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2023 Final State Water Project (SWP) Delivery Capability Report (DCR)

Credit: DWR Photo Team

Nicole Osorio, E.I.T

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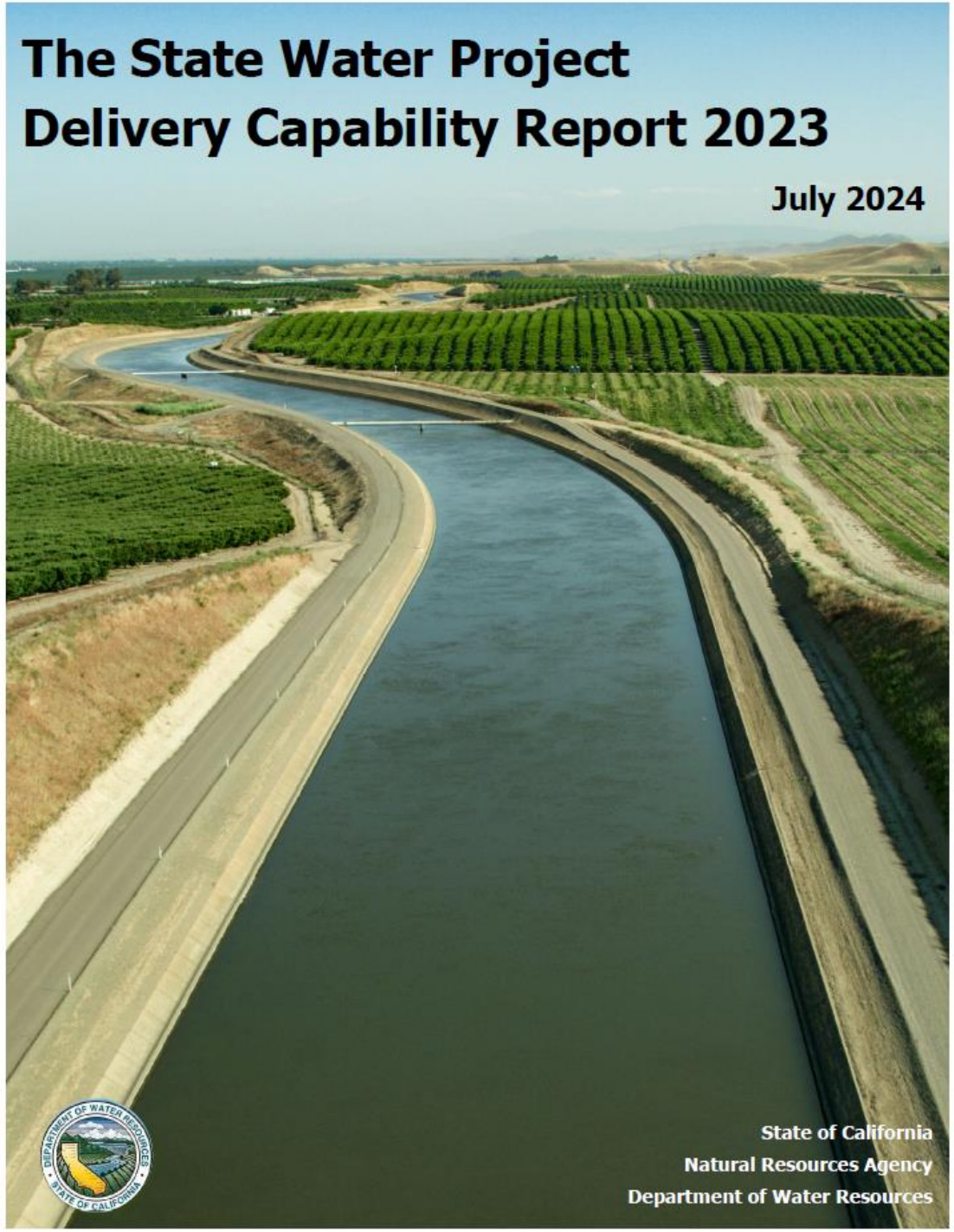
Yiwei Cheng, Ph.D, P.E.

Outline

- Introduction - DCR
- Assumptions
  - DCR 2021 Differences
  - Existing Conditions
  - Future Conditions
- Key Findings
- Q&A

Delivery Capability Report (DCR)

- Bi-annual report of Existing delivery capability
  - Over a range of hydrologic conditions
    - Historic extended dry cycle
    - Long-term average
- Future delivery capability added in 2007 looking 20-years into the future (business as usual + climate change)



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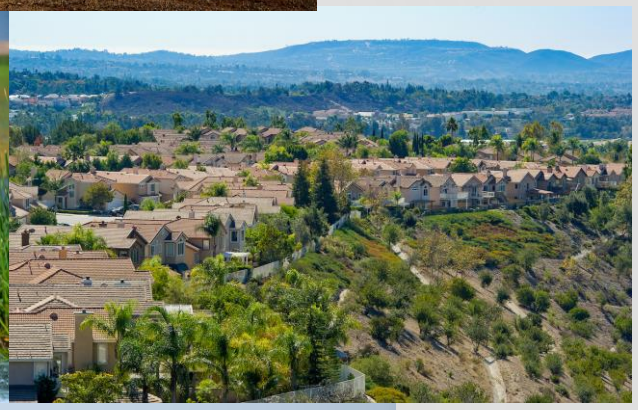
Why the DCR?

