RANCHO MURIETA CSD TOWNHALL DISCUSSION

2024 INTEGRATED WATER MASTER PLAN UPDATE

May 30, 2024

ADKINS ENGINEERING & SURVEYING

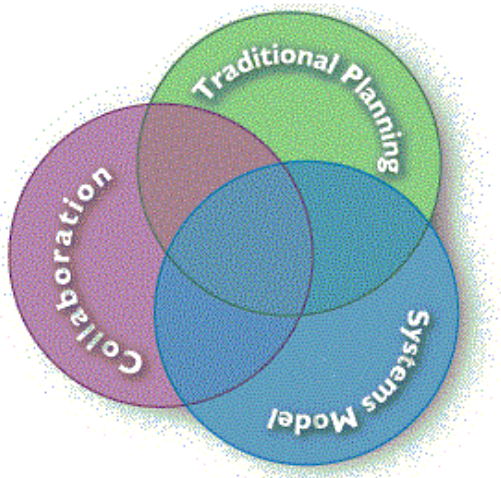
Maddaus Water Management Inc.

Agenda

- Introductions
- Review of Agenda
- Review of Phase 1 Findings (Supply)
- Review of Phase 2 Findings (Demand)
- Presentation of Phase 3 Findings (Scenario/Options Review)
- Next Steps

Integrated Water Resources Scenario Planning

- **Engineering Perspective: Least Cost Planning for Robust System Resilience for the Whole Service Area**
  - Use a model to build scenarios
  - Analyze options
  - Discuss key alternatives
  - Public discussion
  - Refine alternatives
  - Finish the documentation



Source: US Army Corps of Engineers Institute for Water Resources

Testing System Resiliency – Running Water Balance Supply versus Demand

- **Why run a water balance?**
  - Looking to identify water stress in **average year** conditions and **drought year** conditions (how does system fare in "normal case" and "worst case"?)
- **Want to be conservative balancing the water checkbook:**
  - Find options for demand reduction (expenses) or supply augmentation (more income) to make the system more resilient
  - What options really matter in average and drought years?

Testing System Resiliency – Running Water Balance Supply versus Demand to ask "What If" Questions

- **What does testing look like?** Simulate different elements:
  - Hydrology (average year vs. drought year river flows)
  - Account for system losses
  - Existing demands
  - Proposed buildout conditions
  - Demand cutbacks (least cost = save the water you have)
  - Options for more supply (seeking smart investments)
- Are we meeting demands in various conditions compared to supply, this helps identify any shortfall where taps are dry?

Following IWMP Engineering Assessment Phases

1. Supply

- OneWater Portfolio
- Water Rights
- Historic USGS data river flows
- Pumping Volumes and Storage Levels
- Climate Change

2. Demand

- Demand Trends in Consumption
- Past Conservation
- Proposed Development by Lot Type

3. Scenarios/ Options

- Interactive Tool Modeled Scenarios
- Run Shared Vision Model (SVM) “what if” reductions
- Run SVM “what if” supplemental supplies
- Capital Projects utilizing hydraulic model
- Key Options/Findings
- Community Discussion/Board Decisions

Big Picture Overview

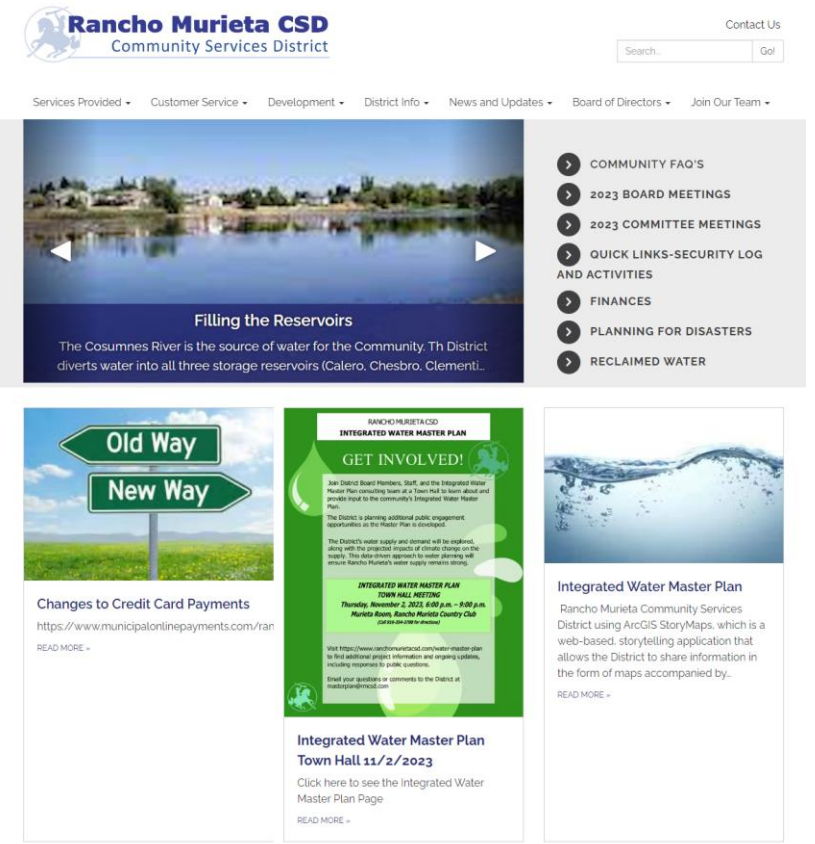
- Compared demand to existing water supply (for both current and buildout demand)
- Evaluated the resiliency of the system
- Identified circumstances that stress the system (found gaps between supply and demand)
- Identified options to address that water stress (close those gaps)

Supply Recap

Supply StoryMap

- [Rancho Murieta Community Water System StoryMap]

https://tinyurl.com/ywduwyc3



Supply Recap – Cosumnes River & Recycled Water

- Pump River Flows
  - Primary Surface Water Rights Permit (copy on Supply StoryMap).
  - The maximum rate of direct diversion (directly to the water treatment plant) is six (6) cubic feet per second (cfs) and the maximum rate of diversion to offstream storage shall not exceed forty-six (46) cfs.
  - The amount diverted to storage shall not exceed four thousand and fifty (4,050) acre feet, with 3,900 acre feet per year (AFY) from the Cosumnes River.
- Reservoir Supply: 4,400 AF of "Usable" Storage Capacity with Flashboards (rounded to nearest 10 AF)
  - Calero – 2,330 AF
  - Chesbro – 1,110 AF
  - Clementia – 960 AF
- Recycled Water (rounded to nearest AF)
  - Current system supply – 437 AF
  - Future system supply – 955 AF (average precipitation years)

Demand Recap

Demand StoryMap

- Rancho Murieta Community Water Demands

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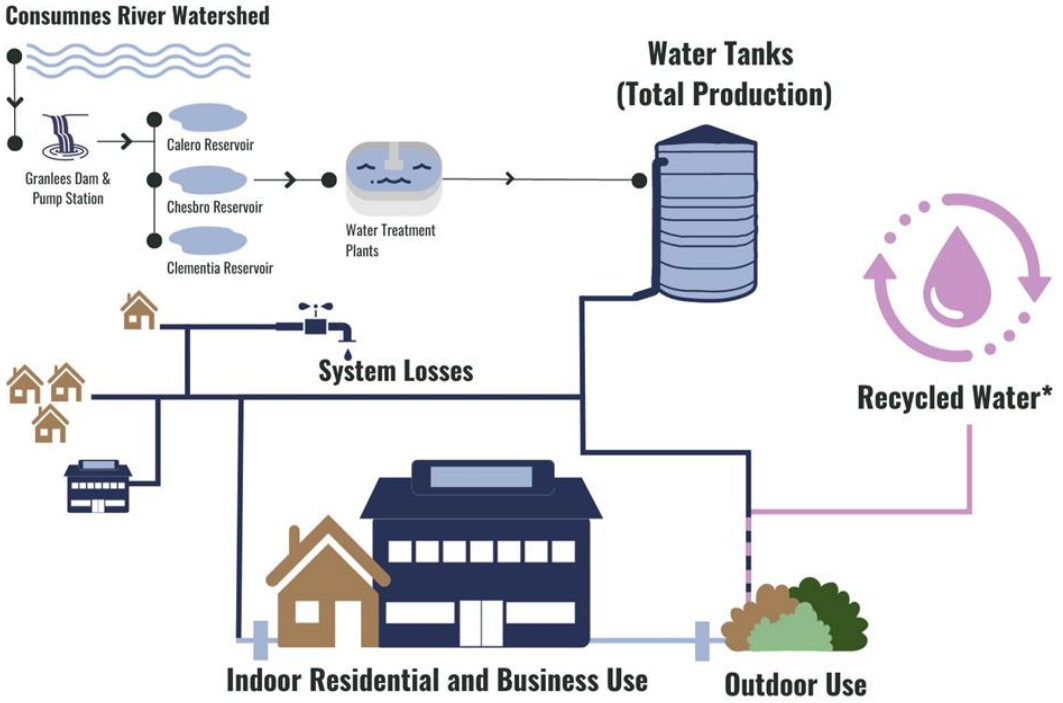
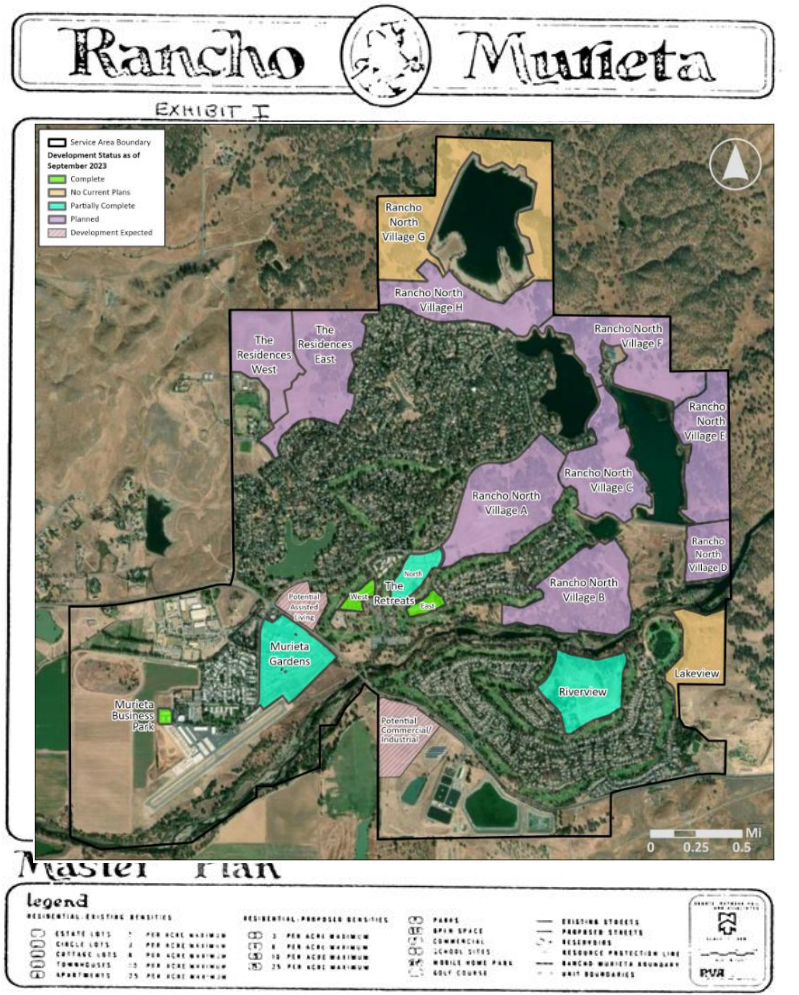


