

**STATE BOARD MONITORING SPECIAL STUDY**  
**Technical Workgroup Meeting #8 – Clarification to Comments on Modeling Assumptions**  
**June 30, 2023**  
**9:30 am – 12:00 pm**

**MEETING NOTES**

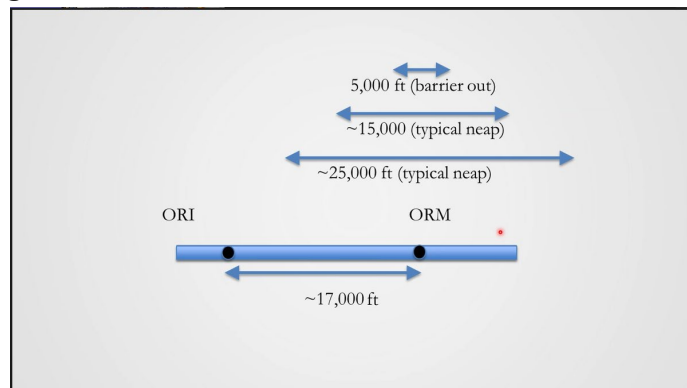
**Attendees**

- Eli Ateljevich/DWR
- Erika Britney/ICF
- Lauren Beaudin/SWRCB
- Thomas Burke/Hydraulic Systems for SDWA
- Chandra Chilmakuri/State Water Contractors
- Ching-fu Chang/Contra Costa Water District
- Dan Deeds/Reclamation
- Jared Frantzich/DWR
- Jelena Hartman/SWRCB
- Kevin He/DWR
- Tracy Hinojosa/DWR
- Dave Huston/DWR
- Lindsay Kammeier/Delta Water Master
- Hans Kim/DWR
- Bill McLaughlin/DWR
- Karen Morgan/Mountain House CSD
- Jenna O’Neill/ICF
- Nicky Sandhu/DWR
- Patrick Scott/DWR
- Jane Tannous/DWR
- Teresa Trinh/DWR
- Grace Windler/Reclamation
- Zhenlin Zhang/DWR
- Captioners – Diane, Ramona

**Action Items**

- Dave Huston to send Tom Burke internal annual water year station history reports.
  - Tom will send Dave a list ([Dave.Huston@water.ca.gov](mailto:Dave.Huston@water.ca.gov))
- Eli and Tom to coordinate about Paradise Cut return flows estimation (DCD vs groundwater inflow/outflow).
- Eli and Ching Fu discussion on PDC data and how to make it more useful
- Eli cross check the material I presented with the modeling assumptions document to make sure that everything is in there

- Eli will update this tidal slide before distributing (3<sup>rd</sup> line should be “spring”, not neap) + one other change.



- Eli will email Lindsay to keep the ET/DETAW discussion going.
- Set up technical meeting after Zhenlin is back from vacation.
  - Tom will talk with John to confirm that we can move forward with this meeting.
- Jelena requested a follow-up on continuous data and what they indicate regarding downstream sources. Eli emailed Jelena; Teresa, Bill, and Grace will participate in meeting.
- Send Doodle Poll for next Workgroup meeting in September or October.
- Send survey about interest in participating in in-person or hybrid meetings.

## Welcome

Teresa Trinh welcomed the group and introduced herself as the new MSS project manager. She explained that the technical leads would provide updates on the four studies, including deliverables and schedule. After that, Eli Ateljevich will present to address and clarify some of the comments that were received on the modeling assumptions report. She asked that everyone hold their questions until after the break.

## Agenda & Ground Rules

Erika Britney went over ground rules and logistics, including how to use chat, how to raise your hand to speak, and how to turn on live captions. This meeting is being transcribed by a live captioner, which everyone can turn on if necessary. The meeting will be limited to discussion about the modeling assumptions only, so Erika will keep everyone focused on that. All other matters will be tabled to a “parking lot” for later discussion.