- Fundamental for drought planning
- Important input for Groundwater, Urban Water, Agricultural, and Integrated Regional Water Management Plans



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Differences Between 2021 and 2023 DCR

	DCR 2021 (Final)	Final DCR 2023 Historical	Final DCR 2023 Adjusted
Simulation Period	1922-2015	**1922-2021**	1922-2021
Hydrology	Historical	Historical[1]	**Adjusted Historical**
Key Operational Updates compared to 2021 DCR	--	**Code updates to maintain consistency with the LTO Existing Conditions Study**	Same as Final DCR 2023 Historical

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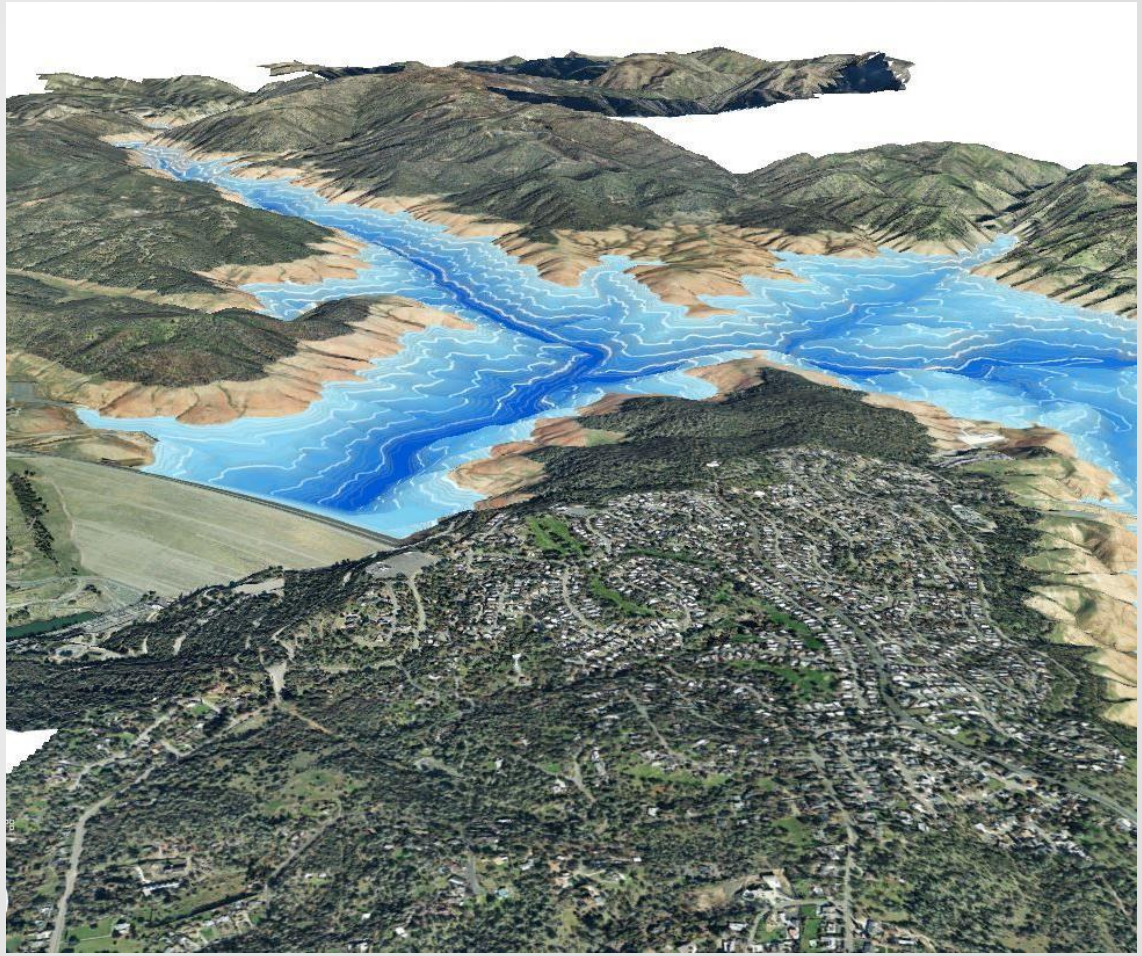
1. Updates were made to the historical hydrology since the release of the 2021 DCR. These include updated rim inflows, error fixes/minor corrections, updated Delta Channel Depletion model.

