GOLDSIM UPDATE

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Water Resources and Watershed Committee

September 13, 2023

SCV WATER

OUTLINE

- Background
- Uses of Reliability Model
- Methodology
- Scenarios
  - Benefits of Article 56 Carryover Storage
  - Benefits of new banking program
- Summary & Next Steps

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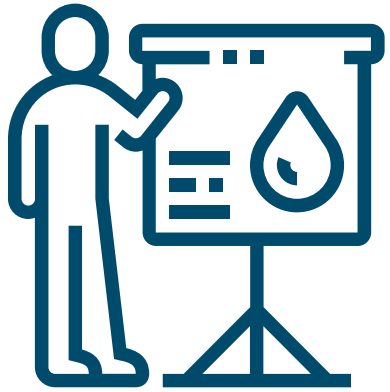
BACKGROUND

BACKGROUND

Board authorized update to the prior Reliability (MBK) Model in Spring of 2021.

- **Improve functionality.**
- **Build expertise in-house.**
- **New platform that is easier to update and maintain.**



In February 2023, presented on model construction and the value of monthly time steps.

Status: we have a functional version of the model that meets our needs to begin running scenarios.

USES OF THE RELIABILITY MODEL

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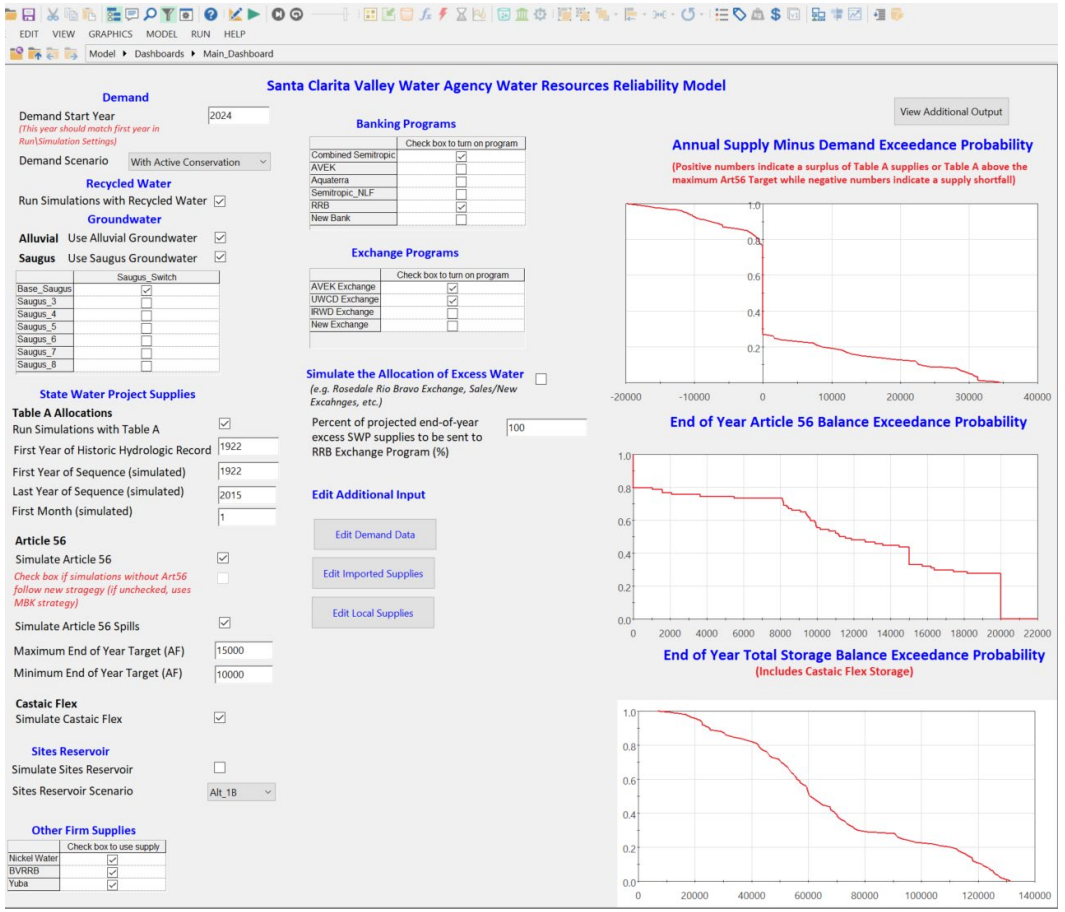
USES OF RELIABILITY MODEL

Assess the adequacy of the existing water resource portfolio.

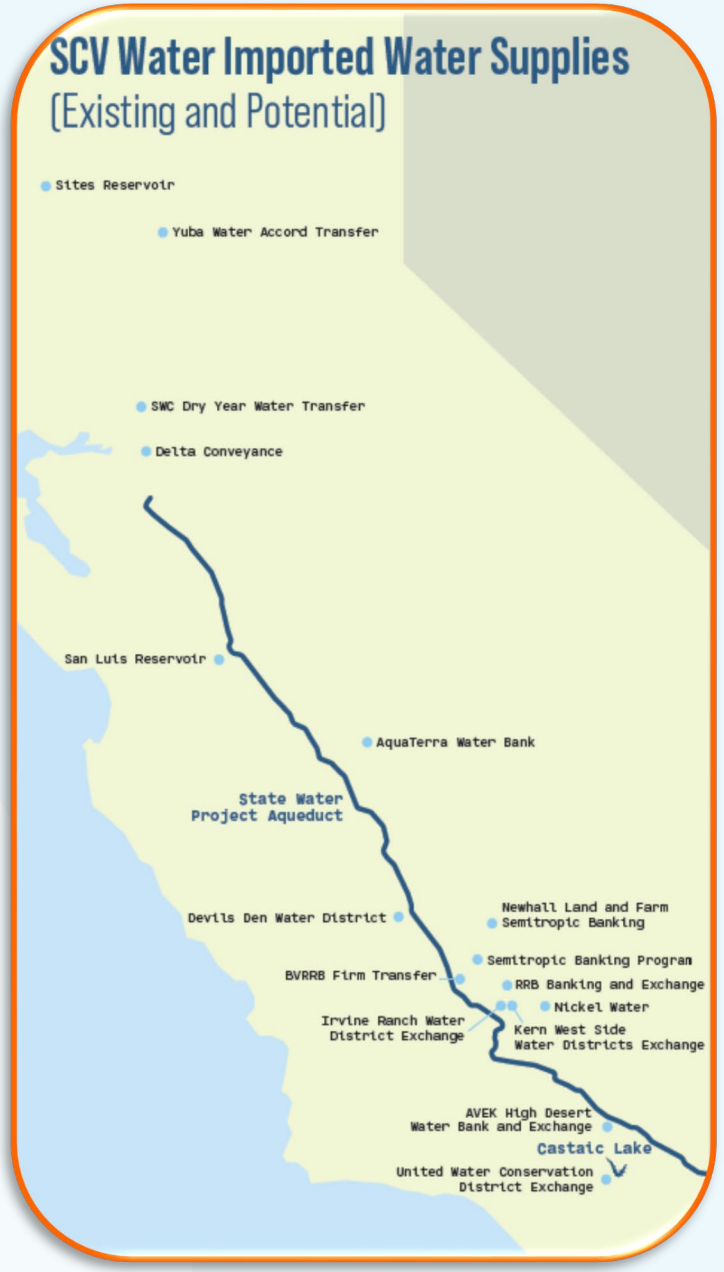
Quantitatively assess and compare the value of new investments.

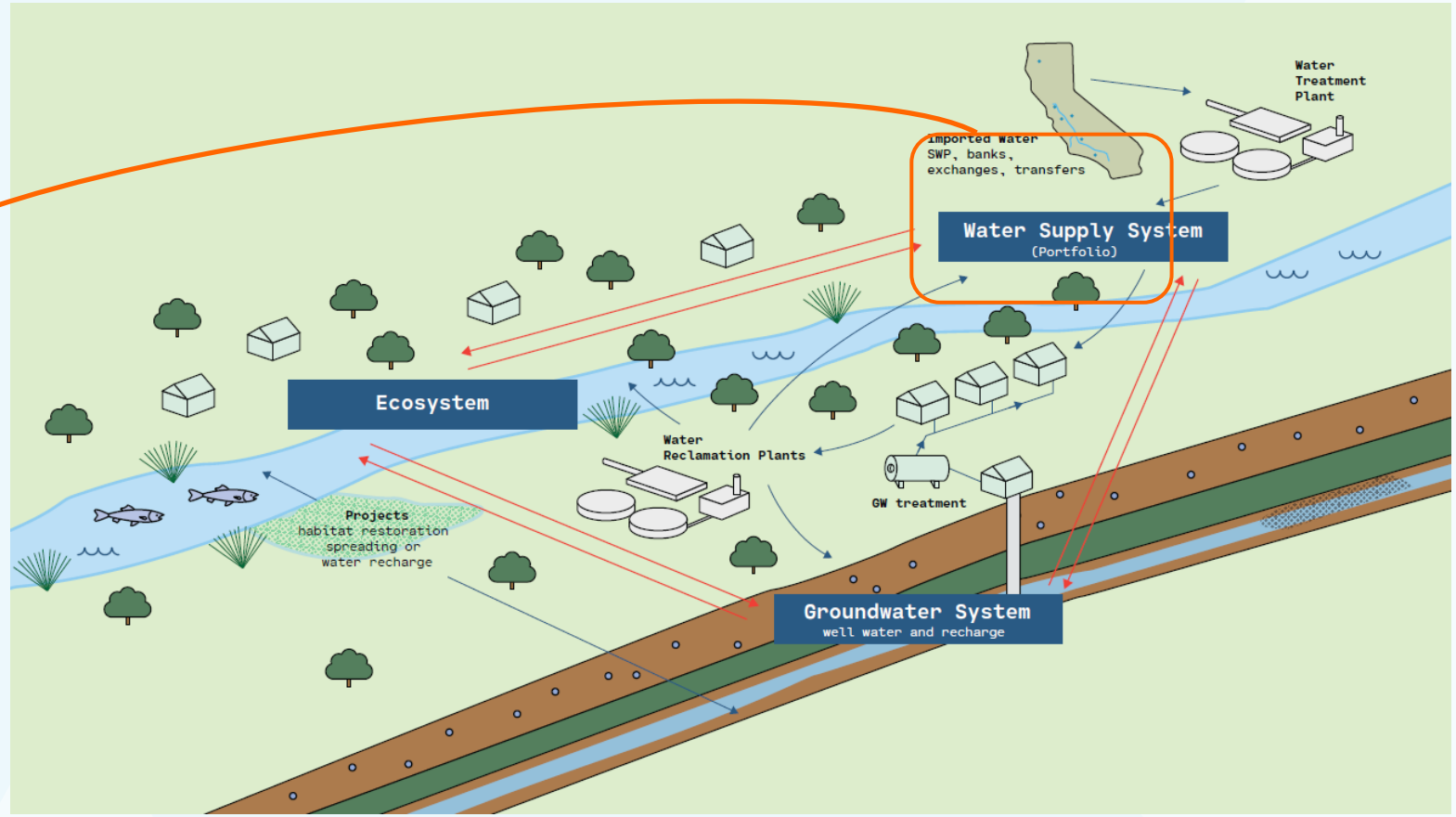
Consider the investments in conjunction with new operating strategies.

Assess the risks of interruptions to one or more supplies.



