

CalSim Results Processing & Communication

2025 CWEMF Annual Meeting, 13 May 2025

Raymond Hoang, P.E.

Motivation

- Develop an intuitive, **interactive**, and easily accessible via **web browser** — one that helps stakeholders interpret modeling results.
- A tool to display the greatest “hits” of a CalSim study in **one click**.



Relationship with other tools

- Not a replacement for excel, or EPPT, Tableau, WRIMS GUI or custom scripts
- A virtual technical appendix to reports

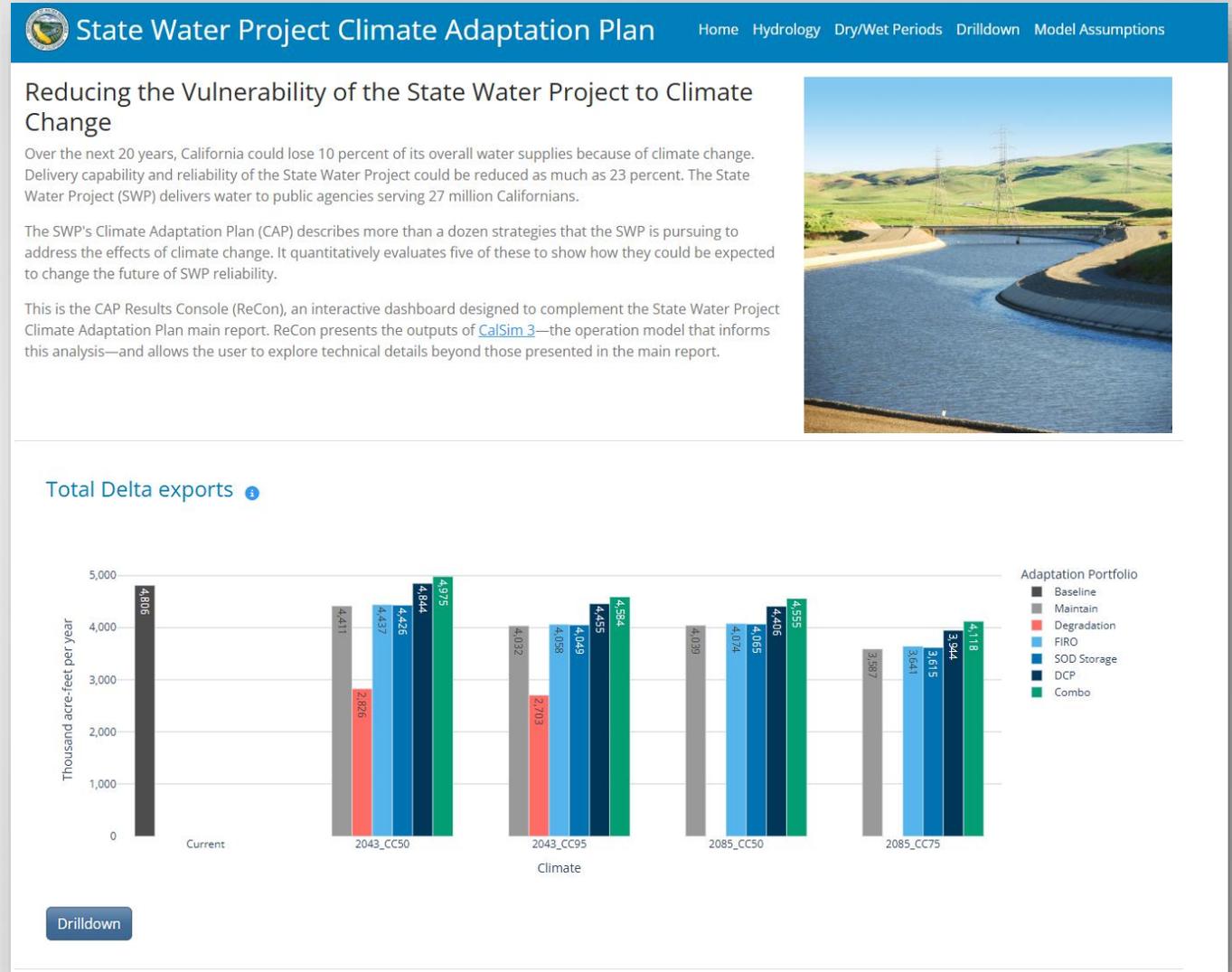
Design considerations:

- Browser-based
- Open source
- Customizable
- Reusable
- Modular



Introducing the CalSim Results Console (ReCon)

- ReCon = Results Console
- Built in Python using Dash + Plotly
- Hosted in Azure for easy access



ReCon Applications

DCR 2023

SWP DCR 2023 ReCon

Home Hydrology Table A Article 21 Summary Table Contractor Summary Drilldown

The State Water Project Delivery Capability Report 2023
July 2024

Welcome to the Delivery Capability Report Results Console (ReCon), an interactive dashboard designed to complement the 2023 Delivery Capability Report.

