

# San Joaquin River Dissolved Oxygen Total Maximum Daily Load Technical Working Group Meeting

Thursday, June 19, 2008  
9:00 a.m. – 12:00 p.m.

ICF – Jones & Stokes  
630 K Street, #400  
Sacramento, CA 95814

## Meeting Minutes

### Attendees

Name	Agency
Brown, Russ	ICF Jones & Stokes
Brunell, Mark	UOP
Cory, David	SJUDA
Grimes, Russ	ICF Jones & Stokes
Joab, Christine	CVRWQCB
Kratzer, Charlie	USGS
Lee, G. Fred	G. Fred Lee & Associates
Lee, Gene	USBR
Litton, Gary	UOP
McGahan, Joe	Summers Engineering
McLaughlin, Bill	DWR
Menconi, Mary	DFG
O'Neill, Jenna	ICF Jones & Stokes (note taker)
Petrozzelli, Ken	O'Laughlin and Casis, San Joaquin River Group
Quinn, Nigel	LBNL
Rajbhandari, Hari	DWR
Simi, Joseph	CVRWQCB
Stringfellow, Will	UOP
Wilson, Danielle	ICF Jones & Stokes (facilitator)
Wingfield, Mike	ICF Jones & Stokes

### Updates

#### **San Joaquin River Water Quality Management Group Plan**

No report

#### **Stockton Deep Water Ship Channel Demonstration Dissolved Oxygen Aeration Facility (Bill McLaughlin)**

DWR has done some efficiency testing, and they are working on the results. Oxygen transfer efficiencies are lower than expected, but they will be trying different procedures this summer. They have been tracking DO levels in the Deep Water Ship Channel, which have been hovering around 5mg/liter since May, and have been holding steady until last weekend. The facility was fired up on June 16, and both pumps are running. The facility is injecting water with a DO level about 30 - 40 mg. They are doing pulse tests to oxygenate the channel, then they will shut down the facility and see what happens, then turn it

back on. They got a good response early on (6 mg/L) and 7.5 mg/L, but it is common for large vessels to park in front of the discharge line, which is lowering mixing rates. Once the ship left at 6:00 on Tuesday, the mixing rates seemed to improve. This is very preliminary data, and they don't have data from the four sensors in the channel. They should have a lot more data to share by the September meeting. The device is running through the end of the week. Bill noted that he can arrange another facility tour if there is interest.

### Questions/Comments

- *Does the port have any control over where these ships park?* The port does not have much discretion about where ships park; these particular ships must park in this area because there is no other space large enough to offload windmill parts.
- *Could the situation get worse as the port expands?* As they are able to dredge more docks and create deeper docks, they will have more flexibility as to where the ships park.
- *What is the power source for the aeration device?* It is all electrical, through a lease with the port.
- *What is the plan for operation? Are you operating to seriously put oxygen in the water, or is it just for testing?* This is a demonstration project for two years. The emphasis is on testing and on getting the study completed to demonstrate the effectiveness of the device and determine if it should run long-term. We will be doing quite a bit of operation this summer to take advantage of low DO levels.
- *When does the objective go up to 6?* September 1 through November 30.
- Gary Litton doesn't think that the ships are an issue. He did some studies that showed that once the oxygen is in the water, it gets carried across the channel fairly predictably.
- Russ Brown pointed out that, since this is a demonstration project (if it is determined to be a problem), they could potentially install a second diffuser section with a valve so that one section would always be open to the DWSC.
- Water is released perpendicularly to the channel to promote mixing across the channel.
- The device was designed to put out a full 10,000 pounds per day, which is hoped to keep the DO up in the future.

### **CVRWQCB (Christine Joab)**

The status on the SJR DO TMDL is the same as the last meeting. CVRWQCB staff are currently reviewing the 2000+ pages of the task reports from the Upstream Studies. They just provided their comments on the Draft Task 12 Report to Will Stringfellow. Monitoring of the San Joaquin River watershed is continuing through the summer by Randy Dalhgren of UCD. His lab is processing water samples collected through the CVRWQCB's Irrigated Lands Program. Randy's summer monitoring program started in June and will continue through the end of August.

### **Presentations**

#### **Gary Litton and Mark Brunnell – Observations and Mathematical Model for Zooplankton and Algae Distributions in the Tidal Reach of the San Joaquin River**

The study was motivated largely by the fact that early modeling results were off (three times the measured chl *a* concentration at Channel Point using the Mossdale input). Most studies showed that algae declined from Mossdale to the Deep Water Ship Channel, with significant loss of algal dynamics below Vernalis. The goal of Tasks 8 and 9 was to figure out what was happening to the algae as water flowed from Vernalis down to the Deep Water Ship Channel. Gary and his team dyed the water at

Vernalis down to the Deep Water Ship Channel. Towards the end of the study in 2007, there was some monitoring in the Deep Water Ship Channel, but the study's main focus was on this 31 mile reach.

The study concluded that:

- Observations for 2005 and 2006 are atypical due to high flows, but data analyses indicate that grazing and light limitation effects are significant in explaining the fate of algae below Mossdale.
- For 2007, under conditions of near zero net flow, the zooplankton maximum shifts upstream in response to available food resources yielding a steep decline in chlorophyll a. Under the low flow conditions observed this season, residence time increases dramatically which can amplify the effects of grazing pressure and light limitation. However, tidal dispersion dominates advective transport at low net flows, leading to greater mixing of the Deep Water Ship Channel water with algae-rich river water. This dilution effect may be an additional factor in the decline of phytoplankton below the Head of Old River.
- A diagnostic model was developed to evaluate the effects of light limitation associated with increased depth below Mossdale and zooplankton grazing. Model simulations are consistent with the transformation and degradation of algal pigments.

