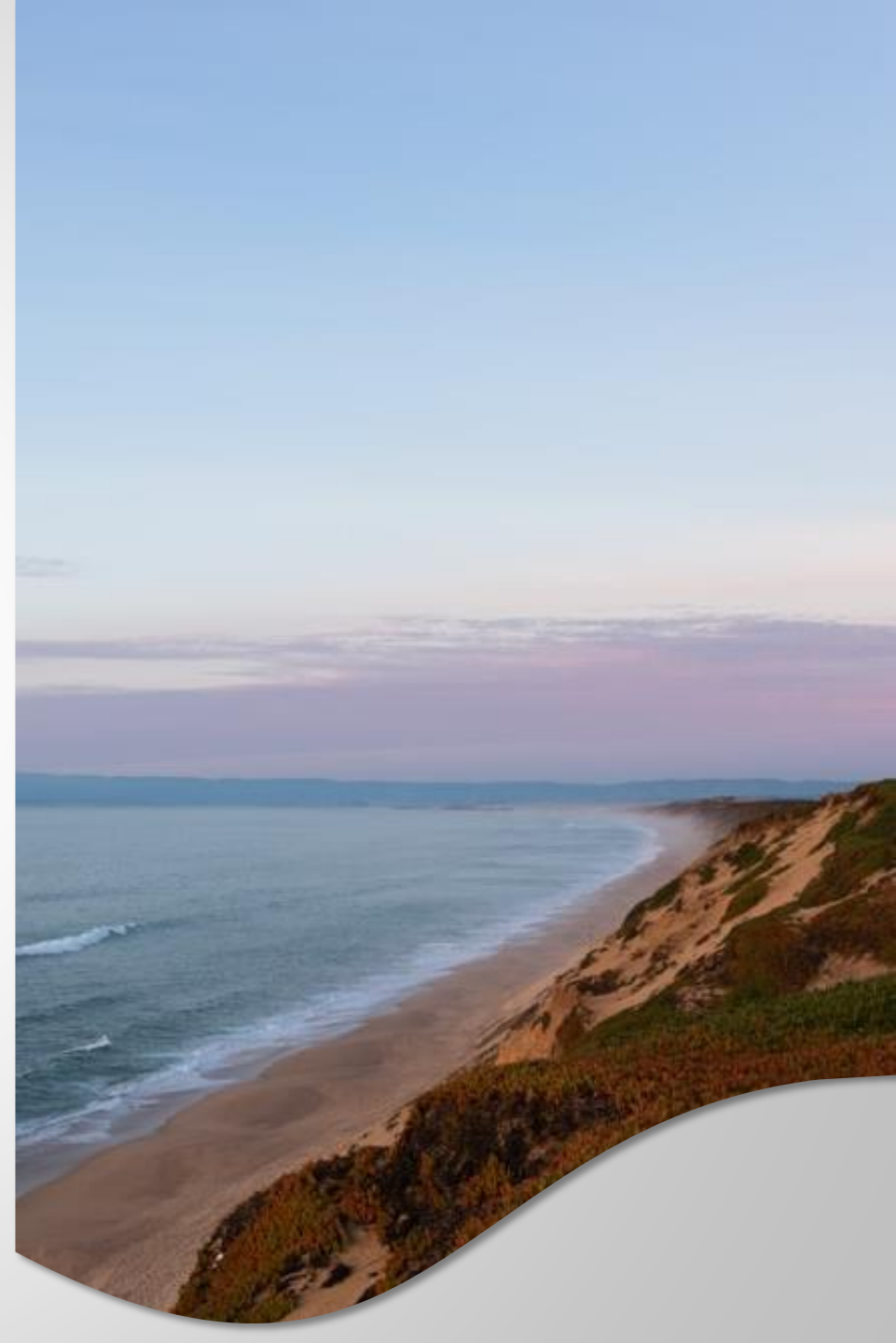
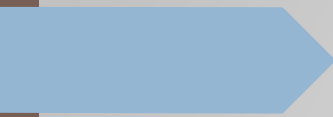


# Salinas Valley Basin GSA SWIG Meeting

## Seasonal Release with ASR

October 25, 2021





## The Second in Our Series of Projects that Could Control Seawater Intrusion

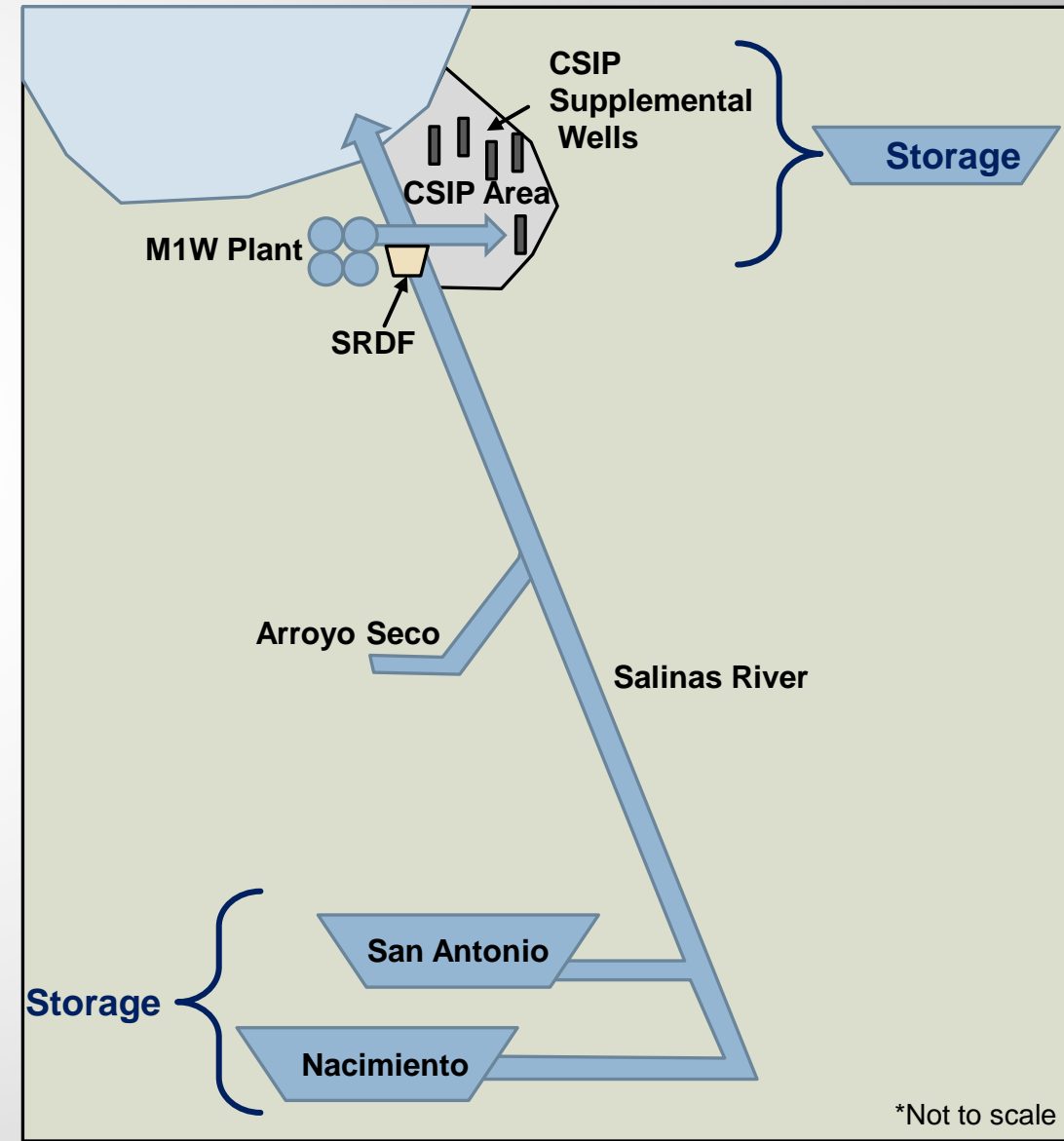
- Present a conceptual understanding of the ASR Project
- Somewhat more complicated than extraction barrier
- Various benefits – this group will focus on SWI benefits
- Has not been discussed by the SWIG TAC

Looking for feedback/questions on the project concept to ensure SWIG understands the SWI control options

# Concept

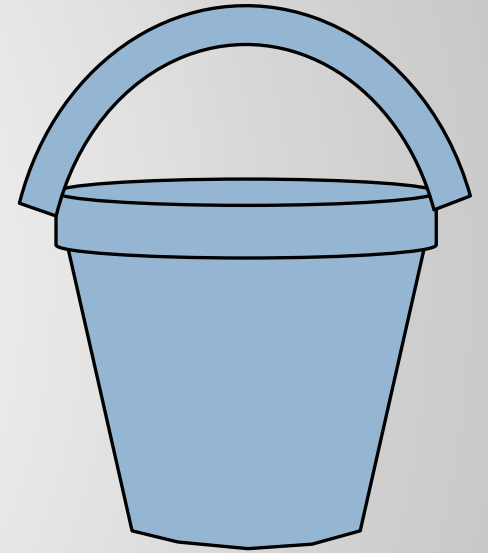
- Seasonally store water at the Valley's north end using existing aquifer space
- More effectively use existing water and facilities
  - Move water from south to north **December through June**
  - Store water in Northern Salinas Valley
  - Use stored water instead of dry season releases

Generalized Operations  
Many Details not Shown



## Summary of Potential Benefits

- Recharge to reduce or halt seawater intrusion
- More reservoir carryover
- Regular annual releases
- Improved fish flows
- Reliable CSIP supplies
- Less water for invasive species
- Provide functional flows more akin to natural river flows



