Water Resiliency Plan Initiative Activities

GoldSim Model Development Update

Water Resources and Watershed Committee

April 13, 2022

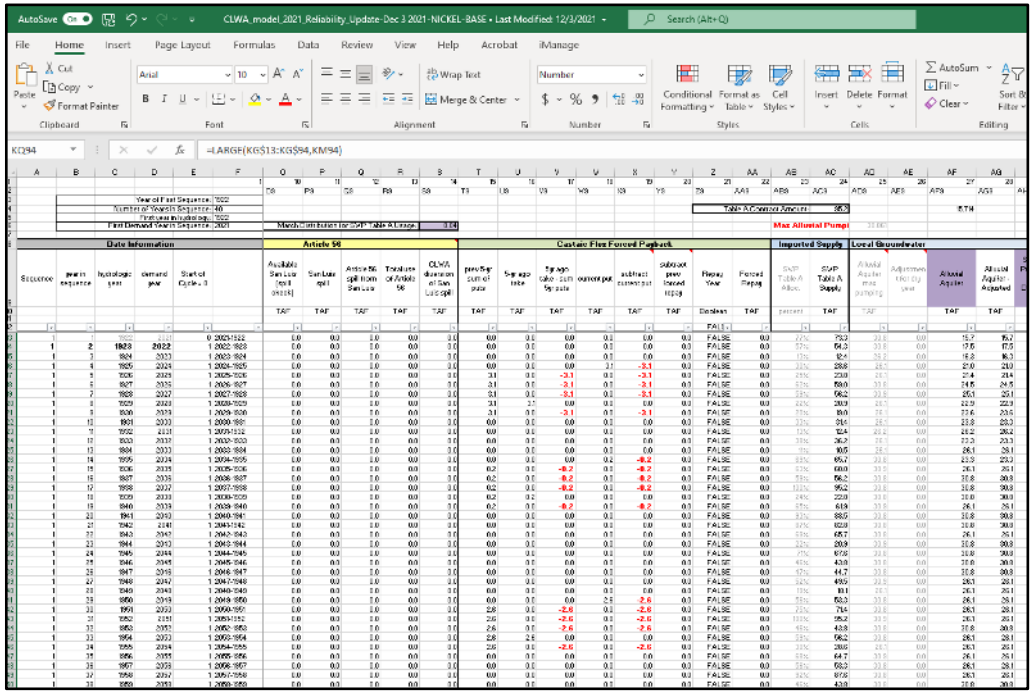
Item No. 6.2

Outline

- Introduction
- Modeling Methodology
- Key Operating Strategies
- Input and Output
- User Interface
- Future Development/Applications

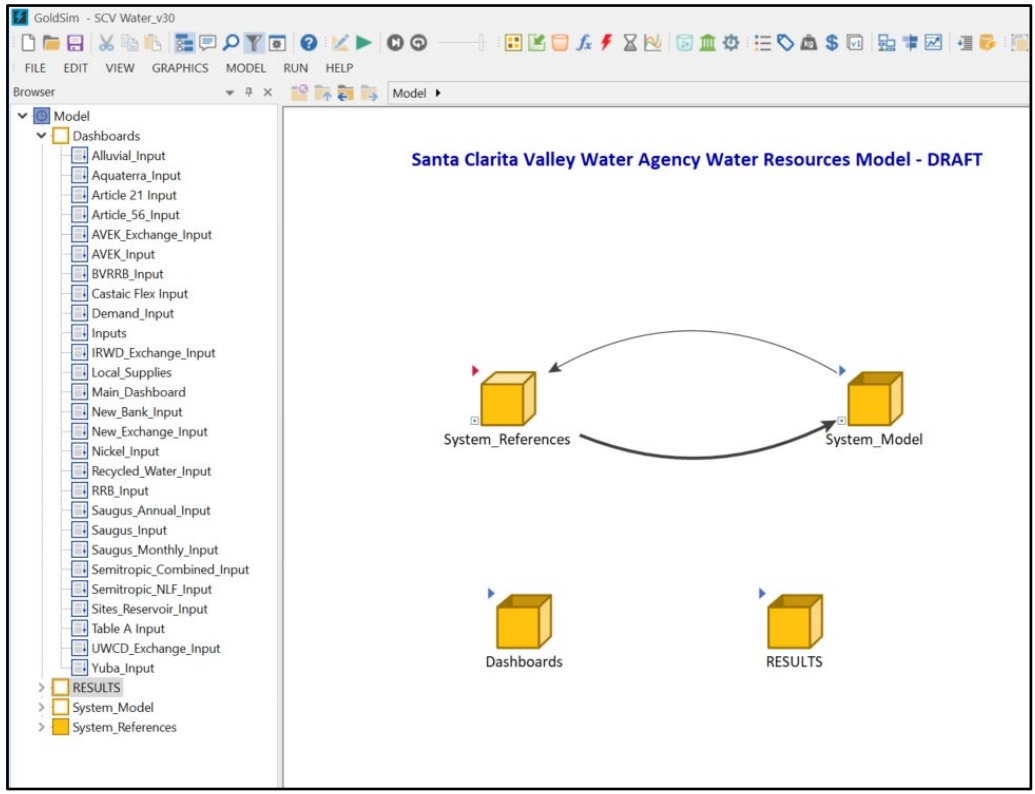
Introduction

- SCV Water has been using an Excel-based Water Resources Model to:
  - Assess the reliability of its supplies.
  - Evaluate the need for new investments.
- The Excel model uses an annual time step, but water resources decisions occur at a finer timescale.
- Currently transitioning to the GoldSim platform, with a monthly time step.



