

## Floodplains Reimagined Hydrodynamics Ad hoc Group Meeting

April 21, 2022, 1 pm – 3 pm

Virtual Meeting, Zoom platform

The meeting objectives were:

- To develop a shared understanding of the Hydrodynamics Model – assumptions, inputs, and outputs
- Initial discussion about environmental assessment for implementation

### Action Items

- Barry O'Regan and Laverne Bill to discuss cultural resources in regards to LiDAR.
- Curt McCasland and Virginia Getz to work with cbec to establish functional elevations and schedules.
- Andy Duffey and Scott Wright to talk about the additional infrastructure on the 833 Canal.
- Kearns & West to adjust dates for Ad hoc Group meetings [Complete, with some dates remaining tentative]
- Kearns & West along with technical team to include agenda item for Salmon Benefits Ad hoc Group on separating stranding of fish versus optimizing the landscape for fish.

### Welcome and Introductions

Kayla Kelly-Slatten (Kelly-Slatten), Senior Associate at Kearns & West, welcomed all attendees. She reviewed the meeting agenda and objectives.

### Orientation to Modeling and Hydrodynamics Model Development

Chris Campbell (Campbell) and Scott Wright (Wright) presented information on the model and metrics.

- Newly developed models for the Butte Basin overlap with the Sutter Bypass model.
- Models predict water depth and velocity with given boundary conditions.
- The models simulate the 1999-2018 conditions.
- Model drivers and data needs include:
  - Flow data into the model domain (see slide 5)
    - Technical team collected flow and stage data throughout both basins to be used for hydrologic boundary conditions and model calibration.
    - Butte Basin – team will use gaged flow data and scaling relationships for baseline hydrologic boundary conditions.
    - Colusa Basin – team adapted a HEC-HMS model to provide baseline conditions for the Colusa Drain and larger, west-side tributaries.
  - Topography data (see slide 6)
    - A combination of 2008 CVFED LiDAR and 2018 USGS LiDAR representing the lowest elevations
  - Water infrastructure data (see slide 7)

- Team will model the natural overflows and weirs from the Sacramento River into the Butte Basin, outfall gates, and large structures that define how water routes through.
  - The team will not model individual agricultural structures.
- Floodplain management data
  - Conceptual modeling of a flooding schedule with the following stages:
    - Wet-up stage
    - Maintaining water elevation stage
    - Flood draw-down stage
  - Managing the flooding schedule is a top priority.
  - Diagram (see slide 10) illustrates the flood-up and draw-down process.
  - The technical team is working with a nested model grid that provides refinement where needed. Each cell has a correlated time series. (See slide 9)
- The team will calibrate the models using any measured data available including flow and stage gages, high water marks, inundation extents from remotely sensed imagery, and previous results from the CVFED models. The team can adjust for surface roughness, structures, and break-lines. (See slides 11-13)
- There are no specific plans for modeling climate change scenarios, but the team can assess findings from scenario runs and flow regime changes. They will look at other reports and studies related to climate change related to flood flows and low flows and use that information to interpret how actions might respond to climate change scenarios.

Group members provided comments in the following categories:

- **Model Sensitivity**
  - [response] We will be looking at the relative difference between baseline model results and alternative scenario results.
- **Concerns - Modeling During Wet Season, October to June**
  - [response] Modeling during this time frame is a carryover from previous modeling efforts to capture post-rice harvest to winter flooding until the next agriculture season.
  - [response] Shorebird habitat needs to start in August.
- **Infrastructure List**
  - Please clarify what you are looking for in terms of operations. Landowners want to manage and control the water at their discretion.
    - [response] We will be doing this for our field management strategy through a target water depth but simplifying the diversion of water onto fields. We may use general target elevations for different field types such as rice fields or wetlands. We know the general schedule of when certain fields are flooded.
    - [response] We don't have data on the desired elevations for every property, but we do have it for federal wetlands.
    - [response] Suggestion to set the target to one level below burn height.
- **Modeling Water on Field During Flooding**
  - [response] This is one of the reasons we are shifting to managing the field scale operated flooding within the model. The models will use a layering approach –

layering a wet field with any baseline flooding and reoperations could make depths deeper. The plan is to define an optimal water level for each field type, and we will define a date for fields to flood up, a period of time for maintenance of water level, and then a draw-down date. Additional flooding will flow on top of this.

