# Operations & Engineering Workgroup

March 11, 2026

Sites

# Agenda

1.1 Conveyance CMAR Procurement Update

1.2 Updates on Conveyance Capacity and Agreements

1.3 Updates to CBD Hydraulic Model Analysis & Assumptions, Losses, Costs, and Options

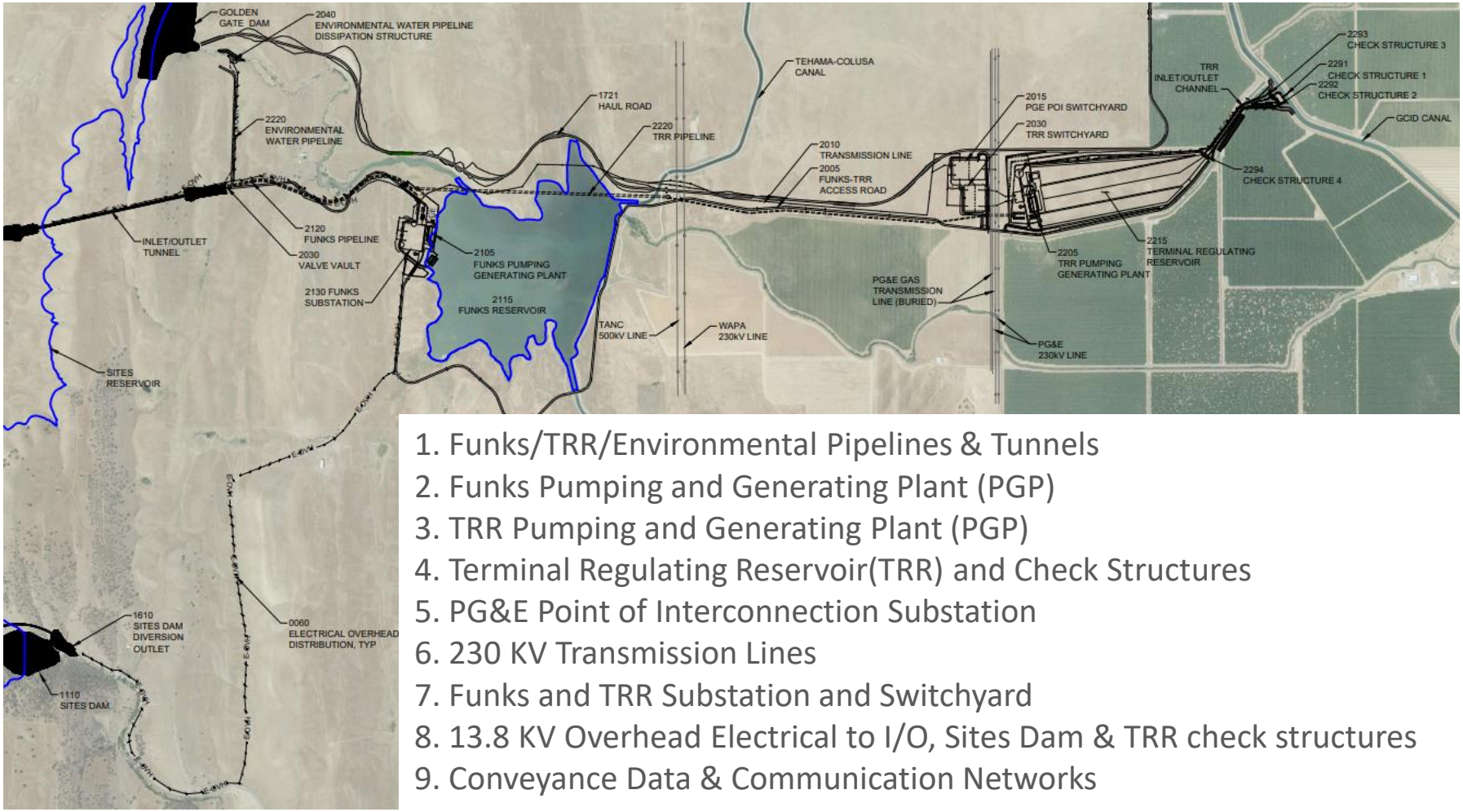
Engineering and Construction Manager's Report

# Agenda Item 1.1

## Conveyance CMAR Procurement Update

Rob Natoli

# Conveyance CMAR Package Overview




1. Funks/TRR/Environmental Pipelines & Tunnels
2. Funks Pumping and Generating Plant (PGP)
3. TRR Pumping and Generating Plant (PGP)
4. Terminal Regulating Reservoir(TRR) and Check Structures
5. PG&E Point of Interconnection Substation
6. 230 KV Transmission Lines
7. Funks and TRR Substation and Switchyard
8. 13.8 KV Overhead Electrical to I/O, Sites Dam & TRR check structures
9. Conveyance Data & Communication Networks

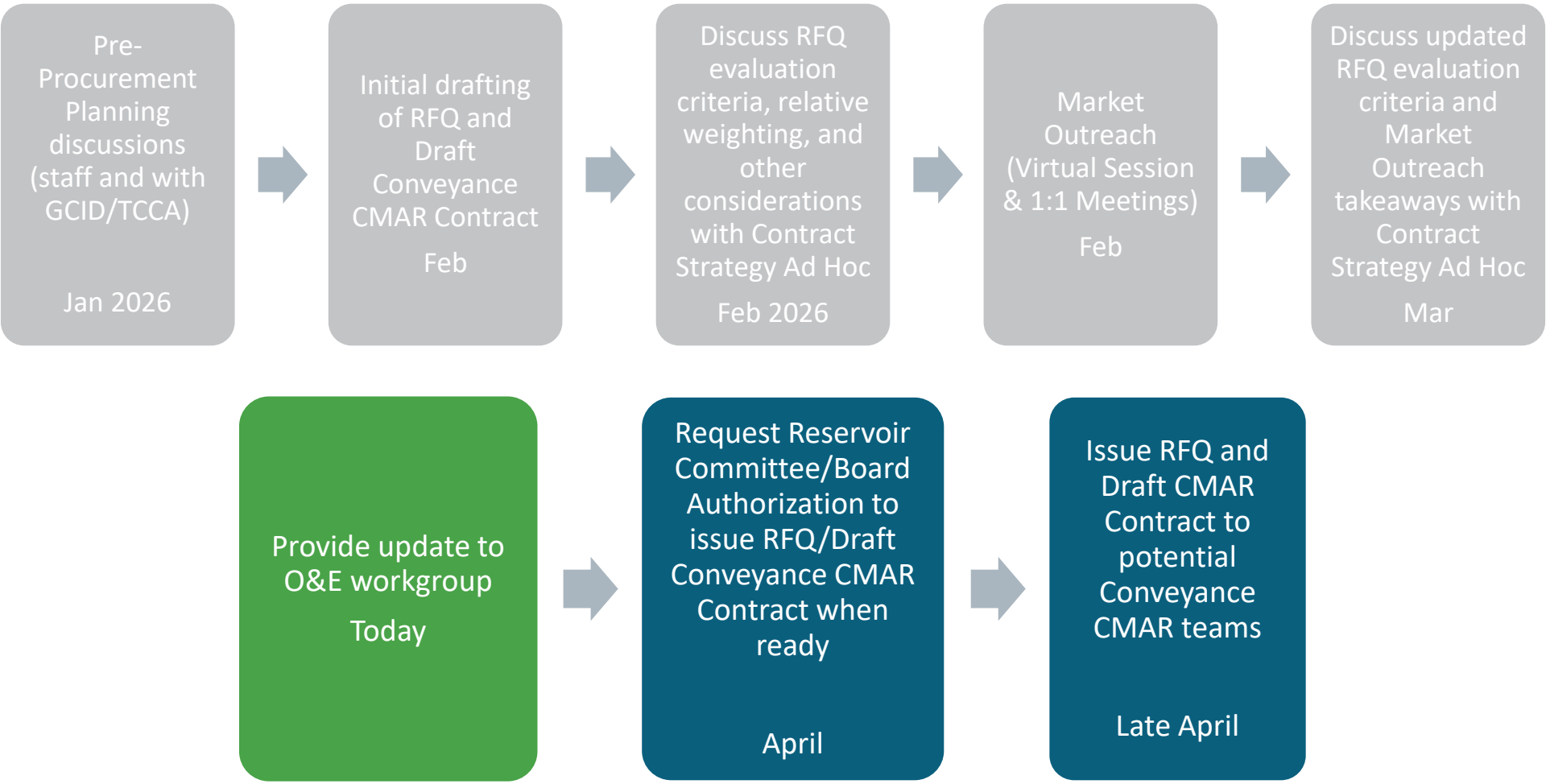
# Staff roles during Procurement

- Conveyance CMAR Procurement will be led by Deputy Engineering & Construction Manager (Rob Natoli)

- Engineering & Construction Manager (JP Robinette) will provide oversight and leadership during the procurement.

- Construction Office Lead (Kyle Hughes) is intentionally excluded from a role in this procurement given his role on the Reservoir Package.

# Process and Proposed Near Term Actions



# Firms met with as part of Conveyance CMAR Contractor 1:1s

Met with 7 firms on Feb 25 and 26 (alphabetical listing):

- Barnard
- Flatiron Dragados
- Kiewit
- Mountain Cascade (with Shimmick and Axia Electric)
- Myers & Sons
- Obayashi
- Rockwell Automation

Draft Procurement Policy Guidance to be pulled up on screen during meeting

# Overall Preliminary Conveyance CMAR Procurement Timeline

Feb

Contractor Informational Session and One-on-Ones

Apr 2026

Reservoir Committee and Authority Board authorize issuance of RFQ when ready

Late Apr 2026

(pending board authorization)

Issue Conveyance CMAR RFQ

July 2026

Conveyance CMAR SOQs Due

Aug 2026

Reservoir Committee and Authority Board approve Short-list

Aug 2026

Pre-RFP meetings with Short-list

Sept 2026

Issue Conveyance CMAR RFP

Nov 2026

Conveyance CMAR Proposals Due

Winter 2027

(pending board authorization)