Introduction

- The logic built into the GoldSim model assumes no foresight on State Water Project Allocations.
- The model makes decisions every time step based on assumptions, rules, and thresholds we set.
- Refinements to logic and assumptions will be made during QA/QC.



Modeling Methodology

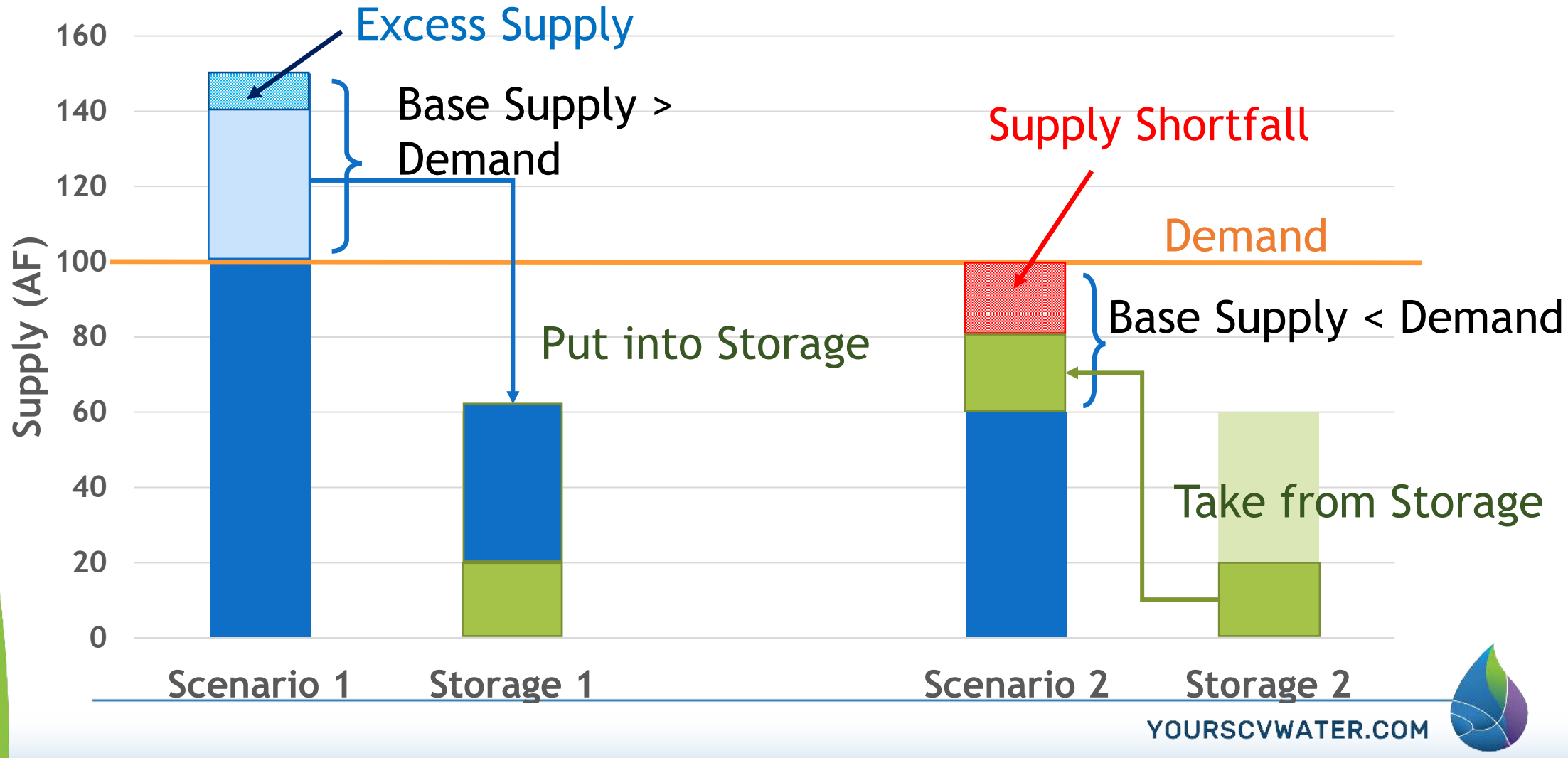
- Similar to the existing model, the approach used in the new GoldSim model assesses how different **supplies are used to meet monthly demand over wet and dry year sequences.**

- The analysis simulates the wet and dry year sequences based on the same **monthly historic hydrologic record** used in CalSim.

