

**San Joaquin River Dissolved Oxygen Total Maximum Daily Load
Technical Working Group Meeting**
May 16, 2006
9:00 a.m.– 4:00 p.m.

**Jones & Stokes Boardroom
2600 V Street, Sacramento**

Attendees

Name	Agency
Beckon, Bill	United States Fish and Wildlife Service
Borglin, Sharon	University of the Pacific
Brown, Russ	Jones & Stokes
Chang, Cecily	United States Geological Survey
Chen, Carl	Systech
De Rosa, Laurie	HydroQual
Fleenor, Bill	University of California, Davis
Gowdy, Mark	Central Valley Regional Water Quality Control Board
Grimes, Russ	Jones & Stokes
Headlee, John	U.S. Army Corps of Engineers
Herr, Joel	Systech
Heyd, Jennifer	Regional Water Quality Control Board
Jones, Darcy	California Bay-Delta Authority
Litton, Gary	University of the Pacific
Mao, Lee	Bureau of Reclamation
Marcotte, Barbara	California Bay-Delta Authority
Nozuka, Bob	Department of Water Resources, Central District
Ploss, Lowell	San Joaquin River Groundwater Authority
Quinn, Nigel	Lawrence Berkeley National Laboratory
Rajbhandari, Hari	California Department of Water Resources
Seville, Steve	Jones & Stokes
Stevens, Craig	Stevens Consulting
Stringfellow, Will	Lawrence Berkeley National Laboratory
Topla, Joe	California Department of Water Resources
Thuman, Andy	HydroQual
Van Nieuwenhuyse, Erwin	United States Bureau of Reclamation
Wilde, Jim	Department of Water Resources
Wong, Henry	United States Bureau of Reclamation
Wilson, Danielle (Facilitation)	Jones & Stokes
Rogers, Jennifer (Note-taker)	Jones & Stokes

UPDATES

San Joaquin River Water Quality Management Group Plan Update

Lowell Ploss (SJRGGA): What we have so far is an implementation group. We are keeping track of implementation activities, the grassland farmers project, and the Bureau of Reclamation's studies. A sub group has been formed as well. DWR has taken a leadership role for organization of implementation team. SJRWQ management group is taking all new information and putting it on the SJR management program Web site.

We have started looking at how to better project upcoming water operations; this year's operations appear to be flood control. The Department of Water Resources and Department of Fish and Game are conducting a study on refuges and how they relate to habitats, also.

US Bureau of Reclamation Update

Nigel Quinn (USBR/Lawrence Berkeley National Laboratory): The Department of Fish and Game and the Wildlife Service are participating in this three-year study, as is the Grassland Water District. Lawrence Berkeley laboratory is conducting a three-year study supported by the state board. They have one year of control to manage 12 wetland sites all together. The study is looking at the impacts of delayed wetland drawdown on drainage water quality and on emergent wetland moist soil plants and soil salinity. Six paired wetland sites have been chosen - in the first year all sites will be drained at traditional times. During years two and three of the study, one of the paired sites will be drained late during the VAMP period (April 15 - May 15).

Lowell (SJRGGA) -- The SVDA applied for grant from CBDA to continue drainage control on west side. They got through the first round, but got nothing in the second. They are asking for \$25million. They are making progress.

Central Valley Regional Water Quality Control Board Update

Mark Gowdy (CVRWQCB): The big news is that by the end of June I will be phasing out of work on board and Jennifer Heyd will be taking over my spot on interacting with all of you on DOTMDL. Jennifer you have my full cooperation. I may be there in June for the TWG meeting. If you need to get a hold of someone please contact Jennifer or feel free to contact me. Other than that, not much is going on at the regional board from an administrative perspective. The state board issued the adopted version to office of administrative law; there are no dates for when that will happen. That's all I have to say. We've come a long way and we are moving toward a solution to the problem. I take solace in the fact we are making progress.

Aeration Demonstration Project Update

Steve Seville (Jones & Stokes): I have some quick notes. The demonstration aeration well construction pictures will be available on the Web site soon. I will tell you where we are on construction. Both wells are encased in the ground. In 30 days water-conducting pipes will be installed. In 60 days above ground water piping will be connected. In early June fish screens and pumps will be onsite, but in-water work may be delayed until September depending on the determination of certain fish species. The oxygen supply will sit on a concrete pad at the facility. The Department of Water Resources is meeting with the supplier today to ensure the pad will be sized adequately for the proposed oxygen

supply equipment. The oxygen facility will not be connected to pumps until December to allow adequate time to complete preliminary pump testing and possible bioassay studies. It looks like the facility will be fully operational in December/January.

