Proposed Basin Plan Amendment for Control of Discharge of Diazinon and Chlorpyrifos Into the San Joaquin River

CEQA Scoping Meeting and Public Workshop

January 19, 2005
Introductions

• Les Grober, Chief, San Joaquin River TMDL Unit
• Diane Beaulaurier, Environmental Scientist, San Joaquin River TMDL Unit
• Joe Karkoski, Pesticide TMDL Coordinator
Agenda

- Introduction (5 min)
- Background (15 min)
- Alternative Water Quality Standards (15 min)
- Implementation Alternatives (10 min)
- Break (15 min)
- Proposed Recommendations (25 min)
- Summary and Next Steps (10 min)
- Time for Questions at end of each section
Where are we in the process?

- **Evaluation**
  - Monitoring Results
  - Management Plans

- **Monitoring**

- **Special Studies**

- **Assessment**

- **Planning**
  - Beneficial Uses
  - WQ Objectives
  - TMDLs
  - Implementation Plan

- **Implementation**
  - Waivers
  - WDRs
  - Prohibition

- **WQOs and Loads met!**

- CWA 303(d) Listed 1994

- Monitoring Results

- Management Plans
### Where are we in the process?

<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial outreach of OP Pesticide TMDL</td>
<td>August 2000</td>
</tr>
<tr>
<td>6 Workshops – TMDL Elements</td>
<td>Nov 2000-Sept 2002</td>
</tr>
<tr>
<td>CEQA Scoping Meeting</td>
<td>January 2005</td>
</tr>
<tr>
<td>Draft BPA Staff Report to Peer Review</td>
<td>Jan-Feb 2005</td>
</tr>
<tr>
<td>Staff or Regional Board Workshop</td>
<td>April-June 2005</td>
</tr>
<tr>
<td>Regional Board Hearing</td>
<td>August 2005</td>
</tr>
<tr>
<td>State Board Approval</td>
<td>Estimated 2005</td>
</tr>
<tr>
<td>Office of Administrative Law Approval</td>
<td>Estimated 2006</td>
</tr>
<tr>
<td>USEPA Approval</td>
<td>Estimated 2006</td>
</tr>
</tbody>
</table>
Scope of CEQA Analysis

- Staff presentation of alternatives
- Public comments on scope of this TMDL and alternatives considered
Questions?
Background

Diane Beaulaurier
Background

• Project area
• Legal requirements, regulations and policies
• Water quality impairment and sources
Project Area for Organophosphorus Pesticide (OP) Pesticide TMDL

Stanislaus River

Tuolumne River

Merced River

Orestimba Creek

Salt Slough

Mud Slough

Stevinson

Note: TMDL is for mainstem San Joaquin River only
SJR Watershed

• 13,500 square mile drainage area
• 3 Major east-side tributaries
• 5 Minor west-side tributaries
• Extensive agricultural land use
303(d) Listing

- 1994 Listing under Section 303d Clean Water Act
- 130 miles from Mendota Dam to Airport Way Bridge near Vernalis
- Aquatic invertebrate toxicity
  - Aquatic invertebrates are base of food web
  - Aquatic life beneficial use not supported
- High OP concentrations year round
  - Dormant Season (December through February)
  - Irrigation Season (March through September)
Legal Requirements

• Federal Clean Water Act requires TMDLs for impaired waters [303(d) listed]
• State Water Quality Act (Porter-Cologne) requires implementation program for TMDLs; implementation program is contained in the Basin Plan Amendment
• OP Pesticide TMDL will meet these legal obligations, and is designed to restore aquatic life beneficial use
Policies

- Regional Board Policies
  - Controllable Factors
  - Water Quality Limited Segment
  - Antidegradation
  - Watershed
  - Application of Water Quality Objectives
Policies

• State Board Policies
  – Implementation and Enforcement of NPS Pollution Program
  – Water Quality Control
  – Maintain High Quality of Water
  – Management Agency Agreement (MAA) with California Department of Pesticide regulation (DPR)
U. S. EPA / CDPR Regulatory Actions

- U.S.EPA and DPR have primary regulatory authority of pesticides
- U.S.EPA re-registrations for all OPs
- DPR developing dormant spray regulations
- DPR label changes for diazinon in place (CA)
- DPR re-evaluation of diazinon and chlorpyrifos initiated
Sources of Diazinon and Chlorpyrifos