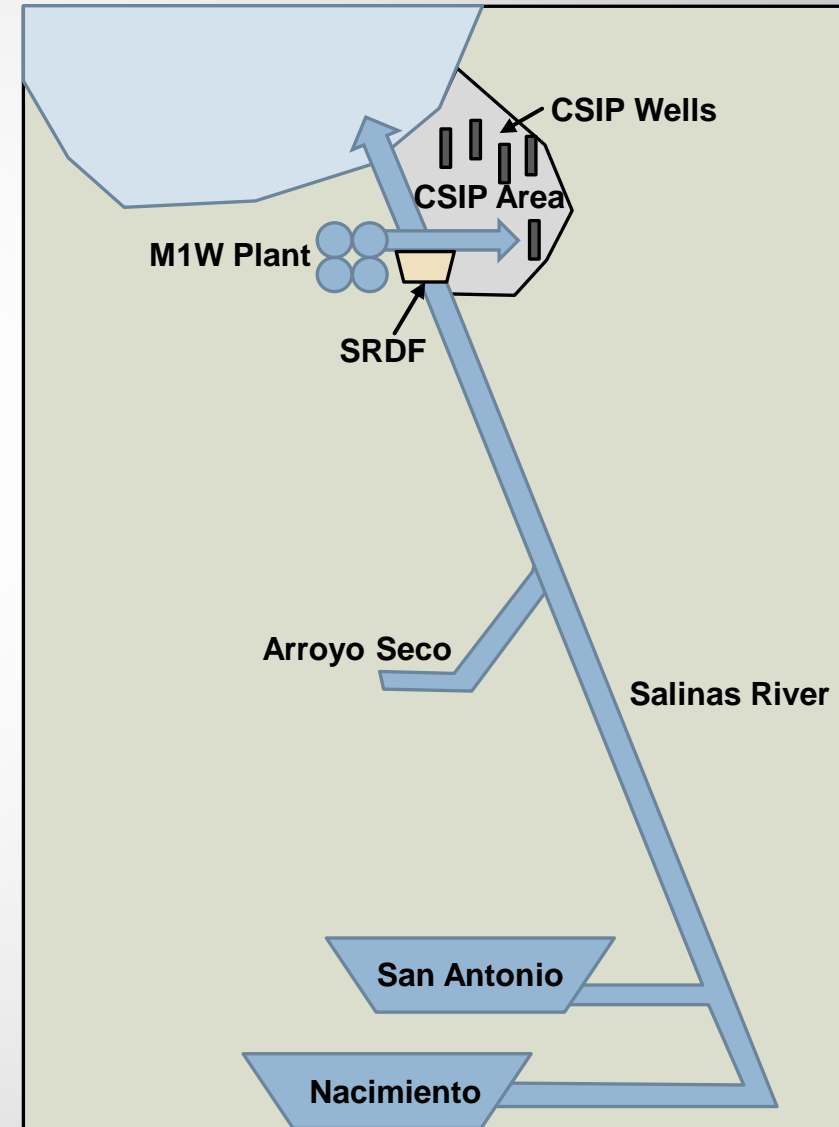
# Current Conditions and Operations



# Current Water Infrastructure

Generalized Operations  
Many Details not Shown

- San Antonio and Nacimiento Reservoirs
- Salinas River
- Arroyo Seco
- SRDF
- M1W recycled water
- CSIP Distribution System
- CSIP Supplemental Wells

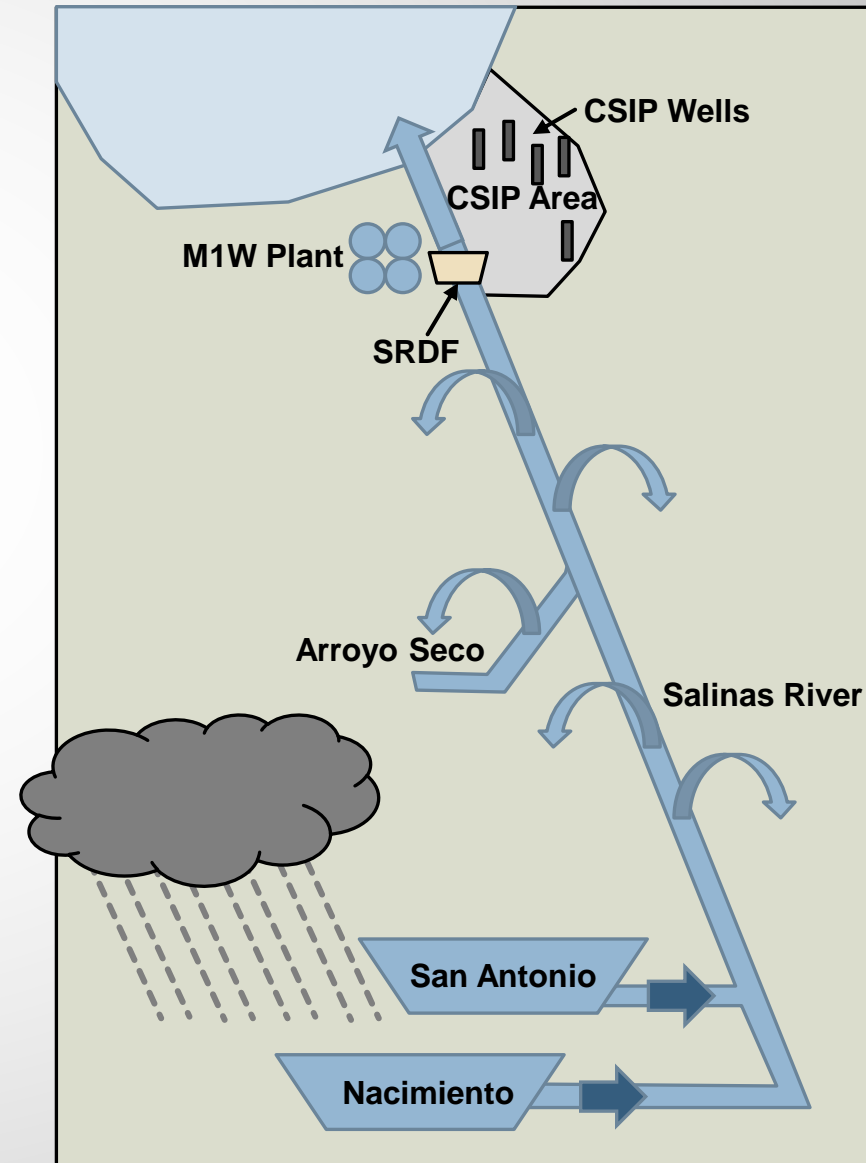


\*Not to scale

# Current Water Operations: Wet Months

Generalized Operations  
Many Details not Shown

- Storms fill reservoirs
- Reservoir releases for flood control and environmental flows
- Full river recharges aquifers
- Flow from Arroyo Seco
- No diversions at SRDF
- CSIP supplied by supplemental wells

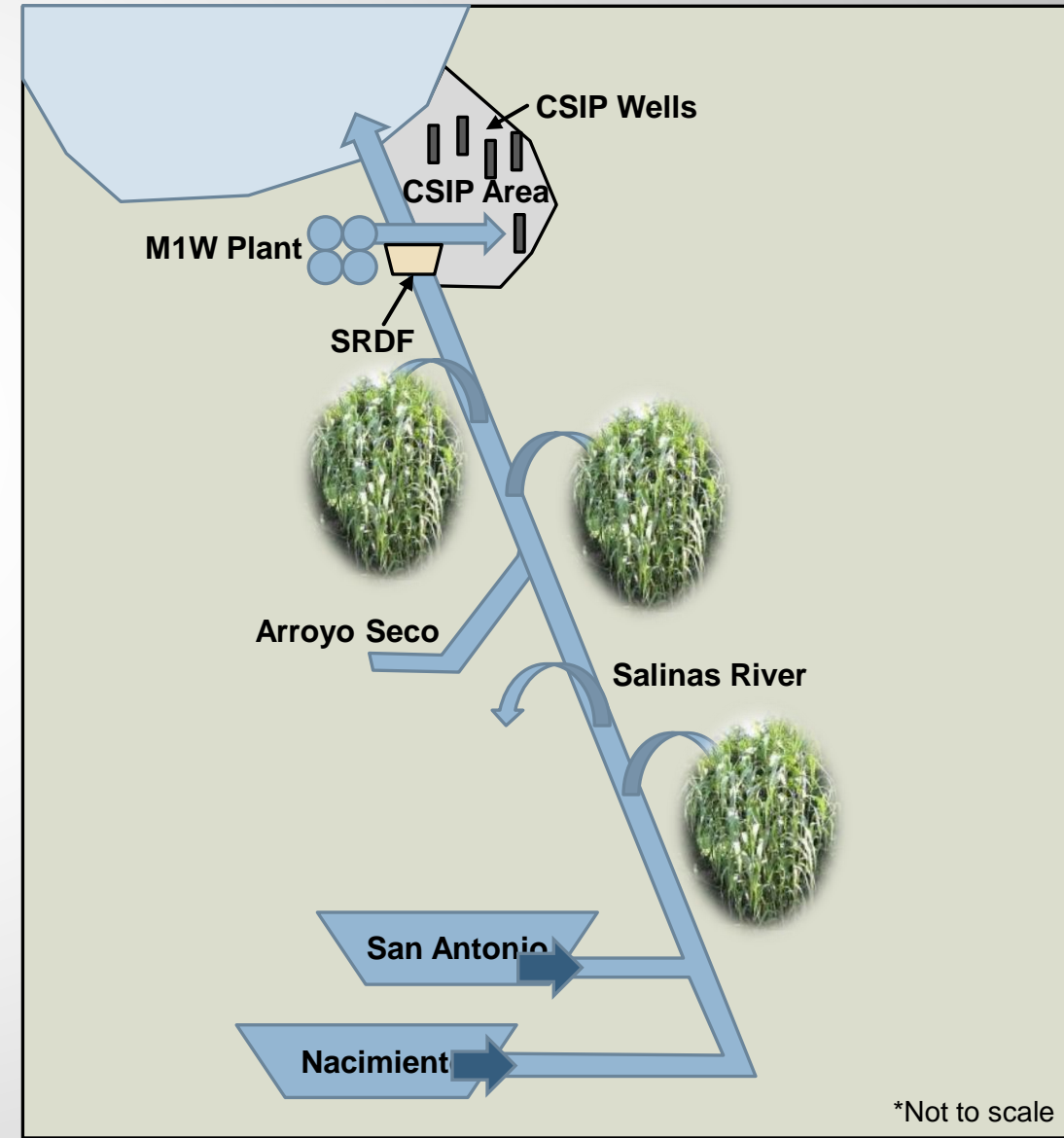


\*Not to scale

# Current Water Operations: Dry Months

Generalized Operations  
Many Details not Shown

- ➔ Conservation releases from reservoirs
- ➔ Full river recharges aquifers during pumping season
- ➔ No flow from Arroyo Seco
- ➔ Invasive species absorb water



