesticides of interest
  - Inventory and evaluate existing monitoring data
  - Identify affected water bodies
  - Identify data gaps and future monitoring needs

Work Plan

- Initial sediment criteria document (TBD)
  - Identify and evaluate existing narrative criteria established by other agencies
  - Identify potential narrative criteria and recommend preferred criteria
  - Develop guidance for interpretation of narrative criteria
  - Identify potential numeric criteria if possible

Current Status

- Internal work plan has been developed
- Literature searches on the existing sediment quality are being conducted
- Available sediment quality criteria derivation methods are being reviewed

References

- Oros, Daniel and Werner, Inge, 2005. *Pyrethroid Insecticides: An analysis of Use Patterns, Distributions, Potential Toxicity and Fate in the Sacramento-San Joaquin Delta and Central Valley.* White Paper for the Interagency Ecological Program. SFEI Contribution 415. San Francisco Estuary Institute, Oakland, CA.
- Weston et. al. 2004. Distribution and Toxicity of Sediment-Associated Pesticides in Agriculture-Dominated Water Bodies of California's Central Valley. *Environmental Science & Technology*. 38(10). 2752-2759. 2005.
- Weston et. al. 2005. Aquatic Toxicity Due to Residential Use of Pyrethroid Insecticides. *Environmental Science & Technology*. 39(24). 9778 –9784. 2005.

Questions?

Aquatic Life Uses in Central Valley Streams

Petra Lee
PLee@waterboards.ca.gov

Purpose

- Describe Aquatic Life Uses within tributaries of:
  - Sacramento & Feather River Basins
  - Sacramento-San Joaquin Delta
  - San Joaquin River Basin
- Collect **bioassessment** data from representative tributaries throughout the Central Valley
- Water Quality Criteria developed could be applied to streams with Aquatic Life Beneficial Uses

Study Areas

61

Beneficial Uses – Aquatic Life Uses

- Municipal and Domestic Supply
- Agricultural Supply
- Ground Water Recharge
- Freshwater Replenishment
- Navigation
- Etc…

- **Warm Freshwater Habitat**
- **Cold Freshwater Habitat**
- **Migration of Aquatic Organisms**
- **Spawning, Reproduction, and/or Early Development**

"Uses of water that support [warm or cold] water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, wildlife, including invertebrates."

62

Work Schedule

- Initial data compilation (Feb 2006)
- Monitoring Plan and Quality Assurance Project Plan (Mar 2006)
- Bioassessment or other data collection (late Apr 2006)
- Draft Beneficial Use Report (late Aug 2006)
- Public Review (Oct-Nov 2006)
- Final Beneficial Use Report (Dec 2006)

Data Compilation

- Bioassessment data
  - US Geological Survey
  - Department of Fish and Game
  - Surface Water Ambient Monitoring Program
  - Local watershed groups
  - Etc…
- Fish Assemblage data
- Mapping Database/GIS Layer to obtain stream names

The Future

- Collect more bioassessment data, fill in gaps
- Stream condition assessment
- Write report
  - Internal review
  - Public review

Questions?

Pesticide TMDL Monitoring for 2006

Petra Lee

Purpose of Monitoring – Scope

- Design a monitoring plan for 2006
  - Data for future TMDL
  - Work within budget restrictions
- Which pesticides to monitor for?
- What waterbodies to monitor?
- When to monitor?
- Cooperation

Which Pesticides to Monitor For Within the Water Column?

- Started with table of **relative** "High Risk" pesticides from Risk Evaluation Report.
  - Pesticides covered by rice program eliminated (ex. molinate, thiobencarb)
  - Decreasing use eliminated (ex. some OP's)
  - High Koc values were eliminated (ex. pyrethroids)
    - » Paraquat was an exception due to its high solubility in water
  - Short half-life eliminated (ex. maneb)

