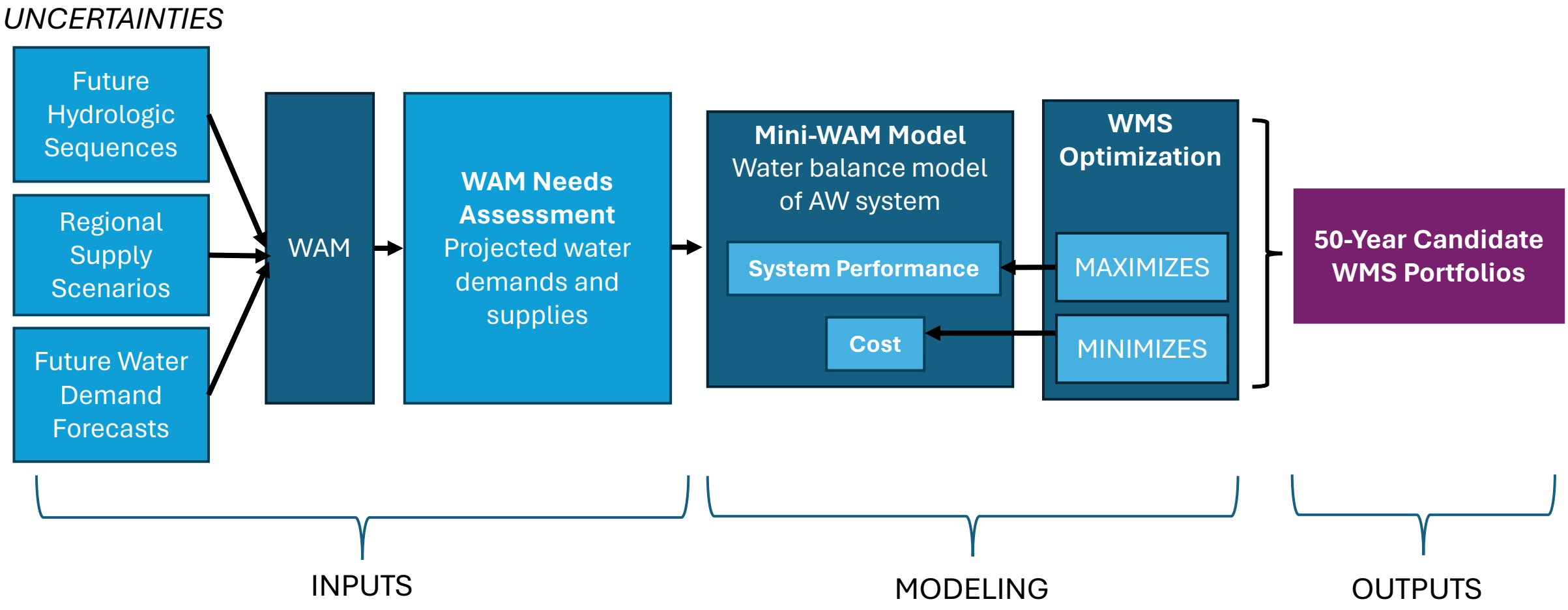
Water Forward WAVE evaluation

Water Forward Task Force Meeting

June 2024

Our analysis identifies candidate 50-year portfolios of supply and demand WMS

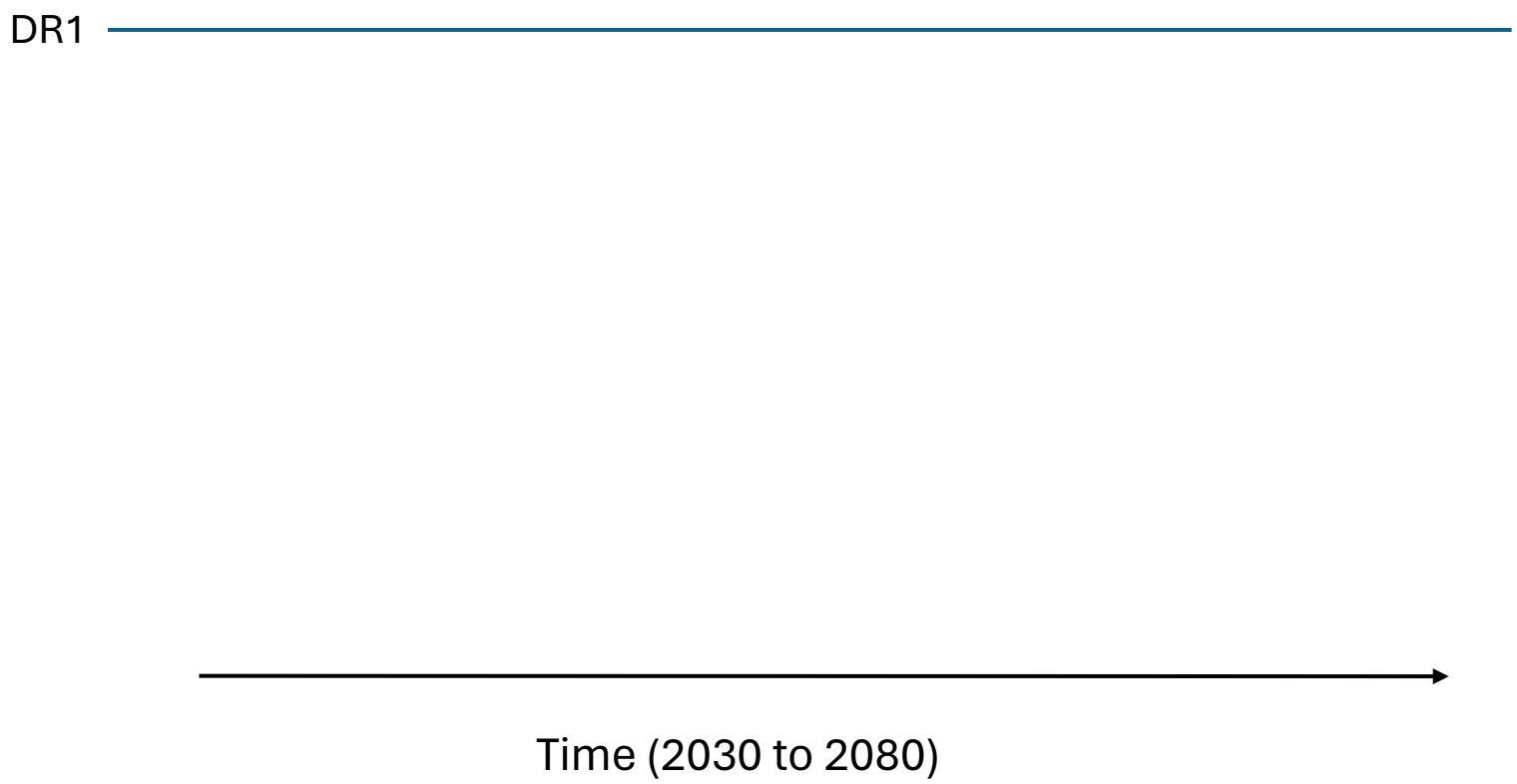


Candidate portfolios are built from an optimization of nearly 2M combinations of WMS

WMS	Description
ASR	Aquifer Storage and Recovery
BGD	Brackish Groundwater Desalination
IPRLBL	Indirect Potable Reuse through Lady Bird Lake with local Inflows
OCR	New Off Channel Reservoir, Colorado River water
OCR+	New Off Channel Reservoir, Colorado River and reclaimed water
Decker	Off-channel reservoir supplied by Colorado River water (Decker Lake)
AddLCRA	Additional Supply from LCRA, regional Colorado River partnerships, and/or water rights optimization
SWD	Seawater Desalination
DPR	Direct Potable Reuse from Wastewater Treatment Plant
IBT	Interbasin Transfer (surface water)
GW	Importation of conventional groundwater
DR1	CR - Current Ordinance, DCR - Phase 1, OR - Current Ordinance
DR2	CR - Larger System, DCR - Phase 1, OR - Smaller Building Threshold
DR3	CR - Larger System, DCR - Phase 1, OR - Adjusting Benchmarks
DR4	CR - Larger Connection Area, DCR - Phase 1, OR - Smaller Building Threshold
DR5	CR - Larger Connection Area, DCR - Phase 1, OR - Adjusting Benchmarks
DR6	CR - Larger System, Larger Connection Area, DCR - Phase 1, OR - Smaller Building Threshold, Adjusting Benchmarks
DR7	CR - Larger System, Larger Connection Area, DCR - Phase 1, 2, OR - Smaller Building Threshold, Adjusting Benchmarks