Selection, Negotiations, & Award

# Agenda Item 1.2

## Updates on Conveyance Capacity and Agreements

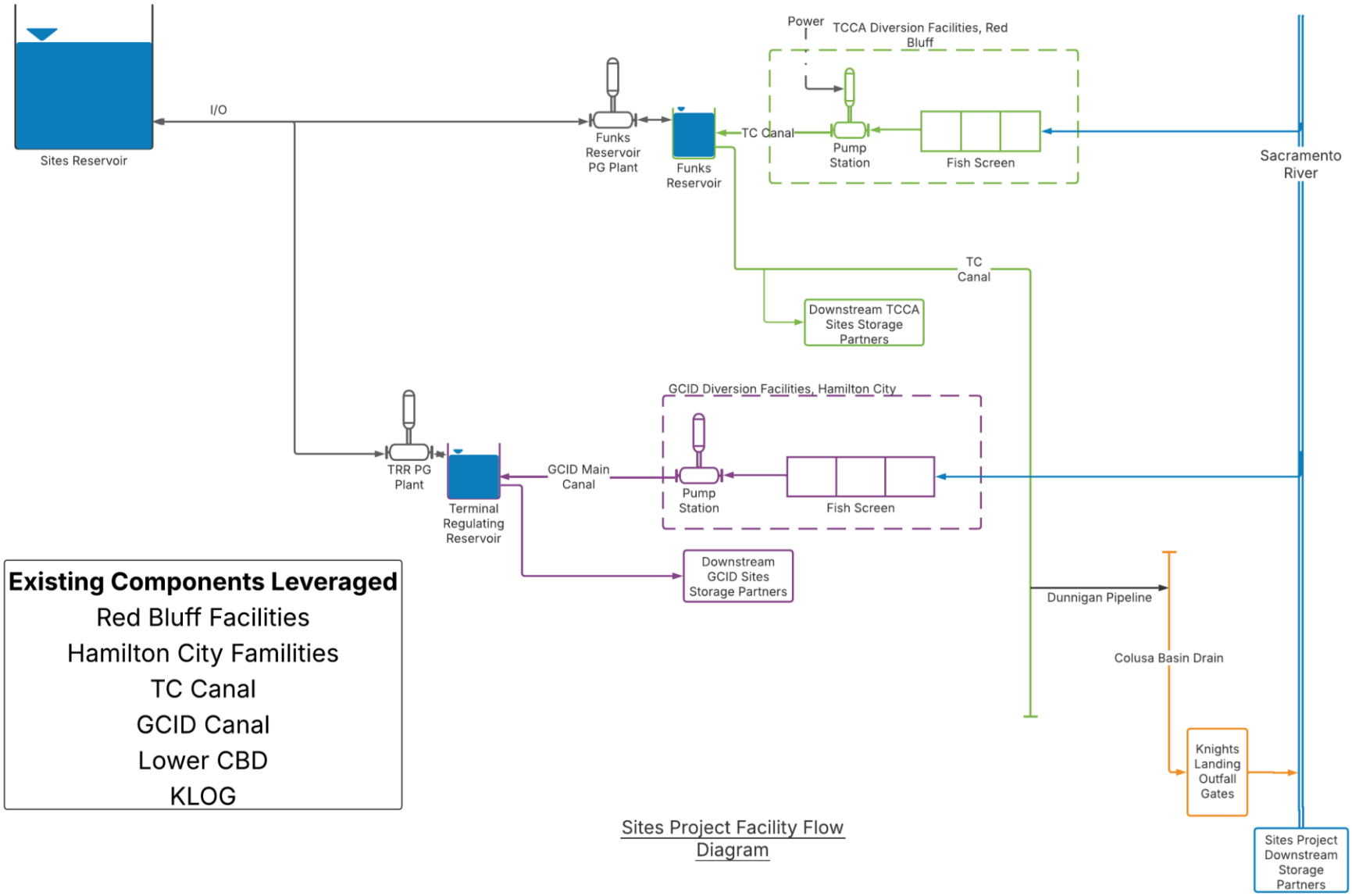
Rob Natoli & Pete Rude

Sites

# Agenda

- Hydraulic Confirmation and Agreements Overview
- TC Canal Capacity Update
- Lower CBD Hydraulic Modeling Updates:
  - Background
  - December 2025 Cross Section Survey Results
  - Current Model Results
- Comparison of CBD vs Dunnigan Pipeline Alt 2 to convey Sites Water to the Sacramento River

# Conveyance Flow Schematic




**Existing Components Leveraged**

Red Bluff Facilities

Hamilton City Familities

TC Canal

GCID Canal

Lower CBD

KLOG

Sites Project Facility Flow Diagram

# DRAFT Hydraulic Confirmation Approach

**Existing Components used to Divert Flows to Sites Reservoir**

| Component | Existing Capacity (cfs) | Capacity w/ improvements (cfs) | Sites Peak Flow (cfs) | Means to Confirm Capacity is Available? | Agreement |
|---|---|---|---|---|---|
| Red Bluff Fish Screen | 2,500 | -- | 2,100 + losses (1) 2,121 | Confirmed | TCCA FUA / Reclamation Excess Capacity Contract |
| Red Bluff Pumping Plant | 2,000 | 2,500 (4) | | Confirmed | |
| TC Canal - Red Bluff to Funks | **Ongoing modeling** | | | **Ongoing modeling,** available capacity analysis in progress | |
| Hamilton City Headworks Structure | TBD | 3,000 | 1,800 + losses (2) 1,836 | Confirmed | GCID FUA |
| Hamilton City Pumping Plant | 3,000 | -- | | Confirmed | |
| GCID Canal - Hamilton City to TRR | up to 3,000 (5) | | | 2021 Modeling confirmed infrastructure, monthly available capacity evaluation in progress | |

**Existing Components used for Releases from Sites Reservoir**

| Component | Existing Capacity (cfs) | Capacity w/ improvements (cfs) | Sites Peak Flow (cfs) | Means to Confirm Capacity is Available? | Agreement |
|---|---|---|---|---|---|
| TC Canal - Funks to Dunnigan | **Ongoing modeling** | | 1000 + losses (3) | **Ongoing modeling** | TCCA FUA |
| Lower CBD | **Ongoing modeling** | -- | | **Ongoing modeling** | RD 108 FUA / DWR/Landowner Agrs |
| KLOG | 10,000+ | | | -- | |

Notes:

1. TRR PGP capacity = 1,800 cfs in 30% design
2. Funks PGP capacity = 2,100 cfs in 30% design
3. Dunnigan pipeline capacity is 1,000 cfs in 30% design
4. Red Bluff PP capacity increased via installation of 2 pumps into existing bays reserved for Sites
5. Capacity Decreases as the GCID Main Canal travels toward its southern terminus where the capacity is 300 cfs (where it connect to the Lower CBD)
6. Being evaluated in current Lower CBD modeling to be presented today

# TC Canal Capacity Analysis

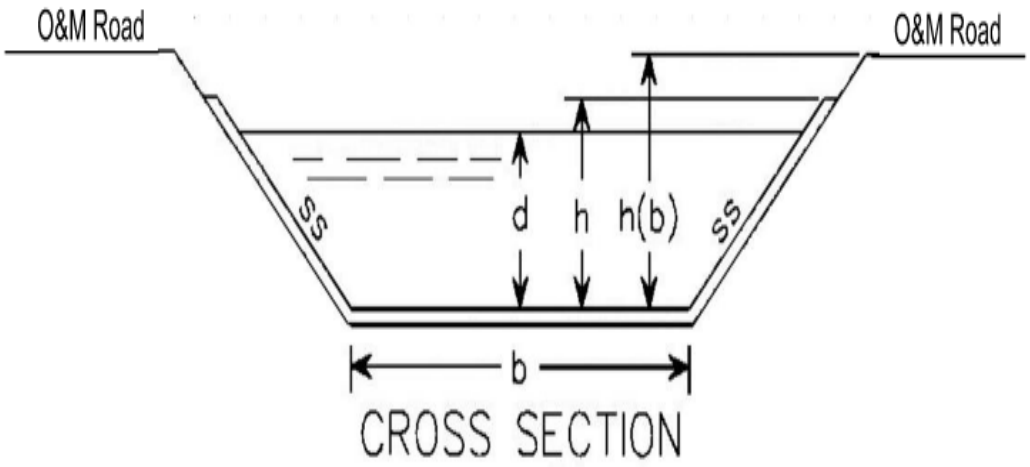
- TC Canal Capacity per As-Builts Drawings
  - 2,530 to 2,100 cfs Head of TC Canal to Funks Reservoir
  - 2,100 to 1,700 cfs Funks Reservoir to TC Canal Terminus near Dunnigan Pipeline Inlet
- Sites Project Requirements:
  - Winter diversions 2,100 cfs to Funks Reservoir
  - Summer releases 1,000 cfs Funks Reservoir to TC Canal terminus
- TCCA Requirements:
  - During Sites Winter diversions: 100 to 200 cfs for Groundwater Recharge and Frost Water (Dec – March)
  - During Sites potential releases (April-Nov): 0 to 500 cfs for Irrigation Water downstream of Funks Reservoir

# TC Canal Capacity Analysis

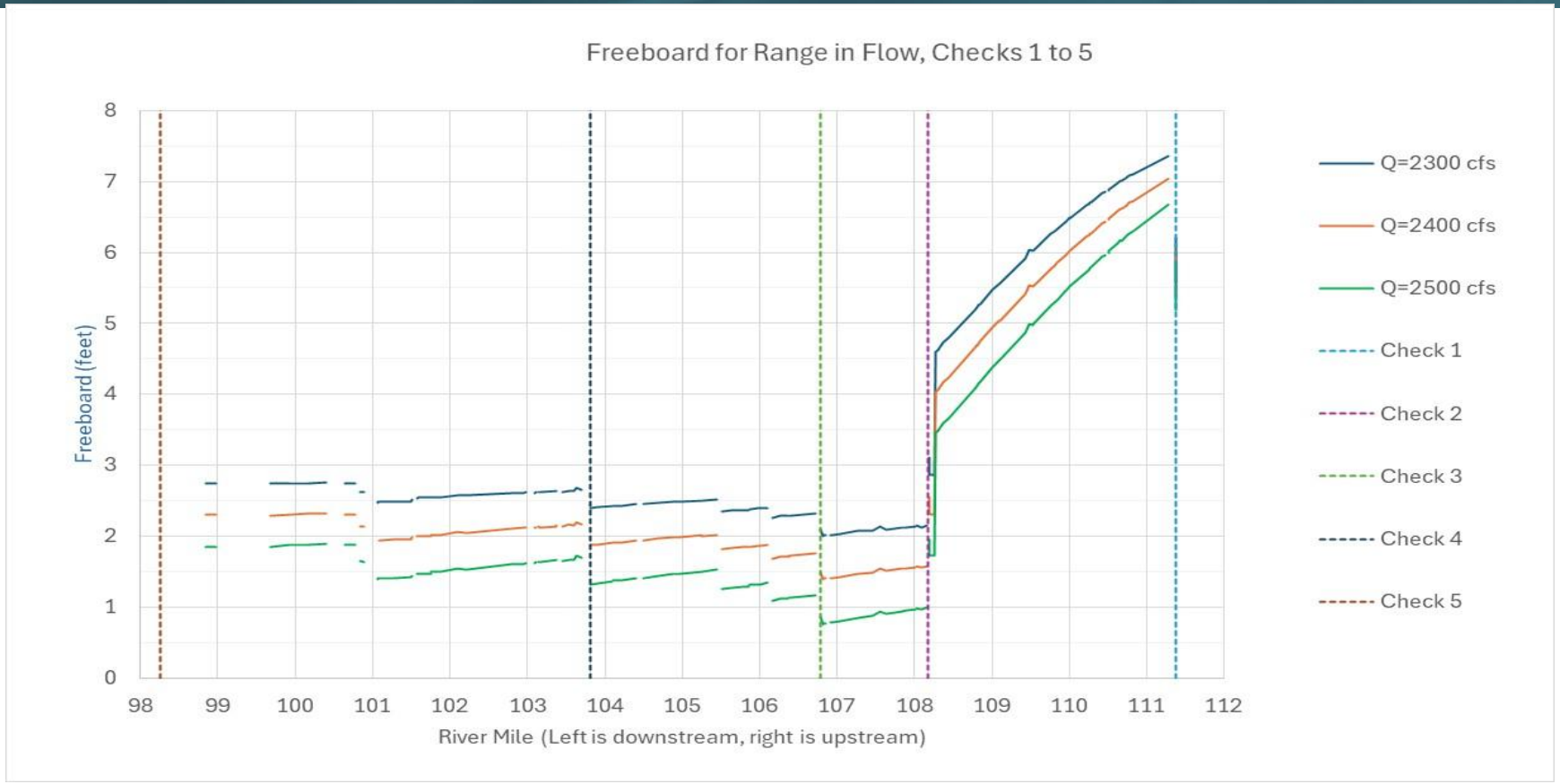
- Building HEC-RAS 1D model of TC Canal
  - 110 miles of concrete lined canal
  - 26 check structures
  - 166 in-canal structures (bridges, siphons and aerial pipe supports)
  - Calibrate and Validate with TCCA gate operations during 2024 and 2025
- Conducted limited topographic survey December 2025:
  - Between Check #10 and Check #12 in area of subsidence south of Orland
  - Results show subsidence of 0.4 to 3-feet in a stretch of about 9 miles with main zone of subsidence within 1.5 miles stretch (2.5 to 3-feet)
- Model is used to determine:
  - Canal Capacity in as-built conditions and impact on designed concrete liner free board of 2-feet
  - Canal Capacity in subsided conditions and impact on design free board