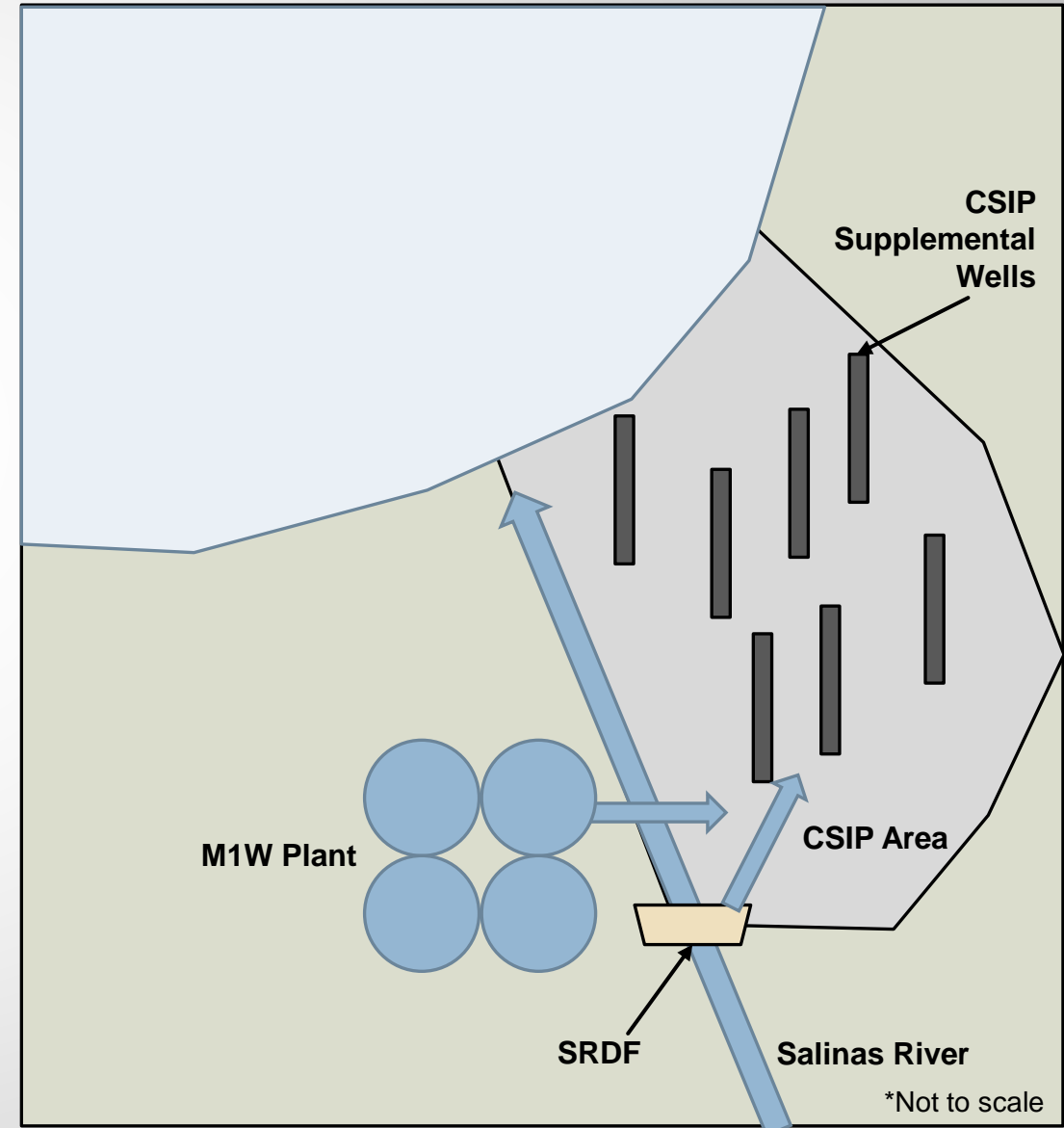
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# Current Water Operations: Dry Months

Generalized Operations  
Many Details not Shown

- ➔ Diversion at SRDF, delivered to CSIP
- ➔ Recycled water delivered to CSIP
- ➔ Supplemental Wells pump groundwater for CSIP
- ➔ Flow to lagoon



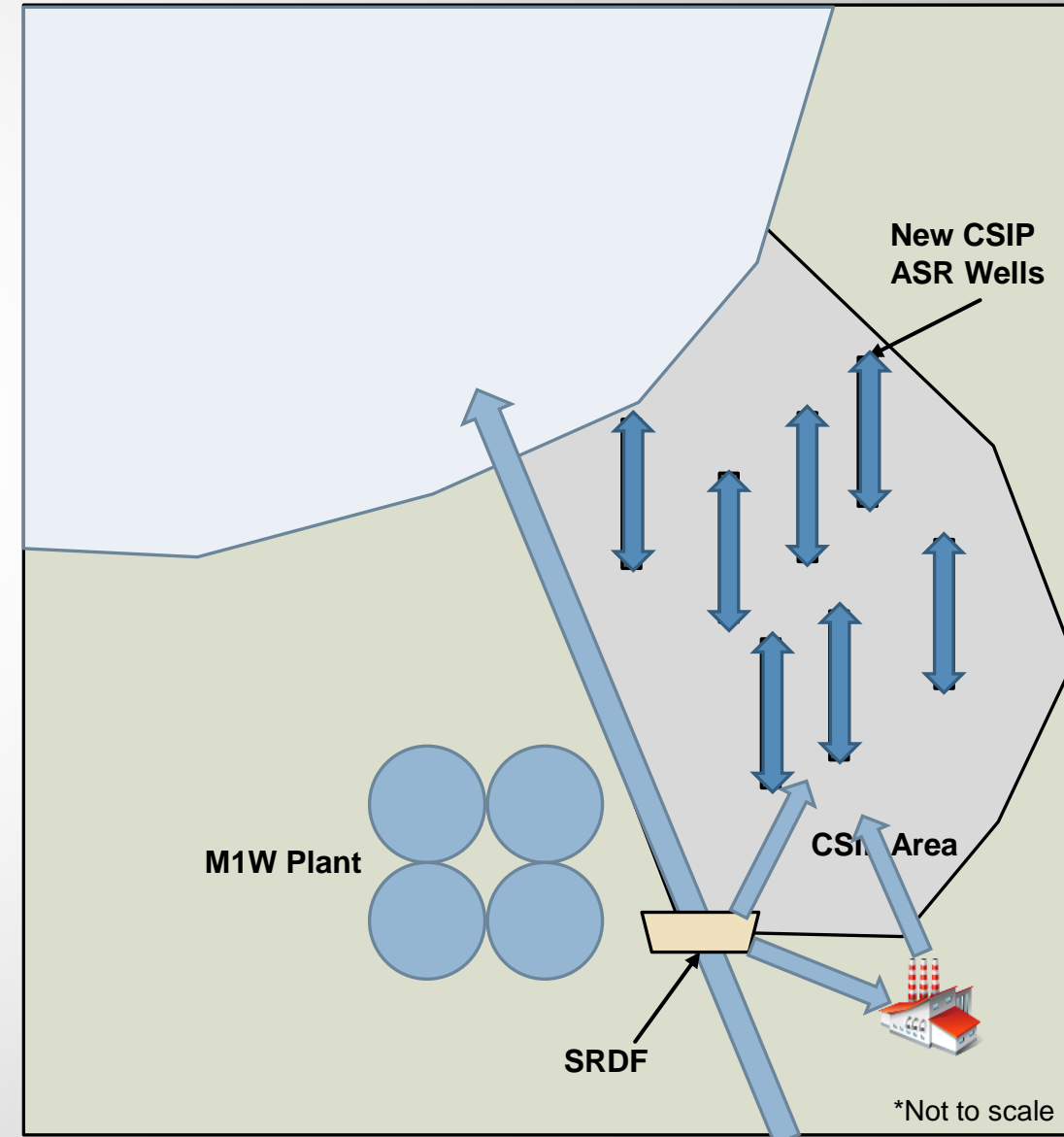
# Proposed Infrastructure and Operations



# New Water Infrastructure

Generalized Operations  
Many Details not Shown

- ➔ Replace CSIP Supplemental Wells with Aquifer Storage and Recovery (ASR) wells
- ➔ Add water filtration plant between SRDF and CSIP

