

Status Update on GoldSim Model Development

2/8/2023

Outline

- Background
- Uses of Reliability Model
- Methodology
- Comparison of Monthly and Annual Time Steps
- Example of Analytical Capability of New GoldSim Model
- Next Steps

Background

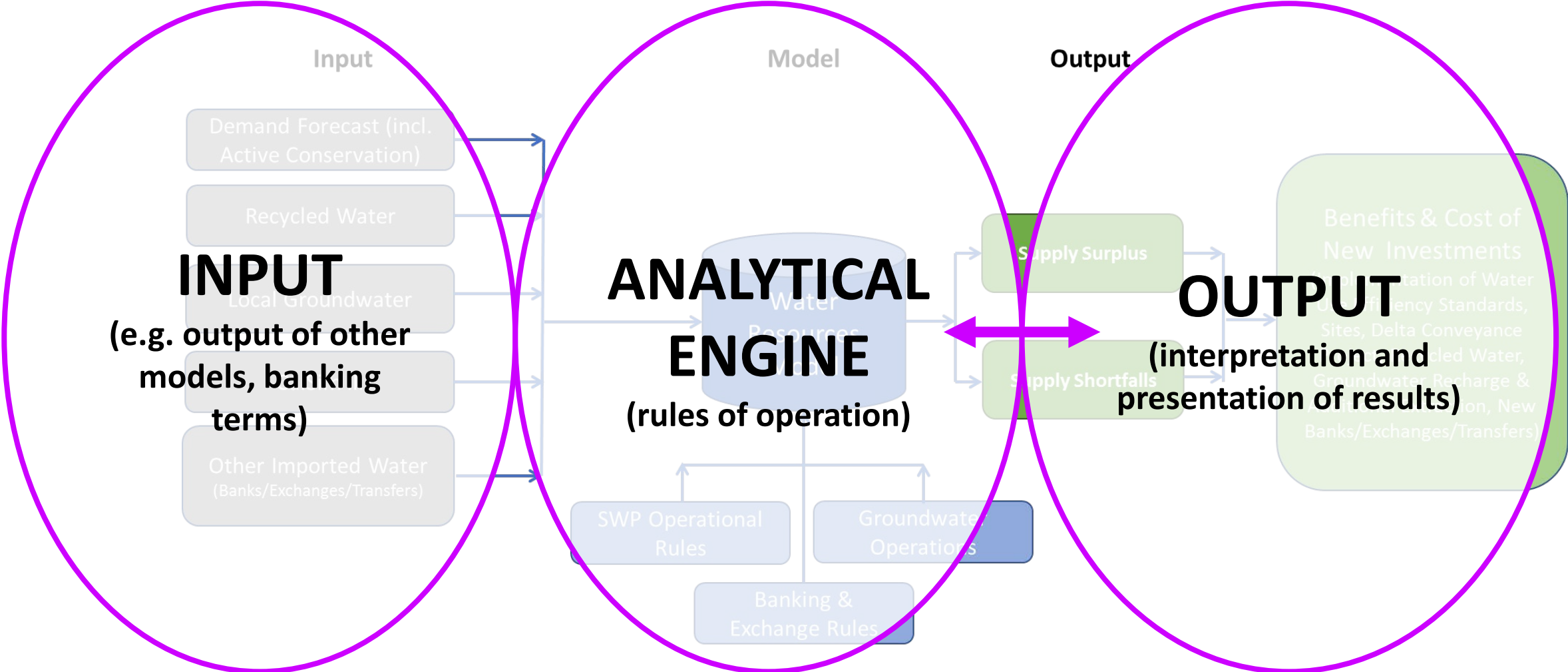
- Board authorized update to the prior Reliability (MBK) Model in Spring of 2021.
 - Improve functionality.
 - Build expertise in-house.
 - New platform that is easier to update and maintain.
- Model is still being updated, but it is appropriate to inform the committee of substantial progress.

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.