The Delivery Capability Report is used widely both within and outside the SWP for water supply planning. The information in these reports is a key component of the drought planning done by the SWP and is fundamental to the drought planning done by the Public Water Agencies that receive SWP and Central Valley Project water. The Report provides the information needed by these agencies to develop and manage their own water supply portfolios and is an important input for Sustainable Groundwater Management Plans, Urban Water Management Plans, Agricultural Water Management Plans, and Integrated Regional Water Management Plans.

The most salient findings of the DCR 2023 are:

- Under existing conditions, the estimated average annual delivery of Table A water for this report is 2,202 TAF/year, 119 less than the 2,321 TAF/year estimated for the 2021 Report.
- The likelihood of existing condition SWP Article 21 deliveries being greater than 20 TAF/year has increased by 4 percent relative to the likelihood presented in the 2021 Report.
- Under the climate change scenarios, the estimated average annual delivery of Table A water shown in the three scenarios is 13 percent to 22 percent lower than under existing conditions.

Comments, questions and suggestions can be emailed to CVMSupport@water.ca.gov

Additional Resources

- [The DCR Report and Models](#)
- [Central Valley Modeling Gtclub](#)
- [Climate Adjusted Historical Documentation](#)
- [Risk-Informed Future Climate Scenario Documentation](#)

Scenario Descriptions

- DCR_21_Hist
- DCR_23_Adj
- DCR_23_CC50
- DCR_23_CC75
- DCR_23_CC95



SWP Climate Adaptation Plan

State Water Project Climate Adaptation Plan

Home Hydrology Dry/Wet Periods Drilldown Model Assumptions

Reducing the Vulnerability of the State Water Project to Climate Change

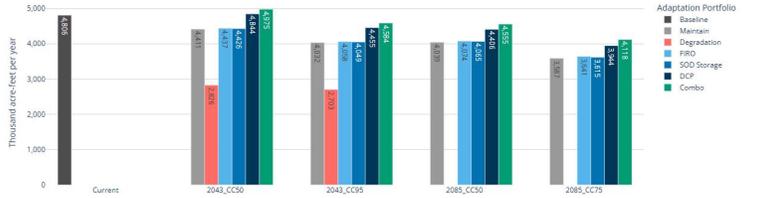
Over the next 20 years, California could lose 10 percent of its overall water supplies because of climate change. Delivery capability and reliability of the State Water Project could be reduced as much as 23 percent. The State Water Project (SWP) delivers water to public agencies serving 27 million Californians.

The SWP's Climate Adaptation Plan (CAP) describes more than a dozen strategies that the SWP is pursuing to address the effects of climate change. It quantitatively evaluates five of these to show how they could be expected to change the future of SWP reliability.

This is the CAP Results Console (ReCon), an interactive dashboard designed to complement the State Water Project Climate Adaptation Plan main report. ReCon presents the outputs of CalSim 3—the operation model that informs this analysis—and allows the user to explore technical details beyond those presented in the main report.



Total Delta exports



Scenario	Current	2043, CC50	2043, CC95	2085, CC50	2085, CC75
Baseline	5087	4187	3979	4079	3879
Mainstem	4187	3287	3079	3179	2979
Degradation	3287	2387	2179	2279	2079
FRO	2387	1487	1279	1379	1179
SOD Storage	1487	587	379	479	279
DCP	587	87	79	79	79
Combo	87	79	79	79	79

Drilldown

DCR Subsidence Addendum

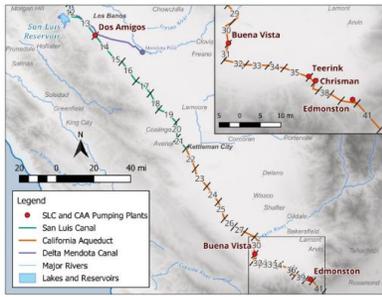
CalSim 3 Results Console (ReCon)

