

**SALT & MUD SLOUGH & GRASSLANDS
TECHNICAL SUBCOMMITTEE SJR DO TMDL**

September 19, 2002

ATTENDANCE

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**SJR DO TMDL
Technical Subcommittee Meeting**

Note: The presentation slides will be available on the SJR website, provided below is a summary of the questions (Q) answers (A) and comments (C) during each session. The presentation materials are available from the presenters and will be posted on the SJR DO TMDL website.

Morning Session:

1. Dissolved Oxygen TMDL Overview Presentation (Mark Gowdy RWQCB)

Q: Are the impact of temperature considered in the Dissolved Oxygen TMDL?

A: Yes, the reduced saturation concentration of oxygen at higher summer water temperature (say 25 deg. C) is considered in setting the interim Water Quality Objective

Q: Are dissolved oxygen impacts related to time of day ?

A: Yes, dissolved oxygen concentrations are highest during day when algal photosynthesis is occurring. During the night and early morning DO is lowest because algal respiration is predominant.

Q: Is the U.S. Army Corps of Engineers Comprehensive Study being considered in developing the SJR DO TMDL?

A: There has been limited interaction with the USACE Comprehensive Study.

C: The Stockton WPCF has Dissolved Air Filtration that supersaturates effluent and holding ponds that retain the effluent during certain periods. The City is evaluating options to reduce ammonia to 2-5 mg/L range.

C: The volume of the Stockton WPCF effluent was about 1/15 of volume of the San Joaquin River during 2000 (e.g., there was 15:1 dilution)

2. Review of technical information with focus on upstream issues (Russ Brown, JSA)

Q: What are the possible sources of TP & TN?

A: The sources are primarily runoff conveying soils and fertilizers,

Q: What are the water quality conditions upstream?

A: The SJR upstream of the DWSC is generally above DO WQO. The DWSC carrying capacity is much lower because flow velocities decrease allowing TSS to settle out and increasing light penetration increase

Q: Have application of copper sulfate (CuSO_4) been considered. If algal loads are removed upstream will it grow back?

A: DO in the DWSC does not appear to be related to U/S algae control. Total-P concentrations would have to be reduced by a factor of five in order to limit algal growth. Dissolved Oxygen consumption (BOD) in the DWSC appears to be derived from the Stockton WPCF effluent (20%) and upstream river loads (80%)

C: Many Districts are experiencing problems with filamentous algae clogging siphons. The "Talent" decision – limits aquatic pesticide application and allows mechanical removal only

C: It is likely that the cause of problem may differ from responsibility for solutions. Might set financial commitment. Need to consider impacts of U/S inputs and the WPCF effluent. RWQCB will be required to prepare a load allocation?

Q Are potential benefits of agriculture being considered? In absence of agriculture would the dissolved oxygen problem be worse?

A: Diversions may serve as a filter to remove algae or nutrients. The San Joaquin River is a highly perturbed system and there is little basis for establishing a natural baseline.

3. Future Studies resolving Peer Review questions

Q: Is the DO TMDL being coordinated with the Salt/Boron/Selenium TMDL?

A: These TMDLs can be complementary (e.g., development hydrologic and WQ models) but may also conflict in the development of alternatives (e.g., additional flows)

C: Where possible, work on the DO TMDL should be incorporated into the Salt/Boron/Selenium TMDL. Model Development should include: temperature/biomass characterization.

C: Data Collection- should consider modeling needs and provide useful information to the local districts. Real time data will facilitate operational decision-making by local Districts

4. Phase I of the TMDL (Mark Gowdy, RWQCB)

C: The DO TMDL will evaluate costs and benefits of various alternatives. This will require a waterside approach. The RWQCB recognizes that a solution to the DO problem might include aeration/treatment within the DWSC as preferred alternative

C: The Interim Implementation Plan will likely include:

- Pilot Aeration Studies in the DWSC (2003)
- Full-Scale Aeration Demonstration Projects (2004)
- Water Quality Monitoring and other special studies (ongoing)
- Implementation Plan for the U/S studies is due to CALFED by end of 2002
- Lead to feasibility study by RWQCB

C: The initial Assurances Package requested by RWQCB is currently being drafted. Initially funding for the Interim Implementation Plan is expected to come primarily from CALFED under Prop 13. The local stakeholders portion of the funding may rely on a negotiated “willingness to pay” during the initial phase and not rely on load allocation based responsibility

C: The RWQCB has established an interim dissolved oxygen Interim Water Quality Objective is 5.0 mg/L during critical periods. This is based on a recent RWQCB review of the USEPA suggested criteria for protecting anadromous fish migration. This is lower than the existing standard of 6.0 added by the RWQCB in 1981 without developing a technical basis. Validation of DO WQO may need to be addressed in the future (peer review)

Afternoon Session

Grasslands Ecological Area (Dennis Woolington, USFWS)

- Total area is approximately 160,000 acres
- Includes Federal/State/Private lands: San Luis, Kesterson, Merced, San Joaquin National Refuge
- 5,100 acres of managed wetlands. These wetlands drain through Mud and Slough, not directly into the San Joaquin River
- San Luis Refuge
 - o Flooding units Sept. – Nov.
 - o Draining units – March-May
 - o Complete end of June
 - o June-Sept there is no discharge from these areas.

