Effective Policy Based on Sparse Data TMDLs in the San Joaquin River Basin, California

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Introduction

- Background
- San Joaquin River TMDLs:
  - diazinon and chlorpyrifos
  - low dissolved oxygen

TMDL Implementation

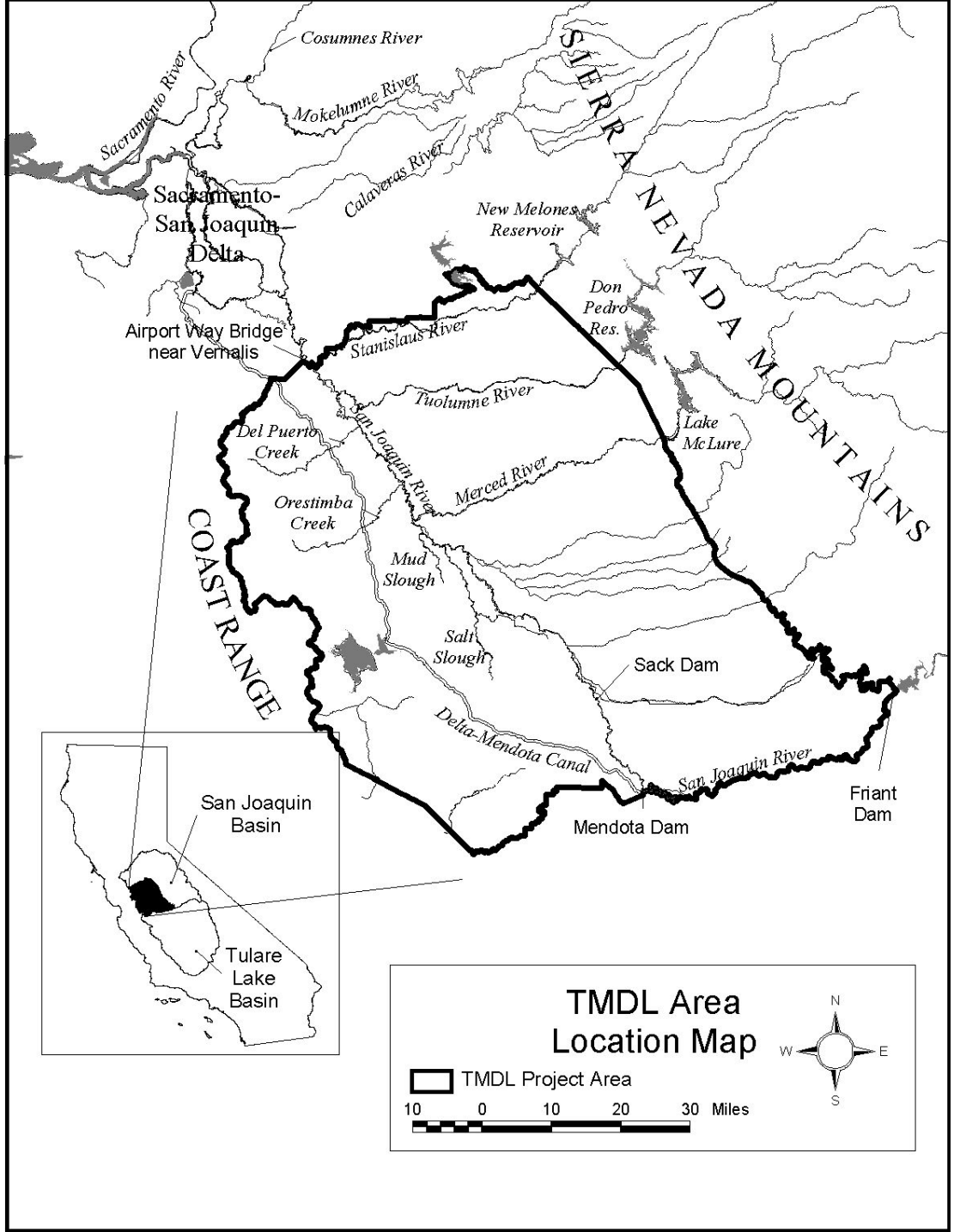
- Water Quality Control Plan (Basin Plan)
  - beneficial uses (e.g. agricultural or municipal water supply, freshwater habitat)
  - water quality objectives
  - numeric or narrative to protect beneficial uses
  - implement actions (to attain the water quality objectives)
  - surveillance and monitoring (to assure compliance with standards)

