

# 2010 Impacts and Potential Other Impacts from SJRRP Flows

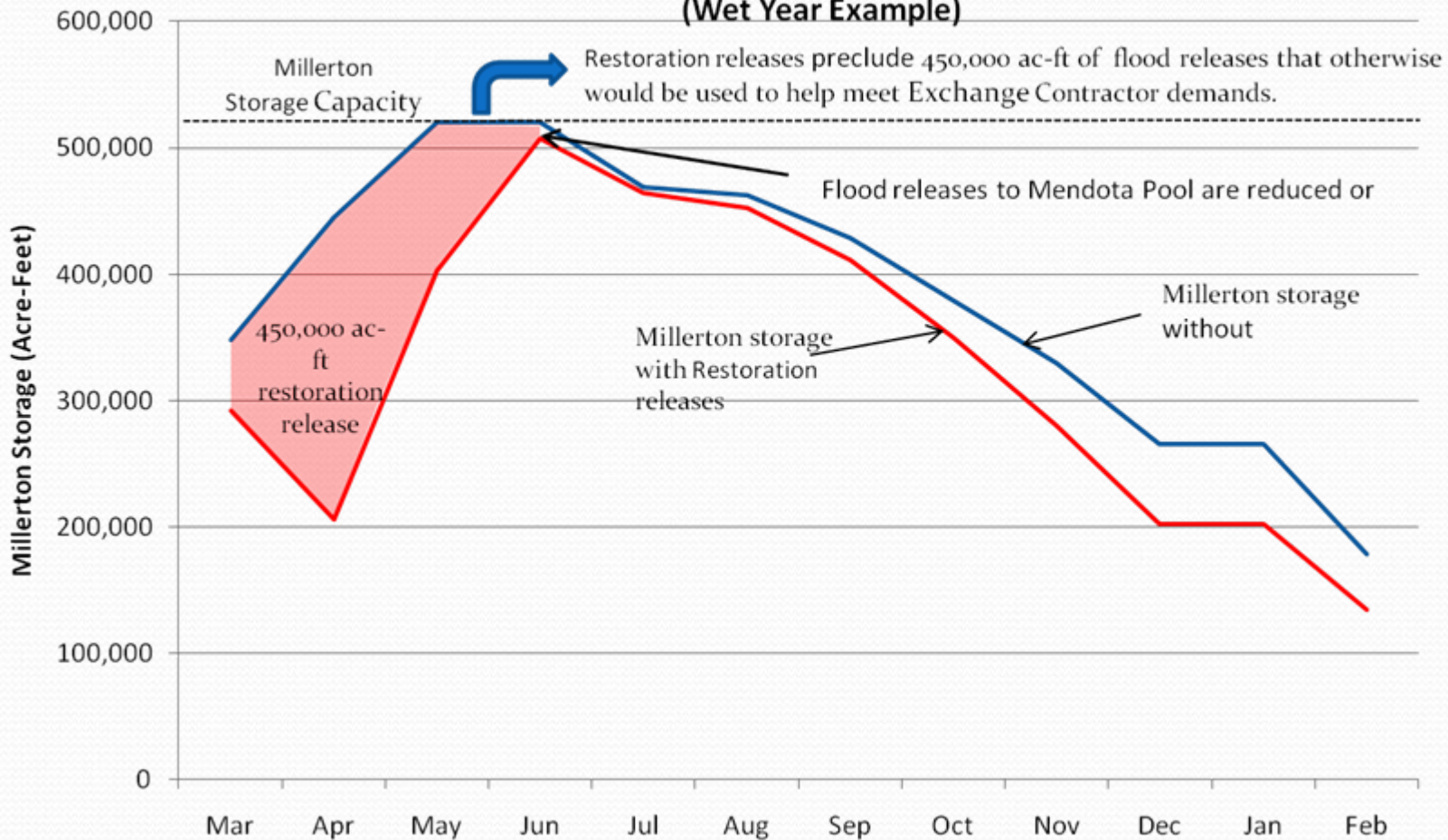
- **Millerton Re-Operation**  
Reduce availability of flood flows.
- **Reclassification of water in San Joaquin River**  
Potential to reclassify flood flows as “restoration flows”
- **Delta Pumps Re-Operation/Priority**  
Potential for Increased Delta pumping
- **San Luis Reservoir Priority**  
Reduced storage
- **Mendota Pool/Delta-Mendota Canal**  
Water quality/supply impacts
- **Seepage**  
Levee Failure and Crop Damage

# Millerton Re-Operation

- Change in operation of Millerton (increased release of stored water) will reduce frequency and duration of flood flows
- Thus the availability of San Joaquin River flood flows to meet demands of Exchange Contractors.
- Increased burden on CVP water pumped from Delta to meet demands of Exchange Contractors.
- Less water for others dependent upon CVP water pumped from the Delta.

# Millerton Re-Operation

Reduction of Flood Releases to Mendota Pool  
Due To Releases for San Joaquin River Restoration Program  
(Wet Year Example)



# Millerton Re-Operation

- Reclamation says re-operation of Millerton will reduce South of Delta CVP Contractors water supply by approximately 30,000 AF per year on average.

# Classification of Water in San Joaquin River

Will Flood Flows reaching Mendota Pool be reclassified as Restoration Flows or as flows available to Exchange Contractors?

# Re-Operation of Delta Pumps

- CVP and SWP operations are already constrained by pumping restraints/capacity
- Restoration Flows must be pumped at the Jones and Banks Pumping Plants after pumping all available water for S. of Delta CVP and SWP Contractors, including transfer and exchange water.
- Pumping of Restoration Flows must not displace pumping capacity from S. of Delta CVP and SWP Contractors.

