

OUTCOMES MEMORANDUM

TO: Lower Sutter Bypass Planning Process Participants

RE: June 28, 2021 Workshop #4: Flood Management

Meeting Attendees:

Jacob Katz, Cal Trout
Morgan Kilgour, CDFW
Duane Linander, CDFW
Colin Purdy, CDFW
Tanya Sheya, CDFW
Andrea Buckley, CVFPB
Jen Stewart, CVFPB
Mike Zelazo, CVFPB
Mike Denny, Dos Rios Norte
Maya Kepner, Dos Rios Norte
Doug Brown, Douglas Environmental
Scott Deal, DWR
Simar Dhanota, DWR
Jesus Esparza, DWR
Mark List, DWR
David Martasian, DWR
David Pesavento, DWR
Lori Price, DWR
Michael Roberts, DWR
John Brennan, Goose Club
Elizabeth Beckensten, KSN
Barry O'Regan, KSN

Tom Engler, MBK
Ally Bosworth, NMFS
Kimberly Clements, NMFS
Brian Elrott, NMFS
Brad Mattson, RD1500
Julie Rentner, River Partners
Anna Schwyter, River Partners
Michael Bessette, SBFCA
Paul Brunner, TRLIA
Rene Henery, Trout Unlimited
Matt Brown, USFWS
Jim Early, USFWS
Mark Henderson, USGS

Consultant Team

Chris Campbell, CBEC
Greg Kamman, CBEC
Josue Medellin-Azuara, UC Merced
Bruce DiGennaro, Essex Partnership
Terra Alpaugh, Kearns & West
Sharon Hu, Kearns & West

Action Items:

- Mark List will look into maintenance of the area around Highway 99 and follow up on sediment deposit data.
- Brad Mattson will share the GPS location of the West Borrow Canal rocks growings with Julie Rentner.
- Andrea Buckley will send a list of riparian plant species to Colin Purdy.
- Julie Rentner will share results of the effects analysis of a restoration/vegetation redesign project in Davis.
- Andrea Buckley will share the easement deed language for Parcel No. 12 with the group.
- Mike Zelazo to share special standards for the Sutter Bypass easements related to invasive aquatic species and fish and wildlife.

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Objective: Gain a common understanding of flood management in the Lower Sutter Bypass.

Discussion Highlights:

Flood Management in the Bypass

1. Dave Pesamento, Mark List, David Martasian, DWR Flood Maintenance Office

- Per the California Water Code, DWR has specific flood risk reduction operations & maintenance (O&M) requirements that must be met in perpetuity. DWR is interested in finding opportunities to add multi-benefit elements that do not interfere with the State Plan of Flood Control (SPFC).
- Discussion
 - How does DWR view the berm separating the Lower Feather River from the Lower Sutter Bypass and the berm/levee from the Nelson Bend Control Structure down to the confluence?
 - The berm separating the Lower Feather River from the Lower Sutter Bypass was built in the 1970s as part of the USACE flood protection system to limit sediment deposition in the bypass. The purpose of this feature is to keep the Feather River flowing in the left bank of the channel and along the left bank of the Sutter Bypass.
 - The short line railroad embankment from the Nelson Bend Control Structure down to the confluence has existed for a long time and is not a maintained levee. This feature keeps the Feather River within its banks in the historic channel.
 - DWR is obligated to maintain a half-mile section that is part of the SPFC as well as the rock weir at Nelson (pink line).
 - North of the rock weir, CDFW has a lease from CVFPB to operate in the Nelson Slough area to benefit fish and wildlife. Additionally, there is a wildlife area along the Feather River that is maintained for quail in the fall.
 - Is there sediment removal in this area north of the Nelson rock weir?
 - DWR evaluates flows approximately every seven years and has not yet determined that sediment removal is necessary in this area north of the Nelson rock weir. This system may undergo sediment removal if there is a capacity concern, but the Feather River was technically designed for more capacity than it currently experiences from dam flows.
 - In addition to hydrologic evaluations, DWR will take new data after periodic events, in compliance with the federal O&M

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manual. For example, DWR has conducted around 4 LiDAR surveys over the last ten years to examine surface topography and determine where there may be breakthroughs.