TMDL Implementation Actions

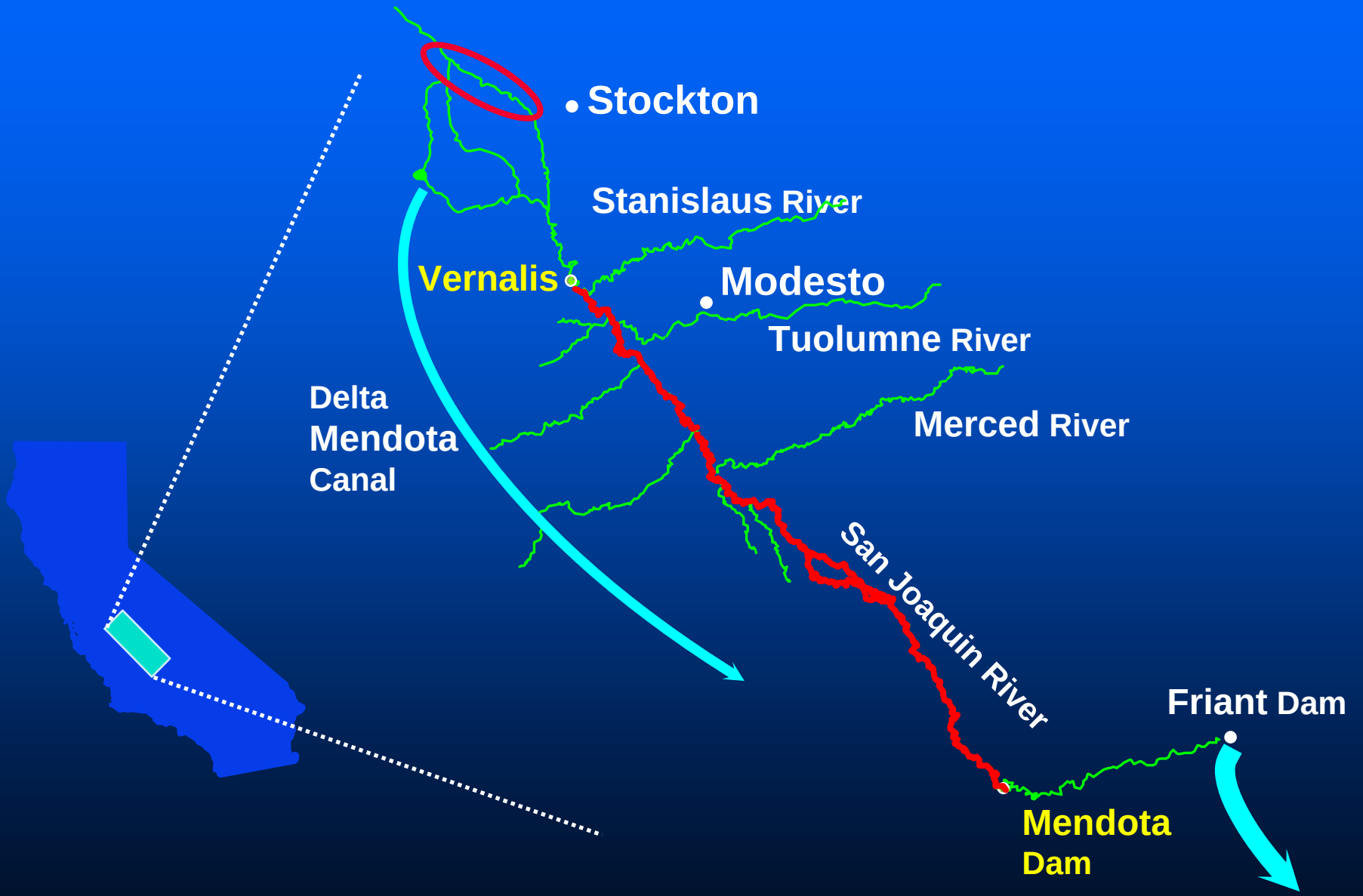
- Waste Discharge Requirements (WDRs)
- Waivers of WDRs
- Prohibitions of discharge
- Recommendations