# Re-operation of Delta Pumps

- Recapture of Restoration Flows could cause fish salvage.
- Increased fish salvage as a result of Recapture of Restoration Flow could limit pumping at other times, when attempting to move water for South of Delta CVP and SWP Contractors.

# San Luis Reservoir Storage Priority

- When San Luis Reservoir fills, there is an established priority of “spill” for various types of water in storage.
- Restoration Flow must have lowest priority.



# Water Quality Impacts

- The Delta Mendota Canal (DMC) and Mendota Pool (Pool) experienced water quality degradation in April of 2010.
- Interim Flow operations must be conducted in a manner that does not impact water quality in the lower Delta-Mendota Canal and in the Mendota Pool
- A Water Quality Response Plan must be in place to respond to similar occurrences in the future.

# Recapture and Recirculation Plan

- Place to provide No Harm assurances:
  - Establish a model to evaluate annually the with and without SJRRP operations
    - To determine water supply impacts due to changes in Millerton flood and New Melones operations.
    - To ensure flood flows will not be reclassified for Restoration Flows.
    - To establish recapture of Restoration Flow at the Delta pumps has the lowest priority.
    - To establish storage of Restoration Flows in the San Luis Reservoir to be the lowest priority. (First water to spill)
  - Provide measures to avoid or mitigate adverse impacts.

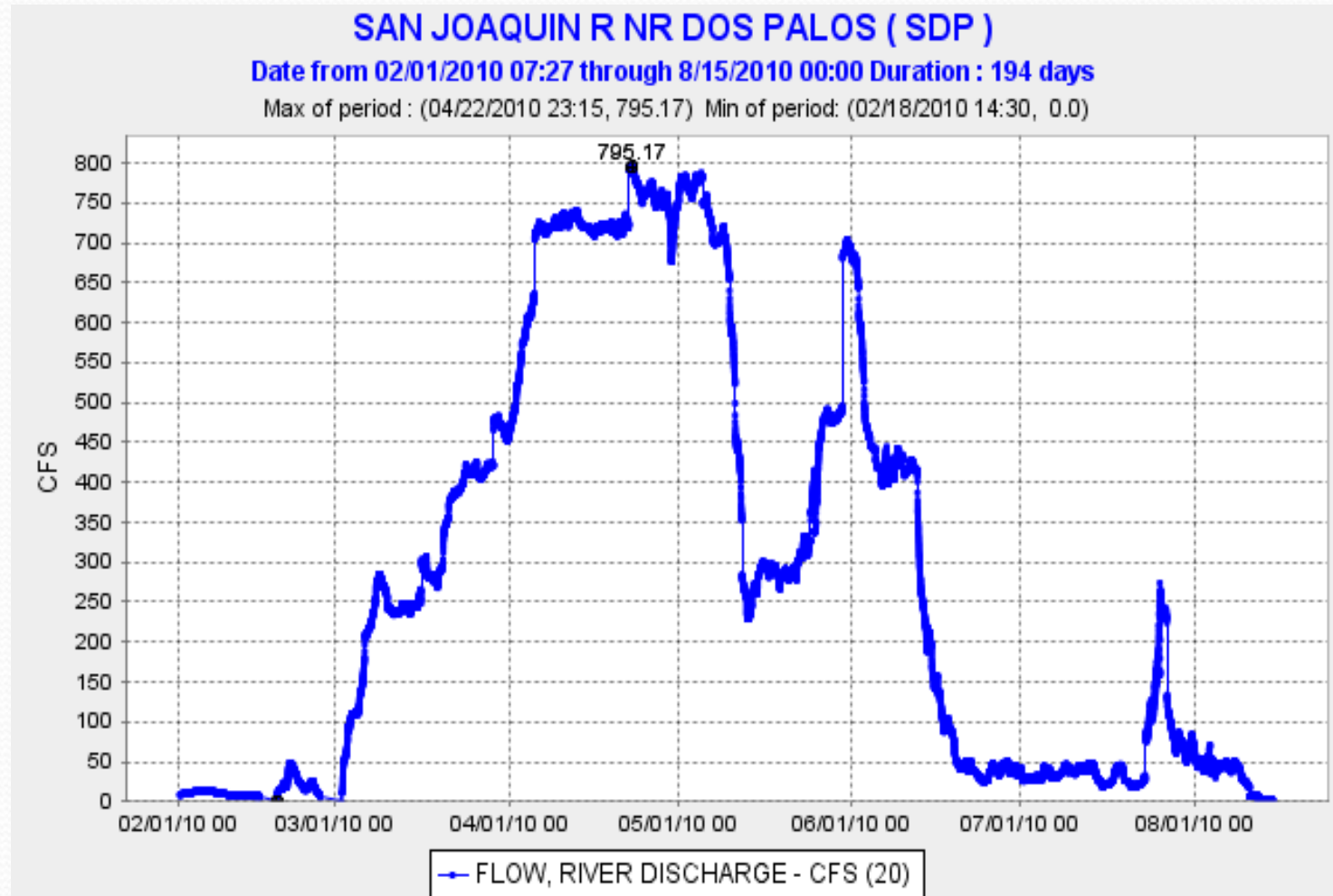
# Seepage Issues

## 2010 Interim Flows

- Levee failure in Reach 2B
  - Repaired by Columbia Canal Company
- Seepage caused high groundwater and elevated soil salinity resulting in crop damages in Reach 4A