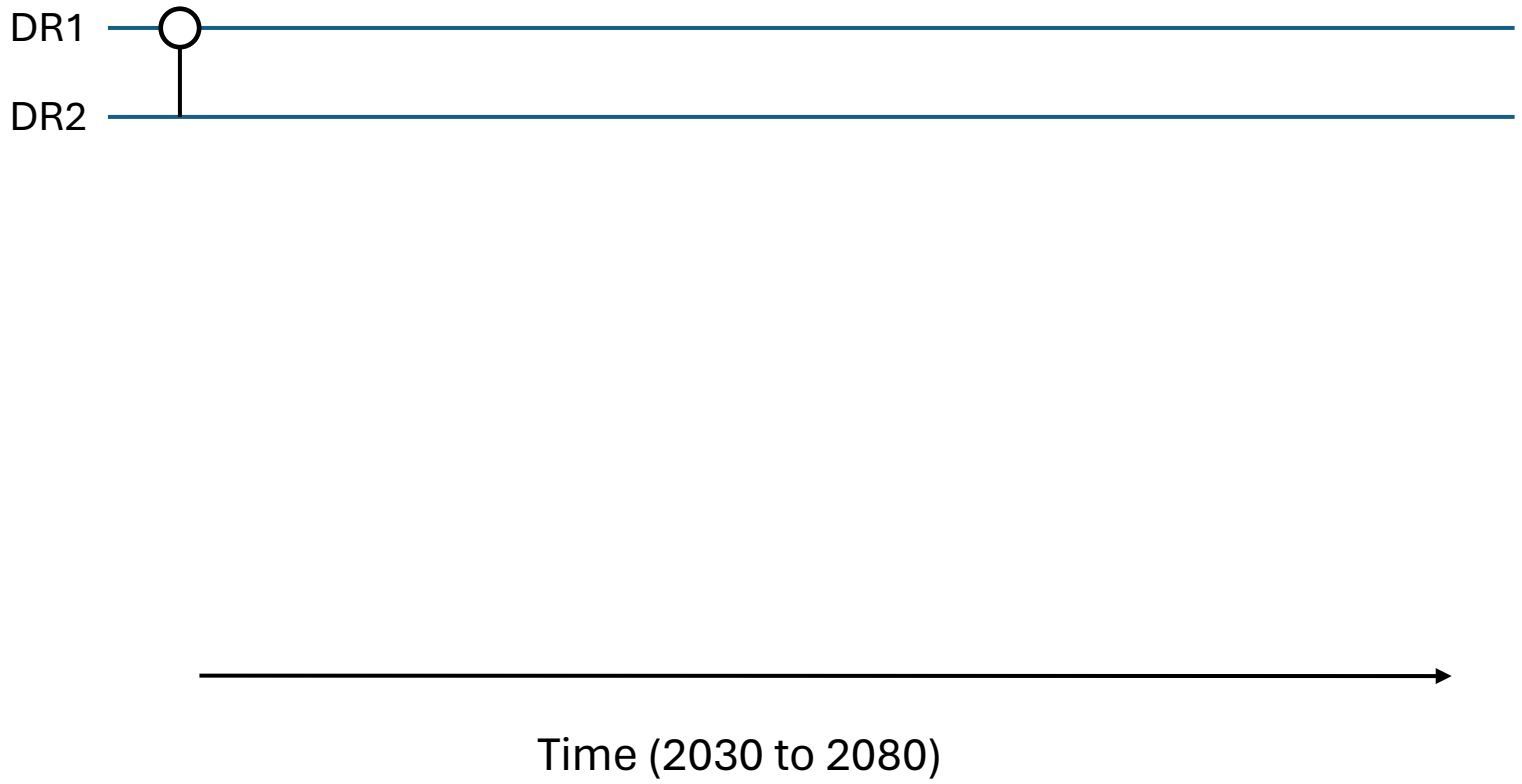
Individual WMS can be organized into specific pathways over time