Demand Recap

- Existing Demands by Lot Type
- Approved Lots
- Total Future Community Demands by projected Lot Type at Buildout



Demand Recap

	System Demands (acre-feet per year)
Baseline Potable Water Existing Demands (based on 12/31/22 Connections)	1,716
Projected Future Demands at Buildout * Note: Based on planned uses and known values provided as lot maps by the District from proposed developments	1,574*
Total Community Demands at Buildout (with system losses)	**3,290**

Additional details on the Demands StoryMap

Shared Vision Model Options for More Supply & Scenarios for System Resilience

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Overview of Key Findings

- There are gaps between supply and demand under drought in the current system, in the future system under buildout
- There are options to increase the dependability of your water system (for the current situation and for proposed buildout)
  - Optimize recycled water further
  - Add a groundwater source
  - Leverage Clementia Reservoir
  - Increase conservation (everyday efficiency)
  - Accept more risk of drought curtailment (i.e. greater than 30% cutbacks)

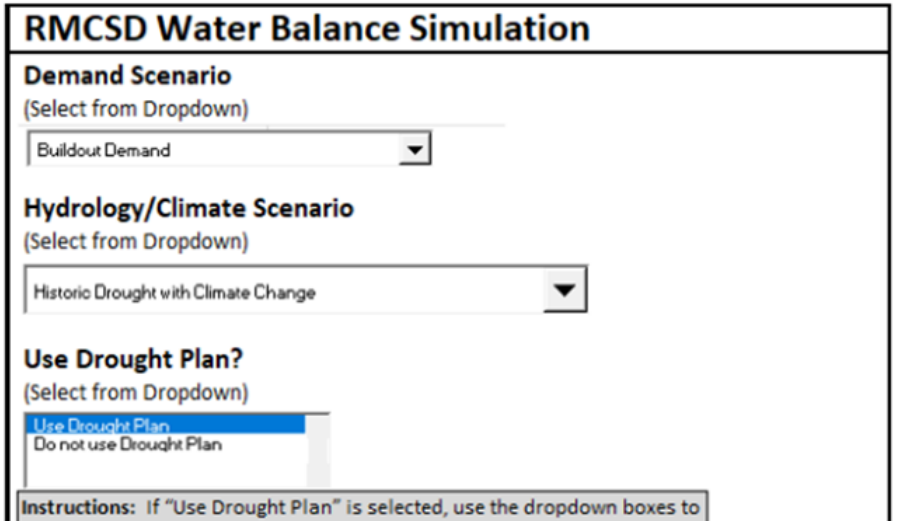
Overview of Options

- We are going to walk through the gaps we have identified and the options to close those gaps in three scenarios:
  1. An average year (normal river flows)
  2. A "worst-case" drought (1976-1978)
  3. Options applied to a "worst-case" drought

Future Steps to Complete the Engineering Assessment

- Discuss identified potential solutions
- Incorporate feedback
- Cost out acceptable options
- Complete documentation, including the roadmap for next steps in the Integrated Water Master Plan
- Adopt the IWMP in July/August

Scenarios StoryMap



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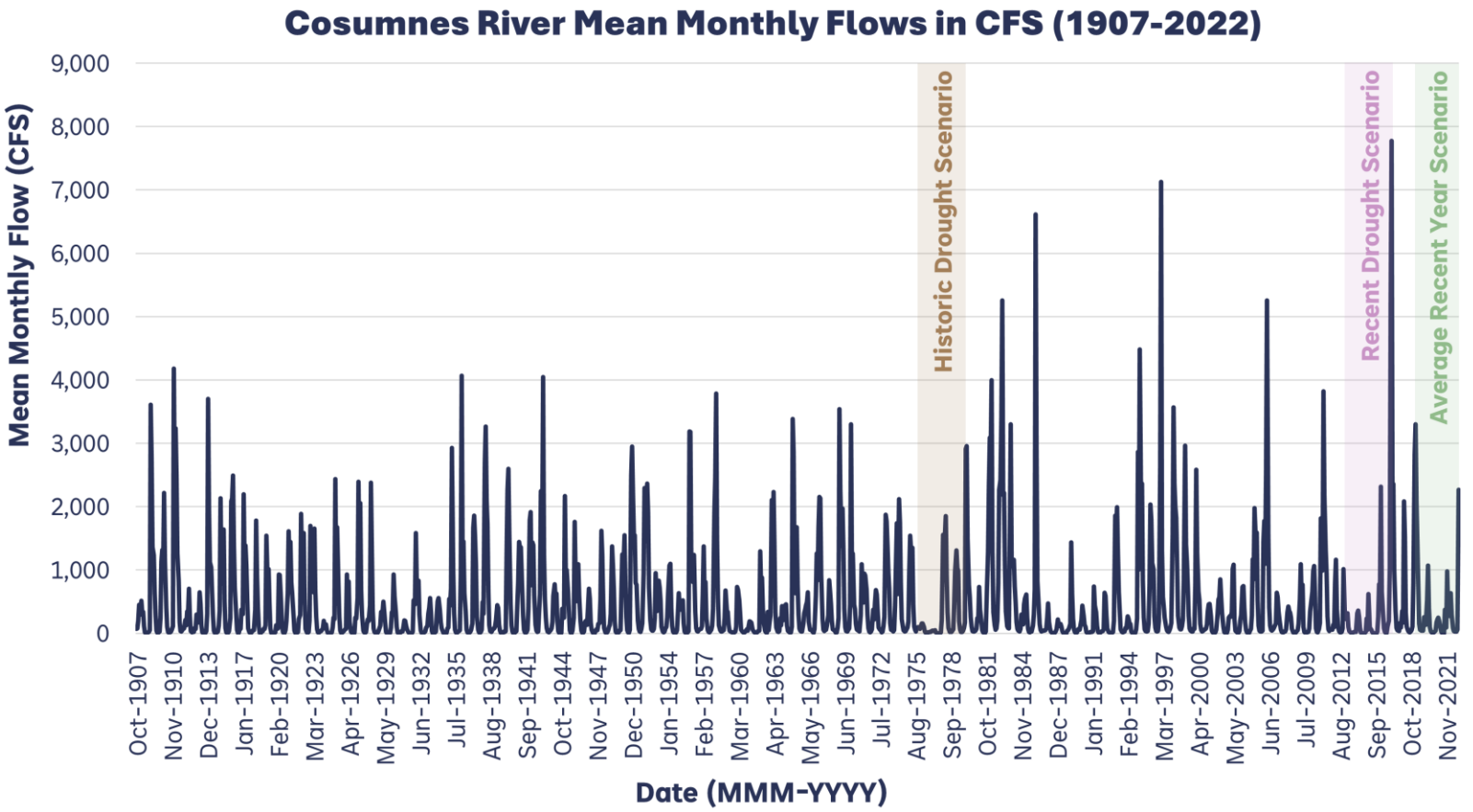
What Does Average Year Mean?

