



# Strategic Water Supply Assessment

**PUBLIC WORKSHOP**

**February 6, 2023**



# Workshop Agenda: Strategic Water Supply Assessment

- Detailed Review of Demand Management
- Project Update
- Review of Water Management Portfolios
- Summary of Performance of Portfolios
- Developing Roadmaps
- Next Steps

# Current Water Saving Incentives

- Turf Conversion Rebates
- Flume Smart Home Water Monitor
- Hot Water Recirculating System
- Pool or Spa Covers
- High Efficiency Clothes Washers
- High Efficiency Toilets
- Smart Irrigation Controllers
- Graywater: Laundry-to-Landscape kits
- Rain barrels and cisterns



# Current Policy and Regulations

- Local Policy and Regulations

- Landscape Plan Review
- Indoor Fixture Standards
- Graywater Requirement
- Water Waste Prohibitions
- Ongoing irrigation limitations
  - Overhead spray limited to 2 days/week

- State Regulations

- SB606/AB1668: Water Use Objectives
  - Indoor Residential Targets
  - Outdoor Water Use Targets
  - Commercial, Industrial, Institutional Water Use Targets
  - Water Loss Targets

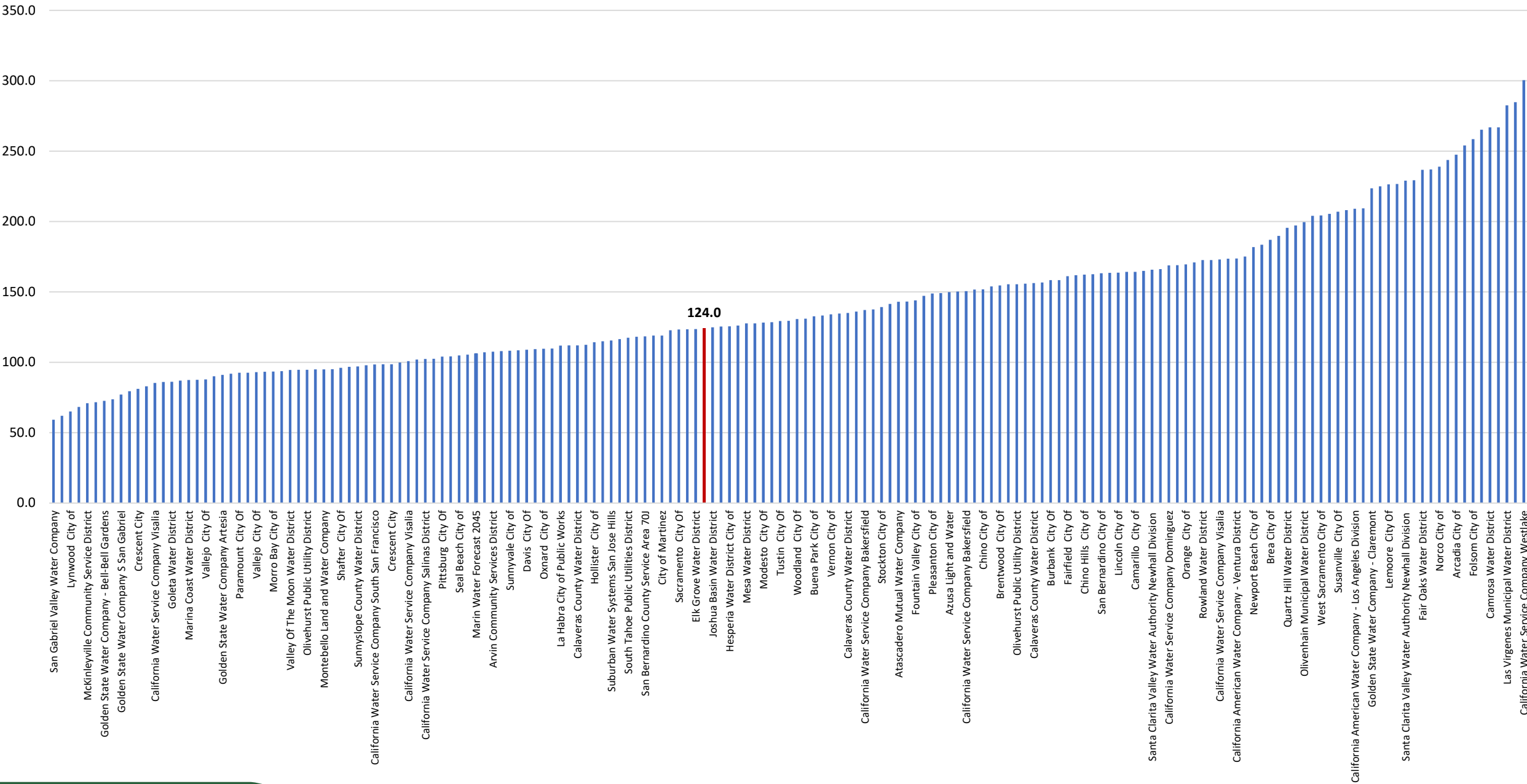


# Current Outreach and Education

- School Education
- Residential and Commercial Water Use Surveys
- Marin-Friendly Garden Walks
- Eco-Friendly Garden Tour
- Watershed Approach to Landscaping
- Weekly Watering Schedule
- Workshops and Training Seminars



2020 Total Per Capita - California



# **Development of Strategic Water Supply Assessment Water Conservation Element**

# Pursuing Demand Reduction through Water Efficiency

## WATER EFFICIENCY PROGRAM

### SWSA's WATER CONSERVATION ELEMENT

*Demand Reduction Goal: ~160 AFY*

### WATER EFFICIENCY MASTER PLAN

*Goal: TBD*

### DROUGHT RESPONSE ACTIONS

*Goal: Aligns with Shortage Level*

- Incentivized, voluntary program
- Quantifiable programs with calculated water savings
- Participation levels limited to be achievable based on historic data

- Short, medium, long term demand reduction goals maximizing the potential water savings
- Leading edge initiatives
- Incentivized, voluntary program
- May include adaptation of ordinances
- Includes non-quantifiable programs

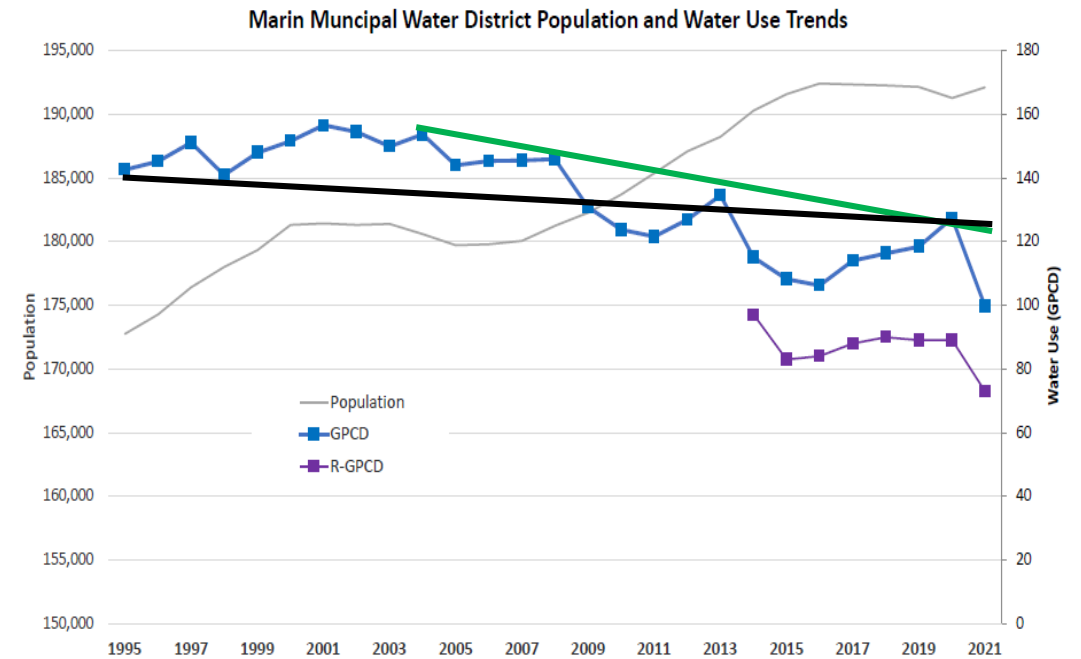
- Short term, low frequency
- Initially voluntary, progress to mandatory
- Defined short term savings objectives per adopted Shortage Level (WSCP)
- Provides some long-term benefit



# SWSA Development of the Water Conservation Element: Forecasting Water Savings

- Understating demand may lead to shortage of water
- Over stating demand may lead to unnecessary water supply projects
- Conservation is challenging to accurately forecast

The level of conservation to be included in water supply planning must be based on empirical data to ensure a reasonable level of confidence in achieving the projected savings.



Very different forecasts of future conservation water savings can be drawn from GPCD trend analysis.

# Water Supply Assessment: Evaluation of Opportunities for Water Savings in each Sector

- Single Family Indoor – Proposed State target of 42 indoor gpcd
- Residential Outdoor – Turf replacement, technology & efficiencies
- Landscape – Plant material, irrigation efficiencies, education
- Other – System losses
- Multi Family – Limited (similar to single family indoor)
- Industrial/Commercial – Largely indoor uses

The greatest opportunity for water savings is in outdoor irrigation

# Development of the SWSA Water Conservation Element

- Natural replacement of water using appliances with newer high efficiency devices due to building code, plumbing code, and other regulatory requirements.
- Incentives include, but not limited to:
  - AMI Leak Letters: 1,250 notifications/year (increase will correspond with new AMI installations)
  - Non-Functional Turf Conversion: 70,000 sqft/year
  - Turf Conversion: 100,000 sqft /year
  - Rain Barrels: 15,000 gallons/year
  - Pool Covers: 90 covers/year
  - Laundry to Landscape Graywater Kits: 40 kits/year
  - Conservation Assistance Program: 500 site visits/year
  - SMART Irrigation Controllers: 100 controllers/year

Near-term incentive program designed based on best available technology.