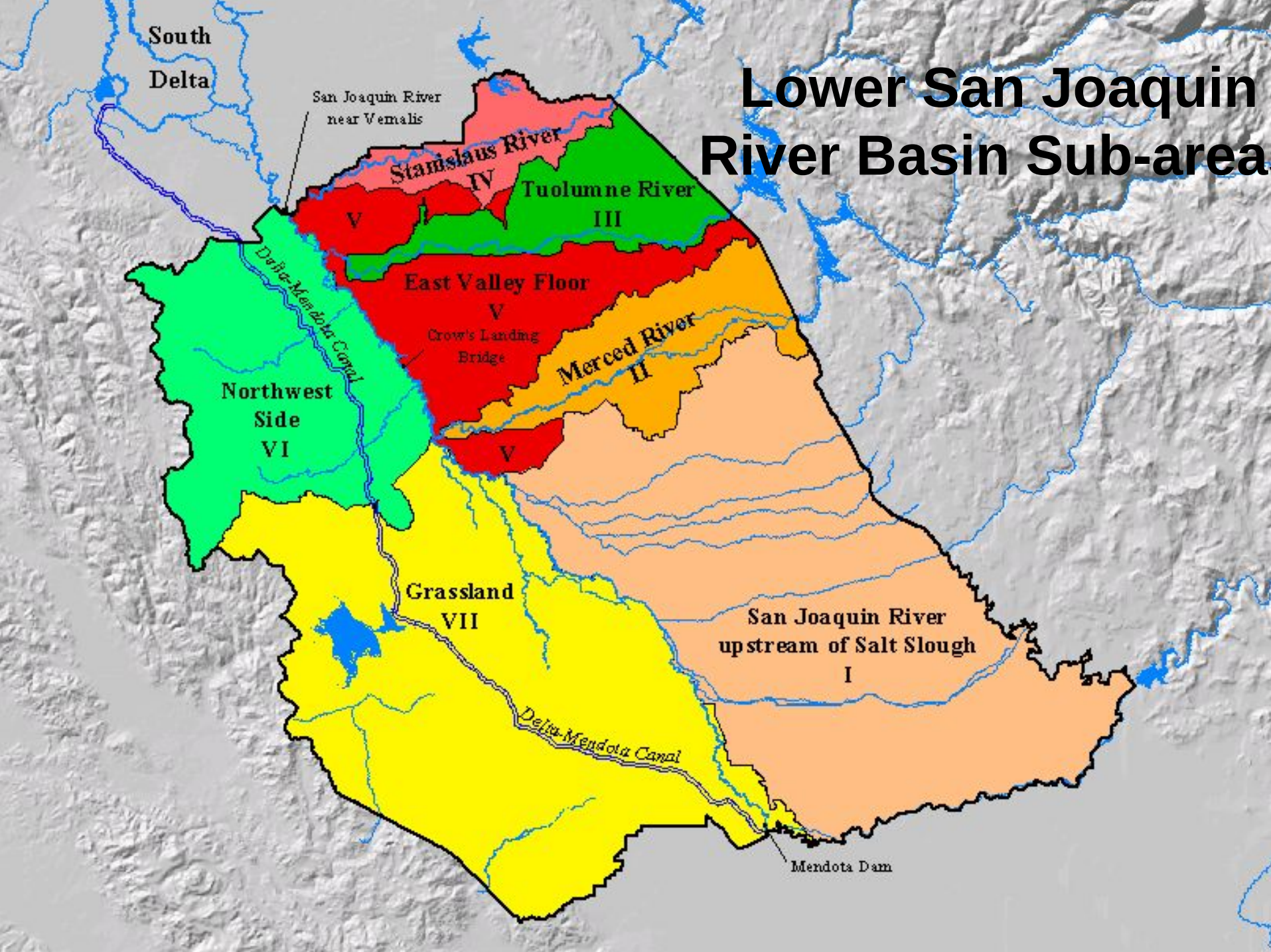
San Joaquin River TMDLs

- San Joaquin River Diazinon and Chlorpyrifos
- Stockton Deepwater Ship Channel Dissolved Oxygen


Cosumnes River
Mokelumne River
Calaveras River
Sacramento River
Sacramento-San Joaquin Delta
SIERRA NEVADA MOUNTAINS
New Melones Reservoir
Don Pedro Res.
Lake McLure
Airport Way Bridge near Vernalis
Stanislaus River
Tuolumne River
San Joaquin River
Del Puerto Creek
Merced River
Orestimba Creek
Mud Slough
Salt Slough
COAST RANGE
Sack Dam
Delta-Mendota Canal
San Joaquin River
Friant Dam
Mendota Dam
San Joaquin Basin
Tulare Lake Basin
TMDL Area Location Map
TMDL Project Area
10 0 10 20 30 Miles
N
W
E
S