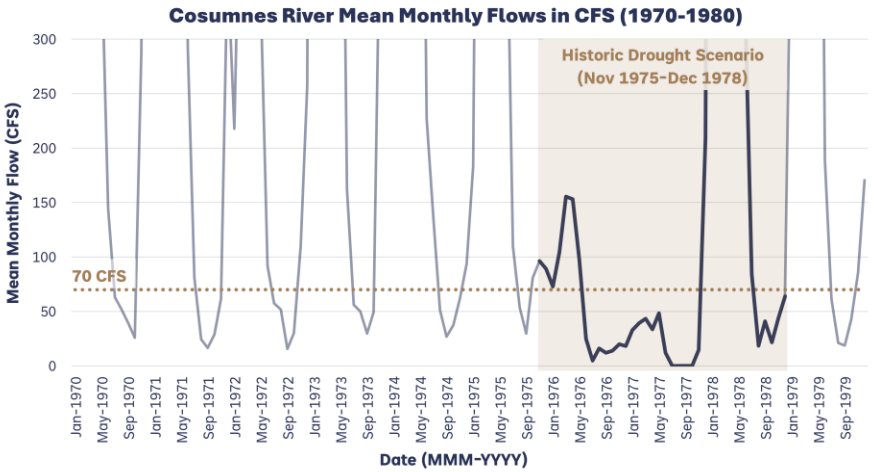


What Does Average Year Mean?

- The Average Recent Year scenario uses the hydrology of the months of November 2021 through December 2022
  - Mean and median monthly river flows for the 115 year hydrologic record of the Cosumnes River were compared to monthly flows in the last 10 years
  - This period is the closest to the mean and median monthly flows for the Cosumnes River
  - Hydrology data obtained from United States Geological Survey

What Does Drought Year Mean?

- The “Historic Drought” hydrology scenario modeled is the drought of 1977-1978.
- There was **no pumping** from the Cosumnes River for an entire water year during the '77/'78 drought
- This hydrology represents the **worst-case** scenario



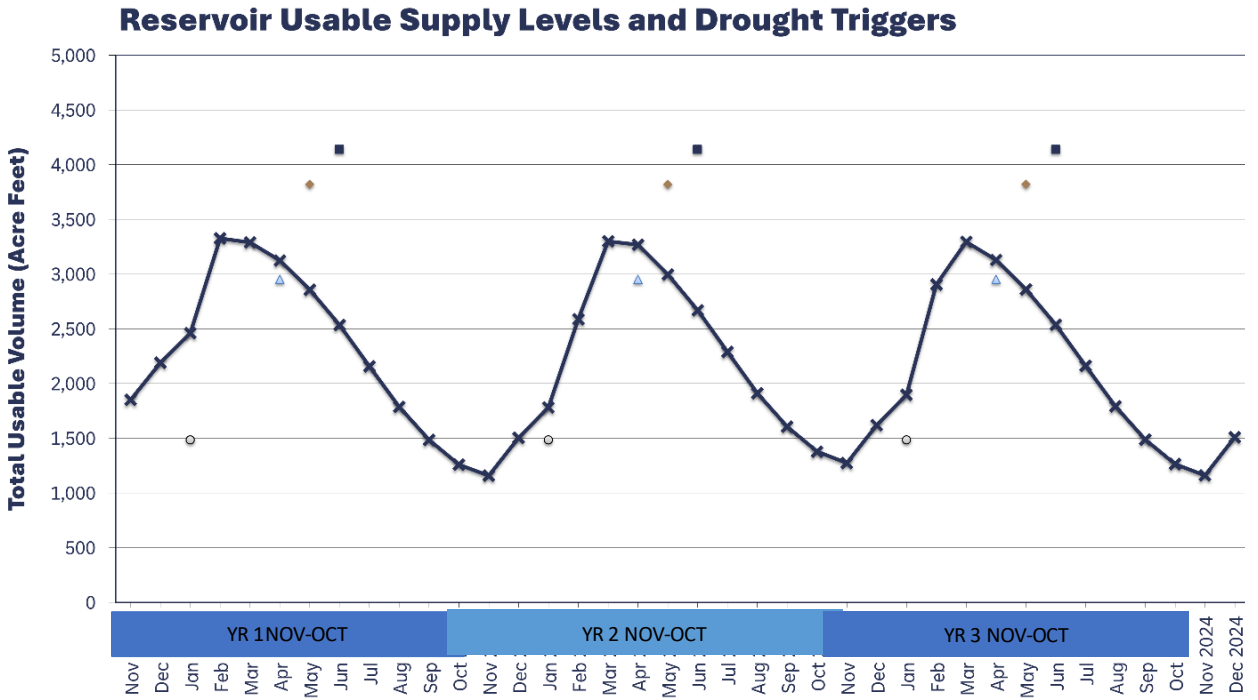
Engineering Assessment Scenarios Executive Summary

- **Scenario 1** – Average Recent Year with Climate Change
  - Have supply to meet Current Demand and Buildout Demand
    - Permitted water right, not permitted drinking water standards for Clementia
- **Scenario 2** – Historic "Worst-Case" Drought with Climate Change
  - Supply cannot sustain Current or Buildout Demand without augmentation
- **Scenario 3** – Historic "Worst-Case" Drought with Climate Change Augmentation Alternatives
  - Current Demand
  - Buildout Demand
  - Other supply augmentation alternatives

Scenario 1 – Average Year "Take-Away" Conclusion

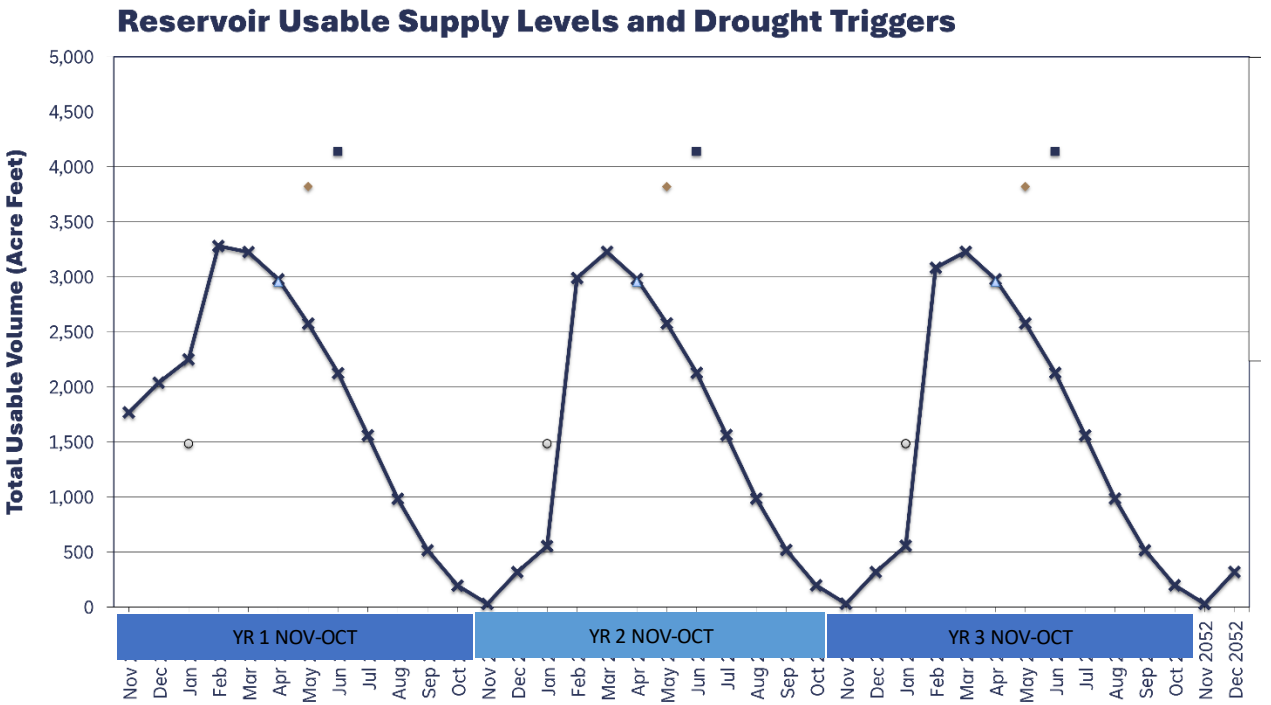
- In an average hydrology year with no demand cutbacks, including climate change, using recycled water
  - Enough water for current demand
  - With Clementia offline there is just enough water for estimated buildout demand

Scenario 1a – Average Recent Year with Climate Change Current Demand Outcome



- Clementia **Offline**
- Using recycled water for established dual-plumbed and planned connections
- Golf course served by raw water
- No drought cutbacks
- No augmentation

Scenario 1b – Average Recent Year with Climate Change Buildout Demand Outcome



- Using recycled water for established dual-plumbed and planned connections
- Golf course served by raw water
- No drought cutbacks
- No augmentation
- Clementia **Offline**