# Developing the SWSA Conservation Element Based on Historic Participation

Program Activity	SWSA Conservation Element	Past Annual Participation	
		Pre-Drought	2021 Drought
AMI Leak Notifications (letters/yr)	1,250	1,140	1,601
Non-Functional Turf Conversion Rebates (sqft/yr)	70,000	0	0
Turf Conversion Rebates (sqft/yr)	100,000	7,736	410,000
Pool Cover Rebates (/yr)	90	12	399
SMART Irrigation Controller Rebates (/yr)	100	50	480
Conservation Assistance Program (site visits/yr)	500	195	667
Laundry to Landscape Graywater Kits Rebates (kits/yr)	40	5	44
Rain Barrel Rebates (gallons/yr)	15,000	460	43,497

# SWSA Conservation Element Program Details & Cost

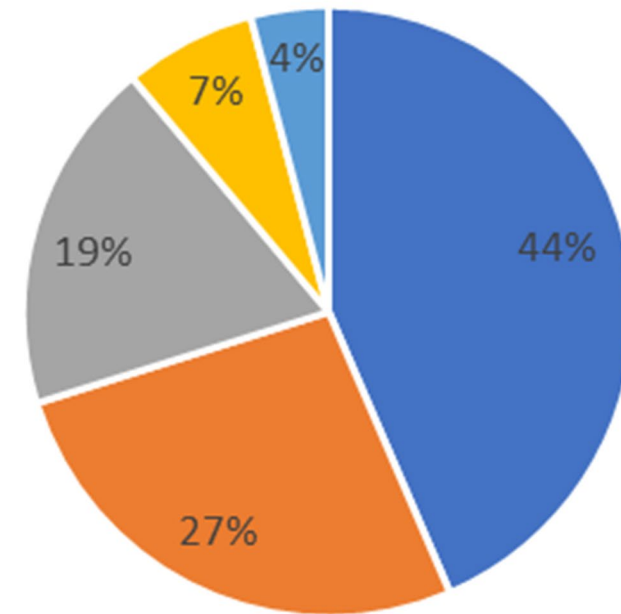
Activity Name (program offer)	Annual Participation	Unit Cost (\$/AF)	Cumulative Water Savings in 2045 (AF)
<i>Actual Drought Response Program Savings</i>			
High Efficiency Toilets (\$150 rebate)	30	\$2,435	6
High Efficiency Clothes Washers (\$100 rebate)	390	\$732	116
Flume Home Water Monitor (\$115 rebate)	2,000	\$442	904
Drought Program Turf Conversion (\$3/sqft)	380,000	\$2,024	780
Drought Program Mulch Madness (\$4.26/sqft)	47,600	\$3,116	97
Hot Water Recirculating System (\$50 rebate)	150	\$1,677	17
<i>Forecasted Ongoing SWSA Water Conservation Element</i>			
AMI Leak Notifications (letters)	1,250	\$287	9,990
Non-Functional Turf Conversion (\$1.50-\$3/sqft)	70,000	\$2,132	4,505
Turf Conversion – Post Drought Programs (\$1.50-\$3/sqft)	100,000	\$1,985	4,282
Pool Cover Rebates (\$100 rebate)	90	\$877	642
Residential Irrigation Controller (\$100 rebate)	100	\$1,035	586
Residential CAP's (site visits)	500	\$13,763	378
Laundry-to-Landscape System (\$125 rebate)	40	\$4,988	154
Rain Barrel Rebate Program (\$0.50/gal of storage)	15,000	\$8,820	58
Program Overhead		\$414	
<b>Total</b>		<b>\$1,792</b>	<b>22,515</b>

# Strategic Water Supply Assessment: Potential For Water Use Savings By Sector in 2045

Calculated using the Alliance for Water Efficiency Conservation Tracking Tool

- Single-family Residential ~1,745 AF
- Multi-family Residential ~1,069 AF
- Commercial/ Industrial/ Institutional ~750 AF
- Landscape ~165 AF
- System Losses ~280 AF
- *Total Savings in 2045 – 4,009 AF*

Savings By Sector



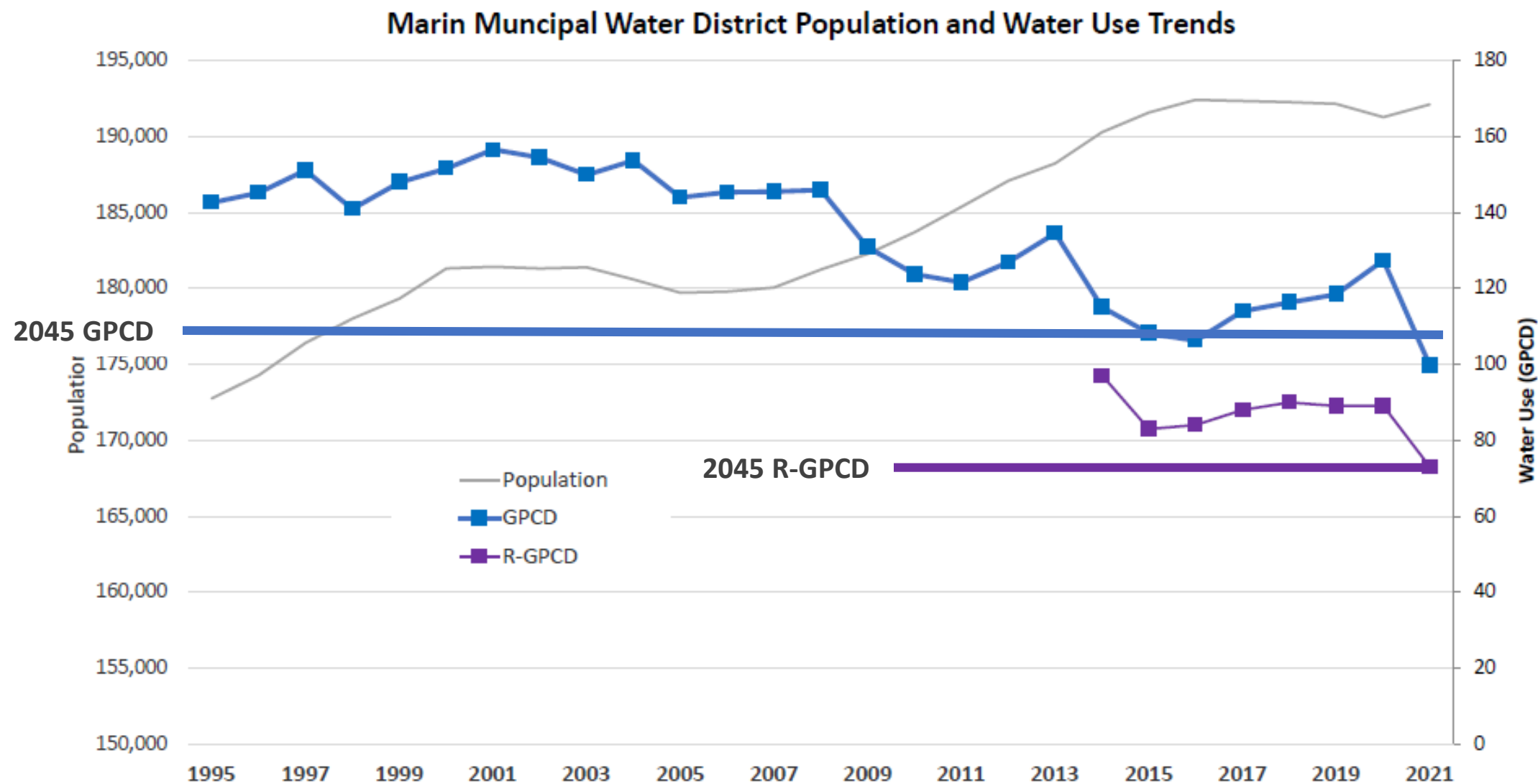
■ SF ■ MF ■ CII ■ System ■ Landscape



# Strategic Water Supply Assessment: Projected Demand and Savings

		Projected Annual Consumption w/ RHNA (acft)				
	Baseline	2025	2030	2035	2040	2045
Single-Family	13702	15575	17253	17702	18034	18392
Multi-Family	3078	3384	3722	3801	3849	3903
Commercial (Business/Industrial)	2560	2875	2922	2945	2952	2959
Institutional/Governmental	1349	1600	1627	1640	1643	1647
Landscape	1381	1659	1686	1700	1704	1707
Other & Non-Revenue Water	2664	2807	2810	2804	2912	2828
Projected Savings	0	-801.8	-1603.6	-2405.4	-3207.2	-4009
Total with Savings	24733	27098	28416	28186	27787	27427
Population (including RHNA)	191,269	202,510	218,444	223,251	227,005	230,996
Total GPCD	115	119	116	113	109	106

# Population and Water Use Trends



# Strategic Water Supply Assessment: GPCD Trends

- 2020 District-wide GPCD = 124 gallons per day
- 2020 R-GPCD = ~87 gallons per day
- 2045 District-wide GPCD = 106 gallons per day
- 2045 R-GPCD = ~73 gallons per day
- All proposed State Water Use Objectives will be met.
  - Proposed Residential Indoor target of 42 gpcd

Projected savings in GPCD represents a 15% reduction in demand

# SWSA Water Conservation Element Summary

- 2045 Adjusted Water Use
  - 2045 demands: 27,427acft, 15% reduction in projected demands
    - 106 GPCD
    - 73 R-GPCD
- Cumulative Savings in 2045: 22,515 acft
- Cost to fund SWSA's Water Conservation Project
  - District Cost: \$1,792/acft
    - Annual Budget Estimate: \$1.7M for incentives and associated program management
      - Does not include School Education Program and other non-incentive based program expenditures

# Initial Peer Review to Identify Additional Opportunities

August 2: Peter Mayer, WaterDM

- Proposed Water Conservation Element is “Substantive and Achievable”
  - Addresses key area for future savings
    - Leaks (AMI leak detection)
    - Outdoor use (turf conversions)
  - Program budget is substantial and compares favorably
  - Expect many adaptations and changes to the program between now and 2045
  - Savings goal of 106 GPCD and 73 R-GPCD is meaningful and achievable
- Savings through new local regulations could increase demand reductions
  - Consider community impact of deeper demand reductions particularly to landscapes and the non-residential sector.

# Development of a Regulatory Driven Project

**Regulations and Enforcement would need to be developed and would require:**

- Enforcement of water budgets and penalties
- Expanded Water Efficient Landscape Ordinance regulations
  - Limit turf installations in all new development and remodels
  - Only allow low water use plants, drip irrigation in all new development and remodels
  - Prohibit non-functional turf in existing non-residential sites
  - Prohibit turf in front yards and limit allowable turf area in existing single-family homes
- Indoor fixture standards/requirements
- Retrofit on Resale and/or Change of Customer
  - Ensure fixture, landscape, and irrigation requirements are met.



# Regulatory Driven Project

- Regulatory Driven Project builds on the savings projected in SWSA's Water Conservation Project
- Water savings estimate resulting from adoption of strict landscape codes and associated enforcement:
  - 2045 demands: 25,875 acft
    - 100 GPCD (vs 106 GPCD)
    - 69 R-GPCD (vs 73 GPCD)
- Cost to Fund a Regulatory Driven Project
  - District Cost: ~\$4,000/acft

