SAN JOAQUIN RIVER RESTORATION PROGRAM

Seepage and Conveyance Technical Feedback Group Meeting

April 25, 2019

Preliminary draft – subject to change

Regina Story

INTRODUCTION

Purpose of Today

- Provide updates on seepage monitoring, seepage projects, and the Seepage Management Plan (SMP)
- Questions

Agenda

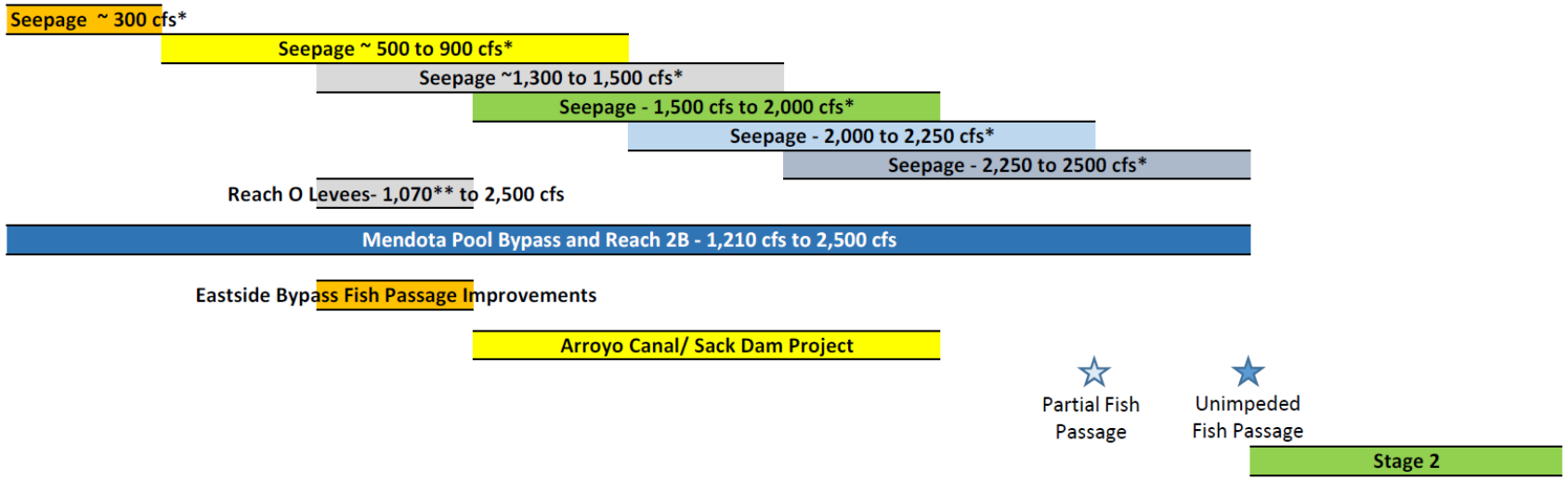
- Introductions, Meeting Agenda
- SJRRP Updates
- Flow Bench
- Groundwater Monitoring
- Seepage Projects and SMP Updates
- Elevation Surveys
- Questions, Wrap-Up

Liz Vasquez

SJRRP UPDATES

SJRRP Project Updates

- Funding Constrained Framework
- Mendota Pool Bypass and Reach 2B
- Arroyo Canal and Sack Dam Improvements Project



Estimated Channel Capacity (cfs)

300	500	700	900	1,210	1,210	1,210	2,500	2,500	2,500

Factor Controlling Channel Capacity

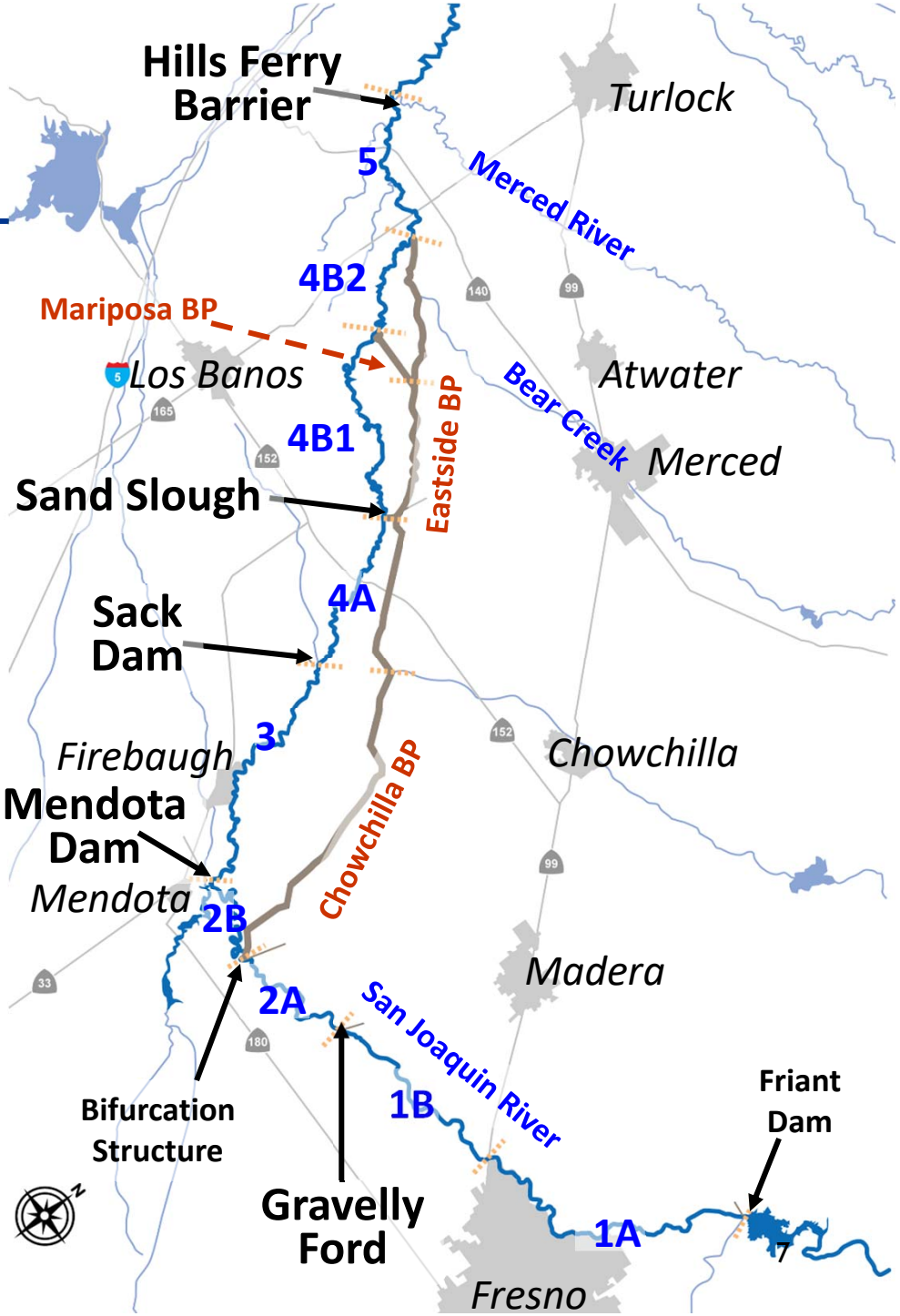
Seepage	Seepage	Seepage	Seepage	MPB	MPB	MPB	Seepage	Seepage	Seepage
Reach 4	Reach 4	Reach 3	Reach 3	Reach 2	Reach 2	Reach 2	Reach 4	Reach 4	Reach 4

* The magnitude of flow that is addressed by seepage actions are approximate and subject to change.

**This channel capacity assumes that the weir boards will be removed from the Merced National Wildlife Refuge weirs. With boards in the weirs, capacity is 580 cfs.

SAN JOAQUIN RIVER RESTORATION PROGRAM

- Water Year 2019: Wet Year Type
  - Flood control releases 3/15-4/5
  - Uncertain if flood control releases will resume
  - Currently operating Restoration Flows



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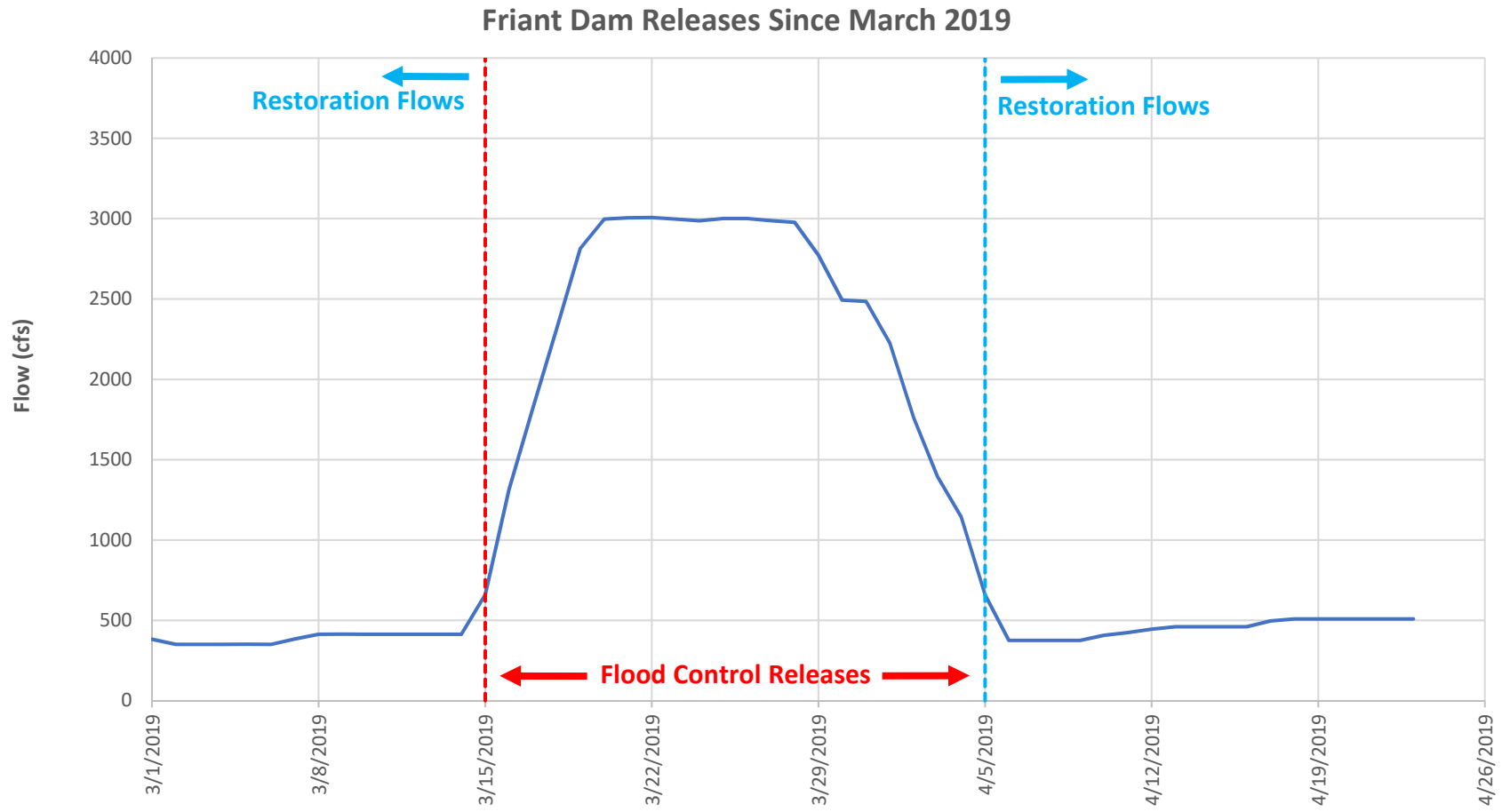
Recent Flows