Methodology

Conceptual Framework of Reliability Modeling

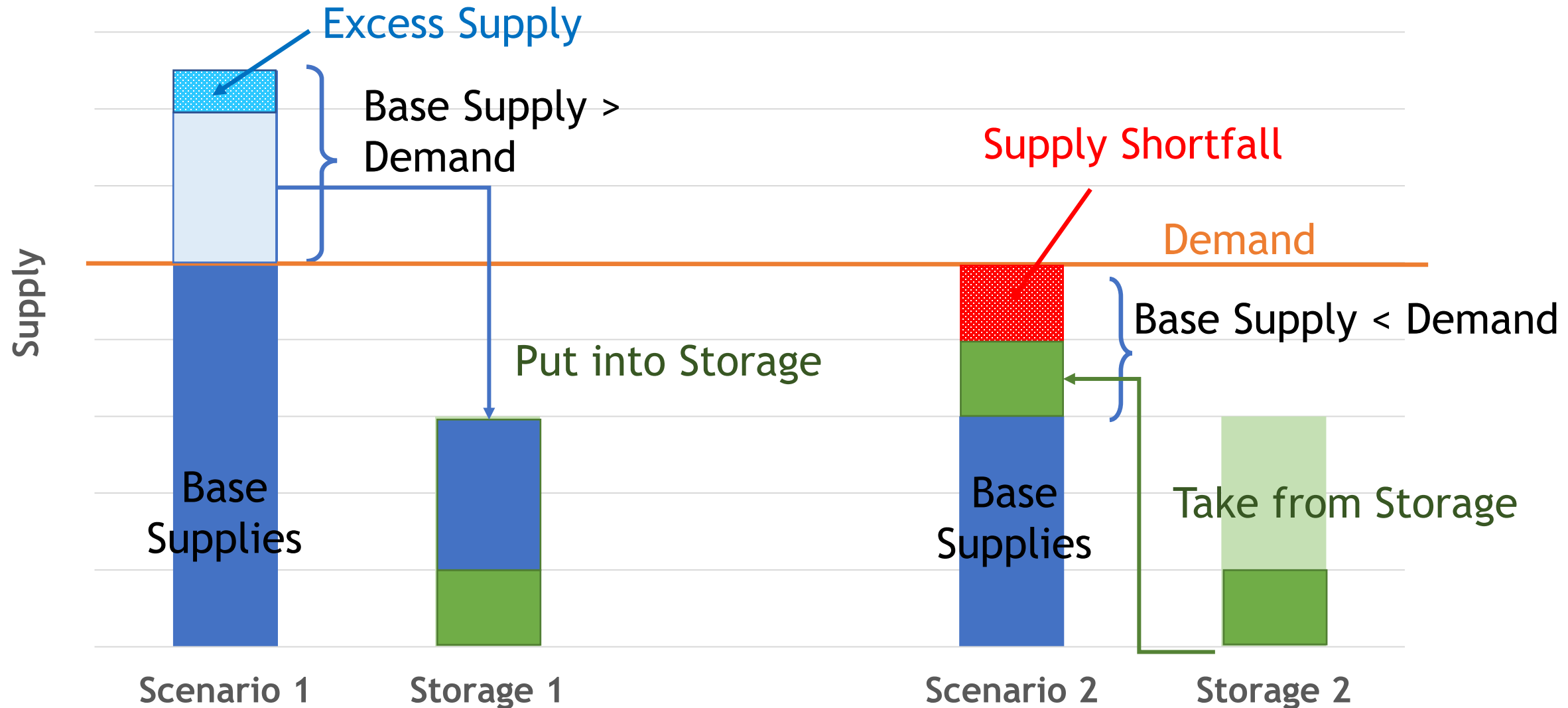


Methodology

- Multi-year sequences of wet and dry years.
- DWR assumptions of climate change, regulations, and future development of the SWP.
- Variability of local groundwater during wet and dry periods.
- 30-year planning horizons.

