Water Storage in California

So Cal Water Dialogue

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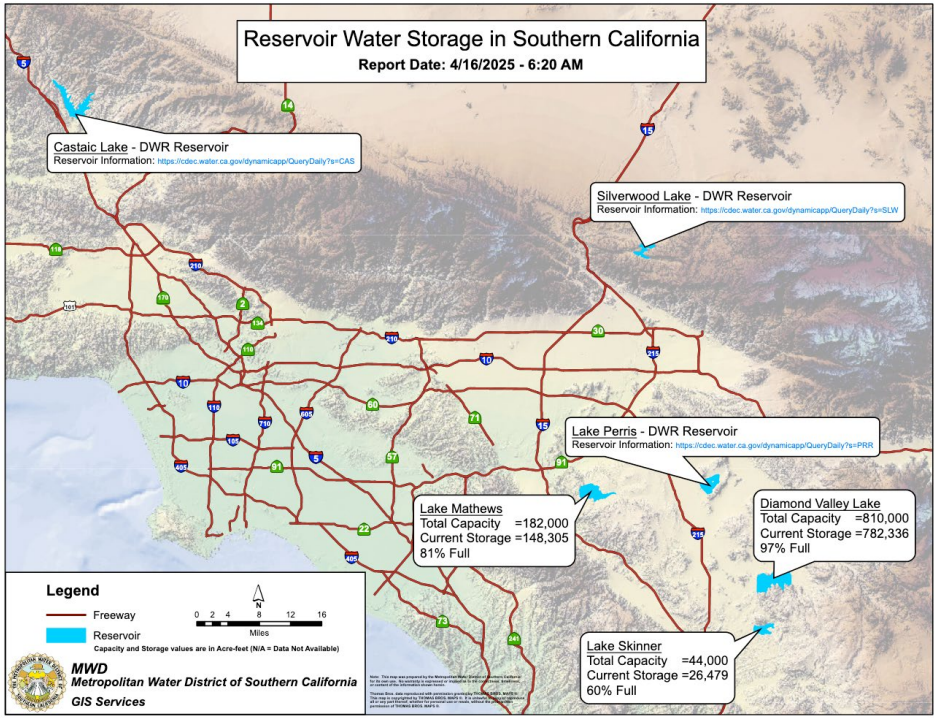
Outline

- The role of storage in California's water supply portfolio
- How storage works
- Some of the major challenges
- The most promising: increasing groundwater recharge and storage