# TC Canal Cross Section: Freeboard

- Design Freeboard to top of concrete (h-d) = 2-feet
- Minimum Design Freeboard from top of concrete to O&M road (h(b)-h) = 2-feet



# Preliminary Results for As-Built Conditions: for 2,500-2,300 cfs from Red Bluff PP to Funks Reservoir

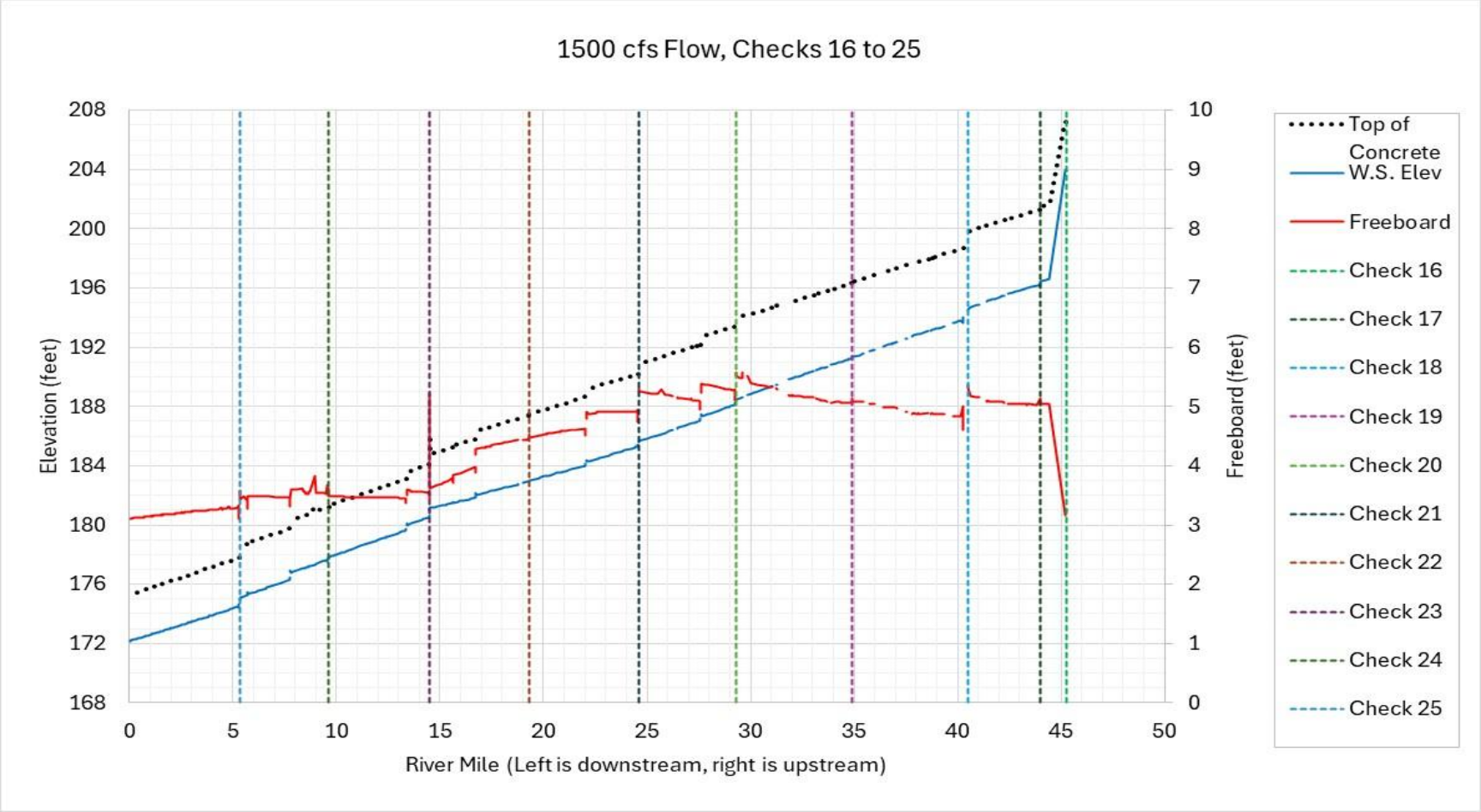



- The most restrictive area is Checks #2 through #5, there the concrete lining freeboard varies from 1 to 3-feet
- At 2,500 cfs, Checks #6 to #16 to Funks Reservoir have 1.7 to 3-feet of concrete lining freeboard

# Preliminary Results for Subsided Conditions: for Checks #10-#12 for 2,500-2,300 cfs from Red Bluff PP to Funks Reservoir

- Results Pending
- May involve raise of canal bank and concrete liner

# Preliminary Results for As-Built Conditions: for 1,500 cfs downstream of Funks Reservoir




- Concrete lining Freeboard varies from 3 to 5-feet
- Plenty of capacity for Sites release flow of 1,000 cfs during April 1-Nov 31

# TC Canal Capacity Summary

- Modeling of As-built drawings show that there is capacity to take 2,100 cfs of Sites water in the winter diversion period and 1,000 cfs of Sites water in the summer release period
- Modeling of current subsided conditions in the Orland area between Checks 10 and Check 12 is just starting. Results are expected to show the need to raise the canal bank and concrete liner for some length. We hope to have those results and rough cost estimate in the next few weeks.

# Agenda Item 1.3

## Updates to CBD Hydraulic Model Analysis & Assumptions, Losses, Costs, and Options

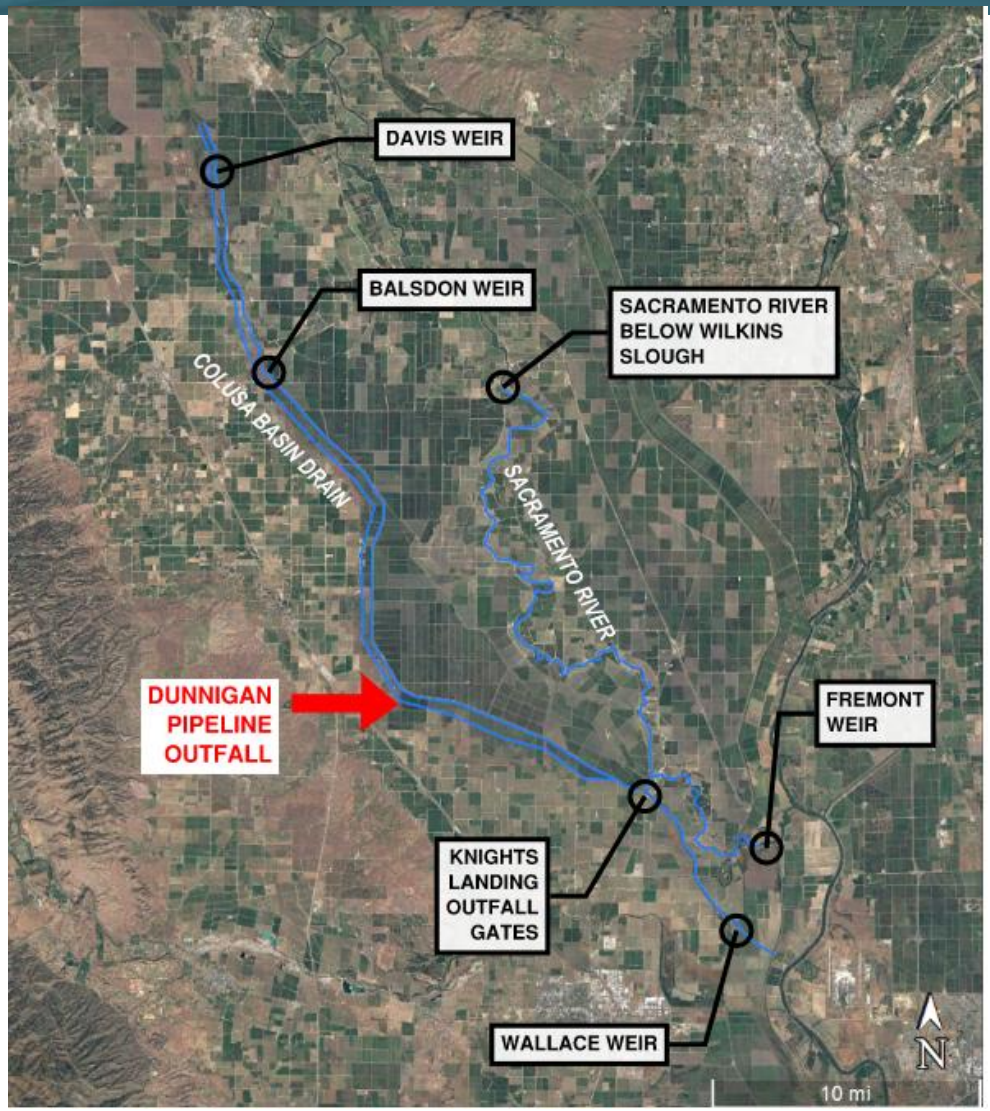
Pete Rude

Sites

# Background

# CBD Modeling Objectives

- Evaluate the effects on water surface elevations (WSE) in CBD caused by Sites release of up to 1,000 cfs using project operation estimates
- Understand potential release constraints, timing (seasonal) and operational effects on Sites releases
- Quantify increase in water level at increased flows to understand potential west bank improvement needs along the CBD