Modeling Methodology

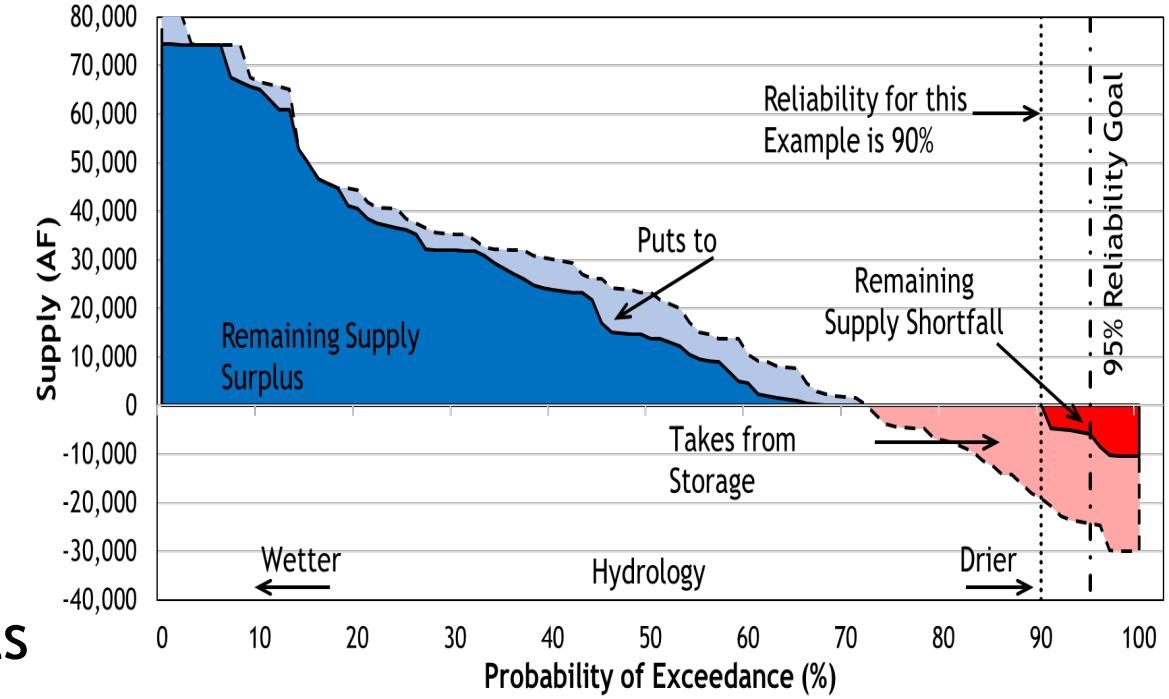
- For each hydrologic trace, the model steps through each year of the study period, comparing annual supplies to demands and operating storage and exchange programs as needed.
  - In years when **supplies are greater than demands**, water is **added** to storage programs.
  - In years when **supplies are less than demands**, water is **taken** from storage.

Modeling Methodology: Water Operations in a Single Year



Modeling Methodology

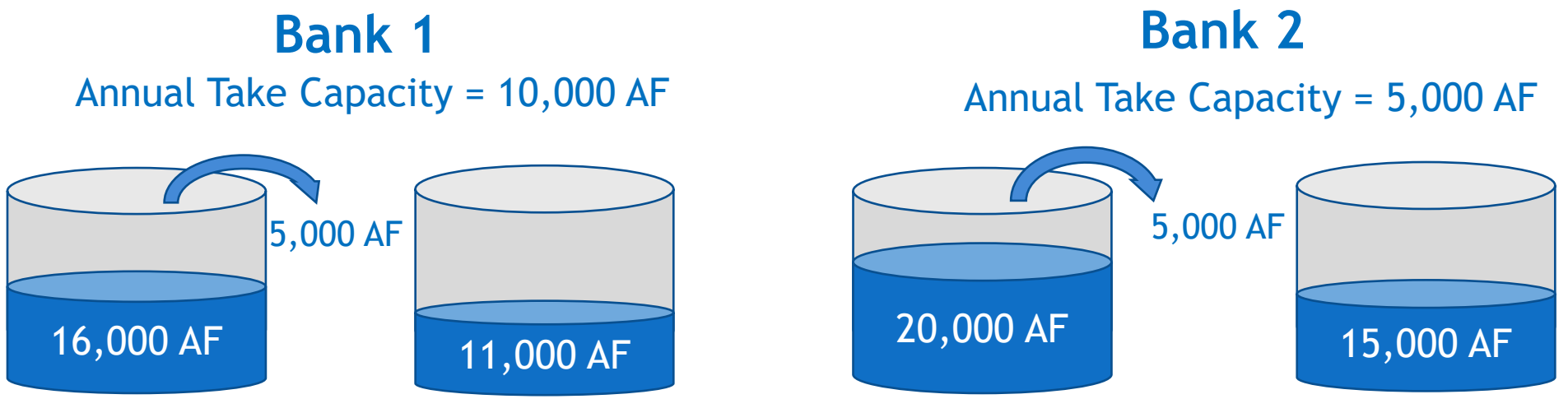
- Study period results from the number of hydrologic traces used are summarized to provide a statistical assessment:
  - Of the reliability of SCV Water's supplies and storage programs.
  - To evaluate and compare the benefits of different investments for maintaining water supply reliability.



Key Operating Strategies

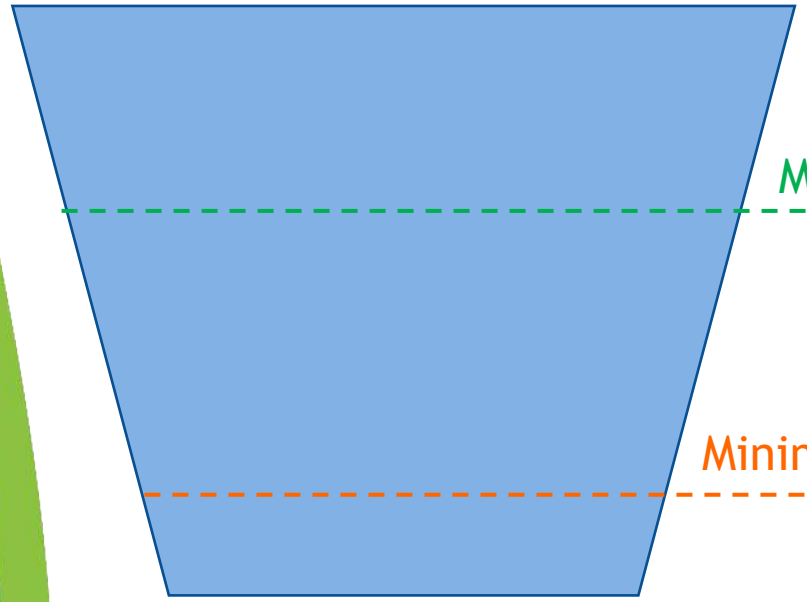
- Extend the life of each storage program by balancing the stored water to take ratio