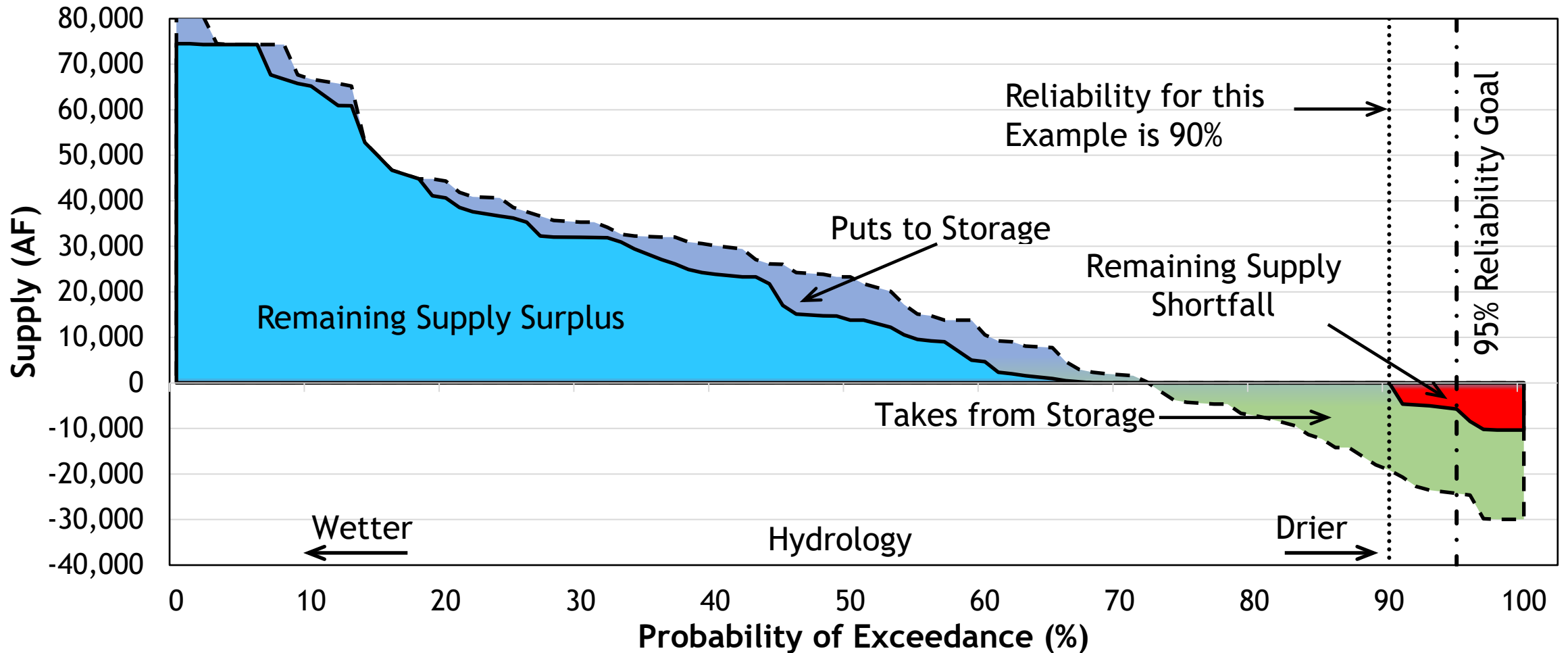
Methodology

Sample Water Operations in a Single Time Step



Methodology

Sample Statistical Summary for a Single Year over Multiple Plausible Hydrologic Traces

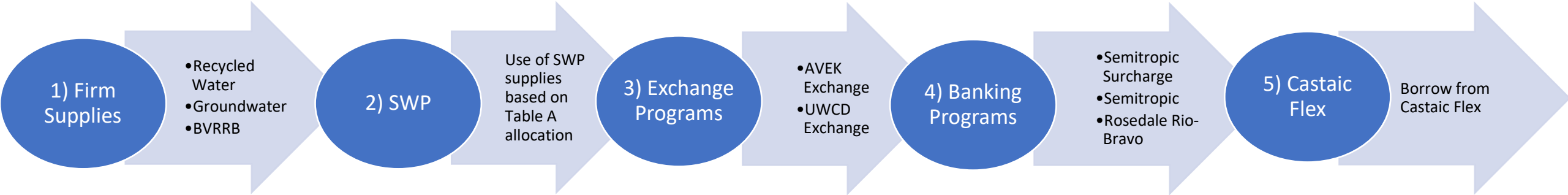


Comparison of Monthly and Annual Time Steps

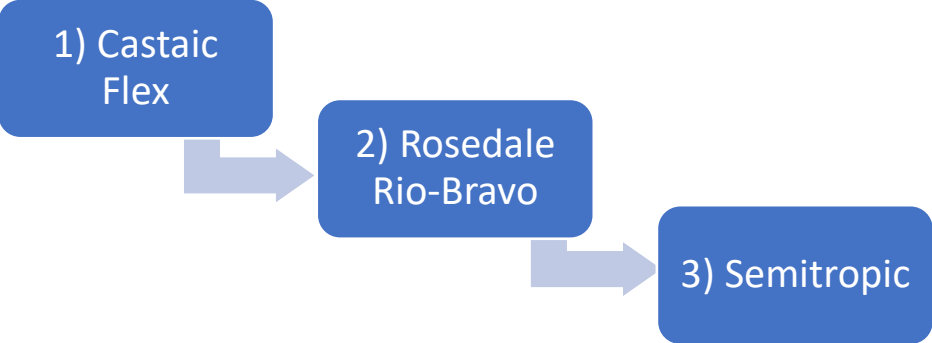
Comparison of Monthly and Annual Time Steps