Can start with DR1 and continue indefinitely



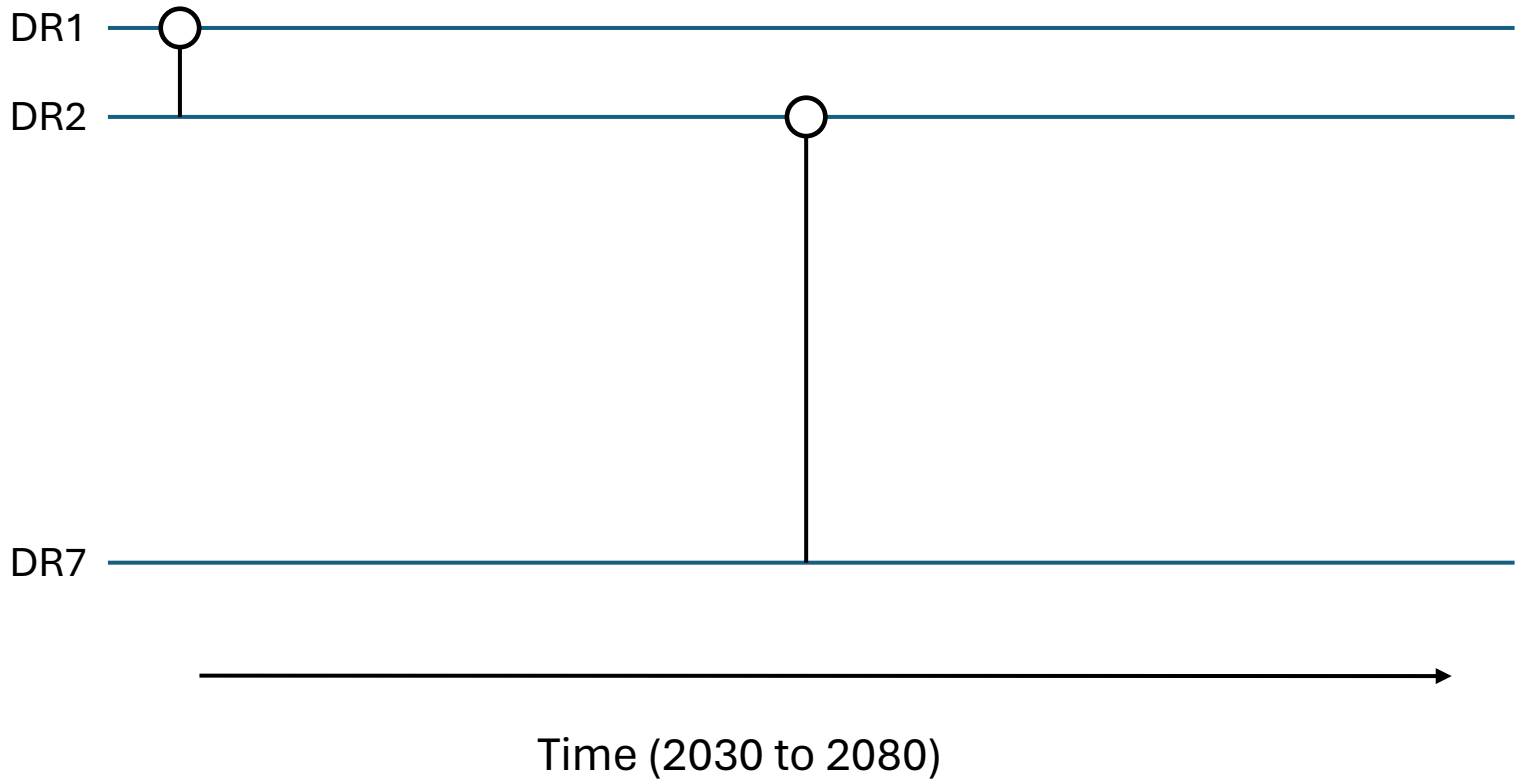
Individual WMS can be organized into specific pathways over time