# Lower CBD System "Reaches"

**Upper Reach:**

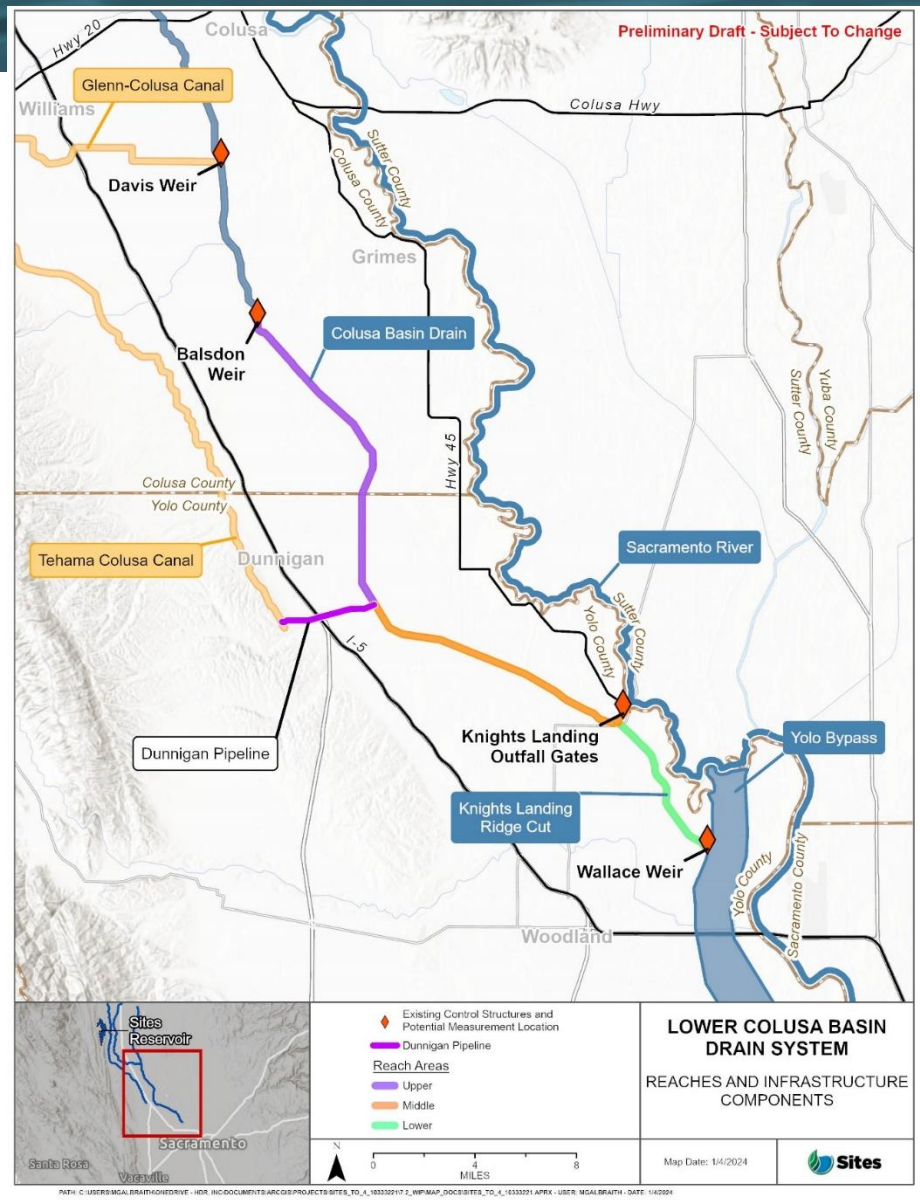
- Balsdon weir(RM 25) to Dunnigan Pipeline(RM 11.6)
- Backwater effects

**Middle Reach:**

- Dunnigan Pipeline to Sac River (KLOG)
- Conveyance of Sites Water

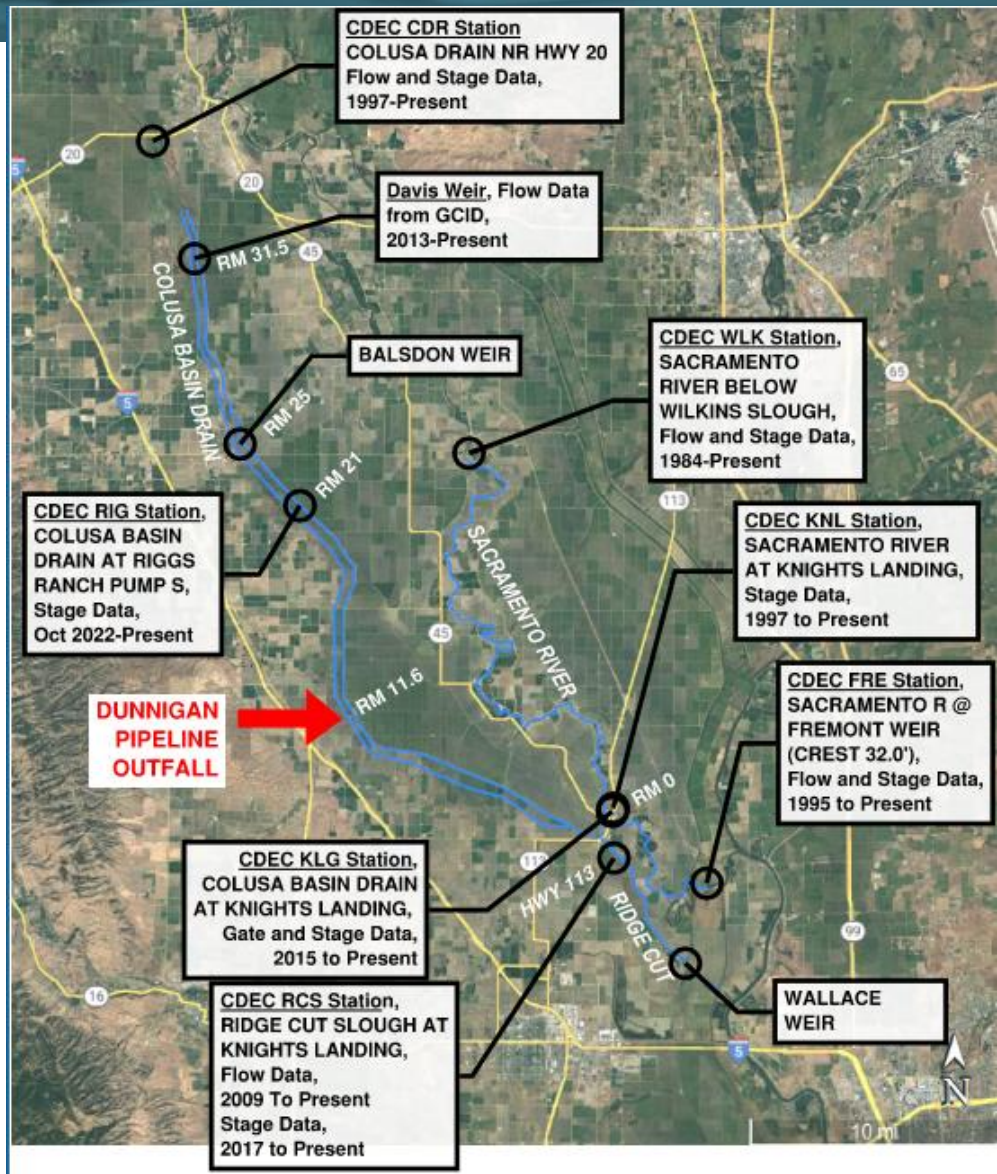
**Lower Reach:**

- Knights Landing Ridge Cut from CBD to Wallace Weir
- No longer required to deliver environmental water benefits
- Potential backwater effects may contribute to losses



# Existing Data Sources Are Limited

- Davis Weir (Flow)
- RIG (Stage)
- KLOG (Stage & Gate Position)
- RCS (Flow & Stage)
- Ideally need flow and stage at each location to calibrate the model



# Hydraulic Modeling efforts to date

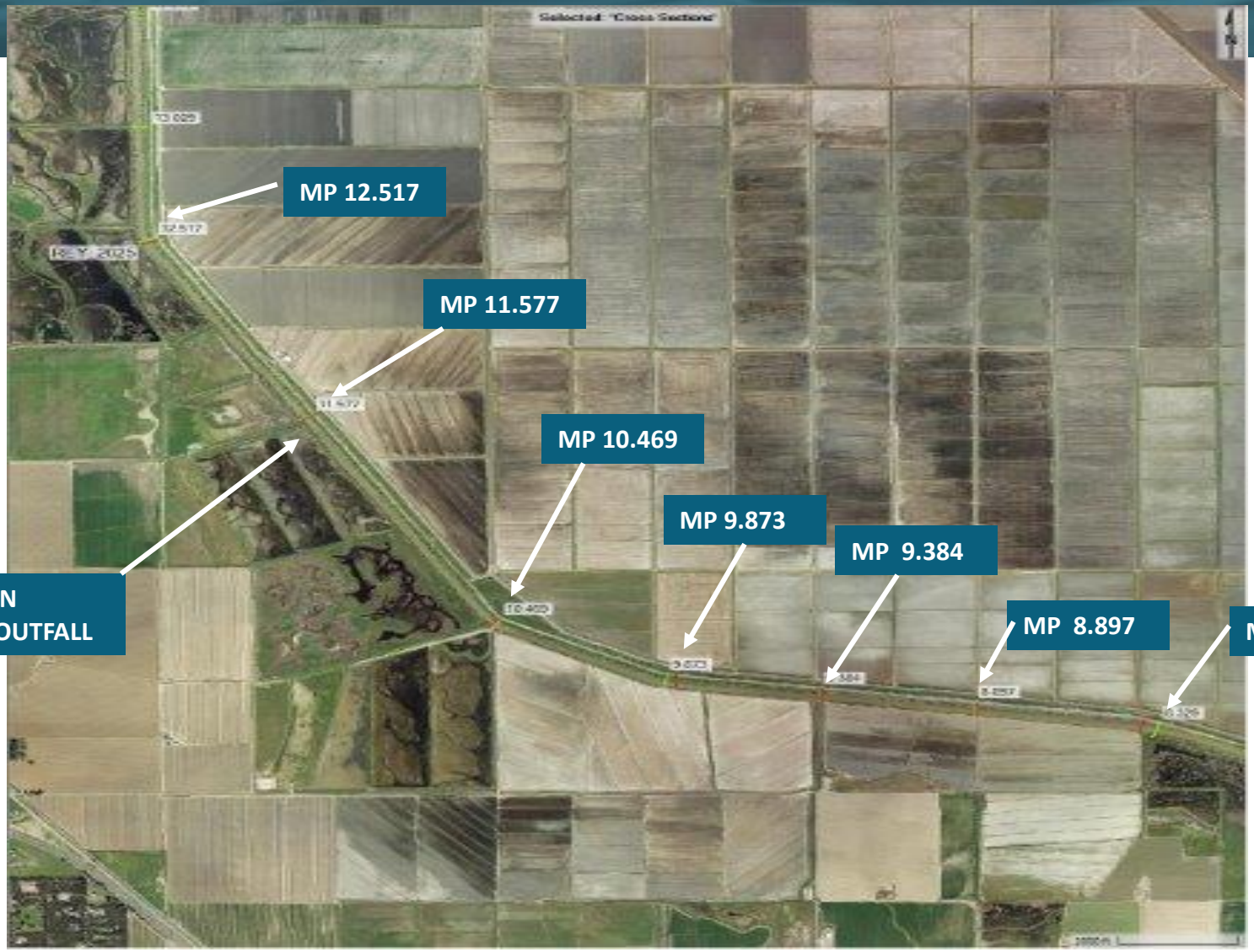
- 2021: developed a 1-Dimensional HEC-RAS Model. Preliminary findings showed about 2.5 miles of western bank improvement might be necessary to handle 1,000 cfs project flows.