## Technical Updates

### *High-Speed Salinity Transects/Patrick Scott*

The team has been working with the DWR GIS team to make their data publicly available. We are getting close to getting the 2022 water year transects into the Water Atlas. All future runs will be appended to this. We will make announcements about when this is ready.

Because of high flows this winter and spring, we had to curtail our planned transects until flows subsided. We’ve been watching what’s coming past Vernalis closely. We’ve been watching flows across the Delta and flows are starting to come down. Flows dropped low enough that

the Paradise Cut weir stopped overtopping, so we are focusing on salinity rebound in the South Delta. We are trying to get out there every week and try to get to as many channels as possible – Lower Old River, Sugar Cut, Middle River, the confluence, Paradise Cut, etc. We added a boat transect into Middle River, but that didn't work out too well because of shallow water, SAV, etc. We are modifying and placing sensors in the river from the bank in places that make sense.

#### *Point Source and Ion Sampling/Jared Frantzich*

We've been operating 14 temporary EC stations. Many of these have been in since January 2022. High flows have created some access issues for us, but we are getting back on track with checks and maintenance as the flows come down. We upload our data right in the water data library once it's been QC'd, or you can request data directly from me (Jared). We've also been working on our 2016-2022 salinity flux report. Ion sampling continues at 16 stations. We've also added some stable isotopes as part of the Reclamation effort at the same stations. We've also added some drone flights and got to watch the overtopping at the Paradise Cut weir. We are also planning on going out in July with lower flow conditions to look at what has changed.

#### *SCHISM and Data Assimilation/Eli Ateljevich*

This update will be incorporated into today's presentation. One quick update is that DEM bathymetry has been received and is being integrated into SCHISM modeling products.

#### **Presentation**

See provided meeting presentation.

#### **Discussion**

*Tom Burke, Hydraulic Systems for SDWA:*

- Is there a report presenting the rating data [Slide 7]?
  - *Response (Dave Huston):* Yes. *Ruhl and Simpson (USGS) 2005 Computing Discharge using the Index-Velocity Method*
  - *Tom Burke:* I wasn't looking for a report on the procedure as much as a report presenting the data collected at each specific station.
  - *Dave Huston:* We don't have station-specific reports for collected data. We do store QA/QC'd data that's publicly accessible on the Water Data Library. We do produce internal annual Water Year Station History reports that provide information per station.
  - *Tom Burke:* Are those annual reports in the Data Library also?
  - *Dave Huston:* No, they're produced internally for our program funders and for our own records. I'm willing to send you any that you'd like to see though.
  - *Tom Burke:* That would be great if you could. A lot of this analysis relies on the measured flow data. We would like to be able to review the data.
  - *Dave Huston:* Which stations and what years would you like, Tom? This data is tidally-averaged (or also called net flows).
  - *Tom Burke:* I will make up a list and send it to you, what is your email address?

- How frequently is the bathymetric survey of the station conducted?
  - *Response (Dave Huston)*: Bathymetry using multibeam echo sounders is performed yearly. Crude bathymetry can be measured by our ADCPs for every transect (bank-to-bank crossing) we perform during a flow measurement.
- Is the data being presented the tidally averaged net?
  - This data is tidally-averaged (or also called net flows).