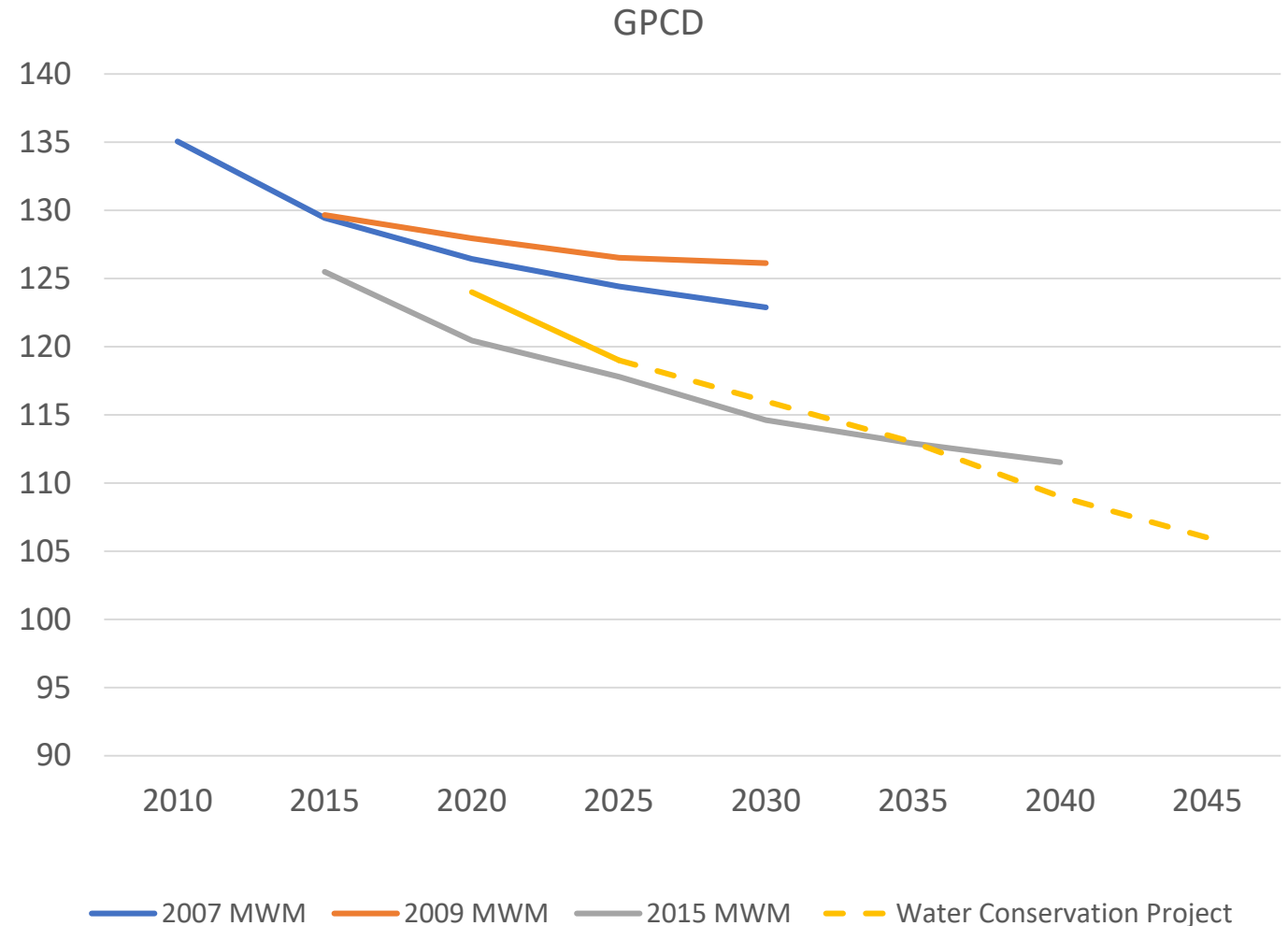
# Secondary Peer Review

November 15: Maddaus Water Management

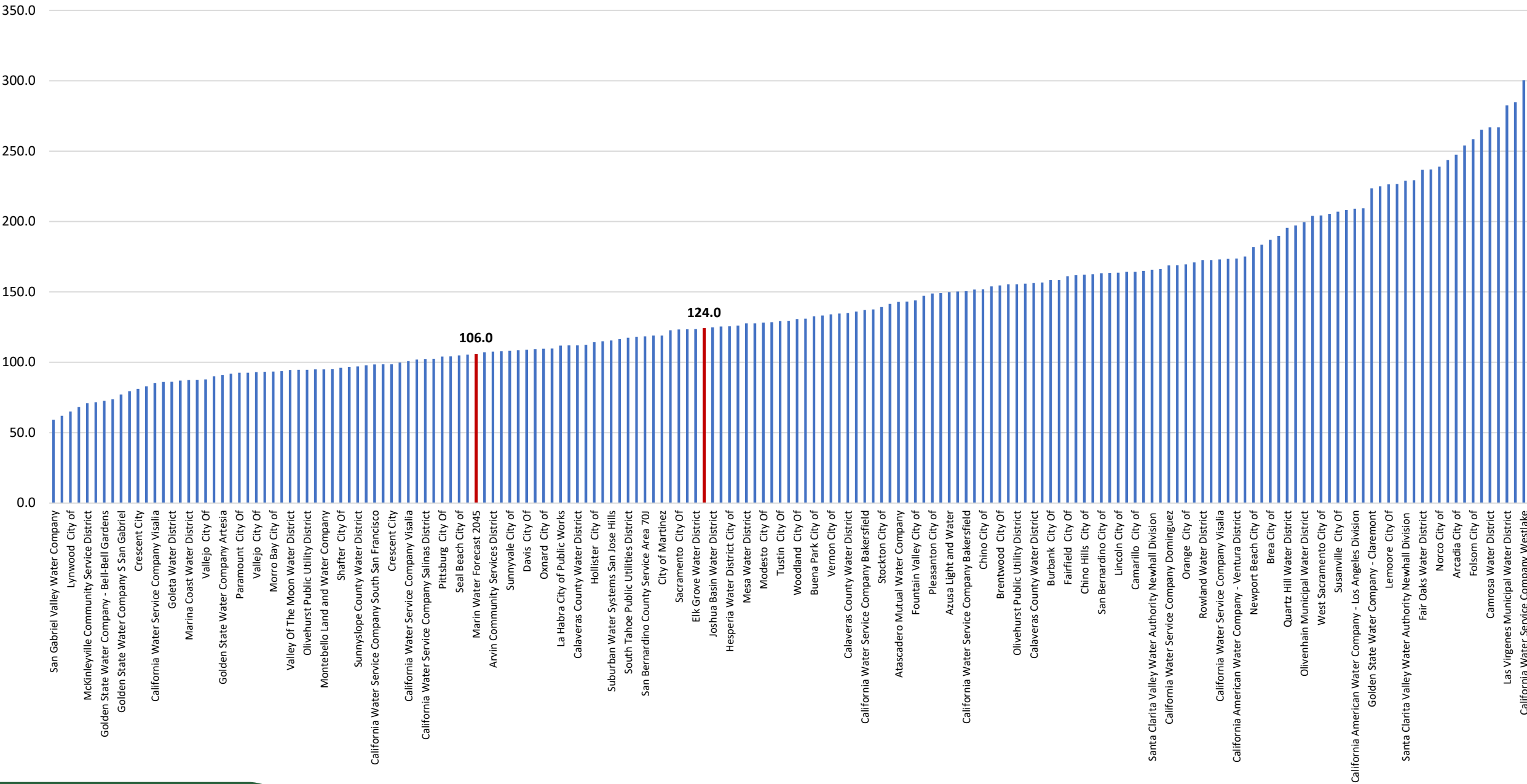
- Proposed SWSA Water Conservation Element savings and participation to be reasonable in context of the ongoing water supply planning effort
  - Recommended removal of some programs (rain barrels, graywater, pool covers)
  - Recommendation to explore opportunities to increase participation in turf replacement program and increase smart irrigation controller rebates
- Opportunities for additional savings
  - System Water Loss Reduction
  - Implementation of District-wide AMI
  - Adopt a suite of regulations and policies (demand offset/water neutral policy for large new developments, increase the enforcement of existing regulations)

# Historic Water Conservation Program Planning

- Maddaus Water Management Program Evaluations
  - 2007
  - 2009
  - 2015
- Alliance for Water Efficiency Program Evaluation
  - 2020 Demand Analysis for 2020 UWMP
  - 2022 SWSA Water Conservation Project Scenario



Total Per Capita - California



# Incorporating Demand Reductions into SWSA

- Based on cost and peer review board feedback was given to pursue the incentive based Water Conservation Element

	SWSA's Water Conservation Element	Regulatory Driven Project
2030 Yield, AF	1,604	2,027
2045 Yield, AF	4,009	5,561
Average Yield, AF	938	1,246
Cumulative Yield, AF	22,515	29,913

Alternative	SWSA's Water Conservation Element	Regulatory Driven Project
Capital Cost	\$0	\$0
Annual O&M Costs	\$1,680,000	\$4,980,000
Total Annualized Cost	\$1,680,000	\$4,980,000
2045 Yield, AF	4,009	5,561
Cost per AFY	\$1,792	\$4,000

# Summary

- SWSA Water Conservation Element is projecting a 15% reduction in demand by 2045
- Conservation savings have been incorporated into the SWSA based on data from historic participation and best estimates by District staff and augmented by nationally recognized experts in field of demand management
- The Water Efficiency program, to be updated this year through the Master Plan, will aspire to greater levels of water savings than the projections incorporated into the SWSA
- Further savings could be achieved through more stringent landscape regulations and policies with focused enforcement

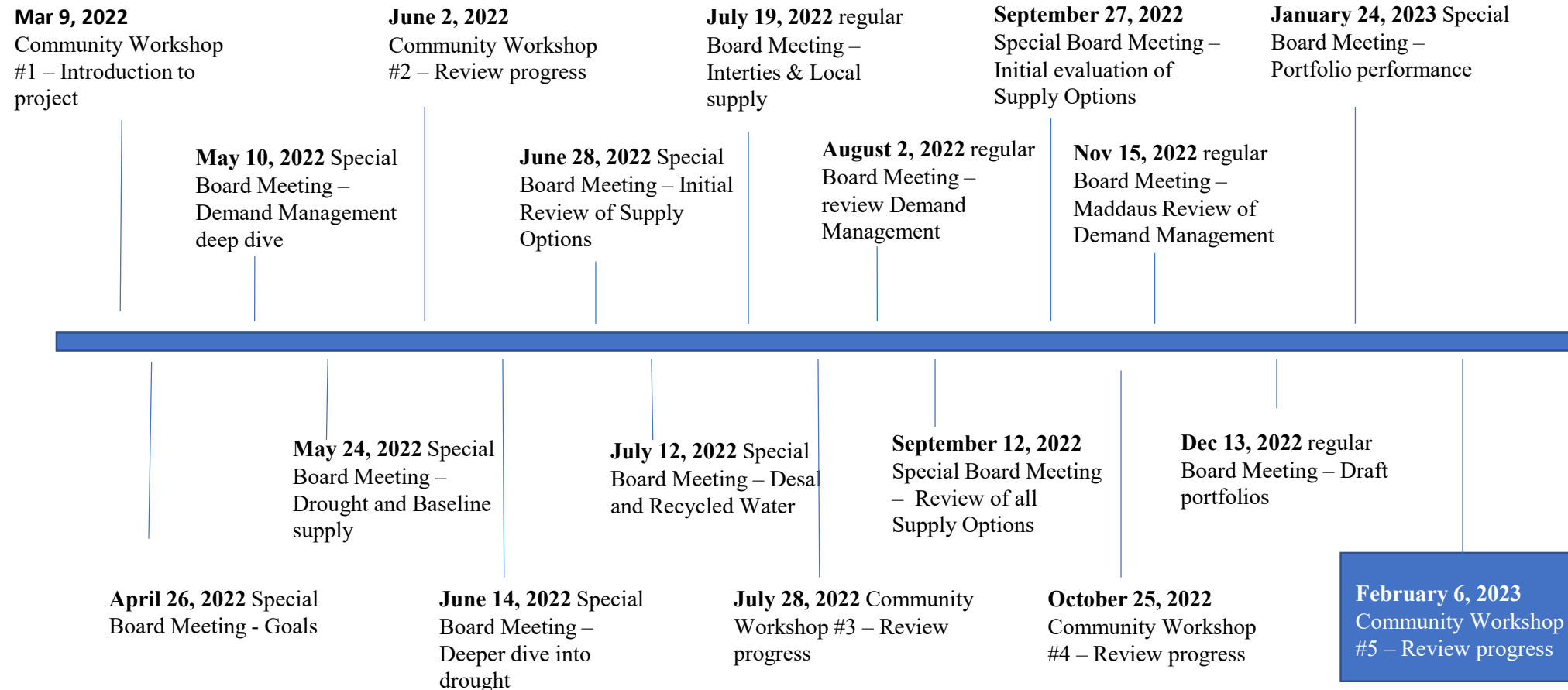


# Strategic Water Supply Assessment Project Update

# Strategic Water Supply Assessment: Glossary

- AF – Acre foot (1 acre foot= 325,850 gallons)
- AFY – Acre feet per year
- TAF or KAF – Thousand acre feet
- AR – Atmospheric River
- GPCD – Gallons per capita per day
- GPHD – Gallons per household per day
- GW – Ground Water
- DPR – Direct Potable Re-use
- IPR – Indirect Potable Re-use
- WTP – Water Treatment Plant
- AWTP – Advanced Water Treatment Plant
- WWTP – Waste Water Treatment Plant
- PS – Pump Station
- Synthetic Drought – hypothetical drought or artificially created
- Trace – line of reservoir storage on a chart
- Paleoclimate – Climate prior to modern observations