# Flow over Sack Dam Causes High Water Near Washington

## Sack Dam is at the head of Reach 4A

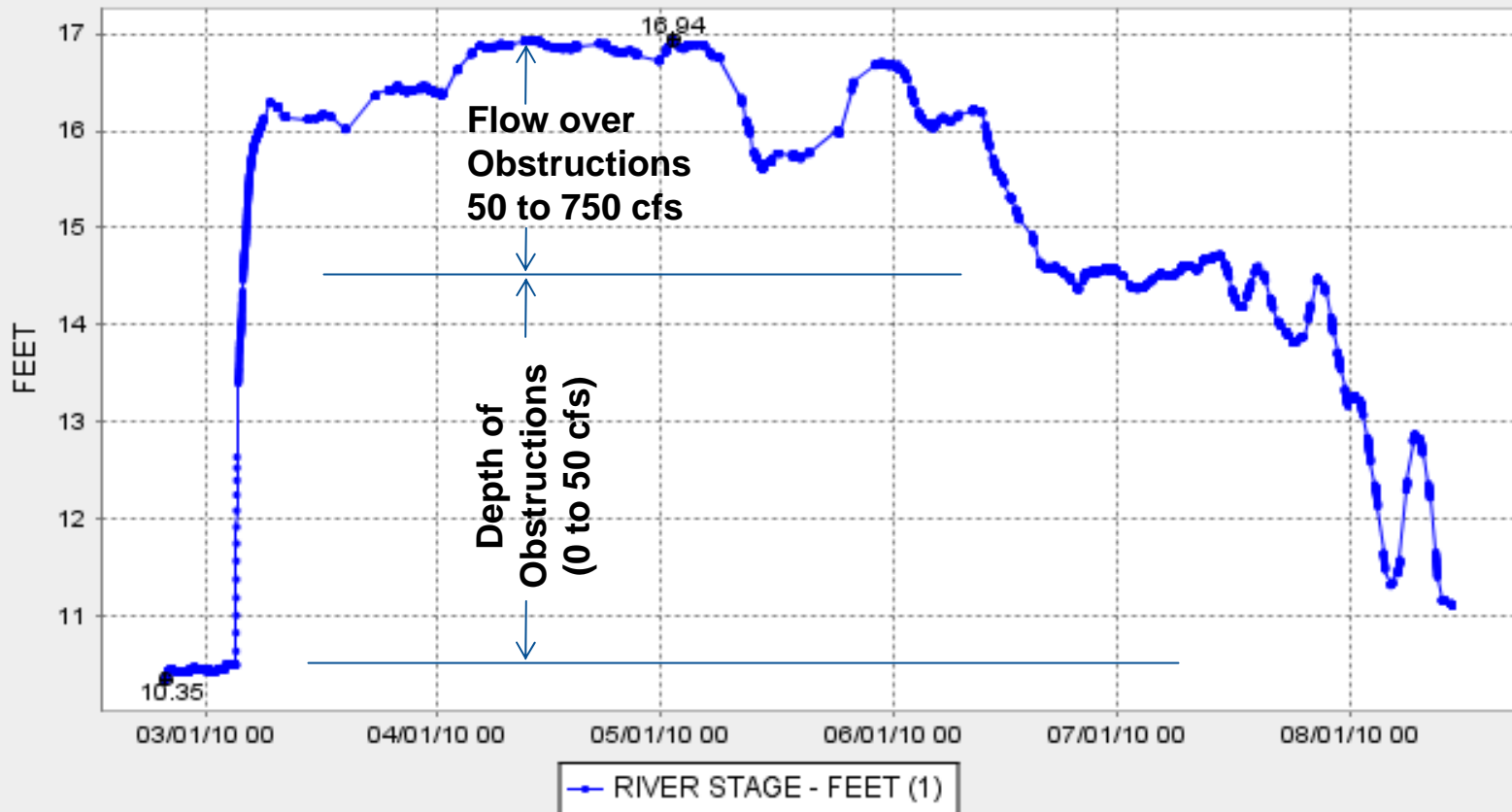


# High Water in the River near Washington Avenue due to Obstructions in Bypass

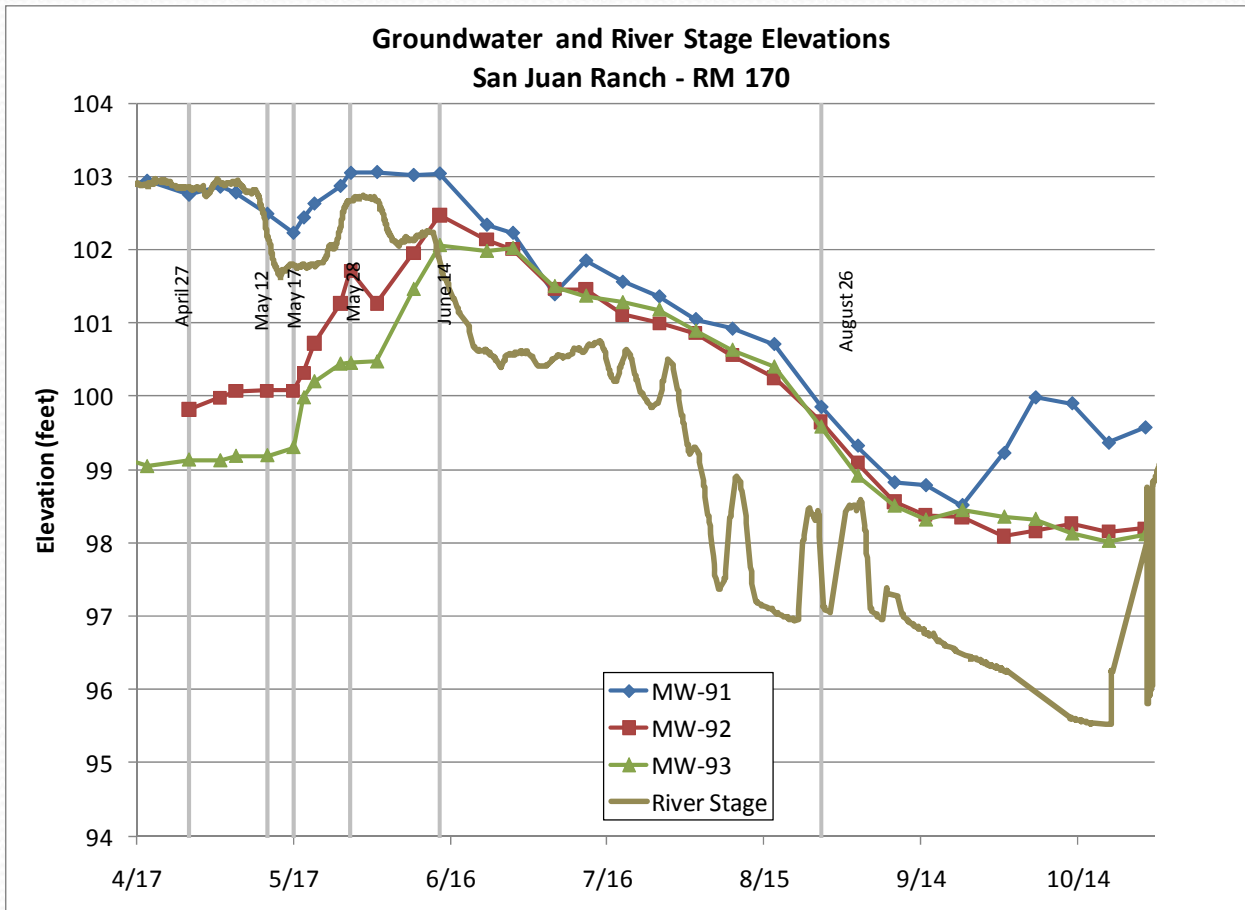
## SAN JOAQUIN R NR WASHINGTON RD ( SWA )