10,000 AF is needed from storage



Key Operating Strategies

- Management of storage in San Luis Reservoir



Monthly Strategy

Fill banks with excess water

No fill of banks

Take from banks

Model Input and Output

INPUT

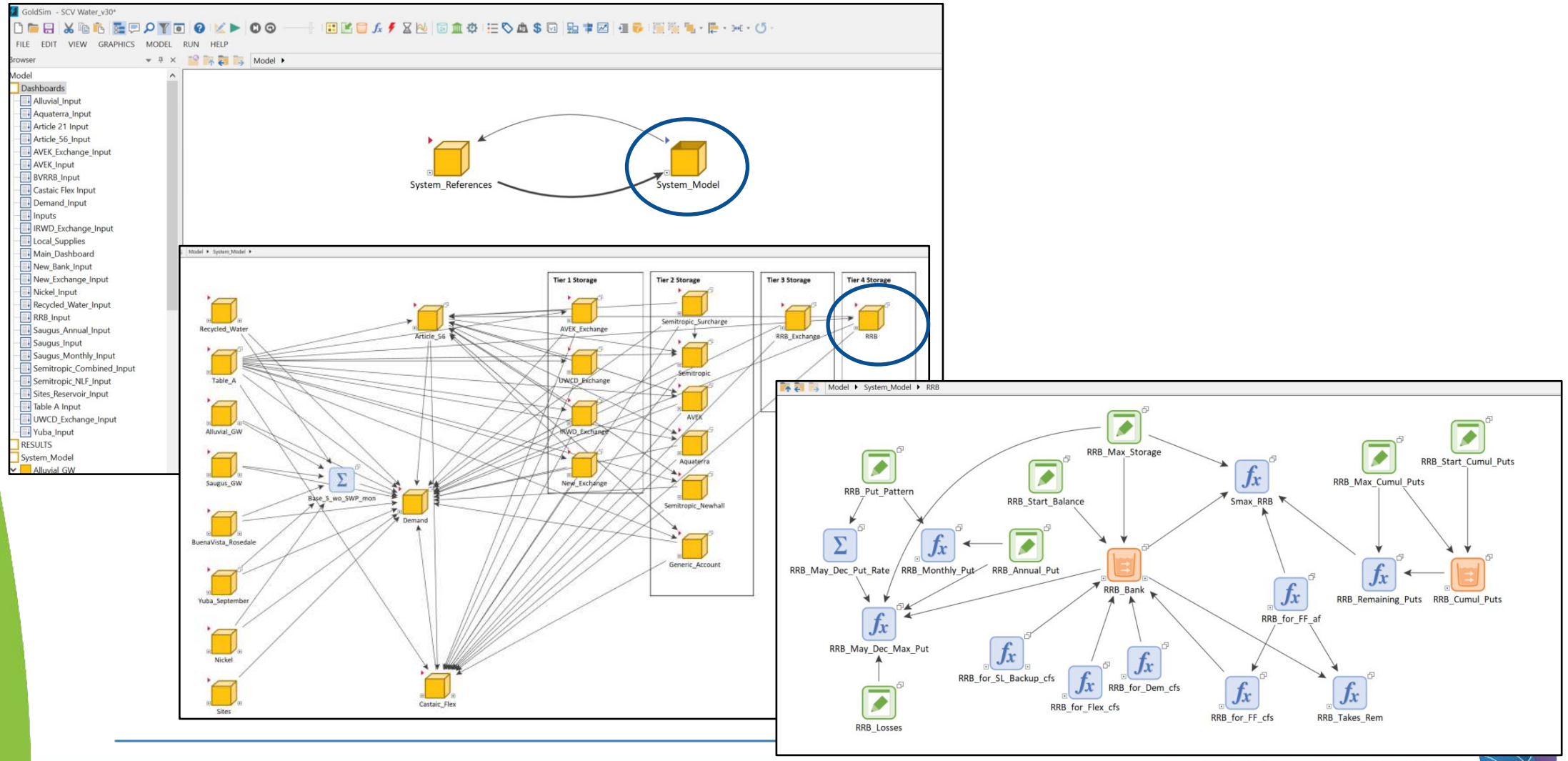
- Demand Forecast
- State Water Project Supplies
- Local Groundwater
- Recycled Water
- Banking and Exchange Programs