- 2022 to 2024: improvements were made to the model including updating to a hybrid 1-D and 2-D HEC-RAS model. Abnormal model results showed flooding during the summer along the west bank when historically no flooding has occurred. Team suspected there are gaps in existing data causing this anomaly.

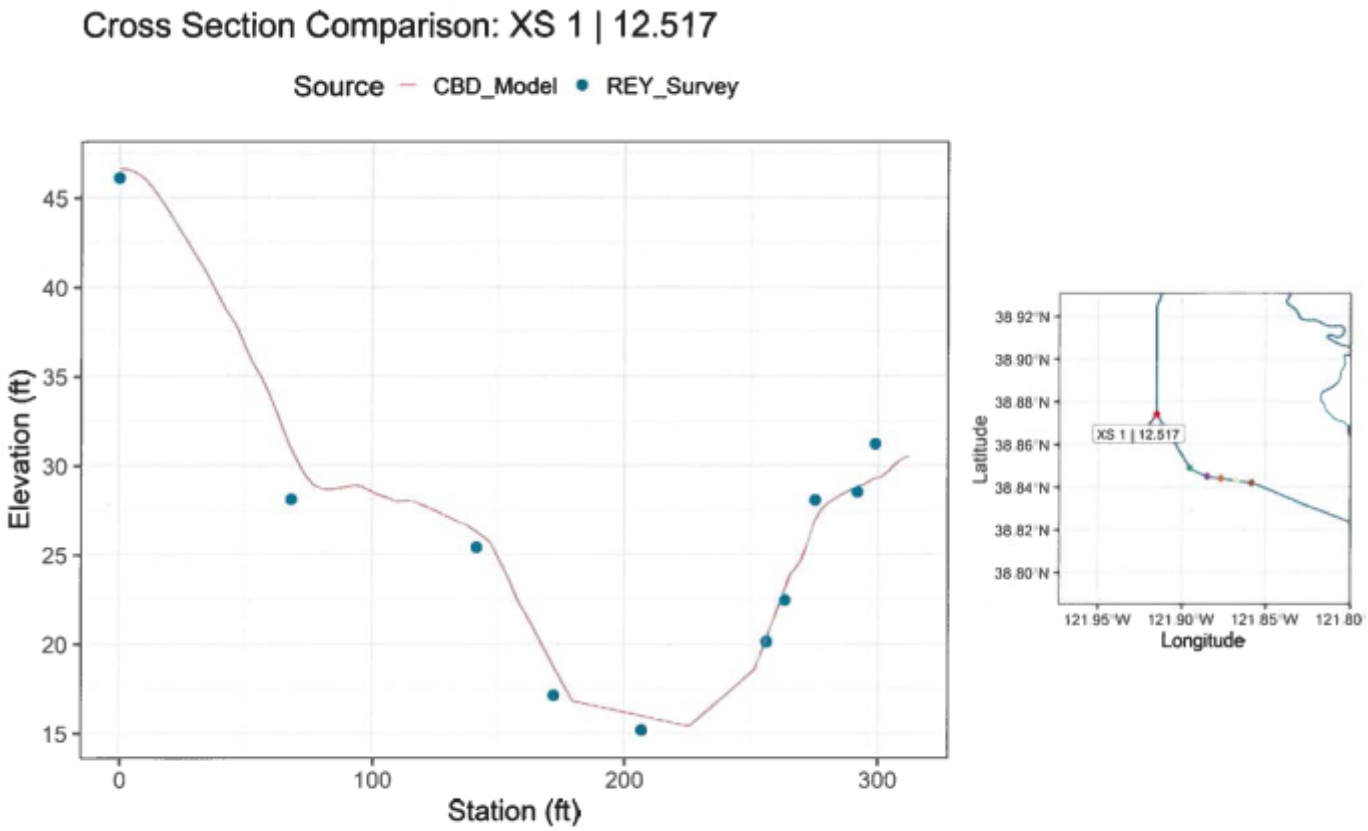
- 2025 – March 2026: Improve model grid and mesh along western bank and agricultural fields to eliminate problem with ambient flows showing summer inundation from 2024 model. Also conducted:
  - March 2025 Field Verifications with Landowners along west bank low points
  - December 2025 Survey Cross Sections to compare with Model Cross sections
  - Use 2016 Below Normal Water Year to determine WSE and inundation with and without 1,000 cfs of Project Flow

