MARIN WATER

Strategic Water Supply Assessment

BOARD UPDATE

December 13, 2022

Workshop Agenda: Strategic Water Supply Assessment

- Project Update
- Strategies and Portfolios
- Next Steps
- Q&A

Strategic Water Supply Assessment: Schedule

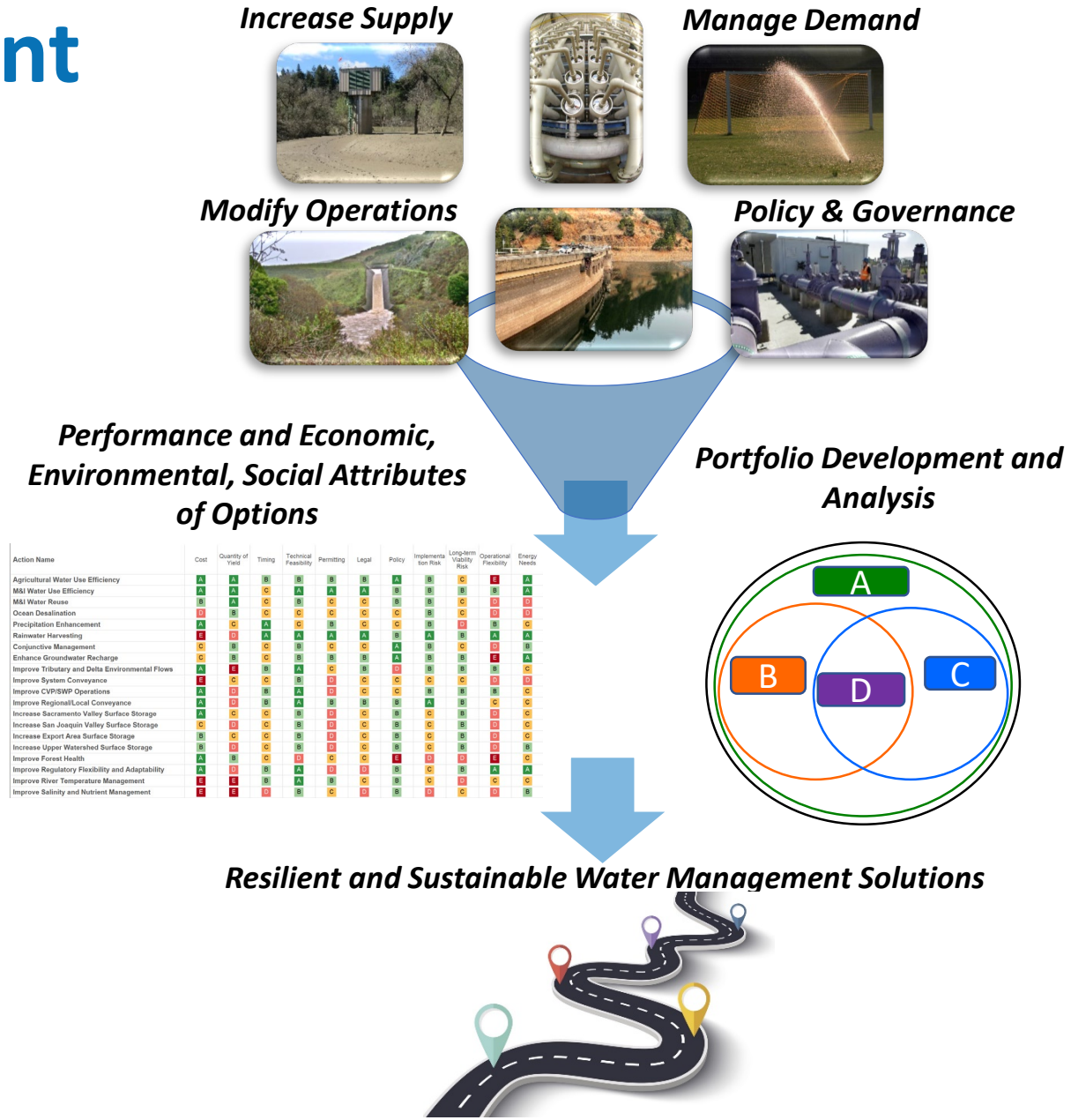
- **December 13 – Draft Strategies and Portfolios**
- January TBD – Analysis of Portfolios
- January/February TBD – Adopt Roadmap