Model Input and Output

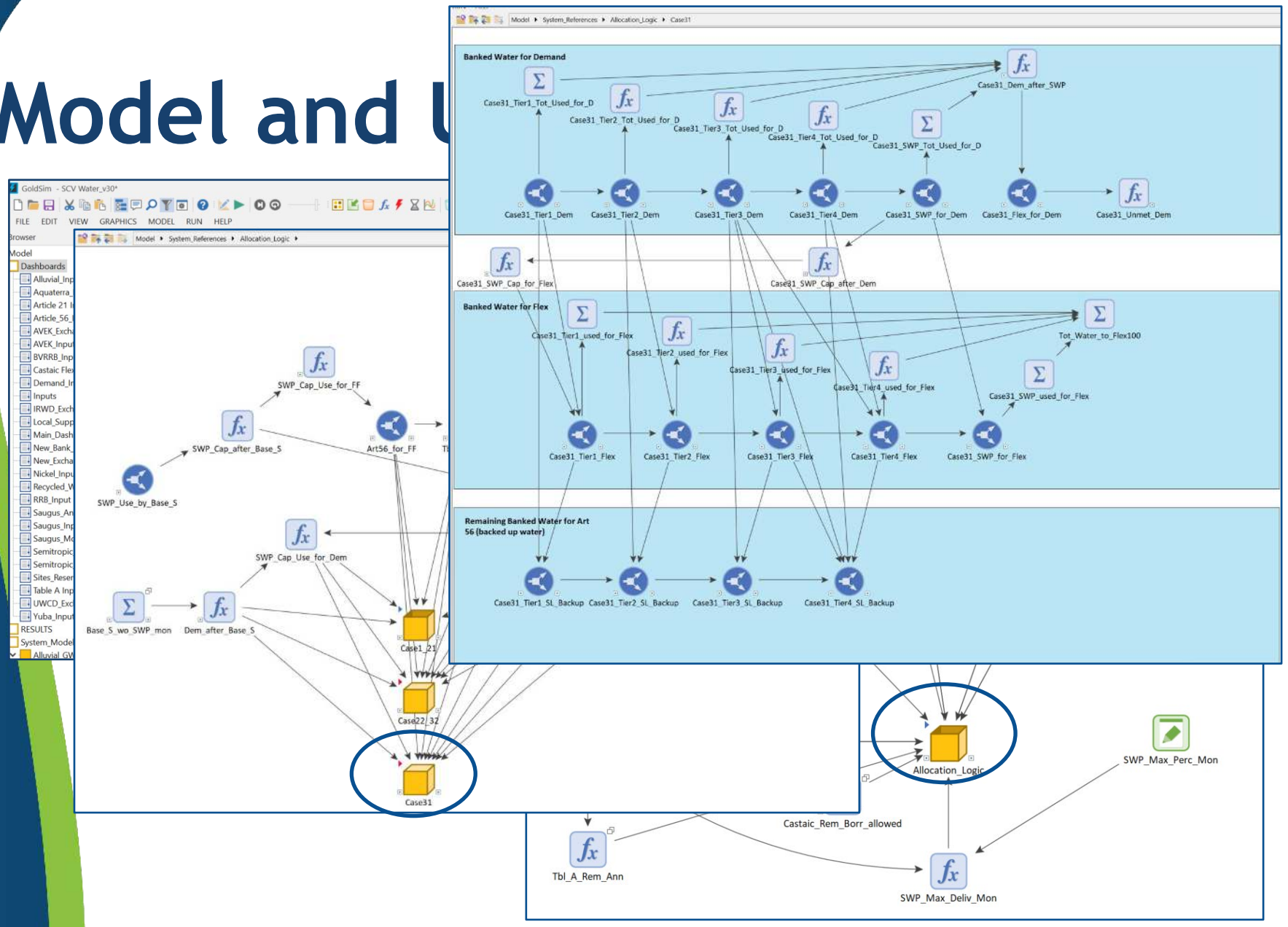
OUTPUT

- Probability and exceedance graphs for different variables:
  - Water Supply Reliability
  - Status of Water Balance in Banking Programs
  - Status of Article 56 supplies in San Luis Reservoir
- Tables that can be exported to excel for further analysis