Assumptions: Existing Condition

- CalSim 3
- Level of development – 2020
- SWP demand – Full Table A
- Regulations – D1641, 2020 Incidental Take Permit for SWP, and 2019 Biological Opinions
- Simulation period – 100 years (Water Year 1922-2021)
- **DWR and BOR updates, model improvements**
- **Hydrology – Climate adjusted historical hydrology**

Baseline Model Updates

- Forecast methodology
- Old and Middle River constraints
- Delta Cross Channel Refinements
- Fremont Weir Adult Fish passage project
- Yuba River representation
- SWP
  - Oroville bathymetry
  - Operational availability
  - Dos Amigos pump sharing
  - Table A and Article 21 demands
- CVP
  - San Joaquin River Restoration and Recapture refinements
  - Sacramento River Settlement Contractors representation



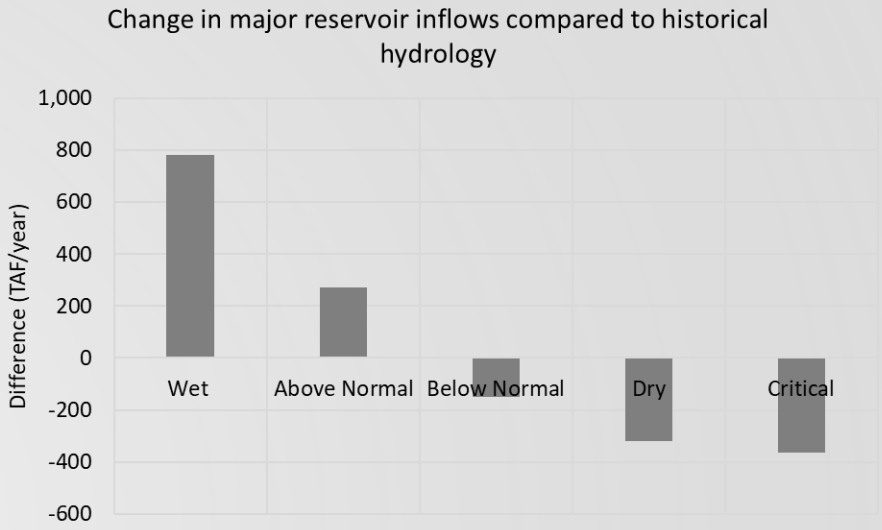
Credit: DWR

Climate Adjusted Historical Hydrology

- Account for climate changes that have ***already*** occurred
- Estimation of ***current*** SWP capacity and reliability for use in operations and planning studies
- Moving forward-future climate changes would be mapped onto this new baseline

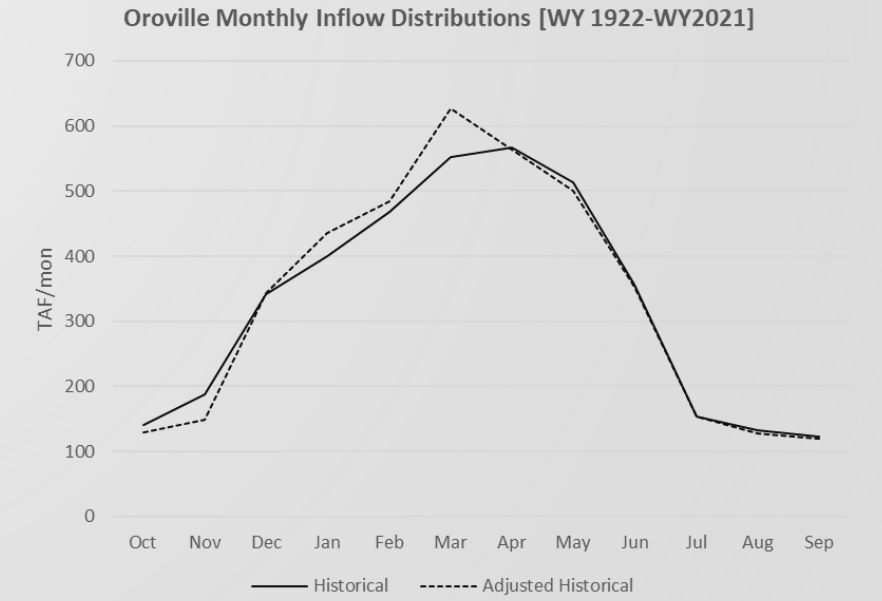
Climate Adjusted Historical Hydrology: Inflow Changes

- Minimal change in long-term annual average.
- More variability in year-year runoff
- More seasonal variability.
  - Higher winter flows.
  - Lower spring flows.