Or, can start with DR1 and then jump to DR2 at some point in the future



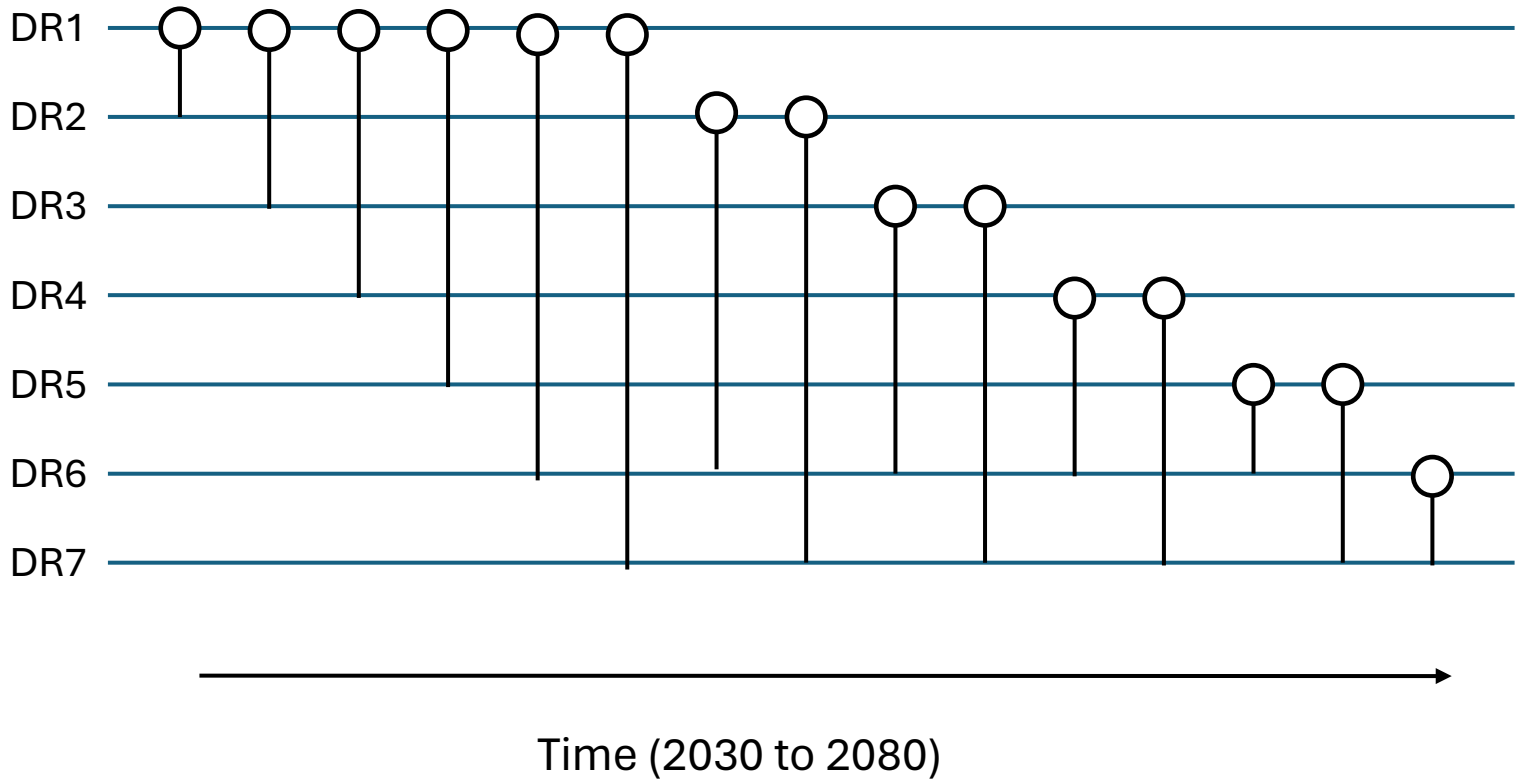
Individual WMS can be organized into specific pathways over time

Or, can start with DR1, then jump to DR2, and finally to DR7



Individual WMS can be organized into specific pathways over time

Pathways map shows full set of possible Demand Reduction Pathways



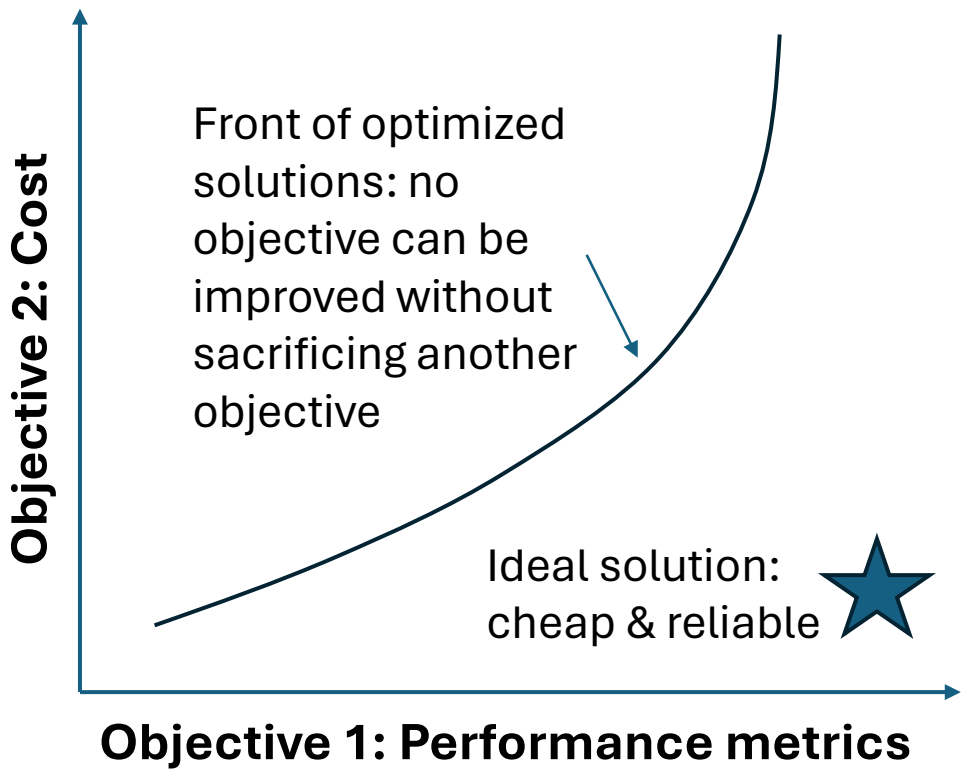
Rhodium selects among possible combinations to build a set of equally-optimal candidate portfolios