SCV WATER SYSTEM PORTFOLIO





METHODOLOGY

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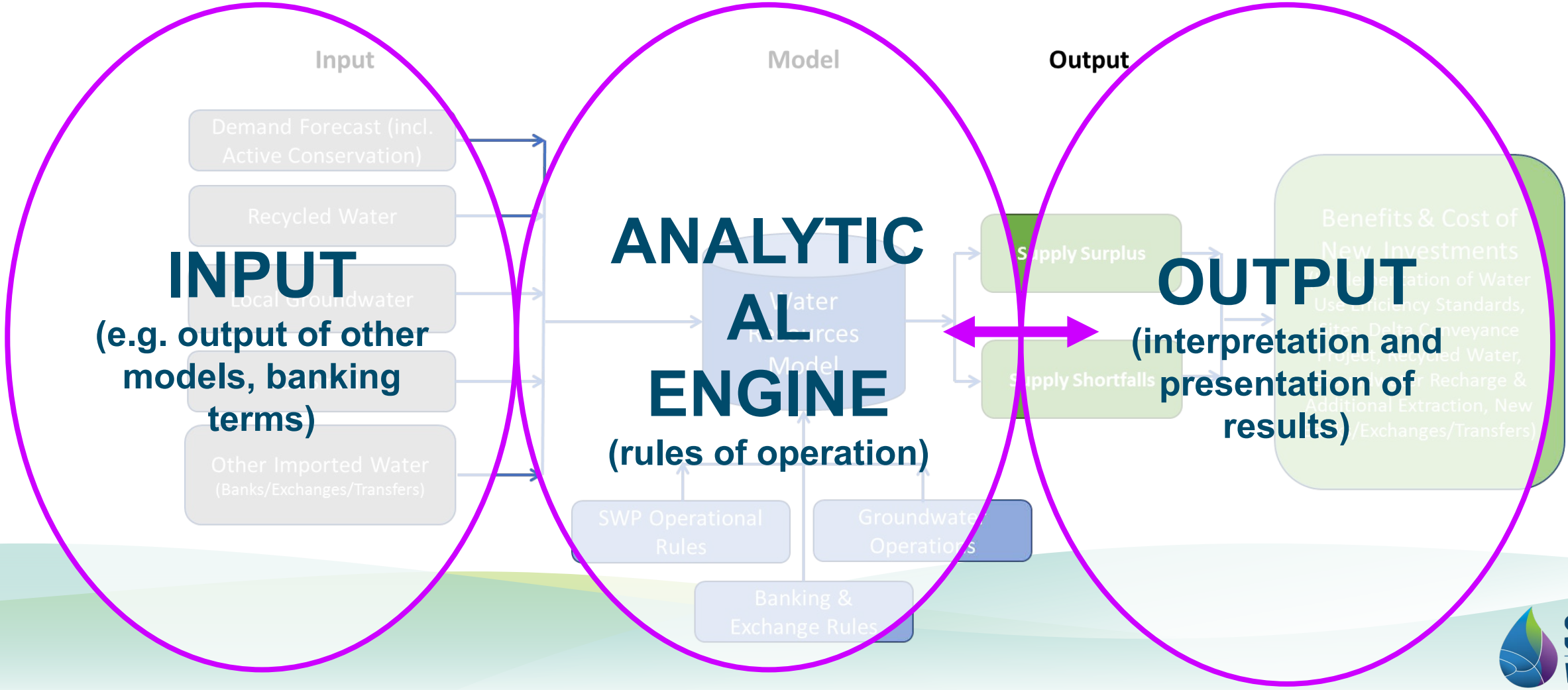
METHODOLOGY
CONCEPTUAL FRAMEWORK OF RELIABILITY MODELING



METHODOLOGY

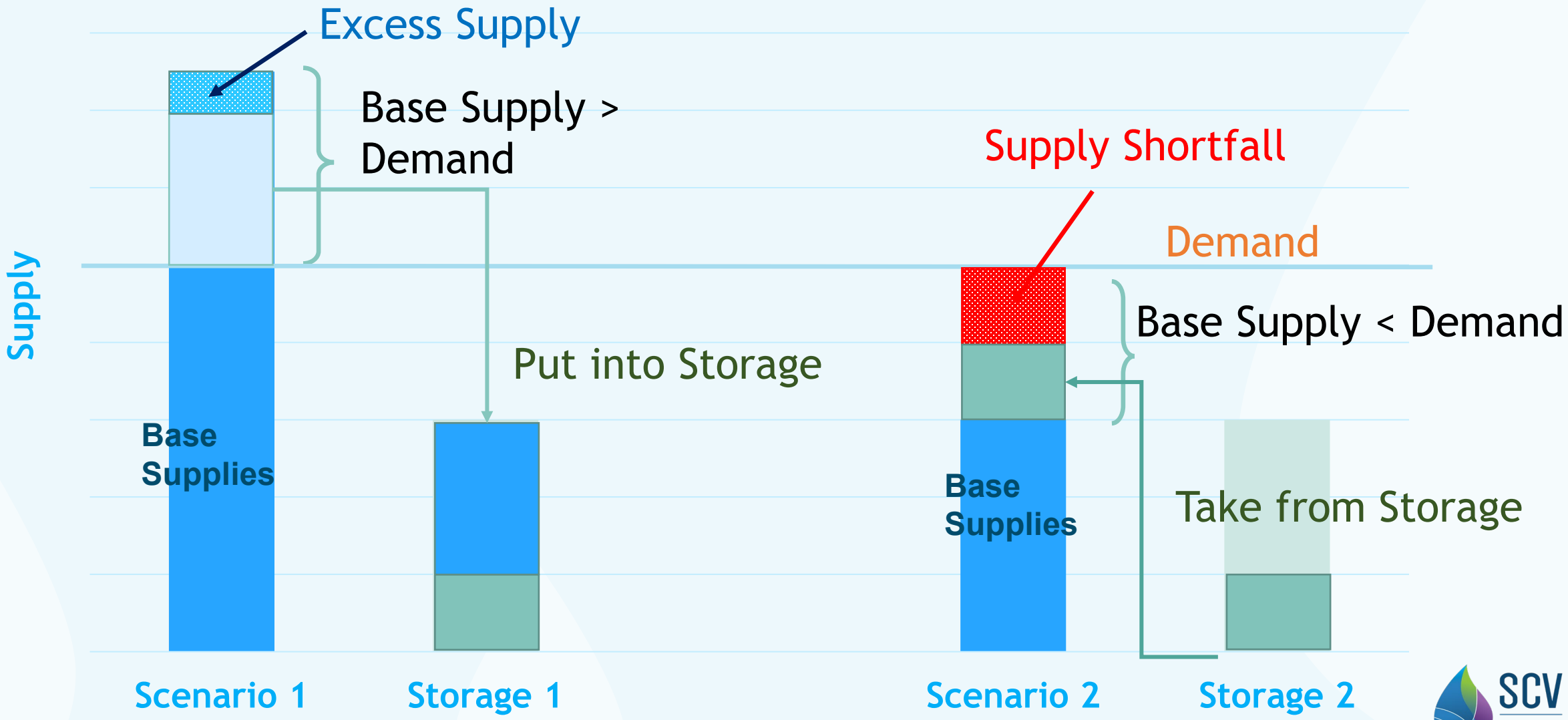
Multi-year sequences of wet and dry years.

State-of-the-practice assumptions for climate change, regulations, and future development of the SWP.

Variability of local groundwater during wet and dry periods.

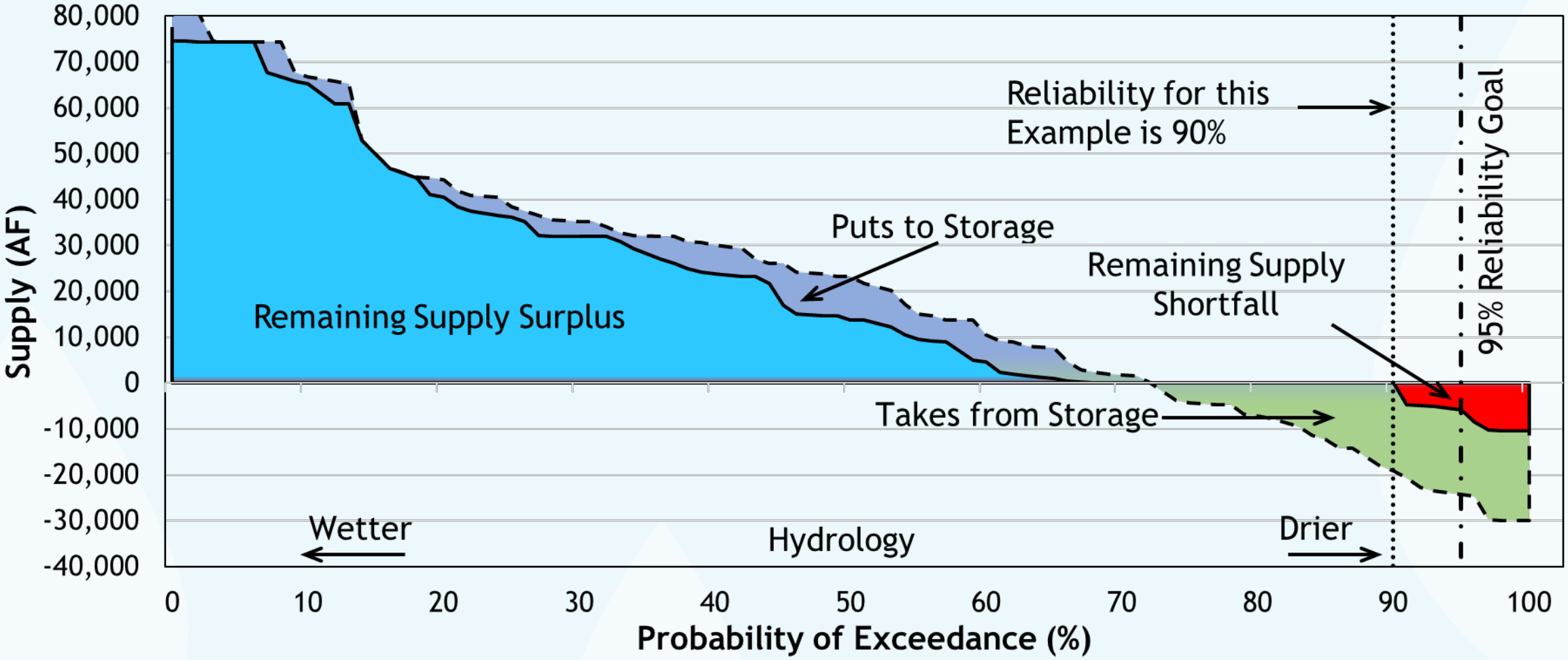
30-year planning horizons.

Methodology
Water Operations in a Single Time Step



Methodology

Sample Statistical Summary over Multiple Plausible Hydrologic Traces



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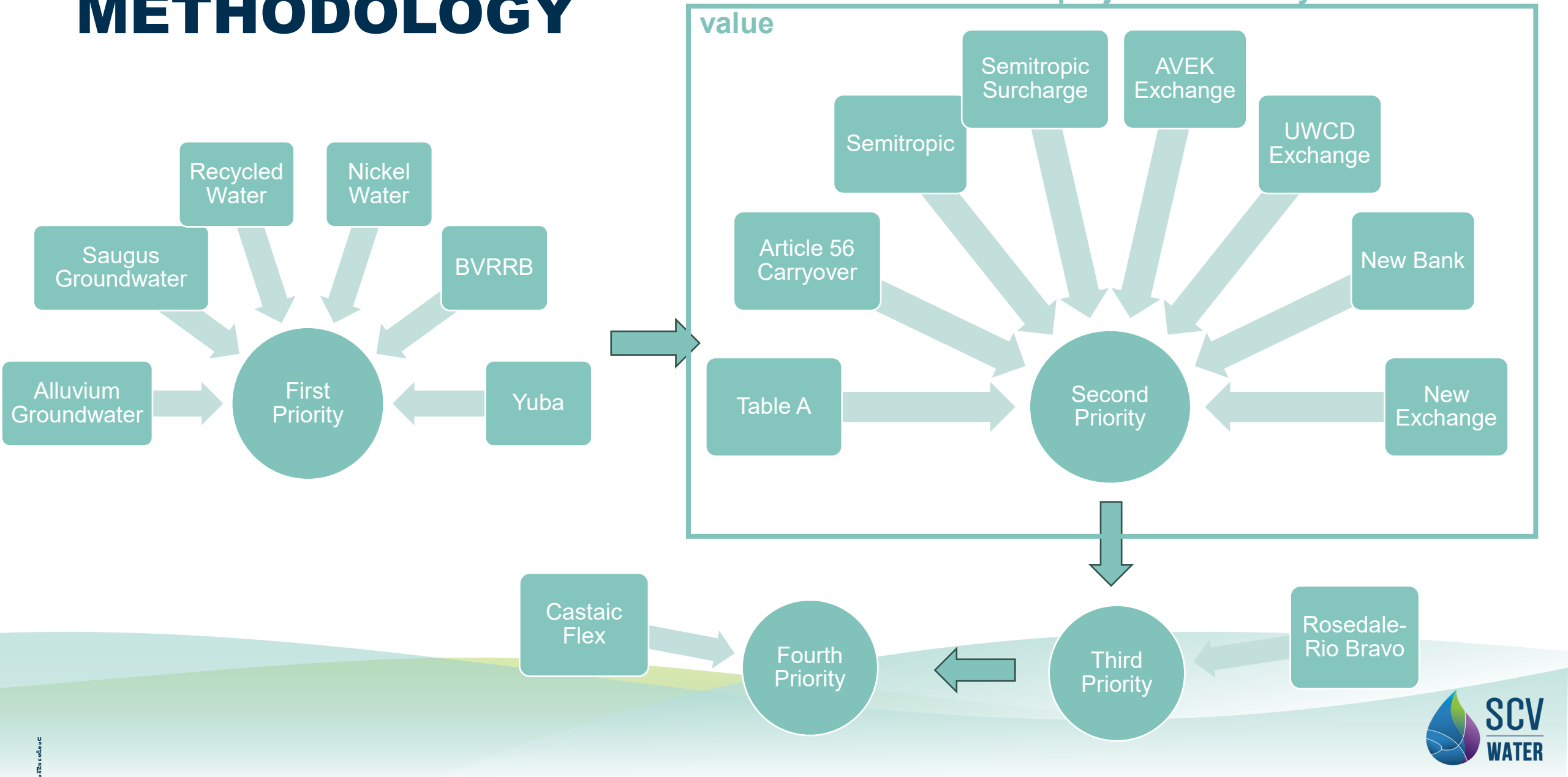
METHODOLOGY