- Stormwater runoff (dormant season)
- Irrigation runoff (irrigation season)
- Both agricultural and urban sources; agriculture is major source; use has been decreasing
- Most urban uses ended effective 12/31/2004 (USEPA re-registrations)
Irrigation Season Use

Source: California Department of Pesticide Regulation’s Pesticide Use Reports
Dormant Season Use

Source: California Department of Pesticide Regulation’s Pesticide Use Reports
Questions?
Basin Plan Amendment Alternatives

Diane Beaulaurier
Basin Plan Amendment Elements

- Introduction
- Water Quality Standards
  - Beneficial Uses
  - Water Quality Objectives
- Program of Implementation
Basin Plan Introduction

• Alternatives
  – No Change
  – Add descriptions of subareas, and correct inaccurate description of planning boundary between San Joaquin and Tulare Lake Basins
Beneficial Use Alternatives

- Determine most sensitive use
- No change to Aquatic Life use
- Add new use
- Modify existing use
Narrative Objective is “No Toxics in Toxic Amounts”

- Toxicity is typically determined using indicator species
  - Fish
  - Zooplankton
  - Phytoplankton

*Ceriodaphnia dubia*
When Diazinon and Chlorpyrifos Enter Rivers, the Food Pyramid Can Be Disrupted

*Drawings courtesy of UCIPM. www.ipm.ucdavis.edu
Water Quality Objectives

- Diazinon alone
- Chlorpyrifos alone
- Additive toxicity
Water Quality Alternatives for Diazinon

• No change to narrative objective
• No diazinon
• Propose new water quality objectives
Alternative Water Quality Objectives for Diazinon

<table>
<thead>
<tr>
<th>Aquatic Life Criteria for Surface Water</th>
<th>μg/L</th>
</tr>
</thead>
<tbody>
<tr>
<td>CDFG Aquatic Life Criteria for freshwater – 4 day average concentration</td>
<td>0.05</td>
</tr>
<tr>
<td>CDFG Aquatic Life Criteria for freshwater – 1 hour maximum concentration</td>
<td>0.08</td>
</tr>
<tr>
<td>Recalculated CDFG Aquatic Life Criteria for freshwater – 4 day average concentration</td>
<td>0.10</td>
</tr>
<tr>
<td>Recalculated CDFG Aquatic Life Criteria for freshwater – 1 hour maximum concentration</td>
<td>0.16</td>
</tr>
<tr>
<td>EPA Draft Aquatic Life Criteria for freshwater – 4 day average concentration</td>
<td>0.10</td>
</tr>
<tr>
<td>EPA Draft Aquatic Life Criteria for freshwater – 1 hour maximum concentration</td>
<td>0.10</td>
</tr>
<tr>
<td>Australian and New Zealand trigger values (95% protection- based on NOEC)</td>
<td>0.010</td>
</tr>
<tr>
<td>Australian and New Zealand trigger values (99% protection – based on NOEC)</td>
<td>0.00003</td>
</tr>
<tr>
<td>1/10th Species mean average value (Ceriodaphnia dubia) (Basin Plan)</td>
<td>0.044</td>
</tr>
</tbody>
</table>

| Human Health Criteria for Drinking Water | | |
|----------------------------------------|-------|
| USEPA Suggested No Adverse Response Levels (SNARL) for non-cancer toxicity | 0.600 |
| California Department of Health Services State Action Level for Toxicity | 6.000 |
| National Academy of Sciences SNARL for non-cancer toxicity | 14.000 |
| Canadian Environmental Quality Guidelines | 20.000 |

Other - No observed effect concentration on salmon anti-predator response (Scholz, 2000) | 0.100 |
Alternative Water Quality Objectives for Chlorpyrifos

- No change to narrative objective
- No chlorpyrifos
- New water quality objectives
Alternative Water Quality Objectives for Chlorpyrifos