Process for Assessment

Key Project Scope Elements

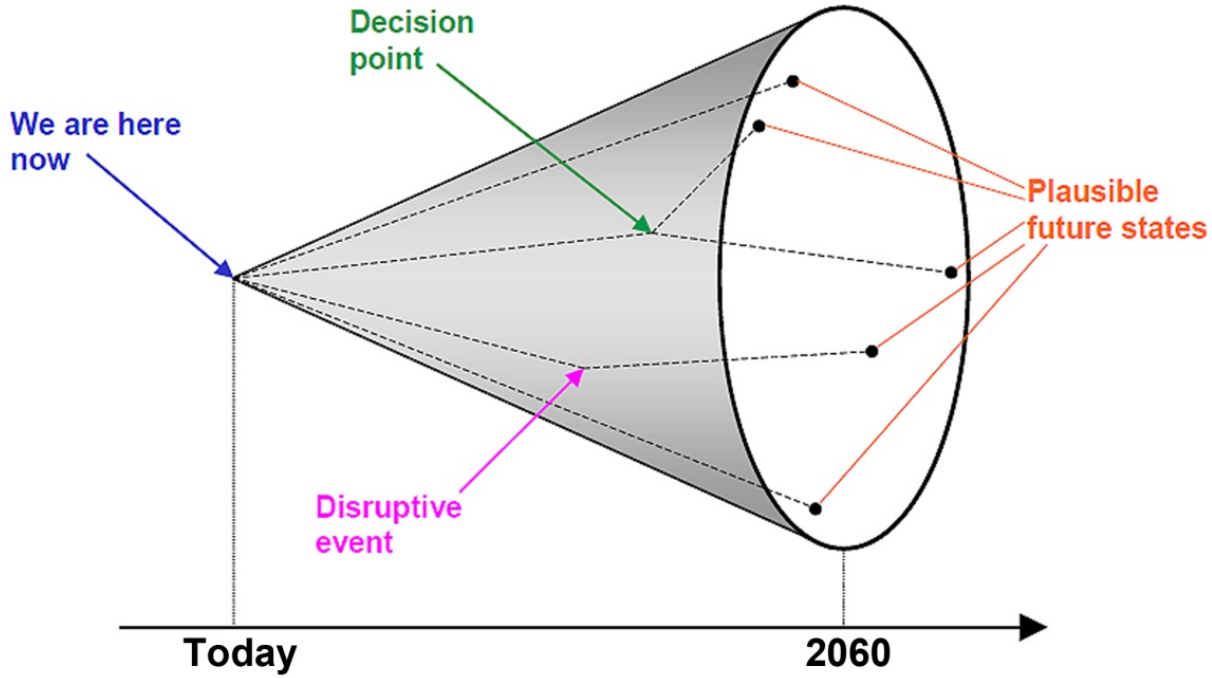
Water Supply Assessment Process

- Consider a broad range of water management alternatives
- Identify most promising alternatives
- Evaluate alternatives for performance and other economic, environmental, and social criteria
- Explore strategic combinations of alternatives
- Develop roadmap with specific project, pathways, and triggers to achieve resilient and sustainable solutions