(See questions regarding this update below):

Bill Beckon: When will the tests by NOAH be conducted?

Steve (JSA): They will start that up in September or October.

Russ Brown (JSA): Those tests are toxicity tests and will be done in January. These are hard problems thrown up by fish agencies to get facilities installed.

Bob Nozuka: Is the smelt holding this back?

Steve (JSA): Yes.

California Bay-Delta Authority Update

Barbara Marcotte (CBDA): There will be more of an emphasis on what I don't know than what I do know. There are a lot of uncertainties about organizational structure and State Bill and Assembly Bills proposing various things, and also the government office of planning. Sometime this month all these things will converge and there will be some path to take and there will be a budget. There are some likely outcomes as far as day-to-day management and more than likely the day-to-day oversight will be transferred to the Department of Fish and Game, the Department of Water Resources or a combination of the two. Hopefully we will sort this out before long. By the June meeting I can give you more clarity. I know that certain contracts (upstream studies) GCAP will transfer to Department of Fish and Game on July 1. Because of that, I don't expect big changes because GCAP will still primarily be doing the work. If that changes, Department of Fish and Game would have more control over amendments to contracts. They are currently relying on CBDA staff for input. Also, I expect the CBDA sciences program, which the government supports, will continue. I am hopeful CBDA can still be involved in peer reviews, etc.

(See questions regarding this update below):

Nigel: What prop. funded upstream work? Prop 13?

Barbara: There's money left in that fund.

Danielle: Thanks, Barbara.

PRESENTATIONS

Will Stringfellow (University of the Pacific)—Investigating Algal Growth in the San Joaquin River and Tributaries

Will Stringfellow's presentation focuses on studies that have been conducted on the San Luis Drain and how those findings relate to the SJR DOTMDL. Specifically the presentation discusses the affect of nutrients on algae growth patterns in the San Luis drain and how that relates to growth in other canals or tributaries.

(See SJR DOTMDL Web site for a copy of the Power Point presentation).

(See questions regarding this presentation below):

Nigel: How does the depth vary over the distance in the drain?

Will: It's shallow in the beginning, and then consistent after 8 feet.

Nigel: The flow is higher. As you get toward end of drain, the gradient drops off.

Bob Nozuka: What is the travel time of canal?

Will: Three days.

Nigel: I found it was about three days at low flow.

Will: The flow didn't vary but 10 percent during our studies.

Nigel: In terms of the sort of drain, can we consider the impact of the sediments and phosphates? I think the sediments are dropping out in the first $\frac{1}{4}$ of the drain. Maybe you could drop in more phosphate as you take out sediments?

Will: I think when that algae comes out of the end of drain, it's inactive. It won't move if not mixed with more nutrients.

Joel Herr: Are you studying at top at beginning of day?

Will: We mix it up.

Cecily: Does your phosphate increase at the end of the drain?

Will: Relative to the total chlorophyll? Not that much. Phosphate is 10 percent of what we ever see.

Joel: In SJR do you see decline in orthophosphate?

Will: I don't have the river data now. What you'll see is spikes in concentration. There doesn't look like much orthophosphate in SJR. Between Crow's Landing and Moss that varies. We get flat lines and then growth; I haven't analyzed the data adequately for SJR yet.

Nigel: There is something strange that occurs at end of San Luis Drain. We found that by site 3, that something in the soup was conducive to certain bacteria.

Will: When algae and bacteria get old, they tend to grab on to things.

Nigel: Maybe it's just slower moving.

Will: This year was odd because of high flows. Growth rates peak out in summer. I wonder if there is a seasonal response of algae, like they know it's fall if they get nutrients.

Cecily: Does the drain flow slow down in the fall months?

Will: Yes.

Will: Most of the days were 55-65 CFF's.

Russ Brown: Did you go out five times, or are you still sampling?

Will: The short answer is no, we'd like to though.

Russ Brown: Do we have A and B?

Will: We wanted to do a study to manipulate the drain, the idea of shutting the drain off. There isn't a lot of enthusiasm for it, but it's not out of the question. So we might want to think about it. If we were sure it would work, we might be allowed to do it.

Cecily: Have you done dye tests in drain?

Will: We have done two

Attendee: Can you calculate loss and how does it relate to sediments and orthophosphates?

Nigel: We have done that.

Will: I don't know if we have the data. If it's important we should do it again, but this particularly was cut in funding.

Attendee: It seems like a simple controlled channel. It's sounds very controlled.