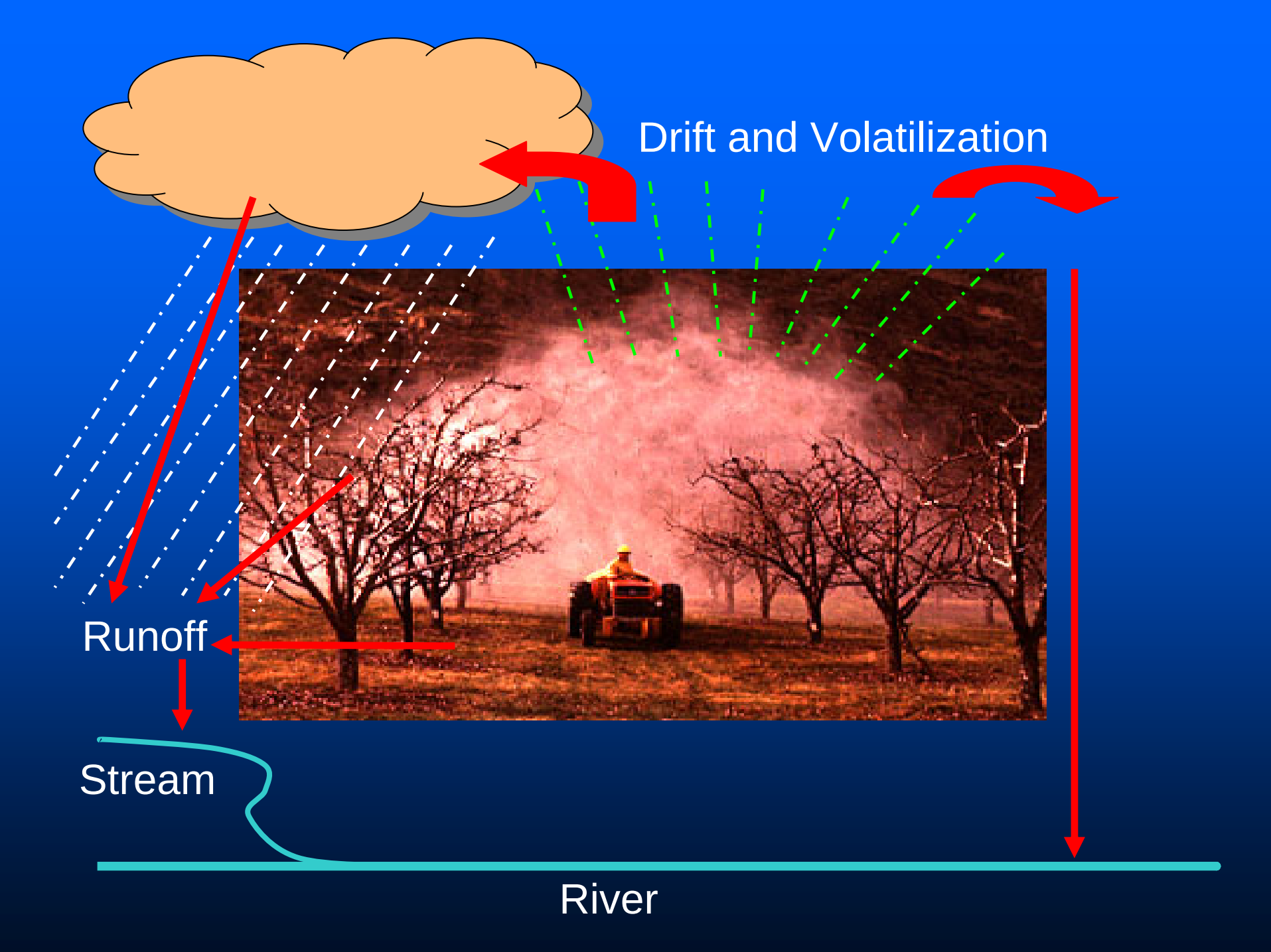
Lower San Joaquin River Basin




Lower San Joaquin River Basin Sub-area
South Delta
San Joaquin River near Vernalis
Stanislaus River
IV
V
Tuolumne River
III
East Valley Floor
V
Crow's Landing Bridge
Merced River
II
V
Delta-Mendota Canal
Northwest Side
VI
Grassland
VII
San Joaquin River upstream of Salt Slough
I
Delta-Mendota Canal
Mendota Dam