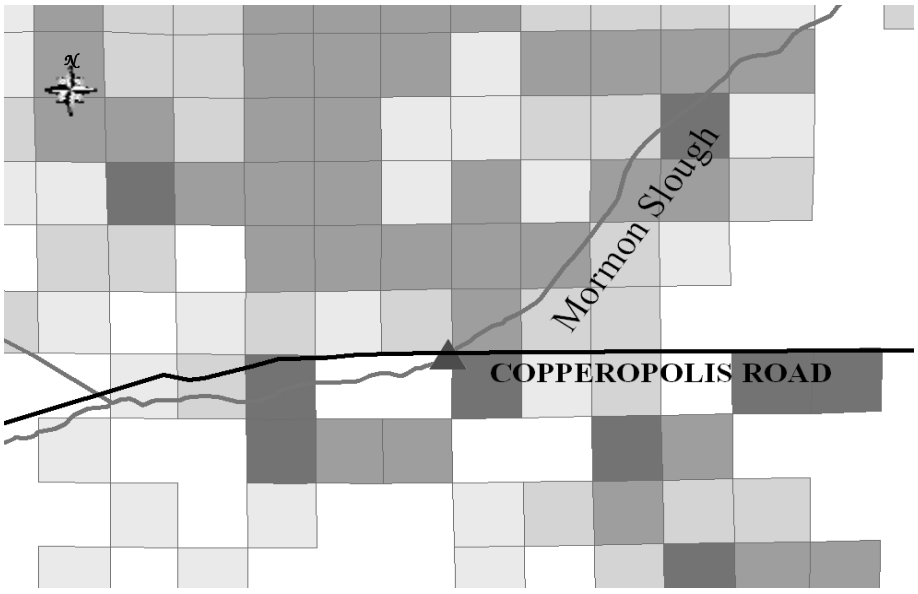
Which Pesticides to Monitor?

Pesticide Group	Target Pesticides
OP's	Diazinon, chlorpyrifos, azinphos methyl, malathion, methidathion, methyl parathion
Carbamates	Diuron, carbofuran, carbaryl, methiocarb, aldicarb, captan, linuron, methomyl
Herbicides	Propanil, propargite, oxyfluorfen, trifluralin
Other	Paraquat dichloride

What Waterbodies to Monitor?

- Department of Pesticide Regulation's Pesticide Use Report for 2003
- Used GIS to **map** out relatively high use areas
- Place monitoring site downstream of high use areas
- Contracted with UC Davis John Muir Institute of the Environment
  - Mike Johnson
  - Henry Calanchini

Here's an Example… Propargite Use in 2003



What Waterbodies to Monitor?

- Nine (9) sites in Sacramento River Basin
- Four (4) sites within Eastern Delta Tributaries
- Five (5) sites within San Joaquin River Basin

When to Monitor?

- Storm-event driven sampling
- Irrigation-season sampling
- PUR database to determine months of highest use

Coordination

- Within Central Valley Regional Board
  - Irrigated Lands Program
  - Other TMDL Units
- SWAMP
- Department of Pesticide Regulation
- Coalition groups
- Grantees

Quality Assurance Project Plan & Monitoring Plan located at:

http://www.waterboards.ca.gov/centralvalley/available_documents/waterqualitystudies/Sac-Delta_TMDL_QAPP.pdf

Questions?

Central Valley Regional Water Quality Control Board - Pesticide TMDL Unit Monitoring for 2006