Average Long-Term (1922-2021) Annual Inflows to Major Reservoirs (TAF/year)

Description	DCR 2023 Historical	DCR 2023 Adjusted Historical	% Difference
Lake Oroville Inflow	3,938	3,986	**1.2%**
Lake Folsom Inflow	2,642	2,671	**1.1%**
Lake Shasta Inflow	5,571	5,592	**0.4%**
Trinity Inflow	1,228	1,234	**0.5%**



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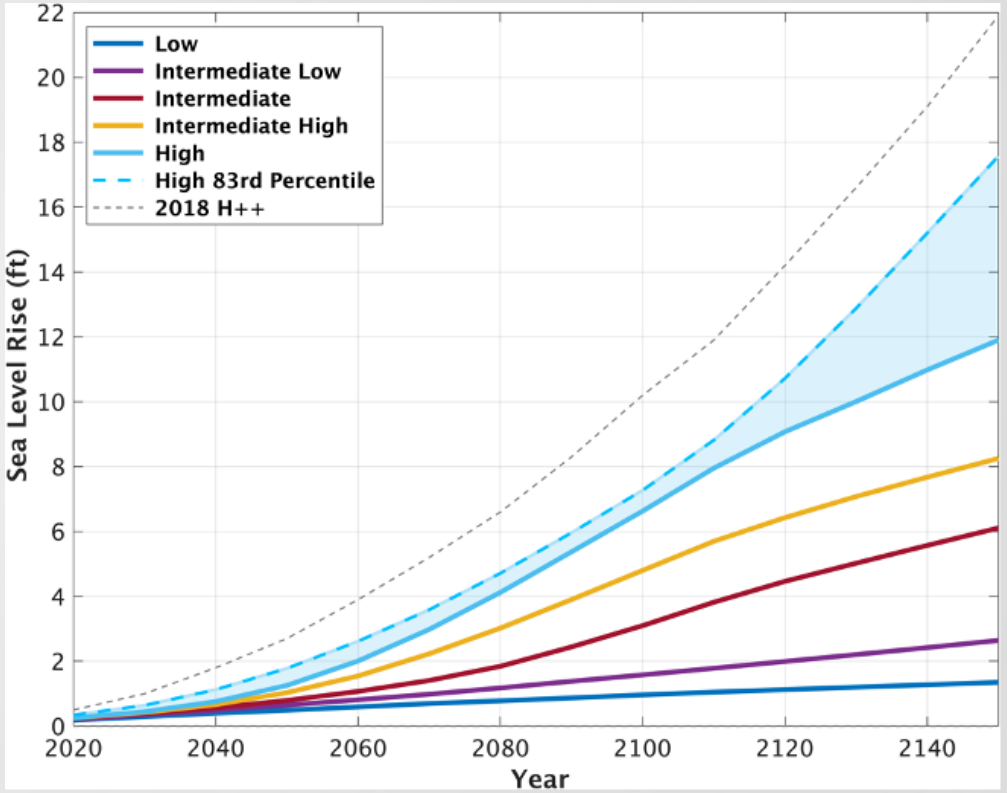
Assumptions: Future Conditions

- **Risk-informed climate change hydrology and sea-level rise**

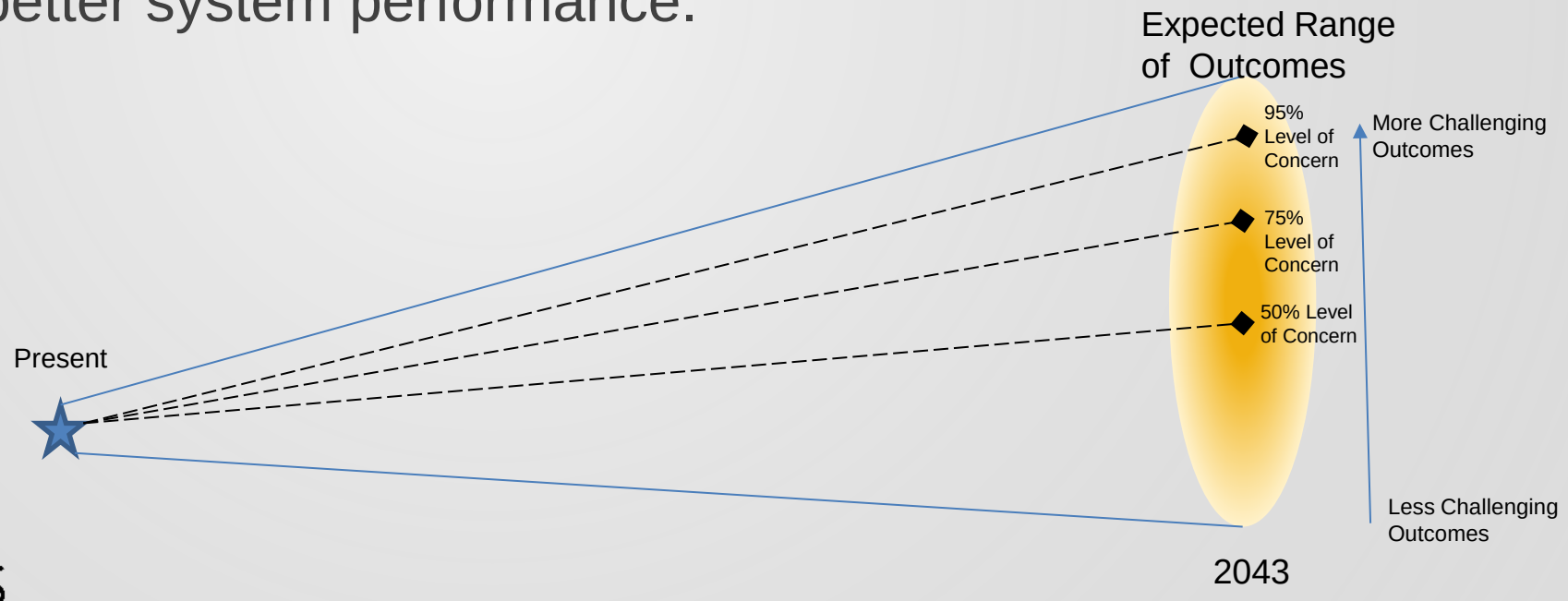
Level of Concern (Percentile)	2043 Change in Temperature	2043 Change in Precipitation	2043 Precipitation Intensification	2043 Sea Level Rise
50th	+1.5°C	+1.5%	11%	15 cm
75th	+1.7°C	+0.1%	12%	30 cm
95th	+1.8°C	-1.8%	13%	30 cm