Water Supply and Demand Scenarios

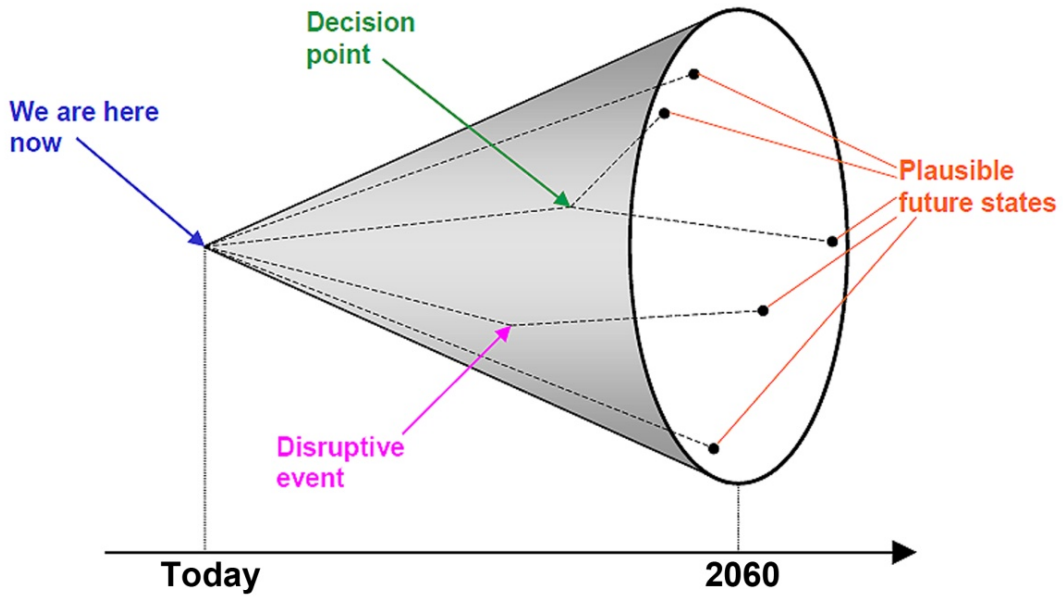
- Recognizing that future is uncertain
  - Climate change
  - Drought variability
  - Demands
  - Policies and regulations
- Seeking robust solutions
- Scenarios allow us to explore plausible future conditions and identify promising solutions
  - Historical droughts
  - Climate projections
  - Paleo reconstructions
  - Stress tests



Scenarios are alternative views of how the future might unfold. Scenarios are not predictions or forecasts of the future

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 that was removed is now a Water Management Alternative