Nigel Quinn (USBR)—Extended San Joaquin River Model, Kate Hucklebridge and Nigel Quinn

Nigel Quinn and Kate Hucklebridge's presentation was about data collection and comparison between modeling and watershed studies. Specifically, the presentation explored the idea of expanding the SJR model network to include: Stanislaus, Tuolumne, and Merced rivers in addition to the Salt and Mud sloughs, and to incorporate flow and salinity information into the extended SJR model for west side creeks and drains and east side irrigation districts discharging to east side tributaries.

(See SJR DOTMDL Web site for a copy of the Power Point presentation)

Craig Stevens (Stevens Consulting)—Demonstration of Web-based conceptual models of DO in the DWSC

We can do the model in two dimensions because it is Web based. The graphic, in addition to being a navigation tool also gives a broad overview of how the system works. You can move into greater detail about the model. The model will be entirely completed in two to four weeks. The homepage provides background of who sponsors the model. The central area will tell about the model. The

sidebar links to data sources. We tried to organize this so all links are on the sidebar. CalFED is developing Web based models as well. DOTMDL wants to link to those Web sites eventually. Jones & Stokes Associates and Russ Brown put this model together.

Physical processes model: You can click on different reaches to take you to that specific reach. We wanted to structure the model so it is highly expandable so when new info comes up, we can add to existing. For example, if you are interested in G Fred Lee's work, you can reference the document. Between 58-95 documents are available in PDF format. A few documents couldn't be acquired because they are not public information yet. If there is a complicated word, you can go to the terminology page, and acronym page and a references page for easy reading.

We wanted to be inclusive and not only use peer review journals for the model. They listed all hypotheses that were feasible.

You can add/deduct from newly collected data. You can actually have a conversation about the data online and it will be sent to Barbara. This is vibrant technology, where we maybe able to look at mathematical data too.

Biological model: This is similar to the conceptual model. Instead of having layers of geography on top, there is a layer below full of species. This page is organized by species. What are the factors that are in place that contribute to negative reaction to low DO level. What we haven't done but could do is click on a graphic to link to data.

You can have specific discussions by species. What's nice about the biological model is that it's structured. You will always know where to find the information. There is a discussion area for each species. We want to compile all information for each species and make that downloadable in one document. Ideally, eventually they'd like to link to outside sources regarding NOAH, etc. Making access to information simpler and more organized is the goal.

(See questions regarding this presentation below):

Nigel: Is there a site map?

Craig: Yes there's a map

Jennifer: This will link off the DO TMDL page?

Craig: Yes. Ideally, we'd like you to comment on it and add information to it.

Jennifer: Who will eventually have ownership of this Web site?

Barbara: That is a good question and will be addressed. In the short term, I envisioned this would go through peer review before it's available for public review. We haven't given Craig much direction for this. I don't know who would be on peer review group. I would love to hear reaction from you all. Do you think if it's well maintained, it will serve you as academics and water users.

Cecily: After you put it up is there some way for people to see "frequently asked questions"?

Nigel: That would be a very good way for peer review. If you document all the questions and responses, then you can alter the document. That would be a very nice way to involve the public.

Craig: It would be a great idea to have a "blog," per say.

Barbara: I am concerned if it were left open, a number of references are cited, and if that was left open, we may not ever get the people who are key to comment because they are too busy. Maybe we can have key people look at it briefly, but then open it to public.

Bob Nozuka: There could be a section for comments until they are incorporated and they can be attributed to the commenter.

Craig: Having it open to public commentary is an important feature.

Nigel: This is comprehensive and you did a nice job, Craig.

Russ Brown (Jones & Stokes)—Review of DWSC Modeling—What should we do next?

Russ Brown's presentation facilitated discussion about the importance of models, the need for them, their relationship to deep-water ship channels, their future use and their importance and relevance in studying DWSC and algae growth.

(See SJR DOTMDL Web site for a copy of Power Point presentation)

(See questions regarding this Power Point presentation below):

Mark: A good model of a deep-water ship channel would be able to help us understand the mechanism for low oxygen in the ship channel. We can use it to understand the sensitivity of the channel. Do you think that by just using data that we would be able to gain any sort of detailed understanding of what causes mechanisms that cause DO?

Russ Brown: I don't think so. You don't know what internally was happening. There is something good about combining field data with models. We can't just use data at beginning of model. It needs to be more interactive. This is a major goal for future modeling. We need to pick the model apart more.

(See graph: DO in the Stockton DWSC vs. Flow)

Will: When you are doing historic simulations, how complete are the data sets? If you are going back to 86, is that a complete data set there? There might not be enough data to do modeling

Nigel: For some of those older years, it might be hard to put the data together.

Russ Brown: If there was a big depletion event in 1993, there is less and less data.

Carl: I agree. But looking at data alone can be misleading.

Mark: This remains a long-term assignment.