OPC, California Sea Level Rise Guidance: 2024 Science and Policy Update

Risk Informed Future Climate Scenarios

- Future conditions scenarios evaluate combinations of climate changes (temperature, precipitation, and sea level rise) that represent different levels of risk - Defined as “Levels of Concern”. The quasi-probability number describes the percent of model informed climate outcomes that would result in better system performance.



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Climate Change Scenarios: Hydrology Impacts

Level of Concern (Percentile)	2043 Change in Temperature	2043 Change in Precipitation	2043 Precipitation Intensification	2043 Sea Level Rise
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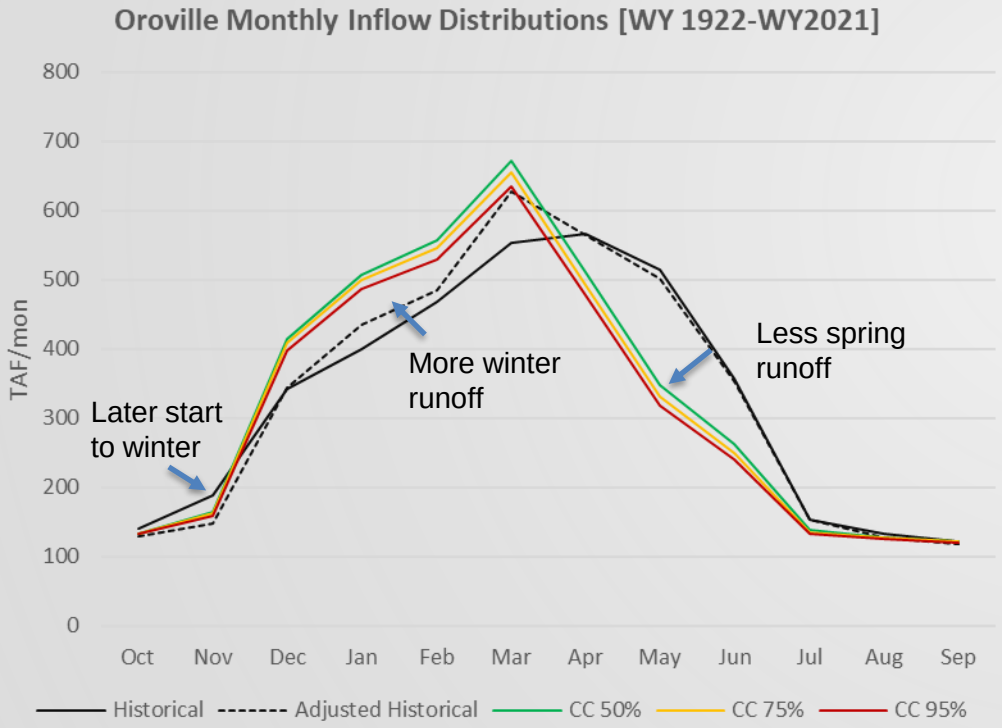