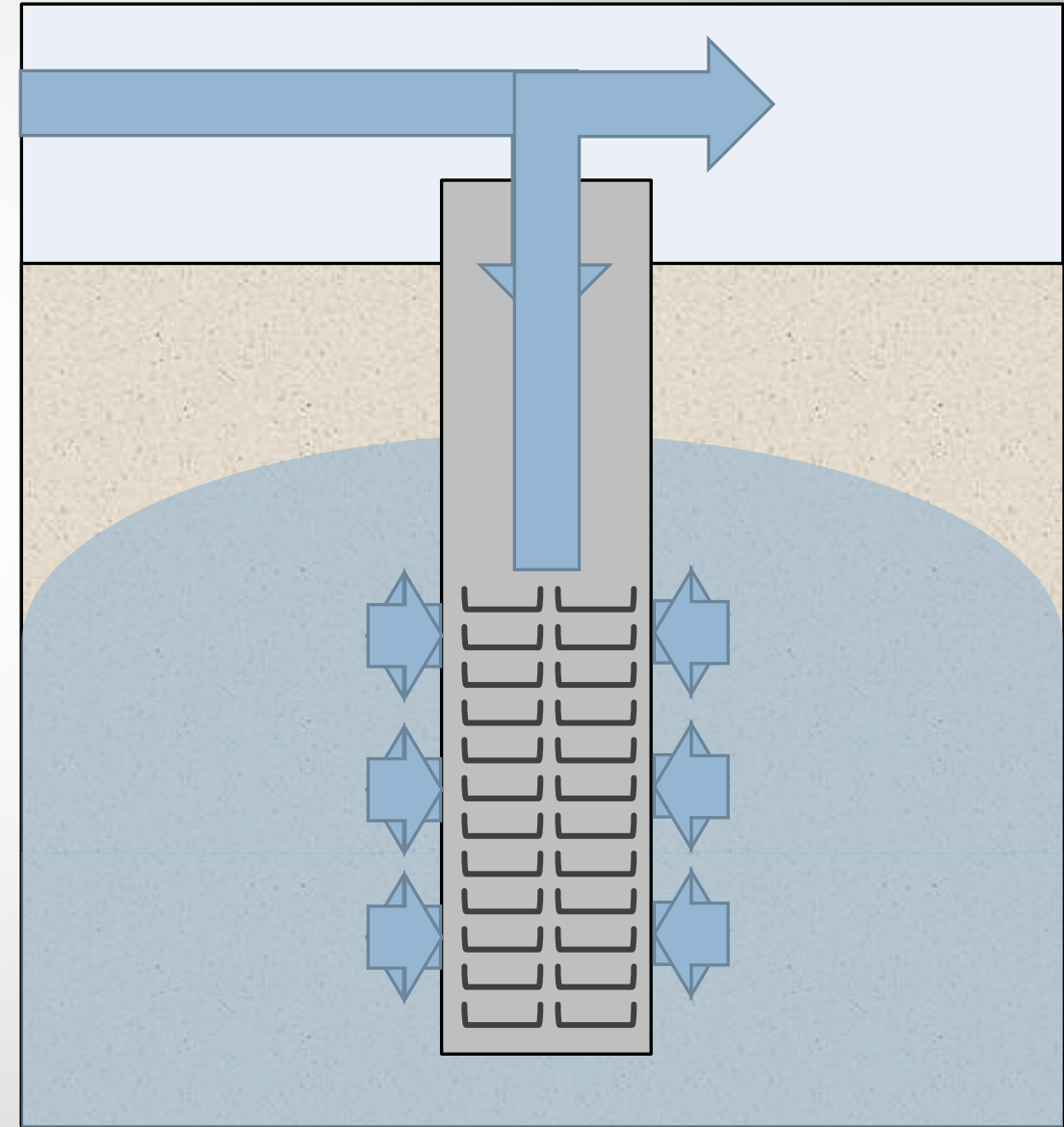


# New Water Infrastructure

## ASR Wells

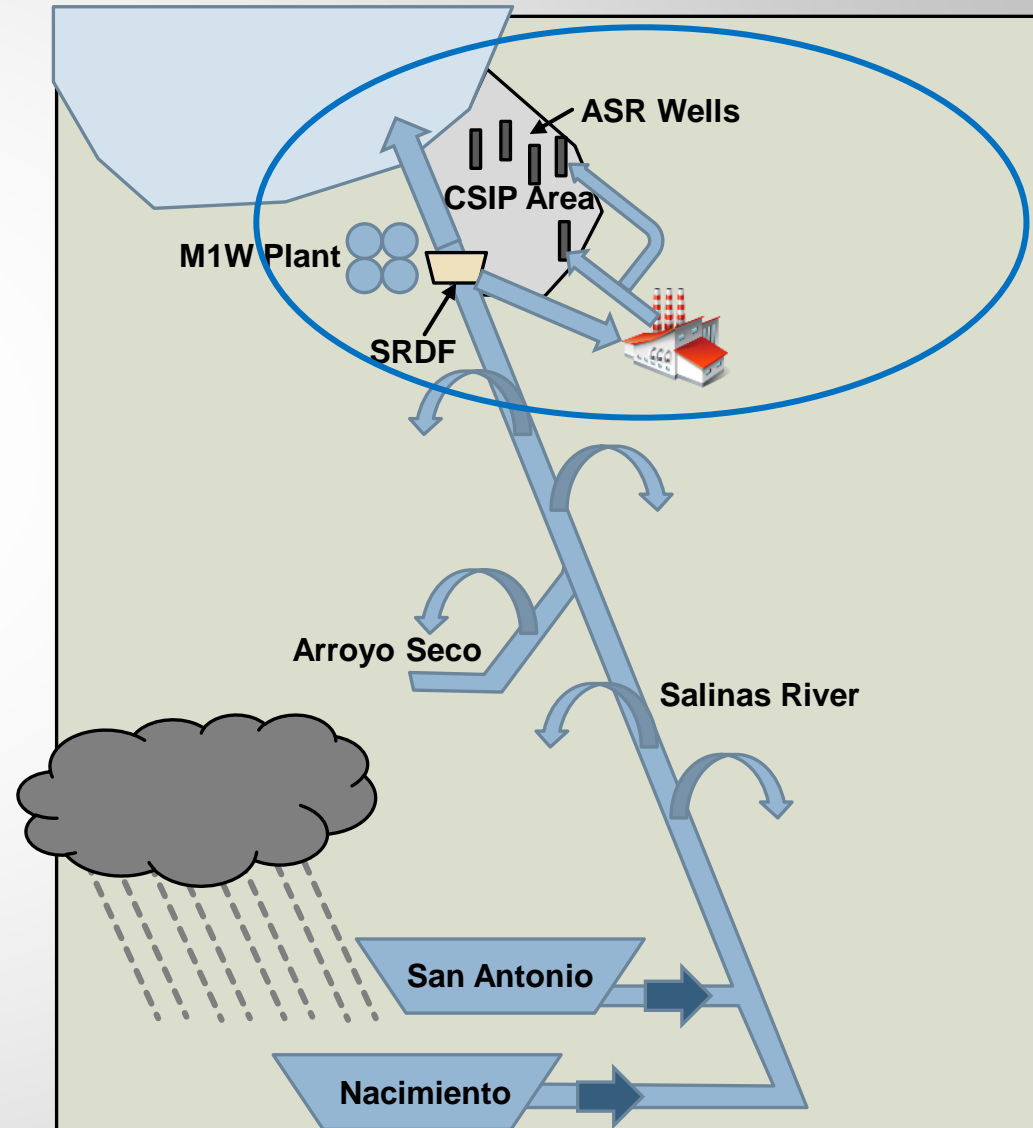
- Wet season recharge
- Dry season extraction
- Use the space in the aquifer as the reservoir

Generalized Operations  
Many Details not Shown



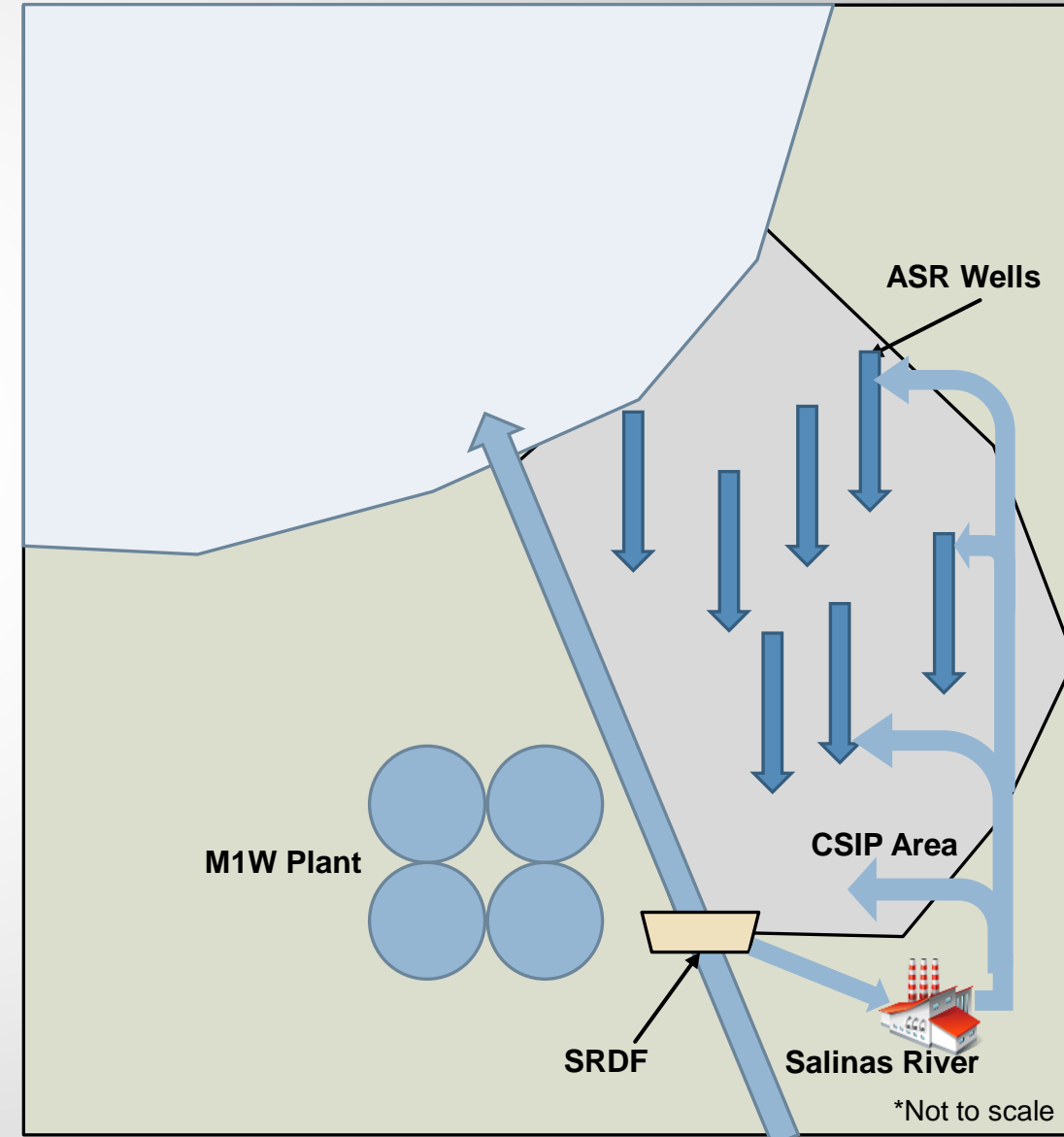
## Proposed Water Operations: Dec. - June