[See PowerPoint presentation for further details]

Post Presentation discussion, comments, and questions:

- *What are the political impacts that this study could have on the management of the San Joaquin River?* Gary responded that it really depends on what the desired outcome in the Deep Water Ship Channel is, and that there is a real opportunity at this point to dictate what the environment in the Deep Water Ship Channel will be. For instance, the study showed that no flows could actually be good. Charlie Kratzer added that the political and management impacts will also depend on the fact that there multiple users with divergent interests for the river. It was also noted that the current crisis in the entire Delta and the multiple options for managing the Delta will also have an impact.
- It was noted that it appears that the zooplankton are where the highest food source is; they don't want to be where the water flows really fast because it is too hard. They need a balance between a place to hide and the food, and grow in this balanced zone. Especially when the flows are low; when the flows are high, they tend to be pushed towards the Deep Water Ship Channel. It may be helpful to think of zooplankton as a population and not individuals. The mass peak will occur where habitat and flows are optimal. The challenge is to develop a predictive model that can track all of these factors at such low flow conditions. We have seen that the oxygen demand is tied to the algae biomass; this needs to be tracked so that we know where it will be most exerted. This could also impact the aerator demonstration and other management plans. This is a good start, we've identified the mechanisms and integrated them into a more complex model and track more conditions. Sampling zooplankton can range anywhere from one hour to days for one sample, depending on turbidity. Looking at the zooplankton next to the phytoplankton is very revealing, but this is difficult to do (Will Stringfellow is working on an approach for this that may be successful).

#### **Will Stringfellow – San Joaquin river Upstream DO TMDL Project Final Report**

This presentation focused on the contract and whether the Upstream Studies team did what they were paid to do. This is formalized with the Task 12 Report, which is available on the UOP website at [www.eerp-pacific.org](http://www.eerp-pacific.org). If you catch any errors in the report, please email Will.

The contract objectives were both contractual and scientific. The study area was limited to above the Deep Water Ship Channel. All agricultural areas were impacted, with some wetland and urban areas in

the system. The purpose was to look at algae growth in the San Joaquin River (including the import of nutrients from agricultural and other sources) and at hydrology, and to put them in context in relation to [what?]. The study area included three reaches: the Southern Reach (wetland systems, meandering streams); the Mainstem (starts with the Merced River coming in; lots of algae growth); and the Tidal Estuary (different kinds of hydrology). This presentation mainly addressed the upper reach above Vernalis.

The study's objectives were to:

- 1) Develop a comprehensive monitoring plan to characterize the loading of algae;
- 2) Characterize the transformation and fate of algae;
- 3) Characterize the fate of nutrients;
- 4) Characterize temporal variability;
- 5) Provide input and calibration data for the model; and
- 6) Provide stakeholder confidence.

The study's approach was to coordinate activities to avoid redundancy and to get the most synergy from the group. The three principal areas were monitoring (data from fixed locations); modeling (above Vernalis); and directed studies (more activities done to answer specific questions).

The Task 12 Final Report concluded that:

- The Upstream Project met all of its project objectives;
- Non-point discharges above Vernalis were thoroughly characterized;
- A water quality model has been developed for the mainstem and southern reaches;
- Sufficient information has been collected to support the development of a scientific load allocation.

[See PowerPoint presentation for further details]

Post Presentation discussion, comments, and questions:

- *Is there is any evidence that there is something wrong with the San Joaquin River and whether it needs any kind of management?* Will compared the river to a garden where you need to figure out what you want to grow. It will really depend on your objective – drinking water, fish habitat, etc. have different needs, and they will never be compatible.
- *Is there any indication that the river provides any part of the problem in the Deep Water Ship Channel?* Will said that everything he's read indicates that you want these nutrients flowing into the system. It is not a matter of going "natural" again; we need to decide what is important. Doing nothing (in the Delta) is not an option. Gary Litton commented that the flow is the driving factor. Russ Brown added that, at higher river flows, the algae doesn't grow; in high flows, there is little algae; at low flows there is more, but they could be moved out via Old River. We need to get to some of these simple answers at this point. There may not be a need to do upstream work for DOTMDL.
- *Could we accept the Null Hypothesis and be prepared to walk away and say "It's OK"?* Gary Litton answered that it depends on what degree of deviation you are willing to accept.

- Salmon restoration plans in the San Joaquin River will also add a new component. Will commented that this all demonstrates the need for an estuary model.
- Will added that salinity and selinity will also be an issue in this area.

Will ended his presentation by adding that there was a lot of good that came out of this task, and that they hopefully we will be able to publish and get additional funding for more modeling. He noted that the interaction between the modeling and field-oriented people/studies is very beneficial. UOP will cover the study for two more months under special funds from the Dean.

Nigel Quinn suggested using his model; UOP applied for additional funding. If funded, they will look at all models available.

**Identify Next Steps**

Have a great summer! We will follow up with you around September. Meanwhile, ICF Jones & Stokes will be updating the website, so please expect to be contacted.