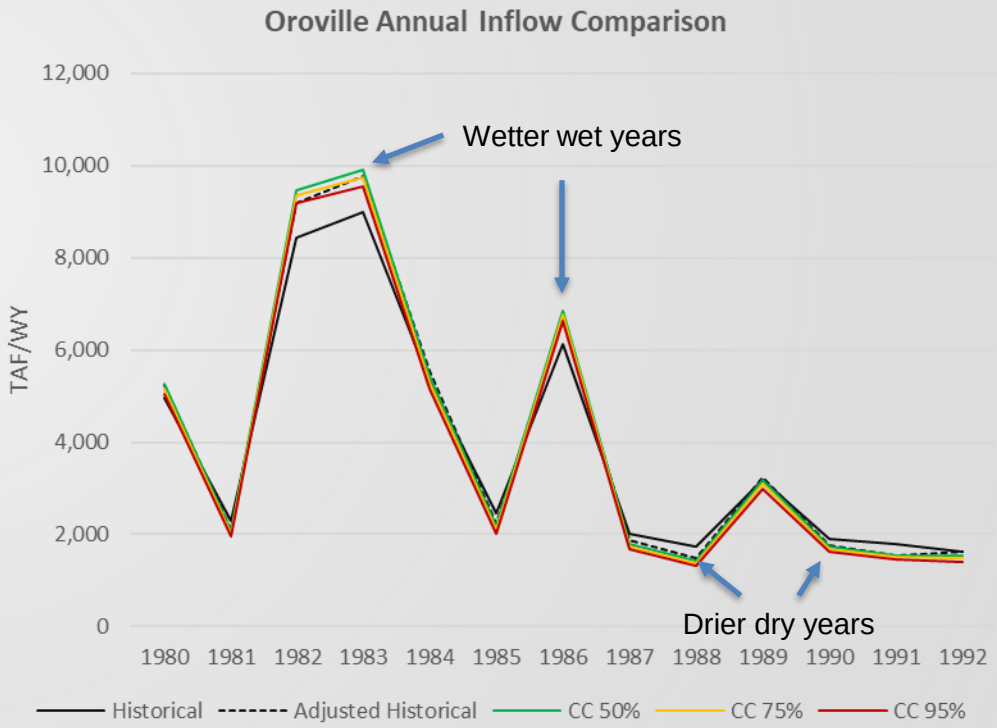

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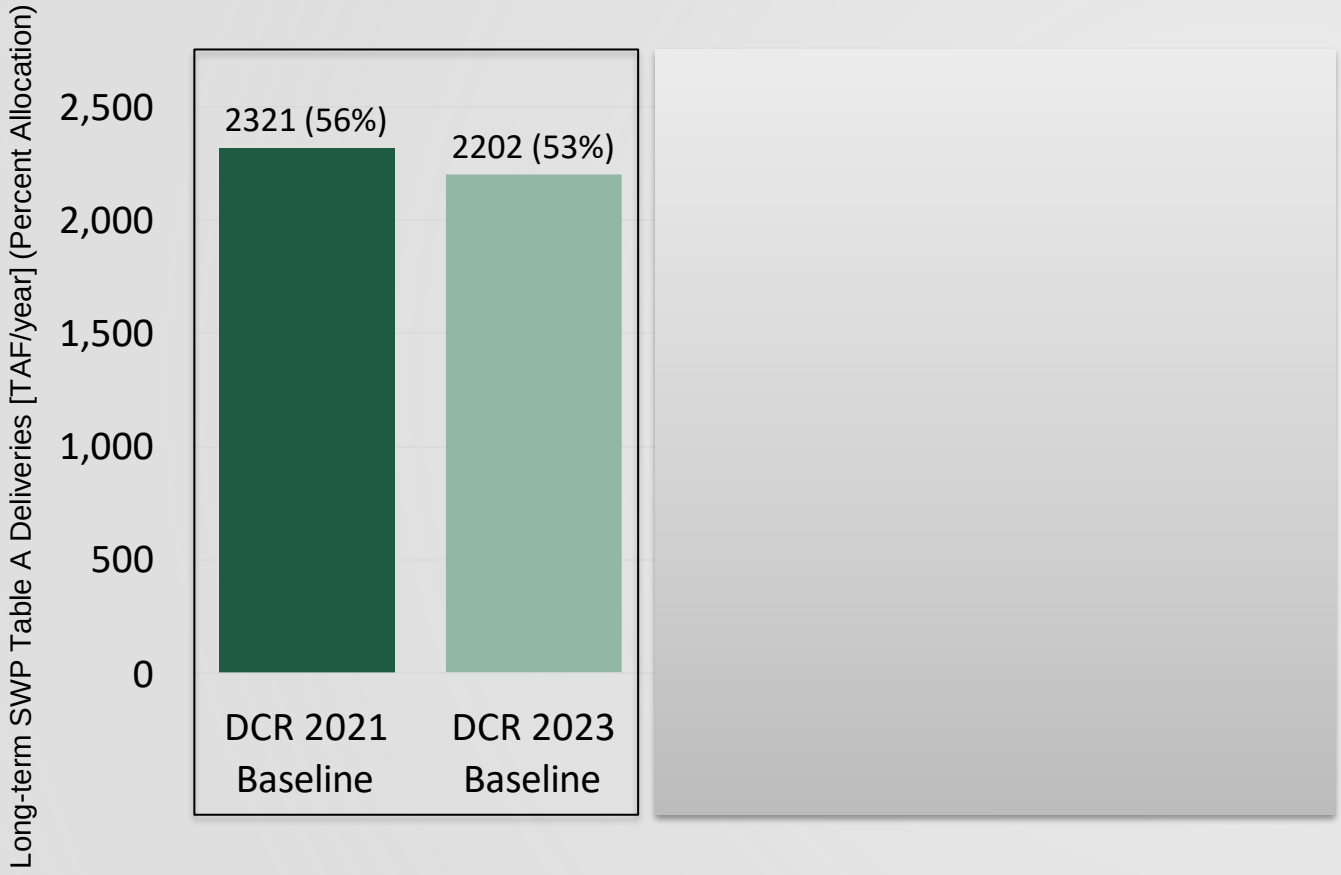
SWP Table A Deliveries – Final DCR 2023