- Storms fill reservoirs
- Reservoir releases for flood control, environmental flows, and SRDF diversion
  - This effectively increases environmental flows
- Full river recharges aquifers
- Flow from Arroyo Seco



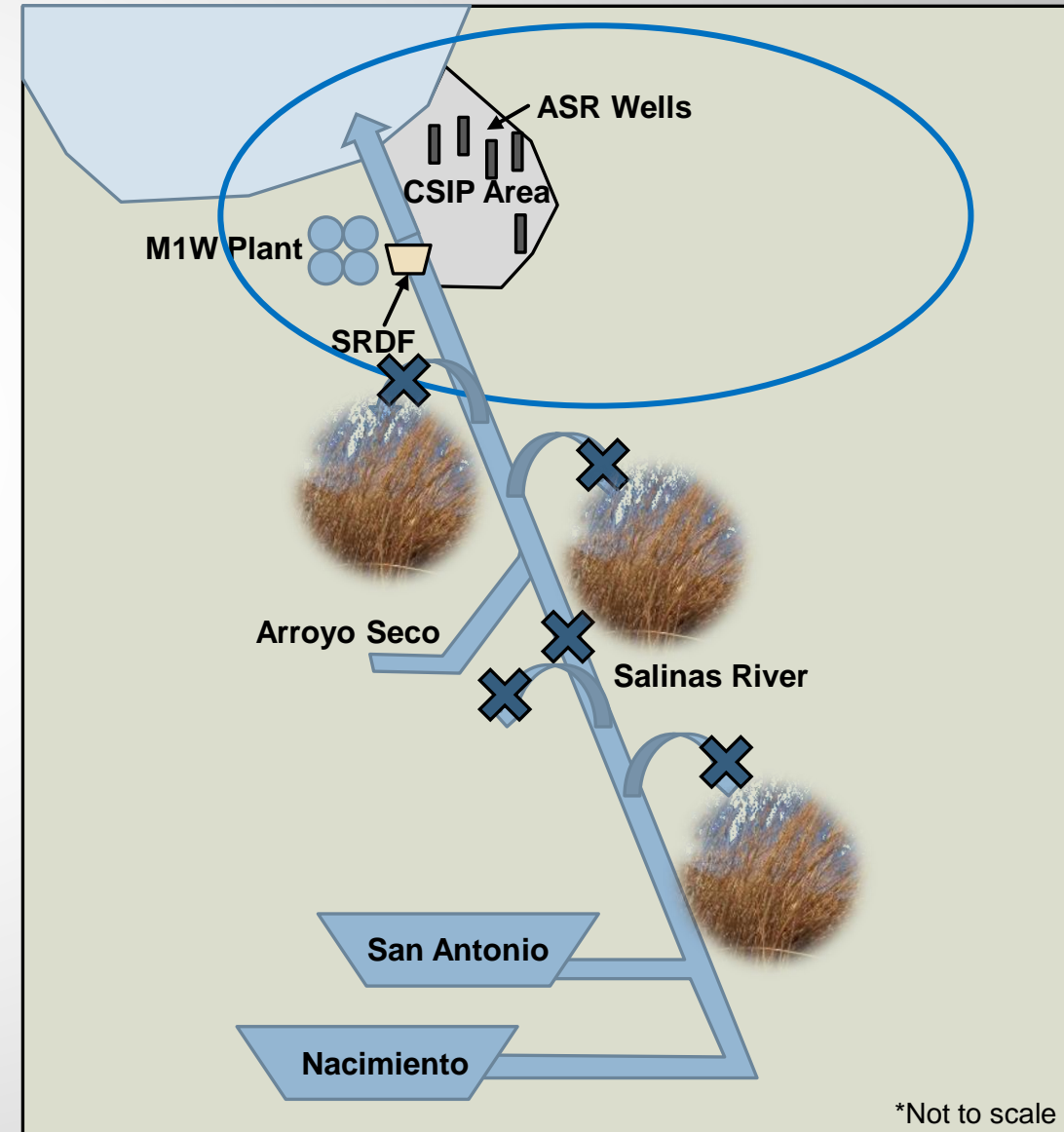
## With Project Water Operations: Dec. - June

- Diversions at SRDF
- Diverted water recharged through ASR wells
  - Some diverted water could be directly provided to municipalities
- Flow to ocean is the same amount of as pre-project
- CSIP supplied by diversions



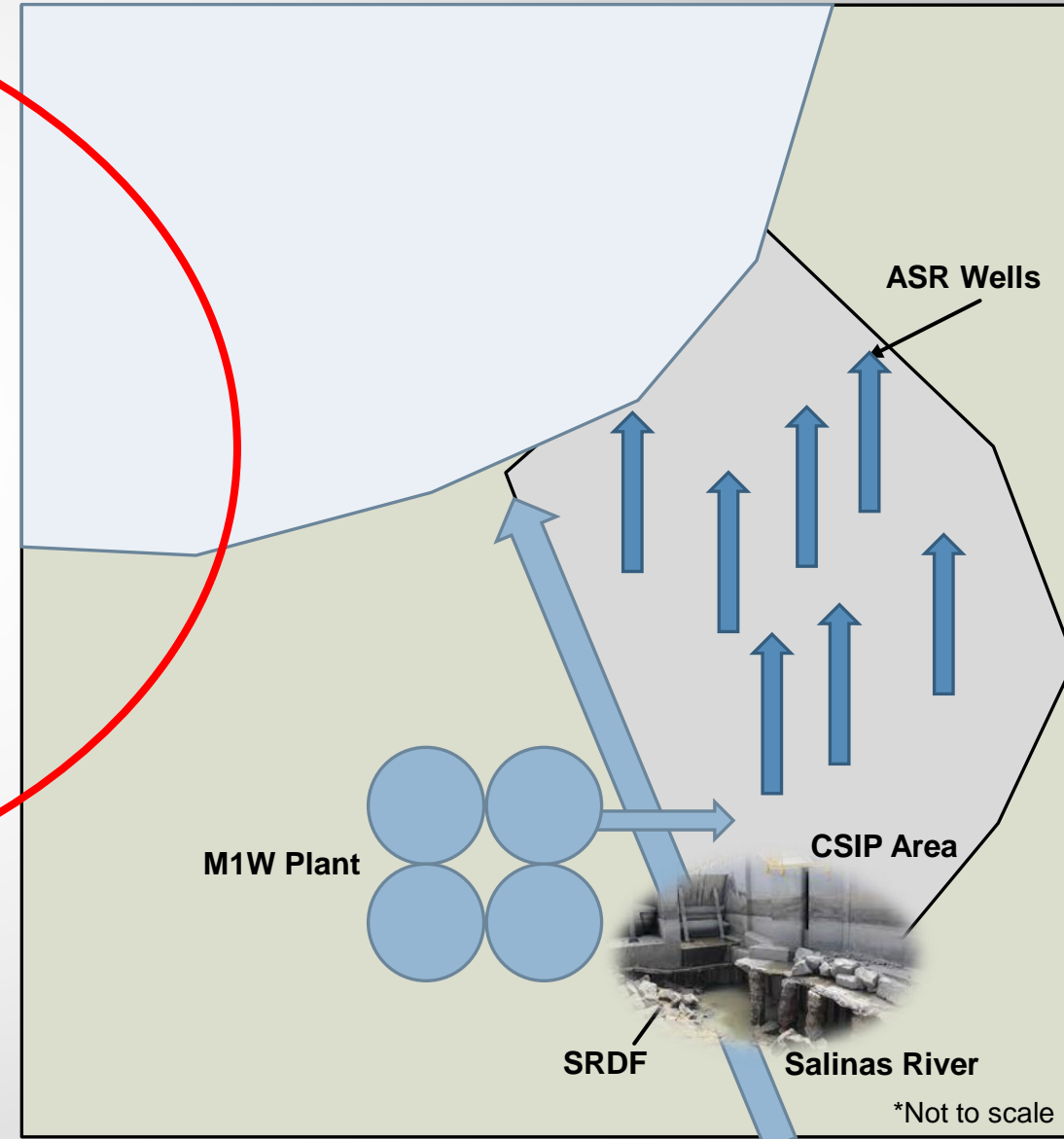
## With Project Water Operations: July – Nov.