Diazinon and Chlorpyrifos TMDL Challenges

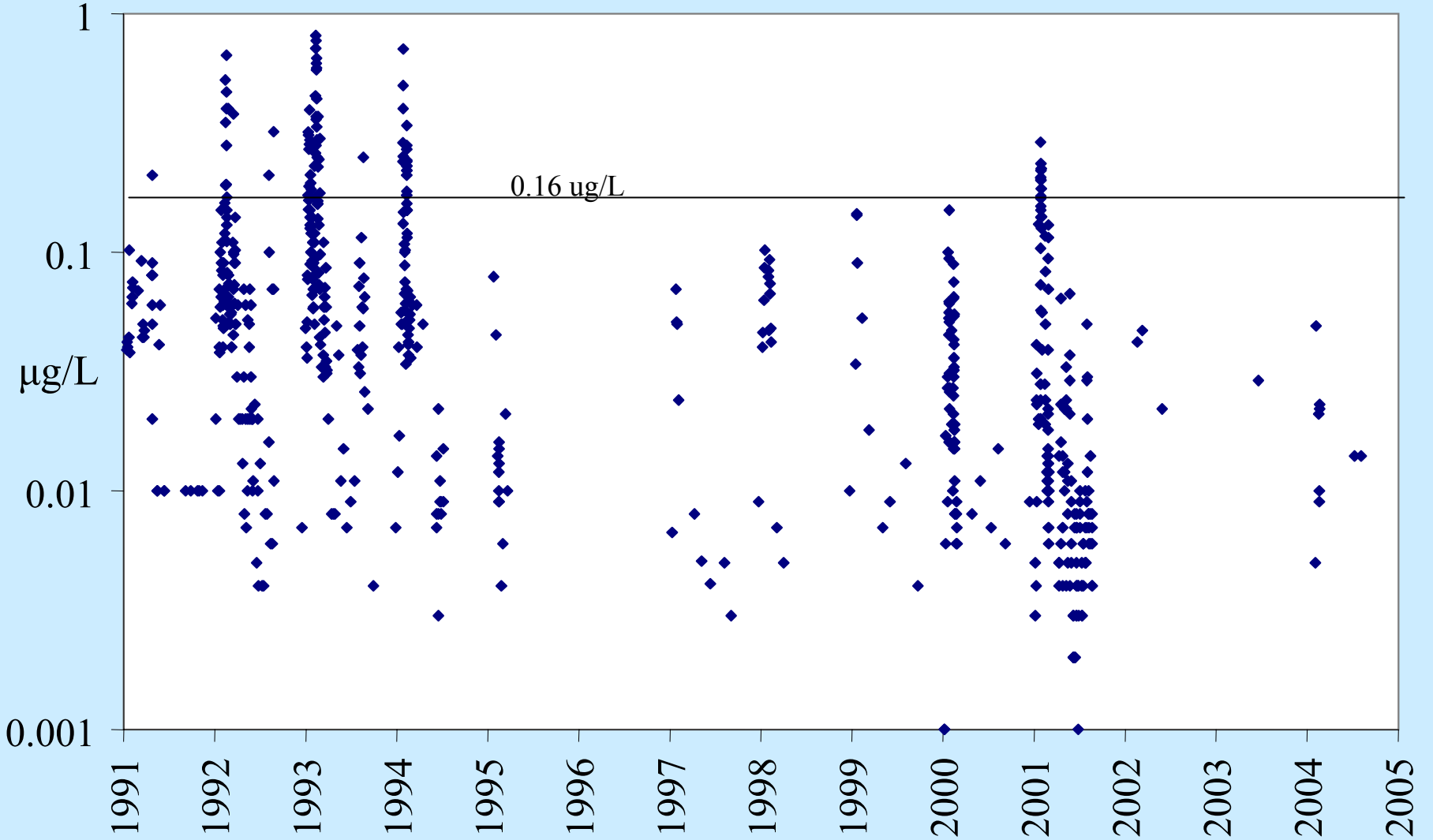
- Only narrative water quality objectives
- Source analysis shows two distinct times of water quality impairment:
  - Storm season (peak concentrations with high flows
  - Irrigation season (peak concentrations with low flows)
- Additive toxicity of diazinon and chlorpyrifos