Joel Herr and Carl Chen (Systech)—Applying WARMF to the San Joaquin River

Joel Herr and Carl Chen's presentation included topics such as applying WARMF to the San Joaquin River, WARMF inputs, boundary conditions data, west and east side return flow data,

gauging and water quality stations, flow output at various stations and EC, TSS and algal outputs at various stations.

(See SJR DOTMDL Web site for a copy of the Power Point presentation)

(See questions regarding this presentation below):

Cecily: At what time did you underestimate flow?

Joel: I will talk about that later in the presentation.

Cecily: The site that I worked at, they got rain all year round but didn't see an increase in discharge in the early summer, because evaporation is so strong.

Joel: That water never made it to the river to begin with though, because it got sucked up too fast. The section of the river that appears to be losing here is Crow's Landing to Patterson. It might be that the water loses to the groundwater. It could be that return flows are being measured and skew the results.

Will: We talked about this in the meeting, but what was the outcome? Are we collecting data that has used estimates? So most of your information isn't new data. Is there a plan?

Joel: We are going to take intensive data of 2005 and plug that in instead of estimates. That should increase flow in the river a bit.

Will: So that's how you are going to handle it. Going forward you will use the actual data right?

Joel: Simulated observed flow for 2005.

Will: I think one thing that might help here is the assumption that these measurements are the inputs, we might want to evaluate where the stations are in relations to the river, but some of these inputs are not going in to the river but they are going in between where we are measuring and where the river starts.

Will: I always want a real reason; I am a field guy.

Carl: That is why we are not using the model in a vacuum. We want to find out what data we are missing. So do you see that?

Russ Brown: Yes I do see it.

Joel: We are basically data leaches and grab it all and stick it in there. It's open for anyone to see; what's in there and where it came from. In theory, algae should like ammonia, but maybe it's not picky.

Carl: There was an article in which algae liked ammonia, but in some situations they prefer nitrate.

Bob: As the river flows down it ends up with more sediment, but it ends up with less phosphorous? But I thought I heard earlier that phosphorous is necessary for sediments:

Joel: There is a parameter called phosphorous. There might be phosphorous that is so low and deep into the dirt that it will be prevented from coming up to be measured.

Laurie De Rosa and Andy Thuman (*HydroQual*)—San Joaquin River DWSC model Calibration, Alternative Management Scenarios, and User Guidance

Laurie De Rosa and Andy Thuman's presentation was one that discussed the development of a model, calibration, and where we a model can take a user. The presentation also touched upon the application of a model, aeration devices, and flow control. Additionally, it discussed Dissolved Oxygen Unit Responses, Stockton RWCF ammonia, algae, upstream carbon, SOD, variable flows & Stockton RWCF Nitrification, O₂ injections, and mud slough flow reduction. For users, it offered a GIS-based post processor, and a Web Viewer.

(See SJR DOTMDL Web site for a copy of the Power Point presentation)

(See questions regarding this presentation below):

Russ Brown: What happens to what is settling in the water column; where does that go?

Andy: It stays in the water column

Russ: I don't know how much algae plus detritus. You are only using .25 milliliters per day? A small fraction of material goes into sediment.

Andy: Yes, but we don't have that level of detail though.

Russ Brown: In this case the SOD is set into the mass balance? You aren't just making this up right? Do you account for any tile mixing?

Andy: Yes we do.

Bob: How many segments do you have?

Andy: 10 segments

Cecily: Not all algae is the same and they all don't live off the same thing. Maybe that will shed light on this.

Andy: Maybe that will help guide us. That's not my decision. Maybe some of the managers would like to change their focus to that.

Bob: I'd like to see critical crash periods simulated. When we start opening the aeration device.

Russ Brown: There will be new DO monitors?

Laurie: TSS 55 mg per liter. One of the things we do is hand calculations to ensure they are correct.

Laurie: You can see there is some effect of nitrate in the Merced River upstream, not so much in Vernalis.

Bob: Does this simulated mud slough, is it cutting or stopping the San Luis drain?

Russ Brown: The San Luis drain is cut in half.

Russ Brown: You found the same chlorophyll at Vernalis?

Laurie: Yes. We found that there was a reduction of chlorophyll if there was a bigger diversion or smaller diversion.

Bob: You want to simulate cutting off San Luis drain? The position of the San Luis drain varies, but is dominated during dry season.

Russ Brown: This is just an idea. There isn't unlimited algal growth in their model. They cut some of the algae and ended up at the same place long-term. There is no point in cleaning up the drain if the same outcome is true.

NEXT STEPS

DOTMDL meeting scheduled for Tuesday, June 13 from 9 a.m. to 1 p.m.

Danielle: Meeting adjourned at 3:35 pm.