# Cross Section comparison: Model (2008/2009) vs REY Survey (December 2025)

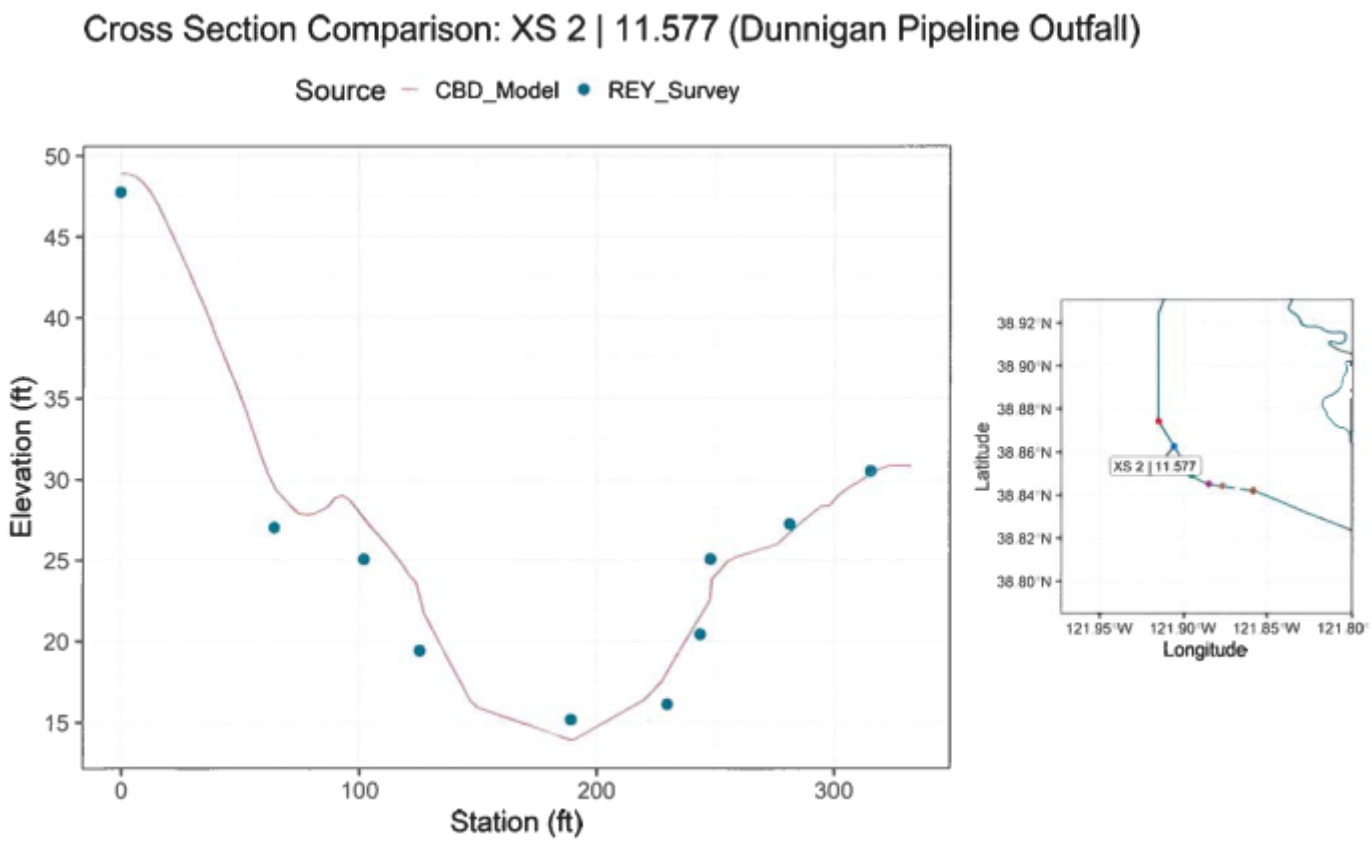
# Cross Section Comparison – Locations



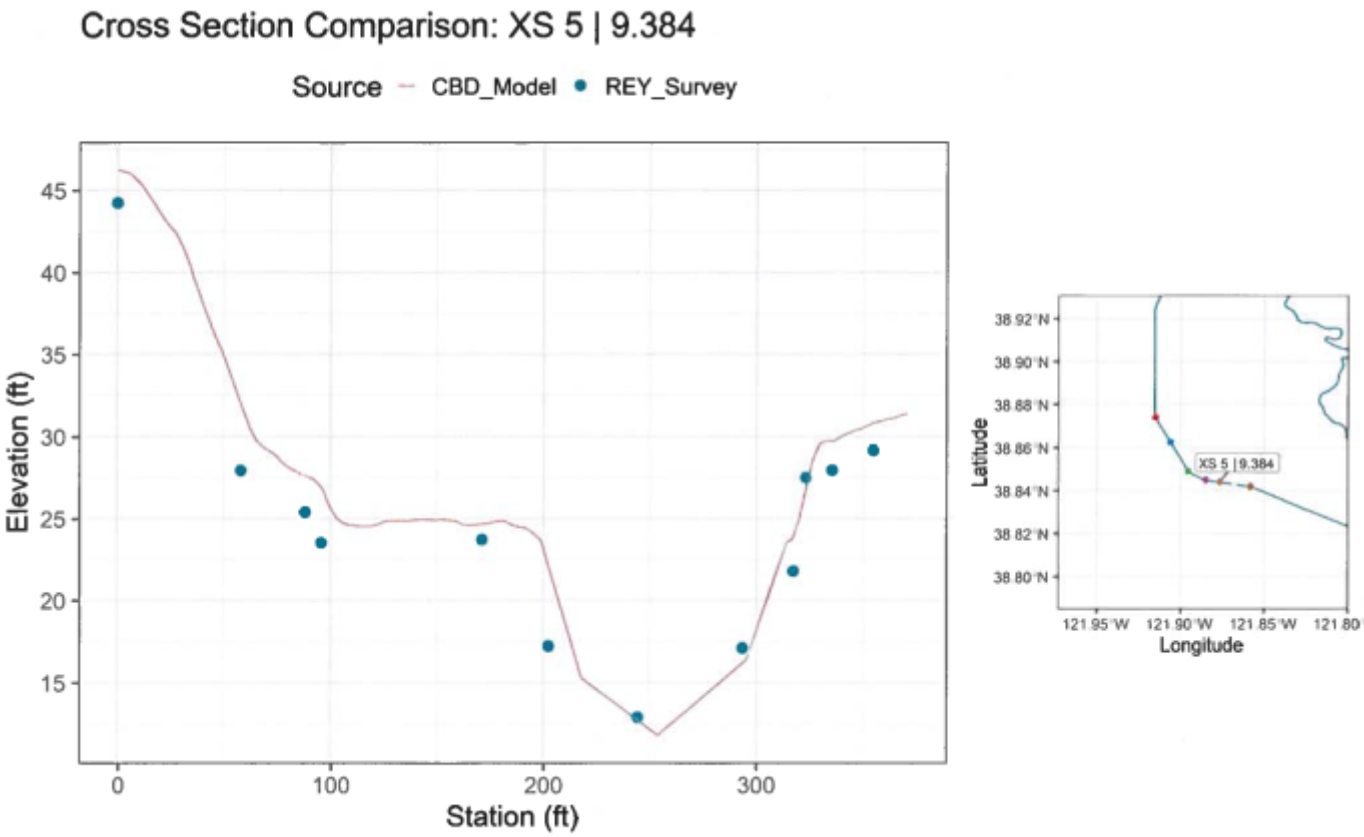
# Cross Section Comparison MP 12.517: CBD Model (2008/2009) vs REY Survey (Dec 2025)



# Cross Section Comparison MP 11.577: CBD Model (2008/2009) vs REY Survey (Dec 2025)



# Cross Section Comparison MP 9.384: CBD Model (2008/2009) vs REY Survey (Dec 2025)

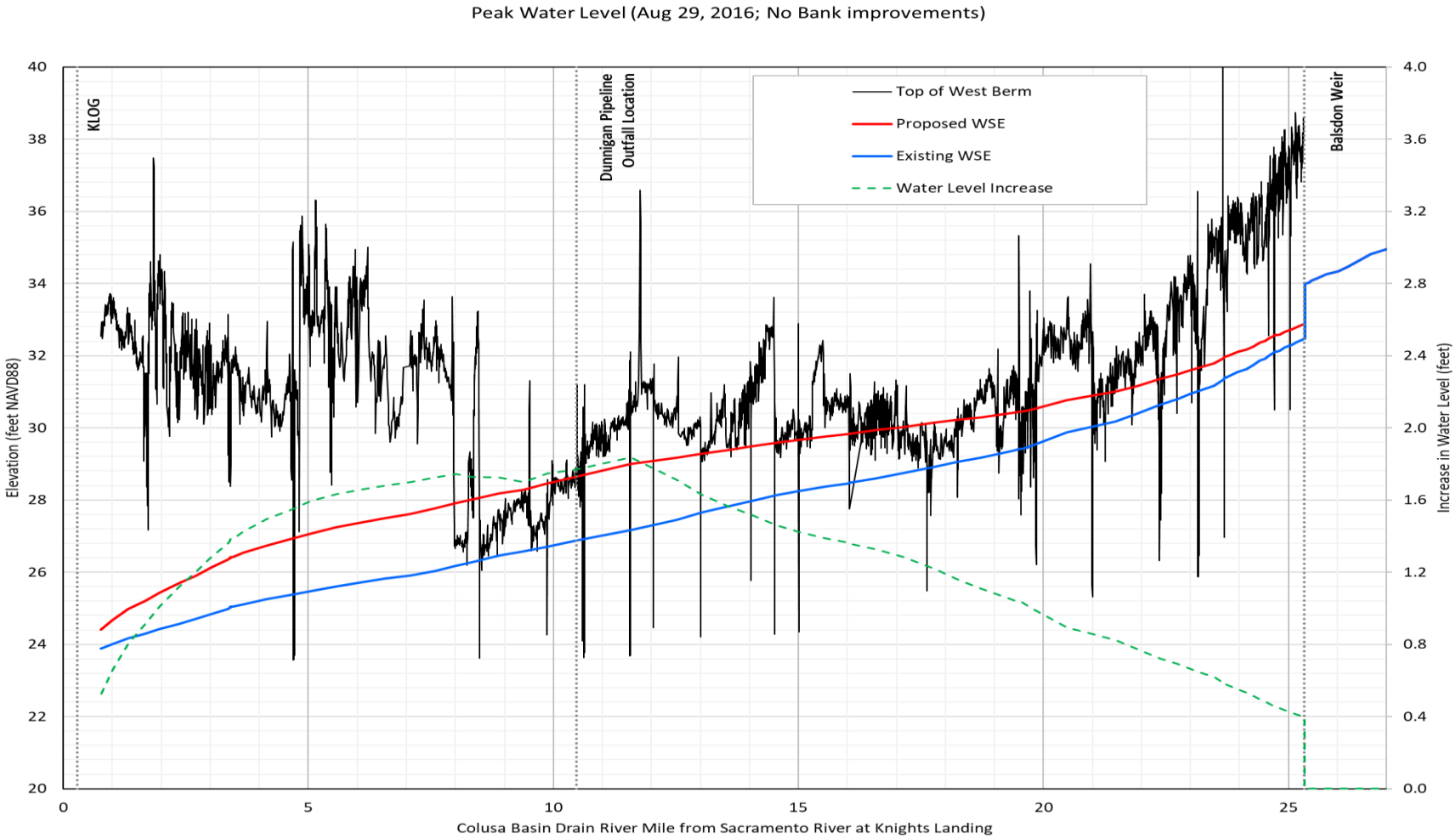


# Cross Section Comparison Conclusions: CBD Model (2008/2009) vs REY Survey (Dec 2025)

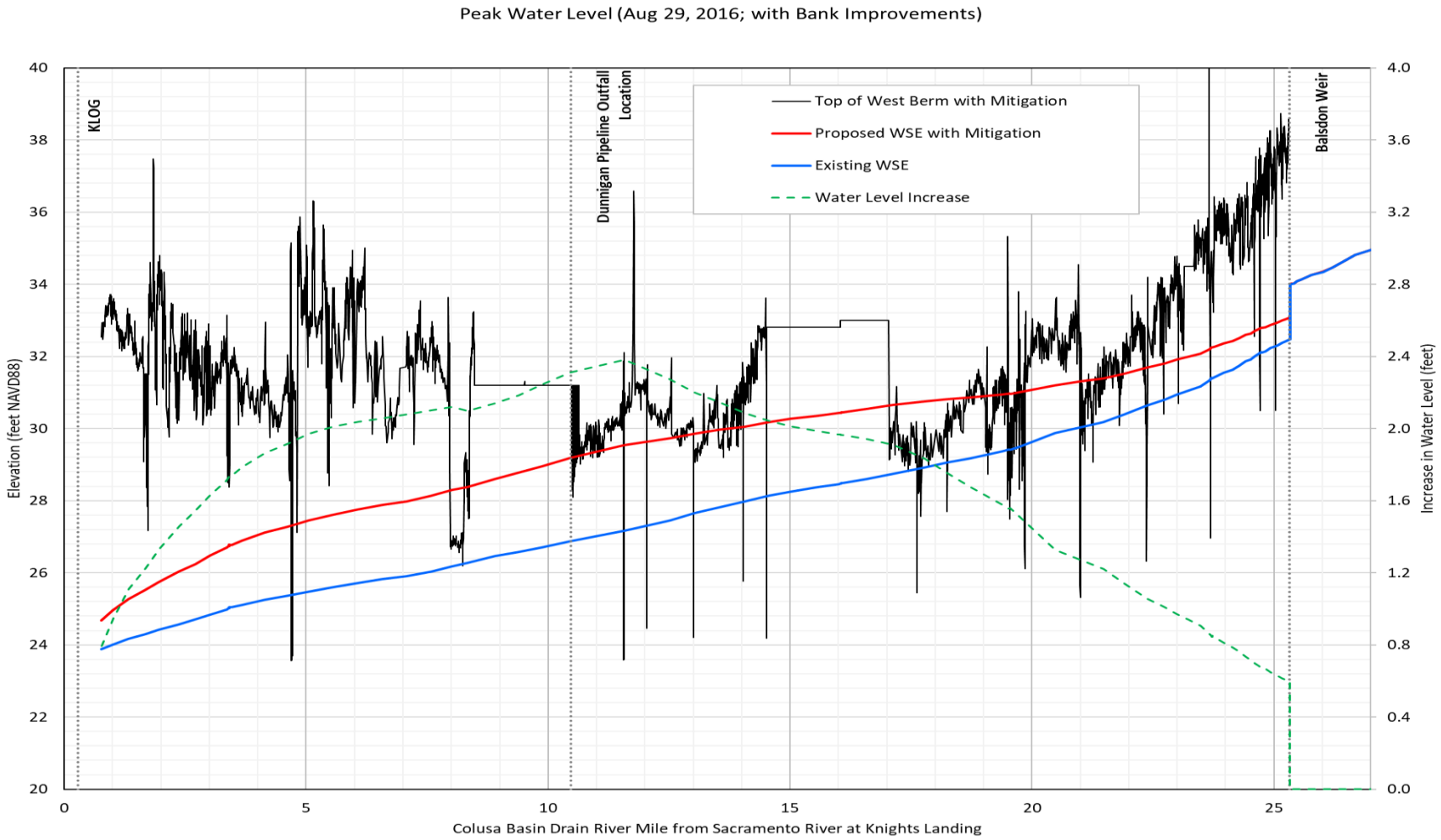
- Generally, the recent December 2025 topographic/bathymetric survey cross sections compare well with the CBD Model cross sections after 16 years
- There is a slight offset due to subsidence which we will address in the future
- Periodic flood flows seem to wash out accumulated silt in the channel
- It means that, at least in this area, the model geometry is representative of the channel geometry