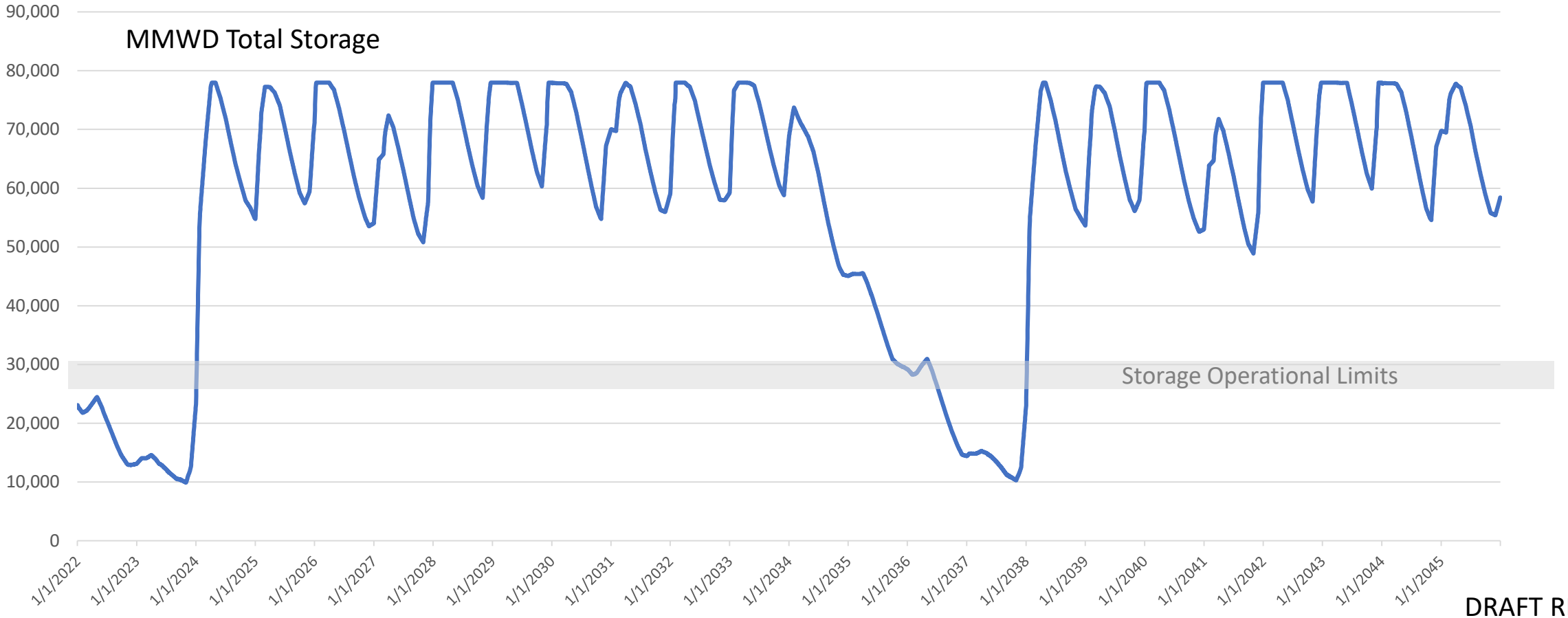
Draft Scenario Assumptions

Scenario	Hydroclimate Assumptions	Demand Assumptions	Operational Assumptions
Scenario 1 – Current Trends	Historical observed	Passive-level savings; drought conservation per WSCP	Current operations; local supply preference; supplemental water with Kastania Pump Station rehabilitation
Scenario 2 – Short and Severe Drought	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
Scenario 3 – Beyond Drought of Record	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
Scenario 4 – Abrupt Disruptions	Severe 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; Treatments plants at reduced capacity (Bon Tempe offline & San Geronimo @ 50% operating capacity for 6 months)

Conservation scenario that was removed is now a Water Management Alternative

Scenarios Provide Planning Level Estimates of Deficit

Scenario	Max. Deficit Duration	Annual Deficit (AFY)
Scenario 3 – Short and Severe Drought	4 years	**7,500 – 8,500 AFY (4 yrs)**



DRAFT RESULTS

Water Management Alternatives Considered

- Water Conservation
- Sonoma-Marin Partnerships
- Local Surface Storage
- Water Purchases with Conveyance through Bay Interties
- Desalination
- Recycled Water

Evaluation Criteria

Criteria	Description	Measurement
Yield	Estimate of new supply or reduced demand option can provide during dry years.	AF
Cost	Cost per acre-foot of supply or demand reduction.	$/AFY
Timing	Estimate of time required before project could be implemented considering planning, design, permitting, and implementation.	Years before alternative could begin operation
Reliability	Reliability of supply during periods of dry year need	5-pt qualitive scale
Flexibility	Degree to which the option could be operated (or implemented) across a wide range of hydrologic conditions by having ability to adjust the magnitude of operation each year to meet required conditions	5-pt qualitive scale
Environmental	Anticipated positive or negative impacts on the natural environment.	5-pt qualitive scale
Feasibility	Maturity of the concept and technical ability to implement.	5-pt qualitive scale
Energy	Estimated change in energy required to implement and operate.	KWH/AF
Permitting/Legal	List of permits required and status if option has begun permitting process.	5-pt qualitive scale
Social	Description of positive or negative socioeconomic effects.	5-pt qualitive scale
Jurisdiction	Primary jurisdiction for implementation	5-pt qualitive scale
Public Acceptance	Anticipated public acceptance	5-pt qualitive scale