Old Model Logic

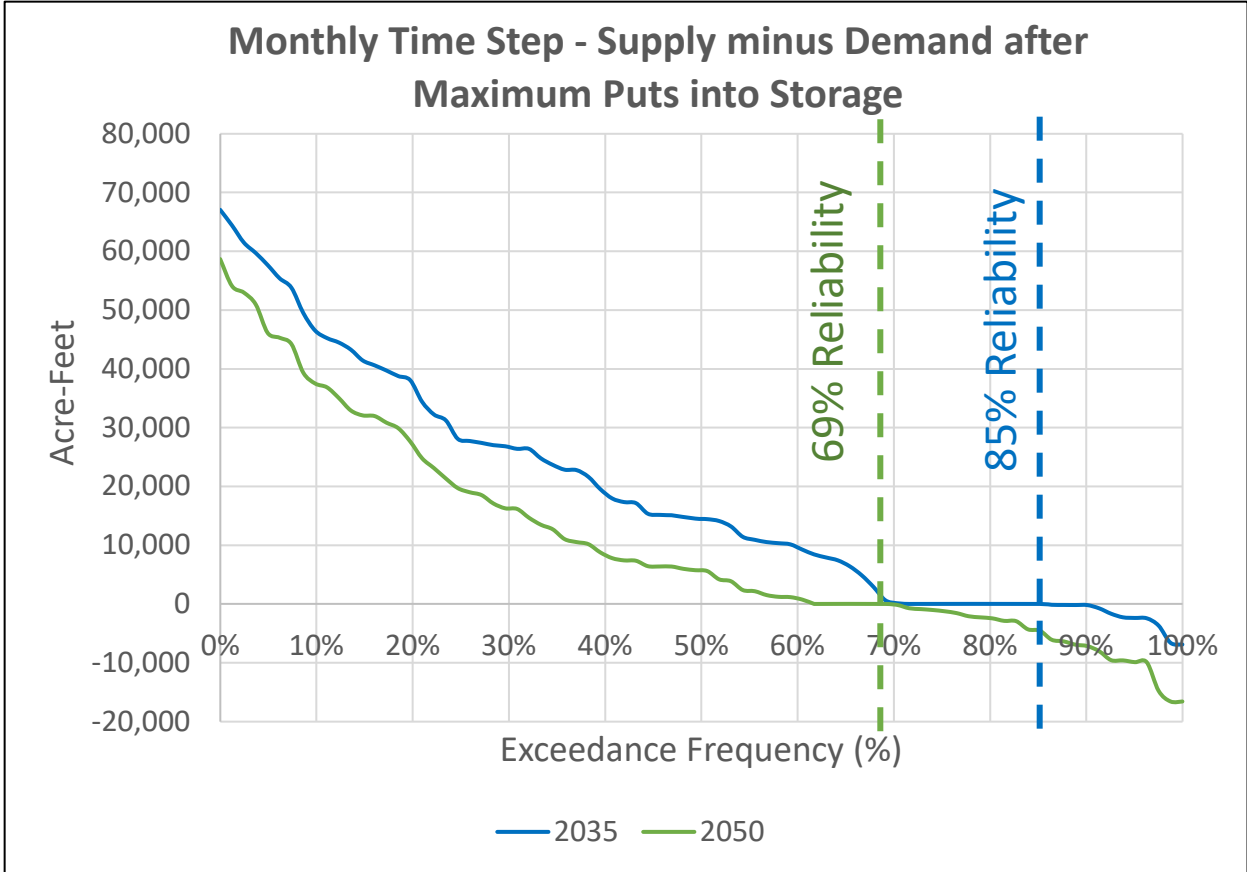
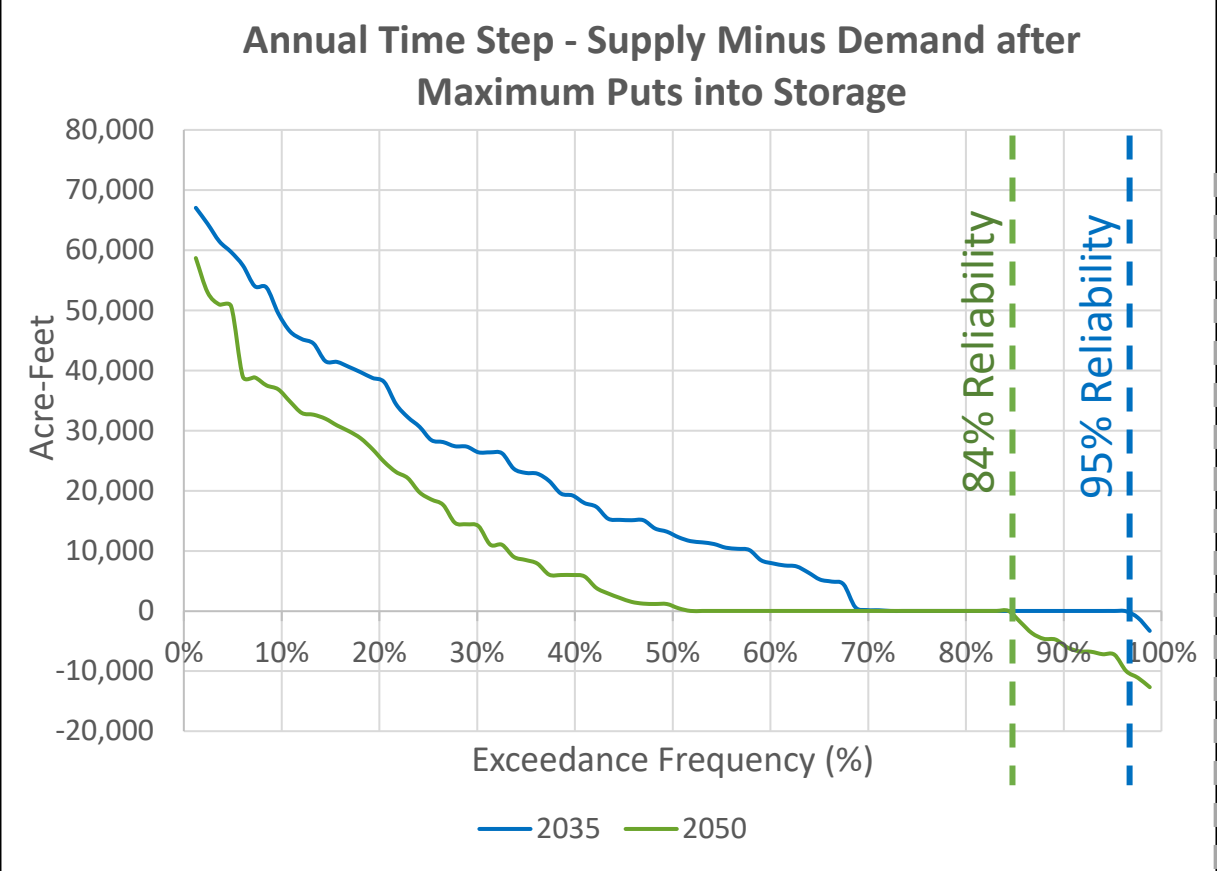
- Sequential order in which Supplies are used to Meet Demand