- Flood flows released from Millerton March 15, 2019 – April 5, 2019

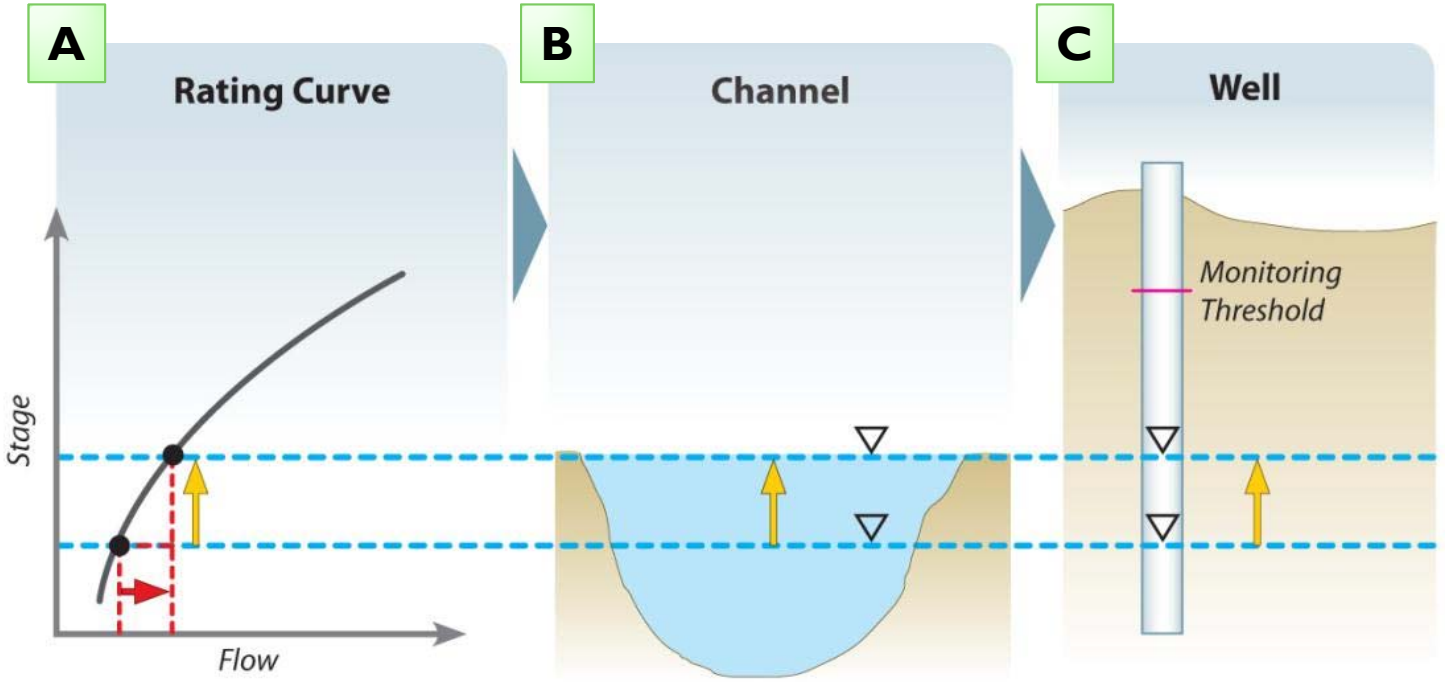


Appendix J (Operations)

- How do we transition from flood flows to Restoration Flows?
  - Ensure groundwater levels are draining, through either the 1:1 stage relationship or the drainage method
  - Monitor groundwater levels to ensure they are decreasing
  - Document in a Flow Bench Evaluation report
  - Refer to Section J.3 of the Seepage Management Plan (http://www.restoresjr.net/restoration-flows/seepage-projects/)

1:1 Stage Relationship

A. Determine change in river stage from proposed flow change
B. Assume change in river stage = change in groundwater level
C. Add change in groundwater level to most recent observed groundwater level