- The area by Highway 99 is often backed up.
 - This was a USACE project turned over to DWR for maintenance. DWR does not modify systems, but can look into maintenance for this area.

2. Brad Mattson, RD 1500

- RD 1500 is responsible for maintaining the portion of the levee on the west side of the Feather River. This project is PL 84-99 compliant and some maintenance work is done by USACE and RD 1500. RD 1500 is seeking resources to address a seepage site from Maddock Road to the causeway with a slurry wall.
- Discussion
 - Is RD 1500 west of the Bypass?
 - RD 1500 is not inside the Bypass at all.
 - Please elaborate on the general regional hydrology/drainage from the Sutter Bypass to the Karnak Pump Station.
 - Sutter begins at the Tisdale Bypass and extends south by 33 miles. RD 1500 controls the Karnak Pump Station and pulls an average of 80 to 90 taf of water out of the Sutter Basin every year. The Karnak plant can pump up to 1,900 cfs and is currently in the process of being rehabilitated.
 - Are the problems with seepage due to water being close to the levee, e.g. Butte Creek?
 - Yes, Butte Creek contributes to the seepage problem that eats away at the levee. Once we have our sheep go through this area, we will be able to see better and enhance some erosion sites.
 - This area is called “West Borrow Canal” instead of “Butte Creek” and was constructed to form the levee. The poor geotechnical conditions also contribute to seepage.
 - What is the criteria for how often the Bypass is drained?
 - There is a main drain that runs through the middle of the basin and drains the entire basin. If there is more than 15.5 feet of water, then the water is pumped out. There are a lot of hydraulic connectivity issues, so pumping only occurs until just below 15 feet.
 - Do weeds cause problems for maintenance?
 - Invasive weeds are a big problem and cause more problems year after year. Weeds plus up parts of the system and can impact bridges during flood events.

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- Are there historic water control features in this canal? Are there potential locations for features that are no longer functional but historically exist in the canal?
 - Regarding the rock growings, there has been some pumping out of the West Borrow Canal. We have water rights in this region. These rock growings were put in for erosion control and appear to be functioning.
 - RD 1500 will share the location of the rock growings in the West Borrow Canal, upstream of Karnak. The rock growings should also be visible in the LiDAR returns (sawtooth patterns) and exist on the east and wide sides of the canal. They are also visible in low water conditions.

3. Tom Engler, RD 1001

- RD 1001 maintains the left bank of the Feather River in the Lower Sutter Bypass as well as 120 miles of internal drainage canals and three pumping plants.
- During floods, there can be high velocities and significant erosion along the Feather River levee/Nelson Bend rock weir. In 2017, the flow was high enough to breach through the embankment and deposit mounds of sand on nearby properties.
- Potential solutions include: removing the rock weir to move water back into the Bypass; controlling overflow locations into the Bypass; reconnecting Nelson Slough to the Bypass; and removing sediment accumulation upstream of the rock weir.
- Sedimentation impedes conveyance capacity, redirects flows, and needs to be better managed to balance flood systems and natural processes. Vegetation will be critical for preventing wind-wave erosion and maintaining slow flow to drop sediment.
- Discussion
 - Can riparian plant communities be used to our advantage in a manner similar to the [Nelson Slough Unit/Feather River Wildlife Area](#)?
 - Further discussion on this topic is warranted. There have been discussions in the past about reconnecting the Feather River to the Bypass and removing the rock weir, which could be compatible.
 - Cal Trout: Fine sediment placement has historically been major characteristic of this system, due to rising water in the Lower Sutter creating pressure and breaches. The Feather River should be reconnected to the Bypass in such a way that mimics historic hydrology. There are many options that can provide multiple benefits.
 - River Partners: Flood plain benches on the properties were part of the