Under existing conditions, DCR 2023 shows a **119 TAF/year reduction in long-term Table A deliveries** compared to the DCR 2021.

Compared to the 2021 DCR, this represents:

- 5% reduction in delivery volume
  (2,321 → 2,202 TAF/year)
- 3% reduction in allocation
  (56% → 53%)

These impacts are due to using Adjusted Historical Hydrology and updating Oroville reservoir bathymetry.

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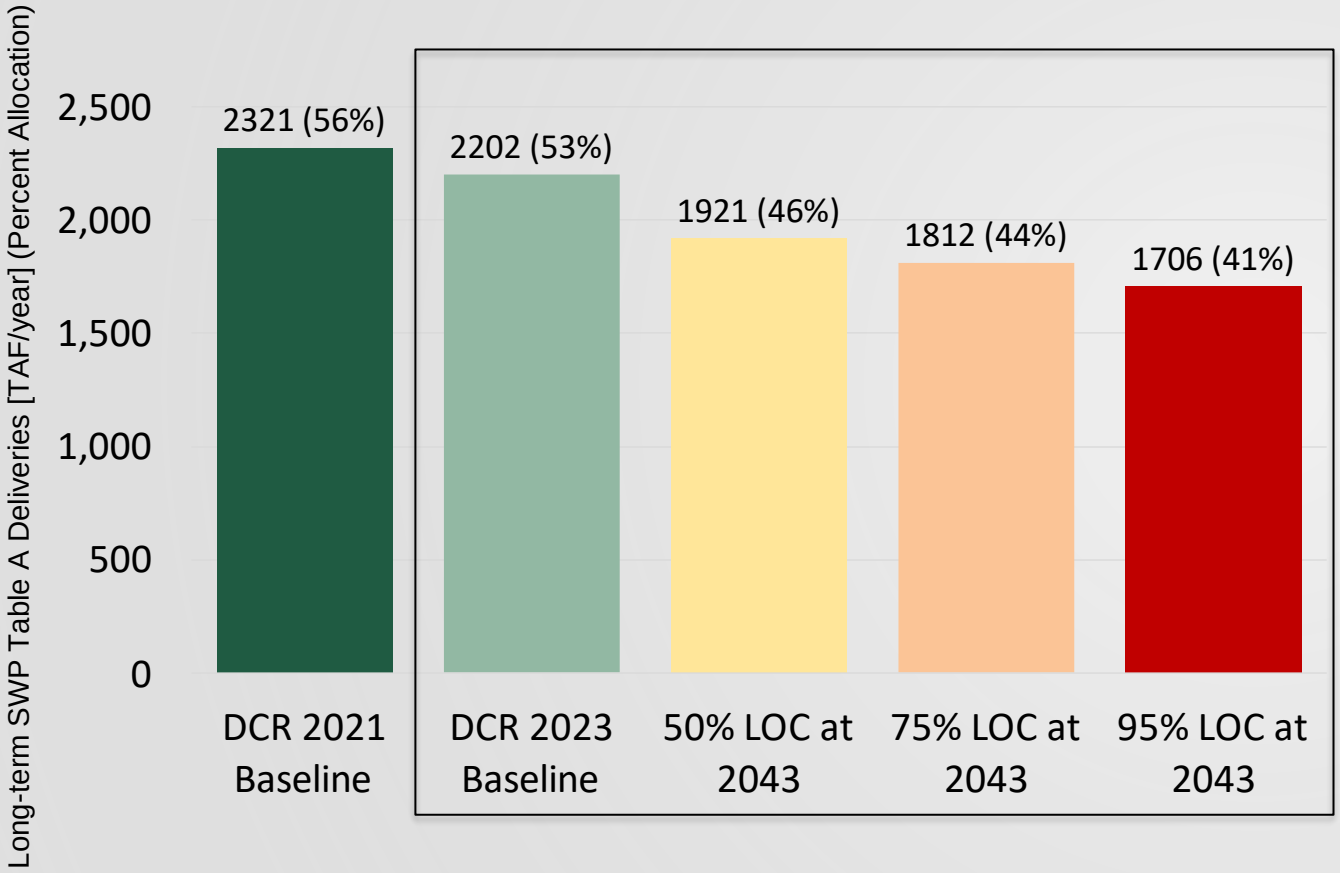
SWP Table A Deliveries – Final DCR 2023



Under future conditions, DCR 2023 shows up to **23% reduction in long-term Table A deliveries** compared to the existing conditions.