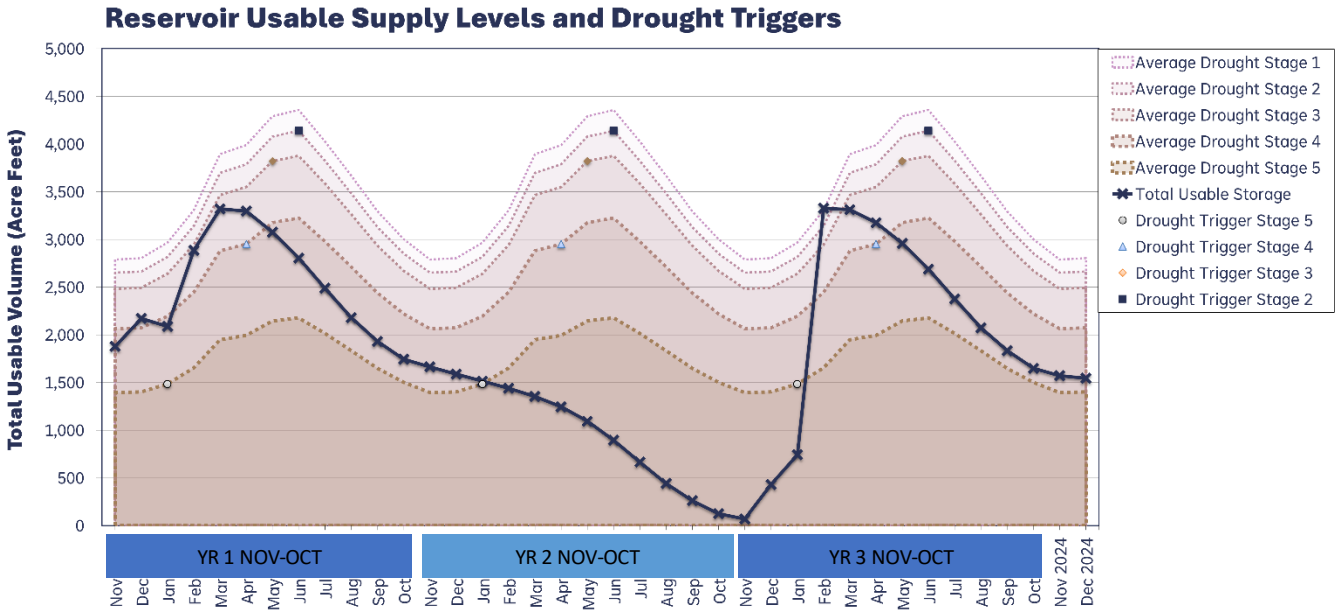
Key Options Add More System Resiliency

- **Under "Average Day" Conditions**
  - Option to Conserve More Water (Demand Reduction)
    - Further maximize recycled water
    - Meet future "Making Conservation Way of Life Laws"
    - Future regulations not accounted for in this analysis (which call for more need for conservation from existing connections/older homes and businesses)

Scenario 2 – Drought Year "Take-Away" Conclusion

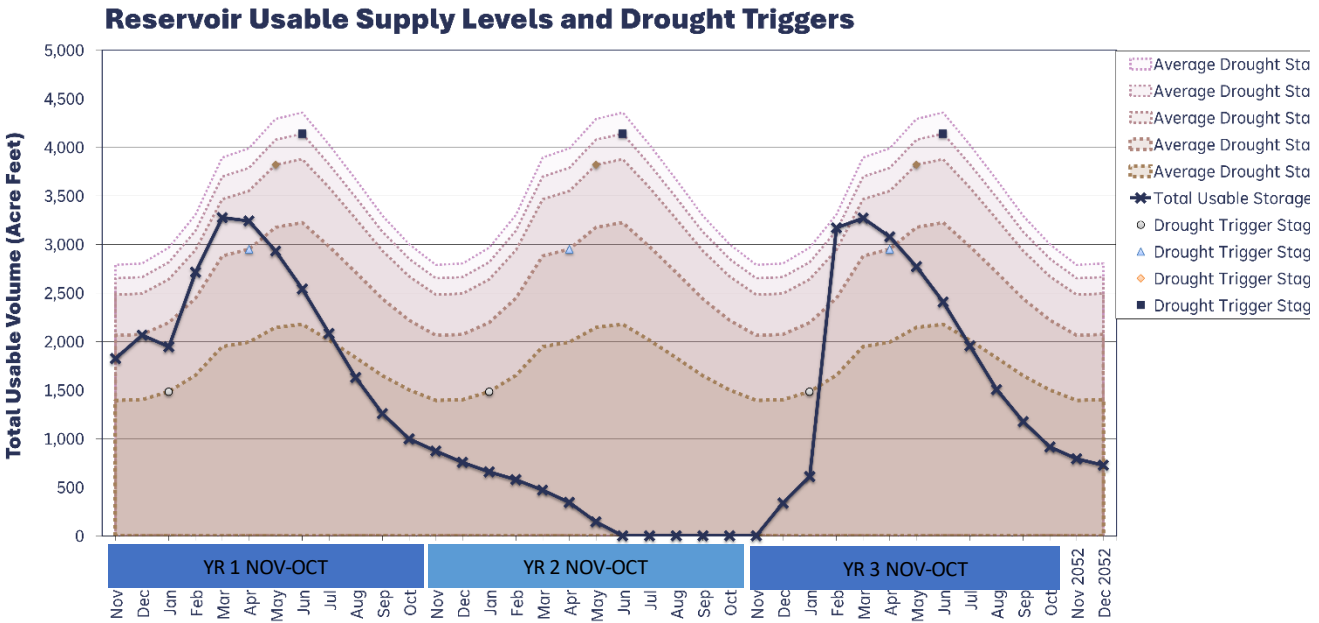
- With a “worst-case” drought and climate change
  - Major stress to meet current demand with drought plan at 30% cutback (risk minor shortfall – need to consider Clementia, back-up well, or steeper cutbacks)
  - Not enough water for buildout demand (significant shortfall – need to consider wells and/or Clementia)

Scenario 2a – "Worst-Case" Drought with Climate Change Current Demand Outcome



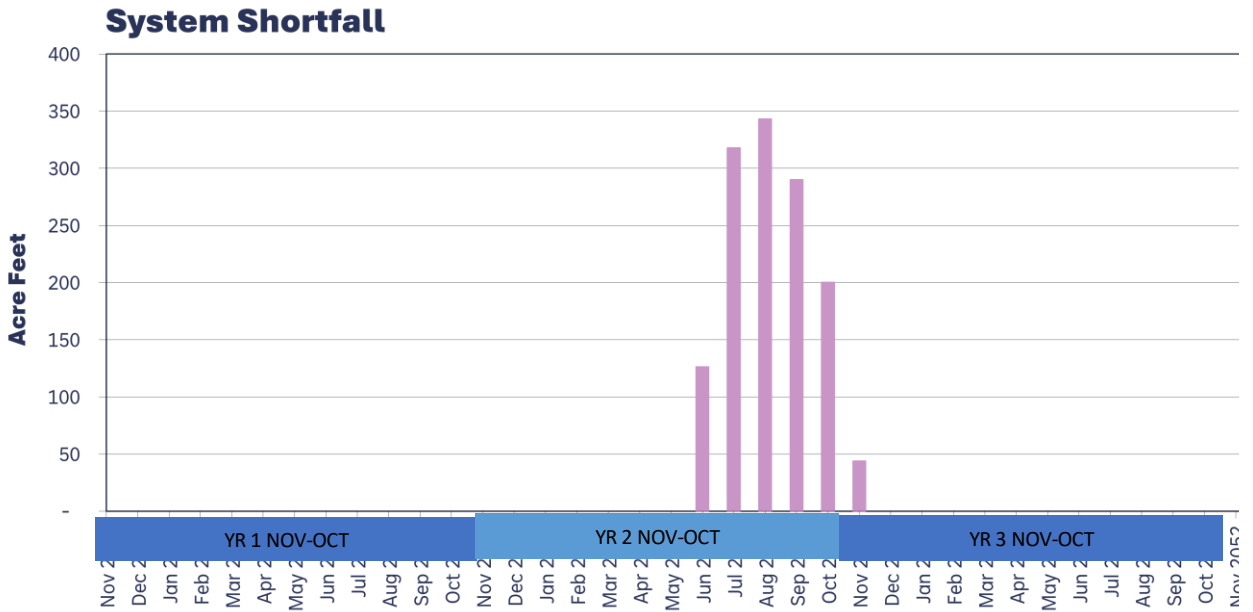
- Clementia **Offline**
- Use drought plan (30% cutback in stage 4 and 5)
- Using recycled water for established dual-plumbed and planned connections
- Golf course served by raw water
- No augmentation (no well)

Scenario 2b – "Worst-Case" Drought with Climate Change Buildout Demand Outcome



- Clementia **Offline**
- Use drought plan (30% cutback in stage 4 and 5)
- Using recycled water for established dual-plumbed and planned connections
- Golf course served by raw water
- No augmentation (no well)

Scenario 2 – "Worst-Case" Drought with Climate Change Buildout Demand Outcome



- Clementia **Offline**
- Use drought plan (30% cutback in stage 4 and 5)
- Using recycled water for established dual-plumbed and planned connections
- Golf course served by raw water
- No augmentation

Solution: Need Options to Augment Supply

- Shortfall projected
- SB 552 – Back-up supply required
- Consider Clementia as a drought solution (need to meet drinking water standards, have water right permit)
- Consider Groundwater Well
- OR consider more drastic cuts in demand during drought years

Key Options Add More System Resiliency

- **Under "Worst Case" Drought Conditions**
  - Setting the 30% curtailment in planning effort could go lower (e.g., 40-50% cutback - note Water Code 10632 requires to plan for 50% cutback)
  - Shifts in Recycled Water Usage
  - Treated Water from Clementia – original design of RMCSD Master Plan
  - Groundwater Well(s) – Senate Bill 552 Back-up Supply Law