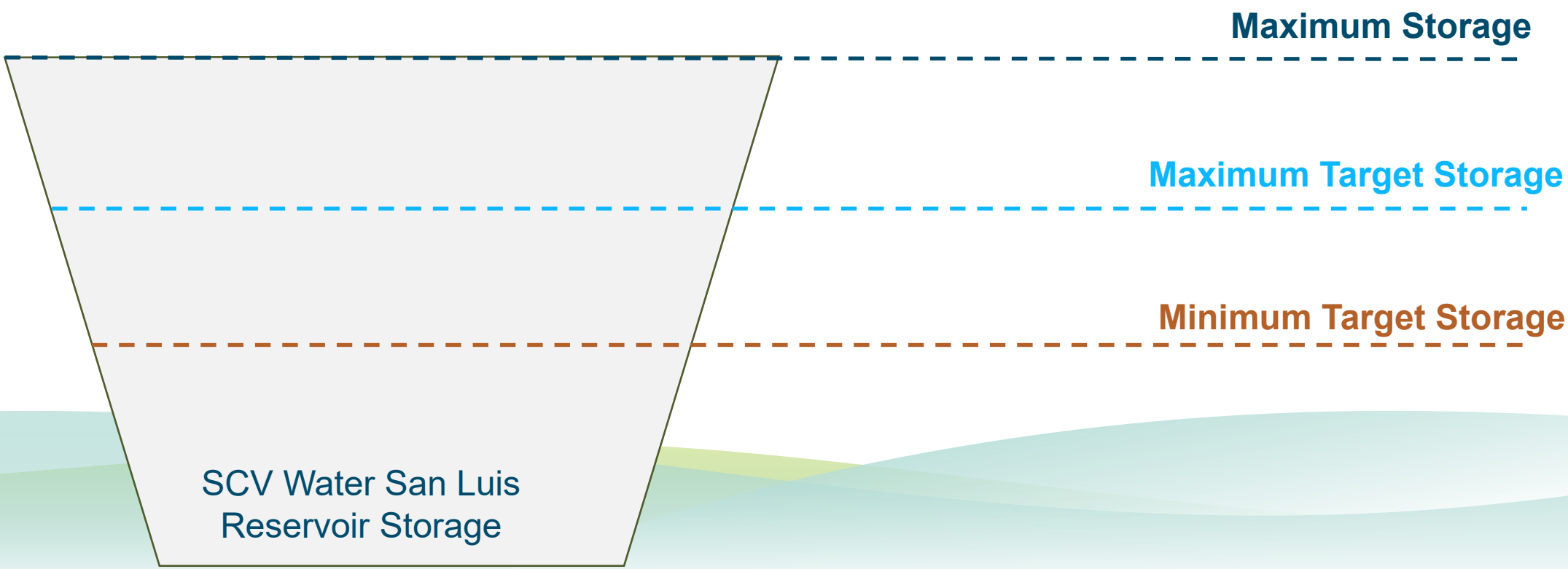
Order in which the use of second priority supplies is allocated is based on the projected end-of-year Article 56 value



METHODOLOGY

Allocation of Second Priority Supplies

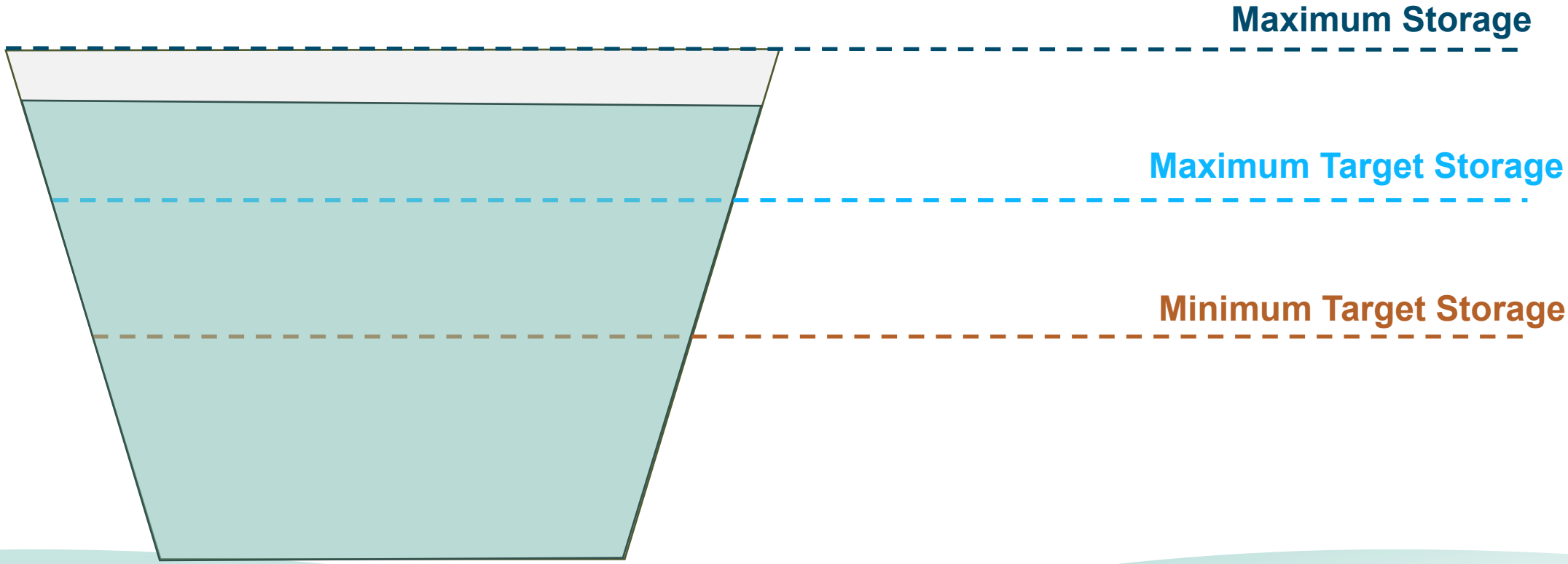
- Management of Article 56 Carryover in San Luis Reservoir provides the agency with additional storage but comes with the risk of spill.



METHODOLOGY

Allocation of Second Priority Supplies

Case 1: EOY Article 56 Carryover Balance > Maximum Target Storage



- Prioritize using SWP supplies to meet demand.
- Send surplus water to flex, then to banking and exchange programs.

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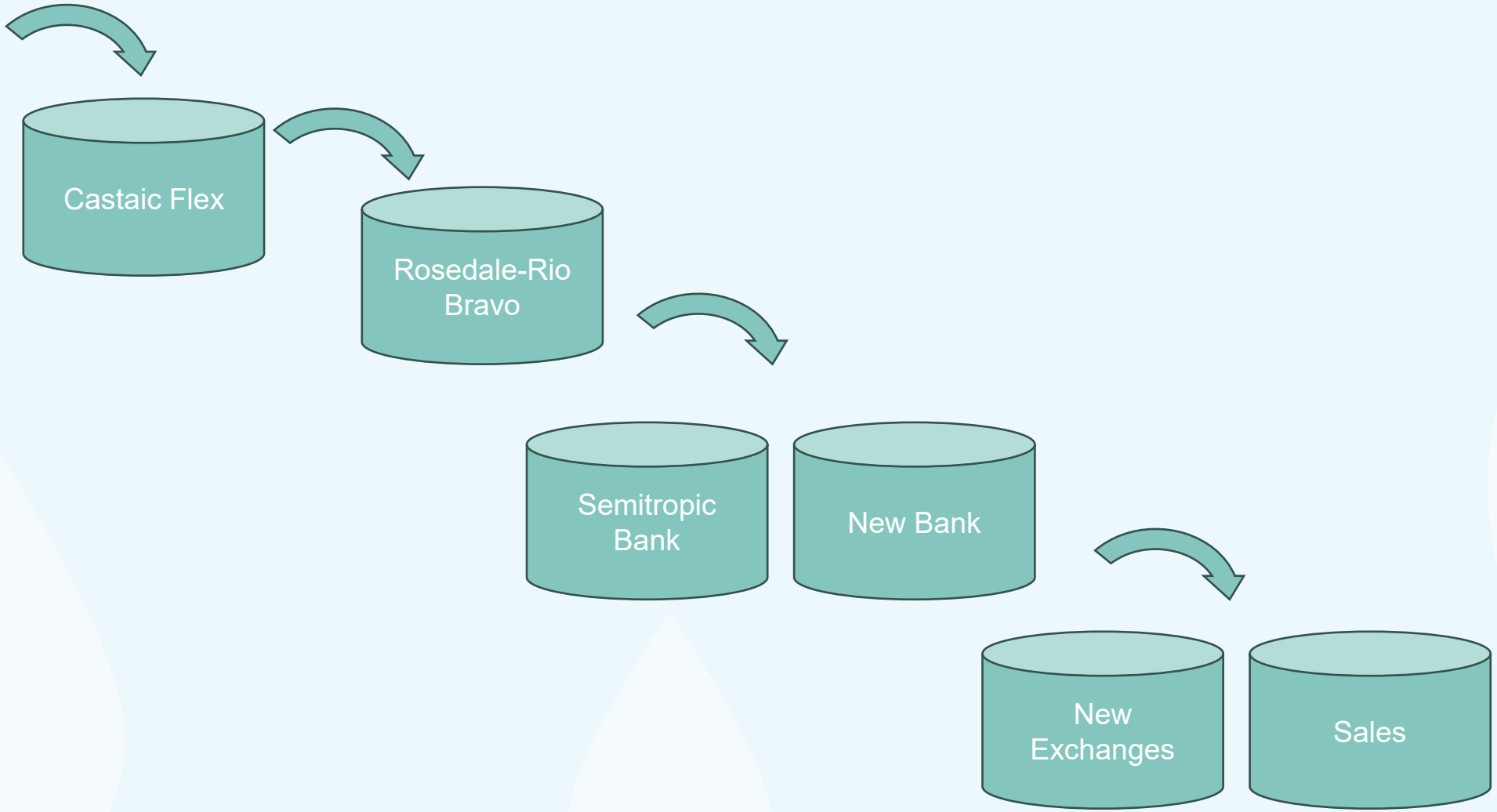
METHODOLOGY

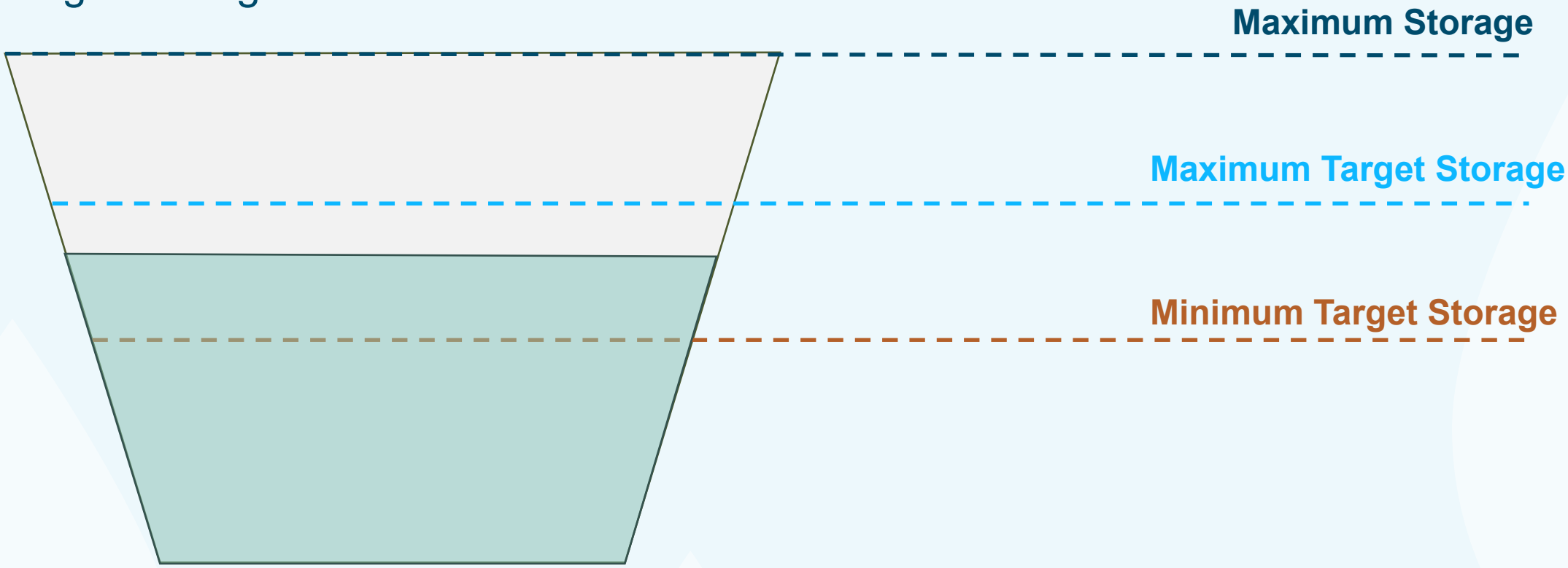
Allocation of Surplus Supplies in Case 1.



METHODOLOGY

Allocation of Second Priority Supplies

Case 2: Minimum Target Storage < EOY Article 56 Carryover Balance < Maximum Target Storage



- Prioritize using SWP supplies to meet demand.
- Return to flex.
- No puts into or takes from banking and exchange programs.