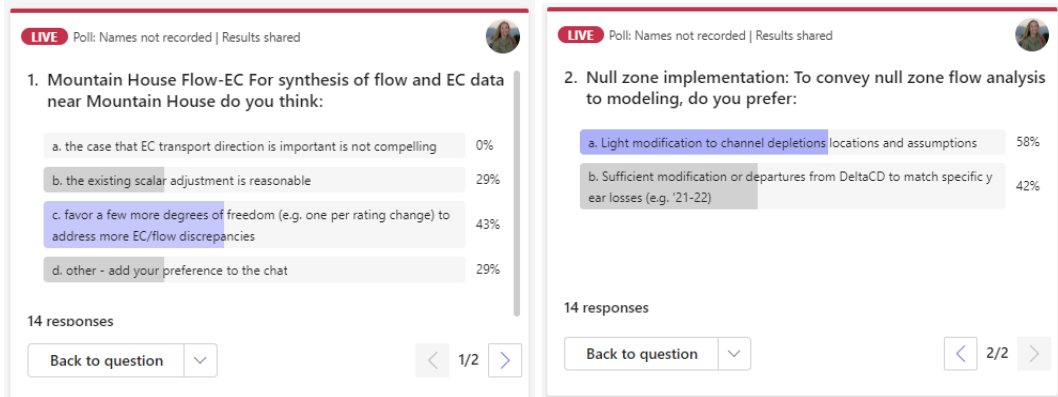
*Jelena Hartman, SWRCB*

- Re: Slide 31—Can we discuss what continuous station data show after the meeting.
- Thanks for picking up on this, Erika. No need to call on me. It takes some preparation to be ready to look at continuous data. So I think after the meeting will do.

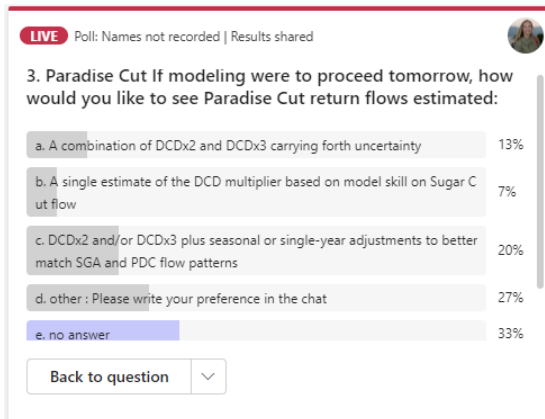
*Lindsay Kammeier/Delta Water Master*

- Have you done any comparisons using open ET values compared to your Delta CD? Because it sounds like you're talking about a lot of the same things with the consumptive use, and I wasn't sure if that's a tool you guys have thought about using or if you've done some comparisons to see if you're comfortable using that or not.
  - *Response (Eli Ateljevich)*: We can address that. I know that DETAW is one of the client models of the open ET suites so there is some compatibility there, but I'm not sure how far it goes or how fast we could evolve to a different item. I believe that DETAW falls in the middle of the open ET portfolio, so I think that's the answer but let's loop back to this later so we can get a better answer.
  - *Response (Nicky Sandhu/DWR via chat)*: For the DETAW comparison with various other ET models was done by UC Davis in 2018. DETAW estimates are middling among the various ET models with about 15% variance. OpenET was not a contender, however it is closely related to one of the models in that report: <https://cawaterlibrary.net/document/a-comparative-study-for-estimating-crop-evapotranspiration-in-the-sacramento-san-joaquin-delta/>
  - *Lindsay Kammeier/Delta Water Master via chat*: I think that study is helpful to confirm DETAW values don't vary from OpenET, at least as things were calculated in 2018. So that does address some of my comment, but the other half of using OpenET instead of DETAW would be to provide reviewers more confidence about the values arrived at, since DWR doesn't control OpenET calculations. So might be beneficial to use OpenET for optics, in the future. I'm basically looking for more clarification on this – is it metric, etc.?
  - *Response (Eli Ateljevich)*: I'm not enough of an expert on this to discuss fully. I think that in the short-term, this might be hard. We have the plumbing between DETAW and the model set up. ET may not be the driving factor. Eli will email Lindsay to keep this discussion going. This may require some connection with other folks within the larger DWR. We do recognize that the board is leaning heavily into open ET. So it'd be good to place our work in that context.
- Poll results:

○ Poll 1:



○ Poll 2:



- *Thomas Burke*: In this area, DCD may be of a similar order of magnitude to groundwater inflow/outflow.
- *Ching-Fu Chang*: My answer is other. My comment on the flow pattern is not necessarily what to use in the model but rather what is in the modeling assumption document. Can discuss further after the break.
- *Jelena Hartman*: PDC flows are important. What options do we have other than the verbatim interpretation? Maybe we could have dye study at PDC regarding the direction? Re: Poll 3—In this area, DCD may be of a similar order of magnitude to groundwater inflow/outflow.
- *Response (Eli Ateljevich)*: We don't see big numbers coming out of either of these channels; it's a pretty subtle net flow. If we could measure what's being pumped then we could quantify the groundwater contribution. This would be a good topic for an off-line discussion [Tom]. It is something we shouldn't ignore or write off without at least doing an initial investigation to see what order of magnitude might be resulting from that groundwater change. I think we can get at the fluxes. I would love to work with you on that and show you what we've got as far as a proposal. For net model calibrations it doesn't matter where the salt comes from but for the evaluation of future decision on system management, then we are tied to

these “assumptions” and if those assumptions aren't correct in terms of the distribution of flow and their contribution to salt, we may end up making wrong assumptions that will affect management of the system in the future.

- *Response (Tom Burke)* I think we've got some ideas that might be helpful to both of us.

*Ching-Fu Chang/Contra Costa Water District:*

- I would like to clarify my initial comments about the Paradise Cut circulation pattern. Looking at the MSS modeling assumptions document, do you want to match the data verbatim, or match all the others? There should be a middle ground. The document says that the PDC measuring mean flow will sometimes be high at 200 cfs, which is unrealistic, and then there's the re-rating process. It's totally possible that the data is wrong or has flaws. But the explanation in your document is too short. The easiest way to is just to match your data; first trying to make data more useful with post-processing. You should have a clear, defensible explanation in your document.
  - *Response (Eli Ateljevich):* I trust flow gauges. There might be a moment where we get a seasonal pattern that doesn't match; this may cause me to gulp...because I've committed to something that's wrong in terms of the mean flow, but we can bolster everything I've said and add it to this discussion. I'd like to see the PDC gauge and I know Dave is making some progress with it. My concern is that it can wobble into places that are hundreds of cfs. That's a pretty serious thing to say, that's not explained by a little bit of groundwater. We will work on this to make it a more compelling case.
  - *Ching-fu Chang:* For example, in Figure 14, you have the flow gauge data. There are ways to revise the processing to remove the high values that are unrealistic. It may seem like a lot of additional work, but if there's a flux in there, you don't need to run the model. You can already see how much flux will come out of it. So given the significance, I believe you need to really put everything, all the thoughts into this component.
  - *Eli Ateljevich:* I do have a comment on the last thing you said. Let's say that we're stuck with a range or something like that. This group has talked several times about the relative influence of concentration versus mass flux. And then there's the question about whether you're going to be making Paradise Cut right or getting its influence on the rest of the system right. And we don't know those sensitivities that well yet. It can be a little bit nuanced. For instance, if EC is high enough in Paradise Cut, it's possible for the mass flux from Paradise Cut to be estimated and to be a little bit wrong about flow. We'll show this in modeling at some point. I realize that I'm being a little vague, but the volume coming out of Paradise Cut isn't affecting the volume of flow in Old River very much. The mass of salt is more important. And that really depends just on how high EC is upstream. If it's very high, it's like you keep throwing in salt pills and you're not affecting the water part at all, you're just

