Workshop Agenda

- Welcome and Introductions
- Overview of Regional Board’s TMDL Development Process and Timelines
- Petition to Revoke the Waiver on Agricultural Return Flows
- Salt and Boron Basin Plan Amendment -- Status
- Salt and Boron TMDL -- Status
Overview of Regional Board’s TMDL Development Process and Timelines
What Is a TMDL and Why Do One?

- **TMDL** = Total Maximum Daily Load
- **TMDLs** are required under section 303(d) of the Federal Clean Water Act
  - TMDLs must be developed for pollutants and waterbodies that have been identified on 303(d) list of impaired waterbodies
What Is a TMDL?

- A total maximum daily load (TMDL) is the amount of a specific pollutant that a waterbody can receive and still maintain a water quality standard.
- TMDLs allocate pollutant loads to point and nonpoint sources...
What Is a TMDL?

- TMDL = WLA + LA + MOS + background

  - WLA: waste load allocation for point sources
  - LA: load allocations for nonpoint sources
  - MOS: margin of safety
Components of TMDLs

- TMDL Description (Problem Statement)
- Numeric Targets (will often be new water quality objectives)
- Source Analysis
- Allocations
- Linkage Analysis (relationship between sources, allocations, and targets)
- TMDL Report
- Implementation Plan
Region 5
San Joaquin River Basin
## TMDL Timeline

### Current Activities

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<tbody>
<tr>
<td>San Joaquin River</td>
<td>Selenium</td>
<td>Diazinon &amp; chlorpyrifos</td>
<td></td>
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<tr>
<td></td>
<td>Salt &amp; boron</td>
<td></td>
<td></td>
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<tr>
<td>Delta</td>
<td></td>
<td></td>
<td>Dissolved oxygen</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Diazinon &amp; chlorpyrifos</td>
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<td></td>
<td>Mercury</td>
</tr>
<tr>
<td>Sacramento River</td>
<td>Copper, zinc, &amp; cadmium</td>
<td>Diazinon</td>
<td></td>
</tr>
<tr>
<td>Clear Lake</td>
<td>Mercury</td>
<td></td>
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<tr>
<td>Cache Creek</td>
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<td>Mercury</td>
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Petition to Revoke the Waiver on Agricultural Return Flows

A Status Report
Petition

- Submitted 28 November 2000 by Earthjustice Legal Defense Fund on behalf of WaterKeepers Northern California (DeltaKeeper and San Francisco BayKeeper) and California Public Interest Research Group
- Seeks termination of waiver of WDRs for pesticide-laden irrigation return water
  - Seeks a hearing within 60 days of petition
- Informational Item Held before Regional Board 26 January 2001
Irrigation Return Water

- 7 million acres of irrigated agriculture in Central Valley
- Tens of thousands of individual discharges
  - Over 340 water agencies
- Potentially contains pesticides and other pollutants
- Seasonally dominates water quality in many lower valley surface waters
Water Bodies Dominated by Irrigation Return Flows

- **160 Natural Water Bodies**
  - 1,512 miles

- **6,319 Constructed Water Bodies**
  - 19,812 miles
Petition

- Extensive appendix
- Transmittal letter signed by 67 organizations
- Many phone calls and comment letters received
California Water Code

- Waste Discharge Requirements are the main tool for controlling discharges

- Section 13269 allows the Board to waive WDRs if it is not against public interest

- New provision:
  - existing waivers sunset on 1 January 2003

- Board may adopt new waivers after compliance with CEQA

- New waivers must be renewed every 5 years
Resolution No. 82-036

- Adopted in 1982
- Conditionally waives WDRs for 23 categories of discharges
- Waivers may be terminated at any time
Waiver Conditions for Irrigation Return Waters

“Operating to minimize sediment to meet Basin Plan turbidity objectives and to prevent concentrations of materials toxic to fish and wildlife.”
Current Status

- Informational Item Held before Regional Board 26 January 2001
- Board directed staff to evaluate merits of petition and review waiver program
  - Identify methods for regulating irrigation return flows
- Public Workshop will be held in July
Issues

- State Board and Regional Board guidance and policies
- Department of Pesticide Regulation’s program
- Impacts of irrigation return waters
- Recommendations of petitioners and others
- Resource issues…
Salt and Boron Basin Plan Amendment

A Status Report
Salt and Boron Basin Plan Amendment

- Last workshop 16 August 2000; Regional Board staff presented:
  - Draft Water Quality Objectives (range of possible WQOs)
  - Draft Program of Implementation
- Verbal and written comments received
More Information