Date from 02/01/2010 07:27 through 08/15/2010 00:00 Duration : 194 days

Max of period : (05/02/2010 12:00, 16.94) Min of period: (02/23/2010 12:30, 10.35)



# Water Level Rise and Fall in the River Affected Water Table in Adjacent Fields

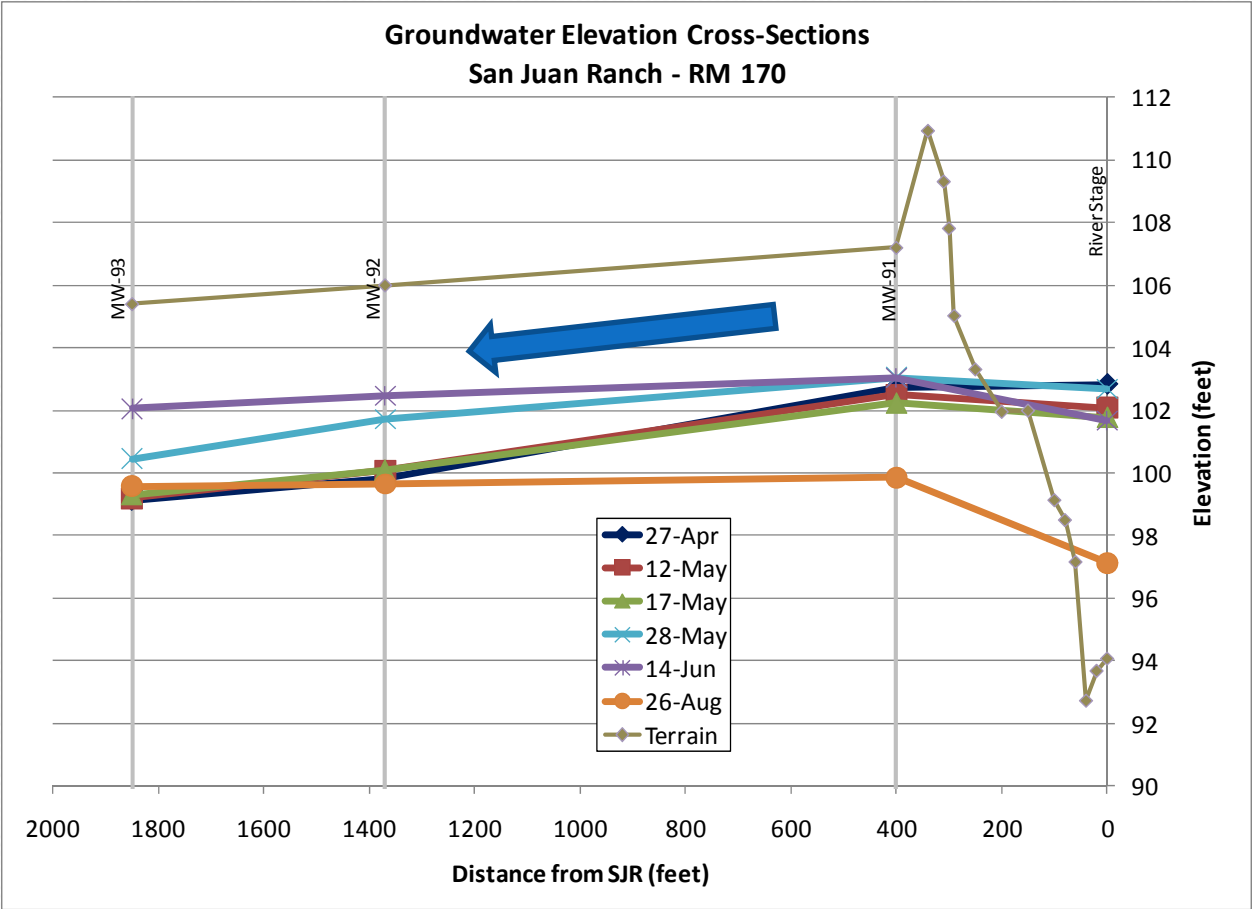


Courtesy USBR

# Sand Slough Control Structure



# Elevated Water Table Due to High River Levels



Courtesy USBR



# Impacts of the San Joaquin River Restoration Flows on Agricultural Fields Adjacent to Reach 4A

# Irrigation Training and Research Center

Beau Freeman, Ph.D.