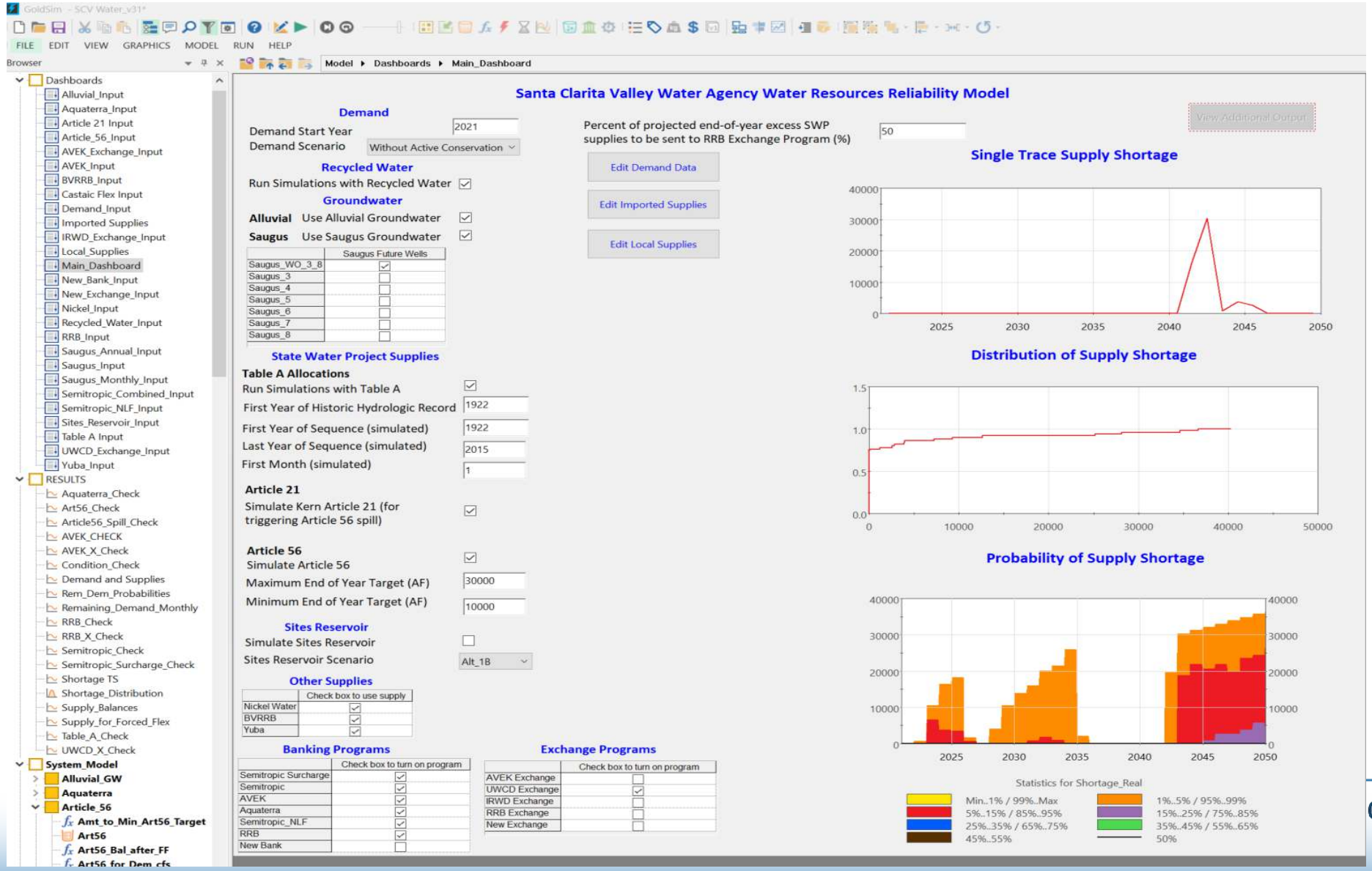
Model and User Interface



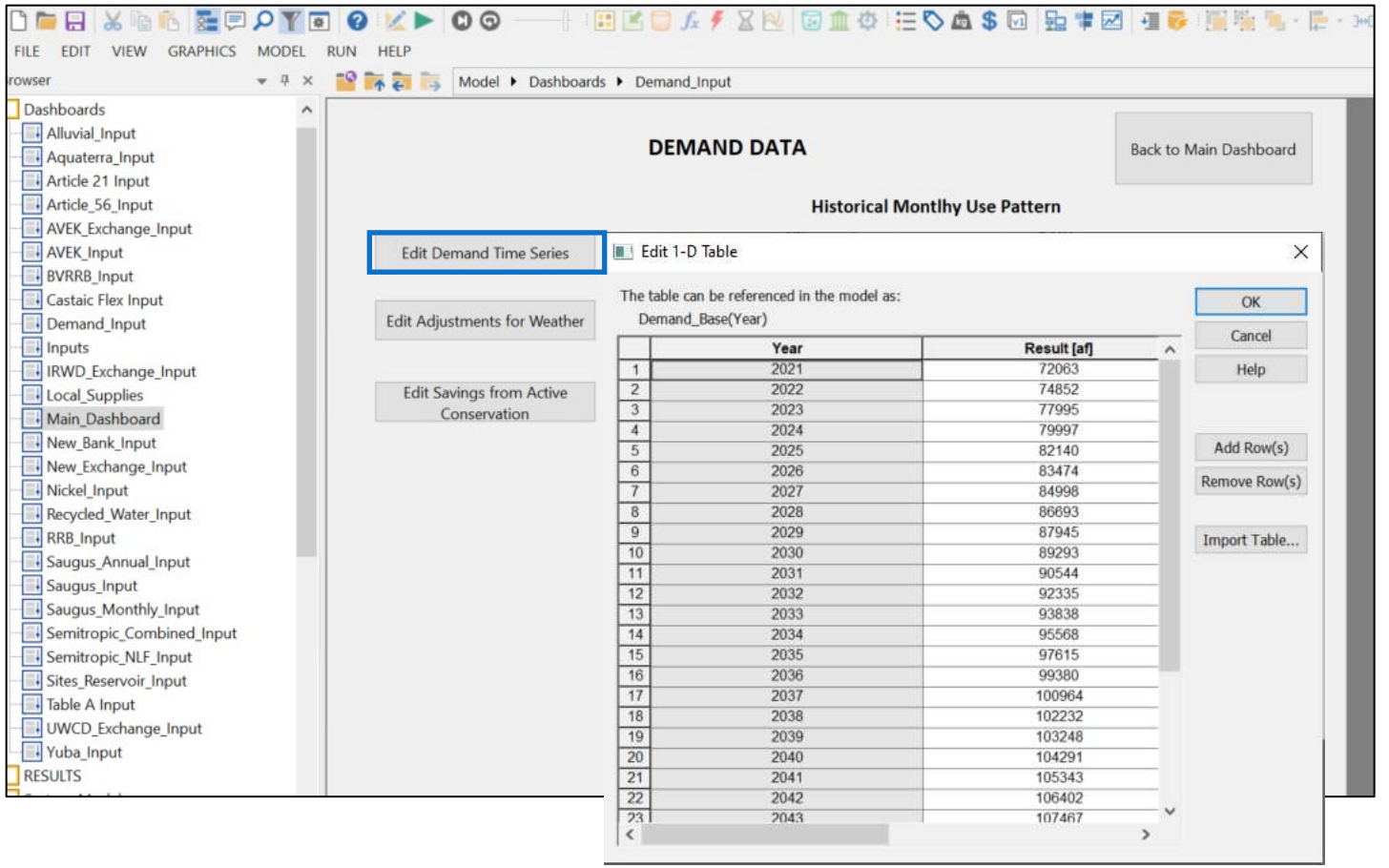
Model and U


Banked Water for Demand
Case31_Tier1_Tot_Used_for_D
Case31_Tier2_Tot_Used_for_D
Case31_Tier3_Tot_Used_for_D
Case31_Tier4_Tot_Used_for_D
Case31_SWP_Tot_Used_for_D
Case31_Dem_after_SWP
Case31_Tier1_Dem
Case31_Tier2_Dem
Case31_Tier3_Dem
Case31_Tier4_Dem
Case31_SWP_for_Dem
Case31_Flex_for_Dem
Case31_Unmet_Dem
Case31_SWP_Cap_for_Flex
Case31_SWP_Cap_after_Dem
Banked Water for Flex
Case31_Tier1_used_for_Flex
Case31_Tier2_used_for_Flex
Case31_Tier3_used_for_Flex
Case31_Tier4_used_for_Flex
Case31_SWP_used_for_Flex
Tot_Water_to_Flex100
Case31_Tier1_Flex
Case31_Tier2_Flex
Case31_Tier3_Flex
Case31_Tier4_Flex
Case31_SWP_for_Flex
Remaining Banked Water for Art 56 (backed up water)
Case31_Tier1_SL_Backup
Case31_Tier2_SL_Backup
Case31_Tier3_SL_Backup
Case31_Tier4_SL_Backup
SWP_Cap_Use_for_FF
SWP_Cap_after_Base_S
Art56_for_FF
SWP_Use_by_Base_S
SWP_Cap_Use_for_Dem
Base_S_wo_SWP_mon
Dem_after_Base_S
Case1_21
Case22_32
Case31
Allocation_Logic
SWP_Max_Perc_Mon
Castaic_Rem_Borr_allowed
Tbl_A_Rem_Ann
SWP_Max_Deliv_Mon