- **Salt and Boron Basin Plan Amendment:**

- **TMDL Program:**
San Joaquin River TMDL for Salinity and Boron

Status and Approaches for TMDL Development
Project Area for Salinity and Boron TMDL
Timelines

• Technical work for salinity and boron TMDL to be completed by June 2001
TMDL Components

- Problem Statement
- Numeric Targets
- Source Analysis
- Loading Capacity
- Load Allocations
- Implementation Plan
TMDL Numeric Targets

Objective:
Establish TMDL the end-points or goals which result in attainment of water quality objectives

Approach:
- Use existing Vernalis Water Quality Objectives for salinity and use the USEPA secondary drinking water MCL for boron at Vernalis
- Eventually TMDL will need be updated when the Salt and Boron objectives are updated under the Basin Plan Amendment process.
## Salinity and Boron Numeric Targets at Vernalis

<table>
<thead>
<tr>
<th></th>
<th>Irrigation Season (April-Sept.)</th>
<th>Non-Irrigation Season (October-March)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Salinity</strong></td>
<td>700 (µS/cm)</td>
<td>1000 (µS/cm)</td>
</tr>
<tr>
<td><strong>Boron</strong></td>
<td>0.6 (mg/L)</td>
<td>0.6 (mg/L)</td>
</tr>
</tbody>
</table>
TMDL Source Analysis

Objective:

Determine the quantity and location of the sources of salt and boron loading in the watershed

Ensure that all significant sources will be addressed so that load allocations result in achievement of Numeric Targets

Approach:

• Divide the watershed into geographic sub-areas

• Use monitoring data and modeling to determine loading from sub-areas and source types.
Lower San Joaquin River Basin Subareas

Grasslands Watershed

N Reservoir Subareas

Tributary Reservoir Subareas

Stanislaus River

Tuolumne River

Merced River

SJR Upstream of Salt Slough

SJR near Vernalis

Northwest Side SJR

Grasslands Watershed

Mud Slough

Salt Slough

Mendota Pool
Lower San Joaquin River Basin Subareas
Sources of Salt (by sub-area)

Mean Annual Salt Load to SJR for WY 1977 to 1997: 1.1 million tons

*Northwest Side estimated by difference: Vernalis minus sum of other sources
**East Valley Floor extrapolated from TID 5 data (1985-1996)
TDS Imported and Discharged from the West Side* of the LSJR

*West Side= Grasslands+NW Side sub-areas
Average Annual TDS Imported and Discharged from LJSR Sub-areas 1977-1997

- Grasslands Northwest Side of the SJR
- SJR above Lander

Graph showing the comparison between Salt Imported and Salt Discharged for different sub-areas.
Agricultural Land Use in the Lower San Joaquin River Basin

1.4 million acres of agriculture
## Lower San Joaquin River Basin Agricultural Land Use

<table>
<thead>
<tr>
<th>Sub-area</th>
<th>Agriculture</th>
<th>Managed Wetlands</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>SJR above Lander</td>
<td>561</td>
<td>45</td>
<td>606</td>
</tr>
<tr>
<td>Grasslands</td>
<td>331</td>
<td>115</td>
<td>446</td>
</tr>
<tr>
<td>North West Side</td>
<td>118</td>
<td>--</td>
<td>118</td>
</tr>
<tr>
<td>East Valley Floor</td>
<td>199</td>
<td>--</td>
<td>199</td>
</tr>
<tr>
<td>Merced River</td>
<td>111</td>
<td>--</td>
<td>111</td>
</tr>
<tr>
<td>Tuolumne River</td>
<td>53</td>
<td>--</td>
<td>53</td>
</tr>
<tr>
<td>Stanislaus River</td>
<td>52</td>
<td>--</td>
<td>52</td>
</tr>
</tbody>
</table>

in 1000 acres
Lower San Joaquin River Basin Agricultural/Wetland Land Use

- SJR above Lander: 39%
- Grasslands: 23%
- North West Side: 14%
- East Valley Floor: 8%
- Merced River: 8%
- Tuolumne River: 4%
- Stanislaus River: 4%
## Non Point Source Loading

(Per Acre by Sub-area)

