

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



Public Workshop

September 21, 2005

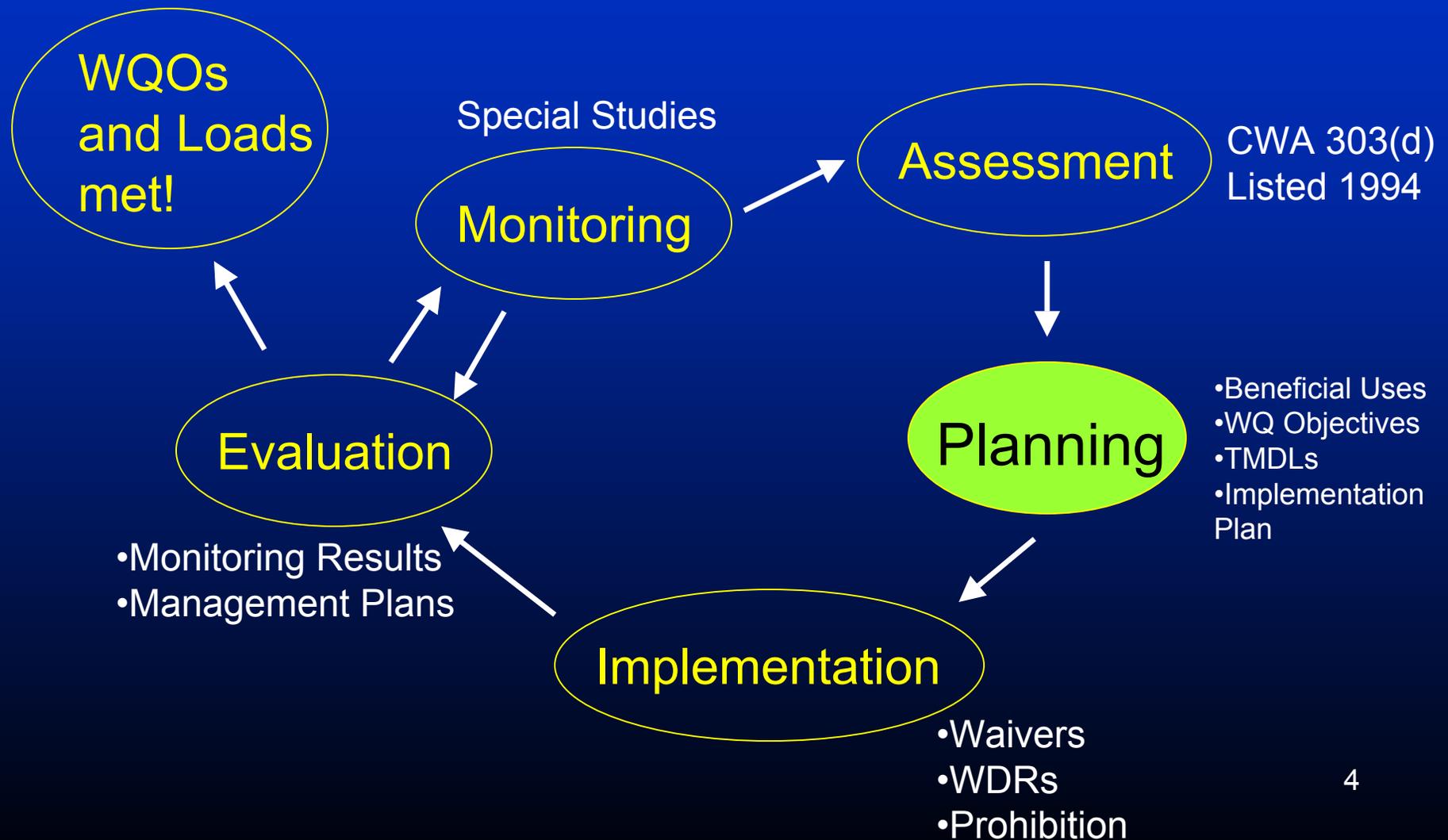
Introductions

- Diane Beaulaurier
Environmental Scientist
San Joaquin River TMDL Unit
- Joe Karkoski
Pesticide TMDL Coordinator

Agenda

- Introduction
- Background
- Alternative Water Quality Standards and Proposed Recommendations
- Implementation Alternatives and Proposed Recommendations
- Summary and Next Steps
- Time for Questions at end of each section

Where are we in the process?



Where are we in the process?

| | |
|---------------------------------------|--------------------------|
| Initial outreach of OP Pesticide TMDL | August 2000 |
| 6 Workshops – TMDL Elements | Nov 2000-Sept 2002 |
| CEQA Scoping Meeting | January 2005 |
| Draft BPA Staff Report to Peer Review | February 2005 |
| Staff Workshop | September 2005 |
| Regional Board Hearing | October 2005 |
| State Board Approval | Estimated early-mid 2006 |
| Office of Administrative Law Approval | Estimated mid-late 2006 |
| USEPA Approval | Estimated late 2006 |

Questions?



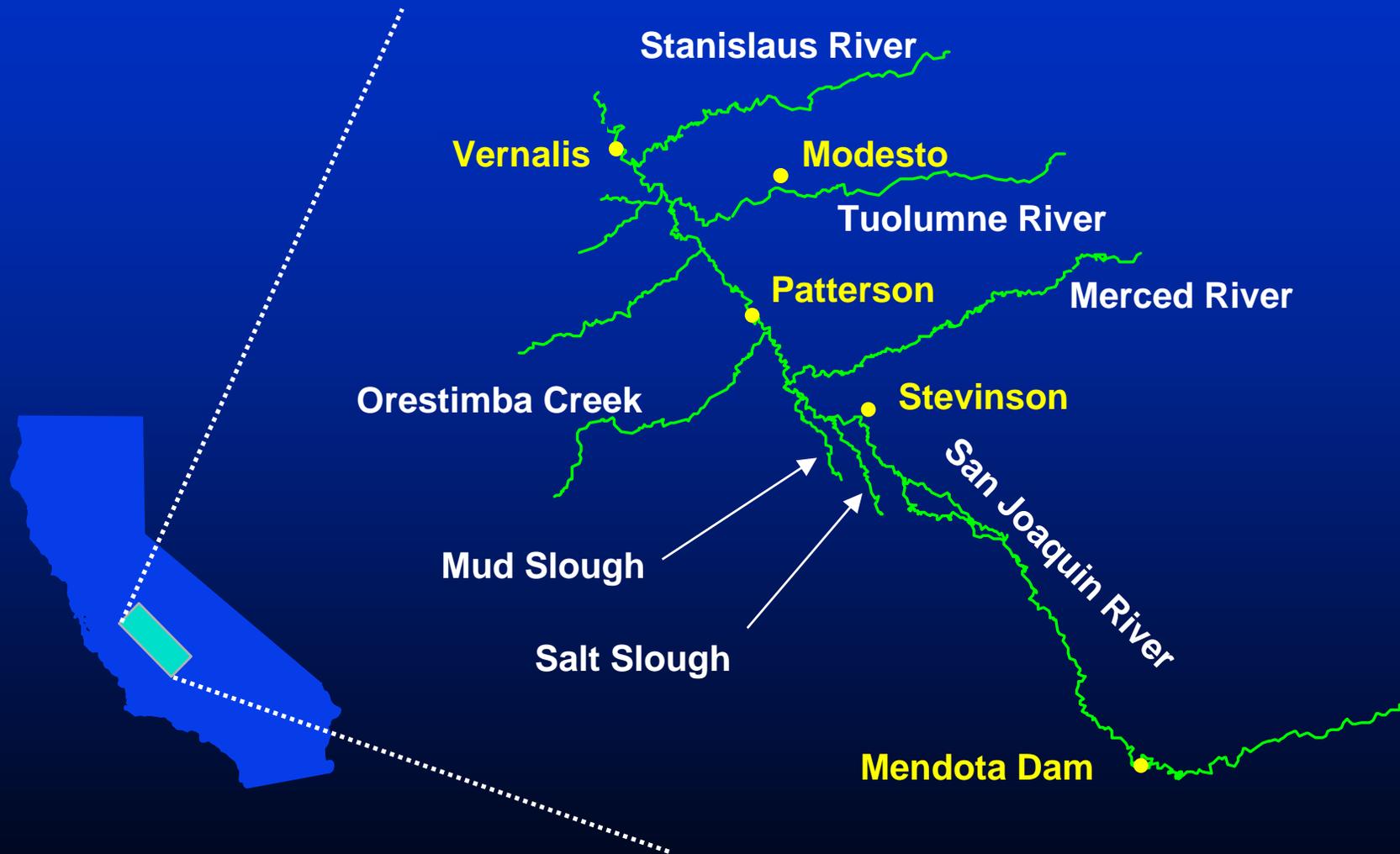
Background

Diane Beaulaurier

Background

- Project area
- Legal requirements, regulations and policies
- Water quality impairment and sources