# Public Meetings and Engagement



<https://www.marinwater.org/WaterSupplyResiliency>

# Strategic Water Supply Assessment: Schedule

- ✓ December 13 – Draft Strategies and Portfolios
- ✓ January 24 – Analysis of Portfolios
- February 6 – Community Workshop
- February 14 – Roadmap

# Strategic Water Supply Assessment: Project Overview

The Assessment will address the following questions:

1. What is the current risk to MMWD's water delivery reliability under recent and projected future droughts?
2. How much additional water supply is needed under different future hydrologic drought and demand scenarios?
3. What are the range of water supply alternatives that could increase resiliency of MMWD's system? And what are their strengths and weaknesses?
4. What recommendations can be developed to support MMWD's near-term investment in drought resiliency?

# Process for Assessment

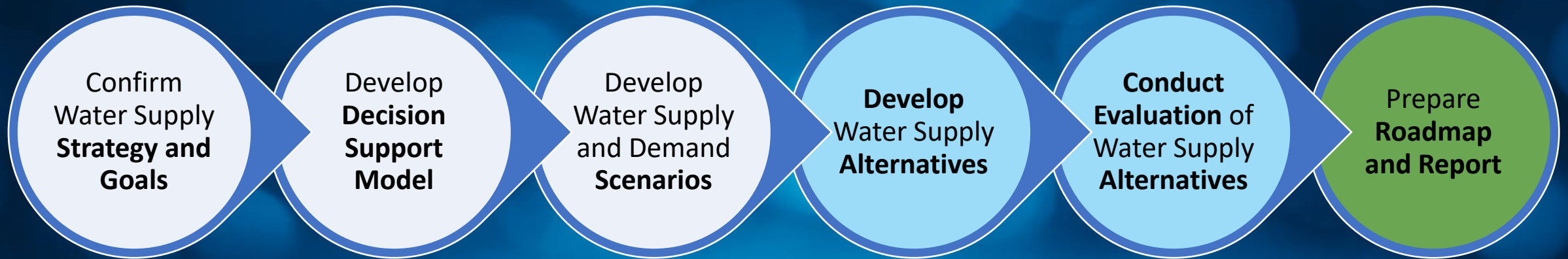


# Key Project Scope Elements

Understanding Current Risks & Establishing Goals

Identifying & Evaluating Alternatives

Recommendations  
& Path Forward



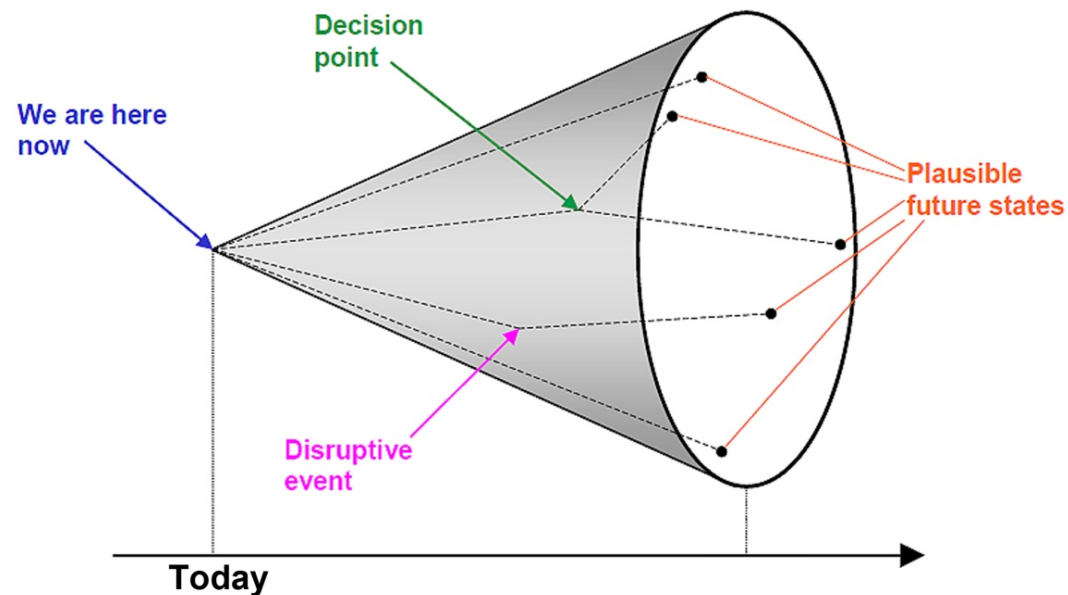
We are here

# Strategic Water Supply Assessment: Scenarios

- Scenarios are intended to capture uncertainty that is NOT in management control for this decision
- Water Supply - Hydroclimate
  - Historical
  - Climate projections
  - Paleoclimate reconstructions
  - Synthetic droughts
- Water Demand
  - Recent trends
  - Population growth and land use
  - Passive levels increasing water use efficiency

# Strategic Water Supply Assessment: Scenarios

## ■ Draft Scenarios – *Explore Uncertainties We Don't Control*



Scenario 1 – Current Trends

Scenario 2 – Short and Severe Drought

Scenario 3 – Beyond Drought of Record

Scenario 4 – Abrupt Disruptions

Conservation scenario is now a Water Management Alternative

# Draft Scenario Assumptions

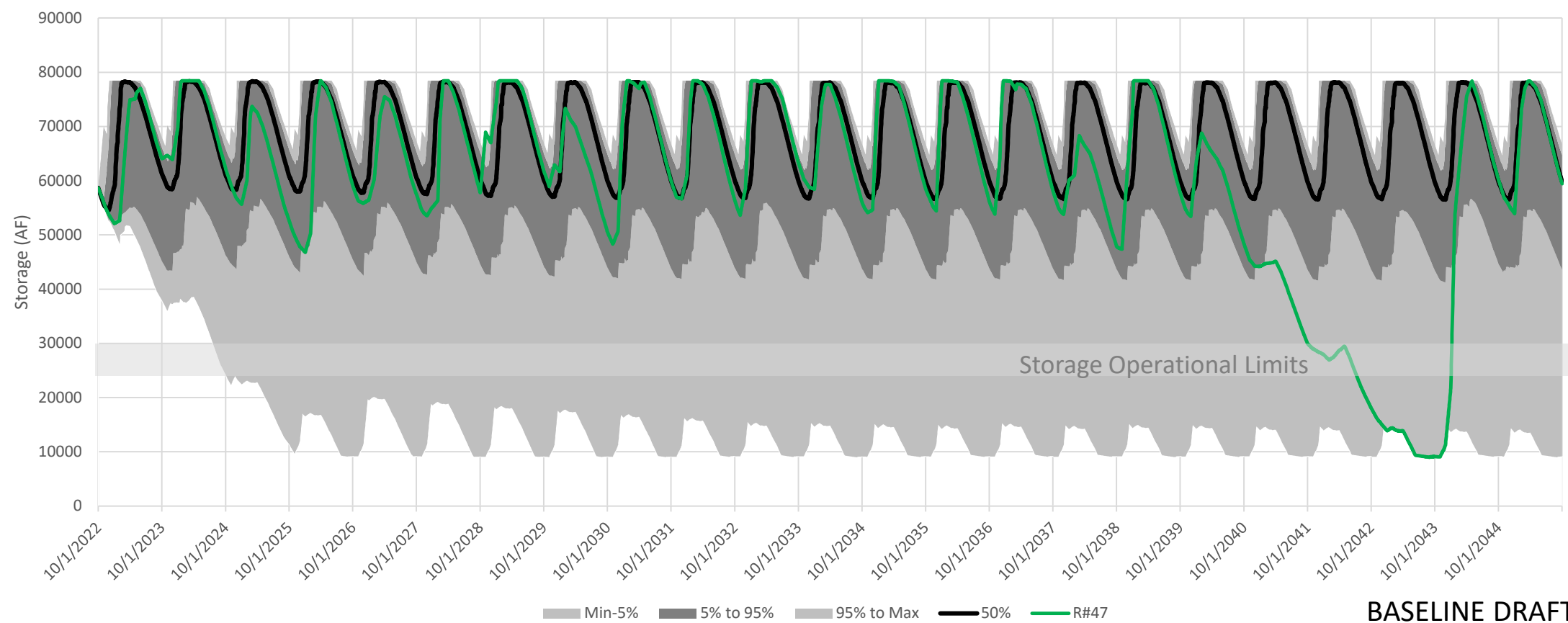
Scenario	Hydroclimate Assumptions	Demand Assumptions	Operational Assumptions
<b>Scenario 1 – Current Trends</b>	Historical observed	Passive-level savings; drought conservation per WSCP	Current operations; local supply preference; supplemental water with Kastania Pump Station rehabilitation
<b>Scenario 2 – Short and Severe Drought</b>	Severe 4-Yr drought (2020, 2021, 1976, 1977)	Passive-level savings; drought conservation per WSCP	Current operations; local supply preference; supplemental water with Kastania Pump Station rehabilitation
<b>Scenario 3 – Beyond Drought of Record</b>	Long-range, extended 6- or 7-Yr drought (based on climate change projections)	Passive-level savings; drought conservation per WSCP	Current operations; local supply preference; supplemental water with Kastania Pump Station rehabilitation
<b>Scenario 4 – Abrupt Disruptions</b>	Severe 2-Yr (2020, 2021) or 4-Yr drought (2020, 2021, 1976, 1977); high wildfire likelihood	Passive-level savings; drought conservation per WSCP	Operational disruptions due to post-wildfire sediment loads; Treatment plants at reduced capacity (Bon Tempe offline & San Geronimo @ 50% operating capacity for 6 months)

Conservation is now a Water Management Alternative

# Scenarios Provide Planning Level Estimates of Deficit

Scenario	Max. Deficit Duration	Annual Deficit (AFY)
Scenario 2 – Short and Severe Drought	4 years	7,500 – 8,500 AFY (4 yrs)

Simulated MMWD Total Reservoir Storage, WY 2023-2045, Scenario 2



BASELINE DRAFT RESULTS

# Review of Water Management Portfolios

# Water Management Alternatives Categories

- Water Management Alternatives considered in 6 main categories
  - Water Conservation
  - Sonoma-Marin Partnerships
  - Local Surface Storage
  - Water Purchases with Conveyance through Bay Interties
  - Desalination
  - Water Reuse