Drift and Volatilization
Runoff
Stream
River

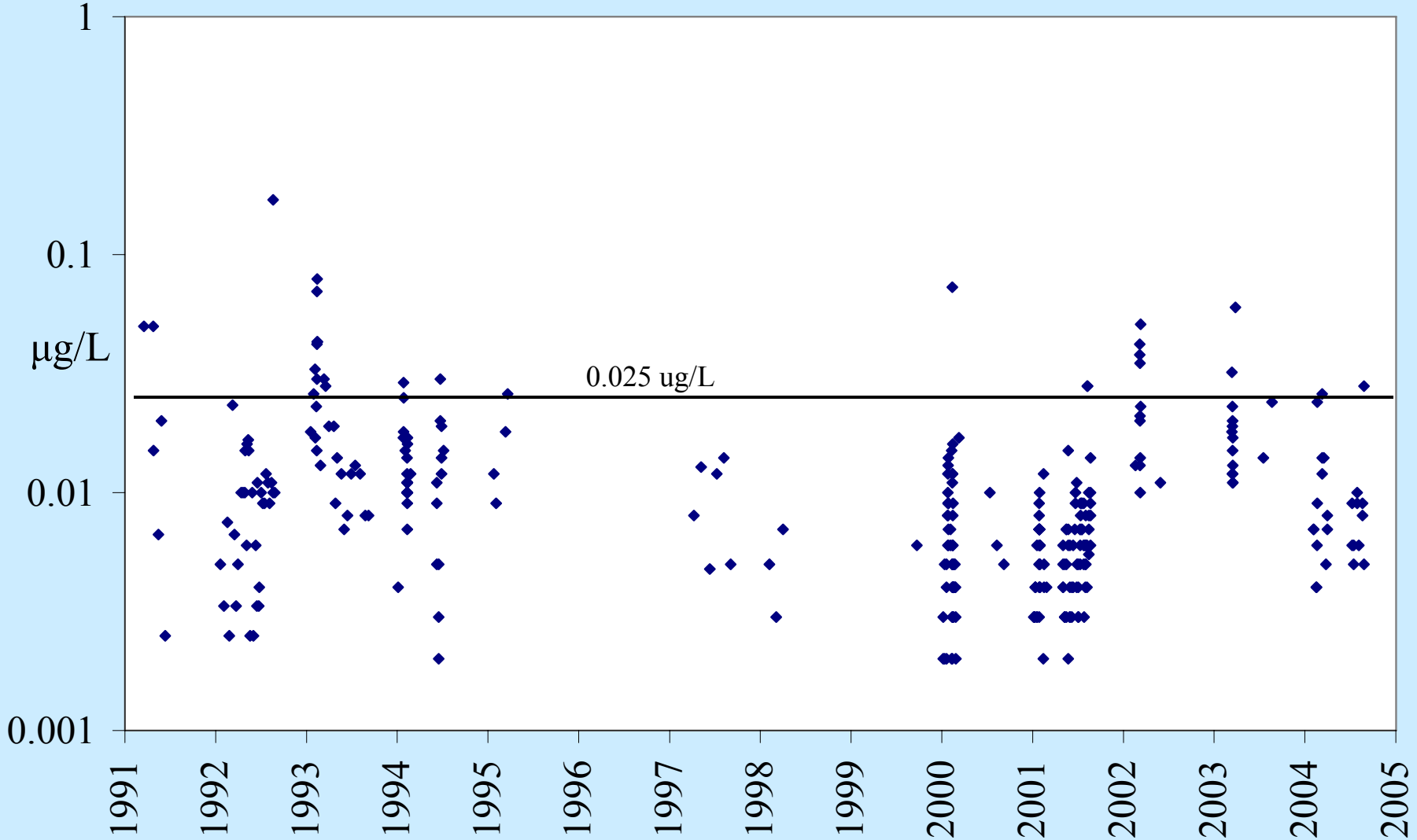
Sources of diazinon, chlorpyrifos

- Most diazinon used in dormant season (Dec-Feb)
- Most chlorpyrifos used in irrigation season (March- Sept)
- Some overlapping use of both at same time

San Joaquin River Mainstem Diazinon Concentrations



San Joaquin River Mainstem Chlorpyrifos Concentrations



Recommended Loading Capacity (Additivity Formula)