Groundwater Level Method

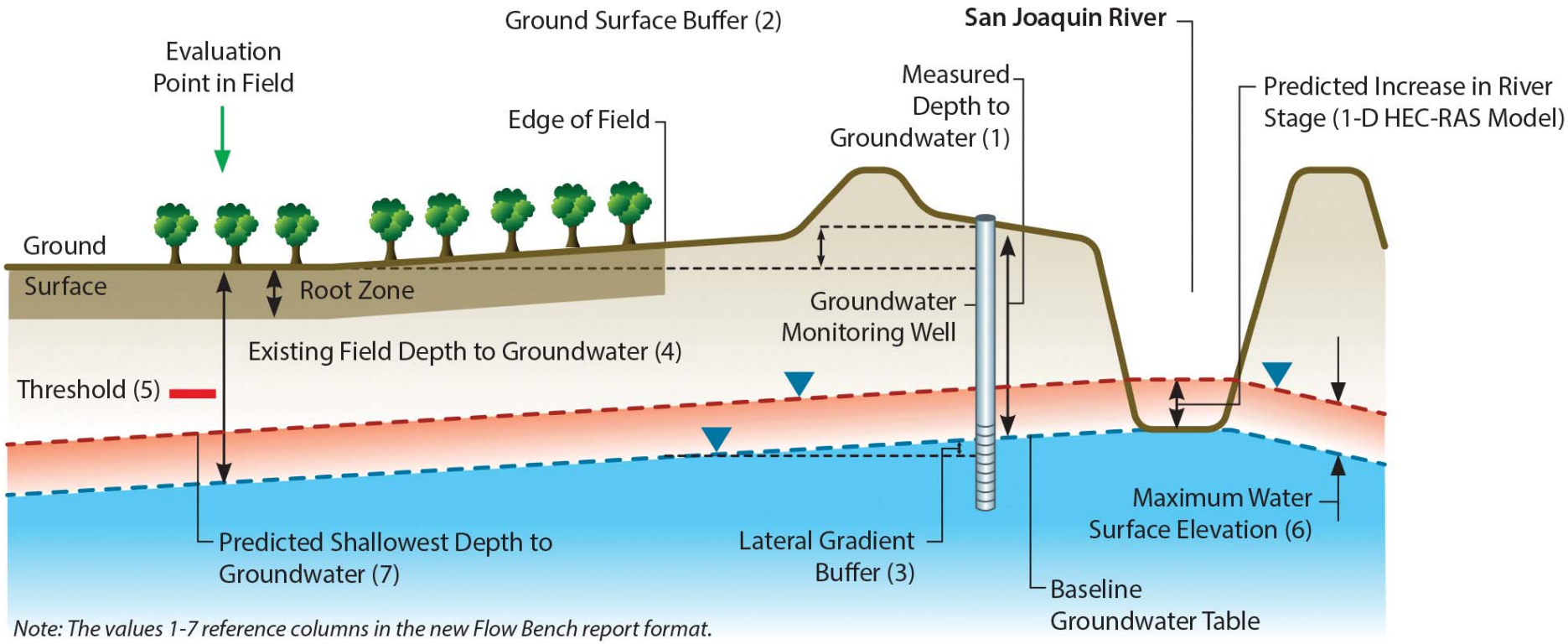


Figure J-2 from SMP Appendix J

Drainage Method

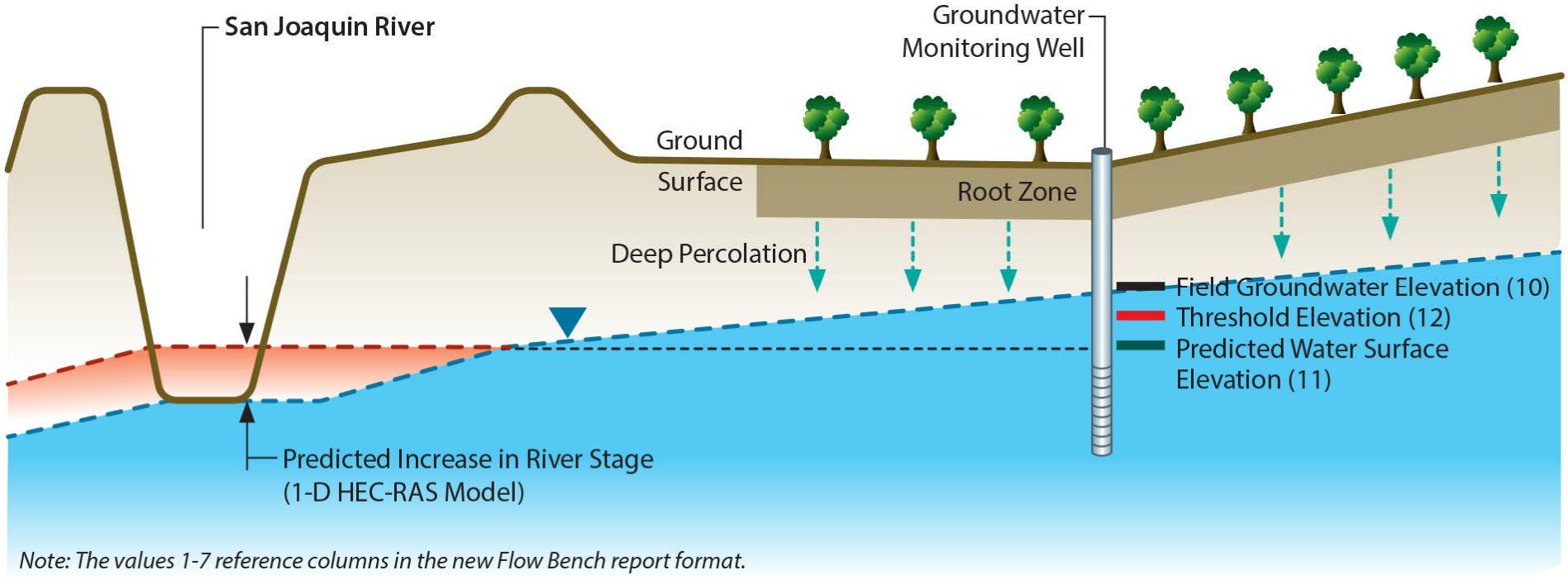


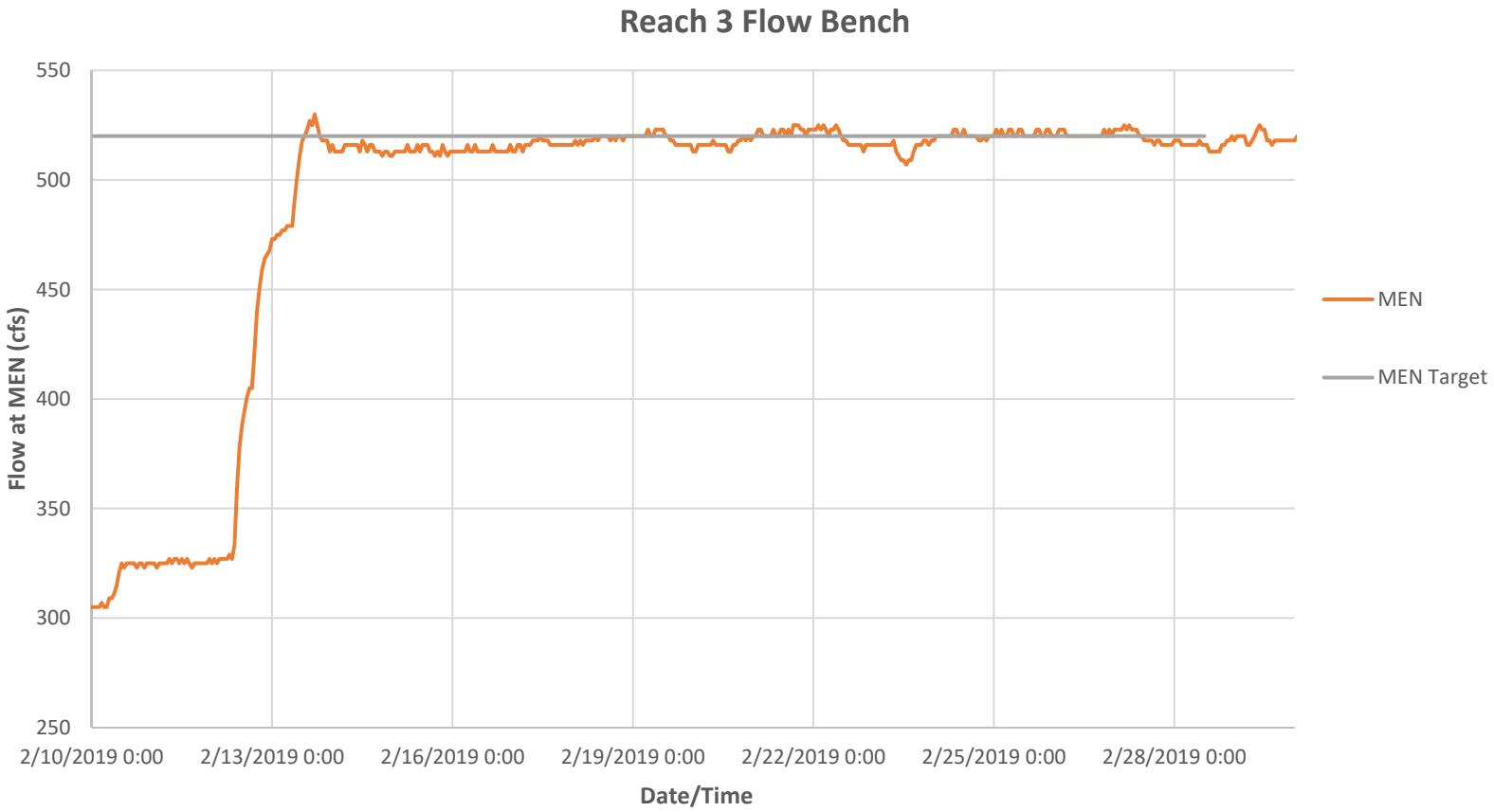
Figure J-3 from SMP Appendix J

Regina Story

FLOW BENCH

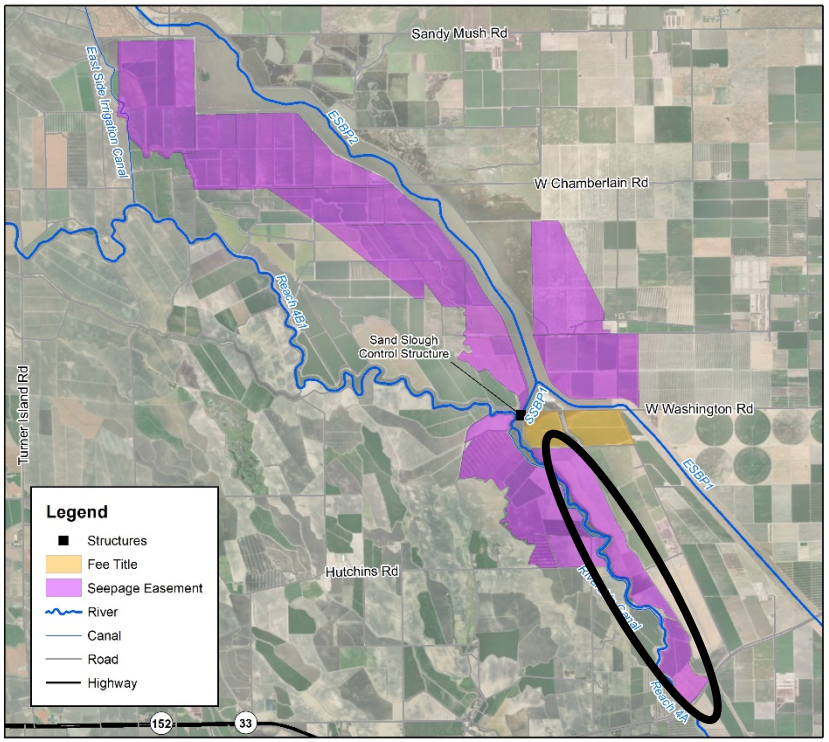
What is a Flow Bench?

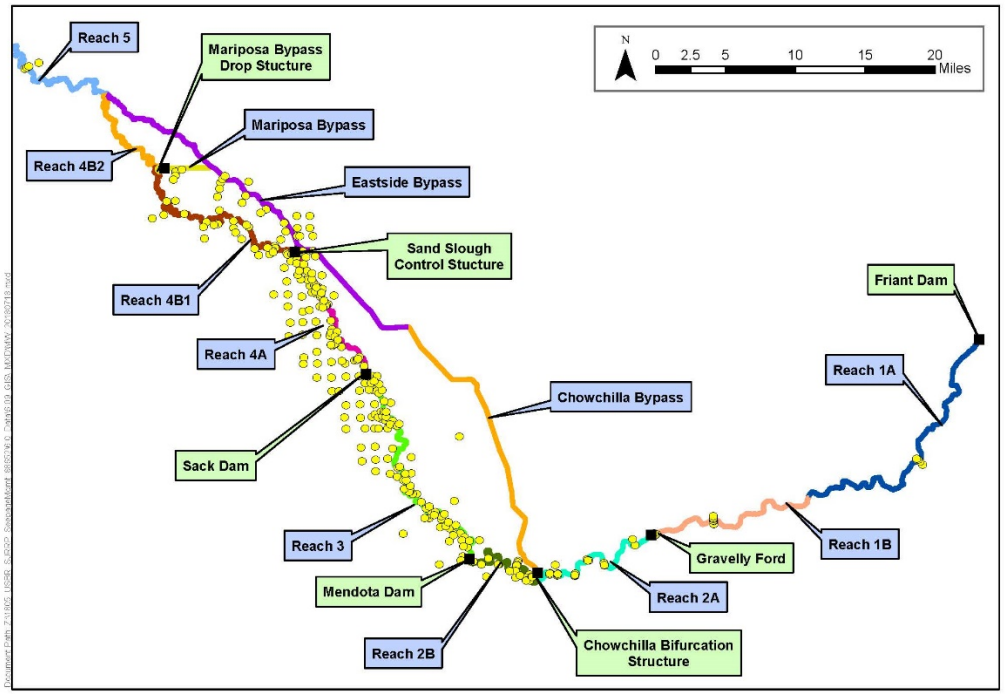
- Sustained flows at a targeted flow rate
- Allows for observing response of groundwater table



Flow Bench

- Completed seepage easement at the downstream end of Reach 4A, right bank in November 2018
- Empirical evaluation of groundwater data to-date informed flow bench target