# Moving Toward Strategies and Portfolios

- **Strategies** – a particular plan of action or policy designed to achieve the overall water management goals
- **Portfolios** – a combination of actions designed to implement a particular strategy
- Recognizing no singular alternative is likely to achieve all goals
  - How to balance long-term and shorter-term actions?
  - Are some alternatives synergistic? Can one set of alternatives amplify the benefit of other alternatives or preclude others?
  - Develop select strategies and associated portfolios for testing performance
- Draft portfolios are designed to INFORM roadmap; but are NOT themselves the roadmap
  - Roadmap will follow analysis and evaluation of the portfolios



# Draft Portfolios for Analysis

## ■ Portfolio A: Maximize Existing Infrastructure

- Emphasizes alternatives that maximize existing local and regional water supplies
- Sonoma-Marín partnerships, local storage optimization, interconnections

## ■ Portfolio B: New Local Supply

- Emphasizes alternatives which add new local drought-resilient supplies
- Desalination, Reuse

## ■ Portfolio C: Diversify Imports

- Emphasizes alternatives that diversify imported water from different source watersheds
- Water purchases with Bay interties (EBMUD or CCWD)

## ■ Portfolio D: Low Cost

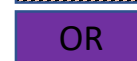
- Emphasizes lowest cost actions (less than ~ \$2,500/AF)
- Greater conservation, maximizing Sonoma Water purchase, regional groundwater bank, local storage augmentation, Petaluma brackish desalination

# Portfolio A – Maximize Existing Infrastructure

Project	Portfolio A: Maximize Existing Infrastructure		
	Near Term (0-3yrs)	Mid Term (4-7yrs)	Long-Term (8-12 yrs)
Temporary Urgency Change Permits (TUCPs)			
Water Shortage Contingency Plan (WSCP) - Stage 1-3			
Water Conservation Program			
Regulatory Driven Program			
Maximize Use of Sonoma Water - Existing Facilities			
Maximize Use of Sonoma Water - Resolve Bottlenecks			
Maximize Use of Sonoma Water - Resolve Bottlenecks+South Transmission System			
Maximize Use of Sonoma Water - Dedicated Conveyance Stafford to Nicasio			
Maximize Use of Sonoma Water - Dedicated Conveyance Kastania to Nicasio			OR
Maximize Use of Sonoma Water - Dedicated Conveyance Cotati to SoulaJule			OR
Regional Groundwater Bank			
SoulaJule Enlargement			OR
Nicasio Enlargement			OR
Kent Enlargement			OR
Halleck Reservoir			
Devil's Gulch Reservoir			
Movable Spillway Gates - SoulaJule			
Movable Spillway Gates - Nicasio			
Movable Spillway Gates - Kent			
Movable Spillway Gates - Alpine			
Phoenix Lake - Bon Tempe Lake Connection			
SoulaJule Electrification			



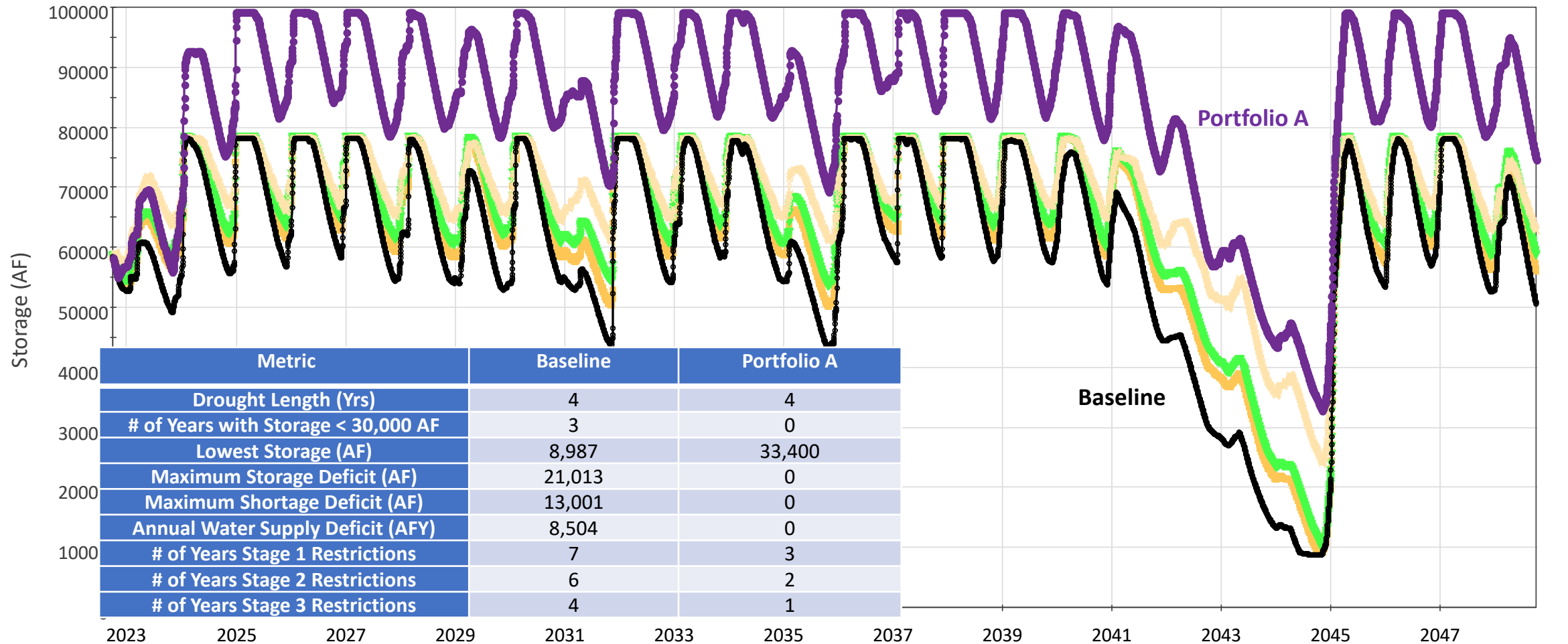
Part of portfolio, but uncertain implementation. Planning required. Not simulated.



Decision between projects. Only one would be selected.

# Portfolio A - Maximize Existing Infrastructure

## Total MMWD Reservoir Storage (Scenario 2)

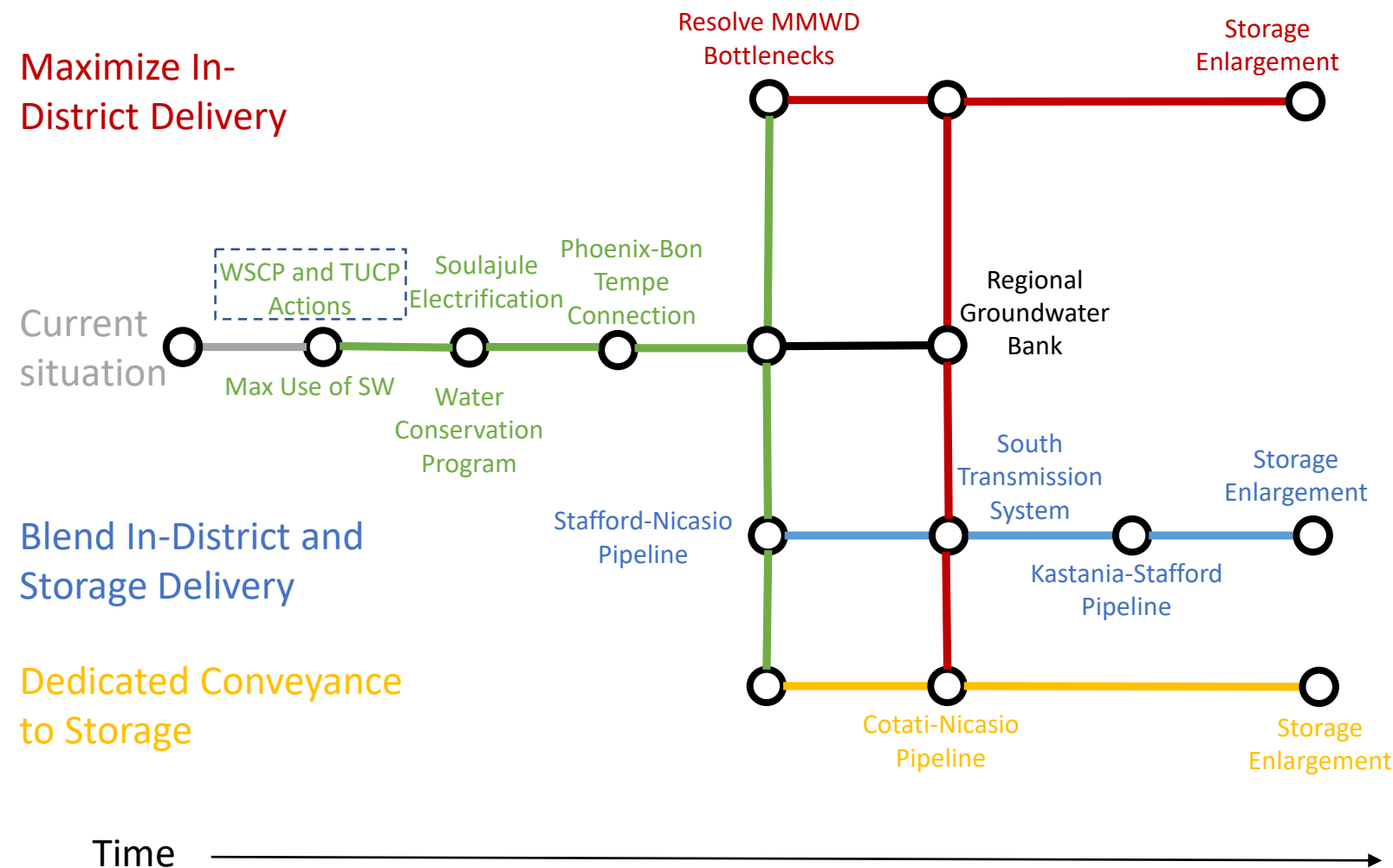


Model

--■-- SM1-S2-Maximise Sonoma Water-Existing Facilities  
--●-- Baseline Scenario2  
-▲- SM2B-S2-Max SON + Bottlenecks+ STS  
-●- Portfolio A-S2 Max Exist Infrastr  
-x- SM4-S2-Max SON with dedicated pipe from Cotati to SOU

# Draft Roadmap for Portfolio A

## Adaptation Pathway Roadmap



## Yield and Cost for Pathways

Pathway	Yield (AFY)	Cost (\$/AFY)
	5,100	1,600
	10,800	2,200
	6,300	1,700
	9,100	2,200
	13,500	2,300
	14,800	2,400
	16,300	2,500

# Portfolio B – New Local Supply

Project	Portfolio B: New Local Supply		
	Near Term (0-3yrs)	Mid Term (4-7yrs)	Long-Term (8-12 yrs)
Temporary Urgency Change Permits (TUCPs)			
Water Shortage Contingency Plan (WSCP) - Stage 1-3			
Water Conservation Program			
Regulatory Driven Program			
Marin Regional Desalination Facility- 5 MGD Stand Alone			
Marin Regional Desalination Facility - 5 MGD Expandable			
Marin Regional Desalination Facility - 10 MGD Expandable			
Marin Regional Desalination Facility - 15 MGD			
Containerized Desalination Facility			
Bay Area Regional Desalination Facility			
Petaluma Brackish Groundwater Desalination Facility			
Recycled Water Expansion - Peacock Gap			
Recycled Water Expansion - San Quentin			
Regional Indirect Potable Reuse (IPR)			
CMSA Direct Potable Reuse (DPR) - Raw Water Augmentation			
CMSA Direct Potable Reuse (DPR) - Treated Water Augmentation			
Regional Direct Potable Reuse (DPR)			