For each candidate portfolio:

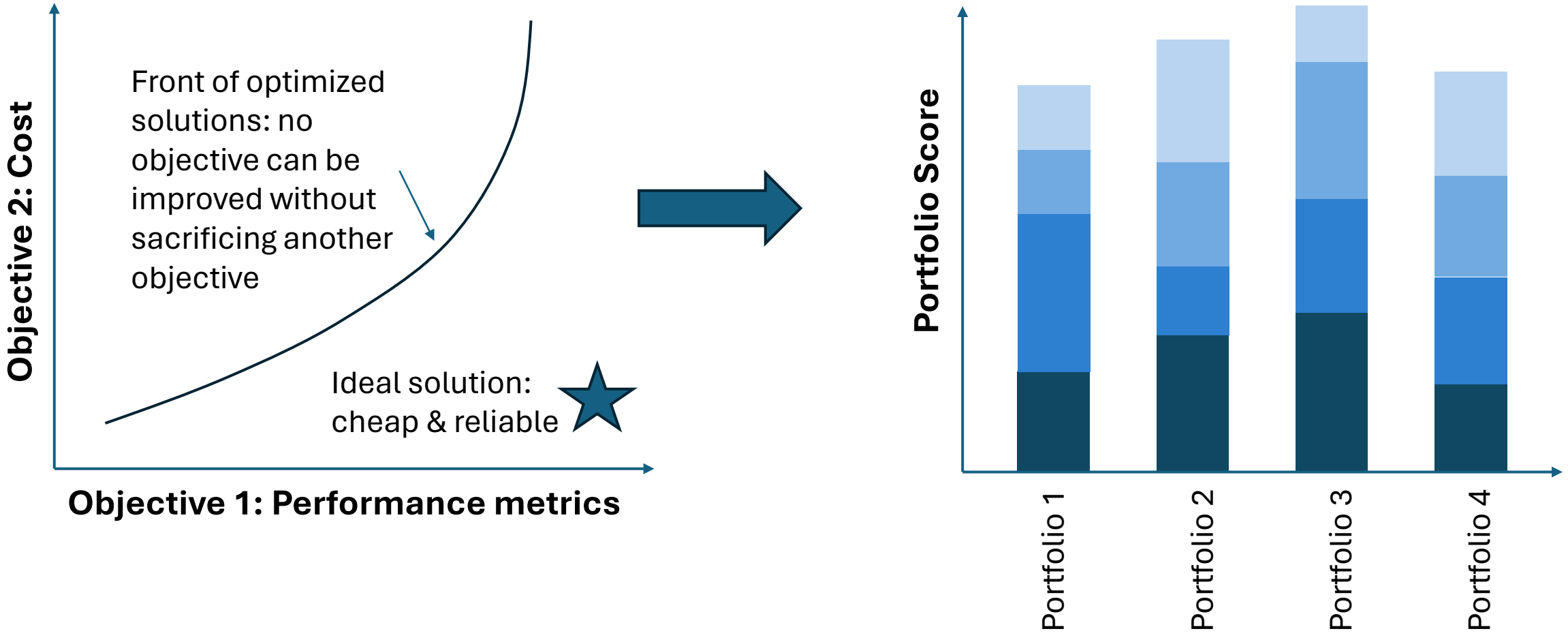
1. Portfolio configured in mini-WAM
2. Portfolio tested under 36, 30-year futures
3. Portfolio evaluated on:
   - Resiliency
   - Reliability
   - Vulnerability
   - Cost