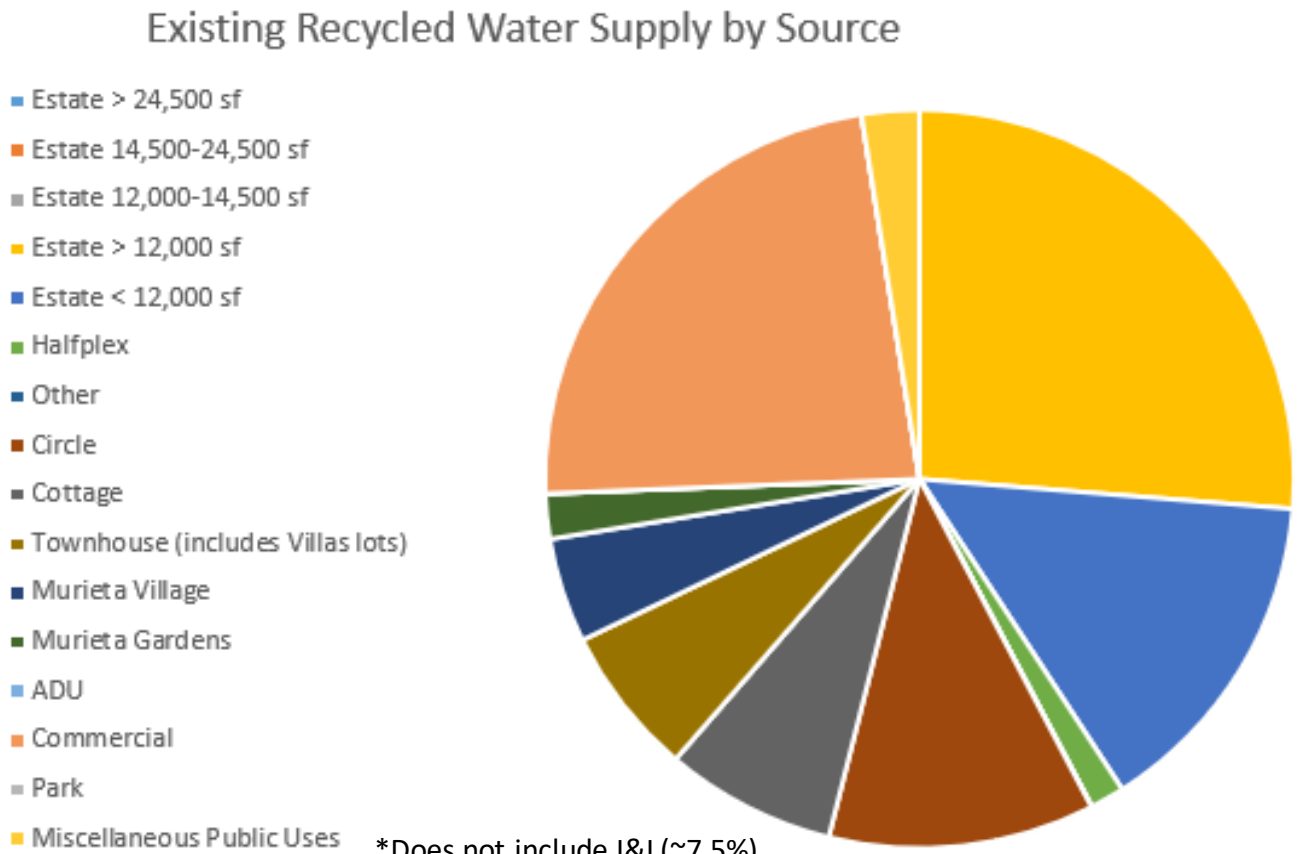
What If We Conserve More Water?

- **In the Extreme "Worst-Case" Drought Conditions**
  - Potential to cut back potable water use
    - Total cut back to ~125 gallons per capita per day
      - Indoor use would be ~50 gallons per capita per day
      - Outdoor use would be ~75 gallons per capita per day
      - New residential home construction projected to use ~43 indoor GPCD
  - Potential to shift recycled water usage
    - Trim outdoor watering for dual-plumbed connections
  - Potential to shift raw water
    - For example, Golf Course watering only the greens and tees

Recycled Water Options

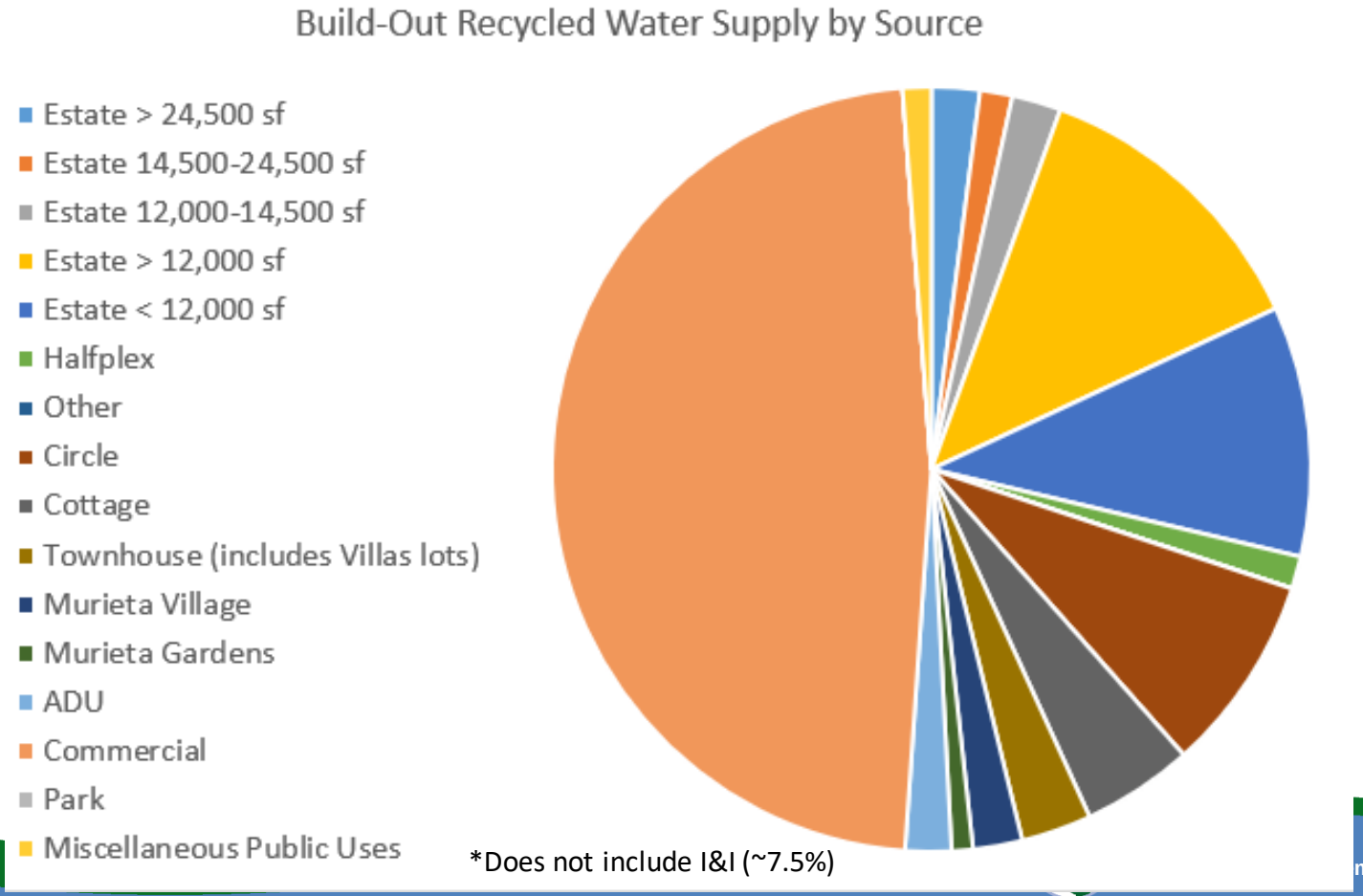
- **Combination of Utilizing Raw River Water for the Golf Courses and Recycled Water for Most New Developments**
  - CSD to work with golf courses to utilize pumping raw water directly from the Cosumnes River on a more regular basis.
    - Infrastructure and water rights already exist.
      - e.g. 240Ac-ft in 2023, 155Ac-ft in 2022, 241Ac-ft in 2021
  - Developments planned to receive recycled water:
    - Murieta Gardens (already plumbed)
    - Retreats
    - Villages A, B, & C

Recycled Water Options



*Does not include I&I (~7.5%)

Recycled Water Options



*Does not include I&I (~7.5%)