Project Area for Organophosphorus Pesticide (OP) Pesticide TMDL



Note: TMDL is for mainstem San Joaquin River only

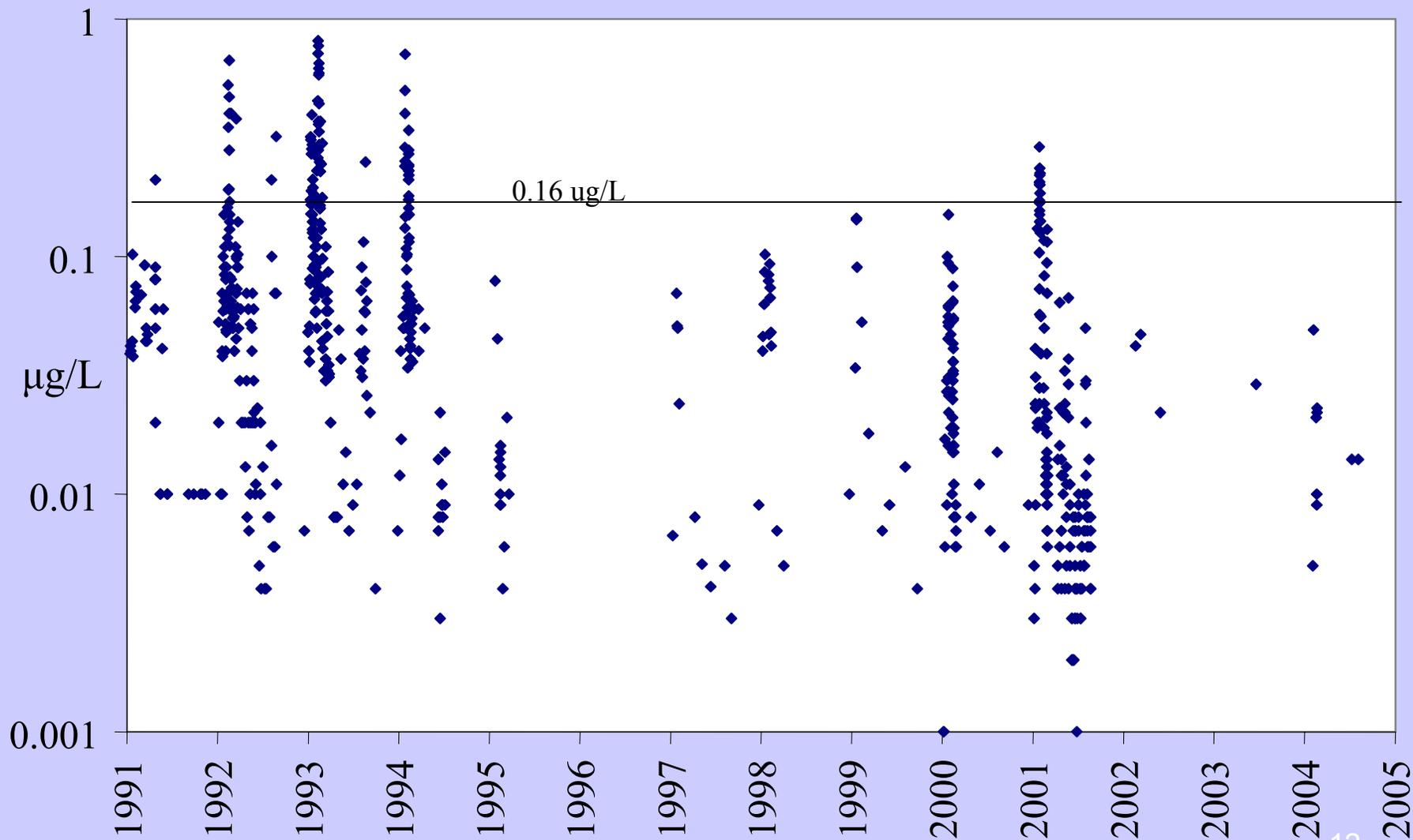
SJR Watershed

- 13,500 square mile drainage area
- 3 Major east-side tributaries
- 5 Minor west-side tributaries
- Extensive agricultural land use

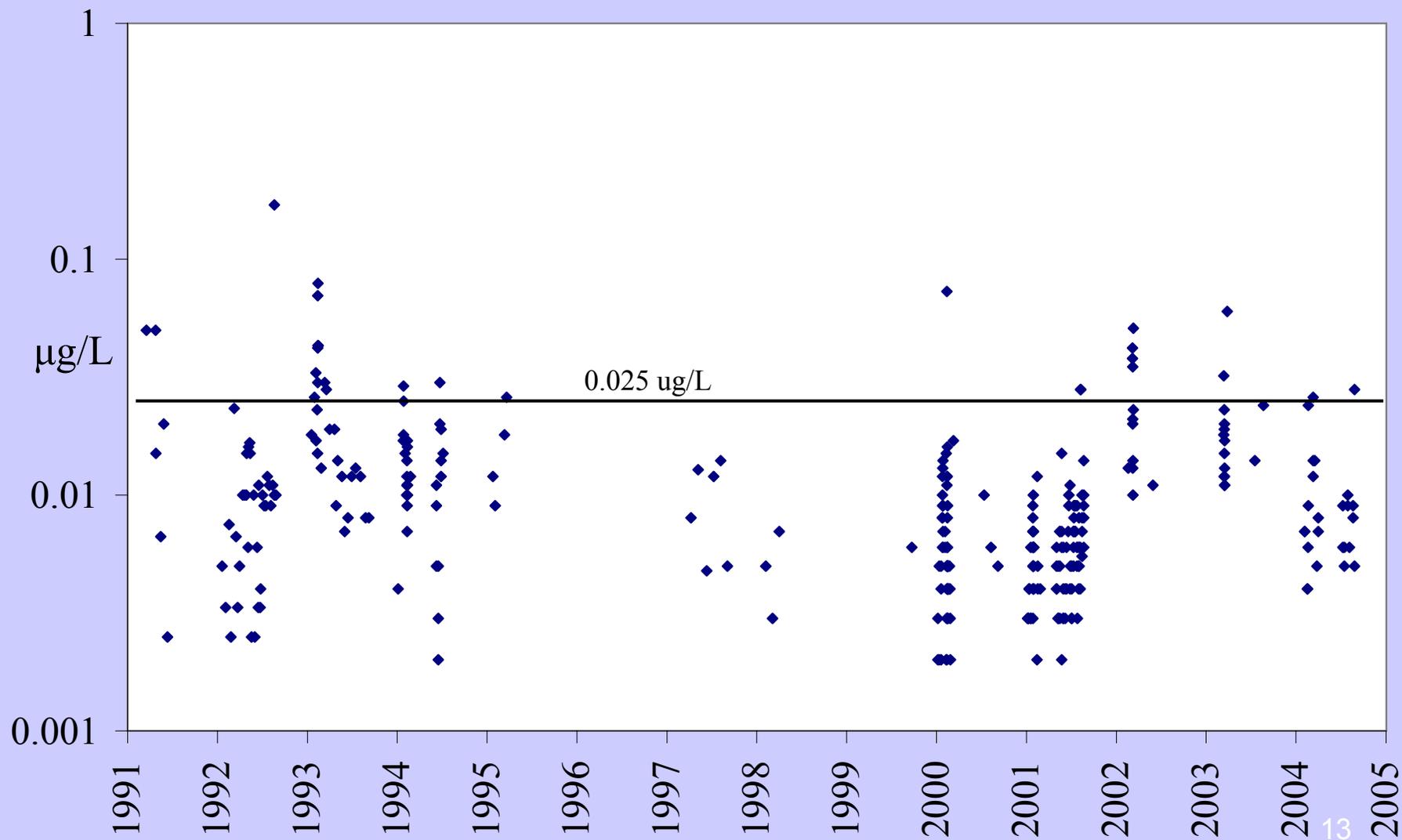
303(d) Listing

- 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)