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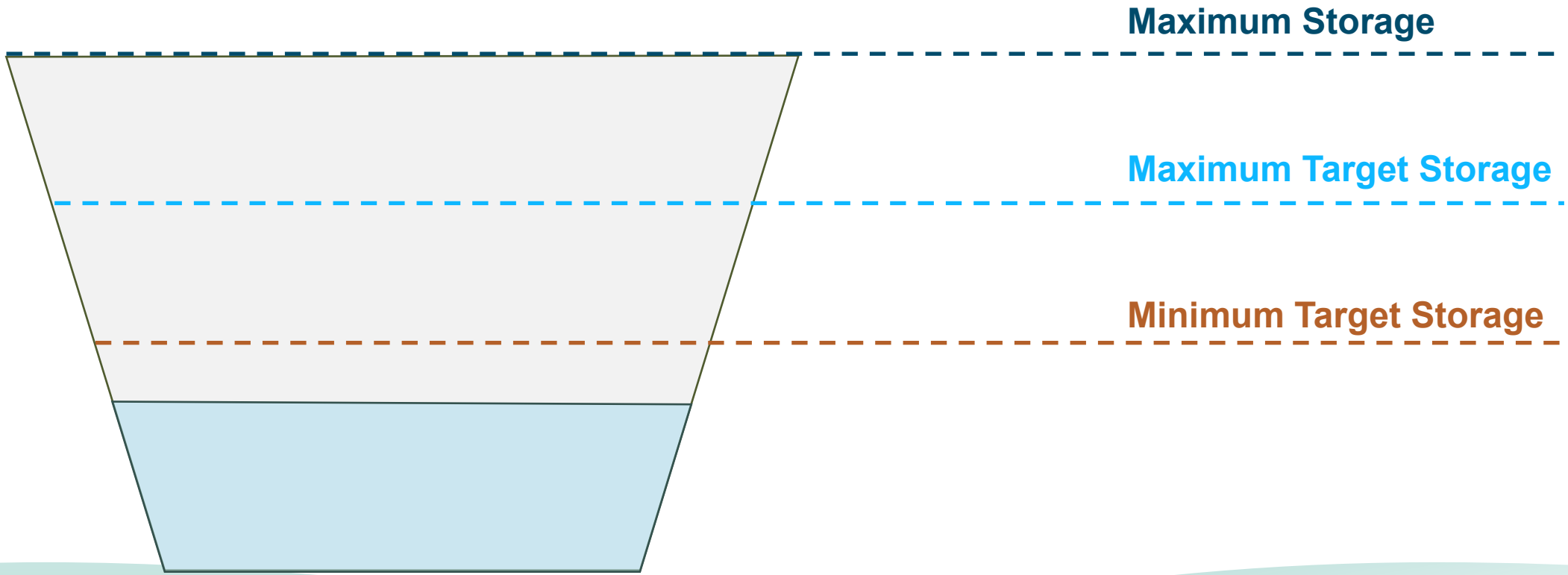
METHODOLOGY

Allocation of Second Priority Supplies

Case 3: EOY Article 56 Carryover Balance < Minimum Target Storage



- Prioritize using banked and exchange water to meet demand, then return to flex.
- After meeting demand, back up stored water into San Luis Reservoir.

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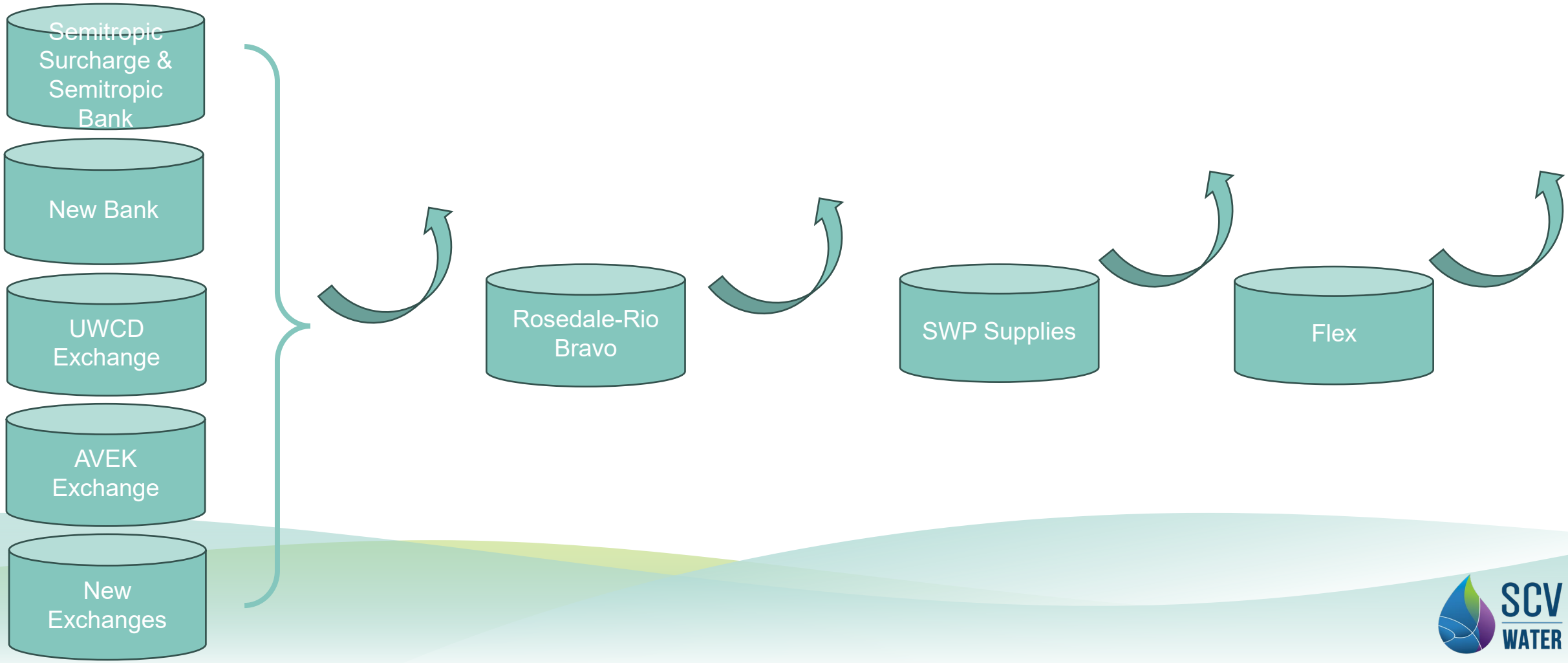
METHODOLOGY

Allocation of Supplies to meet Demand in Case 3.



SCENARIOS

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SCENARIOS

		Prelim (without Article 56)	Base Scenario (with Article 56)	Scenario 1 (with Art56 & AVEK)
Demand with Active Conservation		x	x	x
Alluvium (2020 GSP)		X	X	X
Saugus (2020 GSP)		X	X	X
Dry Year Saugus (3-8)				
Recycled Water		X	X	X
Table A (with climate change)		DCR 2021	DCR 2021	DCR 2021
Article 56 Carryover	Max Target		15 TAF	15 TAF
	Min Target		5 TAF	5 TAF
SWP/Castaic flexible storage		X	X	X
BVRRB		X	X	X
Nickel Water		X	X	X
Yuba		X	X	X
Semitropic		X	X	X
Semitropic NLF				
Rosedale Rio Bravo		X	X	X
Rosedale Rio Bravo Exchange				
AVEK Exchange		X	X	X
UWCD Exchange		X	X	X
High Desert AVEK Bank	Puts			20 TAFY
	Takes			20 TAFY
	Max Storage			80 TAF

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SCENARIOS - ASSUMPTIONS & INITIAL CONDITIONS

Existing Programs

	2024 Initial Balance (AF)	Max Storage (AF)
Semitropic Surcharge	20,970	-
Semitropic Bank	13,800	15,000
Rosedale Rio Bravo Bank	75,966	80,000
AVEK Exchange	2,250	-
UWCD Exchange	500	-
Article 56	10,000	20,000

Potential New Program

AVEK Program	Scenario 1
Maximum Storage	80,000 AF
Annual Puts	20,000 AF
Annual Takes	20,000 AF
Losses	10%
Program Start Year	2030
Program Last Year	2065
Initial Balance	0

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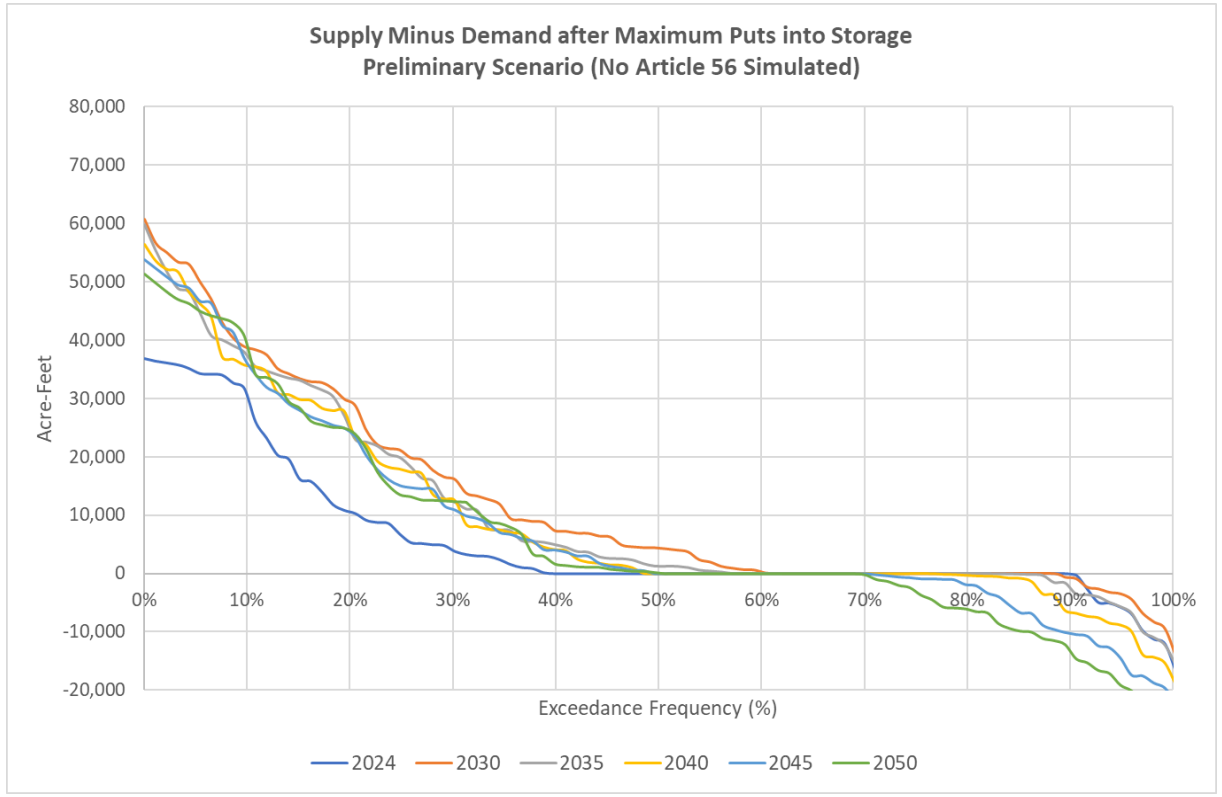
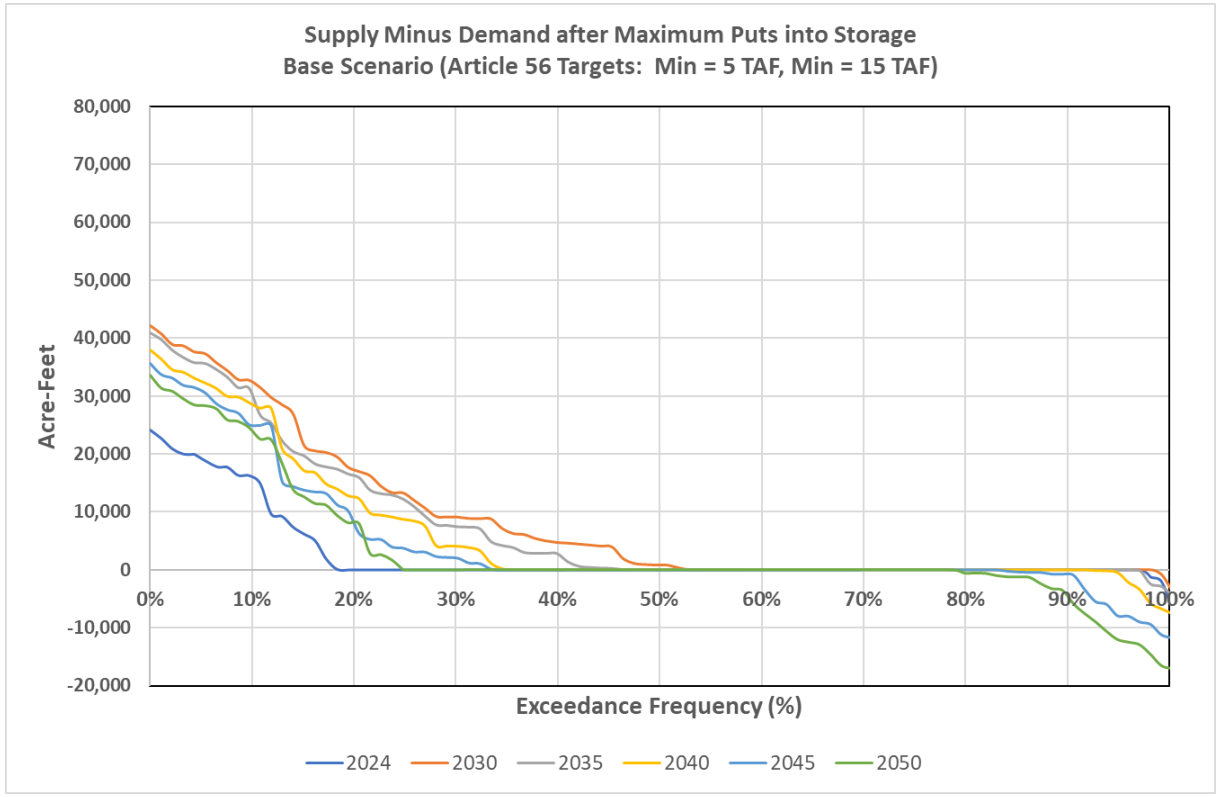
ARTICLE 56 CARRYOVER STORAGE SIMULATIONS

BENEFITS OF ACCESS TO ARTICLE 56 CARRYOVER STORAGE





- The management of Article 56 in San Luis increases reliability of SCV Water's base supplies.