- affecting the salt. At the other extreme you could have a really big flow but it's at the same EC as the ambient in Old River so you're not going to have any influence on that at all either. So, mass flux sometimes matters. Sometimes it's concentration. It depends on where you're looking as to what matters. You know, I think that we need to come up with a picture. It's probably going to have two different values. I think we need a bracket. I think we need to acknowledge uncertainty. The more we can measure, the higher our certainty will be.
- *Ching-Fu Chang*: If you can revise the section to include more details, then I think there could be ways that you either change your filtering or change your post-processing of the data to make PDC data more useful. Maybe you use the process data not necessarily verbatim, but there should be a middle ground of making different sources of data more consistent and it'll converge towards one more plausible model. If you can revise the section to add more details, I'd like to see the effort put forth.
  - *Eli Ateljevich*: Okay. I can imagine it would be in multiple layers. I'm fine with that as long as it's at the behest of a request. I've got some ideas for how to make that happen and I think if I did autonomously, I would feel like I was in a precarious situation. Since you're requesting it, I do think we can come up with kind of like a slowly temporally re-rating of the gauge or something that gives us the shape that comes from the gauge. But remember also this added issue about completeness. Just having a total isn't necessarily enough to run the model. We still have to talk about whether there's divergence and returns. So there's going to be a lot of interceding layers that go in there that may have to be supplemented by something. We might have to scale the ag returns that come in on the Paradise Cut site to match that. There will be a lot of massaging to get to what you're saying and I feel like it would be precarious for me to undertake that on my own, but I will discuss with you maybe offline an idea that I have for doing it. It will look a little bit more like the Paradise Cut gauge.
  - *Ching-Fu Chang*: I think that goes hand in hand with the comment on the document itself. So yes, a lot of massaging, and as long as they can all be clearly documented in the document. If you have concerns, that's totally fine. I'm not saying this is the right way or the true way to do it but if there are concerns it's all well documented so that we're not saying this is the only right way to do this modeling. At least it's very clear anyone can pick it up and understand the pros and cons that's why I'm seeking this document.
  - *Eli Ateljevich*: Well, maybe the first step is to take a look at the material I presented today and make sure that everything is in there, because I think one of the things you're saying is that there's maybe some holes between what I've said and what I've written.
  - *Ching-fu Chang*: Yes, thank you.

- *Dave Huston*: With the PDC gauge, we do have some measurements where the barrier was in only two and we maybe got 80 data points there and then we have a bunch with the barriers out and there definitely seems to be a difference in slope between the two. If we can get the barrier-in in future years we could develop a rating for barrier conditions and back-apply it to historical data with a lot of caveats. You can see how that meshes with your current modeling results Eli.
- *Eli Ateljevich*: I think that's good. We're not going to get any information this year, but I think it is a good plan for something we could initiate. I think there's a good chance of a barrier next year where we could do it then.  
Also, I don't know if getting a few more measurements in this .5 range on the leakage would be possible, but there was a lot of response asking for that. I know you can't do it with super high stage without having it be conflated with the Weir flow, but something to think about.
- *Dave Huston*: If we do any more barrier work and you just pick the barrier obviously we'll work with Bill and Karen on that.
- *Eli Ateljevich*: Also, (correct me if I'm wrong), the emergency drop barrier also has a leakage that was measured and I think you measured it over a larger section of tides. You've got more different variations of stage on that one, is that right?
- *Dave Huston*: No, we actually measured it mostly at a peak spring tide, sort of around the solstice, and I think flows in west fall river can get up to 65,000 cubic feet per second leaking through the rock barrier.
- *Eli Ateljevich*: So maybe that isn't a resource as much as I had hoped. My suggestion would be it would be good to do it once just so our source of equation it would be great to have 15 points instead of four. Again, we're moving on so we're going to go with what you've got. I think what you've got, it's a huge improvement. If you compare that to just staying at zero and there's no leakage, it's a big movement forward. If we could make slow progress, I think that's great.
- *Dave Huston*: It's not a solid wall.

#### *Ching fu Chang/Contra Costa Water District*

- For your next steps, I believe there's some comments I made before, and comments from others. I still have questions about data assimilation and how you implement it, and I assume that others have some other questions as well. Will there be more room for discussion on this?
  - *Response (Eli Ateljevich)*: Yes absolutely. We have a few more proof-of-concept things we need to do, then we will bring this to you. We will not move forward with this without bringing it to you. You don't need to worry like we've slipped something into the margins and moved on or something like that. And there are really three different data simulation methods that might be fruitful in different ways for this problem. So, it is kind of a rich discussion when we finally get to that, but we'll definitely have that meeting.