Senior Water Resources Engineer

- Water Balance and Efficiency Studies
- Implementation of Modernization and Automation at Numerous California Irrigation Districts
- Drip Irrigation Expertise: Evaluation, Design Training, and Research
- Water Conservation, Salt Management, etc.

# Objectives

Independent analysis of fields in San Juan Ranch adjacent to Reach 4A to determine:

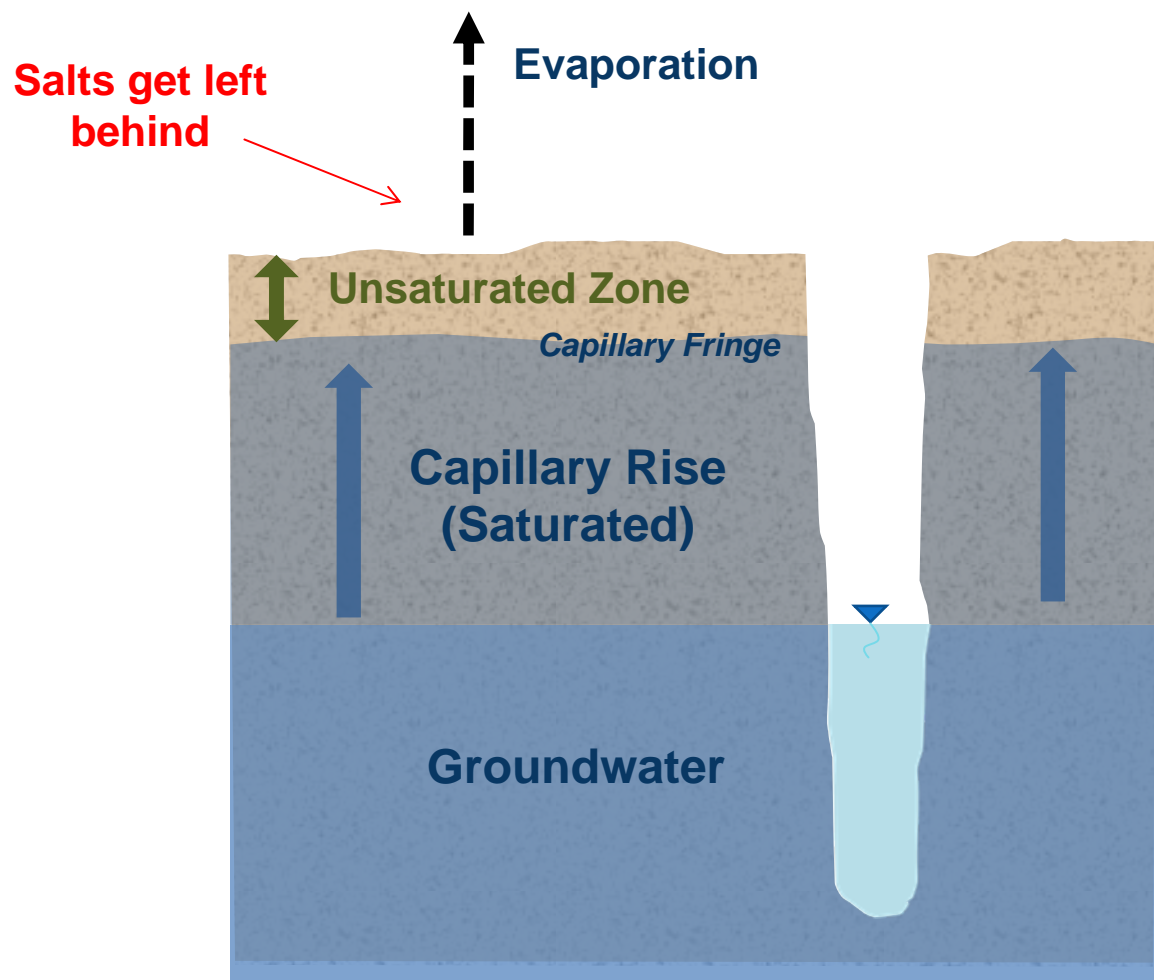
- Did negative impacts occur?
- What were the negative impacts?
- What were the likely causes of the negative impacts?
- What solutions might avoid negative impacts in the future?



# Main Findings

- The 2010 San Joaquin River Restoration flows caused an unusual rise in the field water table.
- The high groundwater water table, plus the capillary rise, raised the saturated and saline zones into the root zone.
- Tomato yields on fields adjacent to Reach 4A dropped significantly