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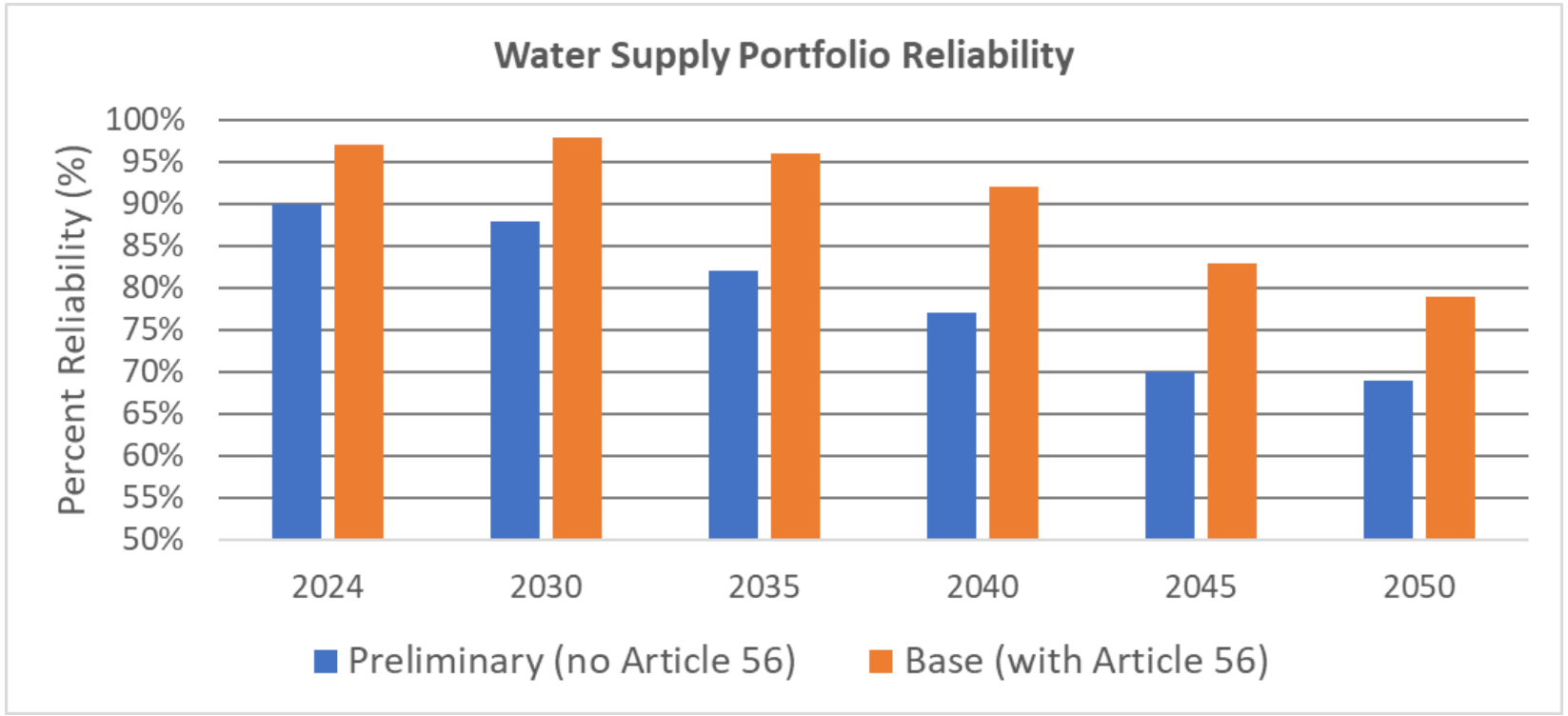
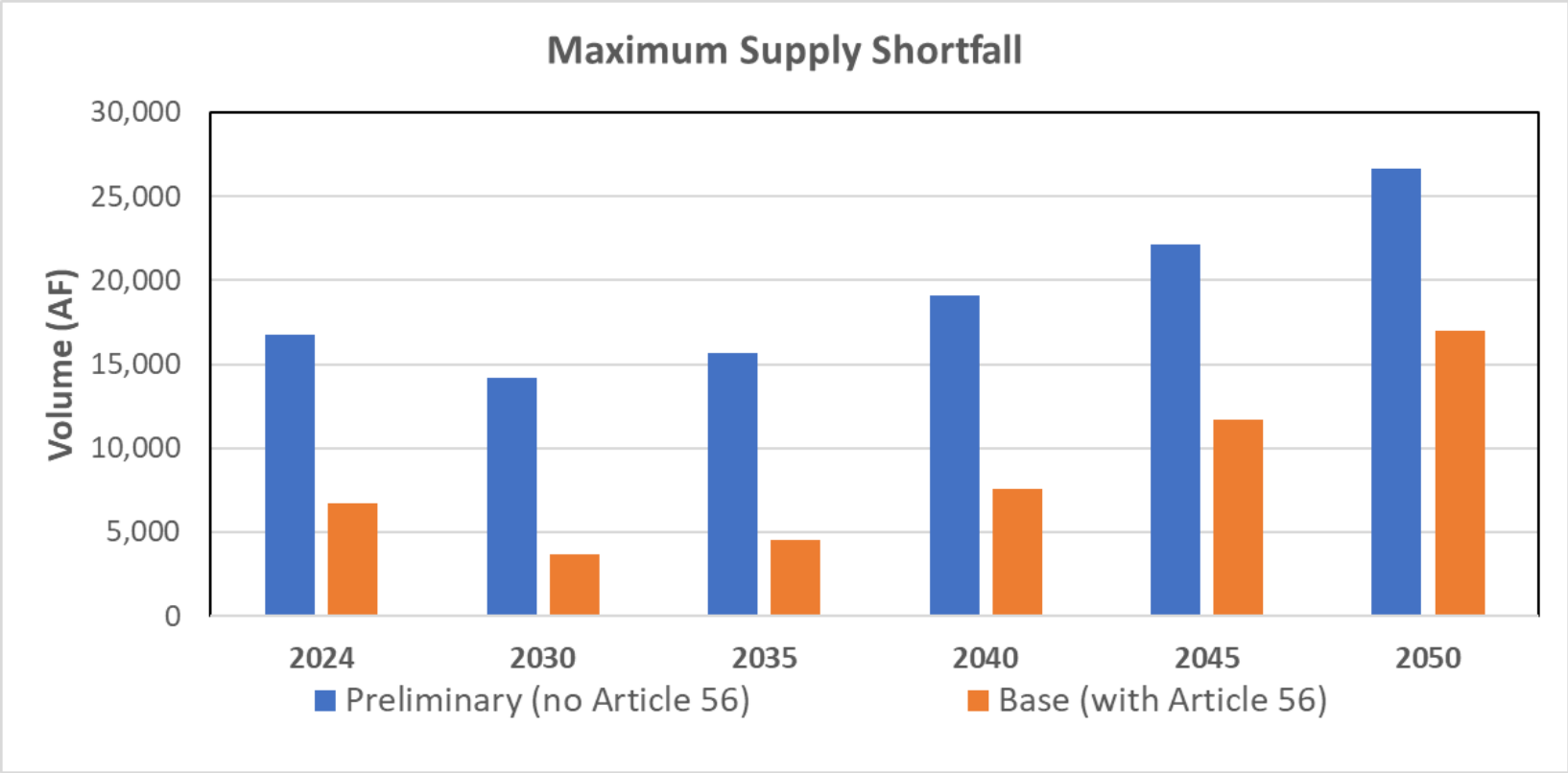
BENEFITS OF ACCESS TO ARTICLE 56 CARRYOVER STORAGE

The management of Article 56 Carryover in San Luis serves as a buffer and increases the reliability of SCV Water's base supplies.



BENEFITS OF ACCESS TO ARTICLE 56 CARRYOVER STORAGE

The management of Article 56 Carryover in San Luis decreases the magnitude of maximum supply shortfalls.



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AVEK

AVEK SIMULATIONS

SCENARIOS

		Prelim (without Article 56)	Base Scenario (with Article 56)	Scenario 1 (with Art56 & AVEK)
Demand with Active Conservation		x	x	x
Alluvium (2020 GSP)		X	X	X
Saugus (2020 GSP)		X	X	X
Dry Year Saugus (3-8)				
Recycled Water		X	X	X
Table A (with climate change)		DCR 2021	DCR 2021	DCR 2021
Article 56 Carryover	Max Target		15 TAF	15 TAF
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SWP/Castaic flexible storage		X	X	X
BVRRB		X	X	X
Nickel Water		X	X	X
Yuba		X	X	X
Semitropic		X	X	X
Semitropic NLF				
Rosedale Rio Bravo		X	X	X
Rosedale Rio Bravo Exchange				
AVEK Exchange		X	X	X
UWCD Exchange		X	X	X
High Desert AVEK Bank	Puts			20 TAFY
	Takes			20 TAFY
	Max Storage			80 TAF