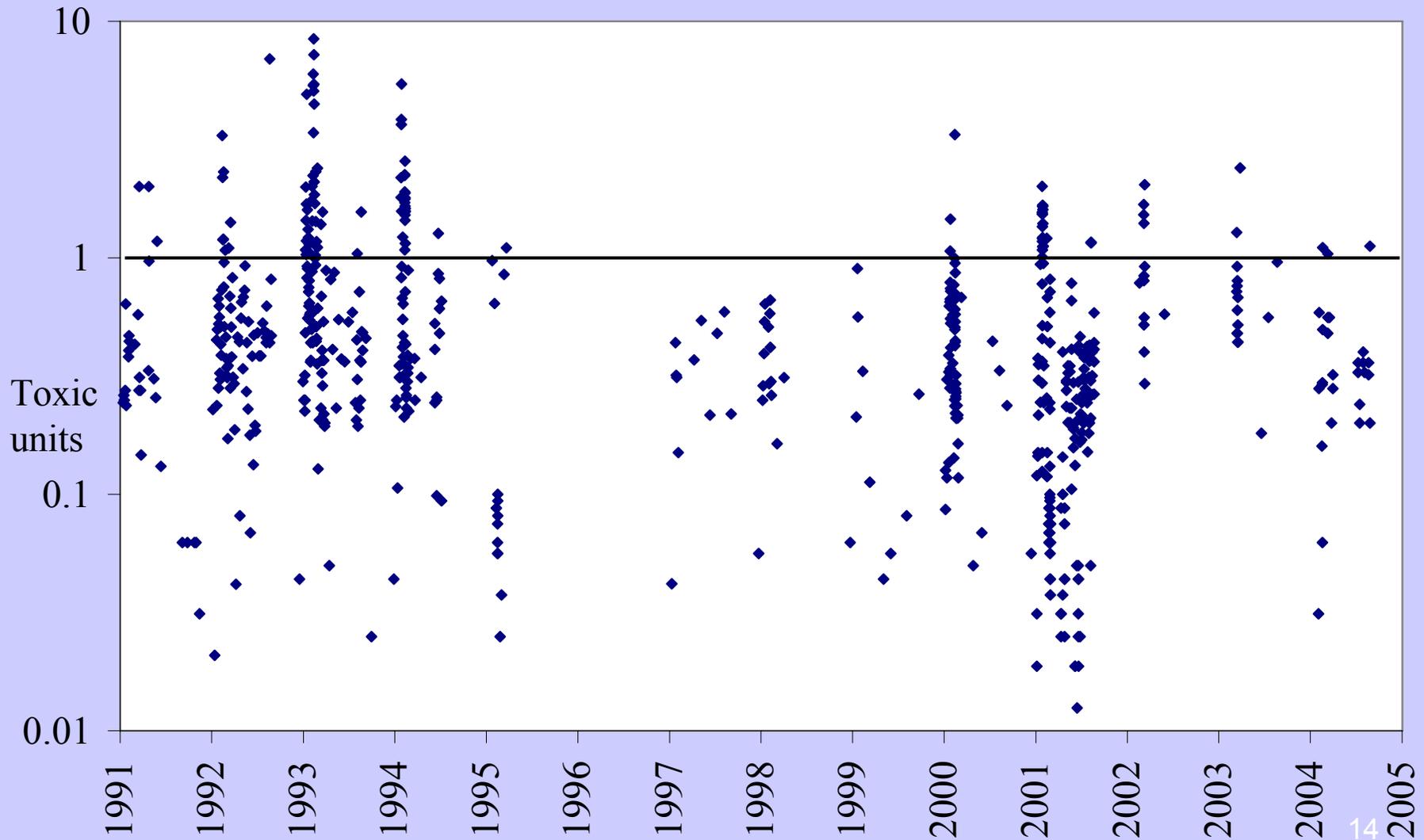
San Joaquin River Mainstem Diazinon Concentrations



San Joaquin River Mainstem Chlorpyrifos Concentrations



San Joaquin River Mainstem Additive Toxicity (Diazinon + Chlorpyrifos)



Data points greater than 1 indicate additive toxicity narrative objective is not met

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

Legal Requirements

- Bay Protection Clean-up Plan requires adopting TMDLs and water quality objectives
- OP Pesticide BPA will protect aquatic life beneficial use from elevated levels of diazinon and chlorpyrifos and will meet these legal obligations

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)

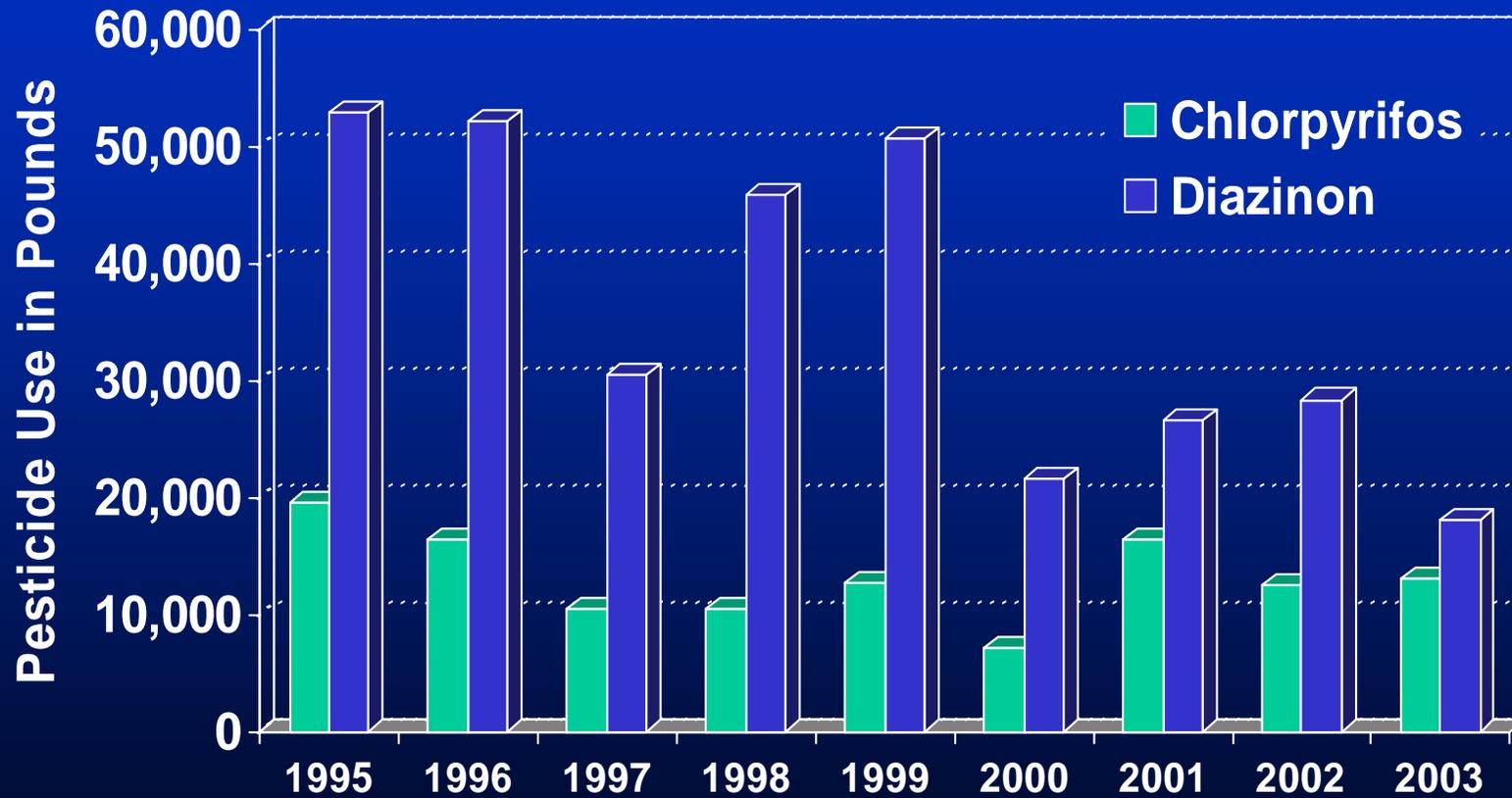
U. S. EPA / CDPR Regulatory Actions

- U.S. EPA and DPR have primary regulatory authority of pesticides
- U.S. EPA re-registrations for all OPs
- DPR developing dormant spray regulations
- Supplemental label for diazinon in place (CA – Sacramento/San Joaquin Valleys)
- DPR re-evaluation of diazinon and chlorpyrifos initiated