# Capillary Rise



## Significant Yield Reductions occurred in 2010

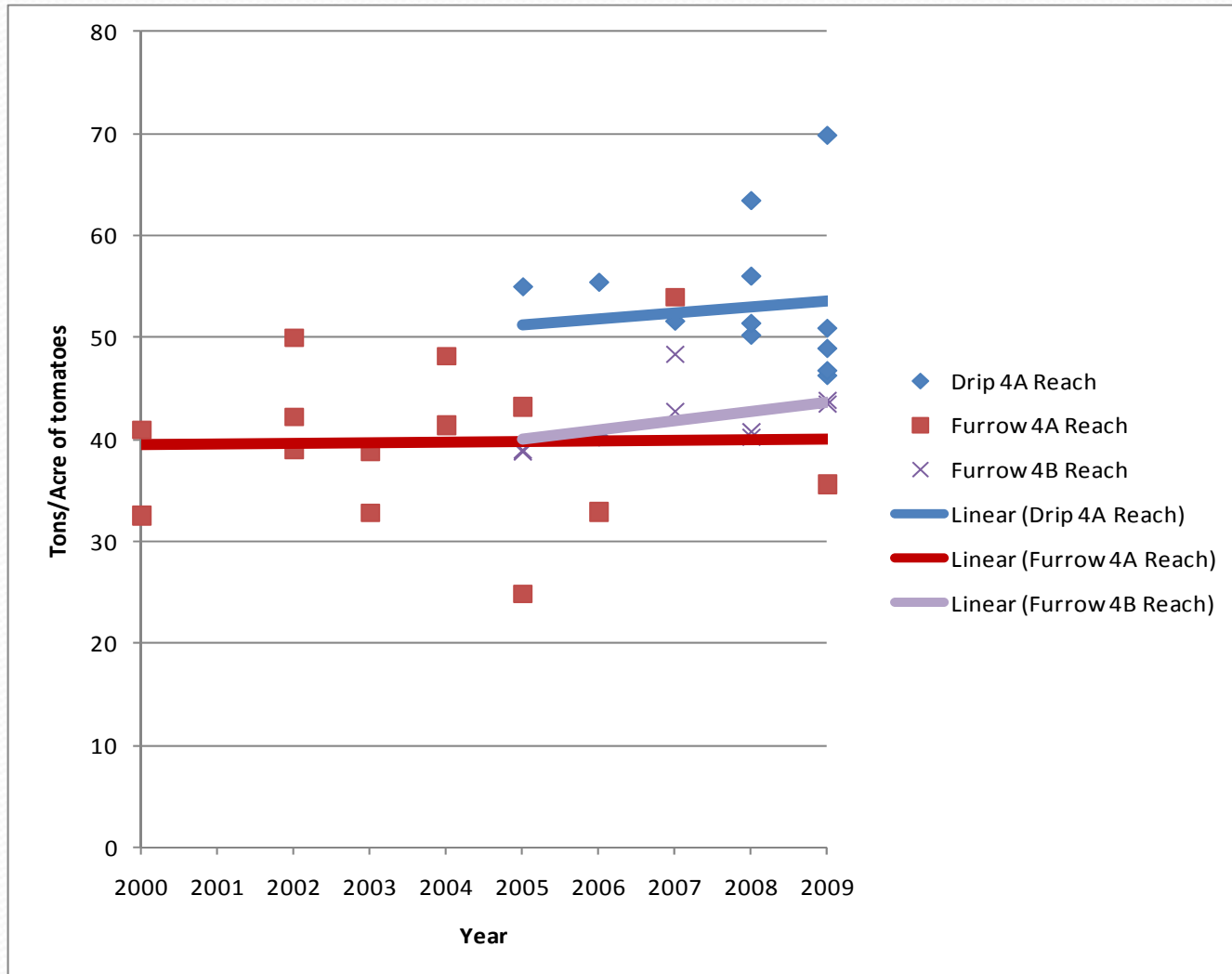
- No unusual management circumstances
- Similar farming conditions in Reach 4A and 4B
- No disease problems

# Reduced tomato yields in 2010

- Wide-spread observations of establishment (transplants, seeds) problems only on fields adjacent to Reach 4A