Rhodium selects equally-optimal portfolios

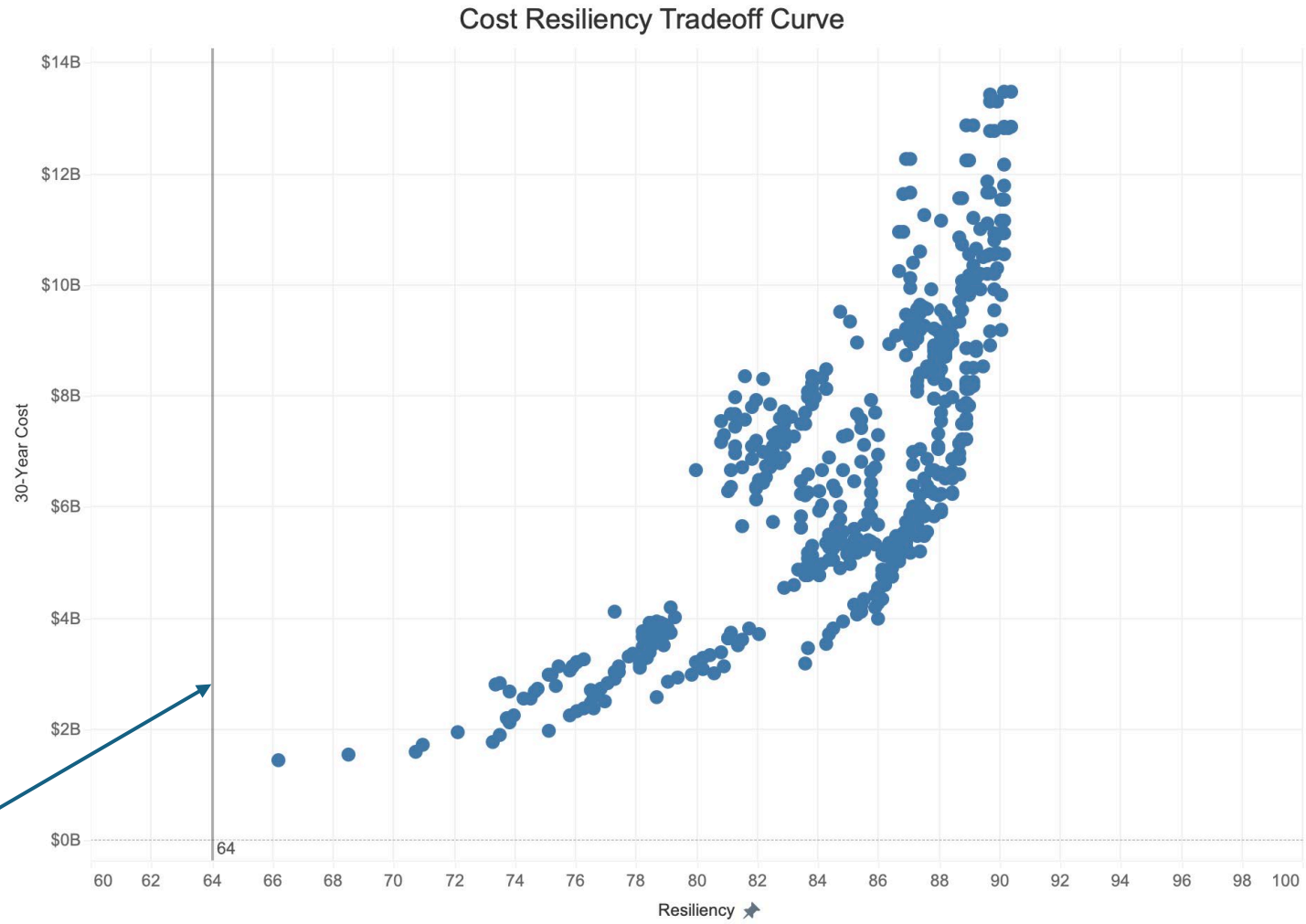
Those that offer the "best" performance and cost, or those that can't do better on one metric without sacrificing another.