- ▶ Minimum releases from reservoirs limit flow in river
- ▶ No flow from Arroyo Seco
- ▶ No (or limited) river flow eliminates or limits dry season aquifer recharge
- ▶ No or limited water available to invasive species



## With Project Water Operations: July – Nov.

- No flow in river, or to lagoon
- No diversion at SRDF
- Water pumped from ASR wells delivered to CSIP
  - No need for supplemental wells to pump groundwater for CSIP
  - Some ASR water remains in the aquifers to reduce or halt seawater intrusion
- Recycled water delivered to CSIP





# Summary of Operational Changes

## Current

### Wet Months

- Releases for flood and ecological benefits
- No storage in northern Valley

### Dry Months

- Regular releases
- SRDF diversions for CSIP



## With Project

### Dec. - June

- Larger seasonal releases to accommodate SRDF diversions
- Water seasonally stored in 180/400-Foot aquifers

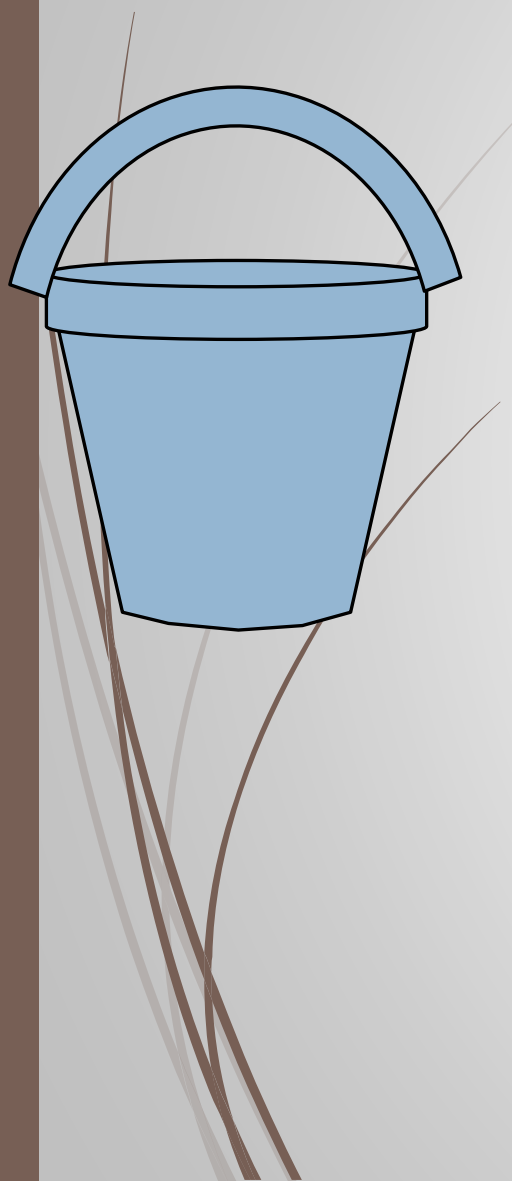
### July – Nov.

- Limited releases
- No SRDF diversions – CSIP water supplied by ASR wells



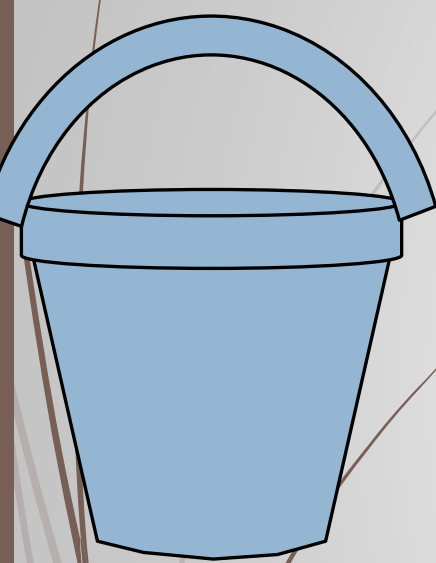


## Summary of Potential Benefits

- 
- More reservoir carryover (no dry season releases)
  - Regular annual releases
  - Improved fish flows
  - Reliable CSIP supplies
  - Recharge to reduce or halt seawater intrusion
  - Less water for invasive species
  - Provide functional flows more akin to natural river flows



## Summary of Potential Downsides

- 
- No (or reduced) dry season recharge of Upper Valley and Forebay, but balanced by regular wet season releases during droughts
  - No dry season flow to lagoon



# Initial Modeling

Do we see the benefits?





# Seasonal Release Simulations

- ➔ Used existing SVOM
- ➔ Compared two simulations:
  - ➔ A baseline simulation which projects current operations using the SVOM rules
  - ➔ A simulation with modified operations to include December to June releases for ASR
- ➔ Both simulations run 47 years



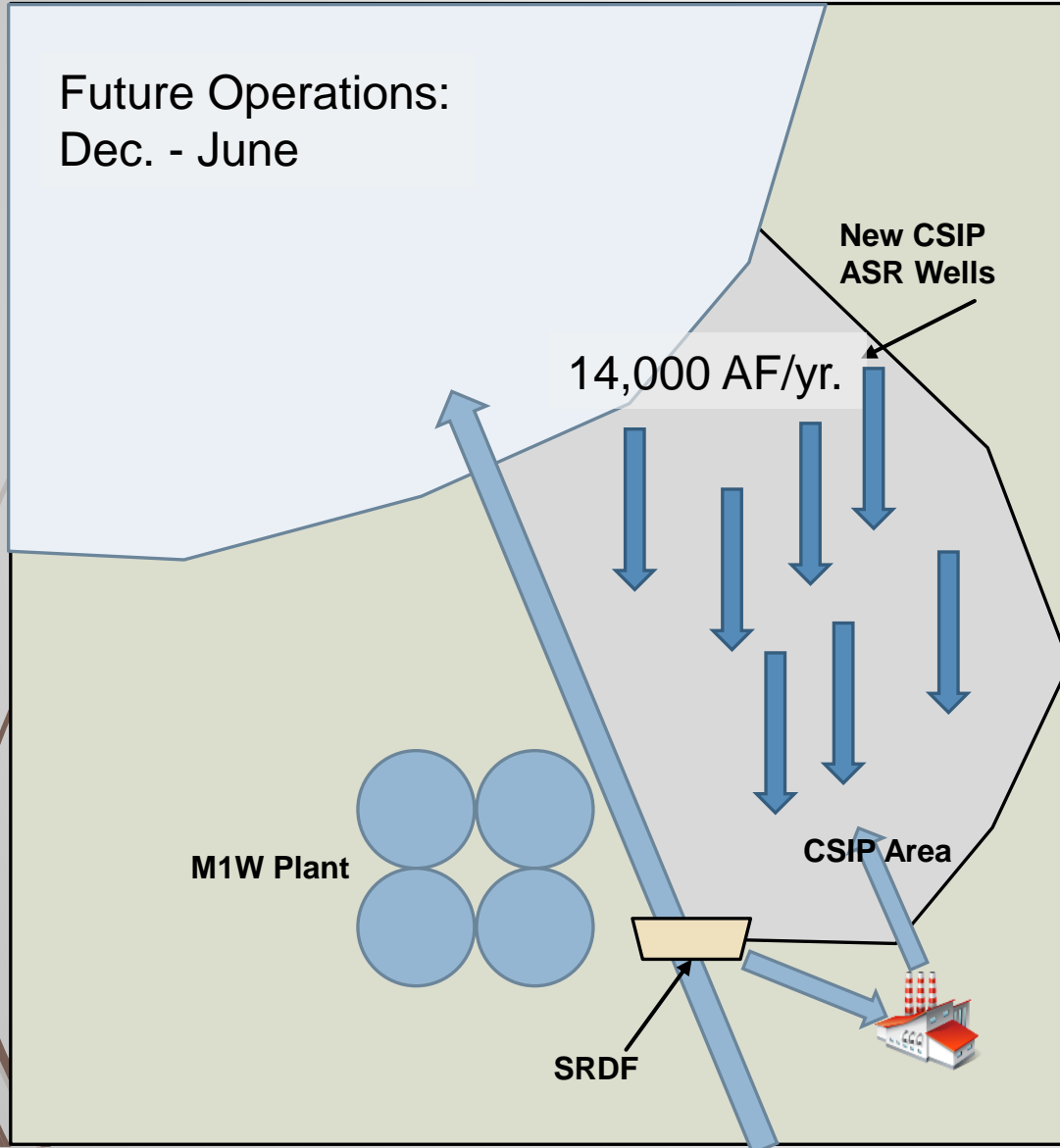
# Seasonal Release Simulations Assumptions

- ▶ All environmental releases and flood releases remain according to the current operating rules
- ▶ ASR releases occur when water is available between December 1 and June 30
- ▶ SRDF demand is eliminated between July 1 and November 30