Site	Analysis for Storm Season	Analysis for Irrigation Season (Mar-Apr)	Analysis for Irrigation Season (July)	Storm Sampling Schedule	Irrigation Sampling Schedule (Mar-Apr)	Irrigation Sampling Schedule (July)
Eastern Delta Tributaries						
Pixley Slough at Ham Lane	A,C	A,B	D	1 sample/day for 2 days for 2 events	1 sampling event/2 weeks for 8 weeks	1 sampling event/week for 4 weeks
Mormon Slough at Copperopolis Road	A,C,D	A,B	D	1 sample/day for 2 days for 2 events	1 sampling event/2 weeks for 8 weeks	1 sampling event/week for 4 weeks
Littlejohn Creek at Jack Tone Road	A,C,D	A,B	D	1 sample/day for 2 days for 2 events	1 sampling event/2 weeks for 8 weeks	1 sampling event/week for 4 weeks
Lone Tree Creek at Austin Road	A,C,D	A,B,C	D	1 sample/day for 2 days for 2 events	1 sampling event/2 weeks for 8 weeks	1 sampling event/week for 4 weeks
Sacramento River Basin						
Gilsizer Slough at South Township Road	A,C,D	A,C	D	1 sample/day for 2 days for 2 events	1 sampling event/2 weeks for 8 weeks	1 sampling event/week for 4 weeks
Live Oak Slough at Nuestro Road	A,C,D	A,C	D	1 sample/day for 2 days for 2 events	1 sampling event/2 weeks for 8 weeks	1 sampling event/week for 4 weeks
Morrison Slough at Luckehe Road	A,C,D	A,B	D	1 sample/day for 2 days for 2 events	1 sampling event/2 weeks for 8 weeks	1 sampling event/week for 4 weeks
Angel Canal/Commanche Creek at Crouch Ave	A,C,D	A,B	D	1 sample/day for 2 days for 2 events	1 sampling event/2 weeks for 8 weeks	1 sampling event/week for 4 weeks
Sacramento and Feather Rivers TMDL Compliance Monitoring						
Sacramento River at Alamar	A			1 sample/day for 8 days		
Sacramento River at Freeport	A			1 sample/day for 8 days		

Central Valley Regional Water Quality Control Board - Pesticide TMDL Unit Monitoring for 2006

	Analysis for Storm Season	Analysis for Irrigation Season (Mar-Apr)	Analysis for Irrigation Season (July)	Storm Sampling Schedule	Sampling May - June	Irrigation Sampling Schedule (July)
Propanil Monitoring						
Little Dry Creek at Afton Road		D			1 sample/week for 8 weeks	
Butte Creek at Afton Road		D			1 sample/week for 8 weeks	
Stone Corral Creek at Four Mile Road/Excelsior Road		D			1 sample/week for 8 weeks	
Freshwater Creek at Old Hwy 99 West		D			1 sample/week for 8	
Colusa Basin Drain #1		D			1 sample/week for 8 weeks	
San Joaquin River Basin						
San Joaquin River at Patterson	A*,B,C,D			1 sample/day for 2 days for 2 events		
San Joaquin River at Lander Avenue	A*,B,C,D			1 sample/day for 2 days for 2 events		
Merced River at River Road	A,B,C,D			1 sample/day for 2 days for 2 events		
Orestimba Creek at Kilburn	A,B,C,D			1 sample/day for 2 days for 2 events		
Del Puerto Creek at Vineyard Avenue	A,B,C,D			1 sample/day for 2 days for 2 events		

Analyses
A) Organophosphates by GC-FPD "Short List" (chlorpyrifos, diazinon, azinphos methyl, malathion, methidathion, methyl parathion)
B) Paraquat dichloride by LC-MS
C) Carbamates by LC-MS (diuron, carbofuran, carbaryl, methiocarb, aldicarb, captan, linuron, methomyl)
D) Herbicides by GC-MSMS (propanil, propargite, oxyfluorfen, trifluralin)

*OPs are being monitoring by SJR TMDL monitoring program.

For more information contact Petra Lee, Environmental Scientist, at 916-464-4603 or plee@waterboards.ca.gov

Summary

- Addressing pesticides in streams that could impact aquatic life
- Basin Plan Amendment elements
  - Water quality objectives
  - Sediment quality objectives
  - Implementation provisions

Summary

- Technical reports will:
  - identify pesticides to focus on
  - define acceptable levels through development of criteria
  - identify streams to focus on
  - describe current conditions through monitoring

Next Steps

- Possible options
  - Hold staff workshops when major products are ready for review
  - Periodic scheduled meetings with interested parties to provide updates
  - Updates through e-mail

Scoping Comments

- Looking for comments on range of actions, alternatives, mitigation measures, and significant effects
- Requesting written comments by March 17, 2006
- Comments can be e-mailed to Joe Karkoski at jkarkoski@waterboards.ca.gov

Next Steps

- Comments on Risk Evaluation report March 31 to Jamie Lu at zlu@waterboards.ca.gov