# Tomato yields for drip and furrow irrigated fields (2000-2009)



Source: San Juan Ranch

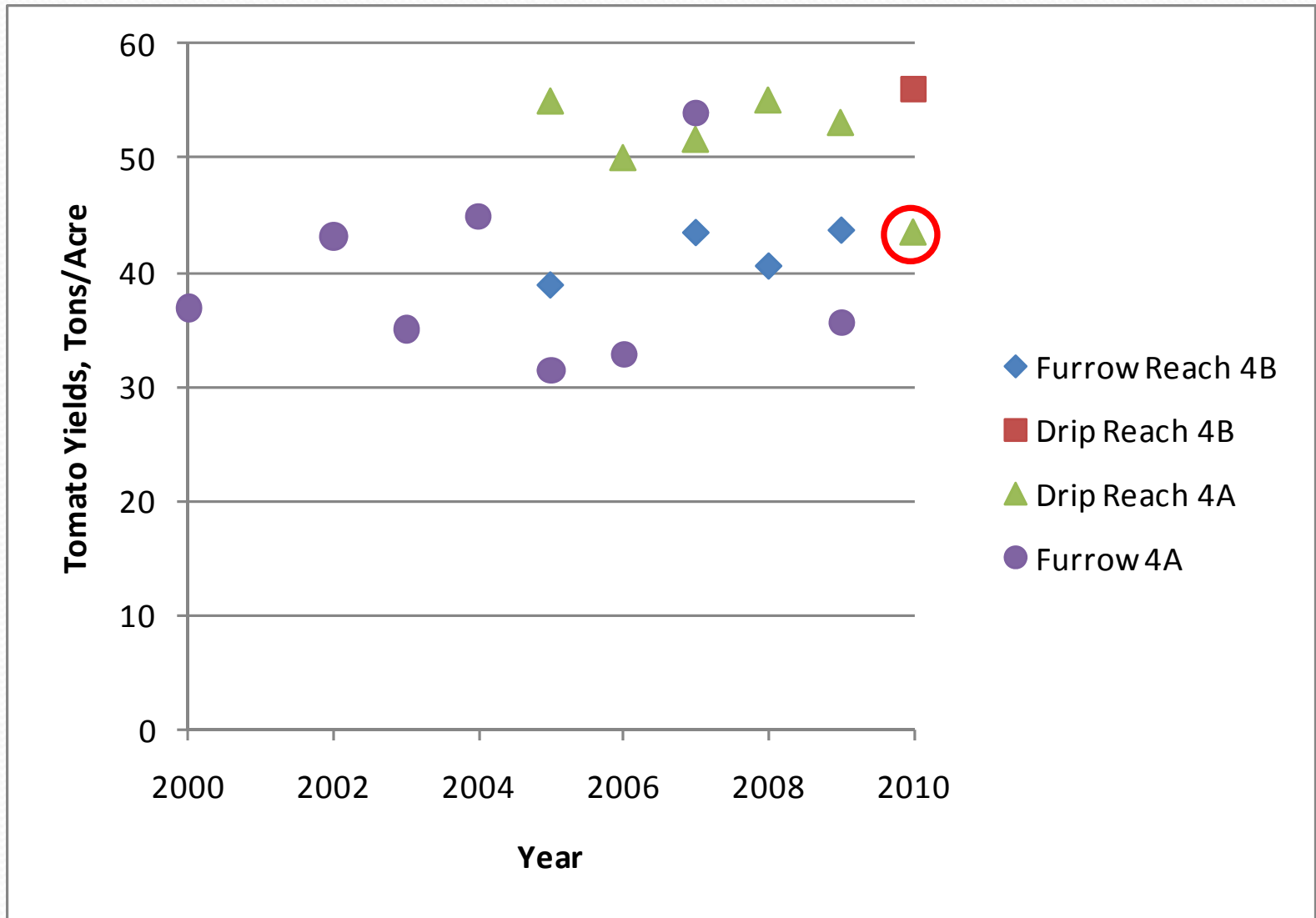
# Reduced tomato yields in 2010

- Wide-spread observations of germination problems only on fields adjacent to Reach 4A
- The historical tomato yields are similar for furrow irrigated fields on fields adjacent to Reach 4A and 4B

# Reduced tomato yields in 2010

- Wide-spread observations of germination problems only on fields adjacent to Reach 4A
- The historical tomato yields are similar for furrow irrigated fields on fields adjacent to Reach 4A and 4B
- Yields increased 12 tons/acre with conversion to drip irrigation

# Average tomato yields (2000-2010)



# Reduced tomato yields in 2010

- Estimated reduction beyond what would have occurred:  
about 15 tons/acre

## Considering:

- Typical drip tomato yields
- This was a “good year” for tomatoes

# Main Findings

- There is a saturated zone of soil above the water table due to capillary rise – this brings salt up into the root zone.