- 545 AC wetlands (permanent and semi-permanent wetlands that have a year round flow < 0.3 cfs/minimal Q)
- Merced Refuge
 - 1,800 acres refuge
 - 200 acres wetlands
 - No Water Quality monitoring is being performed due to limited funded
- San Joaquin Refuge
 - Mostly receives drainage from U/S areas
 - Sediment loads are a problem along Ingrams Creek
 - Monitoring includes: Monthly EC monitoring w/irrigators/inflow/outflow
 - SALT/BORON fixed stations/last 2 years (Nigel Quinn)
 - Want to expand monitoring
- Wetlands (3) Types
 - Seasonal – flood fall/drain spring
 - Permanent – Flooded year round
 - Semi-permanent – Flood/Nov. – Aug./Drain Sept., Oct.
- March/April – peak drainage/spillage
- June-Sept. – minimum spillage

Q: Is extra water applied to saltier lands?

A: Yes/flushing during wet years

C: Drawdown of water levels timing/rate dependent on migratory patterns (shore birds)

Q: How is the discharge controlled?

A: Each unit has a water control structure

- Stop log (inflow/outflow)
- Screw gate (inflow/outflow)

Q: Are the losses to GW/seepage significant?

A: Yes within several units measurable losses are reported. In some cases switching to areas with impermeable clay soils is feasible

Q: Are flow records available?

A: Tracking inflows through USBR/inflow records. Discharges typically are not measured and better flow monitoring is desired.

Q: Where are the Mud/Salt Slough Flow Gage Locations?

A: They are D/S as far as possible, mouth of sloughs is very difficult to access

Q: What is the source of water?

A: The refuges do not have a dependable water supply – there is no contract with MID.

Grassland Water District (Don Marciochi Grasslands Water District)

- The total area of the North/South units is approximately 50,000 acres
- 36,000 acres seasonal wetlands
- Annual operations is very similar to the National Refuges
 - Flow thru Winter
 - Discharge March/April

- Irrigation – begins in May
- Typically zero discharge – June-Aug.
- Water Quality Monitoring Plan developed by Nigel Quinn
 - Includes real-time monitoring
 - Inflow monitoring
 - 75% CCID
 - 25% Alta Refuge
- Comparing inflow/outflow indicates uncertainty about flow data
- Northern Unit Discharge thru Mud slough
- Sante Fe Canal is the source of supply/discharge for the Grasslands Southern unit
- Grasslands/FWS signed MOU in Jan. 2001
 - Meets requirements of CVPIA
 - Require development of a Conservation Plan (not developed yet)
 - Inflow/outflow monitoring
 - Identify BMPs

State Refuges (Bill Luster)

- Total area is about 18,000 acres 10% of this is wetlands
- Annual operations are very similar to the Federal Refuges
- Feb. – June drain
- Los Banos Refuge drains through Salt Slough
 - 2 lakes/storage – timed releases
- Minimal discharge June – Oct.
- Pulse discharges have been employed
- Water Quality Monitoring
 - Los Banos
 - Weekly EC
 - Q estimates
 - Other Locations “Hit&Miss” monitoring
 - Not consistent
 - GW monitoring at several units
 - Level only
 - Monitoring reports are kept in office

Grasslands Farmers (Joe McGahon Summers Engineering)

- Total area is 100,000 acres primarily irrigated farmland
- Because of Selenium problems in 1996 developed the Grasslands Bypass
 - San Luis Drain – 28 miles into Kesterson Reservoir
 - Other areas drain into Mud slough
- Approved Selenium TMDL
 - 97-98 load allocation exceeded
- Lbs/Year Selenium Load Allocation
 - 6,800 lbs/yr 1996
 - 4,400 lbs/yr 2002
 - 1,000 lbs/yr 2010
- Water Quality Monitoring program \$750K/yr.
 - Includes (2) sites on the San Luis Drain
 - Continuous flow

- WDR permit monitoring
 - Nutrient (TKN), EC
- Toxicity testing (3) locations
- Fish tissue testing
- Mud Slough/Salt Slough Water Quality Monitoring
 - DO/EC/Temp/Q – continuous monitoring at Sites A/B on the San Luis Drain
 - Grasslands project monitoring project (see website)
- Water Supply is from DMC/Exchange Contractors

San Luis Canal Co/Columbia Canal Co. (Dave Cory)

- Total area is 40,000-50,000 acres
- Discharges to Salt Slough – monitoring
- Very limited discharges during June through September
- Crops – primarily cotton/alfalfa/row crops/diary

CCID

- 144,000 AC long linear/numerous small discharges
 - Discharge into Salt Slough/Mud slough
 - Los Banos Creek
- Limited Water Quality monitoring along Orestimba Creek

Q: Are you members of SJ Valley drain authority?