Sources of Diazinon and Chlorpyrifos

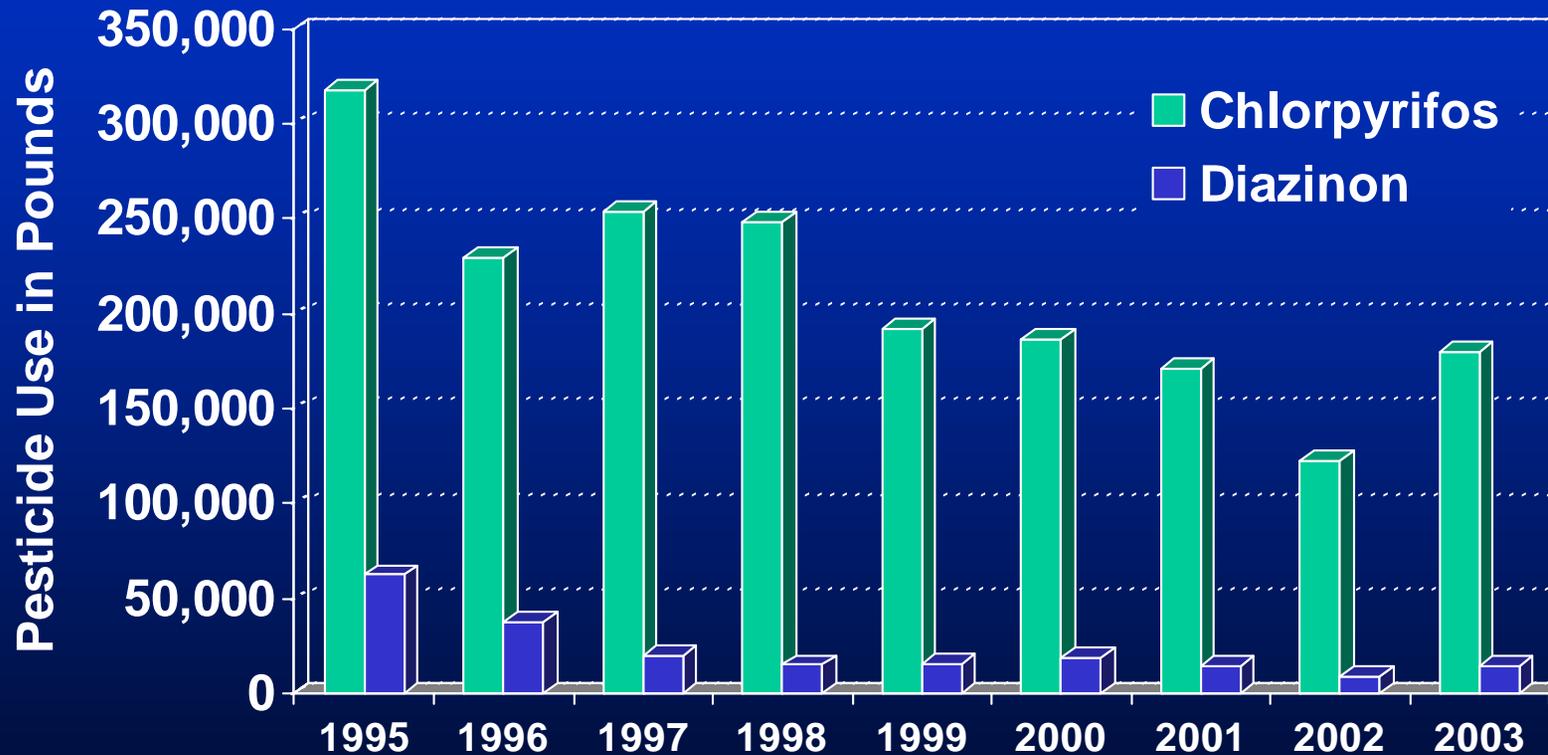
- Stormwater runoff (dormant season)
- Irrigation runoff (irrigation season)
- Both agricultural and urban sources; agriculture is major source; ag use has been decreasing since the early 1990's
- Most urban uses ended effective 12/31/2004 (USEPA re-registrations)

Dormant Season Ag Use



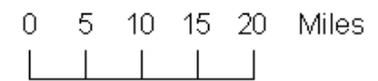
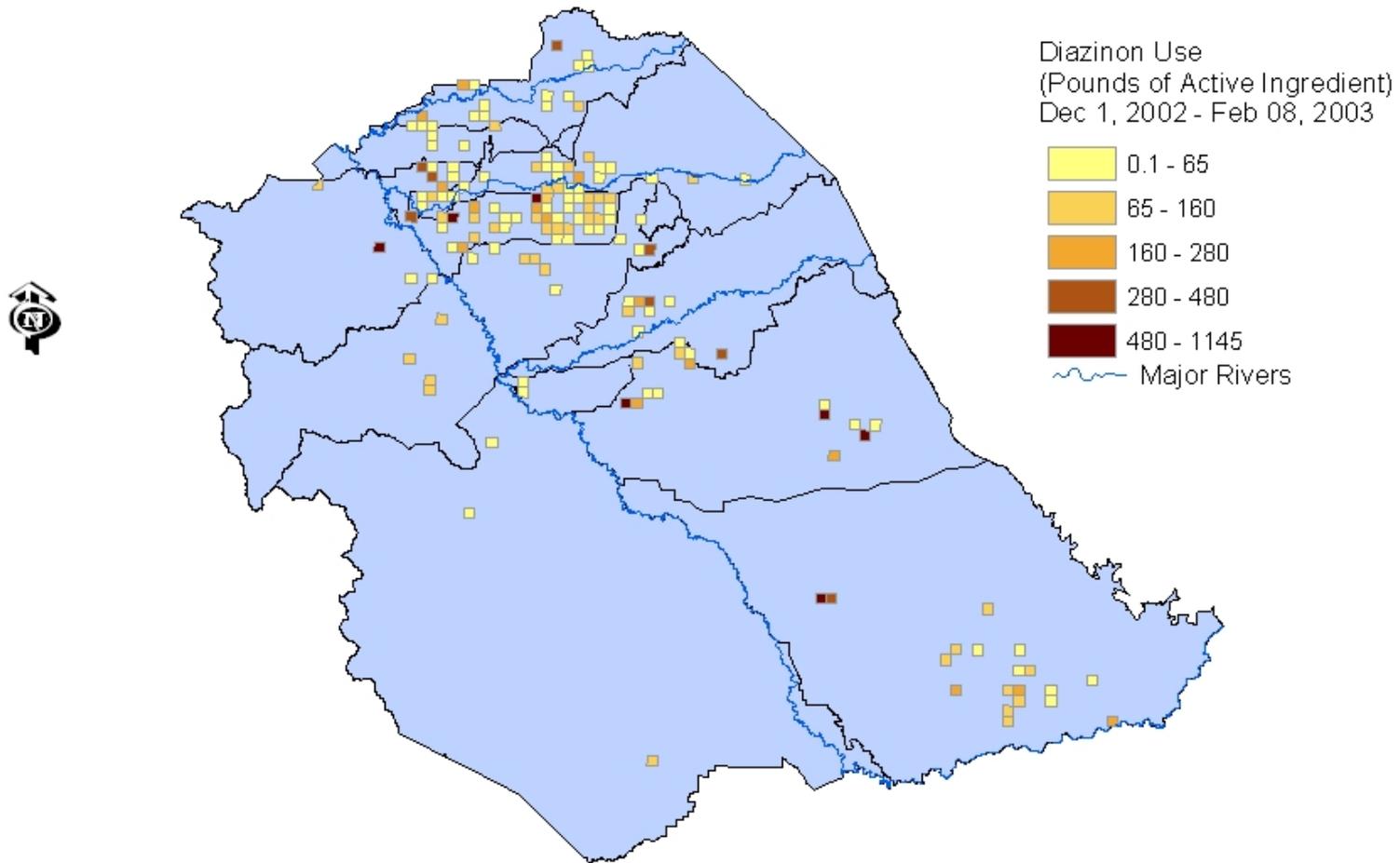
Source: California Department of Pesticide Regulation's Pesticide Use Reports