*Tom Burke/Hydraulic Systems for SDWA*

- We would like to have a meeting specifically about the technical aspects of data assimilation with you before this. Is that still on the table?
  - *Response (Eli Ateljevich):* Yes. Zhenlin is on vacation for a month and results will follow a couple of months later. We will get it moving after that. By the end of the year, the data simulation should be kind of in hibernation (the data should've been passed on and prepared). So that's where we're going. The other slight change in the approach to the data simulation is there's going to be more emphasis on the past couple of years because the data are so much richer. In 2021 and 2022 there's a lot more to say than there was in 2016. So, one of the things we're going to do is say if you use those techniques in 2016, would the loss of some of those stations that we have in 2021 make a difference as to whether it's a viable technique or not? It'll give us a sense of how wide we can go with the techniques. It's a lot easier to make sense of what's going on.
  - *Bill McLaughlin:* Tom, I just want to chime in and say we're happy to meet with you in-person. I just want to make sure that we include John in the discussion and make sure we have his blessing to do so.
  - *Tom Burke:* That sounds great. I'll talk about this with John so he knows what's going on so we can get together and talk about these topics.

*Jelena Hartman via chat/SWRCB*

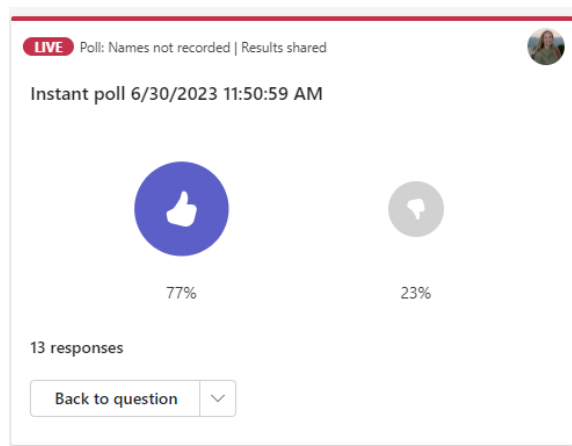
- Are box-model estimates of leakage of any utility, as published in the 2016 ICF report (Brown)?
  - *Response (Eli Ateljevich):* It's based on the flows with in 2016 when the ORM station had only been in for a couple years at best. It's hard to make use of those data. But Jelena did make a good point – we should make sure that we measure because the leakage flows can be kind of high and they're almost on par with some of the observed stations around. So we want to make sure that we do get good validation results at all the stations on that tidal basis at places like ORM and OLD to make sure that everything plays well together.
- Jelena also requested a follow-up regarding the continuous data and what they indicate regarding downstream sources. There was a comment that could suggest that the Montoya 2012 report and the continuous stations suggest there might be downstream sources. While the continuous data don't show this, let's look at the Montoya report. It's conceptual at this point. There are data, but it would take a bit of time to prepare. This is not how it relates to Montoya, it's how it relates to the statement about whether there's evidence of downstream sources. So there were two pieces as evidence: One was Montoya and the other one was continuous data.

**Closing & Next Steps**

Bill closed the meeting and thanked everyone for participating. We are formulating responses to the comments and will send those out in a couple of weeks. Our goal is to have a final report for the MSS by September 2024 as stated in the MSS plan. The next Workgroup meeting will be in the September-October range. We will send out a Doodle Poll. We are open to topic ideas for this meeting.

Also, is there an interest in in-person or hybrid meetings? These meetings started during Covid so have never been held in person. We are open to hosting this in-person if there is an interest. We can send out a poll about this.

**Quick Poll 3:** Are participants in favor of offering an in-person option for the next TWG meeting?



- *Tom Burke/Hydraulic Systems for SDWA via chat*
  - I would like to see more frequent meetings covering fewer topics so we can have more of a dialogue between the presenter and participants.
- *Eli Ateljevich/DWR: Field trip too!*