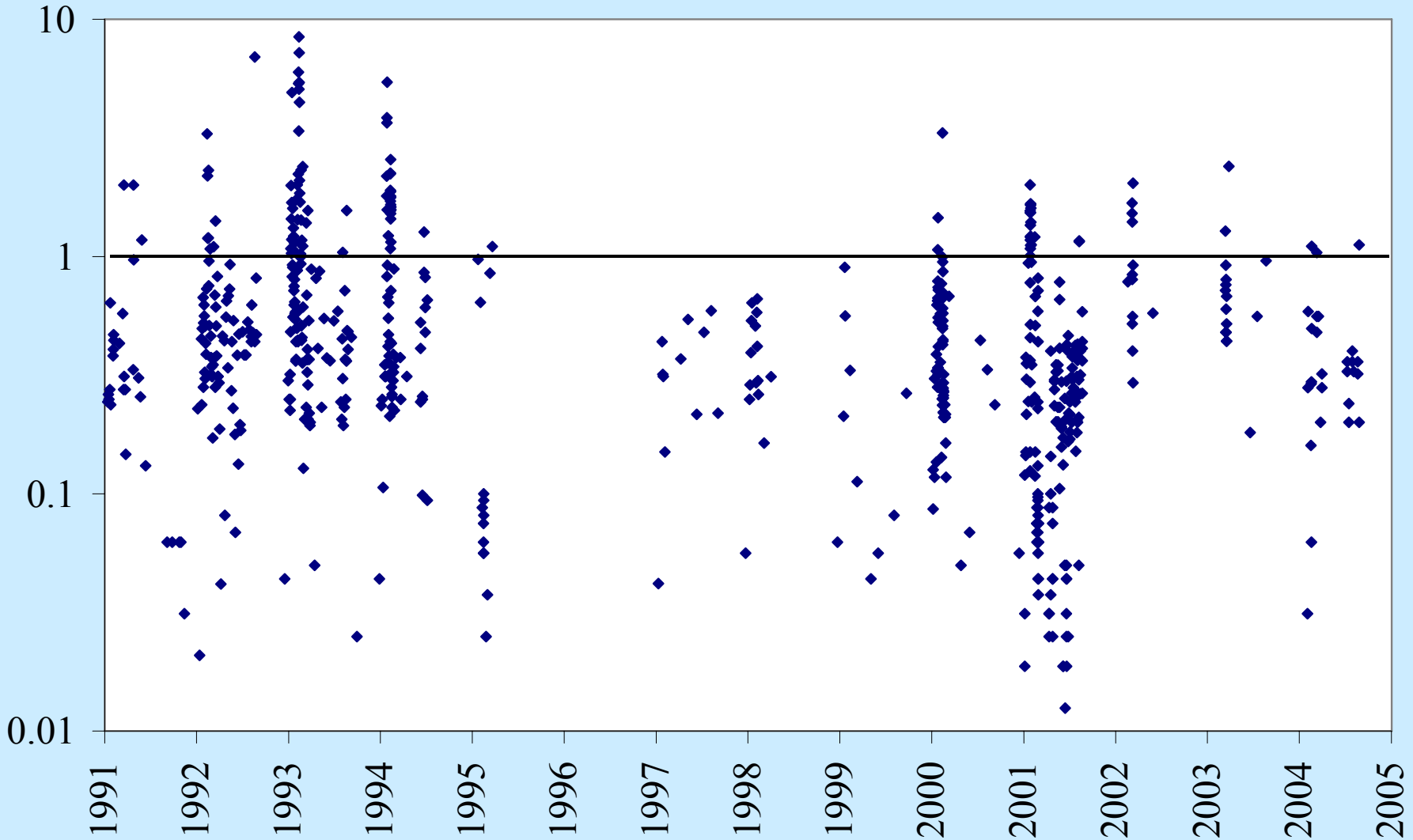
$$\frac{C_D}{WQO_D} + \frac{C_C}{WQO_C} \leq 1.0$$

where

C_D and C_C = diazinon and chlopryrifos concentrations in the receiving water.

WQO_D and WQO_C = acute or chronic diazinon or chlopryrifos water quality objective

San Joaquin River Mainstem Additive Toxicity (Diazinon + Chlorpyrifos)