Irrigation Season Ag Use



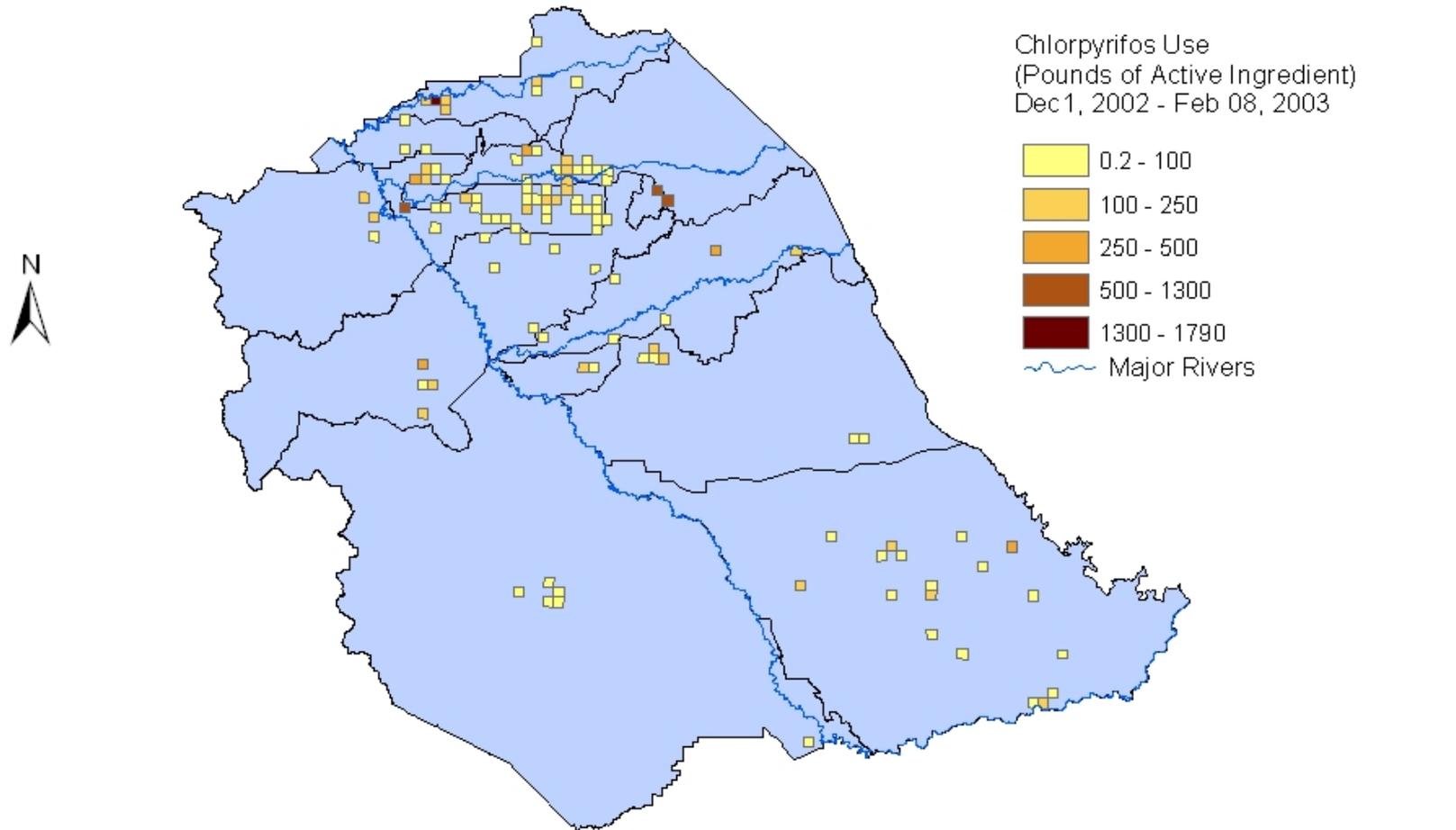
Source: California Department of Pesticide Regulation's Pesticide Use Reports

Dormant Diazinon Use in San Joaquin Watershed 2003



Agis Lab
Land Air and Water Resource Dept.
University of California, Davis
Data from the CA DPR PUR Database
November 2004

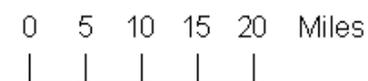
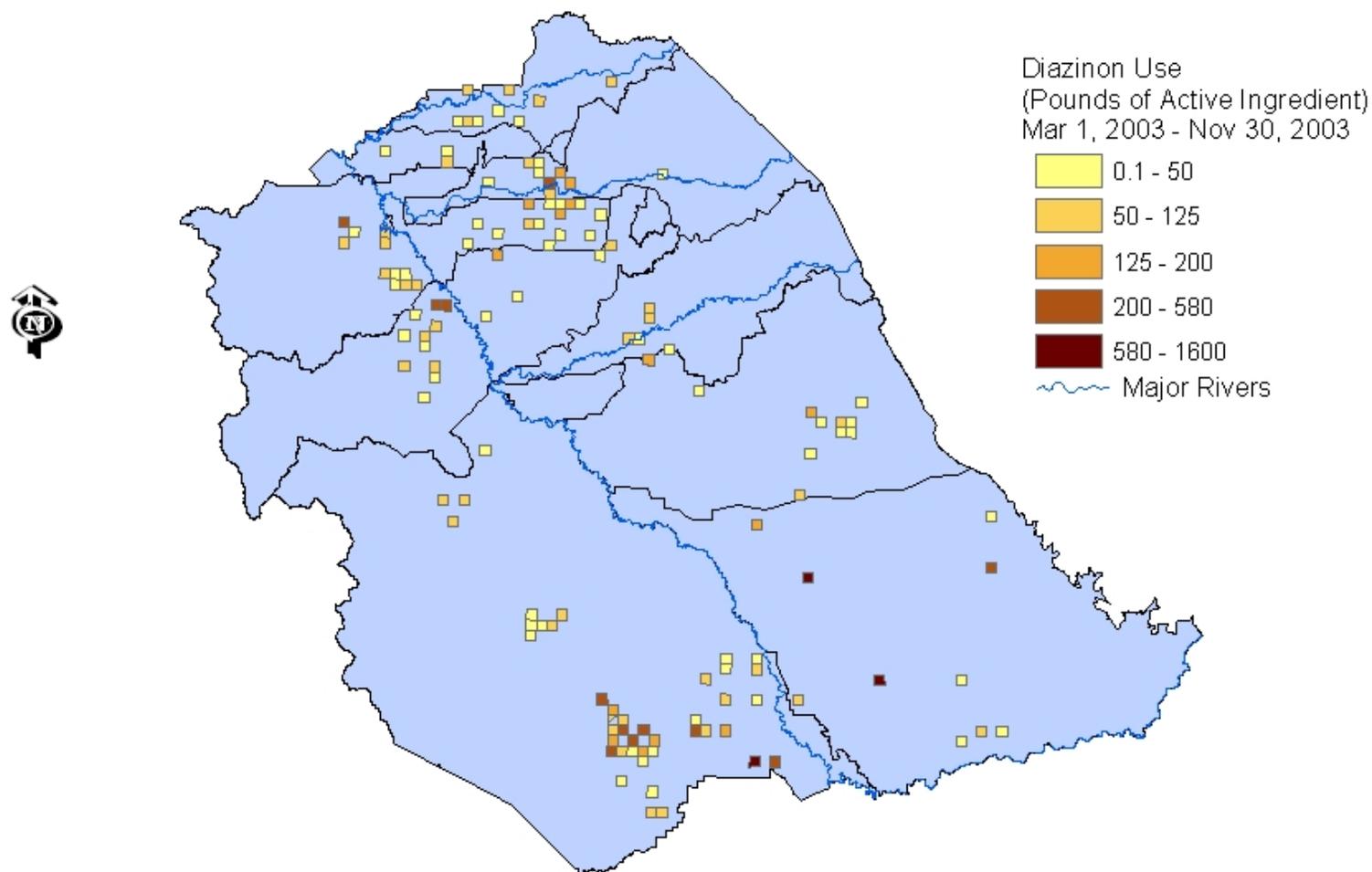
Dormant Chlorpyrifos Use in San Joaquin Watershed 2003