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AVEK SIMULATIONS

AVEK Program	Scenario 1
Maximum Storage	80,000 AF
Annual Puts	20,000 AF
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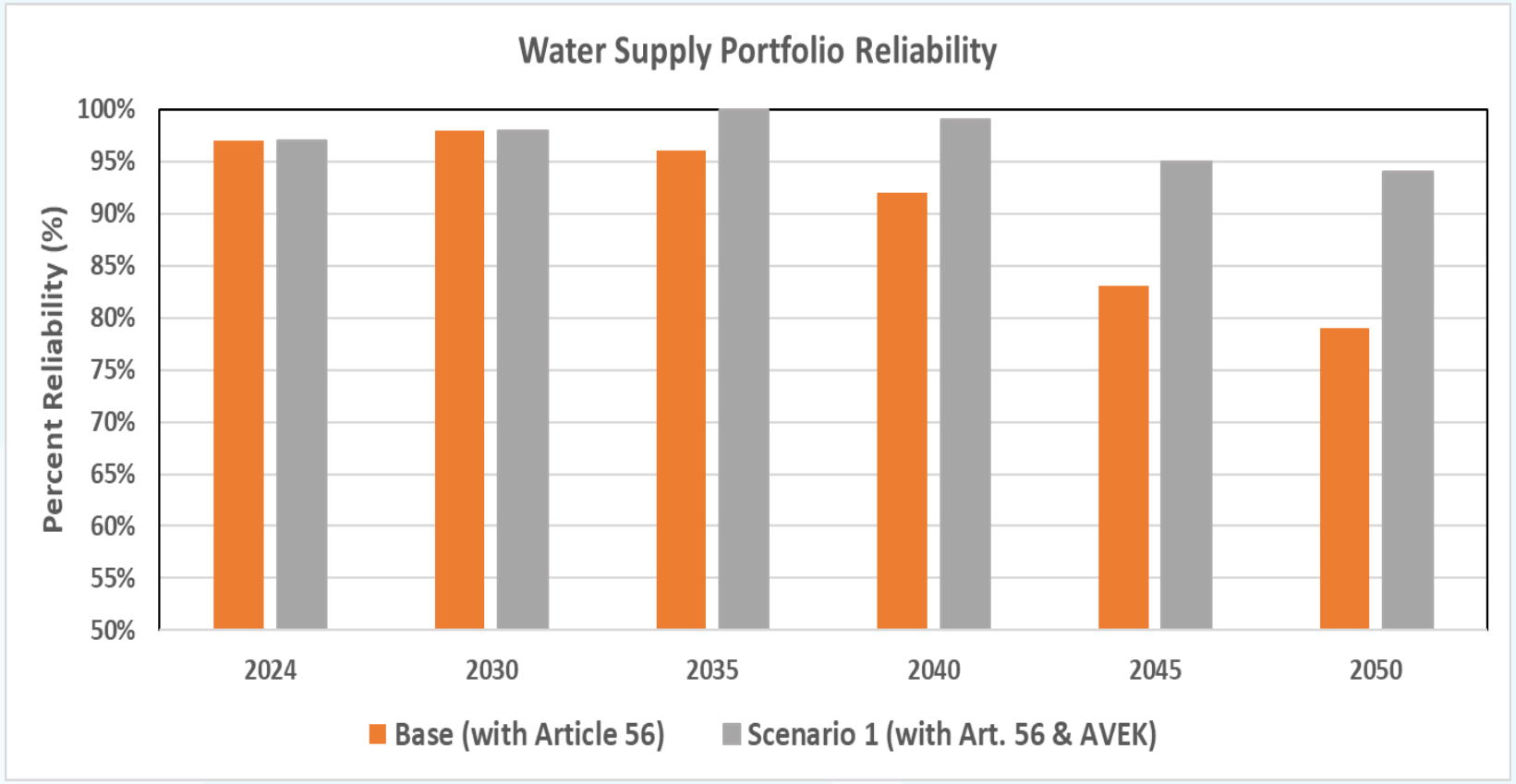
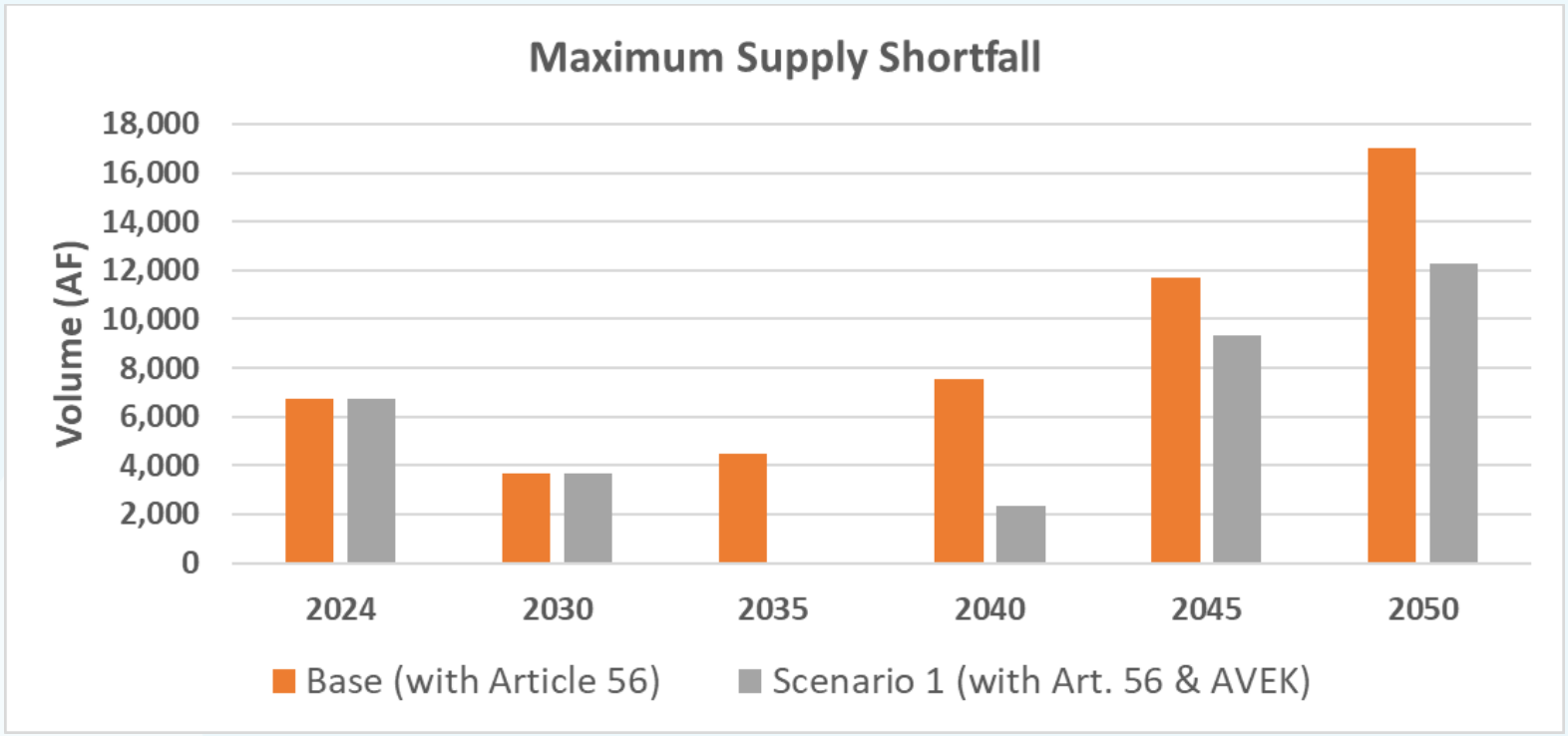
Program Start Year	2030
Program Last Year	2065
Initial Balance	0

COMPARISON BETWEEN BASE SCENARIO AND AVEK SCENARIO 1



Additional storage increases reliability, especially during extended periods of drought

COMPARISON BETWEEN BASE SCENARIO AND AVEK SCENARIO 1



Additional storage decreases the magnitude in supply shortfalls.

AVEK BANKING PROGRAM

Set AVEK parameters so they are non-constraining:

Puts & Takes = 65,000 AFY

Maximum Storage = 175,000 AF

Still can't achieve 100 % reliability because of:

Availability of supplies

Limits on aqueduct capacity (secondary)

Questions on what level of reliability we want to achieve

SUMMARY & NEXT STEPS

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SUMMARY & NEXT STEPS

SCV Water now has a running water supply reliability model with several improvements:

Monthly timestep

Complex rules on the management of Article 56

Rules on banking program fills and takes

Access to and management of Article 56 Carryover storage serves as a buffer between dry and wet years and improves reliability by at least 10%.

Preliminary AVEK evaluations demonstrate the value of additional storage for improving reliability.

AVEK improves reliability by more than 15% by 2050.

AVEK reduces the magnitude of supply shortfalls by more than 25% by 2050.

One of the main constraining factors for filling AVEK (and other potential storage programs)is the availability of surplus water upon realization of increased demands in service area.

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SUMMARY & NEXT STEPS

We can begin to assess the need and value of other projects inside and outside the service area.

Investment in DCP.

Investment in Sites Reservoir.

Investments in Saugus dry year wells.

Development of local groundwater recharge and recovery.

New conservation measures.

Investments in new banking programs.

Together with other tools, we can evaluate consequences of alternate local groundwater management and recycled water management scenarios in a much more comprehensive way.

Storage.

Refined operating strategies.

Interaction with environmental flows.

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EXTRA SLIDES

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Scenarios

		Prelim (without Article 56)	Base Scenario (with Article 56)	Scenario 1 (with Art56 & AVEK)	Scenario 2 (with Art56 & AVEK)
Alluvium (2020 GSP)		X	X	X	X
Saugus (2020 GSP)		X	X	X	X
Dry Year Saugus (3-8)					
Recycled Water		X	X	X	X
Table A (with climate change)		DCR 2021	DCR 2021	DCR 2021	DCR 2021
Article 56	Max Target		15 TAF	15 TAF	15 TAF
	Min Target		5 TAF	5 TAF	5 TAF
SWP/Castaic flexible storage		X	X	X	X
BVRRB		X	X	X	X
Nickel Water		X	X	X	X
Yuba		X	X	X	X
Semitropic		X	X	X	X
Semitropic NLF					
Rosedale Rio Bravo		X	X	X	X
Rosedale Rio Bravo Exchange					
AVEK Exchange		X	X	X	X
UWCD Exchange		X	X	X	X
High Desert AVEK Bank	Puts			20 TAFY	30 TAFY
	Takes			20 TAFY	30 TAFY
	Max Storage			80 TAF	100 TAF

Extra

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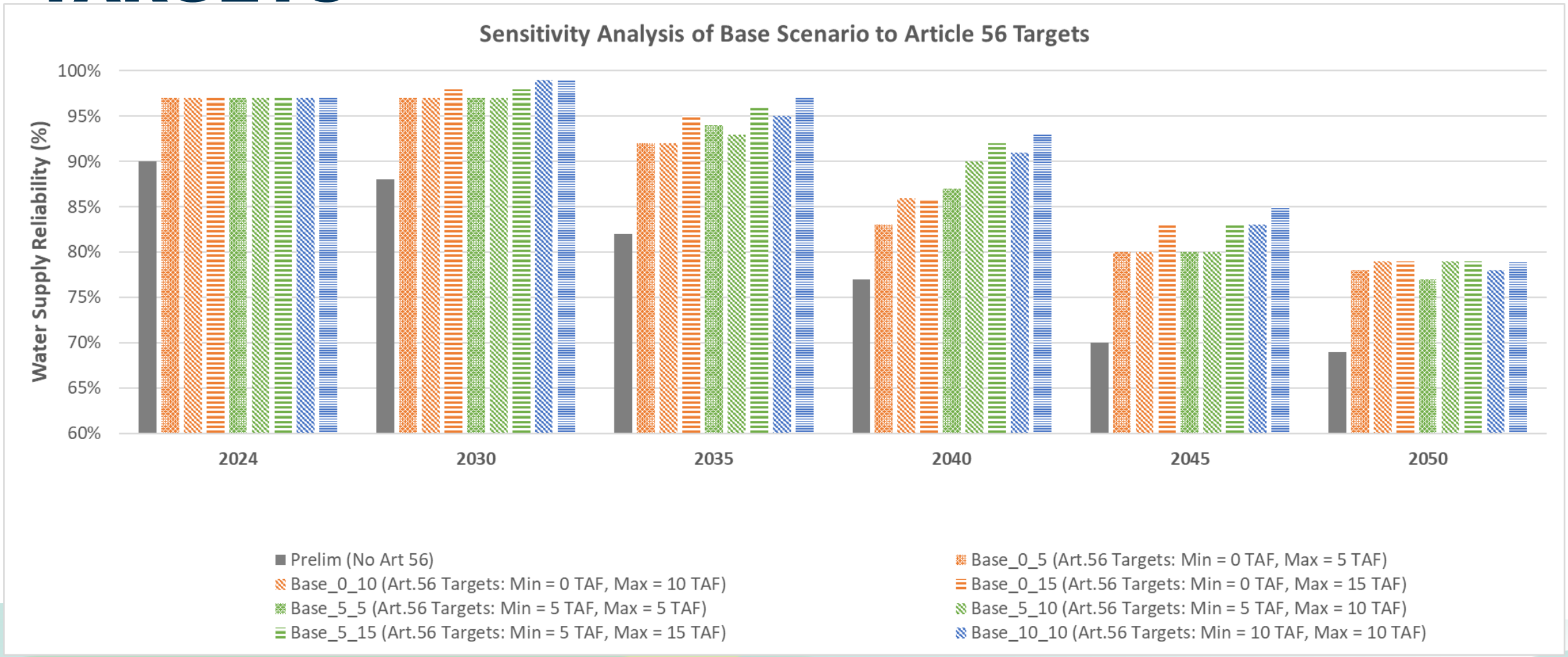
SENSITIVITY ANALYSIS TO THE ARTICLE 56 TARGETS