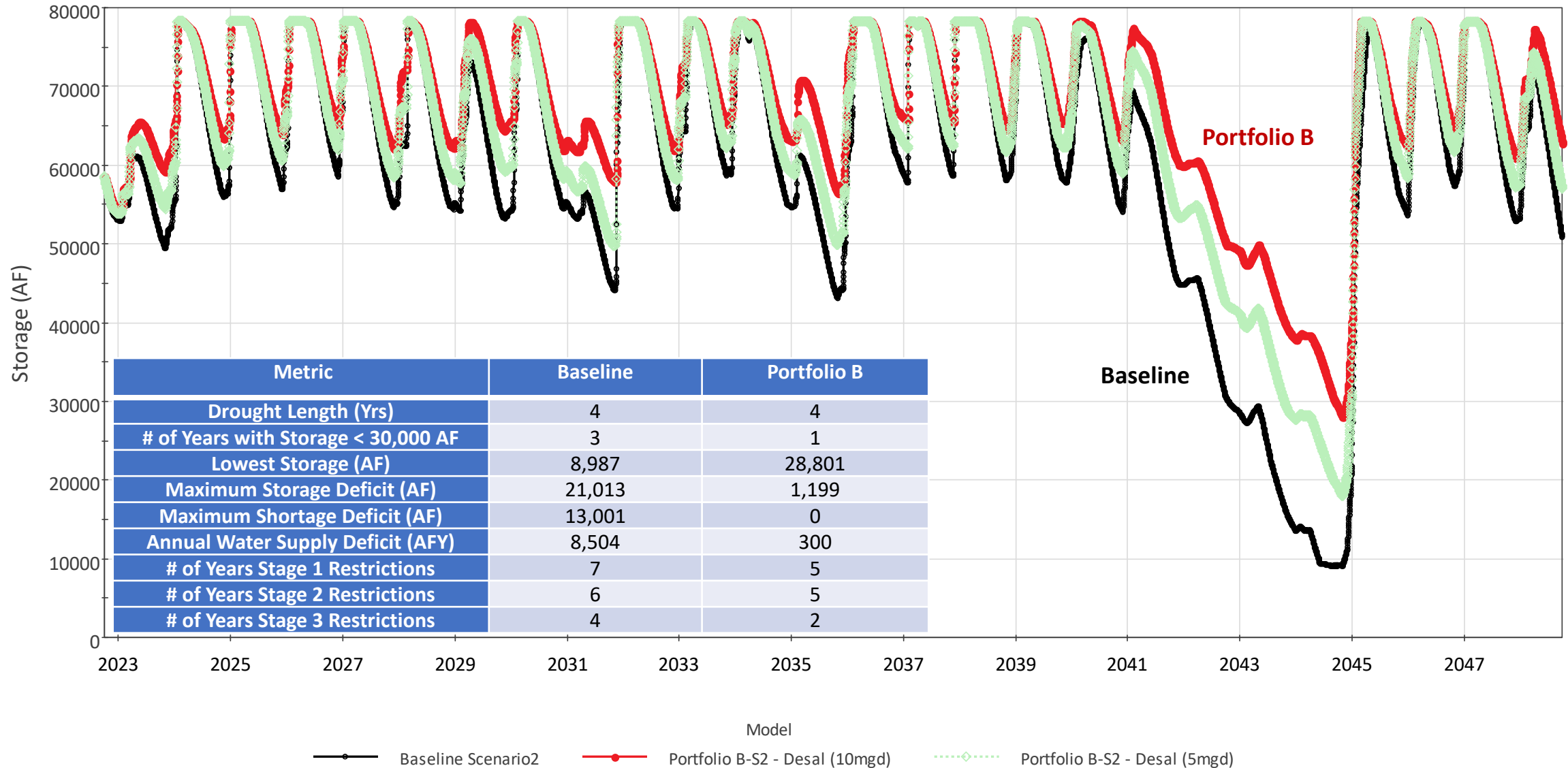
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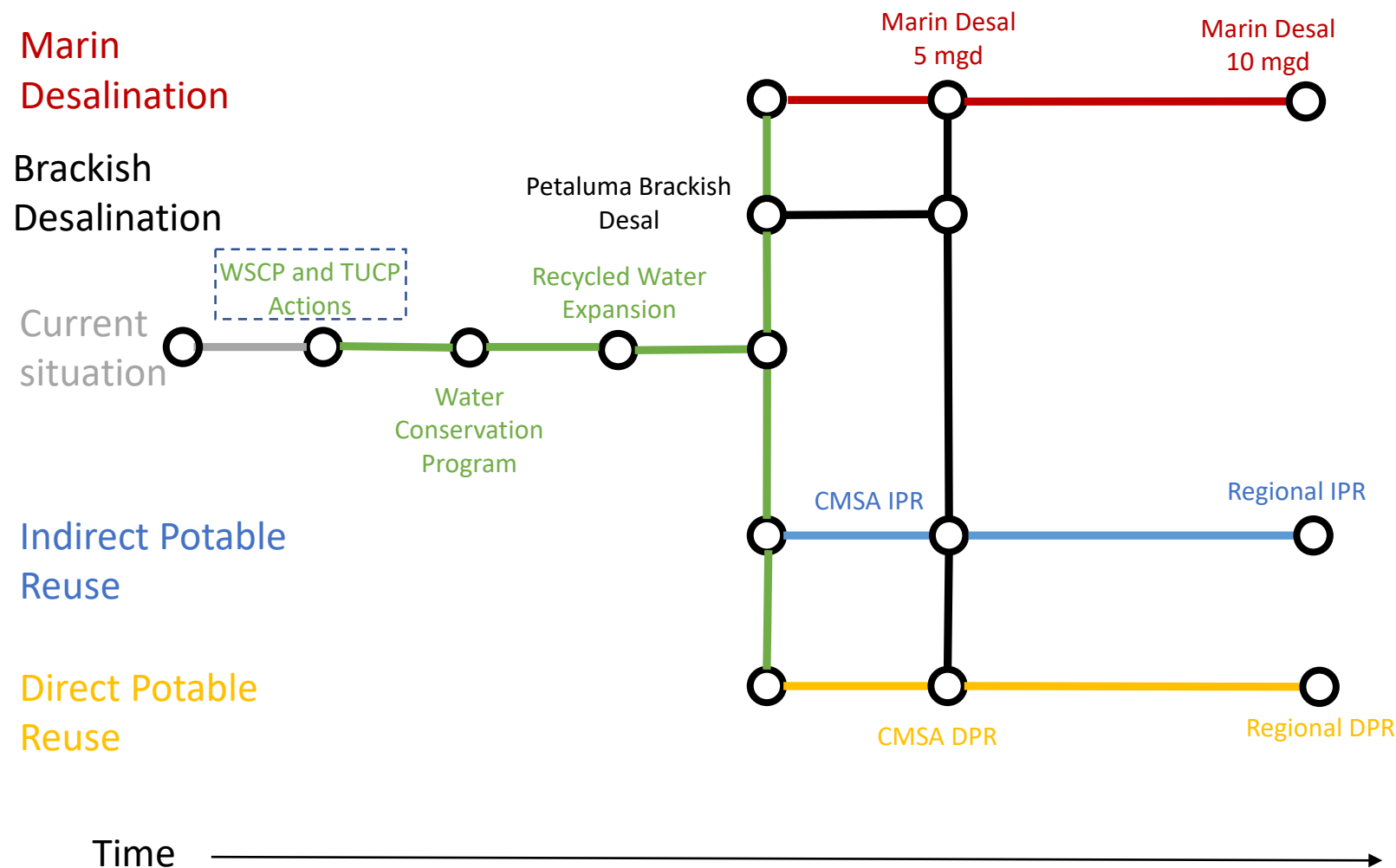
# Portfolio B – New Local Supply

## Total MMWD Reservoir Storage (Scenario 2)



# Draft Roadmap for Portfolio B

## Adaptation Pathway Roadmap



## Yield and Cost for Pathways

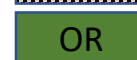
Pathway	Yield (AFY)	Cost (\$/AFY)
	2,800	2,300
	12,900	3,400
	8,200	2,400
	9,900	3,600
	9,900	4,600
	15,200	3,200
	15,200	3,800

# Portfolio C – Diversify Imports

	Portfolio C: Diversify Imports		
	Near Term (0-3yrs)	Mid Term (4-7yrs)	Long-Term (8-12 yrs)
Temporary Urgency Change Permits (TUCPs)			
Water Shortage Contingency Plan (WSCP) - Stage 1-3			
Water Conservation Program			
Regulatory Driven Program			
EBMUD Intertie		OR	
CCWD Intertie		OR	
NBA Intertie - MMWD			
NBA Intertie - Sonoma Aqueduct			
SFPUC Intertie			



Part of portfolio, but uncertain implementation. Planning required. Not simulated.