Evaluation of Water Management Alternatives

Evaluation Summary of Alternatives

Code	Name	Yield Rating	Cost Rating	Timing Rating	Reliability R..	Flexibility R..	Feasibility R..	Environmen..	Energy Rati..	Permitting/..	Social Rating	Jurisdiction ..	Public Accep..
DS1A	Marin Regional Desalination Facility- 5 MGD Stand Alone	2	5	4	1	4	2	4	3	5	2	2	3
DS1B	Marin Regional Desalination Facility - 5 MGD Expandable	2	5	4	1	4	2	4	3	5	2	2	3
DS1C	Marin Regional Desalination Facility - 10 MGD Expandable	1	5	4	1	4	2	4	4	5	2	2	3
DS1D	Marin Regional Desalination Facility - 15 MGD	1	5	4	2	4	2	4	5	5	2	2	3
DS2	Containerized Desalination Facility	2	5	3	1	4	3	4	3	5	2	2	3
DS3	Bay Area Regional Desalination Facility	2	5	5	1	4	2	4	3	5	2	3	3
DS4	Petaluma Brackish Groundwater Desalination Facility	2	3	3	3	3	2	3	2	3	2	3	2
LS1A	Soulajule Enlargement	2	3	4	2	4	3	4	1	4	5	4	4
LS1B	Nicasio Enlargement	2	3	4	2	4	3	4	1	4	4	4	4
LS1C	Kent Enlargement	2	3	4	2	4	3	4	1	4	3	4	3
LS2A	Halleck Reservoir	3	5	5	4	5	4	5	1	5	5	5	5
LS2B	Devil's Gulch Reservoir	3	5	5	4	5	4	5	1	5	5	5	5
LS3A	Movable Spillway Gates - Soulajule	5	2	2	2	2	2	2	1	2	2	1	1
LS3B	Movable Spillway Gates - Nicasio	5	2	2	2	2	2	2	1	2	2	1	1
LS3C	Movable Spillway Gates - Kent	5	2	2	2	2	2	2	1	2	2	1	1
LS3D	Movable Spillway Gates - Alpine	5	2	2	2	2	2	2	1	2	2	1	1
SM1	Maximize Use of Sonoma Water - Existing Facilities	4	1	1	3	1	1	2	2	1	2	2	1
SM2A	Maximize Use of Sonoma Water - Resolve Bottlenecks	3	3	2	3	1	1	2	2	1	2	2	1
SM2B	Maximize Use of Sonoma Water - Resolve Bottlenecks+Sout..	3	4	3	2	3	1	3	2	2	2	2	1
SM3A	Maximize Use of Sonoma Water - Dedicated Conveyance Sta..	5	4	2	4	2	1	2	2	2	2	2	2
SM3B	Maximize Use of Sonoma Water - Dedicated Conveyance Kas..	2	4	3	2	3	1	3	3	3	3	3	2
SM3C	Maximize Use of Sonoma Water - Dedicated Conveyance Cot..	2	4	3	2	3	1	3	3	3	3	3	2
SM4	Regional Groundwater Bank	3	2	3	3	3	2	2	2	3	2	3	1
WC1	Water Conservation Program	2	2	1	1	1	1	1	1	1	2	1	1
WC2	Regulatory Driven Program	2	5	2	2	1	1	1	1	1	2	1	3
WP1	EBMUD Intertie	2	4	3	4	4	1	3	3	4	3	5	2
WP2	CCWD Intertie	2	5	4	3	4	1	3	3	4	3	4	2
WP3A	NBA Intertie - MMWD	2	5	4	3	4	1	3	3	4	3	4	2
WP3B	NBA Intertie - Sonoma Aqueduct	2	5	4	3	4	1	3	3	4	3	4	2
WP5	SFPUC Intertie	4	5	4	3	4	1	4	2	4	3	4	3
WR1A	Recycled Water Expansion - Peacock Gap	5	5	3	1	3	1	2	2	2	3	1	1
WR1B	Recycled Water Expansion - San Quentin	5	5	3	1	3	1	2	2	2	3	1	1
WR2	Regional Indirect Potable Reuse (IPR)	1	5	5	1	5	4	4	4	4	3	2	4
WR3A	CMSA Direct Potable Reuse (DPR) - Raw Water Augmentati..	2	5	5	2	4	5	4	3	5	4	2	5
WR3B	CMSA Direct Potable Reuse (DPR) - Treated Water Augment..	2	5	5	2	4	5	4	3	5	4	2	5
WR4	Regional Direct Potable Reuse (DPR)	1	5	5	2	5	5	4	4	5	4	2	5

Category
- ✔ Desalination
- ✔ Local Storage Au..
- ✔ Sonoma-Marin P..
- ✔ Water Conserva..
- ✔ Water Purchase..
- ✔ Water Reuse

Measure Names
- ☐ Cost (Budget) R..
- ✔ Cost Rating
- ☐ Cost Value
- ☐ Count of Alt Eval
- ✔ Energy Rating
- ✔ Environmental R..
- ✔ Feasibility Rating
- ✔ Flexibility Rating
- ✔ Jurisdiction Rati..
- ☐ Latitude
- ☐ Longitude
- ✔ Permitting/Lega..
- ✔ Public Acceptan..
- ✔ Reliability Rating
- ✔ Social Rating
- ✔ Timing Rating
- ☐ Timing Value
- ✔ Yield Rating
- ☐ Yield Value