<table>
<thead>
<tr>
<th>SUB-AREA</th>
<th>NPS (1000 acres)</th>
<th>NPS Loads (tons/year)</th>
<th>NPS Load (tons/acre/year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SJR above Lander</td>
<td>606</td>
<td>32,446</td>
<td>0.1</td>
</tr>
<tr>
<td>Grasslands</td>
<td>446</td>
<td>400,000</td>
<td>0.90</td>
</tr>
<tr>
<td>North West Side</td>
<td>118</td>
<td>218,864</td>
<td>1.9</td>
</tr>
<tr>
<td>East Valley Floor</td>
<td>199</td>
<td>33,507</td>
<td>0.2</td>
</tr>
<tr>
<td>Merced River</td>
<td>111</td>
<td>15,256</td>
<td>0.1</td>
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<tr>
<td>Tuolumne River</td>
<td>53</td>
<td>33,382</td>
<td>0.6</td>
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<tr>
<td>Stanislaus River</td>
<td>52</td>
<td>16,328</td>
<td>0.3</td>
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</table>
Non Point Source Loading
(Per Acre by Sub-area)

<table>
<thead>
<tr>
<th>Sub-area</th>
<th>NPS Salt Load (tons/acre/year)</th>
</tr>
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<tbody>
<tr>
<td>East Valley Floor</td>
<td>0.2</td>
</tr>
<tr>
<td>SJR above Lander</td>
<td>0.1</td>
</tr>
<tr>
<td>NW Side</td>
<td>1.9</td>
</tr>
<tr>
<td>Stanislaus River</td>
<td>0.3</td>
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<tr>
<td>Merced River</td>
<td>0.1</td>
</tr>
<tr>
<td>Toulumne River</td>
<td>0.6</td>
</tr>
<tr>
<td>Grasslands</td>
<td>0.9</td>
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TMDL Loading Capacity

Objective:

• Determine the load reductions needed to achieve water quality targets.

• Establish relationship between pollutant sources and in-stream numeric targets

Components of Loading Capacity

1) Design Flow and

2) Real Time
TMDL Loading Capacity

Developing Design Flows:

• Construct a long-term historic flow record projecting current level of water development on past flow regimes (DWR’s CALSIM Model)

• Subdivide flows into season/month and water-year type
TMDL Loading Capacity

Developing design flows:

• Select a low flow that has a desired frequency of occurrence such as 1 in 3 years (e.g. 1 out of 36 months)

• TMDL (Loading Capacity) = WQ objective * design Flow
## TMDL Loading Capacity

Developing design flows:

<table>
<thead>
<tr>
<th>Season</th>
<th>Year Type</th>
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<tbody>
<tr>
<td></td>
<td>Wet</td>
</tr>
<tr>
<td></td>
<td>Above Normal</td>
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<tr>
<td></td>
<td>Below Normal</td>
</tr>
<tr>
<td></td>
<td>Dry</td>
</tr>
<tr>
<td></td>
<td>Critical</td>
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<table>
<thead>
<tr>
<th>Irrigation</th>
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<table>
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<tr>
<th>Non-Irrigation</th>
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|  |  |  |  |  |
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TMDL Loading Capacity

Example of design flow constraints
TMDL Loading Capacity
Example of design flow constraints
TMDL Loading Capacity

Real Time Component: Enables additional loading above and beyond base loads

• Total loading capacity based on real time conditions

• Loading capacity allocated according to a predefined set of parameters

• Load allocations are dynamic
Benefits of Real Time TMDL

• Recognizes that salt and boron do not bioaccumulate

• Recognizes the need to export salts and take advantage of the assimilative capacity of the river while meeting WQ objectives
Prerequisites for use of Real Time Loads

• Development and maintenance of the necessary operational and facilities infrastructure

• Long-term coordinated effort of dischargers
TMDL Load Allocations

Objective:

• Allocate loads to each of the pollutant sources

• Account for and allocate Background Loads

• Use a Margin of Safety to account for uncertainties in the analyses
TMDL Load Allocations

• Regional Board staff are currently evaluating various load allocation approaches
TMDL Load Allocation Principles

• Loads will generally be allocated on a sub-area basis

• Load allocations will be based in part on the area of agriculture and wetlands within each sub-area and based in part on existing drainage needs

• Supply water quality will be considered and responsibility for imported salts will rest with the entities that import salts
Regional Board Next Steps

• Refine Source Assessment and Loading Capacity (determine allowable loading)

• Develop Load Allocation Program

• Hold another workshop and present updated information in approximately 60 days (late April)
Questions/Comments

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