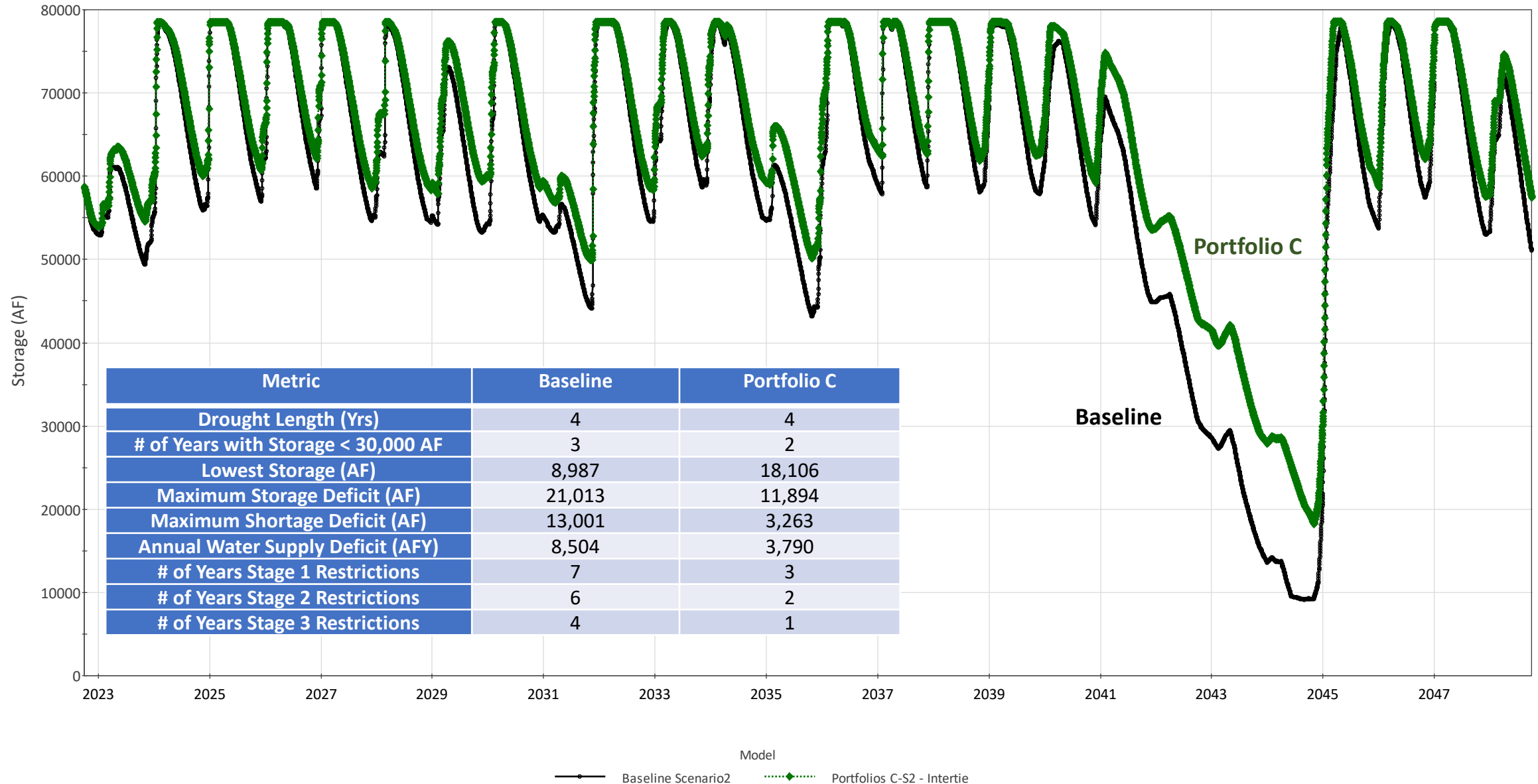


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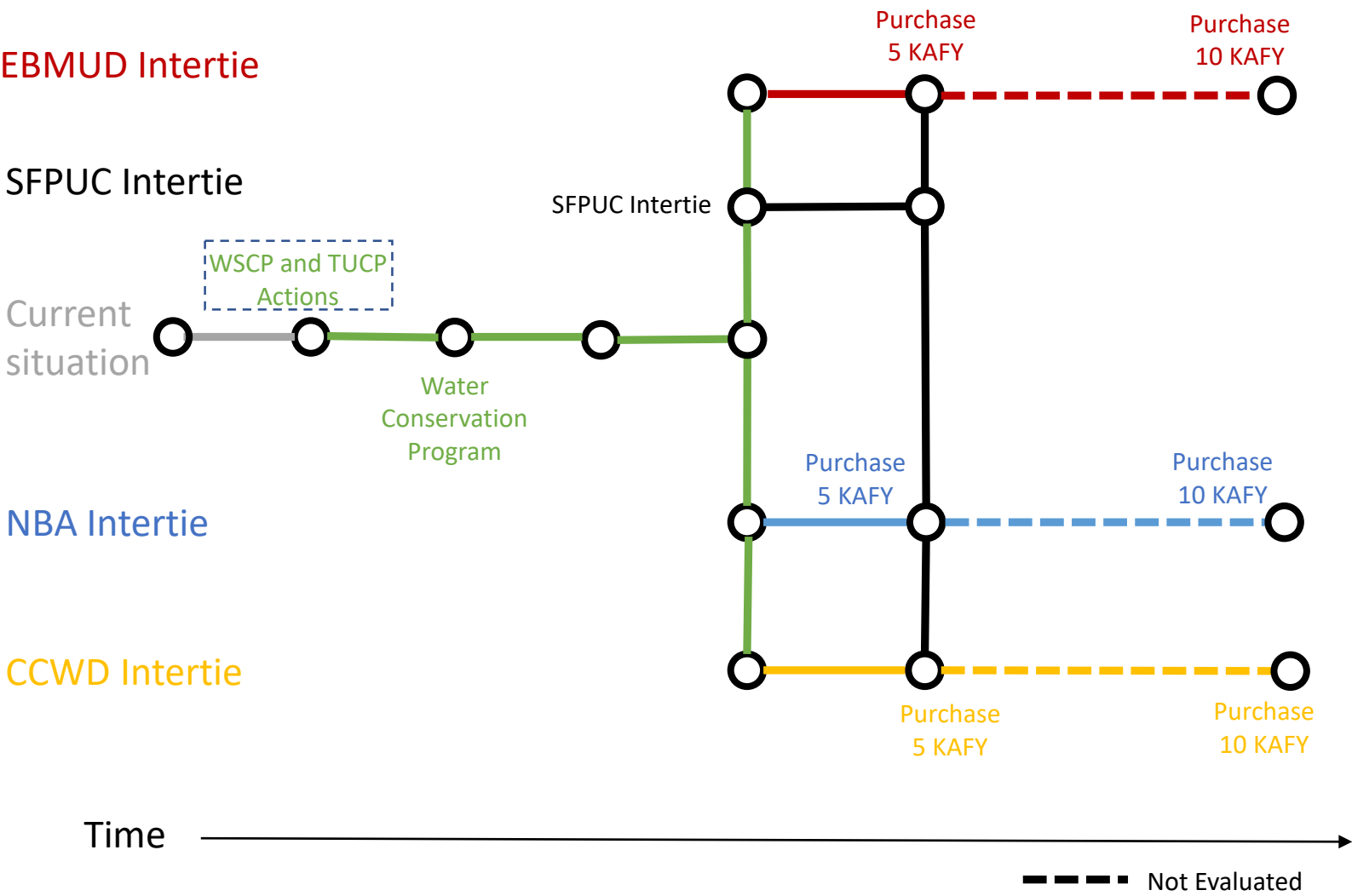
# Portfolio C – Diversify Imports

## Total MMWD Reservoir Storage (Scenario 2)



# Draft Roadmap for Portfolio C

## Adaptation Pathway Roadmap



## Yield and Cost for Pathways

Pathway	Yield (AFY)	Cost (\$/AFY)
	2,400	1,800
	7,400	2,500
	3,400	2,200
	7,400	4,200
	7,400	3,600
	8,400	2,500
	8,400	3,500

# Portfolio D – Low Cost

Project	Portfolio D: Low Cost (less than \$2500/AF)		
	Near Term (0-3yrs)	Mid Term (4-7yrs)	Long-Term (8-12 yrs)
Temporary Urgency Change Permits (TUCPs)			
Water Shortage Contingency Plan (WSCP) - Stage 1-3			
Water Conservation Program			
Regulatory Driven Program			
Maximize Use of Sonoma Water - Existing Facilities			
Maximize Use of Sonoma Water - Resolve Bottlenecks			
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Soulajule Enlargement			
Nicasio Enlargement			
Kent Enlargement			
Halleck Reservoir			
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Movable Spillway Gates - Soulajule			
Movable Spillway Gates - Nicasio			
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Phoenix Lake - Bon Tempe Lake Connection			
Soulajule Electrification			
EBMUD Intertie			
CCWD Intertie			
NBA Intertie - MMWD			
NBA Intertie - Sonoma Aqueduct			
SFPUC Intertie			
Marin Regional Desalination Facility- 5 MGD Stand Alone			
Marin Regional Desalination Facility - 5 MGD Expandable			
Marin Regional Desalination Facility - 10 MGD Expandable			
Marin Regional Desalination Facility - 15 MGD			
Containerized Desalination Facility			
Bay Area Regional Desalination Facility			
Petaluma Brackish Groundwater Desalination Facility			



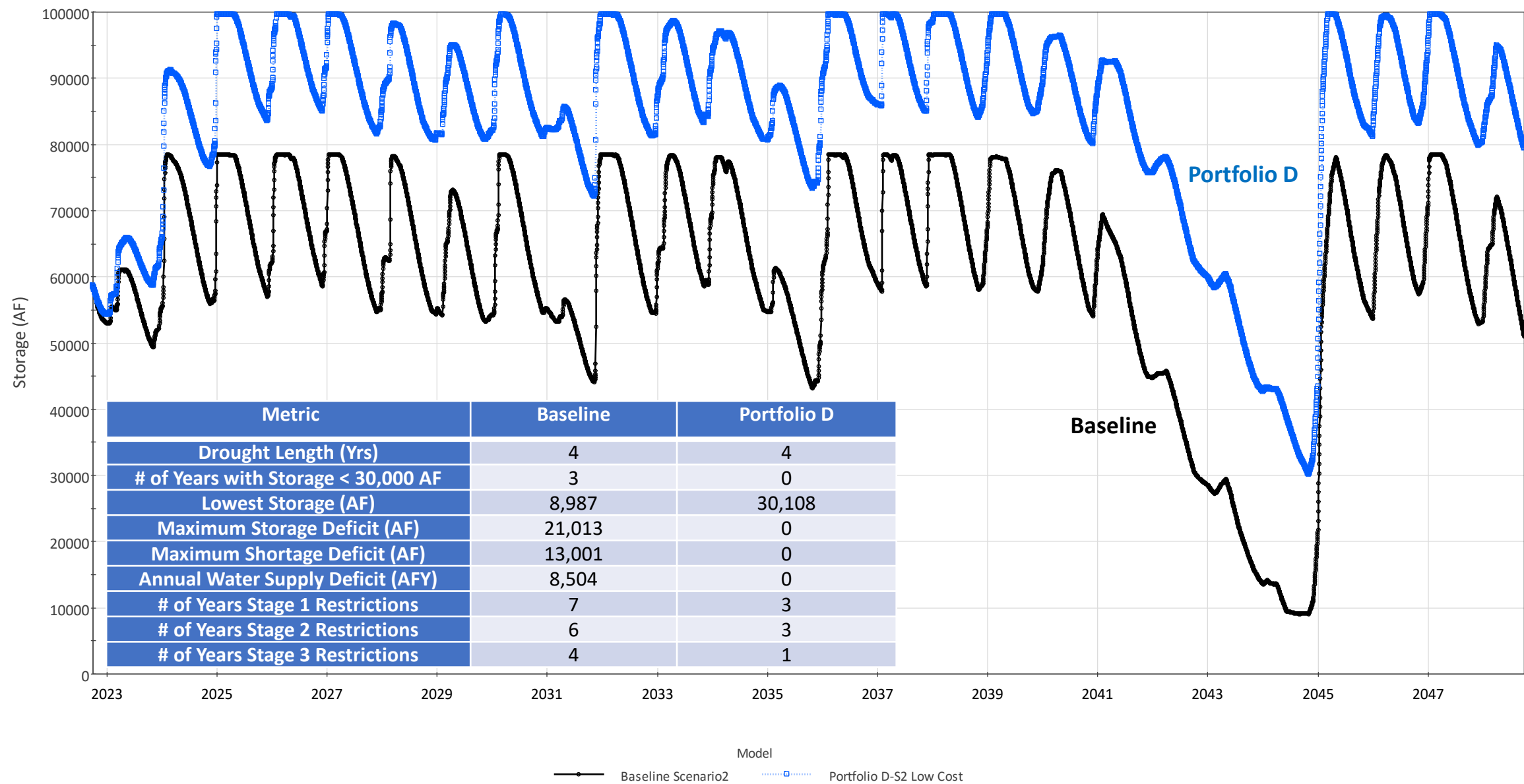
Part of portfolio, but uncertain implementation. Planning required. Not simulated.



Decision between projects. Only one would be selected.