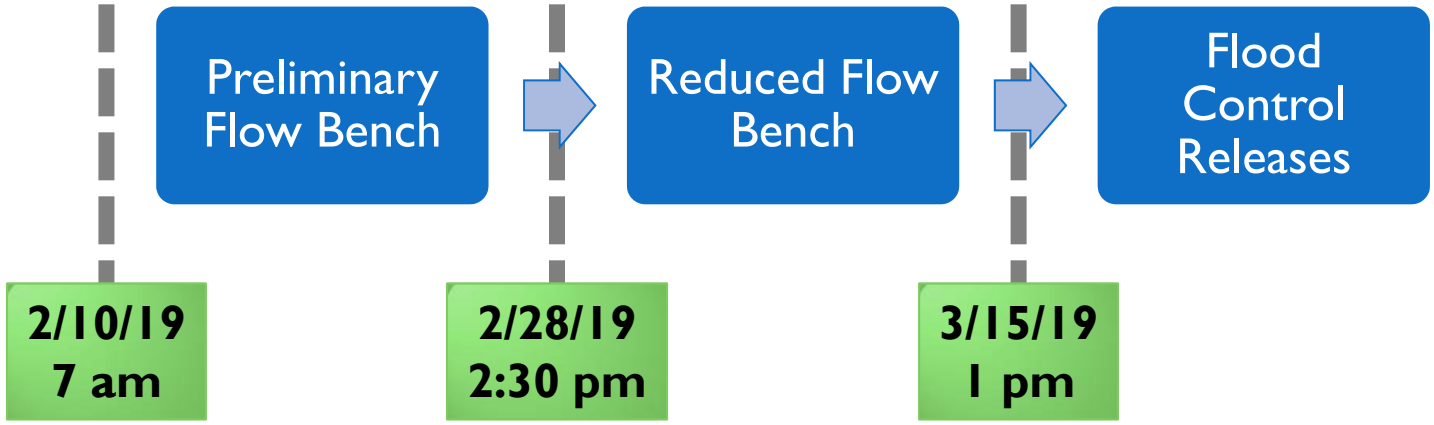




Preliminary draft – subject to change

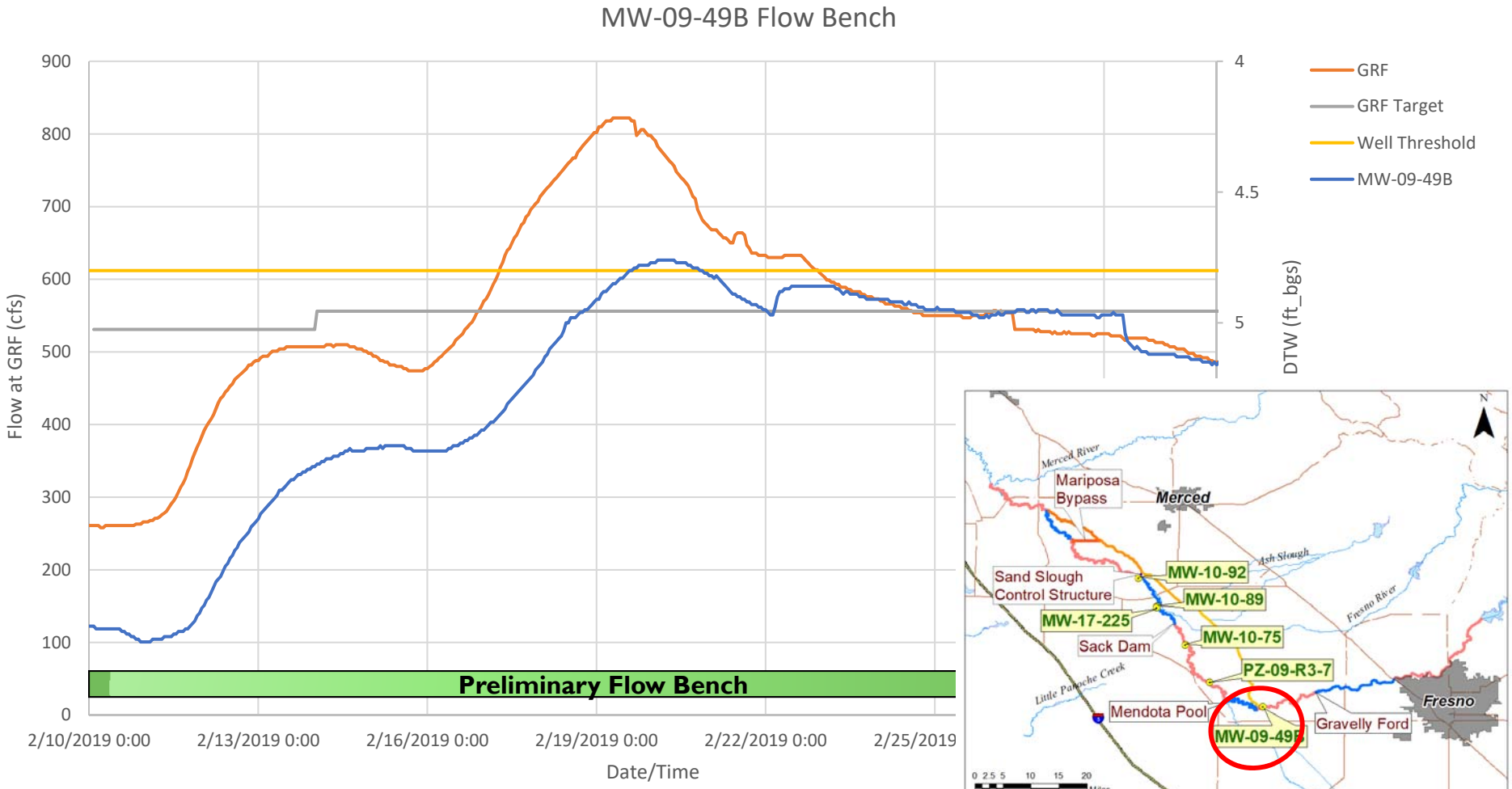
Flow Bench

- Flow bench was intended to assess seepage in Reach 3 and Reach 4A
  - Projected limitation was Reach 3
  - Targeted 520 cfs for flow bench in Reach 3
  - Restoration Flows were released past Sack Dam minus Arroyo Canal demands



Flow Bench (49B)

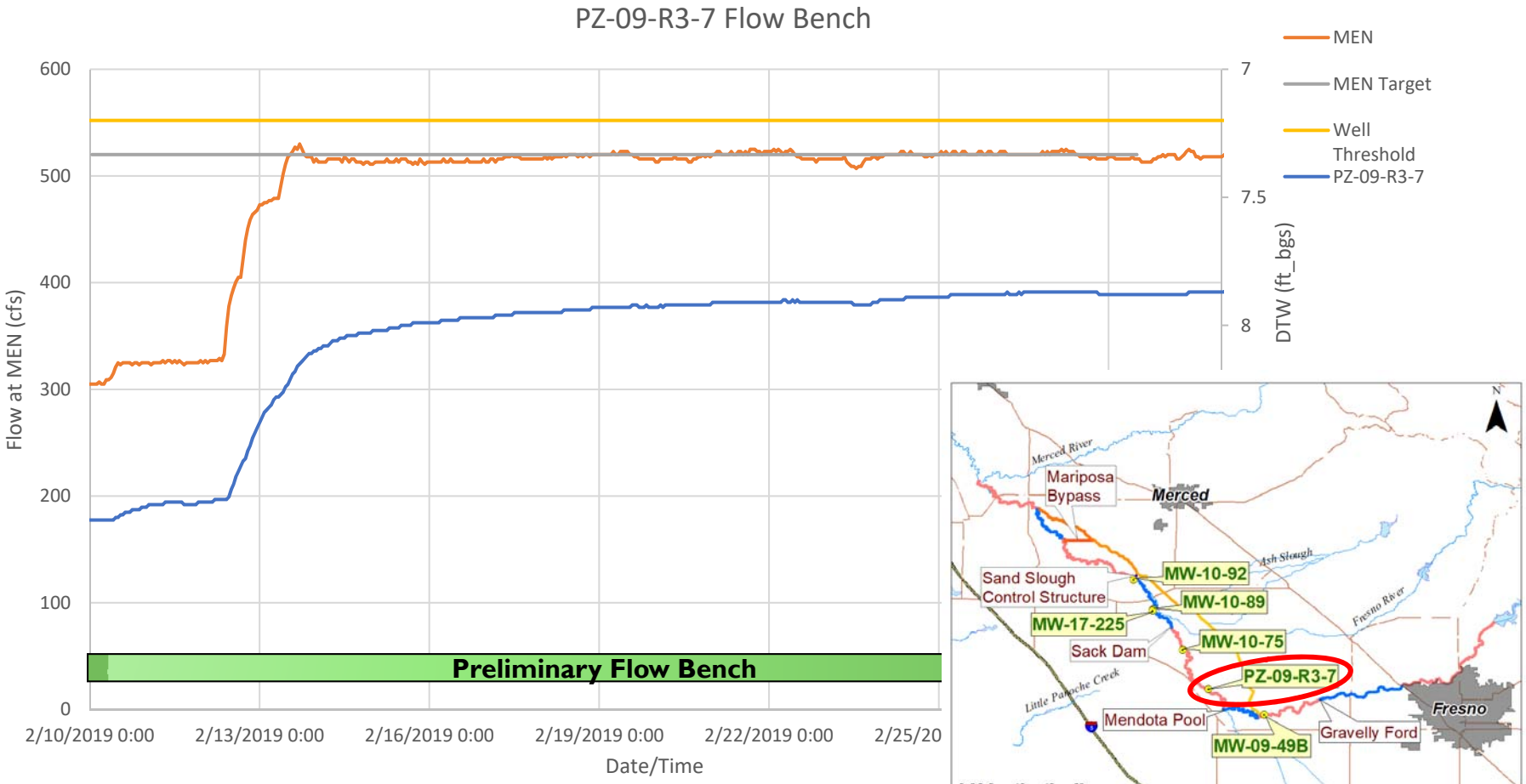
- Bench occurred from 2/10/19, 7am to 2/28/19, 2:30pm



Preliminary draft – subject to change

Flow Bench (R37)