Measure Values
1 — 5

Moving toward Strategies and Portfolios

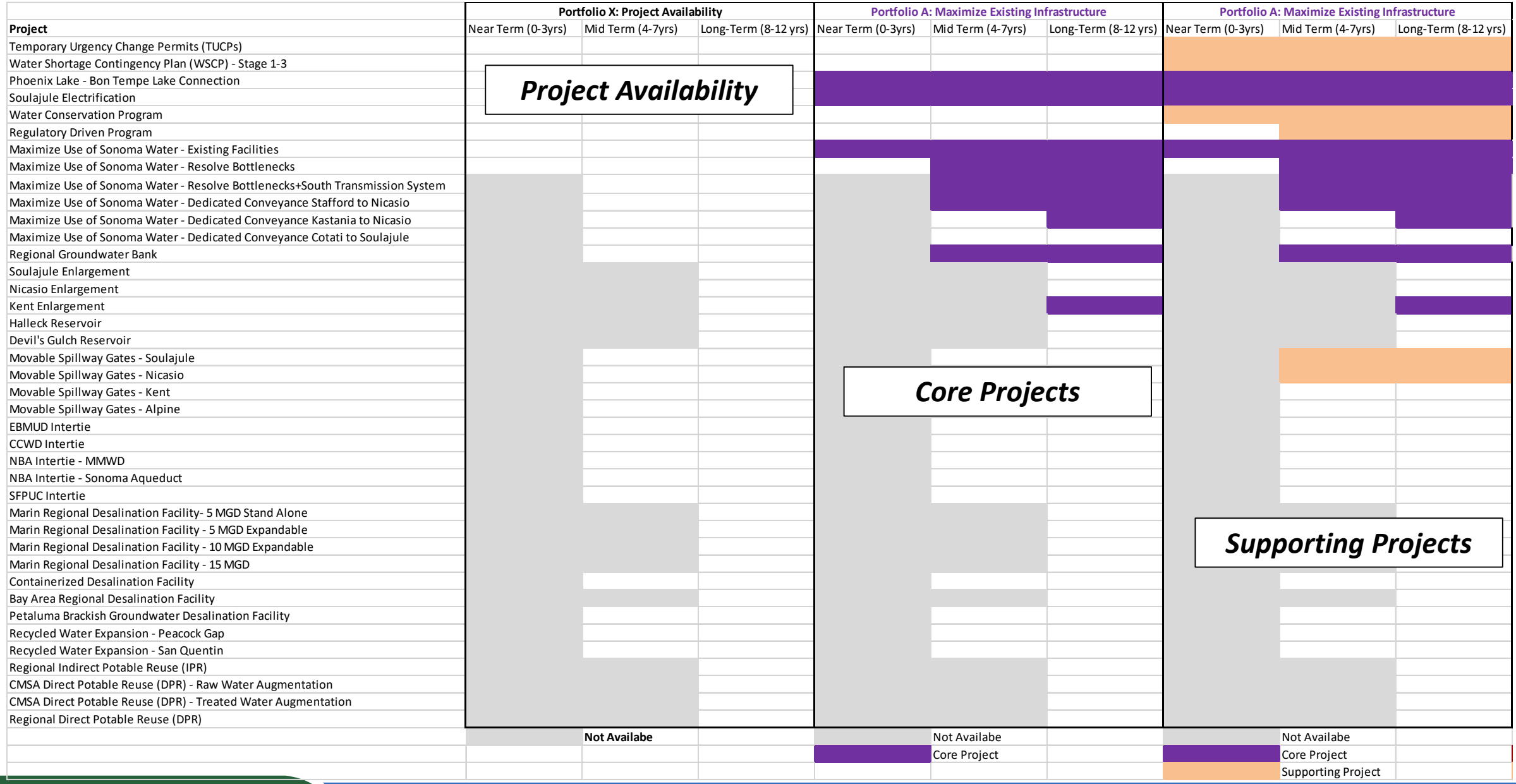
Moving Toward Strategies and Portfolios

- **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-Marin 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 ~ $2250/AF)
  - More expansive conservation, Sonoma-Marin conveyance improvements, regional groundwater bank, local storage augmentation, Petaluma brackish desalination