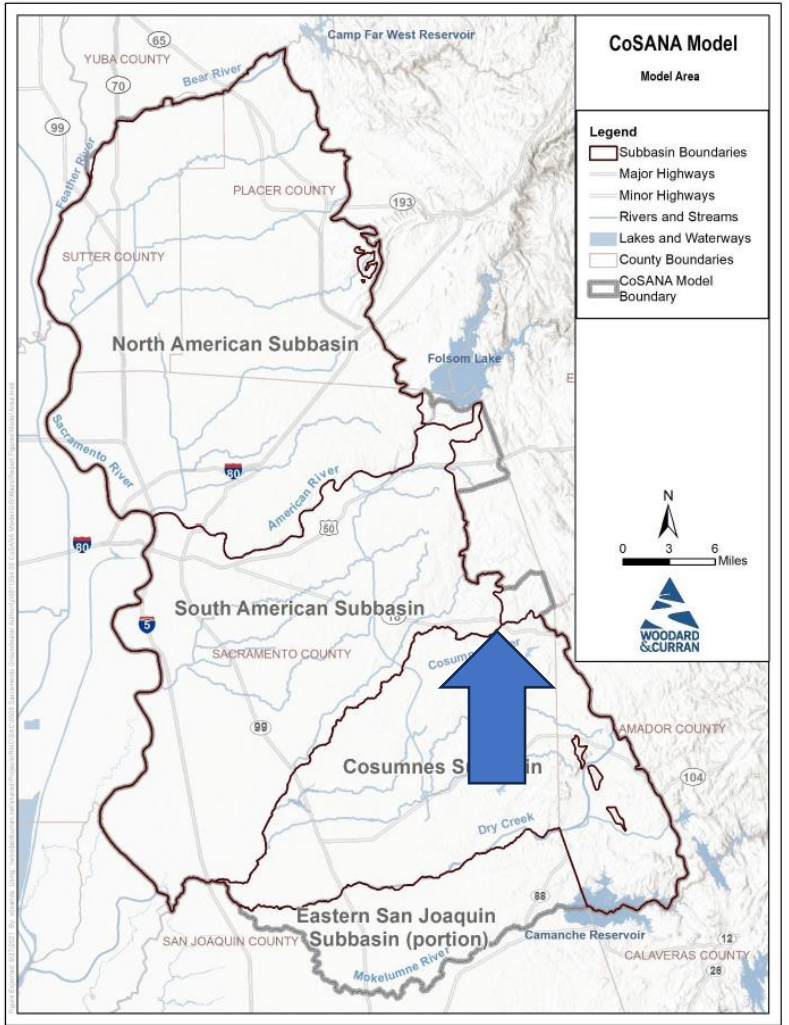
Clementia Option

- **Two Alternatives Available to Use Stored Water in Clementia Reservoir**
  - Apply for a statutory exemption from California Health and Safety Code
    - Examples of other exemptions: Sly Park Reservoir in El Dorado County, all reservoirs in San Diego County, the Nacimiento Reservoir in San Luis Obispo County, Canyon Lake Reservoir in Riverside County, Bear Lake Reservoir in Alpine County and the Modesto Reservoir in Stanislaus County.
  - Apply recreational use restrictions similar to Calero and Chesbro reservoirs

Groundwater Option

- **Groundwater provides flexibility in supply resources**
  - Was started by the CSD in 2012-2013 as follow-up from past planning.
  - Meet the requirements of Senate Bill 552 Back-up Supply Law.
  - Provide short term supply augmentation (back-up supply) under standard well construction.
  - May explore further supply long term supply augmentation under Aquifer Storage and Recovery (ASR) well construction.
    - STATE WATER RESOURCES CONTROL BOARD RESOLUTION NO. 2012-0046
    - STATE WATER RESOURCES CONTROL BOARD WATER QUALITY ORDER 2012-0010

South American Subbasin Groundwater Sustainability Plan, 2022



South American Subbasin Groundwater Sustainability Plan, 2022

- Interconnected Surface Water (ISW) in the South American Subbasin, 2021
  - CC: Climate Change
  - PMA: Projects and Management Actions

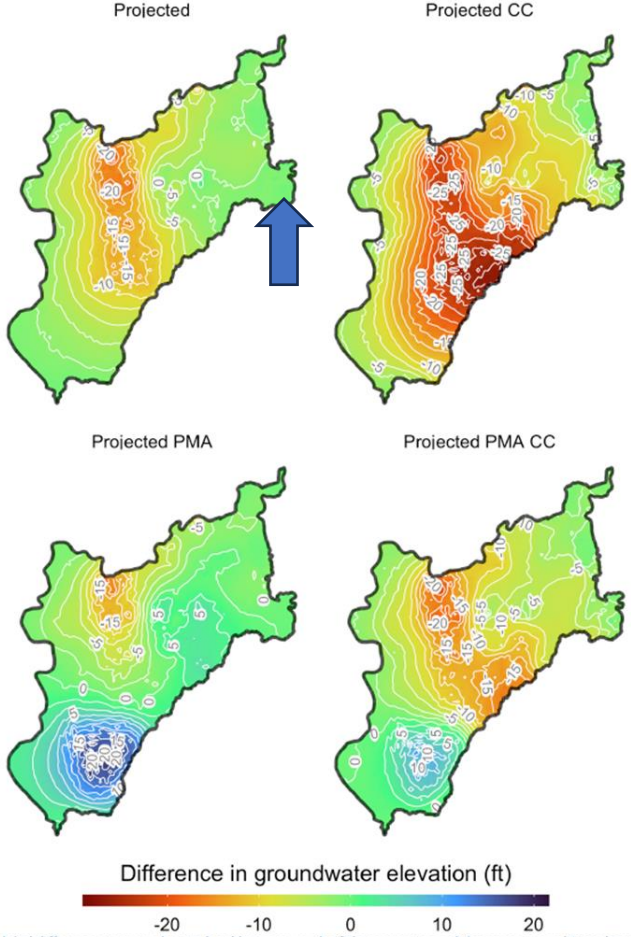
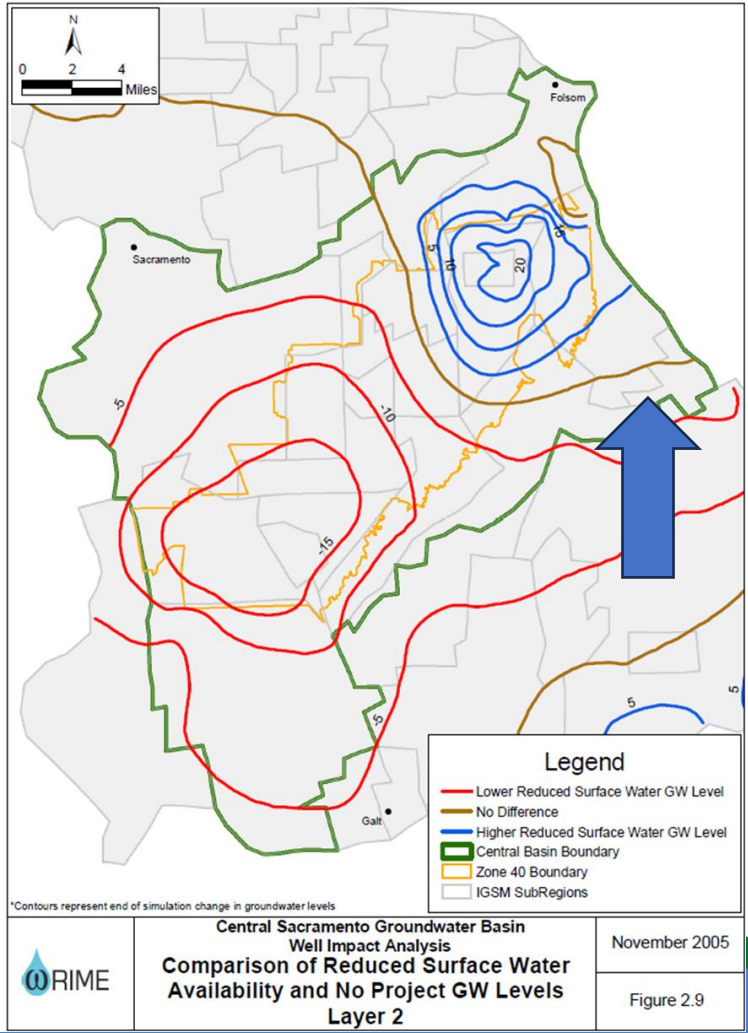


Figure 21: Modeled difference in groundwater level between each of the scenarios and the current conditions baseline at a Fall 2015 benchmark. PMA lead to substantial increases in groundwater level that reduce seepage (e.g., improve baseflow) and increase streamflow at ISW reaches. Climate change projections lead to groundwater level declines, but assume no corrective action or land use change. In reality, climate change would require specialized adaptive management to avoid significant and unreasonable impacts to beneficial users of groundwater and ISW.

South American Subbasin Groundwater Sustainability Plan, 2022

- Central Sacramento County Groundwater Management Plan – Impact Analysis for Well Protection Program , 2005