Agis Lab
Land Air and Water Resource Dept.
University of California, Davis
Data from the CA DPR PUR Database
November 2004

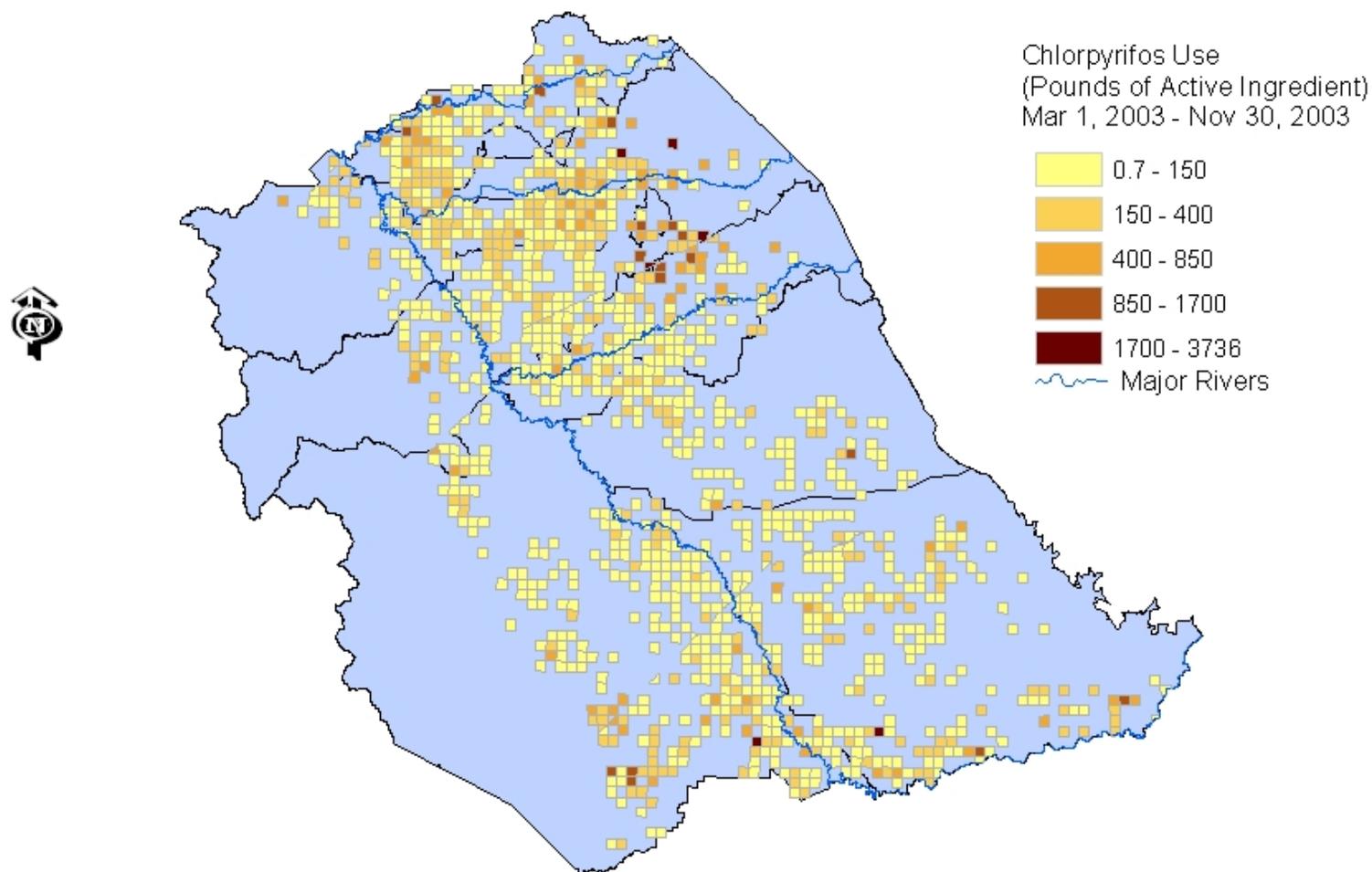
0 5 10 15 20 Miles

In Season Diazinon Use in San Joaquin Watershed 2003



Agis Lab
Land Air and Water Resource Dept.
University of California, Davis
Data from the CA DPR PUR Database
November 2004

In Season Chlorpyrifos Use in San Joaquin Watershed 2003



0 5 10 15 20 Miles

Agis Lab
Land Air and Water Resource Dept.
University of California, Davis
Data from the CA DPR PUR Database
November 2004

Questions?



Basin Plan Amendment Alternatives and Proposed Recommendations

Diane Beaulaurier

Basin Plan Amendment Elements

- Introduction
- Water Quality Standards
 - Beneficial Uses
 - Water Quality Objectives
 - Diazinon
 - Chlorpyrifos
- Program of Implementation
- Monitoring and Surveillance

Basin Plan Introduction

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

Introduction Recommendation

- 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 uses
- Add new use
- Modify existing use

Beneficial Use Recommendation

- Recommendation – No Change
- Aquatic Life (i.e. freshwater habitat) use is most sensitive to OP pesticides



Water Quality Objectives

- Diazinon alone
- Chlorpyrifos alone

Additive toxicity is not a Water Quality Objective, but is addressed in the narrative toxicity objective and is part of TMDL implementation

Water Quality Alternatives for Diazinon

- No change to narrative objectives
- New water quality objectives
 - No detectable diazinon
 - Based on US EPA methodology

Narrative Toxicity Objective is “No Toxics in Toxic Amounts”

- Toxicity is determined using indicator species or by comparing chemical concentrations to available criteria
 - Fish
 - Zooplankton
 - Phytoplankton



Ceriodaphnia dubia

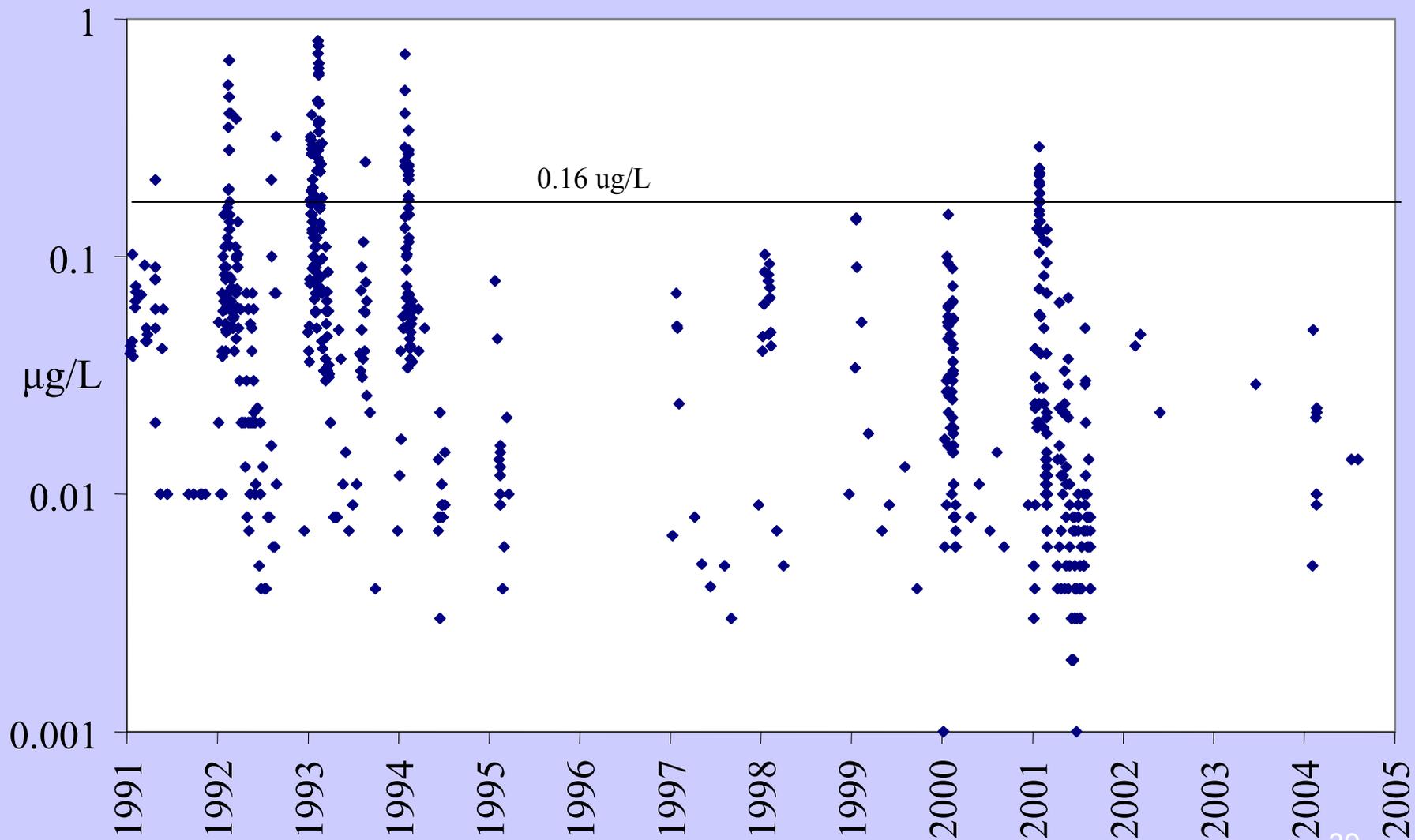
Alternative Water Quality Objectives for Diazinon