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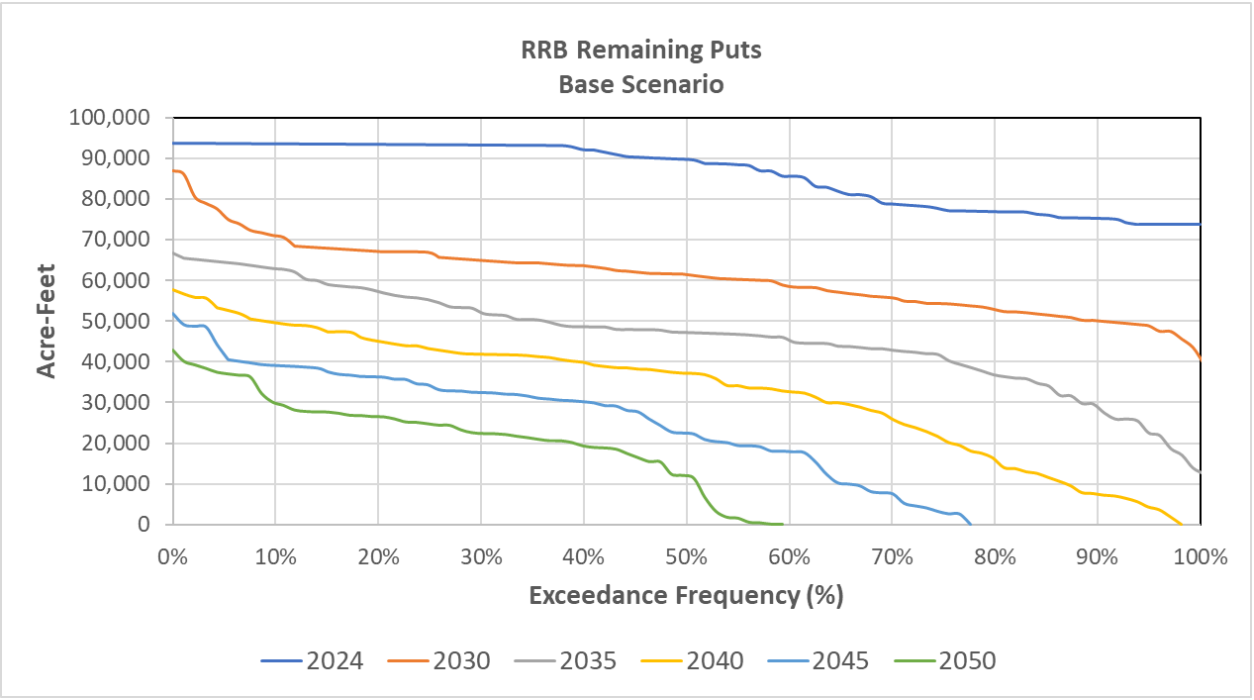
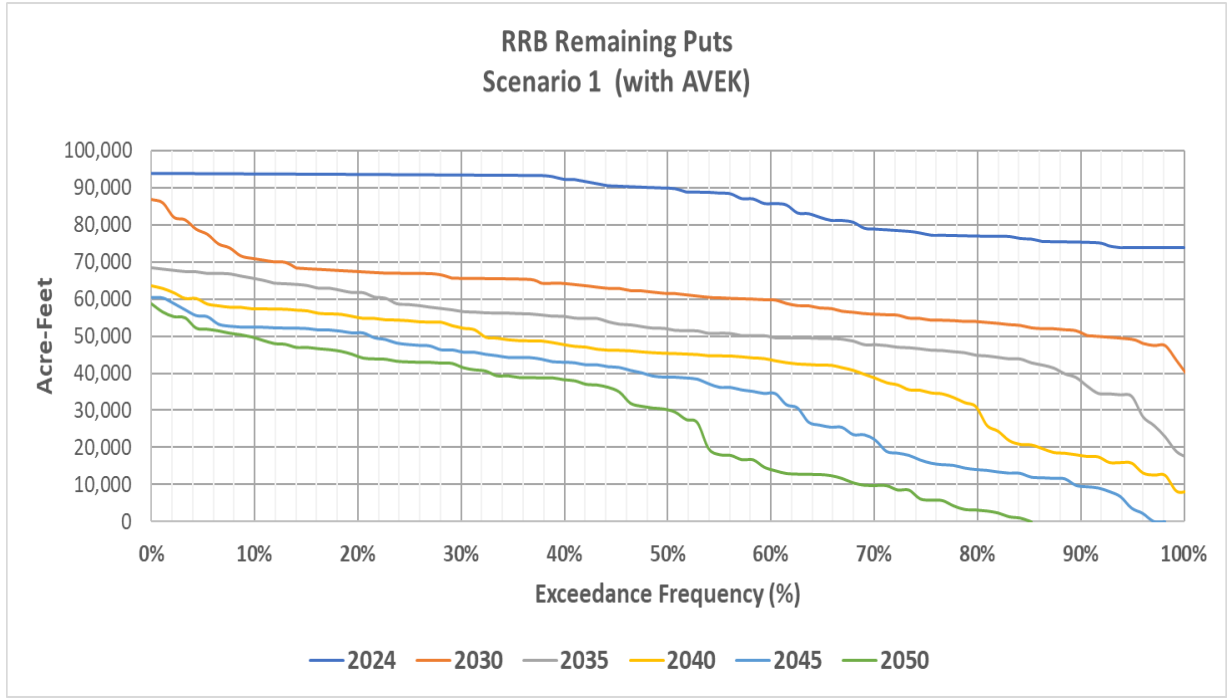
AVEK SIMULATIONS

AVEK Program	Scenario 1	Scenario 2
Maximum Storage	80,000 AF	100,000 AF
Annual Puts	20,000 AF	30,000 AF
Annual Takes	20,000 AF	30,000 AF
Losses	10%	10%
Program Start Year	2030	2030
Program Last Year	2065	2065
Initial Balance	0	0

Extra

COMPARISON BETWEEN BASE SCENARIO AND AVEK SCENARIO 1





- AVEK further extends the life of RRB

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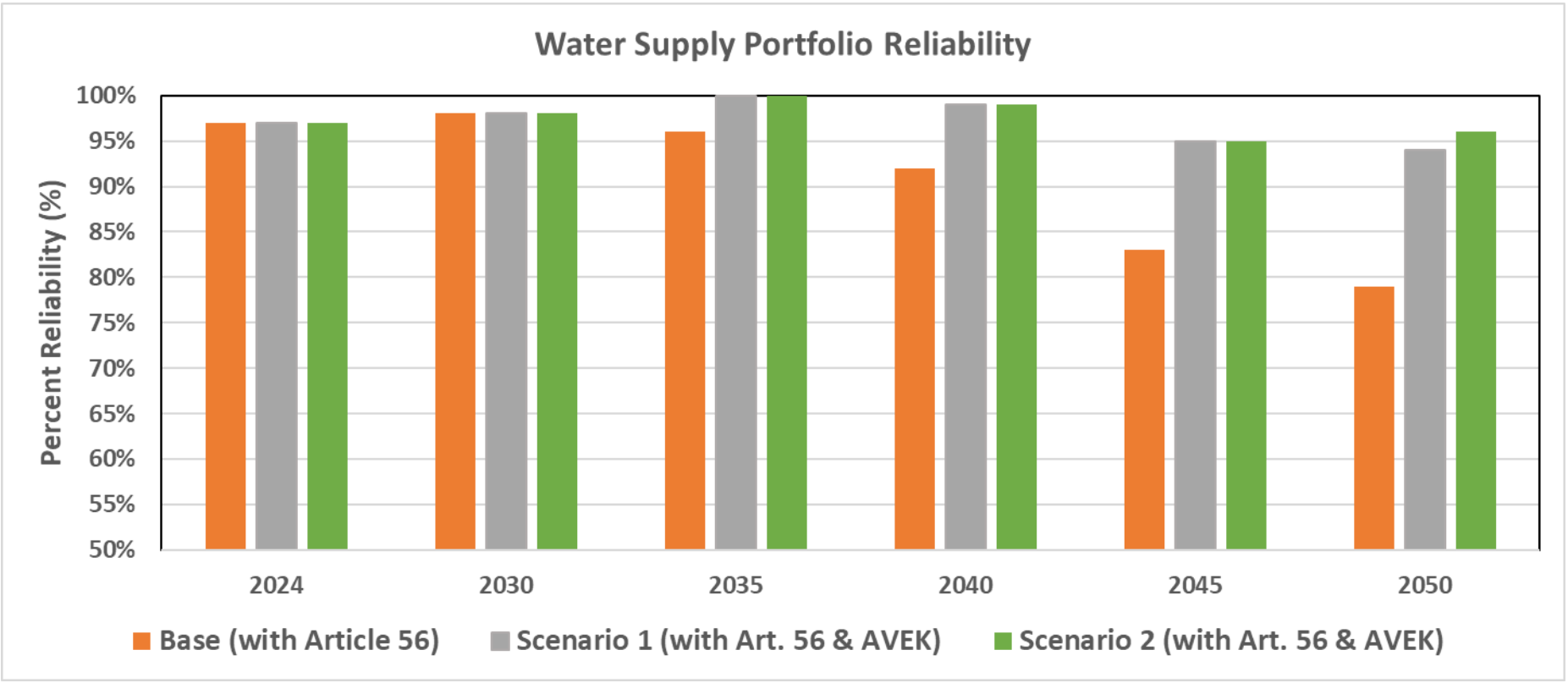
COMPARISON BETWEEN BASE SCENARIO AND AVEK SCENARIOS 1 & 2



AVEK Program	Scenario 1	Scenario 2
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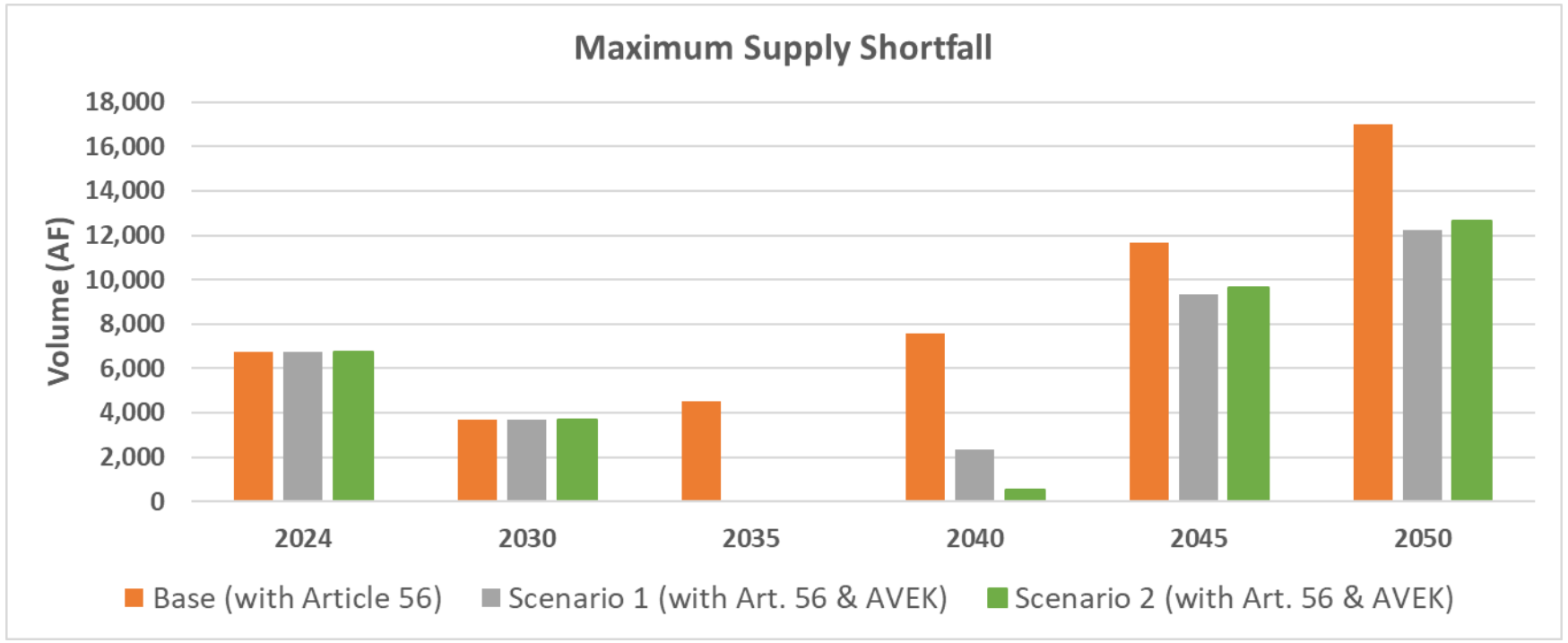
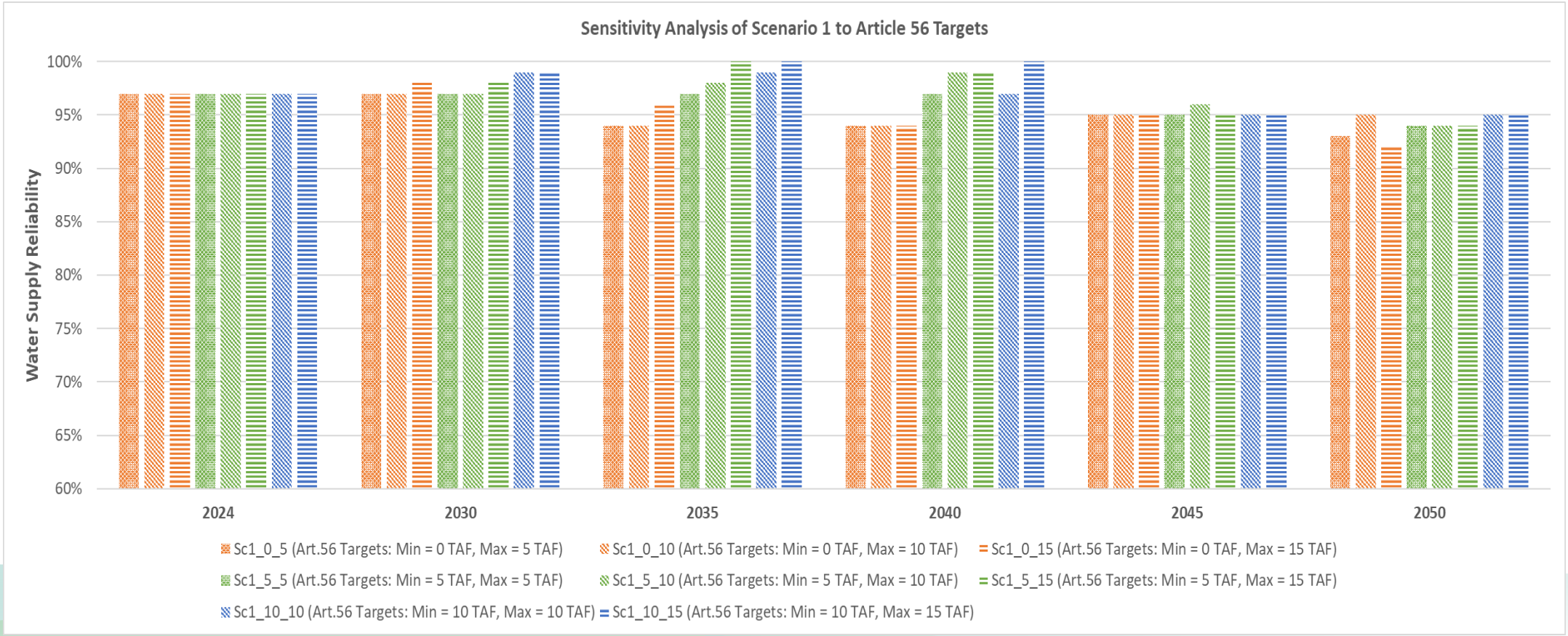
Annual Takes	20,000 AF	30,000 AF
Losses	10%	10%
Program Start Year	2030	2030
Program Last Year	2065	2065
Initial Balance	0	0