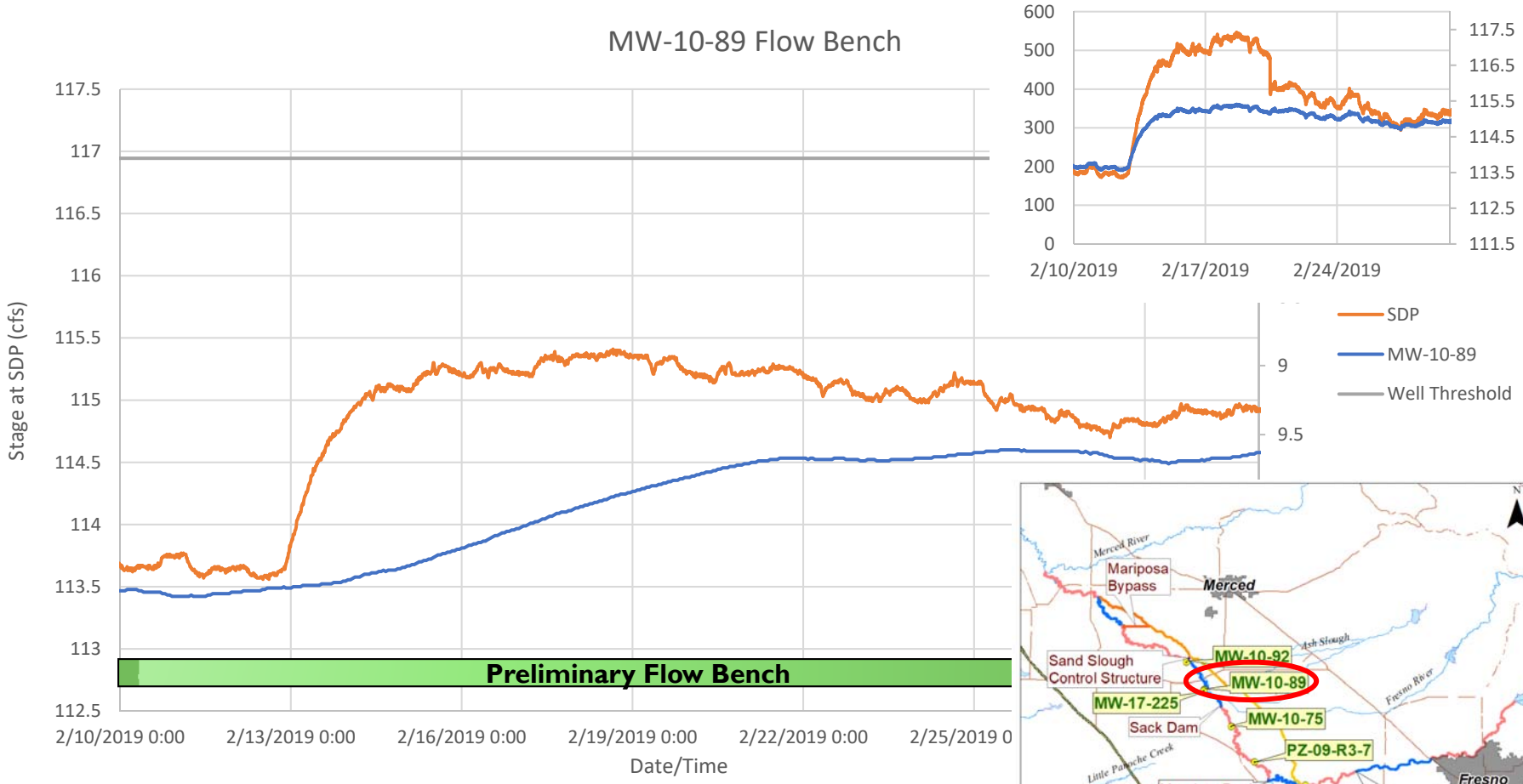
- Bench occurred from 2/10/19, 7am to 2/28/19, 2:30pm



Preliminary draft – subject to change

Flow Bench (W89)

- Bench occurred from 2/10/19, 7am to 2/28/19, 2:30pm



Preliminary draft – subject to change

Analysis of Flow Bench

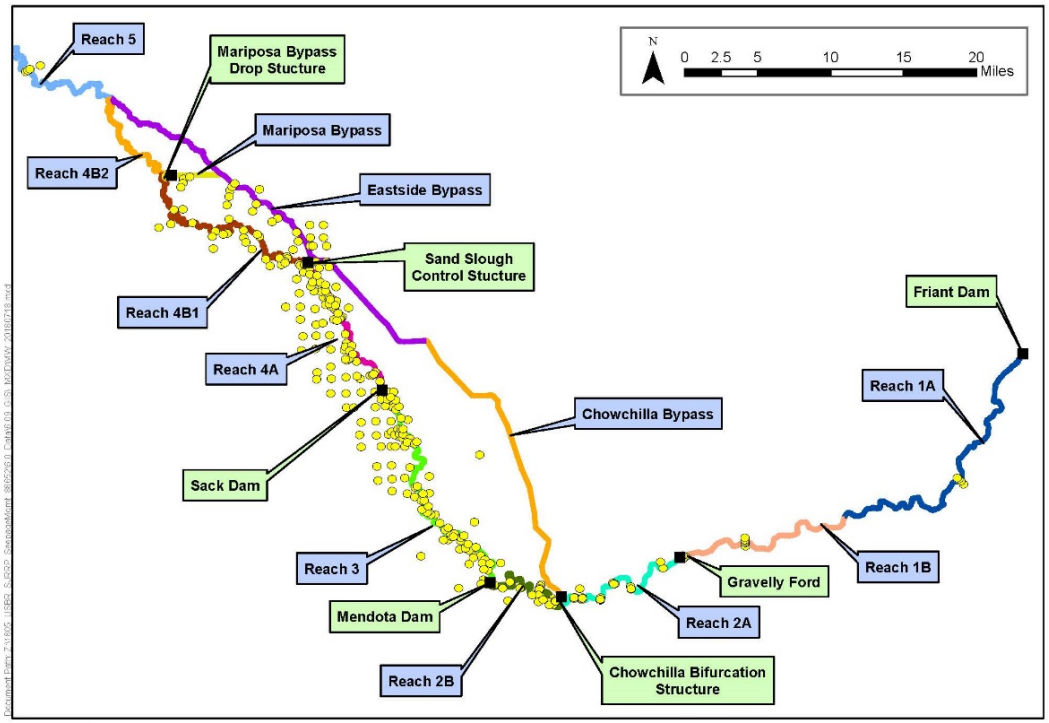
- No thresholds currently assigned at MW-17-225 and MW-18-80B, but had elevated groundwater levels
- On 2/28 the SJRRP communicated to the RA the need to reduce Restoration Flows
- Flow Bench Evaluation posted at:

  http://www.restoresjr.net/?wpfb_dl=2285

Stephen Lee

GROUNDWATER MONITORING

Monitoring Network



- 200+ wells
- Includes SJRRP, district, and landowner wells
- Some locations outfitted with dataloggers and real-time equipment
- Manual measurements taken monthly or more frequently as needed

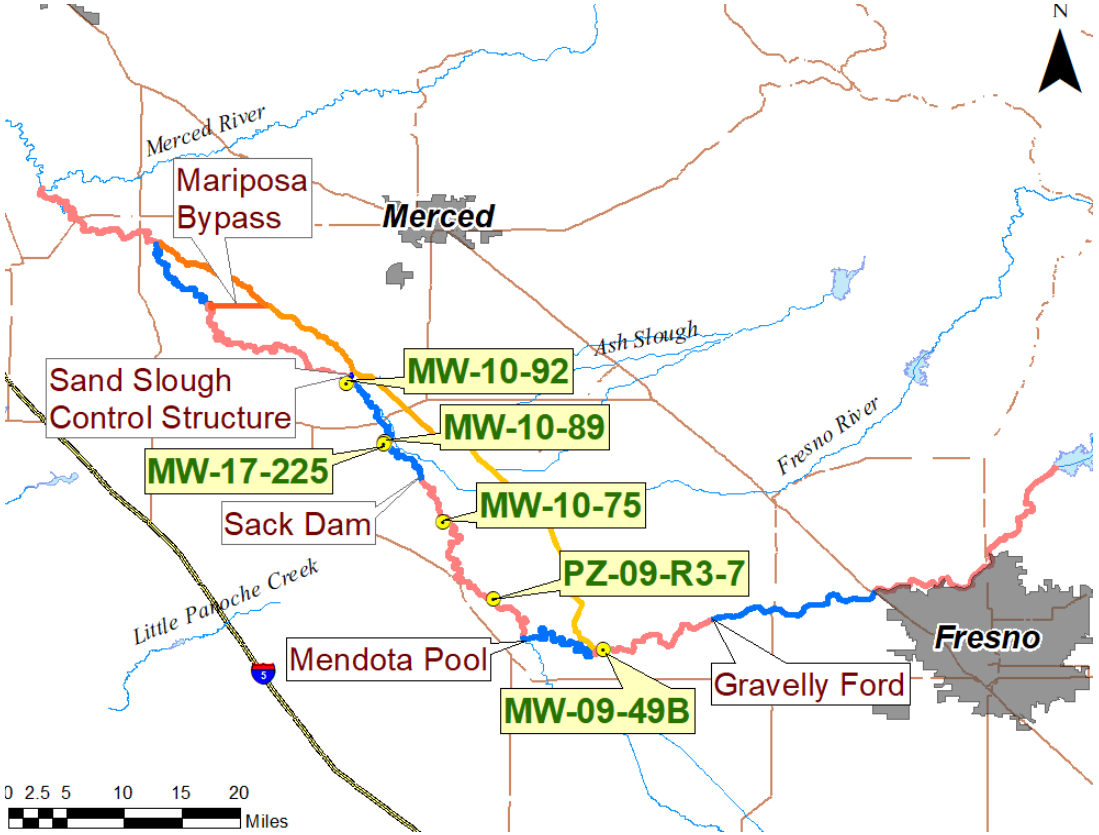
Monitoring Network

- In process of updating the monitoring network
  - Re-assess monitoring frequency
  - Potentially abandon or transfer wells at executed seepage project locations and unresponsive locations
  - Evaluate additional (or replacement) monitoring locations (wells, gauges)