# Testing for Capillary Rise and Soil Salinity

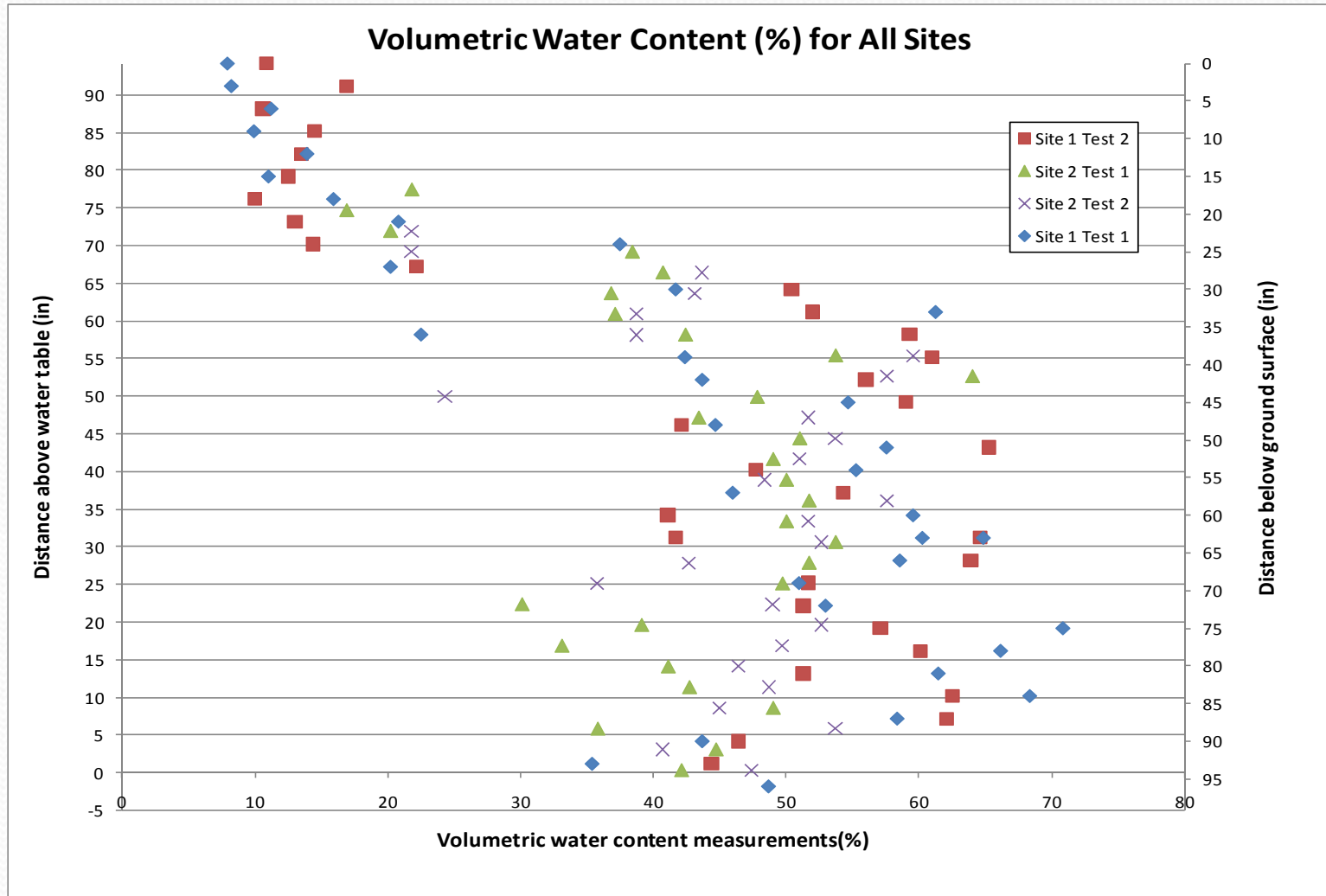


# Testing for Capillary Rise and Soil Salinity





# Moisture measured in backhoe pits (Oct. 2010)



# Recommendations

- The minimum threshold water table depth below the ground surface to avoid soil salinization and crop damage:

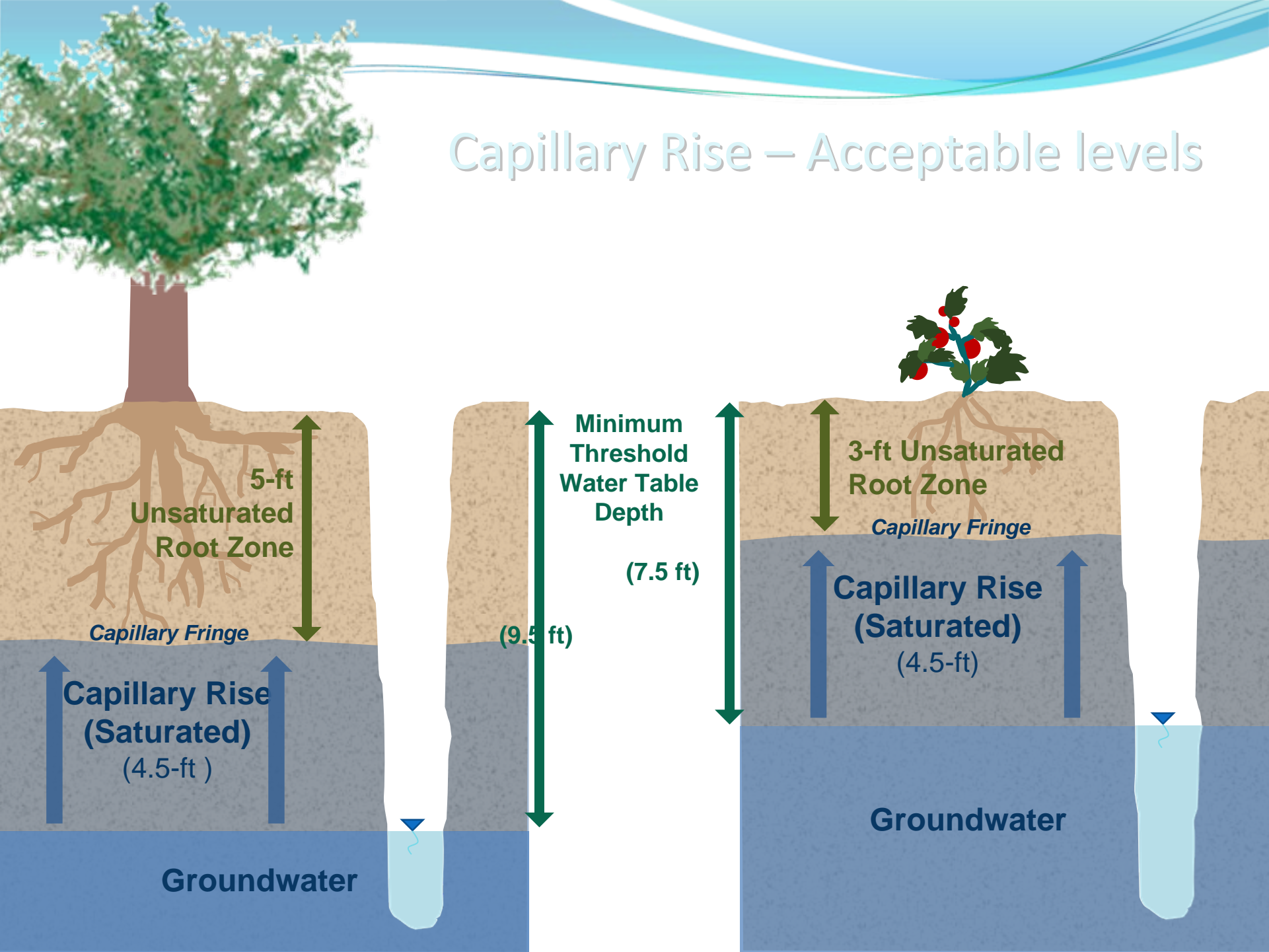
✓ Annual crops:

3-ft root zone + 4.5-ft capillary rise = 7.5 ft

✓ Permanent crops

5-ft root zone + 4.5-ft capillary rise = 9.5 ft

# Capillary Rise – Acceptable levels



# Summary

Both the San Luis & Delta-Mendota Water Authority and the San Joaquin River Exchange Contractor Authority supports the San Joaquin River Restoration Program (SJRRP).

The SJRRP is working cooperatively with the third parties to revise flow hydrographs to avoid further seepage, installing needed improvements to safely pass flow, examining potential mitigation projects, and working with the parties on a recirculation plan.

We need assurances from Reclamation that the implementation of the Program will be done in a manner to avoid or mitigate for all third party impacts.