Home Dry/Wet Periods Contractor Summary Drilldown

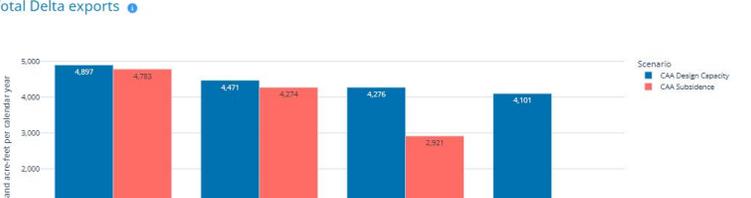
Delivery Capability Report 2023 Addendum: Impacts of Subsidence

The 2023 Delivery Capability Report (DCR 2023) provided estimates of both current and potential future delivery capabilities of the State Water Project (SWP). Those estimates were based on the latest available data concerning hydrology, climate change, regulations, water demands, and other factors critical to SWP operations. However, as noted in that report, the DCR 2023 did not account for the effects of subsidence in its current or future delivery capability estimates. The DCR 2023 Addendum: Impacts of Subsidence addresses that gap by evaluating the impacts of subsidence on the joint use and SWP facilities in the San Joaquin Valley.

This Results Console (ReCon) is an interactive dashboard designed to complement the DCR 2023 Addendum: Impacts of Subsidence. ReCon presents the outputs of CalSim 3, the operation model that informs this analysis, and allows the user to explore technical details beyond those presented in the main report.