A: Not currently, but can participate w/o being members (FWS/CFG are not members either)

Northern Subdistrict

- Patterson ID – WQ Sonde (5) parameters
- W. Stanislaus ID – Continuous EC monitor
- Various Water Supply – ditch, DMC, State/Fed projects direct pumping from river

Upstream Monitoring Discussion

C: San Joaquin Valley Drainage Authority is developing a comprehensive monitoring program

Q: Location of flow monitoring sites? Generally have good understanding of where flow information is required

Q: Which water Quality Parameters are required ? Need to collect most information at least cost

Q Will One or multiple studies? Multiple studies however they need to be well coordinated

C: Need to consider 75 mile main stem as well as tributary inputs RWQCB – very interested in SJR main stem, U/S less interest/subwatershed inputs

Major Elements of Upstream Monitoring/WQ

- Water Quality Monitoring
- Short term special studies (e.g., algal growth)
- Data compilation/analyses
- Modeling (more than DO – need to consider SALT/BORON)
 - Basic modeling infrastructure in place

- LLNL/DWR/USBR Team has developed modeling approach
- Need to perform a mass balance on algae to resolve/reduce uncertainty
- Need to understand the transport and fate of loads @ each tributary
- Sources of algae @ each subwatershed
- Control of algae within subwatershed
- Need to monitor most significant flow inputs
 - Many diversions/inputs already covered by existing monitoring
- Need to provide individual WD's useful info. on how their actions can impact Water Quality
- Load Management – Focus on algae/nutrients, residence time/flow
- Implementation plan subject to CEQA therefore will need to evaluate all alternatives

CALFED

- San Joaquin Watershed is current priority
- 75% proposals awarded were for agricultural projects
- Multiple interests – WQ, ecosystems + water supply
- Funding for SJR is highly probable
- Studies must address CALFED peer review data gaps
- Suggest a brainstorming/scooping session to preliminarily identify CEQA Alternatives. This might be a function of the long-term coordinator.
- State Water Board Prop 13 funding projects from \$50K - \$5M f
- List of constituents (already started)
- List of stations (already started)
- Science review by Calfed

SJR River Upstream Monitoring Framework

Continuous Probe Stations

- Purpose: provide real-time in-situ water quality monitoring. Data can be accessed directly via telemetry.
- Sampling Frequency: typically readings are collected at 15-minute or hourly intervals
- Sampling Parameters: DO, pH, temperature, EC, and fluorometry (chlorophyll-a), turbidity(?)
- Sampling Locations:
 - 1) San Joaquin River at Vernalis
 - 2) San Joaquin River at Mays Boulevard (utilize existing recorder)
 - 3) San Joaquin River between Tuolumne River and Mays
 - 4) San Joaquin River at Patterson
 - 5) San Joaquin River at Crows Landing
 - 6) Mud Slough (furthest location downstream)
 - 7) Salt Slough (furthest location downstream)
 - 8) San Joaquin River at Freemont
 - 9) San Joaquin River @ Highway 165 @ free flowing

C: USBR has a project that will procure 12 sondes to test light technology for Dissolved Oxygen (IEP). Should coordinate with TMDL efforts

C: Need to discuss monitoring approach with modelers to make sure data collection meets the models requirements

C: Need to provide training of staff for O&M of stations provide a QA/QC plan

C: Approximate cost \$25K/station/year first year, \$10K/station/years/future years

Water Quality Grab Sampling

- Purpose: to collect water quality samples for laboratory analyses and to characterize water quality using grab sampling techniques.
- Sampling Locations: Stations would be same as continuous probe locations
- Sampling Parameters: TSS/VSS, Chl-A, BOD5, TKN, NO₃, NH₃, TP, DP, Nutrients, TOC/DOC
- Sampling Frequency: River/weekly – monthly future years (initially sample year round)
- Delete water quality sampling that is duplicated by RWQCB

Special Studies

- Purpose: Conduct special studies to address unknowns, peer reviews issues or minimize uncertainty.
 - o 1) Composite vs. Grab sample (perform a comparative study with instantaneous grab samples) Requires a refrigerated sampler?
 - o 2) Algae speciation Weekly Sampling. Coordinate with university for lab work
 - o 3) Others(?)
- Sampling Locations (to be determined)
- Sampling Parameters (to be determined)
- Sampling Frequency: algal speciation weekly

Tributary Monitoring

- Purpose: to characterize the water quality input/output from major tributary areas and to provide inflow/outflow flow monitoring. Provide useful data to Districts
- Sampling Parameters: to be determined
- Sampling Frequency: to be determined
- Sampling Locations
 - 1) Los Banos refuge
 - 2) San Luis National Wildlife Refuge
 - 3) Grasslands WD
 - 4) Grasslands framers
 - 5) Exchange contractors
 - 6) DMC
 - 7) Mendota pool

Other Considerations

- Upstream Monitoring will be a 3-5 year program to capture year-to-year variability
- Monitoring program should consider data needs for other TMDL's.
- Data management and analyses should be considered.
- Close coordination between the eastside/westside programs is required
- CALFED has a 3 year restriction on contracting – this should be considered in the monitoring program design. A phased approach is necessary