South American Subbasin Groundwater Sustainability Plan, 2022

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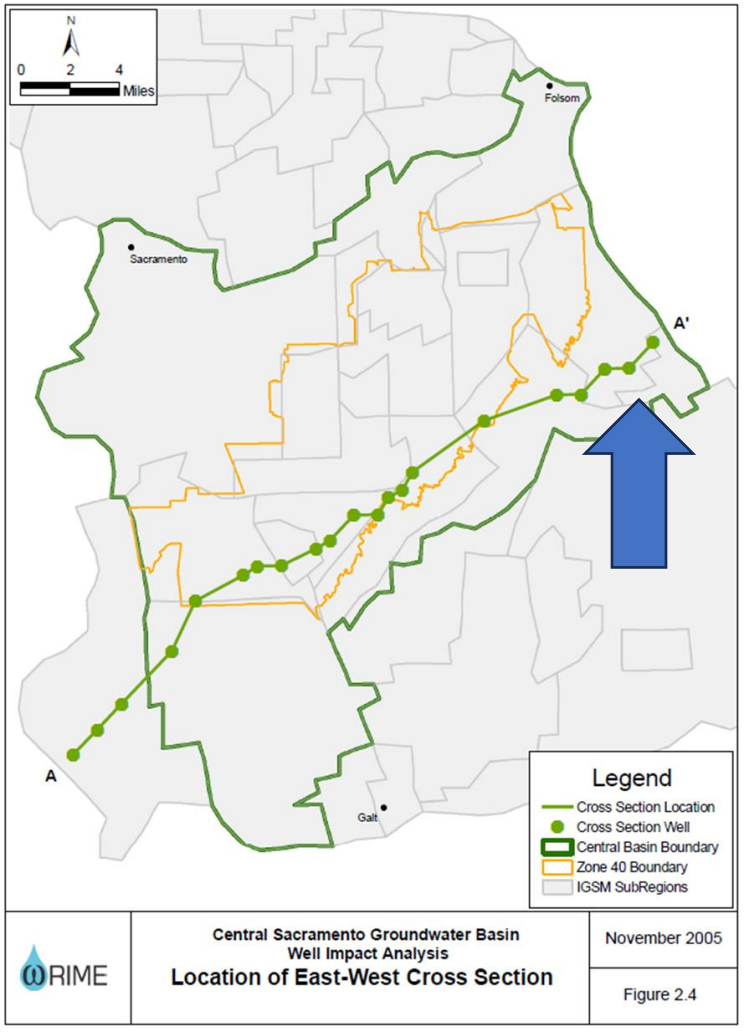
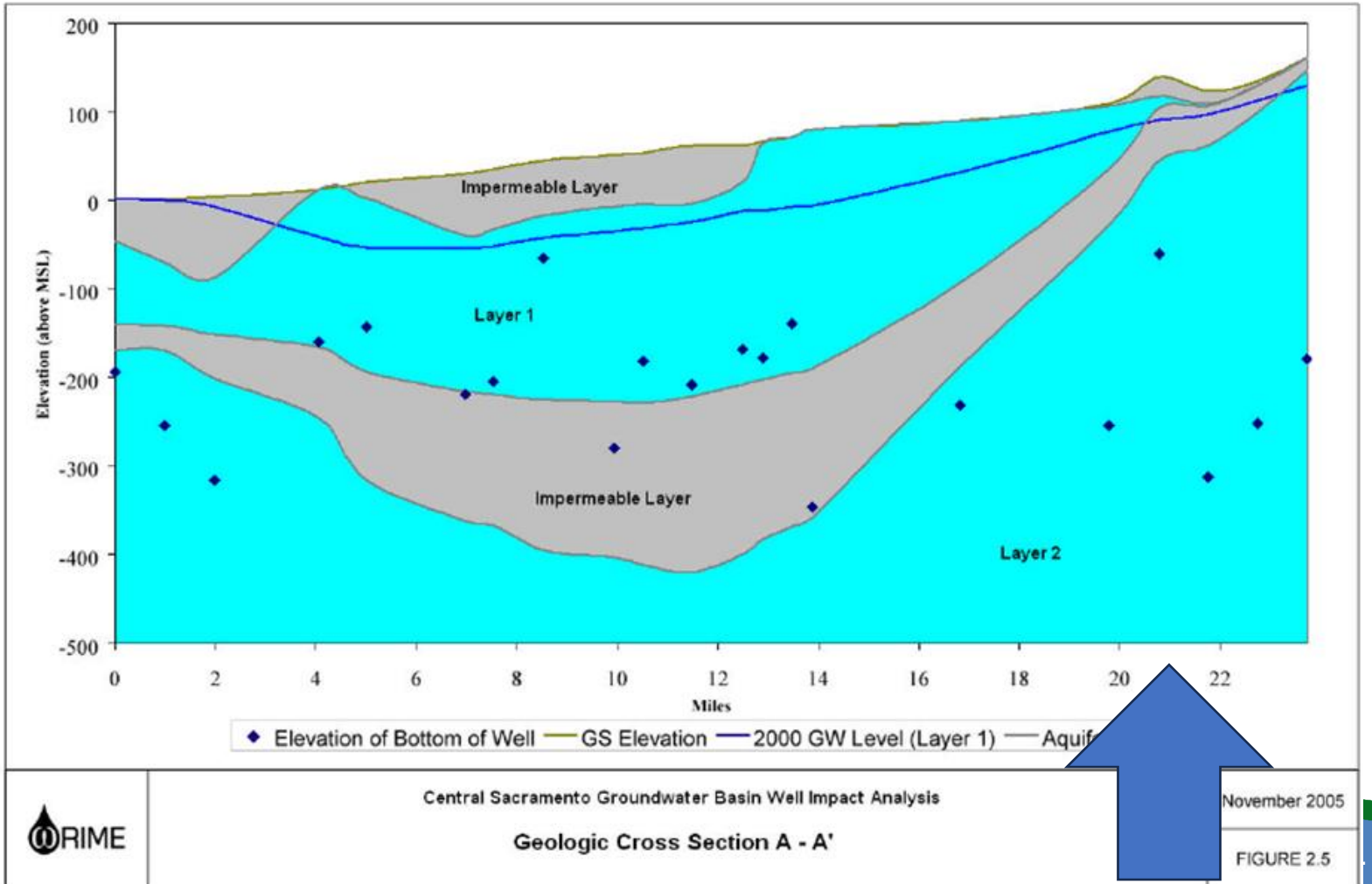
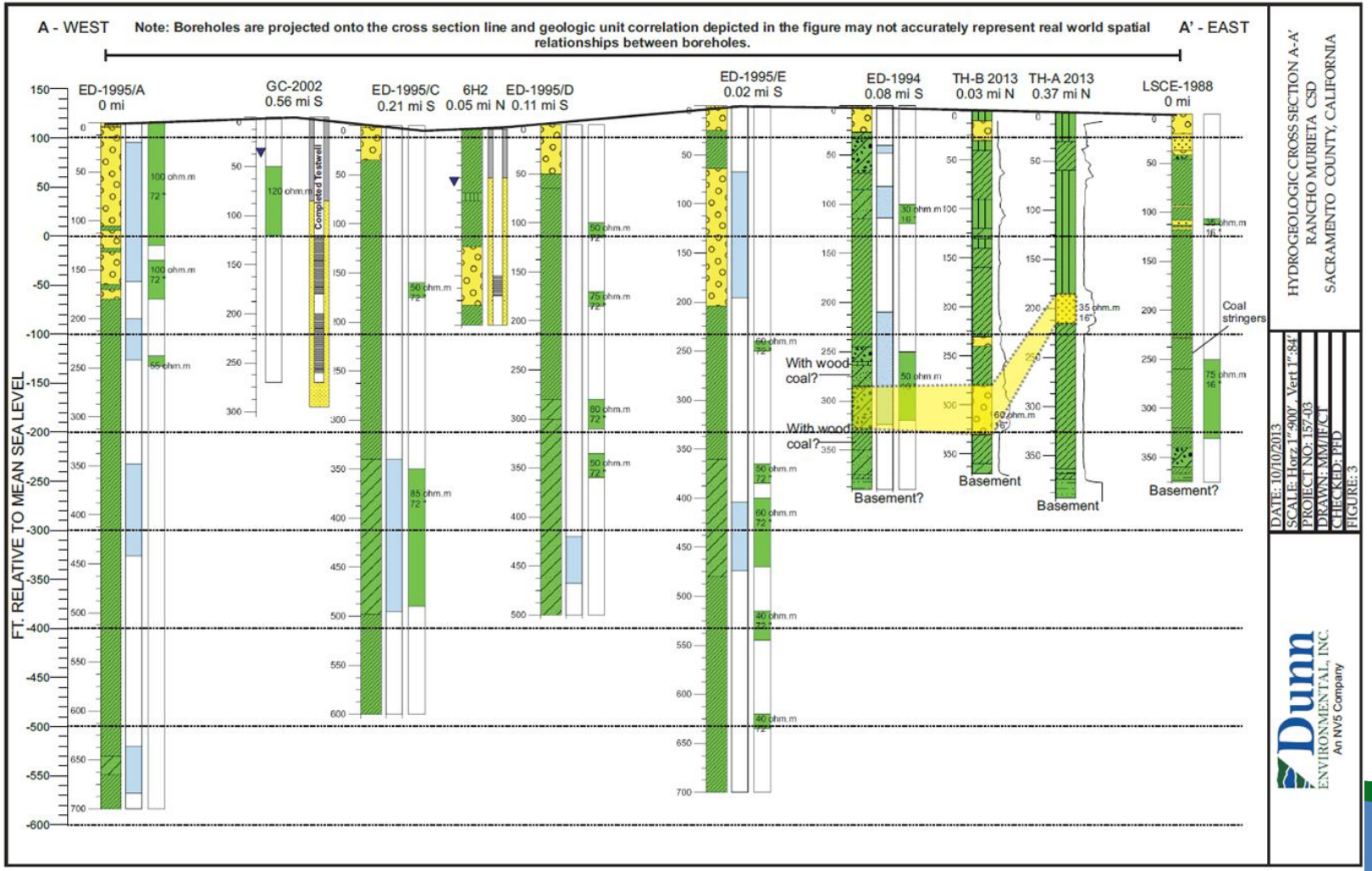



200
100
0
-100
-200
-300
-400
-500
Elevation (above MSL)
Impermeable Layer
Layer 1
Impermeable Layer
Layer 2
0
2
4
6
8
10
12
14
16
18
20
22
Miles
Elevation of Bottom of Well
GS Elevation
2000 GW Level (Layer 1)
Aquif
ORIME
Central Sacramento Groundwater Basin Well Impact Analysis
Geologic Cross Section A - A'
November 2005
FIGURE 2.5