<table>
<thead>
<tr>
<th>Aquatic Life Criteria for Surface Water</th>
<th>µg/L</th>
</tr>
</thead>
<tbody>
<tr>
<td>CDFG Aquatic Life Criteria for freshwater – 4 day average concentration</td>
<td>0.014</td>
</tr>
<tr>
<td>CDFG Aquatic Life Criteria for freshwater – 1 hour maximum concentration</td>
<td>0.02</td>
</tr>
<tr>
<td>EPA Draft Aquatic Life Criteria for freshwater – 4 day average concentration</td>
<td>0.041</td>
</tr>
<tr>
<td>EPA Draft Aquatic Life Criteria for freshwater – 1 hour maximum concentration</td>
<td>0.083</td>
</tr>
<tr>
<td>Canadian Environmental Quality Guidelines</td>
<td>0.0035</td>
</tr>
<tr>
<td>Australian and New Zealand trigger values (95% protection based on NOEC)</td>
<td>0.010</td>
</tr>
<tr>
<td>Australian and New Zealand trigger values (99% protection based on NOEC)</td>
<td>0.00004</td>
</tr>
<tr>
<td>1/10th Species mean average value (Ceriodaphnia dubia) (Basin Plan)</td>
<td>0.006</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Human Health Criteria for Drinking Water</th>
</tr>
</thead>
<tbody>
<tr>
<td>USEPA Suggested No Adverse Response Levels (SNARL) for non-cancer toxicity</td>
</tr>
<tr>
<td>Canadian Environmental Quality Guidelines</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Agriculture-Livestock</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canadian Environmental Quality Guidelines</td>
</tr>
</tbody>
</table>
Water Quality Additivity Formula

• Additive Toxicity:
  – Multiple pesticides increase aquatic toxicity
  – Must meet existing additivity formula for pesticides with same toxicity mechanism (e.g. cholinesterase inhibition for OP pesticides)
Water Quality Additivity Formula

\[
\frac{C_D}{WQO_D} + \frac{C_C}{WQO_C} \leq 1.0
\]

where

\( C_D \) = diazinon concentration in the receiving water.

\( C_C \) = chlorpyrifos concentration in the receiving water.

\( WQO_D \) = acute or chronic diazinon water quality objective or criterion.

\( WQO_C \) = acute or chronic chlorpyrifos water quality objective or criterion.
Questions?
Program of Implementation

Joe Karkoski
Program of Implementation

• Load Limits and Control Actions
  – Load Allocations
  – Implementation Alternatives
Load Limits and Allocations

• Allocation of Loading Capacity
  – Load Allocations to non-point sources
  – Waste Load Allocations to point sources
Available Practices and Technology

• Reduce loads from sources
• Pest management practices
• Pesticide application practices
• Water management practices
Implementation Alternatives

- Conditional Prohibition of Discharge
- Waste Discharge Requirements (WDRs)
- Conditional Waiver of WDRs
Scoping Questions?

• Project area?
• Water Quality Standards?
  – Beneficial use
  – Water Quality Objectives
• Implementation?
BREAK
Where are we now?

• Upcoming peer review of Draft Report
• Draft Recommendations for peer review
  – Water Quality Standards
  – Program of Implementation
• Public comments upon release of Draft Report after peer review
Proposed Recommendations (Peer Review Draft Staff Report)
Introduction Recommendation

• Add descriptions of subareas, and correct inaccurate description of planning boundary between San Joaquin and Tulare Lake Basins
Proposed Recommendations
Water Quality Standards

Diane Beaulaurier
Beneficial Use Recommendation

• Recommendation – No Change

• Aquatic Life use is most sensitive to OP pesticides
Recommended Water Quality Objectives for Diazinon

- No new water quality objective at this time
- Propose new water quality targets (TMDL only)
  - For diazinon alone:
    - Acute = 0.100 µg/L (Scholz 2000)
  - For diazinon in combination with chlorpyrifos:
    - Acute = 0.16 µg/L; Chronic = 0.10 µg /L
      (recalculated CDFG criteria)
- Future development of WQOs
San Joaquin River Mainstem Diazinon Concentrations

µg/L

Recommended Water Quality Objectives for Chlorpyrifos

• New Water Quality Objectives (CDFG criteria):
  • Acute = 0.025 µg/L
  • Chronic = 0.014 µg/L

Note: Acute criterion recalculated to two significant figures per US EPA methodology (1985)
San Joaquin River Mainstem Chlorpyrifos Concentrations

µg/L

1

10

100

1,000

Water Quality Additivity Formula

\[
\frac{C_D}{WQO_D} + \frac{C_C}{WQO_C} \leq 1.0
\]

where

\( C_D \) = diazinon concentration in the receiving water.