## Defining the Baseline

- The models will include facilities and structures that are established and some that have been recently rebuilt or reoperated.
- There is an opportunity to adopt near-term projects into the baseline conditions of the models. These would be projects that are currently under construction or pending construction. Potential projects to include:
  - Tisdale Wier rehab and fish passage project
  - Fremont Weir big notch project
  - Lower Elkhorn levee setbacks
  - Sacramento Weir expansion project.
- In the baseline models, we would adapt any new structure designs and operations for implementation.
- There are longer-term projects for consideration in the modeling, such as:
  - Sites Reservoir
  - Butte-Slough outfall gates rehabilitation
  - These projects will not be included in the baseline models but could be included as part of alternative scenarios.

Group members provided the following comments:

- In the example inundation map, the resolution of depths was 2-foot bins. Will there be better resolution of depths from the models?
  - [response] Yes, we will have finer resolution of depths for analyses, such as an inch scale.
- In Butte Sink there is a structure that moves water from Butte Creek to other parts of the Sink. The structure is near the Morton weir and diverts water to the mile-long canal.
  - [response] We will follow up to identify this structure.
- When fields are flooded, how much water is fluxing through the fields at any point in time? How many inches of water can spill over?
  - [Mike DeWit to consult on this amount.]
- How will water management be handled in the Sutter Bypass and Colusa Basin, both which have managed wetlands and private duck clubs as well? What information do you have for these areas and for what elevations will you be using field management?
  - [response] In the Sutter Bypass, there are detailed habitat management plans for the wildlife refuges. For other lands, where there is less information, we followed a process using the following steps:
    - Used LiDAR to find the lowest elevation on the field perimeter berms
    - Subtracted one foot and used that elevation as the target elevation

- Classified different field management types and have an elevation trigger for each field type depending on water management
- Used average water management schedule based on the habitat management plans for privately-held wetlands
- How will juvenile stranding be addressed at the field scale during flood drawdown?
  - [response] Fields will drain through primary canals and down into the basin. We will not be able to capture small ponding or micro drainage. We will be simplifying the drainage infrastructure based on the low point in the LiDAR.
  - [response] Let the fish group know how the models were developed and assumptions that were made. This will affect how the fish group models the habitat.
  - [response] The model is using two different LiDAR data sets merged to filter out wetted fields and vegetation. We can pass along information on what field base elevations may be inaccurate to the fish group.

### Metrics for Modeling

This agenda item was not reached due to discussions on prior agenda items requiring more time.

### Environmental Assessment

This agenda item was not reached due to discussions on prior agenda items requiring more time.

### Adjourn

Kelly-Slatten thanked attendees for their attendance and participation and adjourned the meeting.

### Meeting Attendees

The following people were in attendance:

1. Alison Whipple, SFEI
2. Amy Merrill, American Rivers
3. Andy Duffey, RD 70/1660; Tisdale/Butte Slough Irrigation
4. Baker Holden, USFWS
5. Barry O'Regan, KSN
6. Bethany Taylor, Kearns & West
7. Bjarni Serup, CDFW
8. Bronwen Stanford, SFEI
9. Chris Campbell, cbec
10. Chris Fritz, R&F Engineering
11. Craig Isola, USFWS
12. Curt McCasland, USFWS
13. Dan Fehring, Ducks Unlimited
14. Eric Holmes, Kearns & West
15. Eric Larrabee, Larrabee Farms
16. Eric Nagy, LWA
17. Holly Dawley, Glenn-Colusa Irrigation District
18. Jenna Duffin, cbec
19. Jennifer Sanders, Wallace Brothers Farms; Colusa/Sutter Cos. Resource Conservation District
20. Jesus Esparza, DWR

21. John Stofleth, cbec
22. Julie Spezia, MWD and Consultants
23. Kayla Kelly-Slatten, Kearns & West
24. Keith Marine, Aquatic Resources Consulting Scientists
25. Kristy Dybala, Point Blue
26. Laverne Bill, Yocha Dehe Wintun Nation
27. Lori Price, DWR
28. Mark Cowan, LWA
29. Mark Tompkins, FlowWest
30. Maya Kepner, Lundberg Family Farms; American West Conservation
31. Michael Bessette, Sutter Butte Flood Control Agency
32. Mike DeWit, DeWit Farms
33. Paul Buttner, CA Rice Commission
34. Scott Wright, cbec
35. Steve Zeug, Fish Sciences
36. Ted Trimble, Western Canal Water District
37. Virginia Getz, Ducks Unlimited