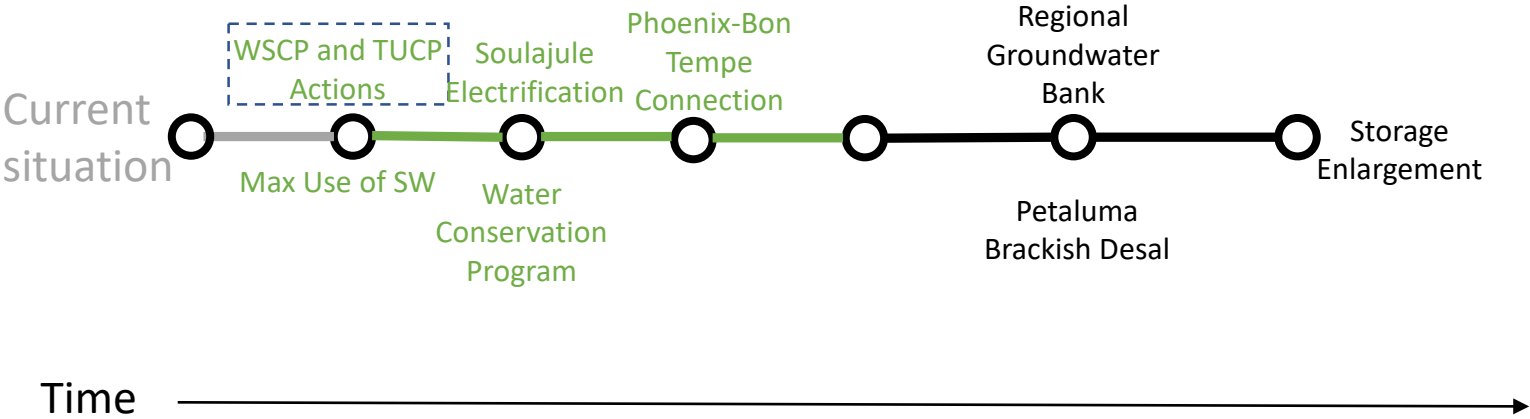
# Portfolio D – Low Cost

## Total MMWD Reservoir Storage (Scenario 2)



# Draft Roadmap for Portfolio D

## Adaptation Pathway Roadmap



## Yield and Cost for Pathways

Pathway	Yield (AFY)	Cost (\$/AFY)
	5,100	1,600
	11,700	2,000

# Comparison of Portfolios

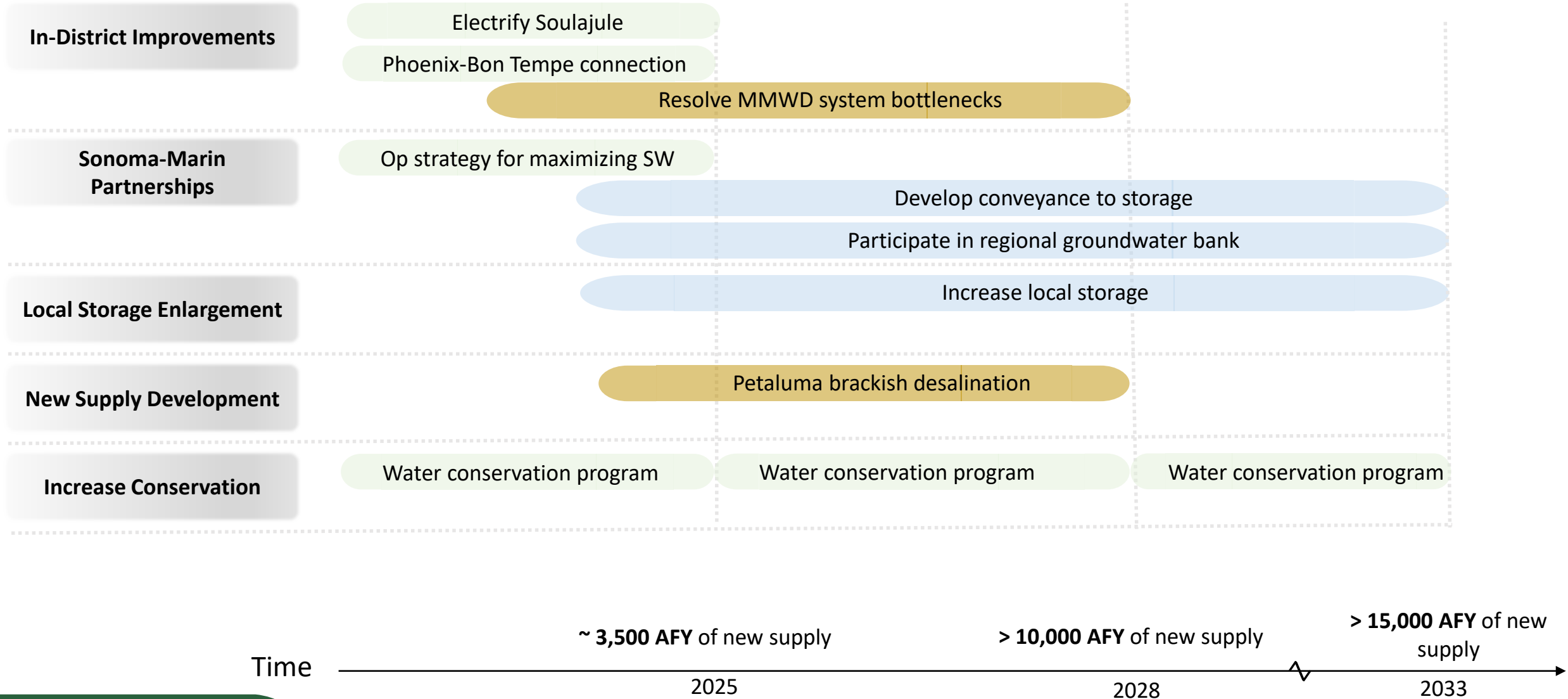
	Portfolio A – Max. Exist Infrastructure	Portfolio B – New Local Supply	Portfolio C – Diversify Imports	Portfolio D – Low Cost
Performance in Achieving Goals	✓✓✓	✓✓✓	✓	✓✓✓
Dry Year Yield (AFY)	9,100 - 16,300	9,900 - 15,200	7,400 – 8,400	11,700
Cost per AFY (\$)	\$2,200 – 2,500	\$3,200 – 4,600	\$2,500 – 4,200	\$2,000
Components Driving Performance	Conservation; maximizing delivery of SW supply; increase storage; resolving conveyance limitations	Conservation; new desal supply; new reuse supply	Conservation; new imports from Sac Valley	Conservation; maximizing delivery of SW supply; brackish desal supply; increase storage

# Observations/Findings

- Multiple viable pathways exist for drought resiliency
- Portfolio observations
  - Conservation and drought restrictions are key elements
  - Operational strategies to maximize Sonoma Water supply can yield benefits with existing infrastructure
  - Enlarging storage provides substantial benefits taking advantage of runoff in both local and Russian River watersheds
  - New desalination, reuse, and Sac Valley import supplies likely to need be generated at scale for drought resiliency, or combined with other actions
  - “Low Cost” portfolio is a useful reference and suggests that drought resiliency can be achieved with new supply costs less than \$2,500/AF
- Integration of promising elements of the portfolios can demonstrate more realistic roadmaps showing performance over time; linking early “low regret” actions with longer-term infrastructure investments

# Example Integrated Roadmap and Supply Targets

## Combining actions from various portfolios





# Public Engagement

- Assessment Information
  - Web page: [marinwater.org/WaterSupplyResiliency](https://marinwater.org/WaterSupplyResiliency)
- Marin Water e-News:
  - Sign up: [marinwater.org/e-News](https://marinwater.org/e-News)
- Board Meetings
  - Receive meeting notifications: [marinwater.org/get-notifications](https://marinwater.org/get-notifications)

The screenshot shows the 'Water Supply Resiliency' page on the Marin Water website. The page has a blue header with the Marin Water logo and navigation links: Customer Services, Your Water, Mt. Tam Watershed, Education and Outreach, Board of Directors, and About Us. Below the header, the page title 'Water Supply Resiliency' is displayed in a blue box. The main content area starts with a section titled 'Improving our water supply security to address the impacts of climate change', followed by a paragraph explaining the district's focus on augmenting water supply. Below this is a row of three buttons: 'Strategic Assessment', 'About Our Water Supply & Usage', and 'A Note about Water Conservation'. The next section is 'Message from Our Board President', which includes a link to 'Read Letter'. This is followed by the 'Strategic Assessment' section, which lists three points: building on previous planning efforts, evaluating current risk, and determining a timeline for alternative water supplies. Below these are three columns: 'Assessment Information' (listing Board Approval and Scope of Work), 'Projects to be Assessed' (listing Intertie, Winter Water, Local Storage, Desalination, and Water Reuse), and 'Public Engagement' (listing three community workshops). The 'About Our Water Supply & Usage' section follows, explaining the district's water sourcing. At the bottom, there are three buttons: 'Our Reservoir Levels & Rainfall', 'Sonoma Water Supply Levels', and 'Customer Usage'. The final section is 'A Note about Water Conservation', which includes a link to 'Learn More About Those Efforts'.

**Water Supply Resiliency**

*Improving our water supply security to address the impacts of climate change*

Severe conditions brought on by the drought over the last several years have intensified the district's focus on augmenting its water supply through new sources as well as strengthening existing systems to increase storage capacity and maximize supply, if and where possible. The efforts outlined below will help the district ultimately determine which options are viable, affordable, and make the most sense for our community and the region. This webpage will be periodically updated as there is new information to share.

Use the buttons below to jump to a section on the page:

[Strategic Assessment](#) [About Our Water Supply & Usage](#) [A Note about Water Conservation](#)

**Message from Our Board President**

Read this letter from President Larry Russell which outlines the District's commitment to improving water supply resiliency to address climate change.

[Read Letter](#)

**Strategic Assessment**

The District has initiated a 5-month strategic assessment of various water supply projects that could supplement community needs in times of future shortages. The effort is intended to:

1. Build on extensive previous water supply planning efforts and incorporate new options
2. Evaluate current risk to District's water delivery reliability under recent and future extended drought scenarios
3. Determine a timeline for developing alternative water supplies to maintain resiliency

**Assessment Information**

- Board Approval of Assessment (Item 9)
- Scope of Work

**Projects to be Assessed**

- Intertie (Richmond/San Rafael Bridge Pipeline)
- Winter Water from Sonoma Water
- Local Storage Expansion
- Desalination
- Water Reuse

**Public Engagement**

- Community Workshop #1 Wed. 3/9, 5-7 p.m.
- Community Workshop #2 Date TBD
- Community Workshop #3 Date TBD

**About Our Water Supply & Usage**

The district provides 100 percent locally sourced drinking water to its 191,000 customers. A total of 75 percent of that water supply is captured and stored in the district's seven reservoirs, which include Phoenix, Lagunitas, Bon Tempe, Alpine and Kent on Mt. Tamalpais, and Nicasio and Soulajule in west Marin. Together, these reservoirs hold 79,566 acre-feet of water, or about 30 billion gallons. The remaining 25 percent of our water supply comes from neighboring Sonoma County's Russian River water system.

[Our Reservoir Levels & Rainfall](#) [Sonoma Water Supply Levels](#) [Customer Usage](#)

**A Note about Water Conservation**

While this web page is dedicated to augmenting the district's water supply, in tandem, the district is also working toward long-term customer conservation programs and policies that focus on areas where it is most reasonable and impactful to reduce water waste that places higher demand on the system.

[Learn More About Those Efforts](#)

# Next Steps

- Further evaluation of portfolios and draft roadmaps
- Development and presentation of recommended roadmap
- Final assessment report