\( C_C \) = chlorpyrifos concentration in the receiving water.

\( WQO_D \) = acute or chronic diazinon water quality objective or criterion.

\( WQO_C \) = acute or chronic chlorpyrifos water quality objective or criterion.
San Joaquin River Mainstem Additive Toxicity
(Diazinon + Chlorpyrifos)
Review Water Quality Standards Recommendations

- Aquatic life beneficial use is most sensitive for OP pesticides
- Establish water quality targets for diazinon
- Establish water quality objectives for chlorpyrifos
- Meet existing additive toxicity formula
Proposed Recommendations Implementation

Joe Karkoski
Recommended Implementation Alternative

- Two Conditional Prohibitions of Discharge
  - Dormant season (Dec - Feb)
    If objectives or loads exceeded in previous year
  - Irrigation season (March – Sept)
    If objectives or loads exceeded in previous year

Backstop for waiver or WDRs
How would TMDL interface with Ag Waiver?

- Ag waiver expires December 2005
- Ag Waiver could be renewed or new waiver could be developed.
- TMDL will assure that either
  1. any applicable waiver or WDR will implement WQOs and load allocations, or
  2. conditional prohibition of discharge will take effect
Other Proposed Basin Plan Amendment Elements

Joe Karkoski
Other Basin Plan Amendment Elements

- Management Plans
- Surveillance and Monitoring
- Time Schedule
- Economic Analysis
Management Plans

- Dischargers to submit management plans
- Plan will describe actions taken to reduce OP runoff and meet allocations
- Plan may include actions required by state and federal pesticide regulations
- Document link between actions and expected reductions
Management Plans

• Individual dischargers, discharger groups or coalitions could submit plans
• Plan must comply with any applicable WDRs or Waiver
• Regional Board will review and may require revisions
Surveillance and Monitoring

- Determine Success of Amendment
- Discharger Ultimately Responsible
Surveillance and Monitoring

- Program Goals
  - Compliance with Objectives
  - Compliance with Load Allocations
  - Effectiveness of Management Practices
  - Avoid toxicity from alternative pesticides
Time Schedule for Compliance

• Time schedules will be needed for:
  – Compliance with objectives and allocations
  – Dormant season prohibition
  – Irrigation season prohibition
  – Submission of Management Plans
  – Monitoring
Economic Analysis

• NPS Discharger Costs
  – Dormant season practices
  – Irrigation season practices
  – Monitoring, planning, evaluation

• NPDES Permittee Costs
  – Not anticipated due to elimination of urban uses
  – Costs if alternatives cause toxicity
Economic Analysis

• Potential sources of financing
  – Government grants, loans or appropriations
  – Surcharge on water
  – Ad Valorem tax
  – Fees by drainage management district
  – Private financing
Review Program of Implementation Recommendations

• Load limits and control actions
• Allocation of loads for point and nonpoint sources
• Two Conditional Prohibitions of Discharge
  – Dormant season (December – February)
  – Irrigation season (March – September)
• Backstop for waiver or WDRs
Questions?
Summary

Les Grober
The Big Ideas:

- Diazinon and chlorpyrifos impair 130 miles of SJR
- Sources are primarily agricultural
- Need to avoid causing new impairments
- Solutions are available (e.g., Integrated Pest Management (IPM), management practices, grant funds)
The Big Ideas:

- No change to WQOs for diazinon at this time; use best available information to interpret narrative objective
- Propose CDFG chlorpyrifos criteria as WQOs
- Existing formula for additive toxicity
- Conditional prohibitions if objectives or loads not met, and if not already regulated by waiver or WDRs
Questions?
Next Steps

- Draft staff report to be released March/April
- Board Workshop in April or June
- Submit comments regarding scope
Next Steps

Submit comments to:
Diane Beaulaurier
CVRWQCB
11020 Sun Center Drive, #200
Rancho Cordova, CA 95670-6114
dbeaulaurier@waterboards.ca.gov

Program info:
http://www.waterboards.ca.gov/centralvalley/programs/tmdl/sjrop/

Listserve:
http://www.waterboards.ca.gov/lyrisforms/reg5_subscribe.html
THANK YOU!