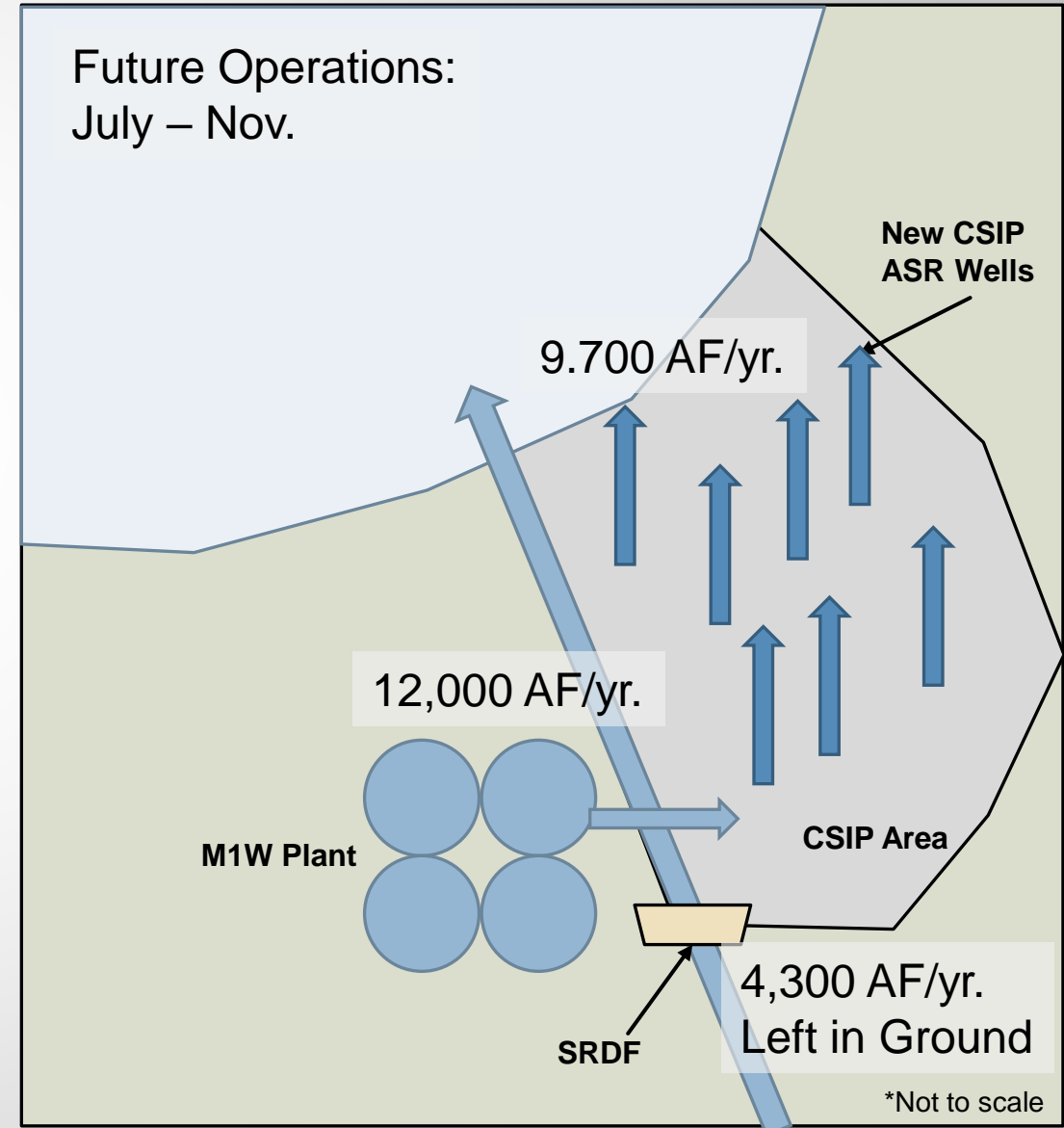
# Project Impact on SWI Control

Generalized Operations  
Many Details not Shown

Future Operations:  
Dec. - June



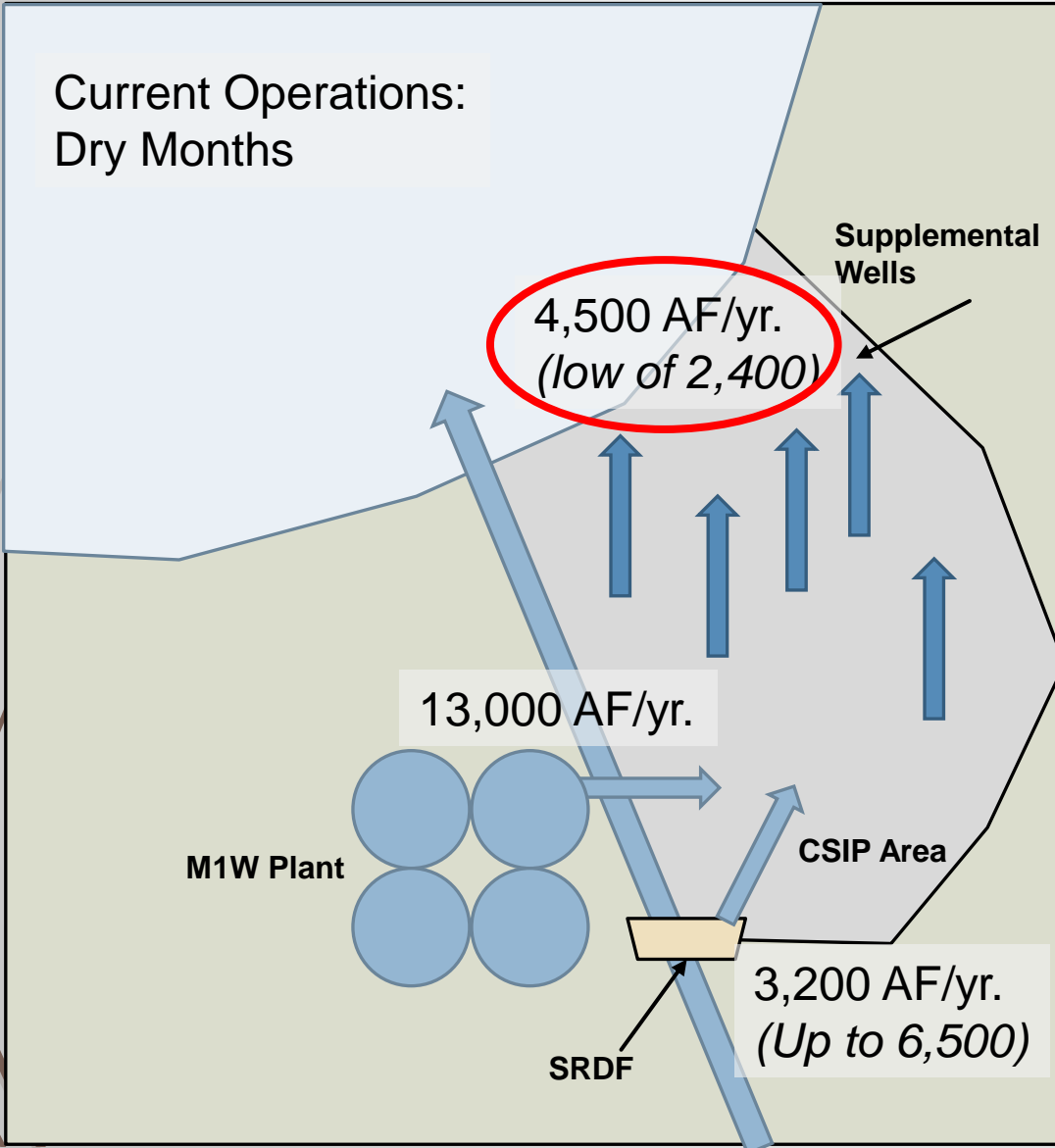
Future Operations:  
July - Nov.