Candidate portfolios will be further evaluated by Austin Water

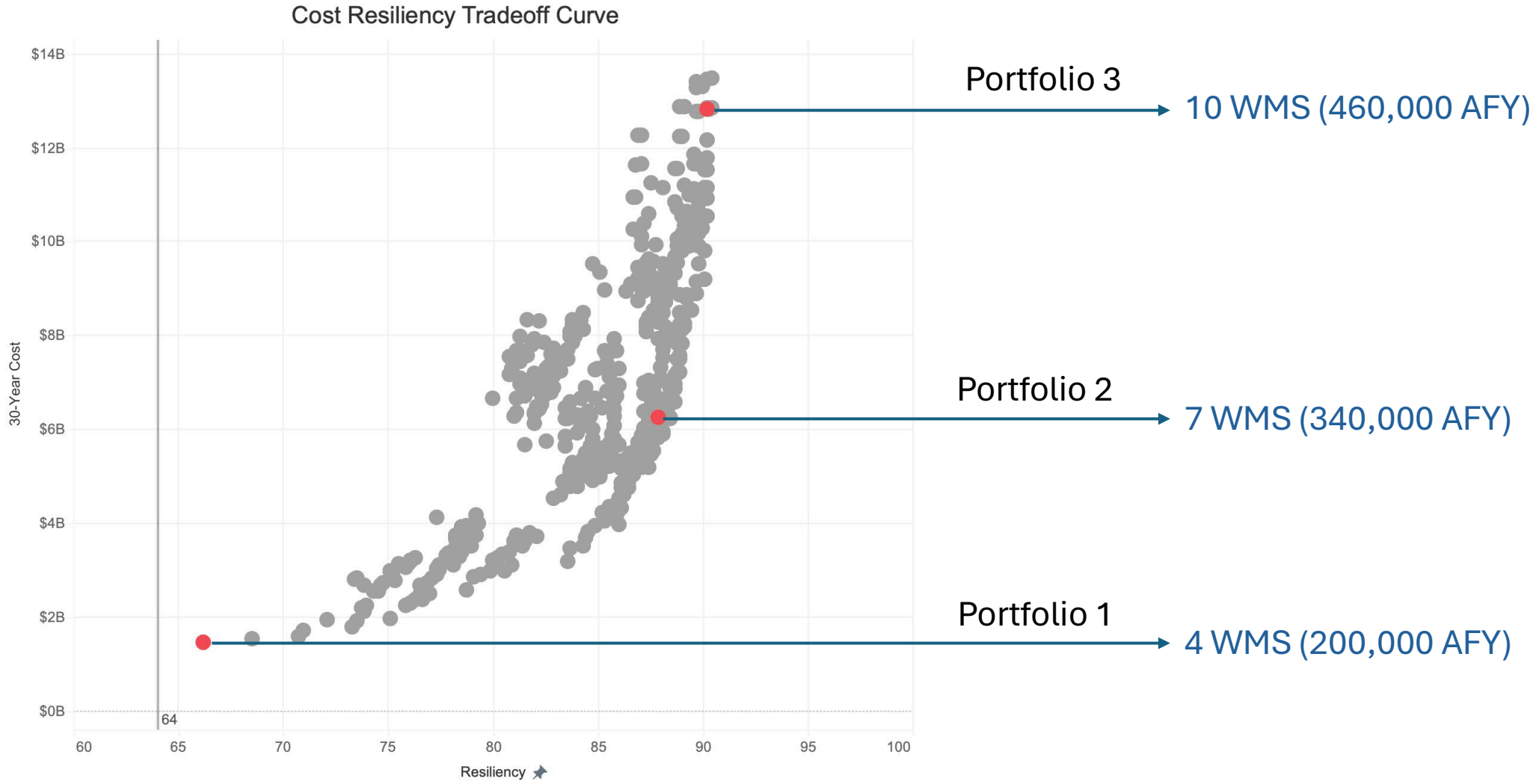


Of nearly 2M options, the optimization identified ~550 candidate portfolios for 2080



Resilience of system without WMS

We can look at a few candidate portfolios on this curve



Tradeoffs between optimization metrics will be assessed by Austin Water as a part of a fuller multi-criteria analysis

Portfolio	Number of WMS	Total Yield (AFY)	Reliability	Resiliency	Vulnerability	Cost*	
1	4	200,000	92	66	97	$1.4B	
2	7	340,000	97	88	99	$6.2B	*4.3 times as much as Portfolio 1*
3	10	460,000	100	90	100	$12.8B	*8.8 times as much as Portfolio 1*

Implementing more adaptive strategies by 2080 could soften the cost and performance tradeoff

**Total portfolio costs are estimated for all WMS as the sum of O&M and capital costs over a 30-year period*