Real-Time Equipment

- 6 active real time locations
- Links and codes available at:

http://www.restoresjr.net/restoration-flows/groundwater-monitoring/



Preliminary draft – subject to change

5 MINUTE BREAK

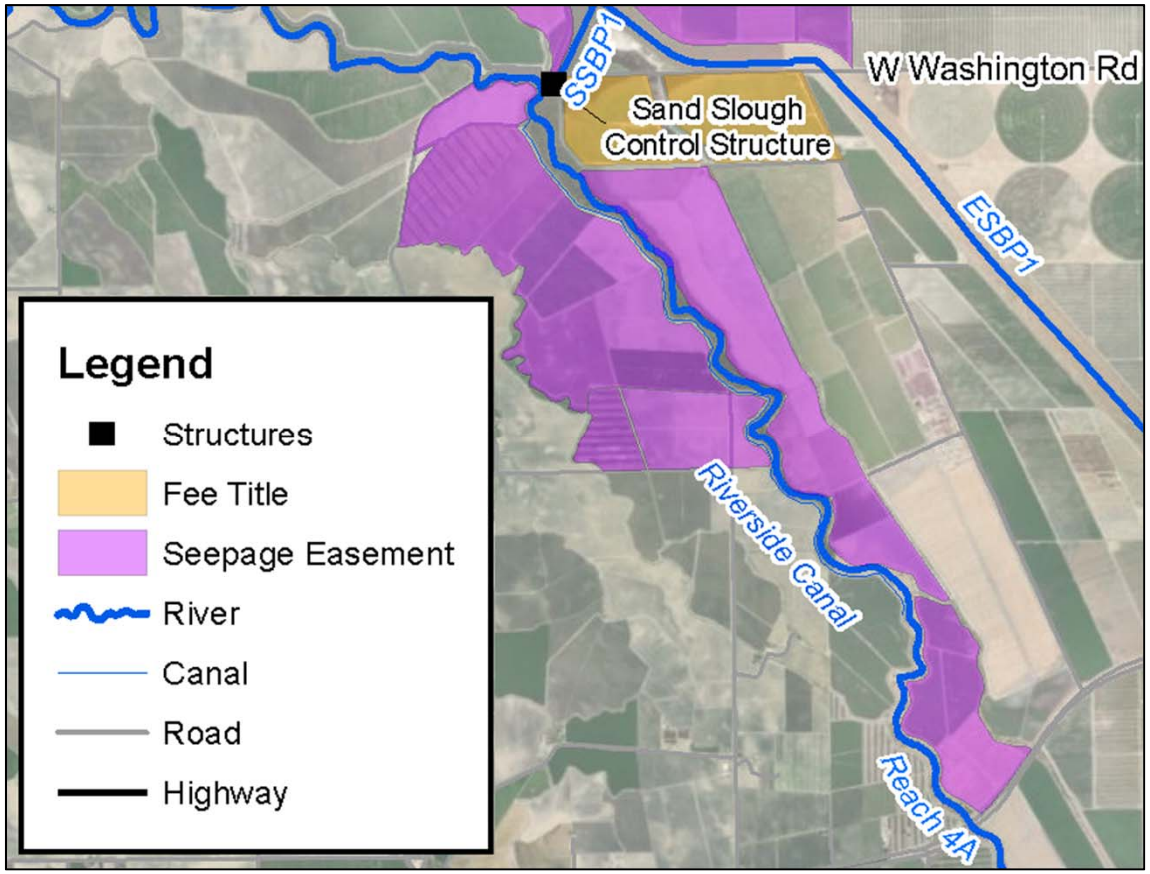
Up Next: Seepage Project and SMP Updates

Regina Story

SEEPAGE PROJECTS AND SMP UPDATES

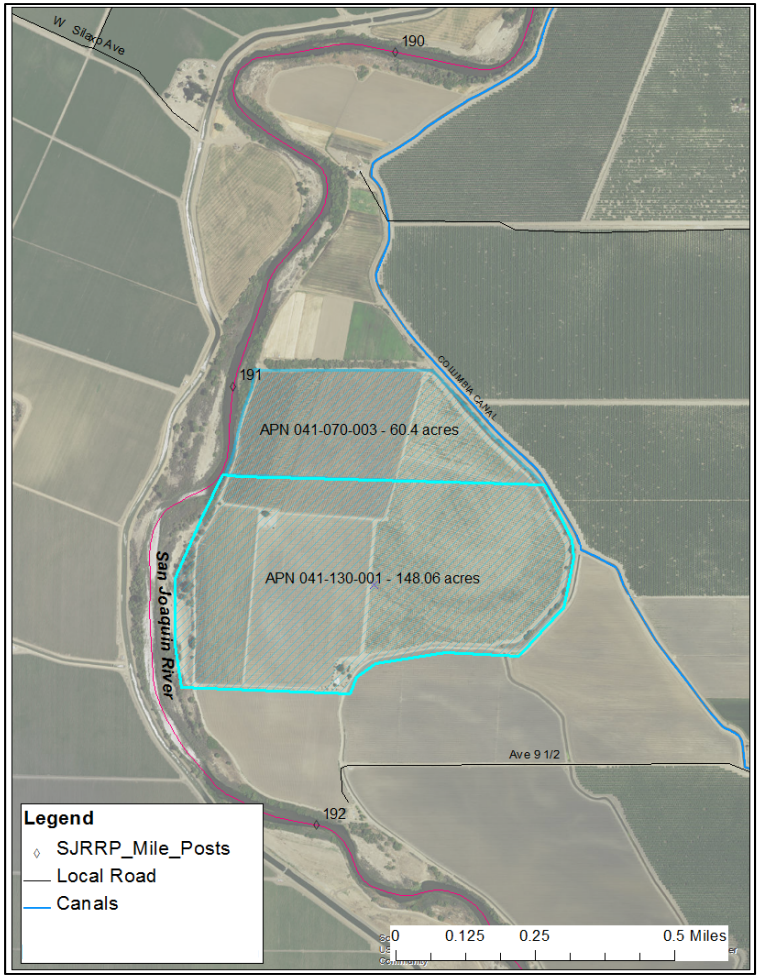
Seepage Projects

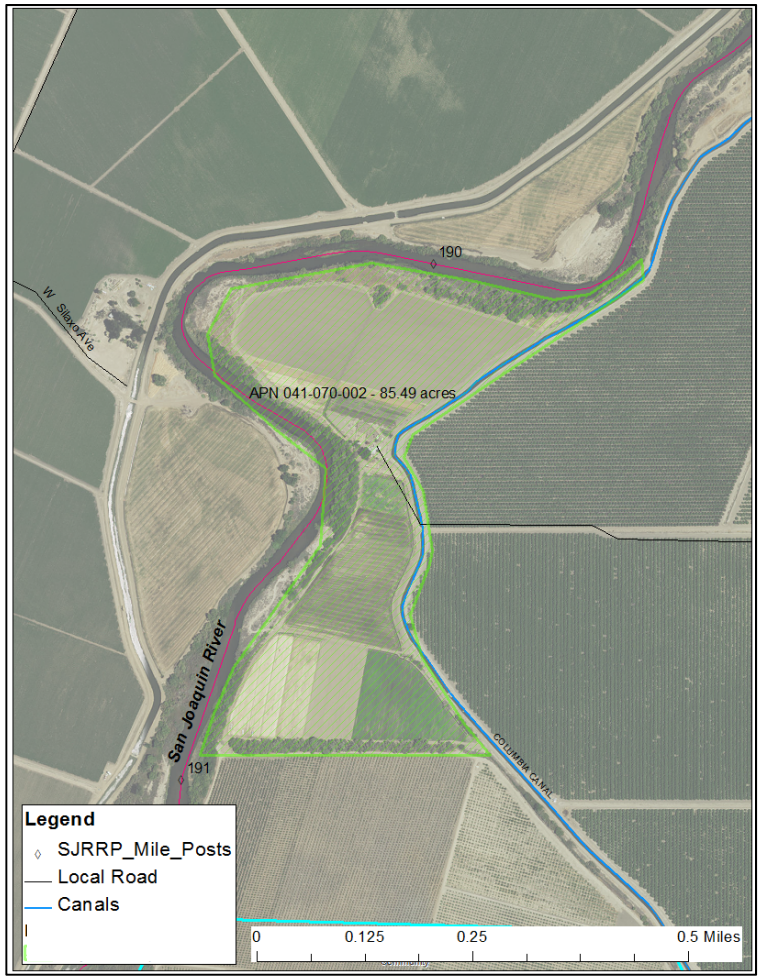
- 2 seepage easements executed since last SCTFG meeting