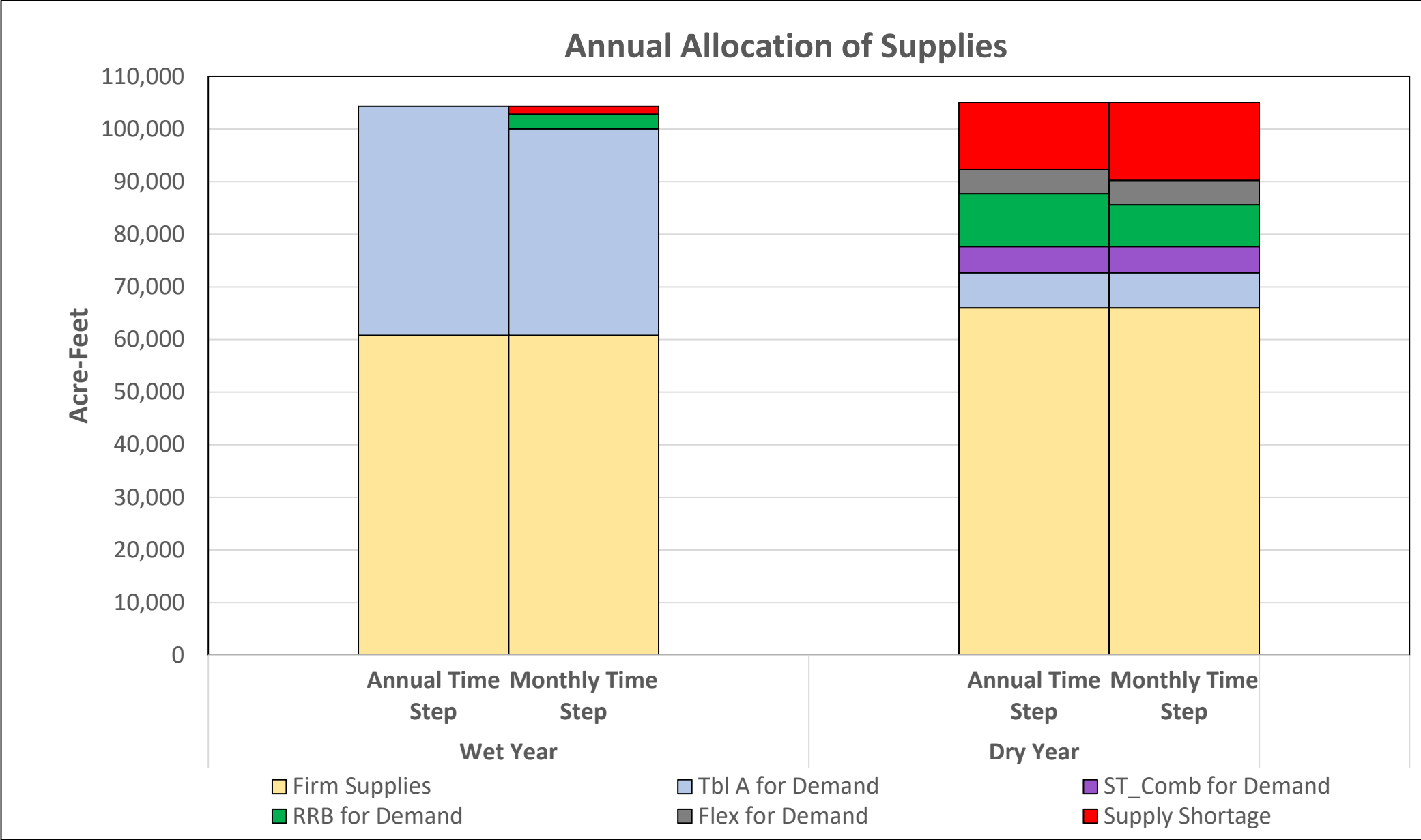
- Sequential Allocation of Excess Water



Comparison of Monthly and Annual Time Steps



Comparison of Monthly and Annual Time Steps



Comparison of Monthly and Annual Time Steps

Semitropic Surcharge and Banking Programs [Back to Imported Supplies](#)

Semitropic Surcharge and Bank Accounts are existing programs that share extraction capacity. Water in surcharge account is extracted before any water that is banked. Water can be added to the bank account only (not the surcharge account) and is subject to storage losses.