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- Feather River Corridor Management Plan, but were cost prohibitive at the time. Perhaps some fish habitat can be created to make sediment removal possible.
- The auxiliary spillway was activated in 2017. What is the sediment budget of the Feather River?
 - There are different issues at different sections of the Bypass. Sediment issues are more prominent further upstream.
 - When water in the Feather River meets the Sacramento River, then the splays and breaches occur at weak points in the berm that separates Goose Club and Feather River. Dos Rios does not experience sedimentation that occurs further north, but if these historical breaches are fixed, raised, or hardened, it is hard to know where the levees would breach. Currently, the levees are protected from breaching because the splays occur further north. Another way to think about the backwater effect is that lower elevations that flood first are also protected from erosive capacity of flow because they are already underwater.
 - The backwater effect occurs in the entire confluence of the system and is heaviest north of Highway 99. This impacts river stages and leads to overtopping and head differences.
 - It seems that there is not as much of a benefit from artificial constriction of the Feather River where the rock weir and Bypass meet, causing water to be held back until elevations reach the top of the weir. If the weir works as intended, then sediment is dropped further upstream but causes problematic river flows into the left bank of the Feather River.
 - River Partners: There is a flood dynamics/inundation animation for the West Borrow Canal/Butte Creek.
 - In flood conditions, there are several hydrologic interactions occurring: backwater from the Sacramento River, flood flows from the Sutter Bypass, and direct connection of the Feather River and Sutter Bypass floodplain via weirs or breaches. Water in the Sacramento River in the Sutter Bypass comes from water moving down the West Borrow pit from the Butte Creek watershed or water from overtopping at Tisdale. Water can be managed in wetland habitats throughout existing infrastructure.
 - River Partners: The state is interested in connecting the Feather River to benefit fish, but the rock weir poses a challenge.
 - Question 2c: Will Water Storage Investment Program (WSIP) pulse flows (18-50 taf) from Oroville lead to flooding in the Lower Sutter Bypass? Are there operation/management criteria for when pulse flows are released?
 - RD 1001: 50 taf can create pressure and breaching/sediment issues in the bypass, but may not be enough to overflow. Detailed

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modeling might be needed to understand this.

- Cal Trout: Pulse flows can raise elevation to support fish, but we would need to find an opportunity to provide access to habitat.

Andrea Buckley and Mike Zelazo, Central Valley Flood Protection Board

- The Central Valley Flood Protection Board (CVFPB) manages the Sacramento and San Joaquin Drainage District (SSJDD). The CVFPB primarily acquires easements for the SSJDD for the purposes of flood control. CVFPB also has additional authorities to acquire CDFW leases for other uses such as fish, wildlife, and recreation; lease replacement lands as mitigation; and establish a mitigation banking program. The CVFPB has about 7,850 acres of real property interests in the Lower Sutter Bypass, which represents a mix of easements, ownership, and joint use agreements. SSJDD easement language can include many types of compatible use, and changing this language requires recommendations from Board staff and is approved at the discretion of the Board.
- Discussion
 - Does CVFPB have a list of acceptable riparian plants, shrubs, and trees?
 - Yes, CVFPB has a list of mostly non-woody plants in coordination with USACE and can share this list with the group.
 - River Partners has worked with CVFPB engineers to redesign vegetation on board easement lands. For one restoration project in Davis, CVFPB engineers is assigning different roughness coefficients based on woodiness and measuring roughness of water flows in the flume. We are redesigning the vegetation perpendicular to overbank flows and parallel to the river, and then characterizing this vegetation based on the percentage of flexible stemmed shrubs and rigid stemmed trees. We can share the impacts of the effects analysis of these different types of vegetation.
 - Can CVFPB share the different easements for the Lower Bypass? In some areas, sedimentation makes farming no longer feasible, and in other areas there are entire riparian forests. It is important to understand the language to know what the Board and land owners are able to do to the existing vegetation. There also needs to be a balance between habitat and flood.
 - CVFPB can share the easement deed for Parcel No. 12, and any other deeds, with the group. The CVFPB legal team can look over any easement language to provide an interpretation of approved uses.
 - DWR: It is important to note that the easement for the Sutter