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

Recommended Water Quality Objectives for Diazinon

- No new water quality objective at this time
- Interpret water quality data using best available information
 - Acute = 0.16 $\mu\text{g/L}$; Chronic = 0.10 $\mu\text{g/L}$
(recalculated CDFG criteria)
- Future development of WQOs

San Joaquin River Mainstem Diazinon Concentrations



Alternative Water Quality Objectives for Chlorpyrifos

- No change to narrative objective
- New water quality objectives
 - No detectable chlorpyrifos
 - Based on US EPA methodology

Alternative Water Quality Objectives for Chlorpyrifos

| Aquatic Life Criteria for Surface Water | µg/L |
|--|-------------|
| CDFG Aquatic Life Criteria for freshwater – 4 day average concentration | 0.014 |
| CDFG Aquatic Life Criteria for freshwater – 1 hour maximum concentration | 0.02 |
| EPA Draft Aquatic Life Criteria for freshwater – 4 day average concentration | 0.041 |
| EPA Draft Aquatic Life Criteria for freshwater – 1 hour maximum concentration | 0.083 |
| Canadian Environmental Quality Guidelines | 0.0035 |
| Australian and New Zealand trigger values (95% protection based on NOEC) | 0.010 |
| Australian and New Zealand trigger values (99% protection based on NOEC) | 0.00004 |
| 1/10 th Species mean average value (<i>Ceriodaphnia dubia</i>) (Basin Plan) | 0.006 |
| Human Health Criteria for Drinking Water | |
| USEPA Suggested No Adverse Response Levels (SNARL) for non-cancer toxicity | 20.000 |
| Canadian Environmental Quality Guidelines | 90.000 |
| Agriculture-Livestock | |
| Canadian Environmental Quality Guidelines | 24.000 |

Recommended Water Quality Objectives for Chlorpyrifos

- New Water Quality Objectives (CDFG dataset):
 - Acute = 0.025 $\mu\text{g/L}$
 - Chronic = 0.015 $\mu\text{g/L}$

Note: Acute criterion recalculated to two significant figures per US EPA methodology (1985)

Water Quality Additivity Formula

- Additive Toxicity:
 - Multiple pesticides may 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

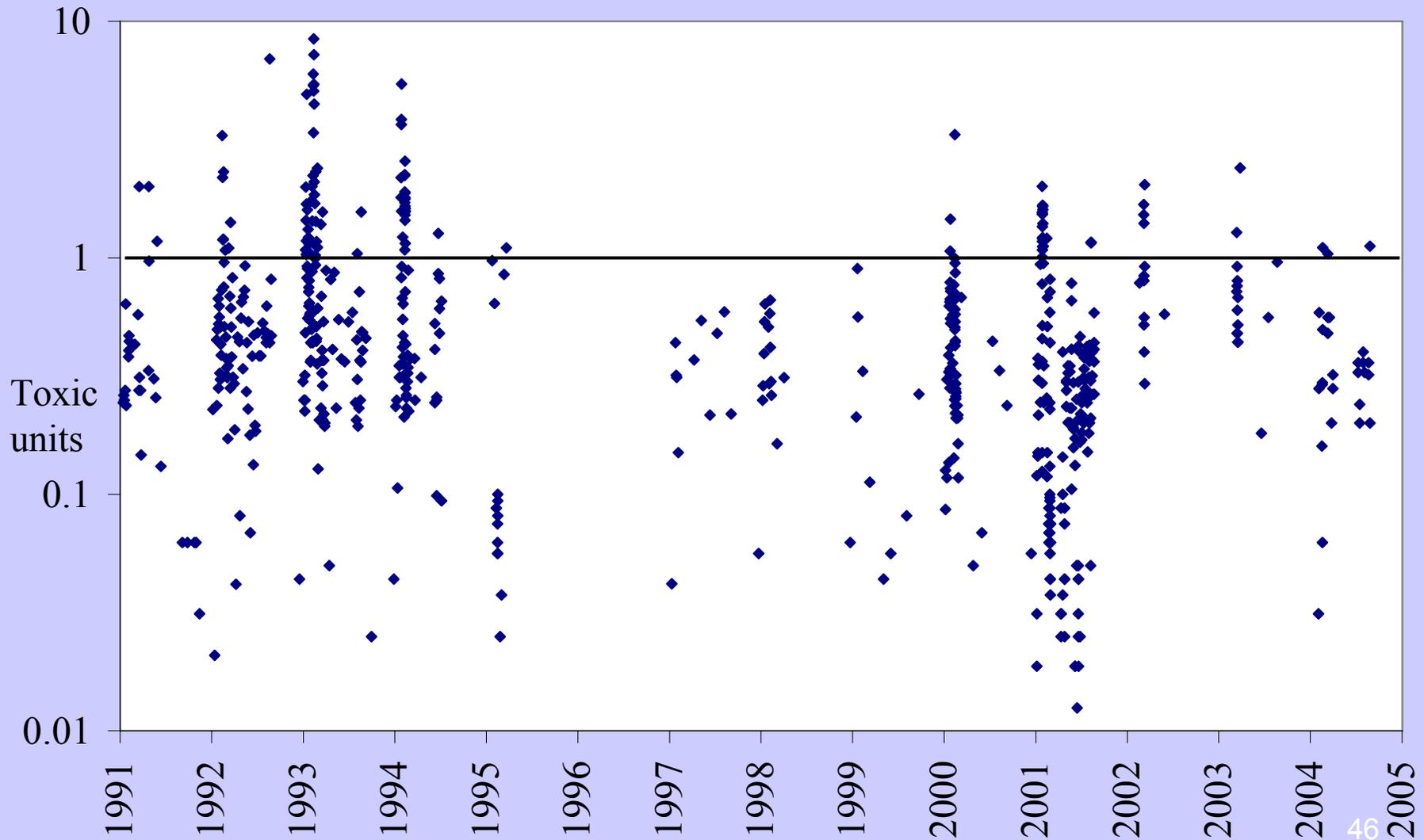
C_D = diazinon concentration in the receiving water.

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.