Semitropic Surcharge Account

Semitropic Surcharge Start Balance (AF)

Semitropic Combined Accounts Shared Input

Combined Accounts Expiration Year

Combined Accounts Annual Take (AFY)

Monthly Take Pattern

	Semitropic_Take_Pattern [%]
January	0
February	0
March	0
April	0
May	6
June	6
July	8
August	6
September	15
October	31
November	16
December	12

Semitropic Bank Account

Start Balance (AF)

Maximum Storage (AF)

Semitropic Puts Trigger (%)
(if Table A Allocations > Trigger, No Puts Allowed)

Annual Put (AFY)

Monthly Put Pattern

	Semitropic_Put_Pattern [%]
January	1
February	10
March	10
April	8
May	11
June	16
July	18
August	15
September	5
October	3
November	2
December	2

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Rosedale-Rio Bravo Banking Program [Back to Imported Supplies](#)

RRB is an existing banking program with potential to increase recovery capacity in the future. Monthly takes and puts are set by the terms of the agreement. The water banked is subject to losses.

Starting Balance (AF)

Maximum Storage (AF)

Maximum Cumulative Puts (AF)

Cumulative Puts to Date (AF)

Storage Losses (%)

Annual Put (AF)

Monthly Put Pattern

	RRB_Put_Pattern [%]
January	8.33
February	8.33
March	8.33
April	8.33
May	8.33
June	8.33
July	8.33
August	8.33
September	8.33
October	8.33
November	8.33
December	8.33

Existing Annual Take (AFY)

Potential Future Recovery Capacity

Check Box for Additional RRB Recovery

Start Year for Additional RRB Recovery

Annual Take with Additional RRB Recovery (AF)

Monthly Take Pattern

	RRB_Take_Pattern [%]
January	13.77
February	13.77
March	6.52
April	6.52
May	6.52
June	6.52
July	6.52
August	6.52
September	6.52
October	6.52
November	6.52
December	13.77

Potential Exchange Program

RRB Exchange Start Balance (AF)

Exchange Fees (minimum 1)

(e.g. a value of 3 means for every 3 units of water exchanged, SCV Water can recover 1 unit of water)

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Example of Analytical Capability of New GoldSim Model

Example of Analytical Capability of New GoldSim Model

	Base	Scenario 1
Alluvium	X	X
Saugus	X	X
Recycled Water	X	X
Table A (with climate change)	DCR 2021 Future*	DCR 2021 Future*
Article 56	X	X
SWP/Castaic flexible storage	X	X
BVRRB	X	X
Nickel Water	X	X
Yuba	X	X
Semitropic Surcharge & Semitropic	X	X
Semitropic NLF		
Existing Rosedale Rio Bravo	X	X
Potential Rosedale Rio Bravo Exchange**		2:1 Exchange
AVEK Exchange	X	X
UWCD Exchange	X	X

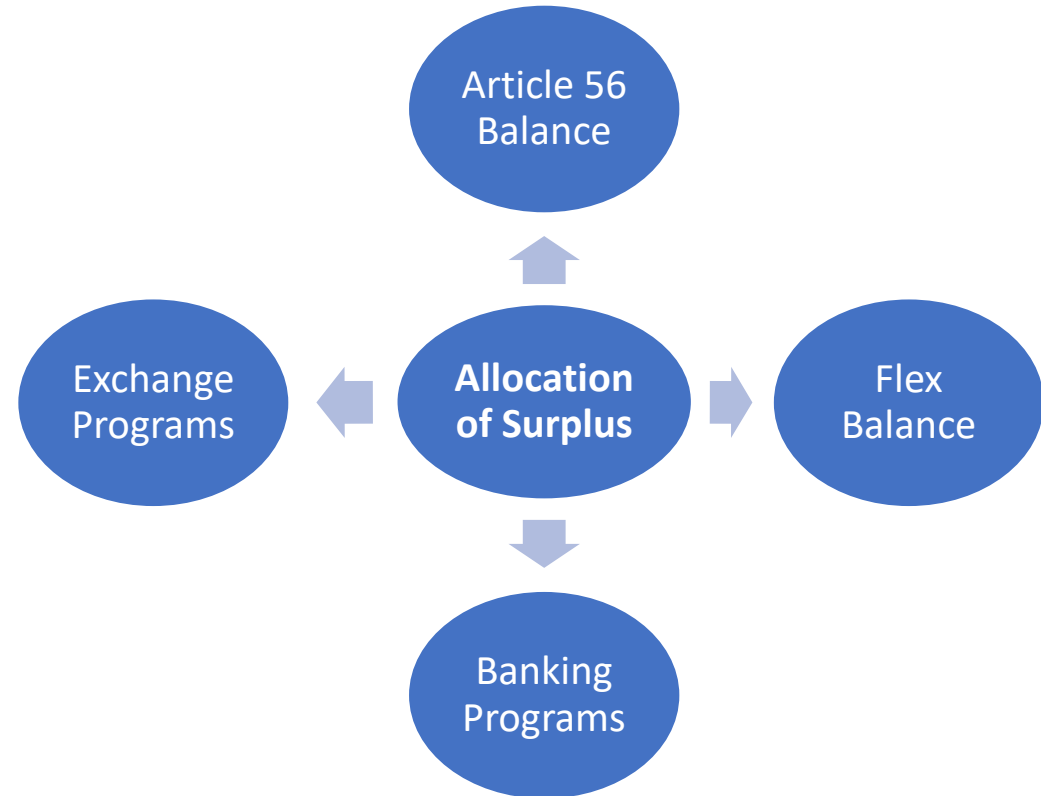
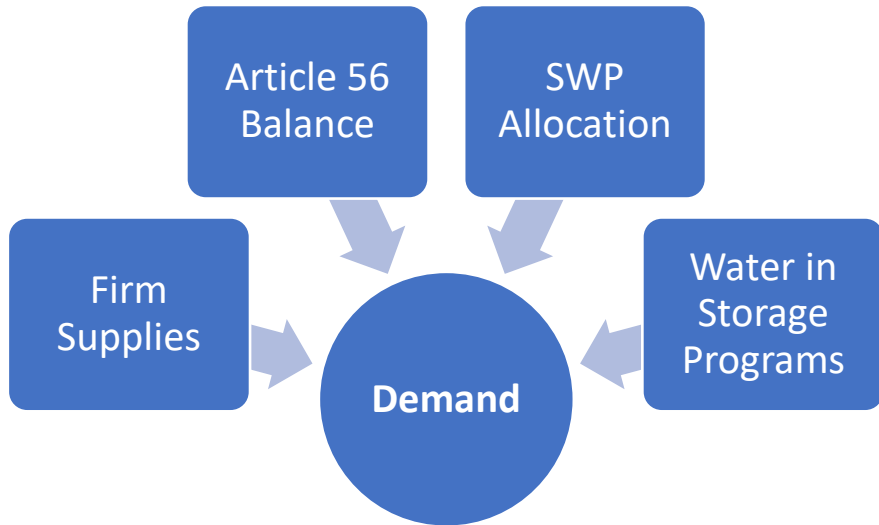
*Delivery Capability Report (DCR) 2021 Future Conditions.