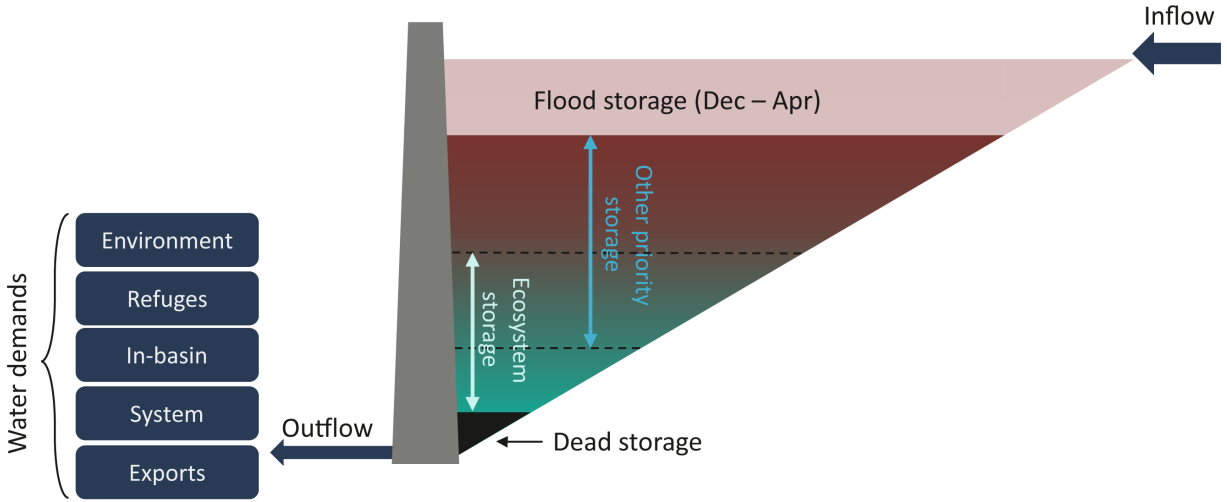
Surface Storage

- >1500 reservoirs
- Approximately 40 maf of storage
- Designed for mid-century
- Most facilities 50-75 years old
- Backbone of water supply grid
- Vital to meeting the water needs of Southern California



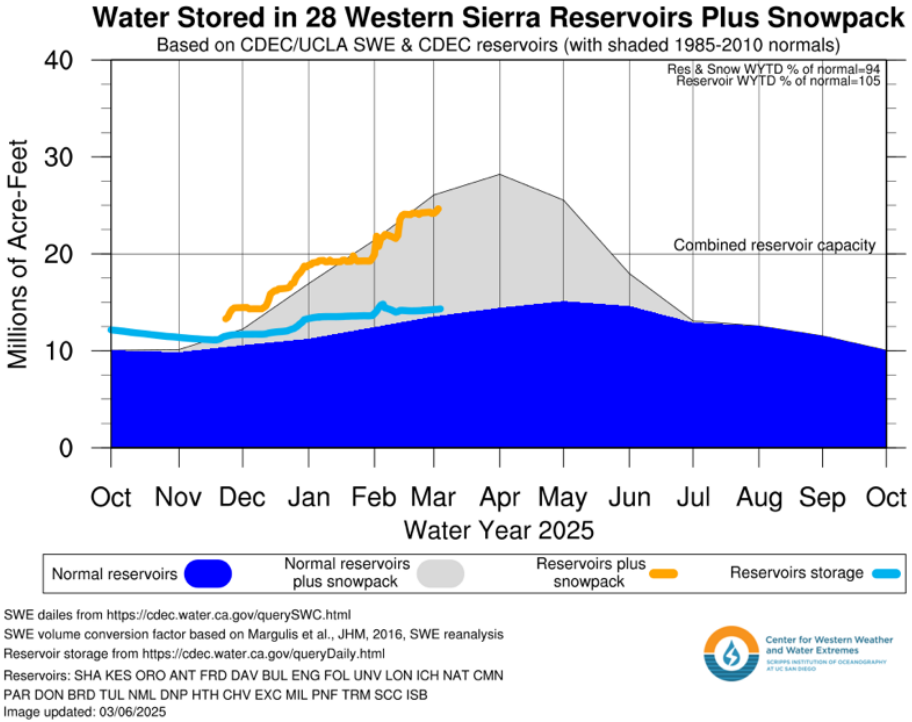
Surface Storage: Conflicting Demands

- Water Supply
- Hydropower
- Recreation
- Ecosystems
- Water Quality
- Flood Management



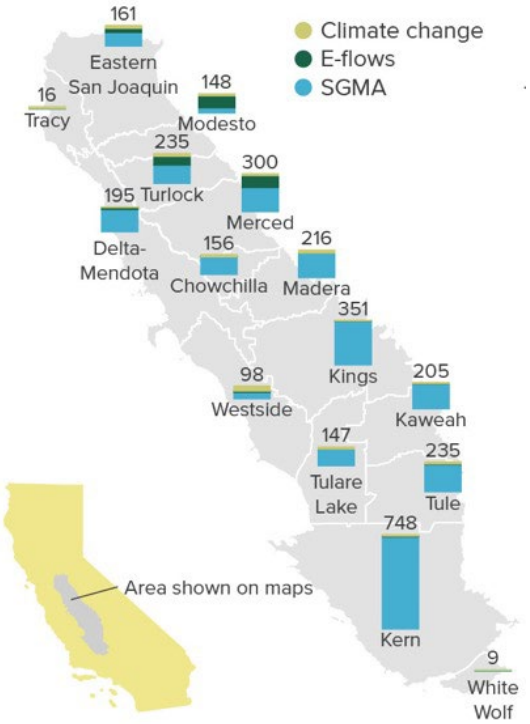
Source: Null et al. 2022. Storing Water for the Environment: Operating Reservoirs to Improve California's Freshwater Ecosystems.