A - WEST
Note: Boreholes are projected onto the cross section line and geologic unit correlation depicted in the figure may not accurately represent real world spatial relationships between boreholes.
A' - EAST
ED-1995/A
0 mi
GC-2002
0.56 mi S
ED-1995/C
0.21 mi S
6H2
0.05 mi N
ED-1995/D
0.11 mi S
ED-1995/E
0.02 mi S
ED-1994
0.08 mi S
TH-B 2013
0.03 mi N
TH-A 2013
0.37 mi N
LSCE-1988
0 mi
FT. RELATIVE TO MEAN SEA LEVEL
100 ohm.m
72"
55 ohm.m
120 ohm.m
Completed Testwell
50 ohm.m
72"
85 ohm.m
72"
75 ohm.m
72"
80 ohm.m
72"
60 ohm.m
72"
40 ohm.m
72"
30 ohm.m
18"
With wood coal?
With wood coal?
Basement?
60 ohm.m
18"
Basement
35 ohm.m
16"
Basement
35 ohm.m
16"
Coal stringers
75 ohm.m
16"
Basement?
HYDROGEOLOGIC CROSS SECTION A-A'
RANCHO MURIETA CSD
SACRAMENTO COUNTY, CALIFORNIA
DATE: 10/10/2013
SCALE: Horz 1"=900' Vert 1"=84'
PROJECT NO: 157-03
DRAWN: MM/JFC/CT
CHECKED: PFD
FIGURE: 3
Dunn
ENVIRONMENTAL, INC.
An NV5 Company

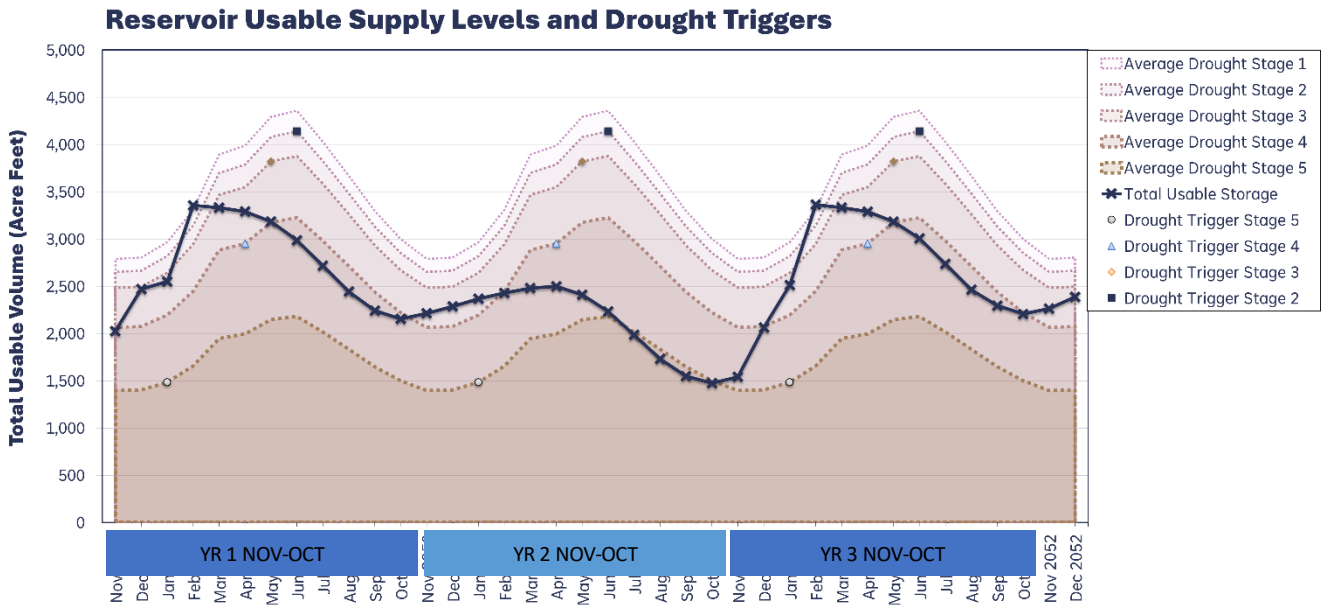
What Can We Expect From Groundwater?

- 2013 Test holes and Water Augmentation Technical Memorandum
  - Two test holes were drilled and tested in 2013
  - Expected flow rates of 150-500 gallons per minute
  - Can expect 1-2 wells to meet current demands, and 3-5 wells to meet future demands
  - Other past groundwater investigations:
    - 2 test holes drilled in 1988
    - 1 test hole drilled in 1994
    - 5 test holes drilled in 1995
    - 1 test hole drilled in 2002

Scenario 3 – Historic Drought with Climate Change Supply Augmentation Conclusion

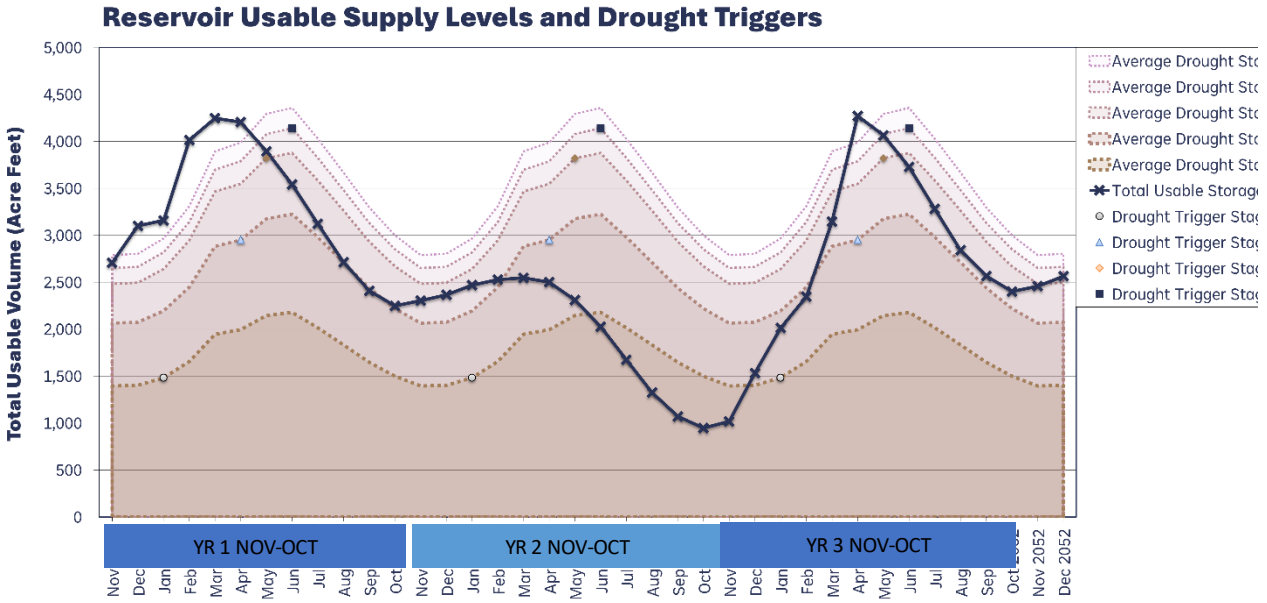
- With “worst-case” drought and climate change:
  - To meet **current** demand need to consider using Clementia or well, or increase cutback
  - To meet buildout demand:
    - Consider Clementia and 1,200 GPM wells, OR
    - Consider 2,000 GPM wells without Clementia

Scenario 3c – "Worst-Case" Drought with Climate Change Buildout Demand Augmentation Outcome



- Clementia **Offline**
- Use drought plan (30% cutback in stage 4 and 5)
- **With 2,000 GPM well**
- Using recycled water for planned and established dual-plumbed connections
- Golf course served by raw water

Scenario 3d – "Worst-Case" Drought with Climate Change Buildout Demand Augmentation Outcome



- Clementia **Online**
- Use drought plan (30% cutback in stage 4 and 5)
- **With 1,200 GPM well**
- Using recycled water for planned and established dual-plumbed connections
- Golf course served by raw water

Technical Observations – Supply Augmentation Alternatives

Scenario	1a	1b	1c	2a	2b	3a	3b	3c	3d
Hydrology	Average Year	Average Year	Average Year	Historic Drought	Historic Drought	Historic Drought	Historic Drought	Historic Drought	Historic Drought
Demand	Current	**Buildout**	**Buildout**	Current	**Buildout**	Current	**Buildout**	**Buildout**	**Buildout**
Utilize Clementia	NO	NO	YES	NO	NO	NO	YES	NO	YES
Additional Source	NO	Back-up needed	NO	Back-up needed	Necessary	**1,200 gpm capacity source**	**500 gpm capacity source**	**2,000 gpm capacity source**	**1,200 gpm capacity source**
Outcome	Meet Monthly Demands and SB552	Do not meet SB552	Meet Monthly D emands and SB552	Do not meet SB552	Significant Shortfall	Meet Monthly Demands and SB 552	Meet Monthly Demands and SB 552	Meet Monthly Demands and SB 552	Meet Monthly Demands and SB 552

CSD Water Conservation & Recycling Program

- Regional Water Authority – District has been a long-time member of RWA's Water Use Efficiency Program
  - Education
  - Website
  - Rebates
- Water waste prevention
- Landscape design standards by County Ordinance
- Recycled water program – currently goes to the golf course

Summary

- Robust water rights permits, some action items
- System technically meets Average Day "Demands" with climate change
  - Existing and at the threshold of meeting estimated future demands
- Need a roadmap for meeting "Drought Demands"
  - Existing and future both projected shortfall
    - Do Nothing – then assume would need Stage 4 or Stage 5
    - Add groundwater wells – solves some vulnerability
    - Revisit approach to Clementia
    - More conservation and/or deeper cuts for curtailment

Questions?

Thank You