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- Bypass, Project #6, was purchased specifically for the flood use in 1918, prior to USACE involvement.
- River Partners: The 1918 deeds might be vague since the function and expectations for the Lower Sutter Bypass have changed over time. Does CVFPB have detailed parcels or overlapping documents that might influence expectations of flood conveyance available? Can the CVFPB make decisions and supercede previous decisions?
 - CVFPB: Deed information is public and can be found via the Database Viewer.
 - Cal Trout: It is important to understand which legal documents that might be constraining land use in the Bypass or compelling landowners to make certain modifications.
 - DWR: The Board's Database Viewer is probably the most useful resource for this information. The purpose of these easements is generally to compensate owners for a flood project system feature and for not societal benefits that have changed over time. The deeds cover different parameters and changing the property may result in needing to compensate the landowner for everything that is not purely for flood.
 - How does CVFPB view these properties in the context of the Central Valley flood Protection Plan/Conservation Strategy? How were these created?
 - CVFPB is open to ideas for updating and modernizing these leases. The master leases with CDFW are generally constrained and 50-year leases. CVFPB and CDFW have met in the past to discuss how to rewrite these master leases to make operations more consistent with the CVFPP. The primary focus will still be flood control and safety of people and property, but CVFPB is interested in options that can also help meet assurance agreements with federal partners.
 - CVFPB authorities and permitting: The CVFPB has authorities under the California Water Code, Titles 23 of the California Code of Regulations, assurance agreements with RDs, and USACE. Flood management permitting under Title 23 requires CVFPB review, followed by USACE review. Once the permit is issued, there are special project-specific conditions that must be met.
 - Discussion
 - Where does the CVFPB permitting authority come from under CVFPB easements? Was levee repair in the half mile section from Nelson Slough to the rock weir not part of the SPFC as a "levee" because it is not owned by a state or federal entity?

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- CVFPB: Landowners are responsible for working on the land owned by the SSJDD and must abide by the terms of the easement.
- River Partners: Landscape modifications in the floodway might be described by the locals as “levees” but we can also describe them as “farmer berms” to differentiate these structures from federal levees. Berms are not authorized or engineered by state/federal authorities, but they can have flowage easements or easement land that is otherwise subject to the jurisdiction of the CVFPB.
- DWR: While the berm may not be an SPFC structure, the CVFPB can still have jurisdiction over the designated floodway where the berm exists.
- USFWS: Please share more information on the special standards for fish and wildlife for the Sutter Bypass easements.
 - Fish and wildlife may have been inadvertently part of Title 23, Section 136.
- USFWS: Who is responsible for maintaining invasive aquatic species? It seems these can impact fisheries but they are unmanaged.

Status of Anadromous Fish Habitat Management Planning

- The Project Team shared the Revised Objectives for the Lower Sutter Bypass Anadromous Fish Habitat Management Plan. Additional means objectives have been added to reflect the intent of the fundamental objective to achieve anadromous fish habitat, reducing flood risk, and improving agricultural viability together. The target date for the final draft is February 2022. The meeting schedule is available online here: [Lowersutterbypassfish.org/schedule/](https://lowersutterbypassfish.org/schedule/).
- Discussion
 - “Zooplankton and invertebrates” should be revised because it is redundant.
 - This term should be more inclusive of terrestrial and aquatic invertebrates.
 - Is agriculture outside of the project boundaries being considered to offset agriculture within the project boundaries?
 - Project Team: There has not been much discussion on agriculture outside the project boundary. However, it is probably more feasible to stay inside the project boundary.