**There is no annual limit on water sent to the exchange program.

Example of Analytical Capability of New GoldSim Model

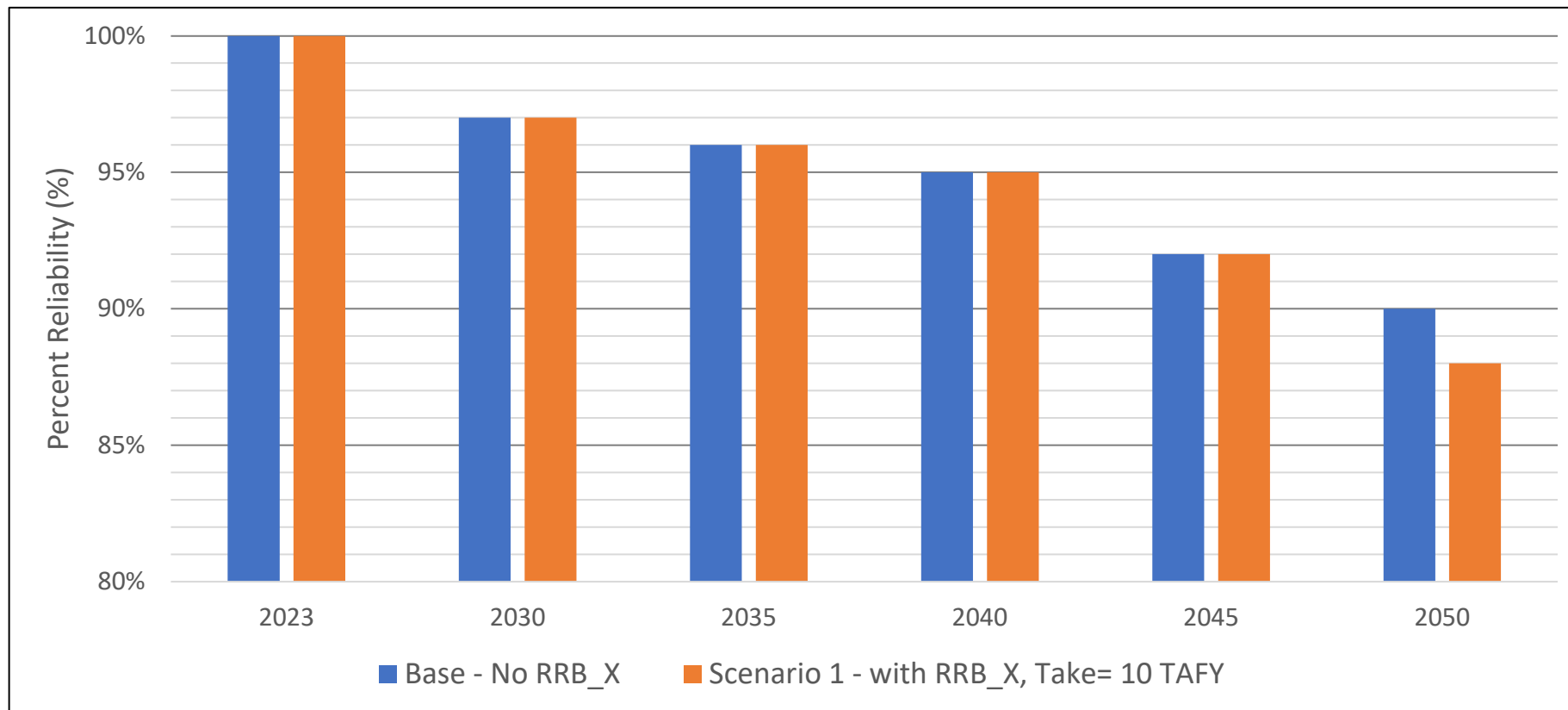
- Decisions on how to use supplies are based on assessing the entire system portfolio