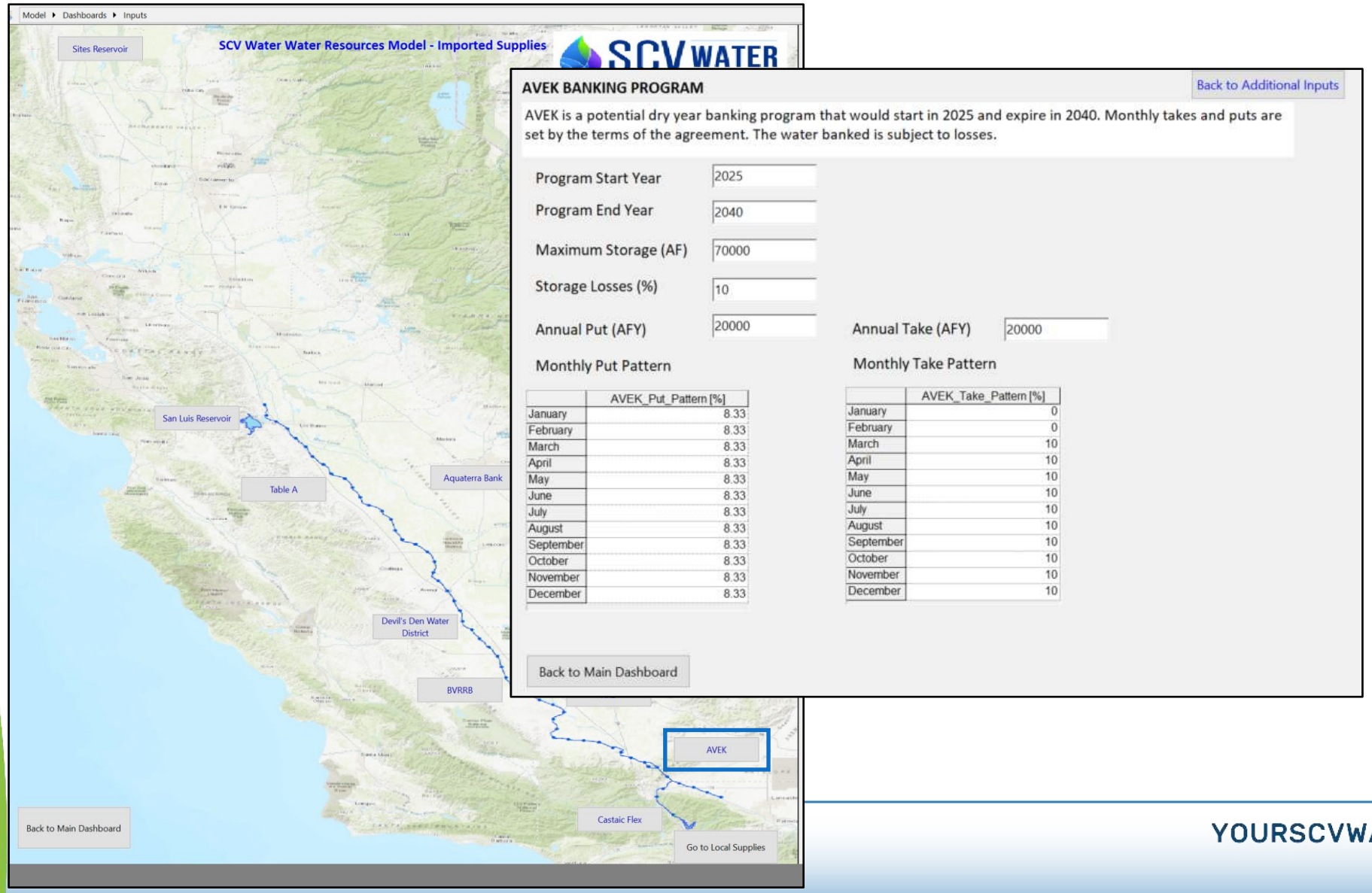
Model and User Interface



Model and User Interface



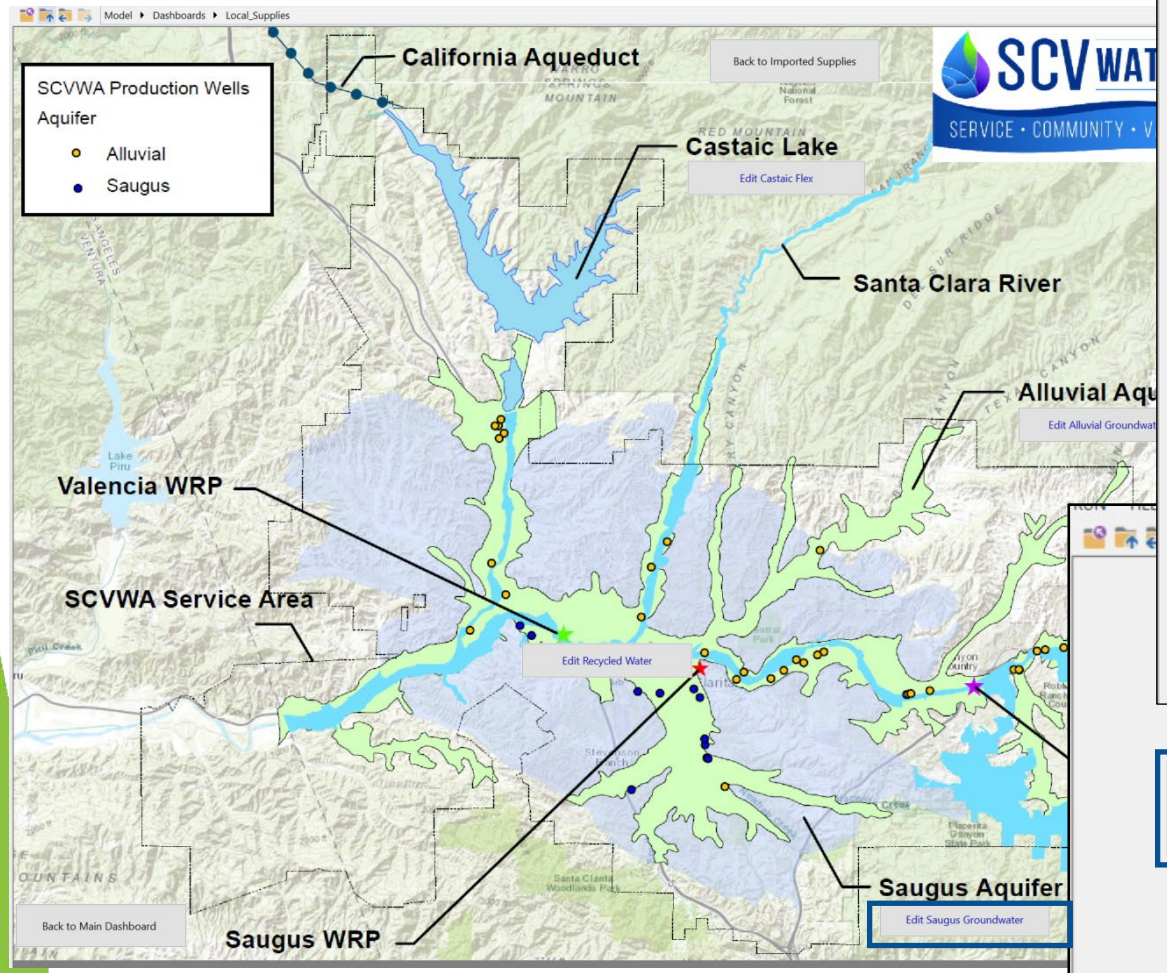
Model and User Interface



	AVEK_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

	AVEK_Take_Pattern [%]
January	0
February	0
March	10
April	10
May	10
June	10
July	10
August	10
September	10
October	10
November	10
December	10

Model and User Interfa



Model ▸ Dashboards ▸ Saugus_Annual_Input

Saugus Annual Sustainable Yield

Annual Total Saugus without Wells 3 - 8 - GSP

Annual Saugus 3 - GSP

Annual Saugus 4 - GSP

Annual Saugus 5 - GSP

Annual Saugus 6 - GSP

Annual Saugus 7 - GSP

Annual Saugus 8 - GSP

Saugus Well Production Capacities

Buildout Year: 2030

Dry Year Production Capacities