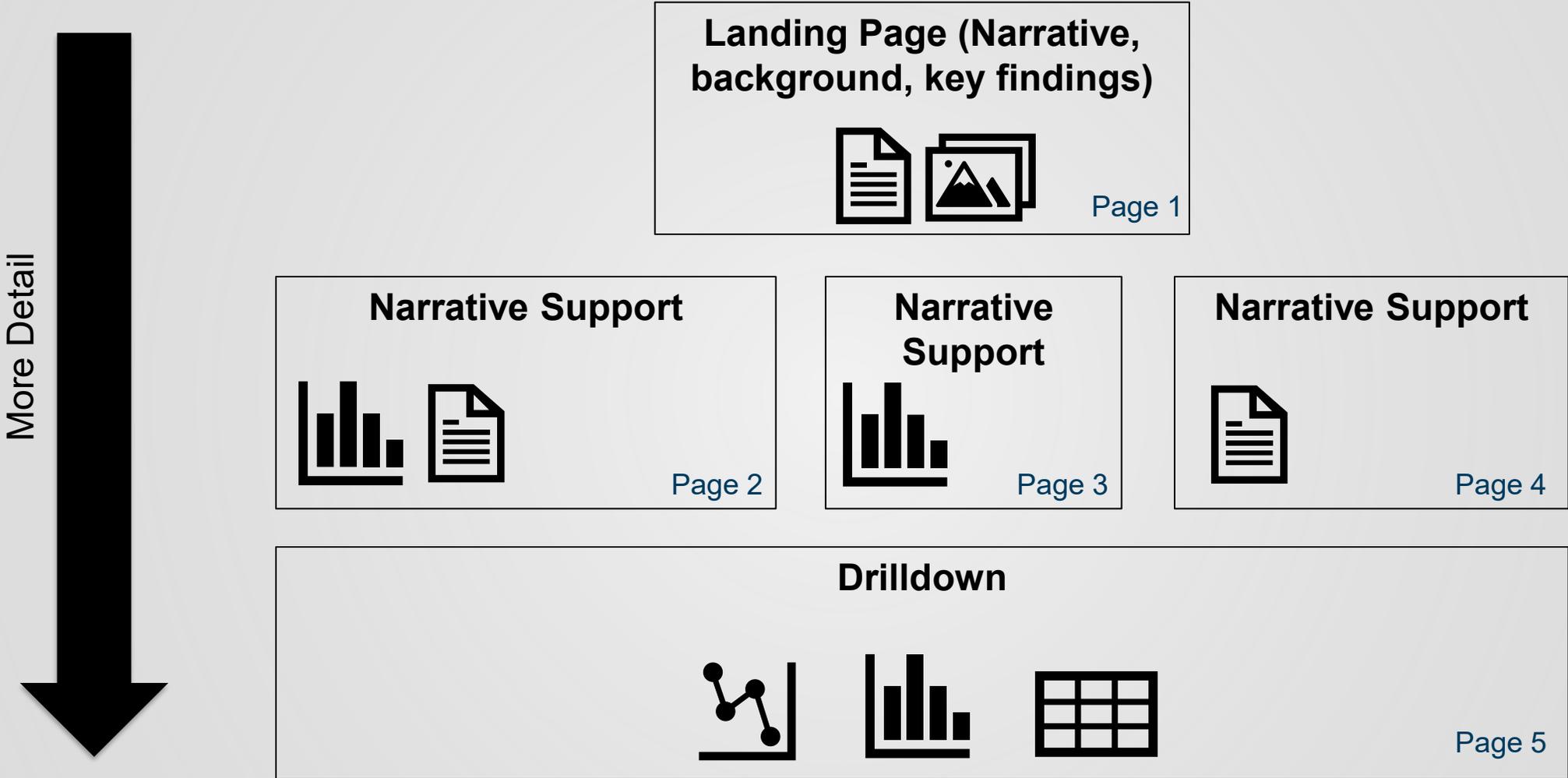
Total Delta exports



Scenario	Current	2043, CC50	2043, CC75	2085, CC95
CAA Design Capacity	4897	4471	4276	4101
CAA Subsidence	4783	4274	2521	-



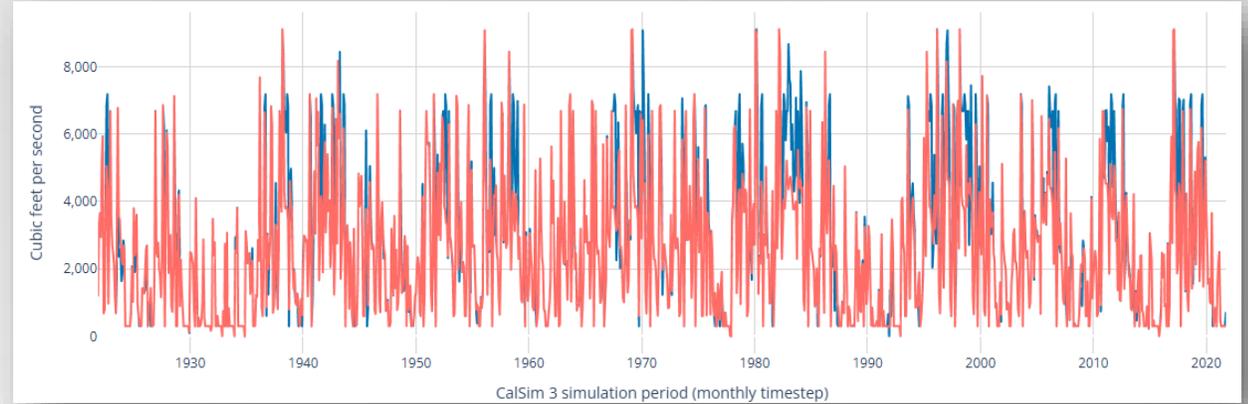
An Example ReCon Layout



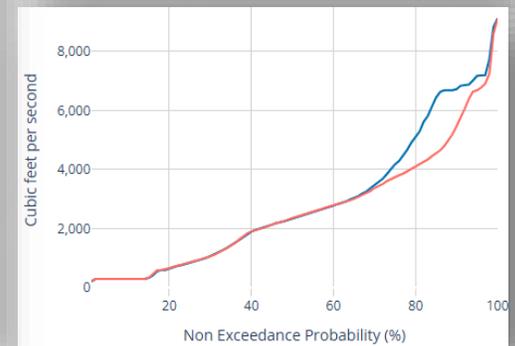
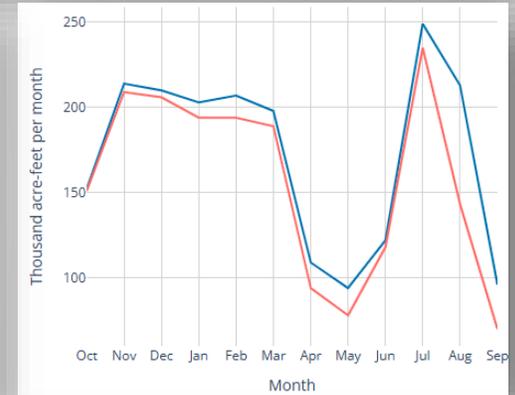
Features