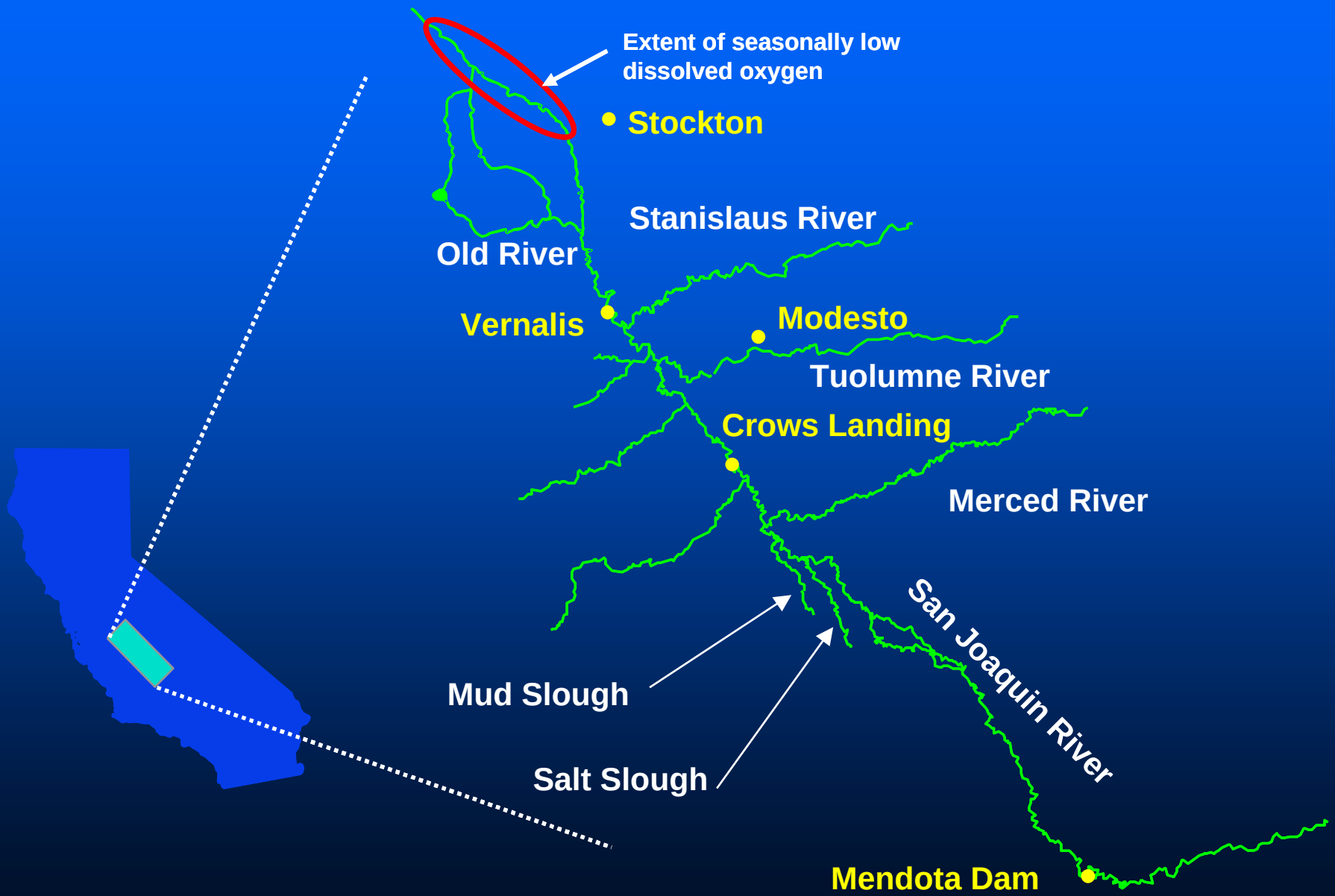


Data points greater than 1 indicate narrative additive toxicity objective is not met

Diazinon and Chlorpyrifos TMDL Solutions & Compliance

- Establish water quality objectives
- Prohibition of Discharge
- Waste Discharge Requirements and Waiver of WDRs:
  - Management plans
- Review TMDL

Lower San Joaquin River Basin



Dissolved Oxygen TMDL Challenges

- Three main causes:
  1. Oxygen demanding substances
     - » Local: ammonia from waste water treatment plant
     - » Upstream: algae
  2. Channel geometry
     - » Stockton Deep Water Ship Channel
  3. Flows
     - » Decreased flows result in increased residence time

Dissolved Oxygen TMDL Solutions

- Apportioning of responsibility
- Allow use of alternate measures
- Require studies:
  - Fate and transport of oxygen demanding substances
  - Efficacy of alternate measures such as aeration
- Prohibition of discharge
- Review TMDL

Conclusion

- Control Programs provide:
  - ‘regulatory backstop’ to encourage creative solutions
  - flexibility in manner of compliance
  - assurance that more information will be available when control programs are reviewed

More Information

- Central Valley Regional Water Quality Control Board TMDL Projects page:

http://www.waterboards.ca.gov/centralvalley/programs/tmdl/index.htm