# CBD Modeling Preliminary Results using 2016 Below Normal Water Year

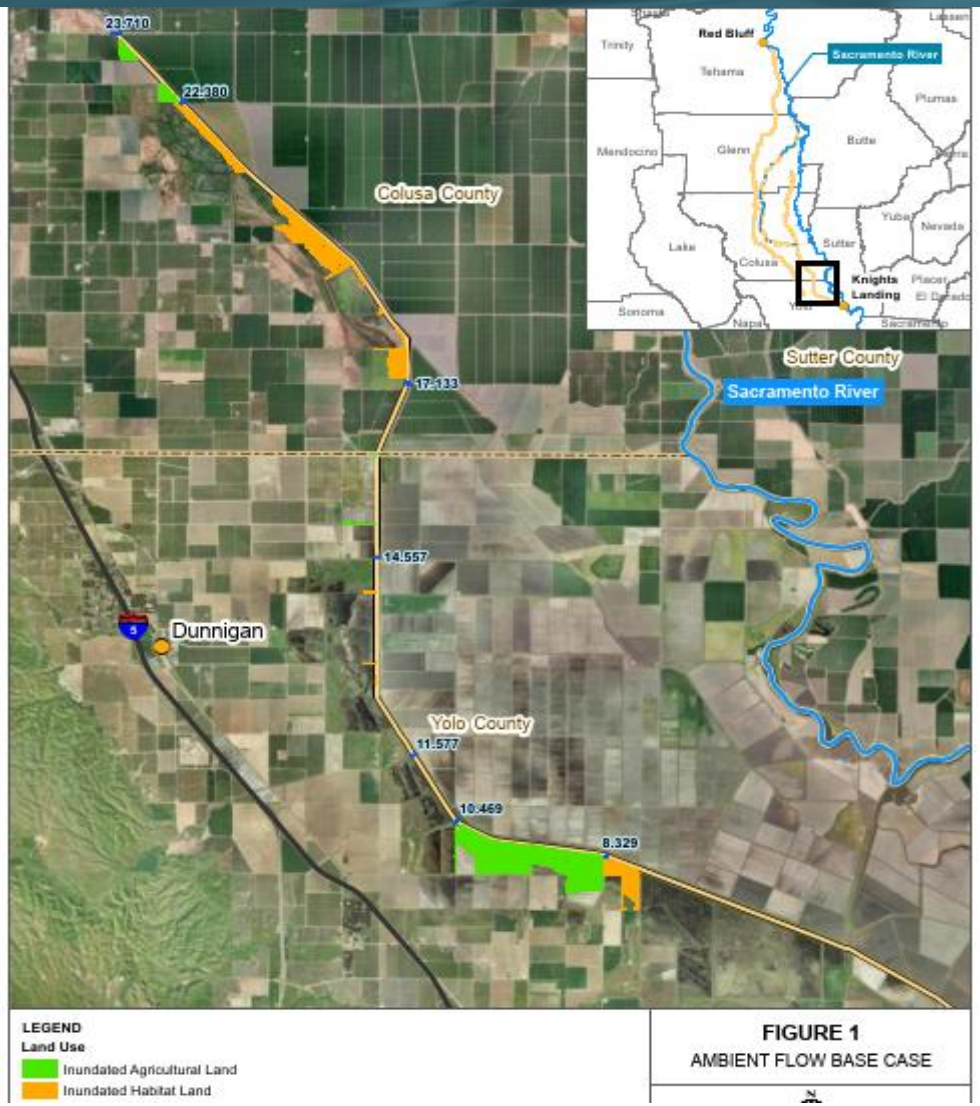
# Preliminary Results: 2016 water year Without West Bank improvements (1,870 cfs peak ambient flow + 1,000 cfs Project flow)



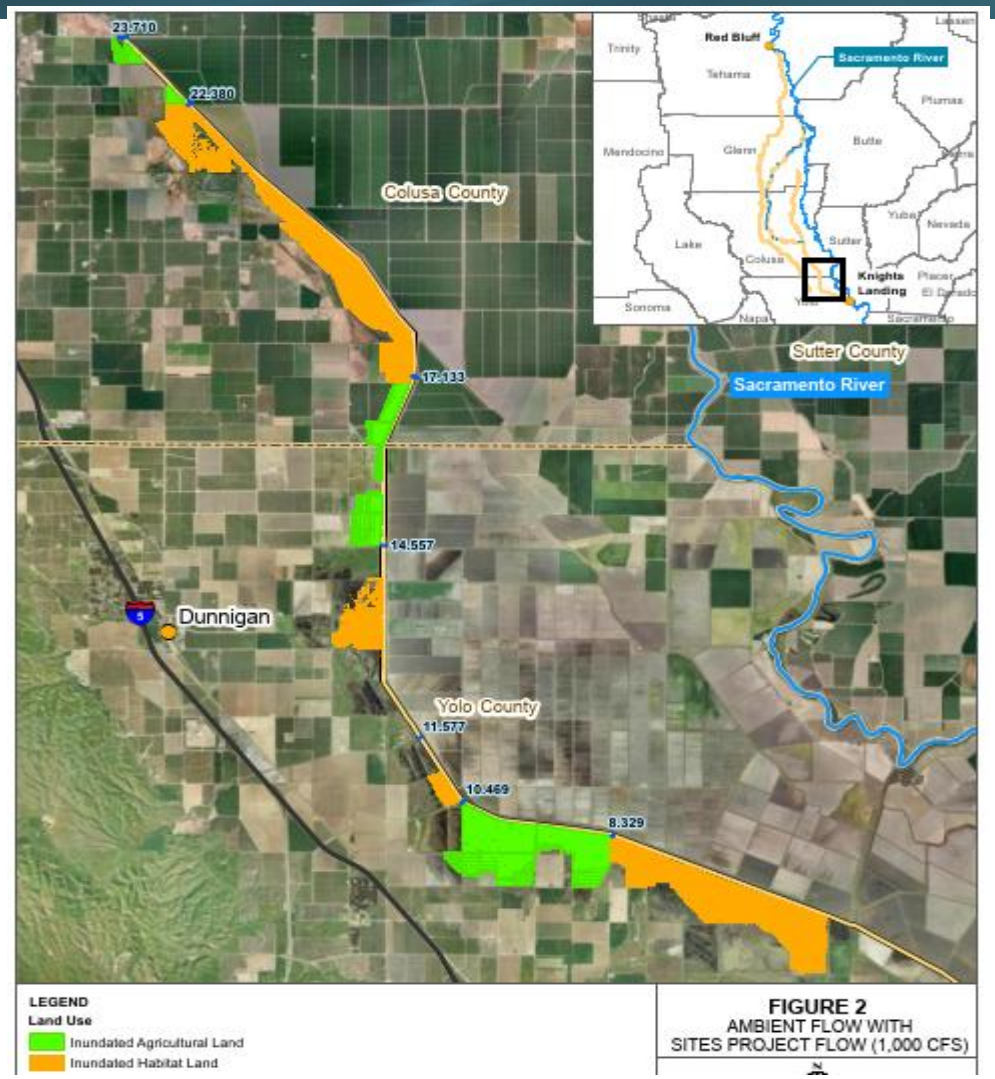
# Preliminary Results: 2016 water year with West Bank Improvements (1,870 cfs peak ambient flow + 1,000 cfs Project flow)



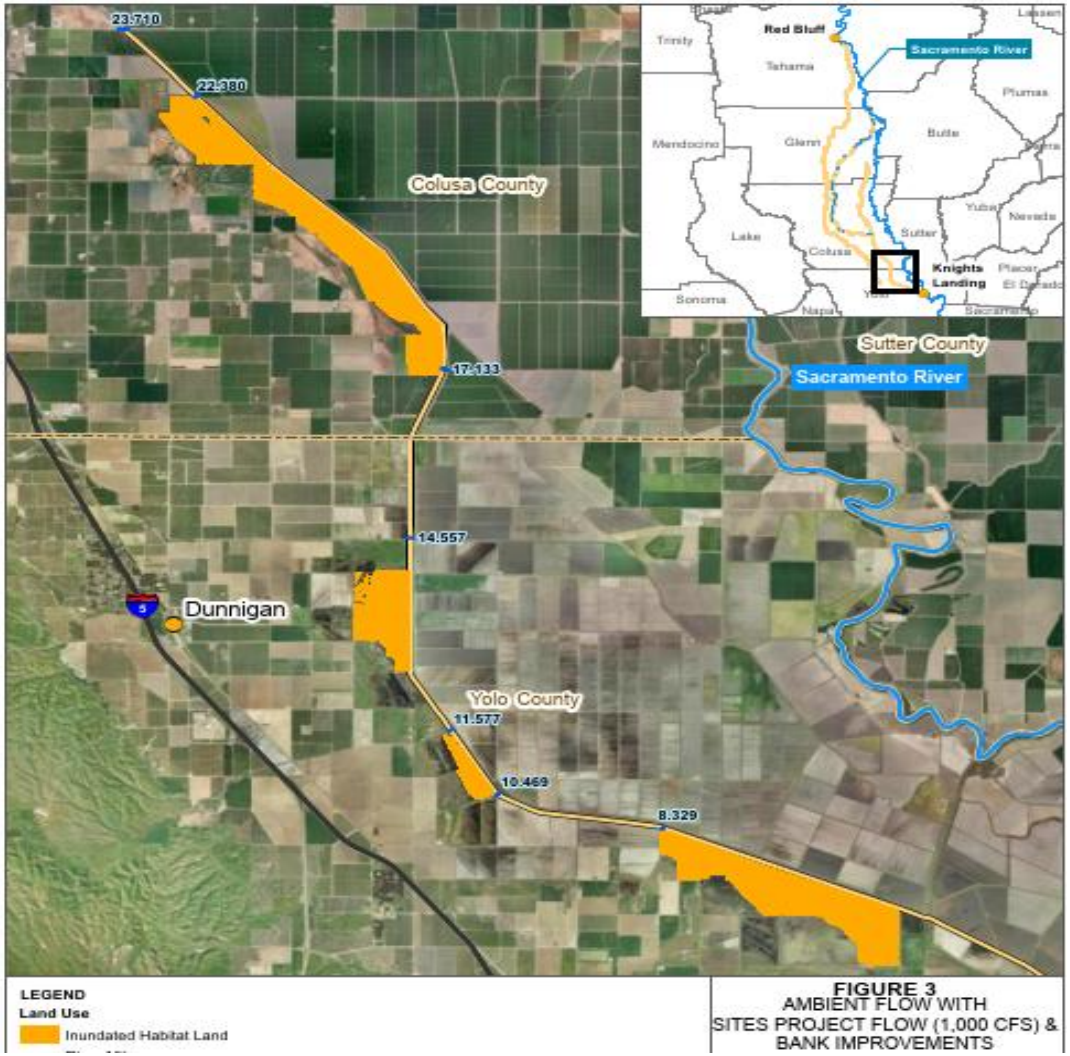
# Preliminary Results - 2016 Below Normal Water Year: End Aug & End Nov - high ambient flows