- Timeseries
- Averages
- Exceedance Plots
- Summary Tables
- Variable Search



Type	Description	B-Part	Existing_Design
CAA	Dos Amigos Pumping Plant	C_CAA087	3,107
CAA	Pool 15 (SLC)	C_CAA095	3,107
CAA	Pool 16 (SLC)	C_CAA109	2,871
CAA	Pool 19 (SLC)	C_CAA143	2,537
CAA	Pool 20 (SLC)	C_CAA155	2,382
CAA	Pool 20 (SLC) Delivery to Avenal, Coalinga, Huron	C_CAA156	2,380
CAA	Pool 21 (SLC)	C_CAA165	2,377
CAA	Pool 22	C_CAA172	2,230
CAA	Pool 22, SWP Reach 8C	C_CAA173	2,228
CAA	Pool 22, SWP Reach 8C County Of Kings	C_CAA181	2,220
CAA	Pool 22, 8C-8D Tulare Lake Basin Wsd	C_CAA183	2,157
CAA	Pool 22, SWP Reach 8D Dudley Ridge WD	C_CAA184	2,130
CAA	Pool 22, SWP Aqueduct Downstream of Bifurcation To Coastal Br	C_CAA185	2,034
CAA	Pool 23, SWP Reach 9-13B KCWA	C_CAA194	1,569
CAA	Pool 24, KWB Semitropic Element Diversion	C_CAA207	1,569
CAA	Pool 25, KCWA & KWB Semitropic Return	C_CAA210	1,569
CAA	Pool 26	C_CAA220	1,557
CAA	Pool 29, CVP Cross Valley Canal AG Diversion	C_CAA238	1,497
CAA	Pool 29, CVP Cross Valley Refuge Diversion	C_CAA239	1,483
CAA	Pool 29, KWB Fan Element Diversion	C_CAA240	1,483
CAA	Pool 29, KWB Local Element Diversion	C_CAA241	1,483
CAA	Pool 29, SWP KCWA & KWB Local Elmnt Rtrn	C_CAA242	1,375
CAA	Pool 30, Buena Vista Pumping Plant	C_CAA245	1,396
CAA	Pool 33, SWP Reach 14A-14C KCWA	C_CAA262	1,396
CAA	Pool 36, Wheeler Ridge Pumping Plant	C_CAA278	1,393
CAA	Pool 36, SWP Reach 15A-16A KCWA	C_CAA279	1,350
CAA	Pool 37, Chrisman Pumping Plant	C_CAA280	1,348
CAA	Pool 41, Edmondston Pumping Plant	C_CAA293	1,348



Filters

- Filter by: climate, time periods, water year types, months, year ranges
- Variable search

Climate (filter for all charts):

2043_CC50 x ▼

CalSim variable name (B-Part):

C_CAA003 x ▼

Search by common description:

Total Banks Exports x ▲

Delivery - CVP Delivery SOD

Total Banks Exports

Other - Banks Export Cross Valley Pumping

Banks CVP Exports

Other - Banks PP North Delta

Banks CVP Exports

Data Filters

Adaptation Portfolio

- Baseline
- Maintain
- Degradation
- FIRO
- SOD Storage
- DCP
- Combo

Climate

- Current
- 2043_CC50
- 2043_CC95
- 2085_CC50
- 2085_CC75

Averaging Windows

- Full Simulation Period (1922-2021)
- 2021 DCR Simulation Period (1922-2015)
- Single Dry Year (1977)
- Two-Year Drought (1976-1977)
- Single Dry Year (2014)
- Two-Year Drought (2014-2015)
- Six Year Drought (1987-1992)
- Six Year Drought (1929-1934)
- Single Wet Year (1983)
- Single Wet Year (1998)
- Single Wet Year (2006)
- Two Year Wet Sequence (1982-1983)
- Four Year Wet Sequence (1980-1983)
- Six Year Wet Sequence (1978-1983)
- Ten Year Wet Sequence (1978-1987)
- Single Wet Year (2017)



Use Cases



A data narration tool for presentation



A drilldown tool



Quick reference: a place to capture key assumptions and results.