Portfolio Details – Projects, Timing, and Support



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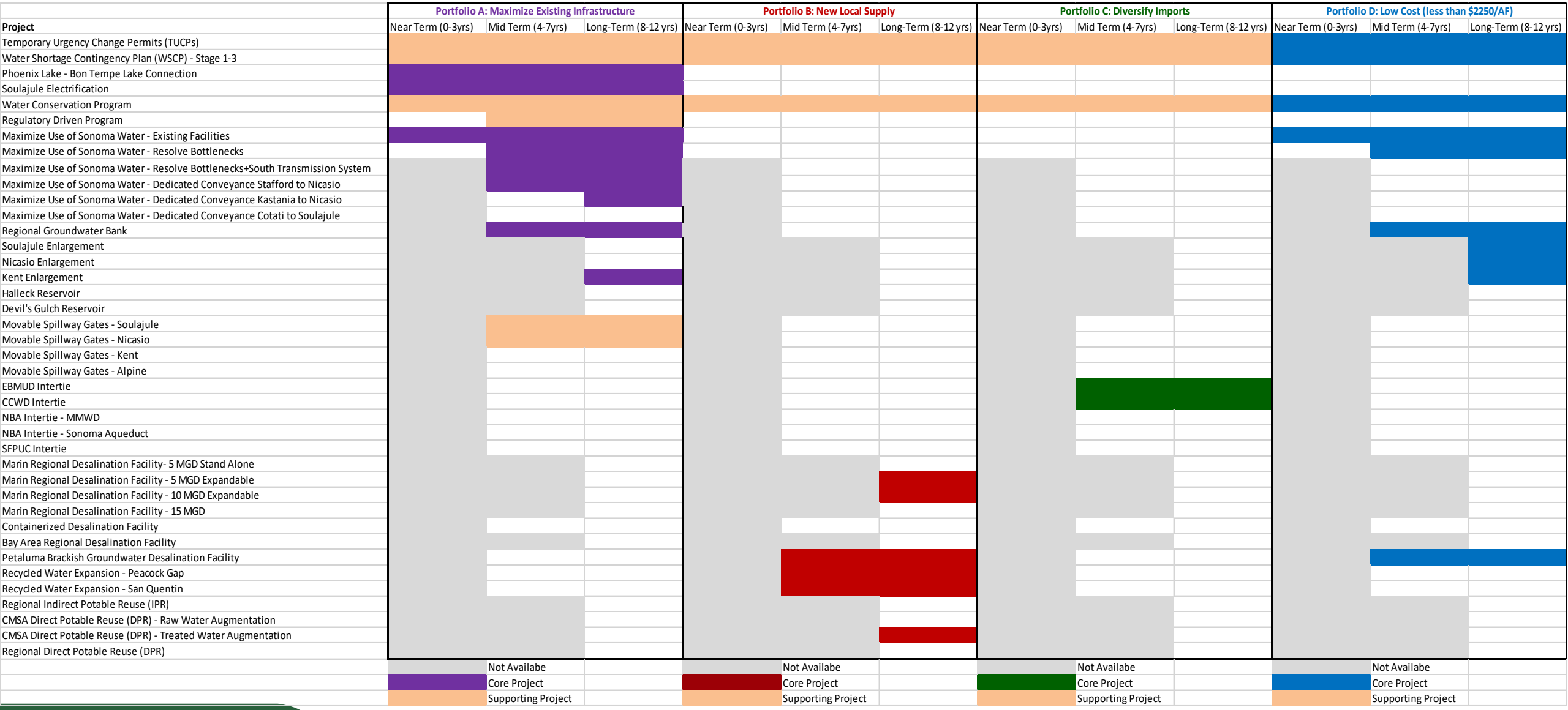

Portfolios Analysis

- Portfolios will be tested for all scenarios
  - Modeling of combined projects, sequencing, and integration within MMWD and regional system facilities
- Portfolios will be evaluated for:
  - Performance Measures – reservoir storage levels and shortage reductions
  - Evaluation Criteria – cost, environmental, social
- Results will be used to:
  - Identify pros and cons of various portfolios
  - Identify portfolio ability to resolve deficits in both near- and long-term
  - Identify high performing common elements of portfolios
- ***Portfolios analysis to be used to inform development of recommended roadmap***

Next Steps

- Presentation of Strategies and Portfolios for analysis
- Draft Assessment Report (without portfolios and roadmap)
- Analysis of Portfolio of Portfolios
- Presentation of Portfolios and Roadmap
- Final Assessment Report