San Joaquin River Mainstem Additive Toxicity (Diazinon + Chlorpyrifos)



Data points greater than 1 indicate narrative additive toxicity objective is not met

Review Water Quality Standards Recommendations

- Aquatic life beneficial use is most sensitive for OP pesticides
- Do not establish water quality objectives for diazinon at this time
- Establish water quality objectives for chlorpyrifos
- Meet existing additive toxicity formula

BREAK



Program of Implementation

Joe Karkoski

Program of Implementation

- Load Limits and Implementation Policies
 - Loading Capacity
 - Load Allocations
 - Wasteload Allocations
 - Implementation Alternatives

Loading Capacity Alternatives

Concentration Based Loading Capacity

$$\frac{C_D}{WQO_D} + \frac{C_C}{WQO_C} \leq 1.0$$

Mass Based Loading Capacity

$$\frac{L_D}{LC_D} + \frac{L_C}{LC_C} \leq 1.0$$

Recommended Loading Capacity

Concentration-based Loading Capacity

$$\frac{C_D}{WQO_D} + \frac{C_C}{WQO_C} \leq 1.0$$

Recommended Loading Capacity

Where:

C_{diaz} = concentration of diazinon in the San Joaquin River

O_{diaz} = diazinon criterion
= 0.160 $\mu\text{g/L}$ (acute) 1-hour average
= 0.100 $\mu\text{g/L}$ (chronic) 4-day average

C_{chlor} = concentration of chlorpyrifos in the San Joaquin River

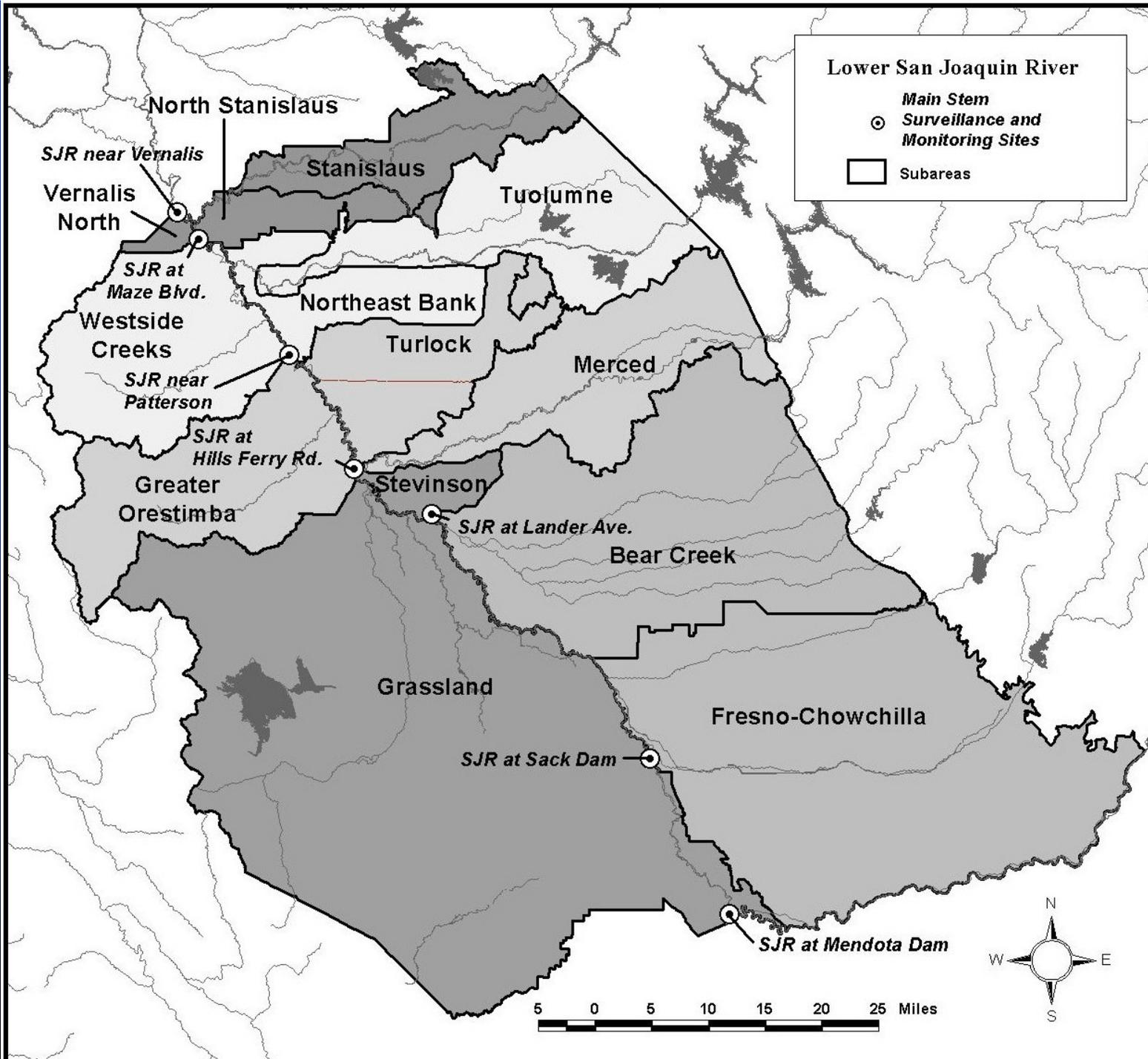
O_{chlor} = chlorpyrifos water quality objective
= 0.025 $\mu\text{g/L}$ (acute) 1-hour average
= 0.015 $\mu\text{g/L}$ (chronic) 4-day average

Load Limits and Allocations

- Allocation of Loading Capacity
 - Load Allocations to non-point sources
 - Waste Load Allocations to point sources

Load and Wasteload Allocations

- Load are allocated by sub areas draining into specific reaches of SJR
- Both load allocations and waste load allocations must meet additive toxicity allocation (i.e. same formula as for loading capacity)



Available Practices and Technology

- Pest management practices
- Pesticide application practices
- Water management practices

Implementation Alternatives

- Conditional Waiver of Waste Discharge Requirements (WDRs)
- WDRs
- Conditional Prohibition of Discharge

Recommended Implementation Alternative

- Either Conditional Waiver or WDRs expected method of implementation
- Two Conditional Prohibitions of Discharge provide a backstop if no waiver or WDRs in place
 - Dormant season prohibition (Dec - Feb)
If objectives or loads exceeded in previous year (Dec-Feb)
 - Irrigation season prohibition (March – Sept)
If objectives or loads exceeded in previous year (March – Sept)

How Would Amendment Interface With Ag Waiver?

- Ag waiver expires December 2005
- Ag Waiver could be renewed or new waiver could be developed.
- Basin Plan Amendment 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 if objectives / loading capacity not met

Questions?



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 for submitting information, but can use information collected by other groups

Surveillance and Monitoring

- Program Goals
 - Compliance with Objectives
 - Compliance with Load Allocations
 - Effectiveness of Management Practices
 - Determine if any toxicity from alternative pesticides

Time Schedule for Compliance

- Compliance with objectives and allocations
 - Dec. 1, 2008
- Dormant season prohibition
 - Dec. 1, 2008
- Irrigation season prohibition
 - March 2, 2009

Economic Analysis

- Estimated Ag Discharger Costs
 - Dormant season practices (\$27K-\$12M)
 - Irrigation season practices (\$4M-\$5M)
 - Monitoring, planning, evaluation (\$600K-\$3.1M)
 - Total \$0.6M-\$20M
- Cost estimates are high end since it assumes every diazinon or chlorpyrifos user must change management practices
- NPDES Permittee Costs
 - Not anticipated due to elimination of urban uses

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 implementation policies
- Allocation of loads for point and nonpoint sources
- Implemented through Waiver or WDRs
- Backstop for waiver or WDRs

Two Conditional Prohibitions of Discharge

- Dormant season (December – February)
- Irrigation season (March – September)

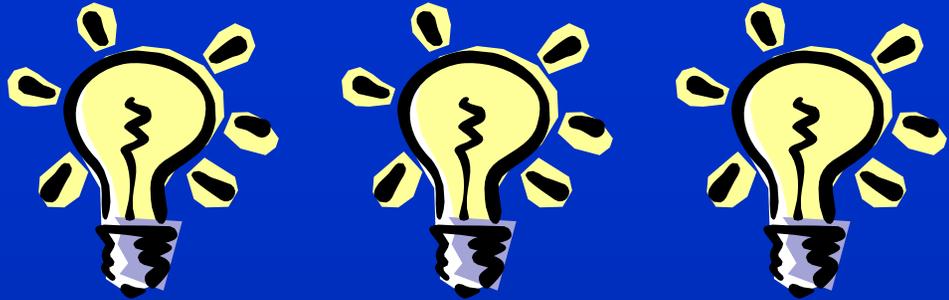
Questions?



Summary

Diane Beaulaurier

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 available to help pay for solutions

The Big Ideas:



- No change to WQOs for diazinon at this time; use best available information to interpret narrative objective
- Propose chlorpyrifos WQOs
- Existing formula for additive toxicity
- Expected implementation through waiver or WDRs. Conditional prohibitions if objectives or loads not met, and if not regulated by waiver or WDRs

Next Steps

- Submit written public comments on the draft staff report by October 5, if a written response is desired
- Please use the comment format provided in Appendix F of the staff report
- Board Hearing planned for October 20 or 21. Check website for agenda two weeks ahead.
<http://www.swrcb.ca.gov/rwqcb5/>

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!