Seepage Projects

- 2 fee title acquisitions expected to close in 2019

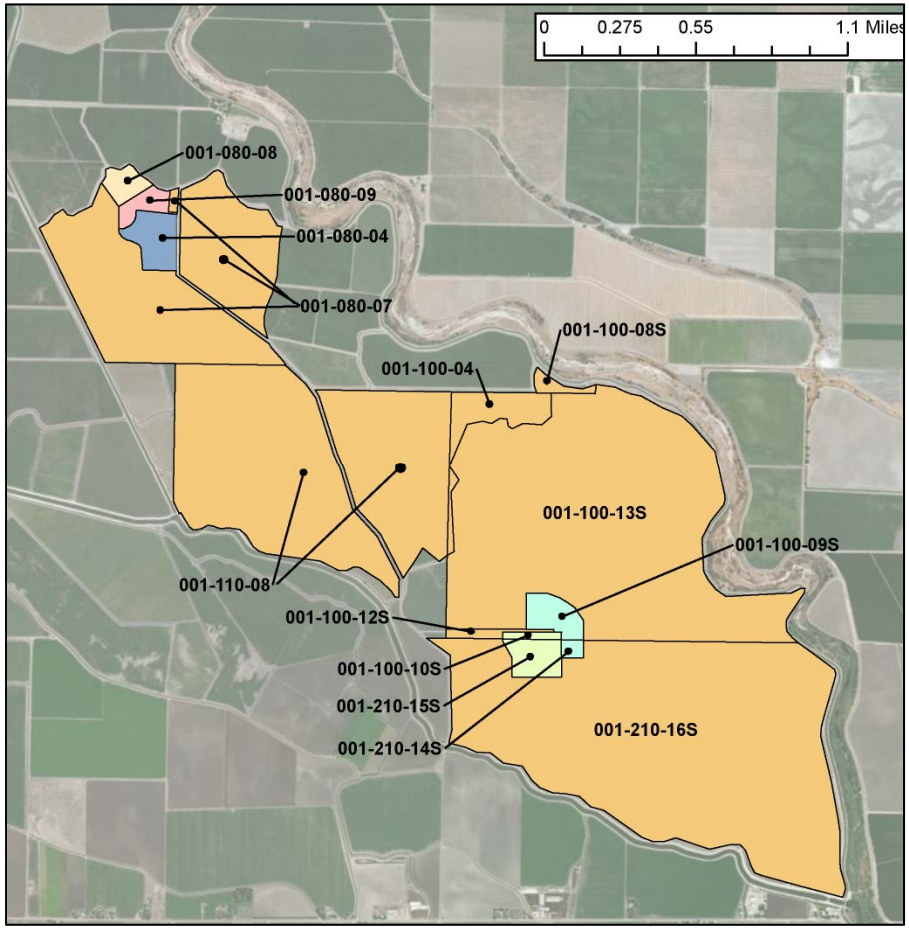


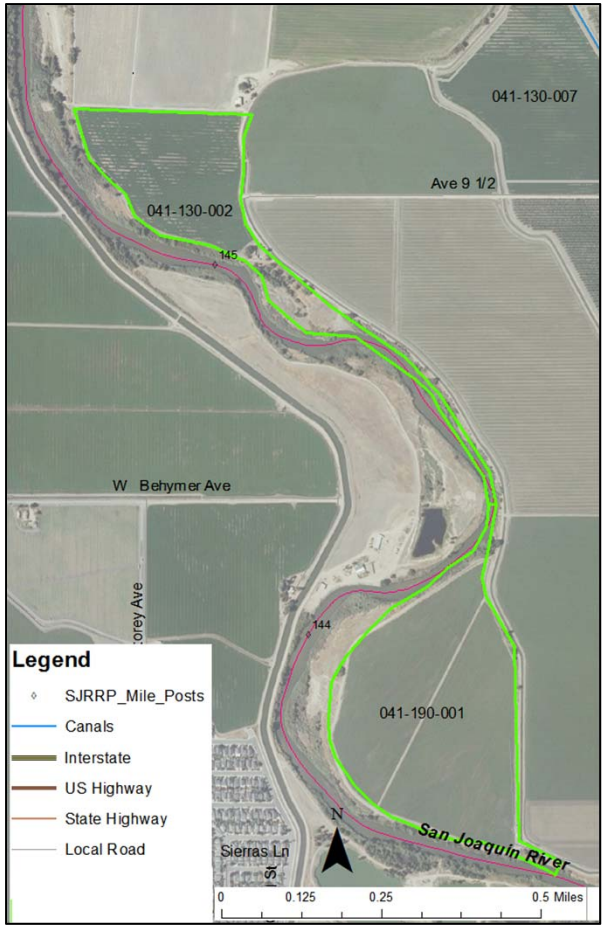


Preliminary draft – subject to change

Seepage Projects

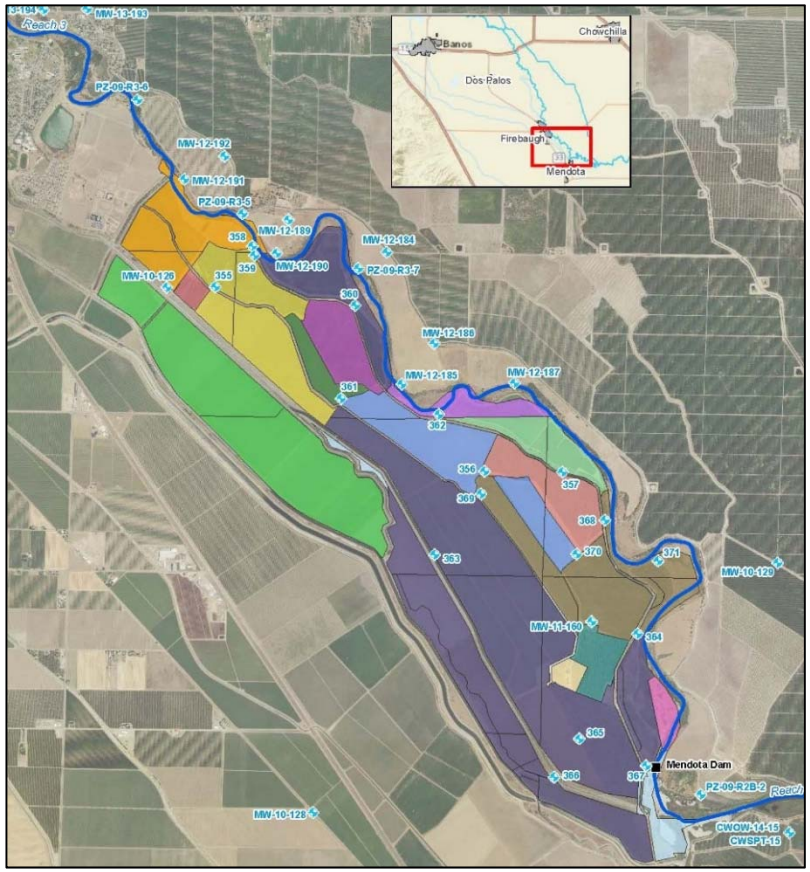
- 7 seepage projects currently being prepared for appraisal

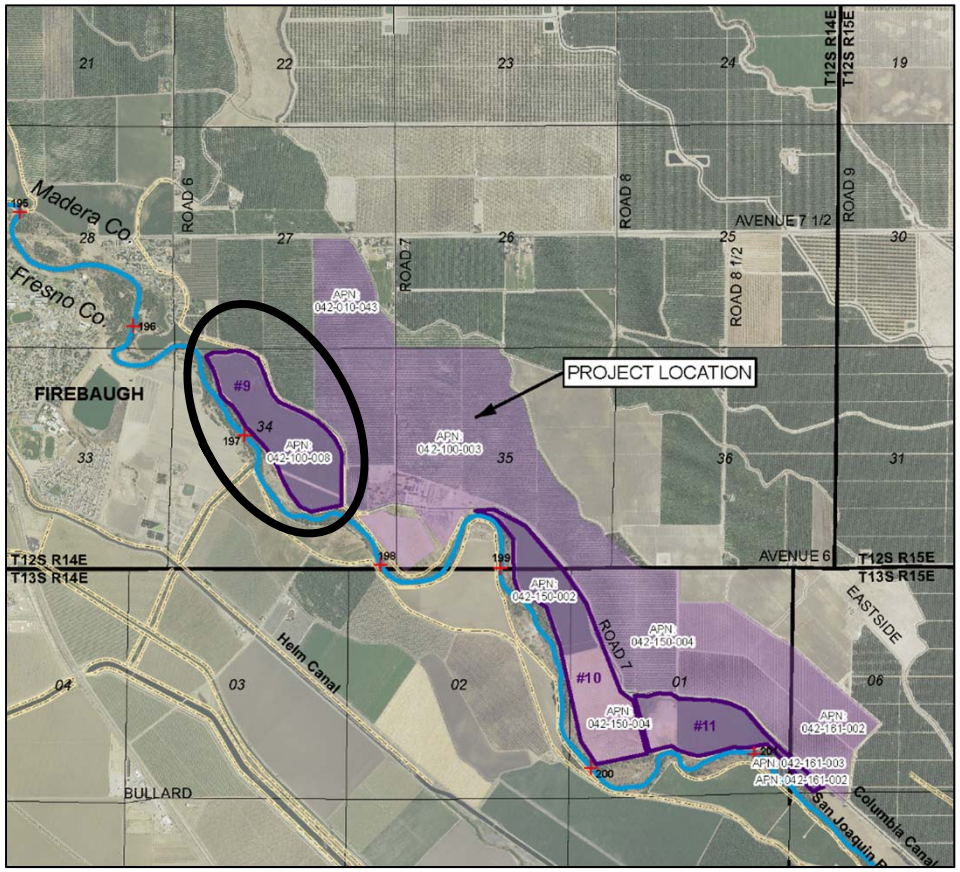




Seepage Projects

- 2 physical projects under consideration





Seepage Management Plan

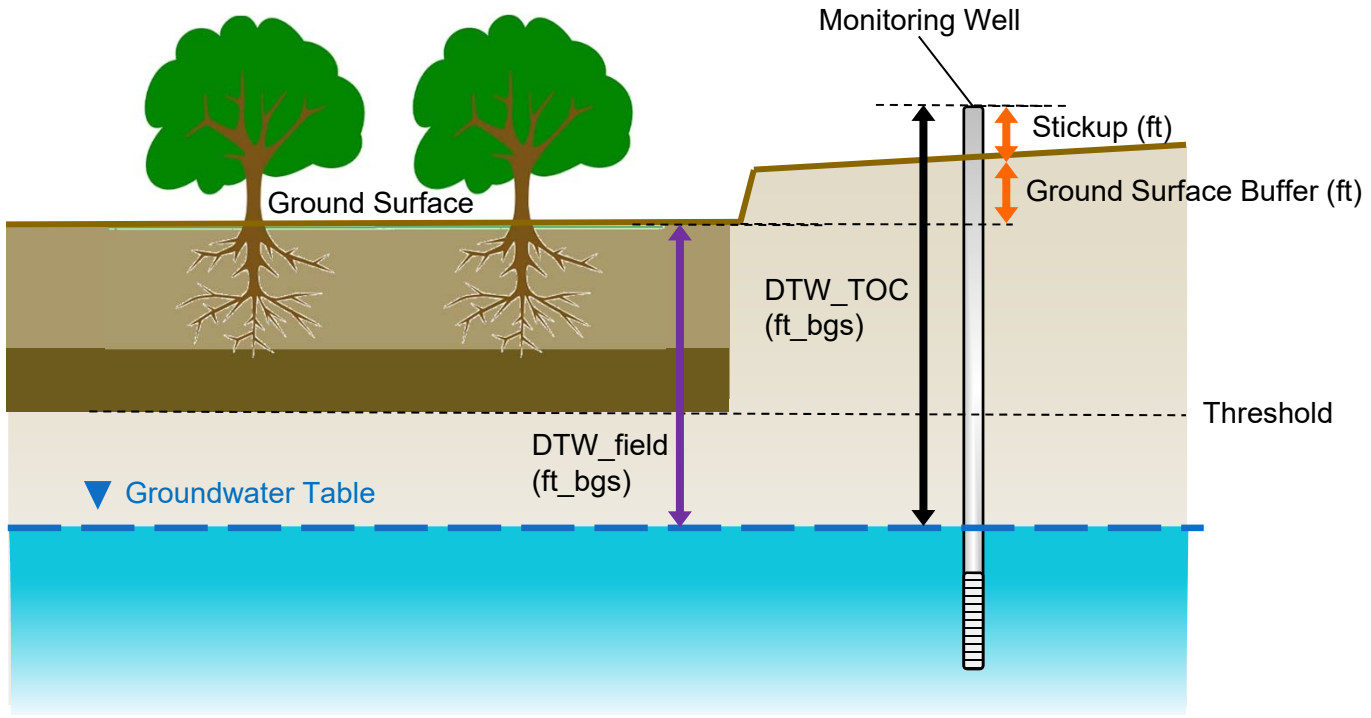
- Planned SMP Updates:
  - Appendix C: Areas Potentially Vulnerable to Seepage Effects
  - Appendix E: Monitoring Network
  - Appendix H: Groundwater Level Threshold
    - Include recently installed wells
    - Update crop type