Compared to the 2023 DCR existing conditions, this represents:

- 13-23% reduction in delivery volume
  (2202 → 1706-1921 TAF/year)
- 7-12% reduction in allocation
  (56% → 41-56%)

These impacts are due to changing flow patterns and extreme weather shifts.

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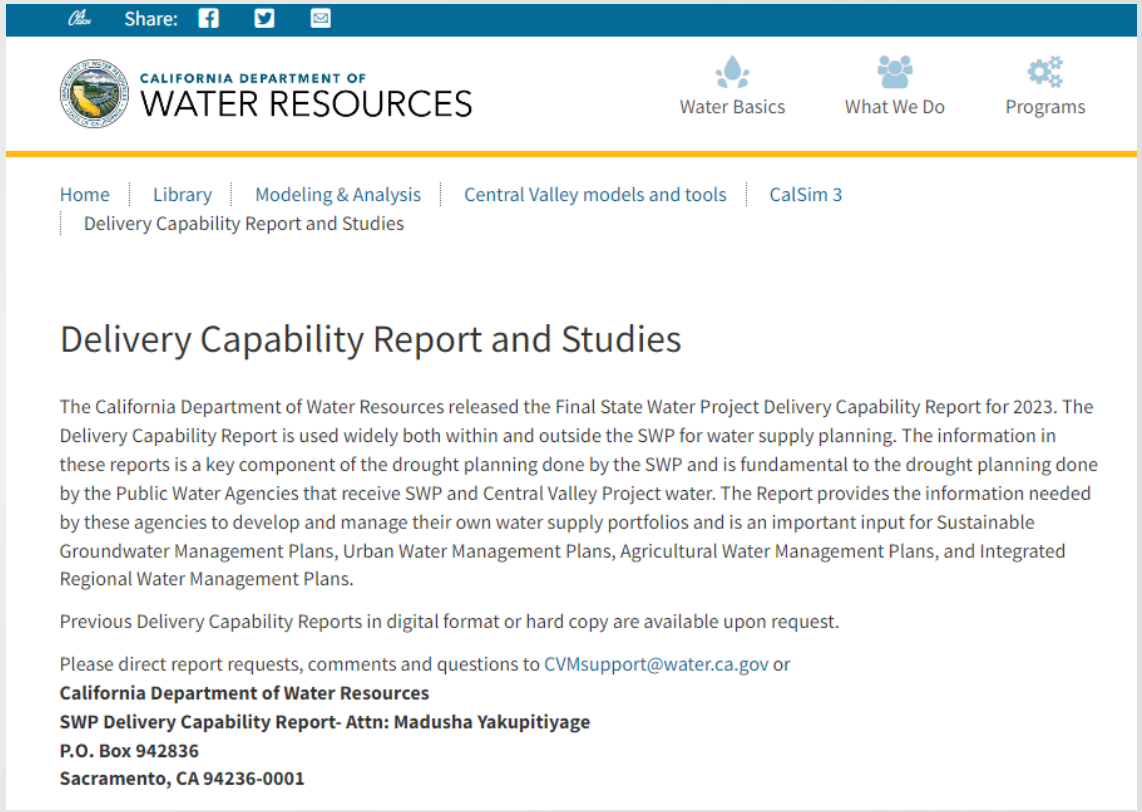
Final 2023 DCR Products

- Main Report
- Technical Addendum
- Hydrology Report
- Peer-Reviewed Additional Technical Reports
- Models
- Input Data



https://water.ca.gov/Library/Modeling-and-Analysis/Central-Valley-models-and-tools/CalSim-3/DCR

For more information:

- **Tuesday, 3:15-5pm Session 16: Hydrology/Climate Change (Ryan Lucas, BOR)**
  - Risk-Informed Climate Change Development – Andrew Schwarz (DWR)
  - USBR 2022MED Hydrology Development: Detrending Methodology – Drew Loney (USBR) & Tapash Das (Jacobs)
  - A New Normal: Adjusted Historical Hydrology – Richard Chen (DWR)
  - A New Normal: Climate Change Adaptation – Andrew Schwarz (DWR)
  - Climate Change Development: BOR and DWR Approaches – Drew Loney (USBR)

Acknowledgements

DWR

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Jacobs

Stantec

HDR

MBK ENGINEERS