- Allocation of surplus water is based on multiple objectives:
 - Meet maximum Article 56 storage
 - Extend the life of each storage and exchange program



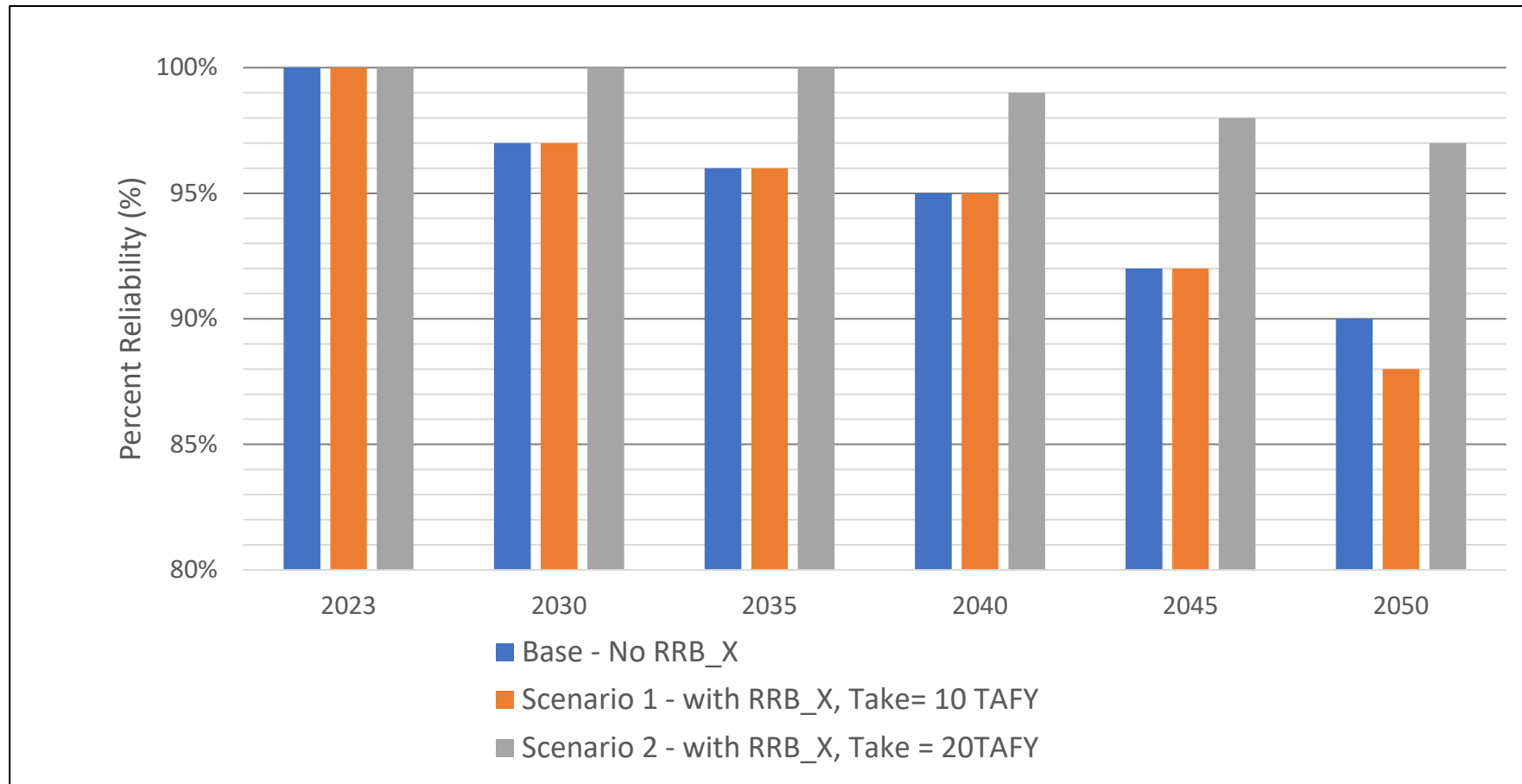
Example of Analytical Capability of New GoldSim Model

Comparison of Base Scenario (without RRB Exchange) and Scenario 1 (with RRB Exchange with Existing Recovery Capacity of 10 TAFY)



Example of Analytical Capability of New GoldSim Model

Comparison of Base Scenario (without RRB Exchange), Scenario 1 (with RRB Exchange with Existing Recovery Capacity of 10 TAFY), and Scenario 2 (with RRB Exchange with Increased Recovery Capacity of 20 TAFY)



Next Steps

1. Update model logic.
2. Perform multiple runs.
3. Analyze results for direction of future resilience work.