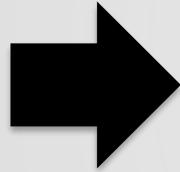


Demo: SWP Climate Adaptation Plan

[CAP Results Console](#)



Technology Stack and Architecture



Flask
web development,
one drop at a time



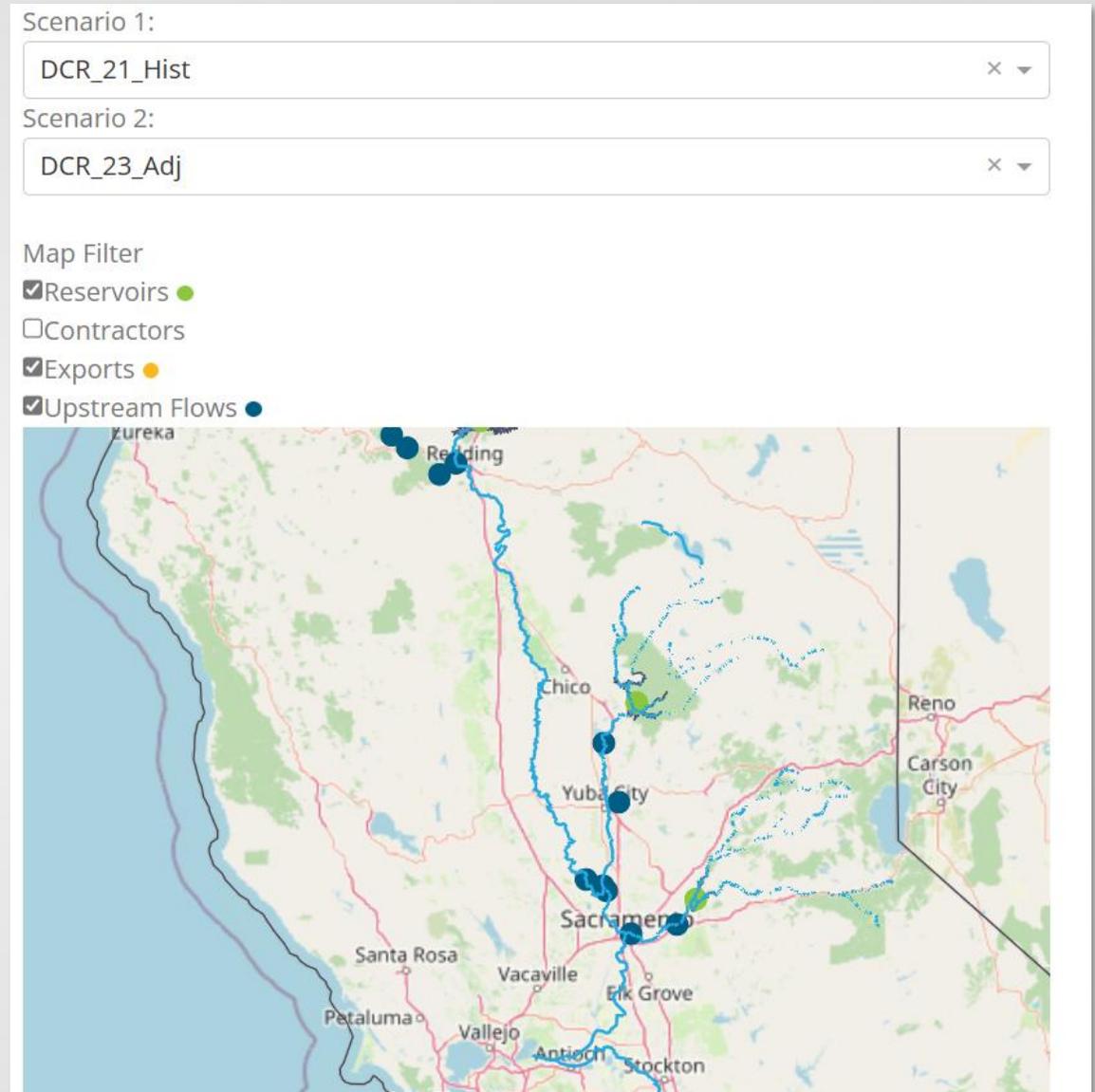
plotly | Dash

[panDSS](#) API for ingesting .dss files



Ongoing Efforts

- Report Generation
- Map View
- User-Loaded DSS Files
- Controls Analysis



Building Your Own

[CentralValleyModeling/calsim-recon: Results Console \(ReCon\) for CalSim 3 Studies](#)



THANK YOU

QUESTIONS?