COMPARISON BETWEEN BASE SCENARIO AND AVEK SCENARIOS 1 & 2



AVEK Program	Scenario 1	Scenario 2
Maximum Storage	80,000 AF	100,000 AF
Annual Puts	20,000 AF	30,000 AF
Annual Takes	20,000 AF	30,000 AF
Losses	10%	10%
Program Start Year	2030	2030
Program Last Year	2065	2065
Initial Balance	0	0

SENSITIVITY ANALYSIS OF SCENARIO 1 TO ARTICLE 56 TARGETS (AVEK PUTS & TAKES = 20 TAFY, MAX STORAGE = 80 TAF)



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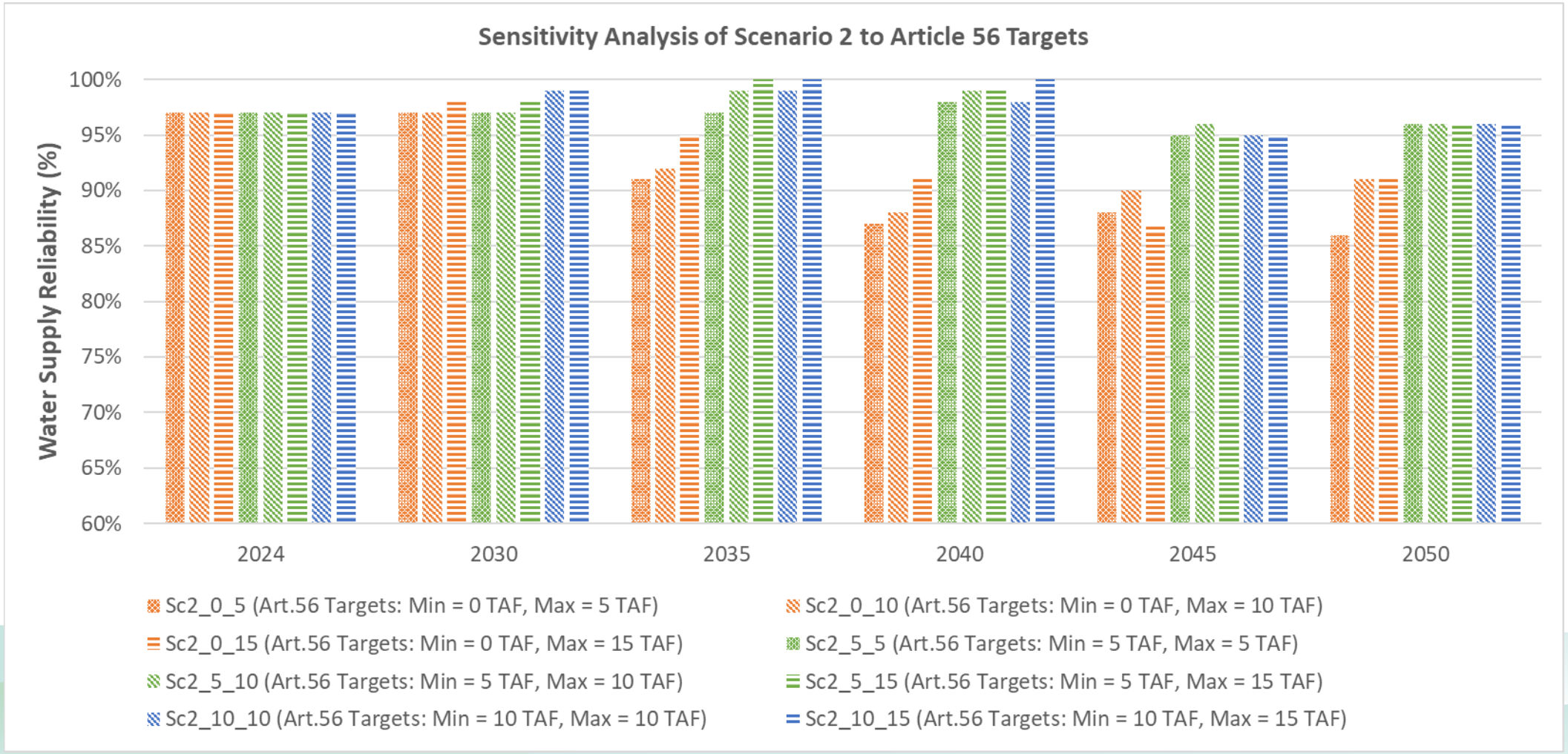
SENSITIVITY ANALYSIS OF SCENARIO 2 TO ARTICLE 56 TARGETS (AVEK PUTS & TAKES = 30 TAFY, MAX STORAGE = 100 TAF)



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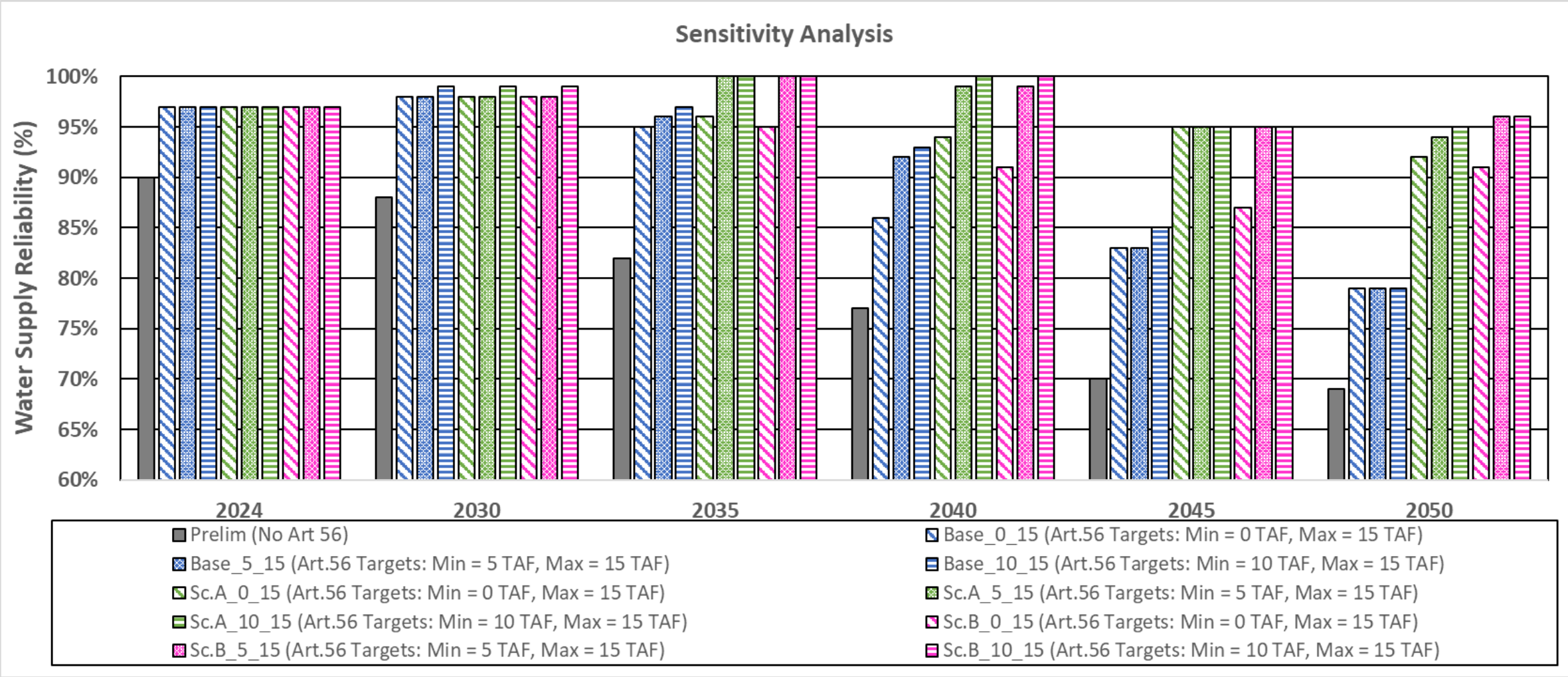
AVEK SIMULATIONS SENSITIVITY ANALYSIS



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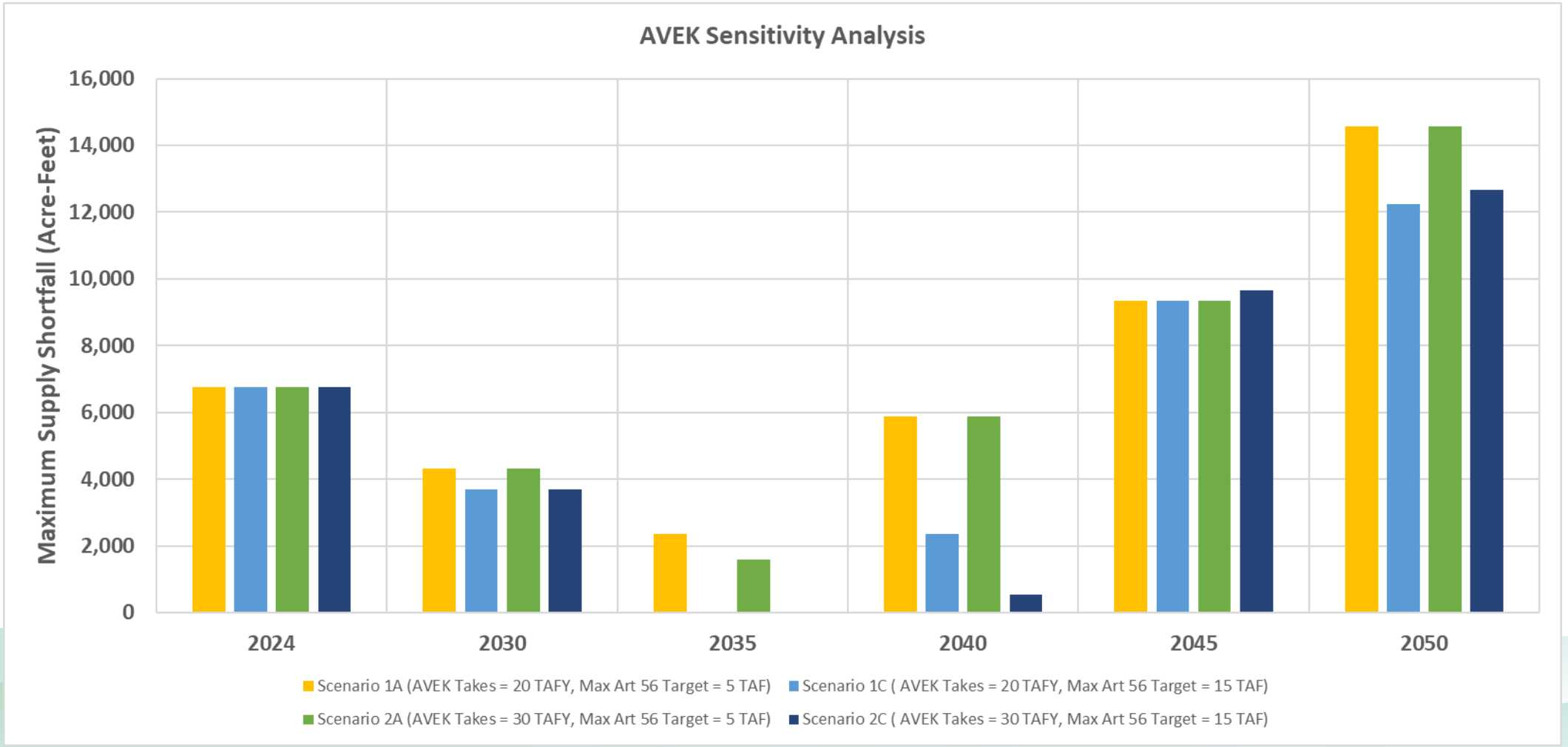
SENSITIVITY ANALYSIS WITH THE AVEK BANKING PROGRAM



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