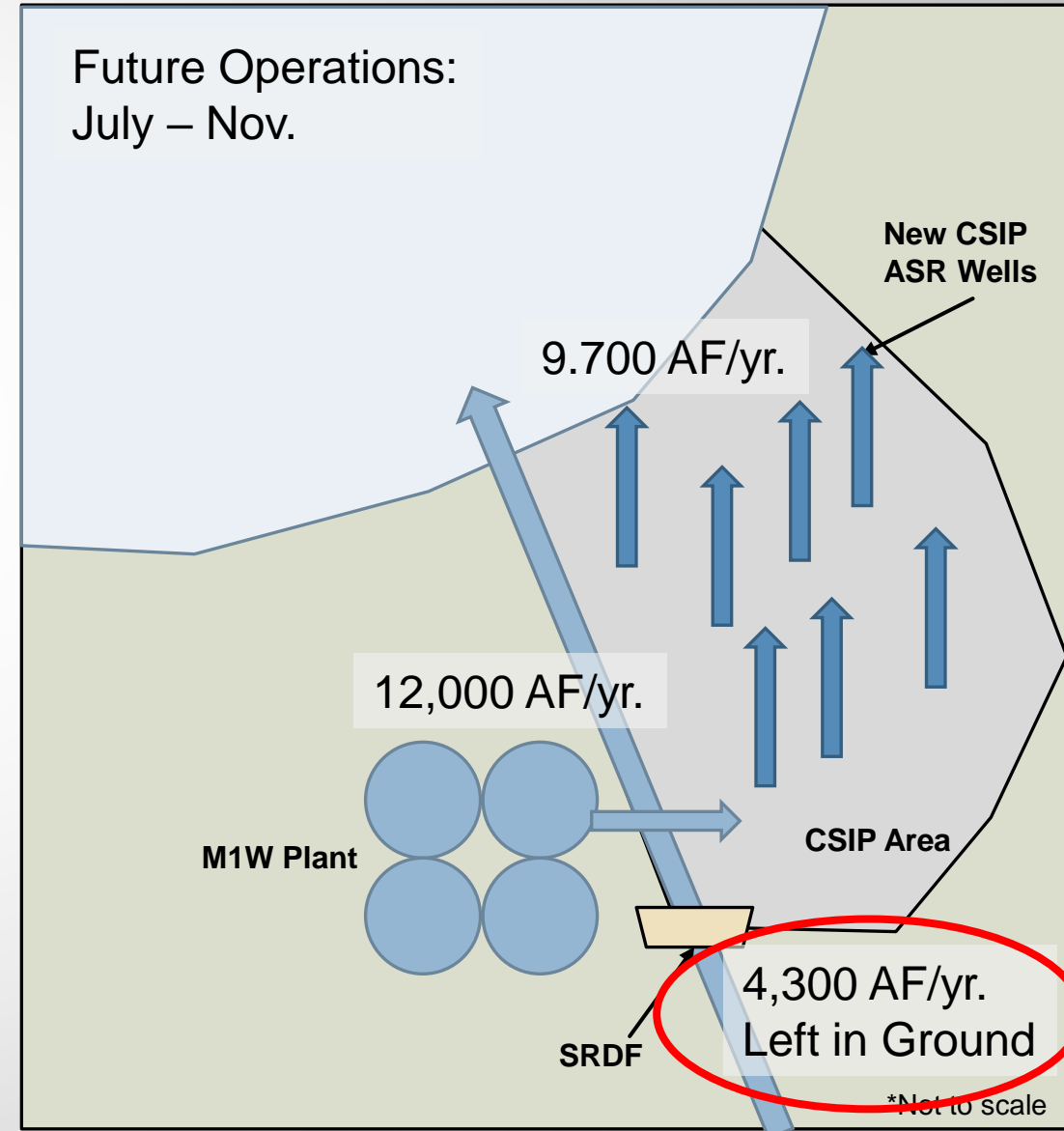
# Project Impact on SWI Control

Generalized Operations  
Many Details not Shown

Current Operations:  
Dry Months



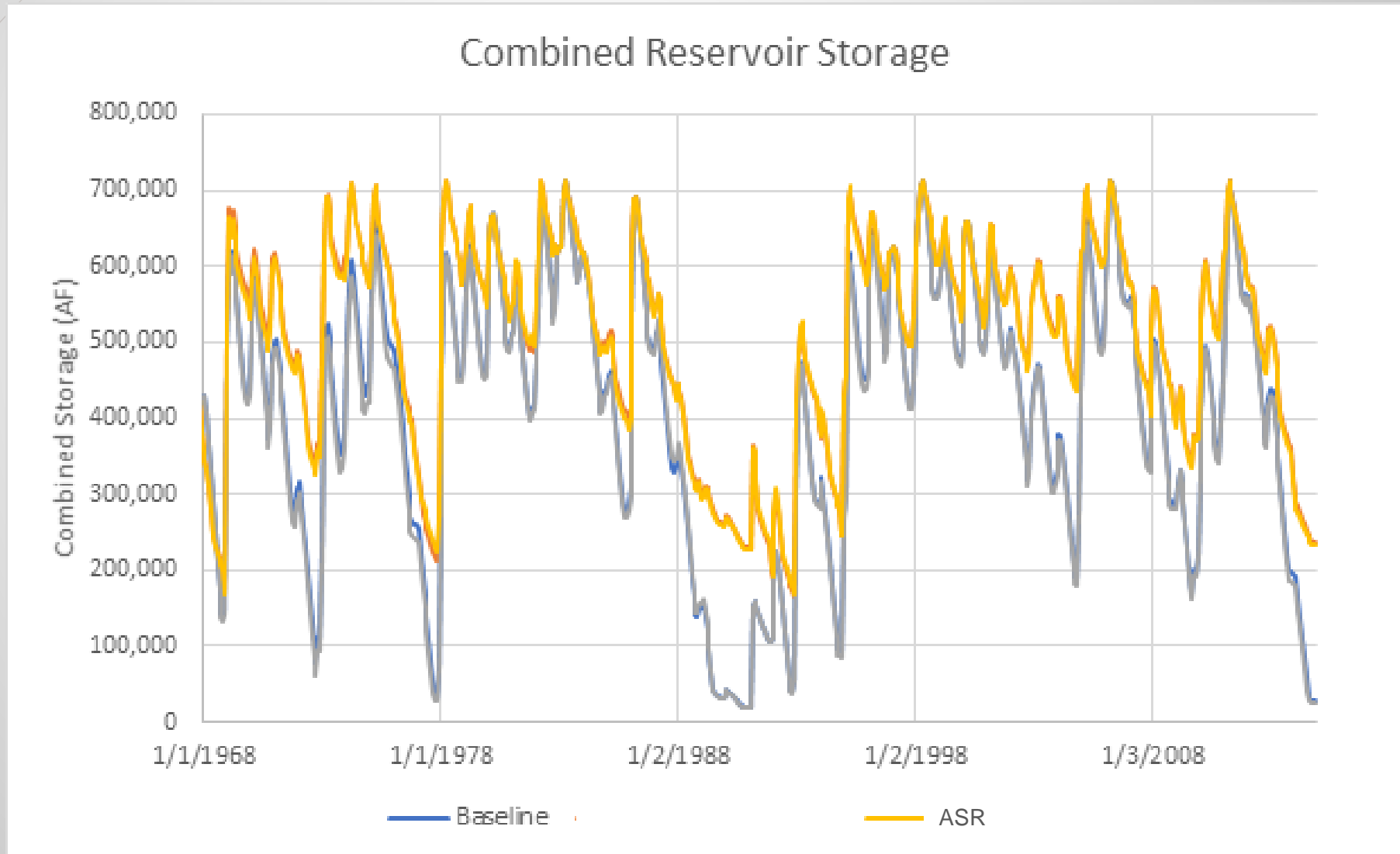
Future Operations:  
July – Nov.



\*Not to scale

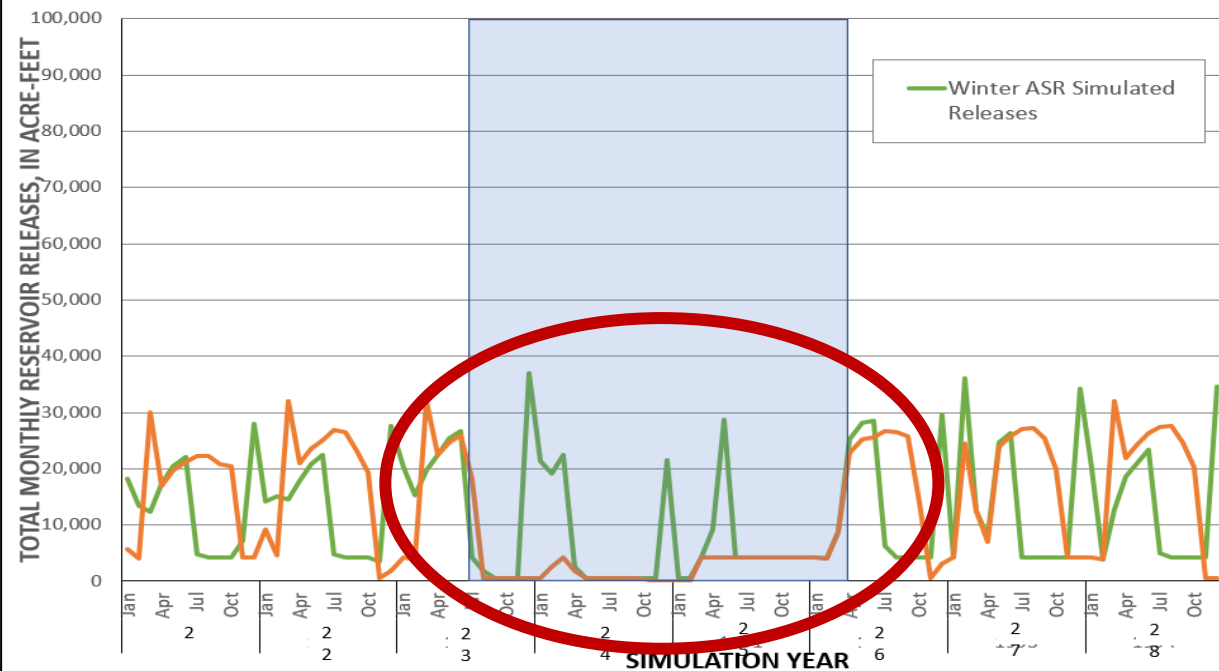
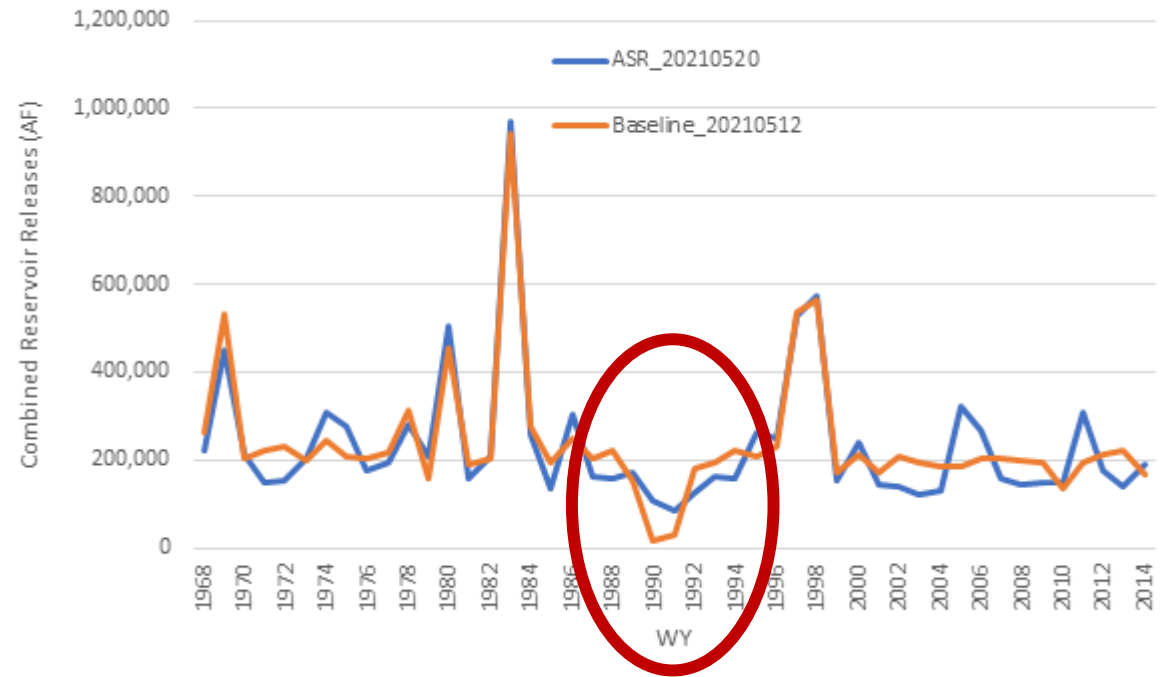


# Project Impacts: Reservoir Carryover



# Project Impacts: Seasonal Releases

- More carryover water means more reliable seasonal releases
- Recharge every year
- Fish releases every year





## Potential Questions

- ➔ Can re-diversion permit be changed?
- ➔ How this fits with revised Salinas River flow prescriptions?
- ➔ Where would the water treatment plant be located?
- ➔ Where would ASR wells be located?
- ➔ Who pays?
- ➔ Refine estimated the impact to SWI mitigation
- ➔ Is it as effective/reliable/compatible with an extraction barrier?



# Discussion/Feedback