Regina Story

ELEVATION SURVEYS

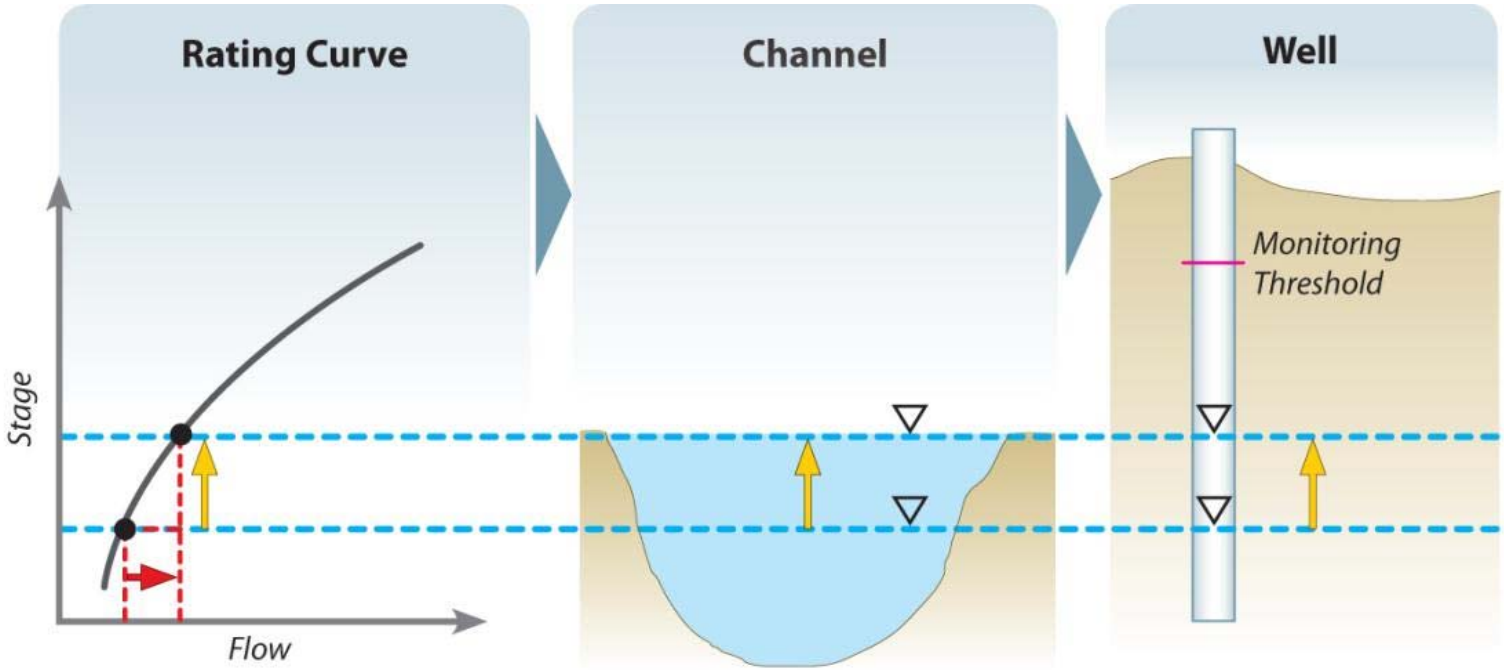
Importance of Elevation Data in SMP

- Managing to thresholds that are based on depth to water (DTW) measurements in wells
- Translating to field requires elevation data



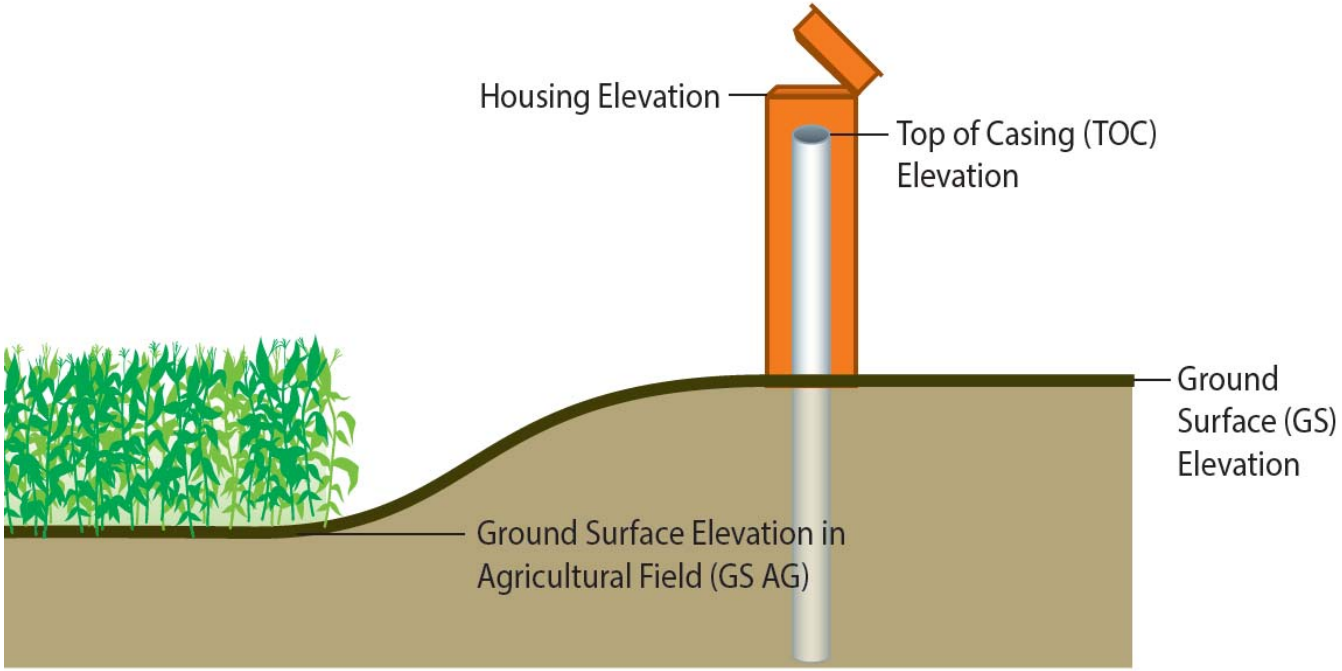
Importance of Elevation Data in SMP

- Flow Bench Evaluation
  - Projected elevation of the water surface is compared to groundwater elevation in the well when evaluating potential flow changes



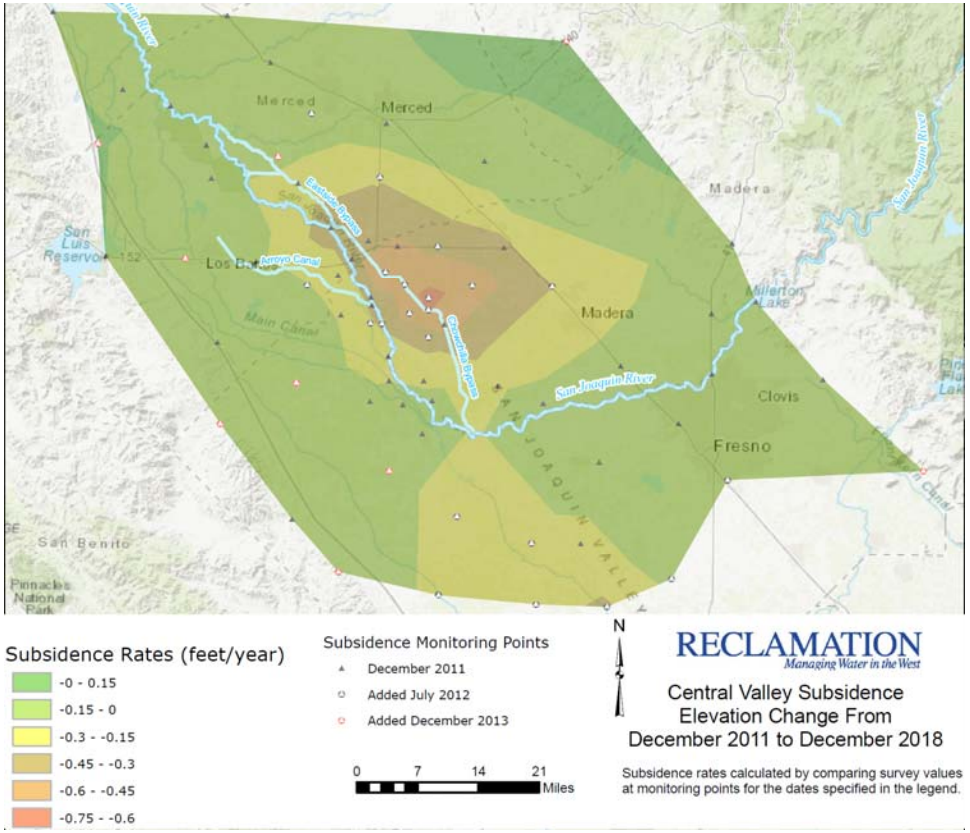
Elevation Surveys

- Collected elevation data, February - April 2019
- Resurveyed the groundwater monitoring network and key staff gage locations
- Results provided 4/17, currently under review



Other Elevation Data

- Most recent LiDAR: Fall 2015
- Biannual subsidence surveys
  - Available at: http://www.restoresjr.net/science/subsidence-monitoring/



Next Steps for Elevation Data

- QAQC of
  - 263 wells surveyed
  - 24 staff gauges surveyed
- No revisions to the SMP at this time
- Determine an approach to account for elevation changes that does not require continued re-surveying of the network

Regina Story

WRAP-UP, QUESTIONS

Contact

- SJRRP: Regina Story
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  - rstory@usbr.gov
- Seepage Concerns: Seepage Hotline
  - 916-978-4398
  - RestorationFlows@restoresjr.net