# Preliminary Results - 2016 Below Normal Water Year: End Aug & End Nov - high ambient flows with 1,000 cfs Project flows



# Preliminary Results - 2016 Below Normal Water Year: End Aug & End Nov - high ambient flows with 1,000 cfs Project Flow & West Bank Raise



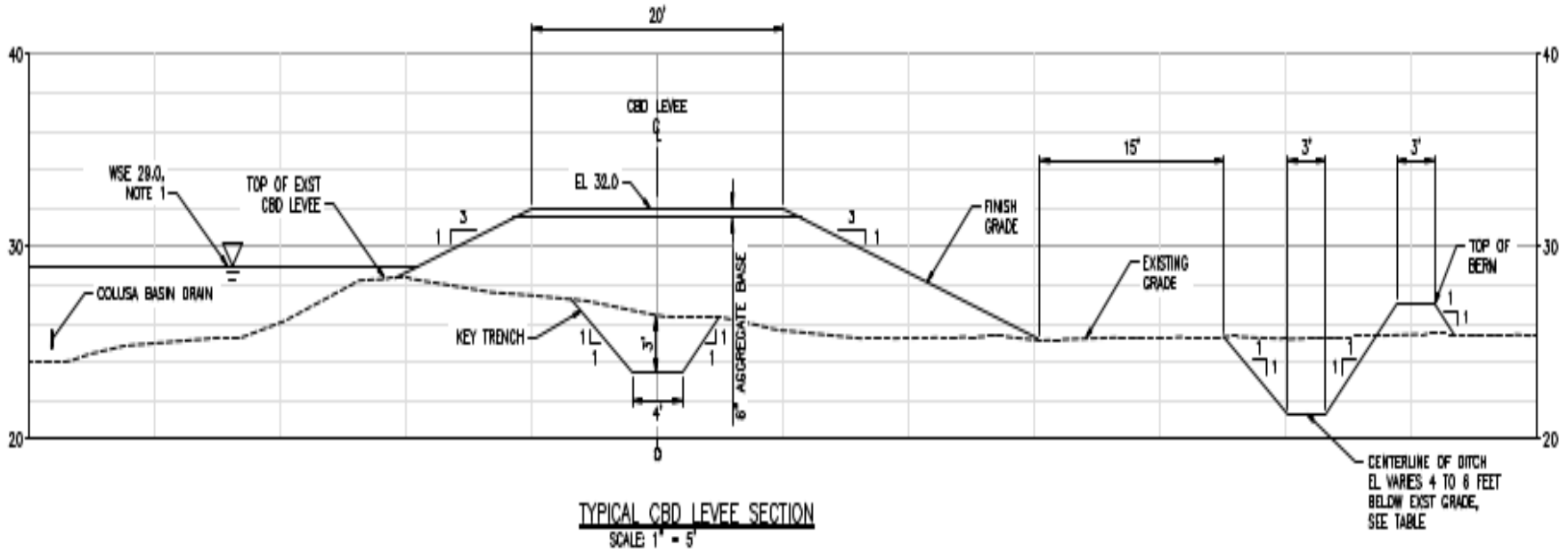
# Preliminary Results – 2016 Below Normal Water Year: End Aug & End Nov - Inundated Area

| Land Type | Ambient Flow Inundation Area (Acres) | Ambient Flow + 1,000 cfs Inundation Area (Acres) | Ambient Flow +1,000 cfs with W. Bank improvements Inundation Area (Acres) |
|---|---|---|---|
| Agricultural | 510 | 1,290 | 0 |
| Habitat | 320 | 2,200 | 2,800 |

High Ambient flow of 1,870 cfs on August 29 (two week period) due to GCID rice field drain water

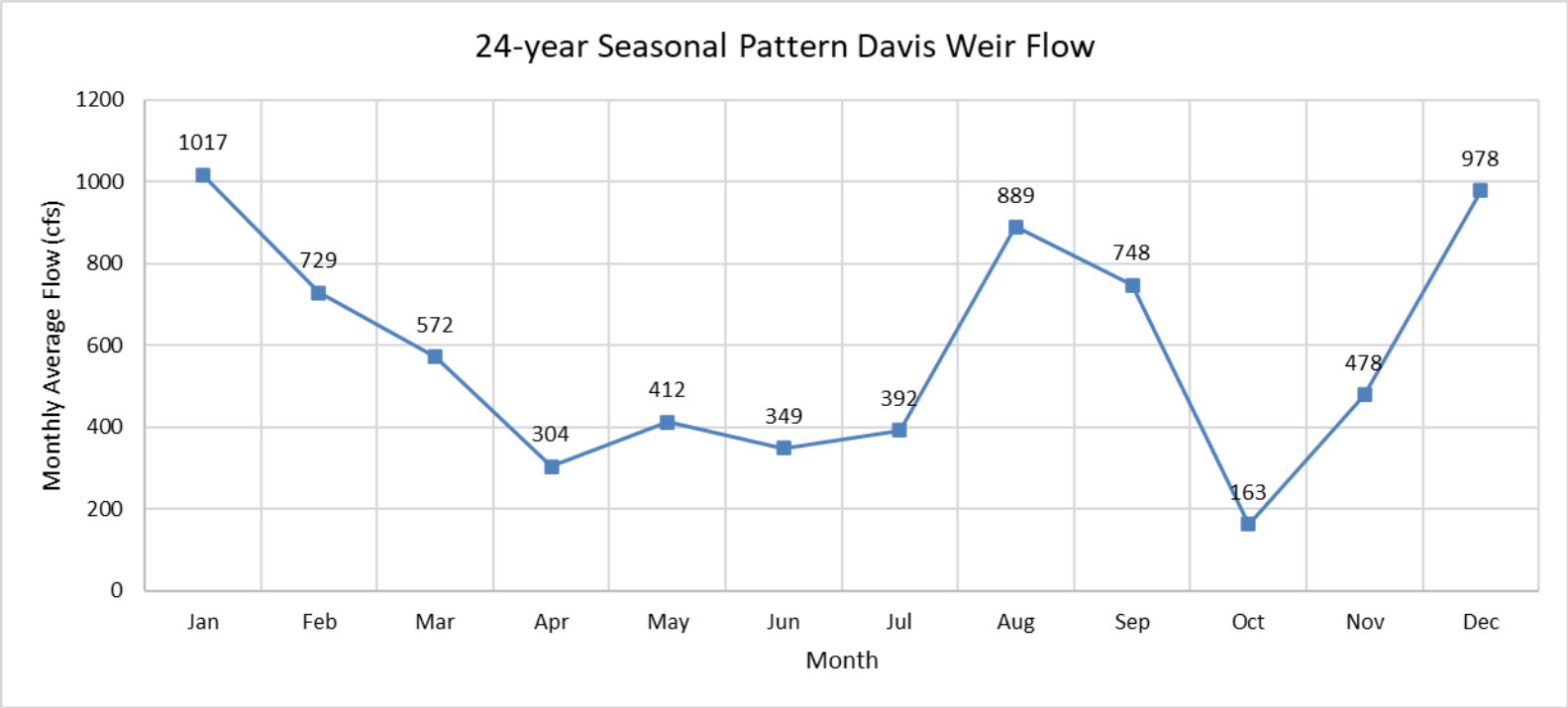
# West Bank Improvements consist of:

- 5 miles of West berm with 2.5-feet of free board, 20-foot all weather road, drainage ditch on field side and one drainage pump per mile.
- 0.8 miles of internal berm with 2.5-feet of freeboard, etc.




TYPICAL CBD LEVEE SECTION
SCALE: 1" = 5'

# CBD Average Monthly Flows at Davis Weir (RM 31.5) from 2001-2024




- In 2016 the maximum peak day between April 1 and November 30 was August 29 at 1,870 cfs
- Nine of the 24 years saw peak daily flows at end of August/early September during release of GCID rice field drain water that was greater than 1,870 cfs and lasted less than two weeks.

# Preliminary Results:

- Ambient flow – shows inundation in end August/early September (about 2 weeks) during high flows from GCID rice field drain water and in November (about 1 week) due to storm.
- Ambient flow plus 1,000 cfs flows, could be partially resolved by rescheduling Project flows during high GCID rice field drain water releases and would be resolved during winter storm events.
- The results are conservative because the model is using a steady state project flow of 1,000 cfs from July 1- November 30.
- We are assuming that the inundation of habitat lands during these time periods is ok.

# Comparison of using CBD vs Dunnigan Pipeline Alt 2 to convey Sites water to Sacramento River

# Using CBD to convey Sites water to Sacramento River

- Colusa Basin Drain
  - Level of Service Assessment: To protect Ag Land from inundation with 1,000 cfs of Project Flow, need about 5.8 miles of west bank improvements (5% design)
  - Potential Improvements: $17.6 Million construction cost for 5.8 miles of west bank improvements.
  - Two years of additional planning/permitting:
    - Update CEQA/NEPA documents for change of project scope by adding west bank improvements, then amend associated permits
    - Additional mitigation costs about 12% of $18 Million = $2 Million
  - Potential water losses
    - Potential water loss down KLRC - Negligible with Wallace Weir closed
    - Conveyance water losses in CBD of about 2 to 5%
    - There is a possibility of the unauthorized take of water

# Using Dunnigan Pipeline to convey Sites water to the Sacramento River

- Dunnigan Pipeline
  - Level of Service Assessment:
    - 30% Design TC Canal to CBD, 10.5-ft Diam, Q design = 1,000 cfs, Max Q = 1,300cfs, $215 Million construction cost.
  - Potential Improvements: Add in Alt 2 – extend pipe from CBD to Sacramento River.
    - Updated 10% design: increase pipe diameter to 12-ft, keep design flow = 1,000 cfs, $315 Million construction cost. Total for Dunnigan Pipeline would be $530 Million construction cost
    - Two years of additional planning/permitting:
      - Adds salmonid permitting topics with USFWS, NMFS and CDFW
      - Revise CEQA/NEPA documents since Board chose Alt 1
      - Add involvement of USBR and USACE
      - Additional mitigation costs of about 12% of $315 Million = $38 Million
    - No water losses to the CBD

# Next Steps

- Short Term: by end of March 2026
  - Complete the analysis
  - Document results in CBD Hydraulic Model Technical Memorandum
  - Document results in a Conveyance TM for Baseline Report
- Long Term: Starting in 2027
  - Continue effort to improve stream gages and installing new stream gages on CBD
  - Take into account local subsidence
  - Continue to update and refine CBD hydraulic model

# Engineering and Construction Manager's Report

JP Robinette

# Engineering and Construction Manager's Report

- Reservoir CMAR Progress
- Update on Baseline Report
- Update on Division of Safety of Dams
- Schedule for Geotech Field Work
- Future Topics

# Questions?

# Thank you!

Upcoming Meetings:

Reservoir Committee and Authority Board:
Friday March 20 – 9 am to 12 pm

O&E Workgroup:
Wed April 8 – 1:30 to 3:30 pm

Sites