	Saugus_WO_3_8	Saugus_3	Saugus_4	Saugus_5	Saugus_6	Saugus_7	Saugus_8
2021	14980	0	0	0	0	0	0
2022	17880	0	0	0	0	0	0
2023	17880	0	0	0	0	0	0
2024	20930	0	0	0	0	0	0
2025	20930	3020	3020	0	0	0	0
2026	20930	3020	3020	0	0	0	0
2027	20931	2620	2620	2420	2420	0	0
2028	20931	2620	2620	2420	2420	0	0
2029	20931	2620	2620	2420	2420	0	0
2030	20800	2620	2620	1940	1940	1940	1940

Normal Year Production Capacities

	Saugus_WO_3_8	Saugus_3	Saugus_4	Saugus_5	Saugus_6	Saugus_7	Saugus_8
2021	13490	0	0	0	0	0	0
2022	16070	0	0	0	0	0	0
2023	16070	0	0	0	0	0	0
2024	17450	0	0	0	0	0	0
2025	17050	200	200	0	0	0	0
2026	9840	30	30	0	0	0	0
2027	9780	30	30	30	30	0	0
2028	9780	30	30	30	30	0	0
2029	9780	30	30	30	30	0	0
2030	9720	30	30	30	30	30	30

Saugus Annual Input

Saugus Monthly Input

Future Development/Applications