The role of snowpack in surface storage



Groundwater Storage: Poorly Managed, but Improving Dramatically

- Groundwater storage total unknown, but more than 100 maf
- Chronic overdraft led to the 2014 Sustainable Groundwater Management Act
- Extensive effort to achieve sustainability by 2040-2042
- Combination of demand management and increasing emphasis on groundwater recharge

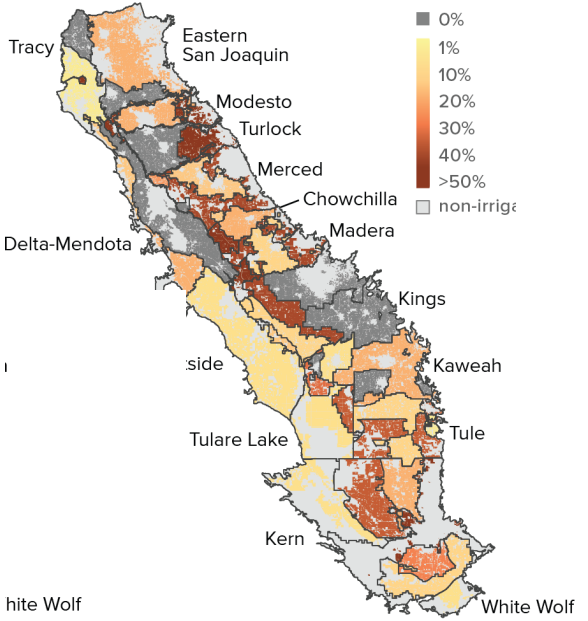


Reductions in applied water in San Joaquin Valley by 2040 (taf)

Our updated analysis shows the uneven spatial consequences of groundwater water scarcity

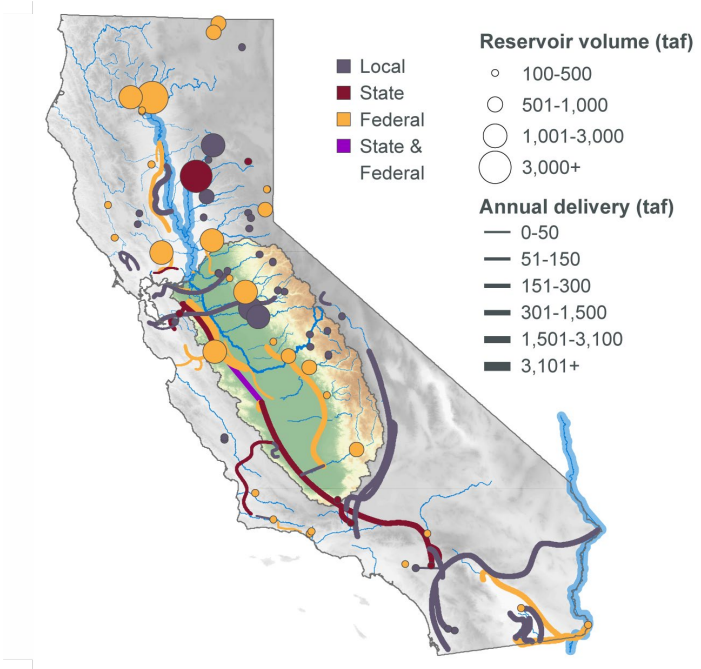
- Without adaptations:
  - ~900,000 acres of lands fallowed, ~50,000 jobs lost, and a 2.3% decline in GDP
- More than 50% of lands would be fallowed in some areas, even in the wetter north

Share of cropland fallowed by 2040 with no trading

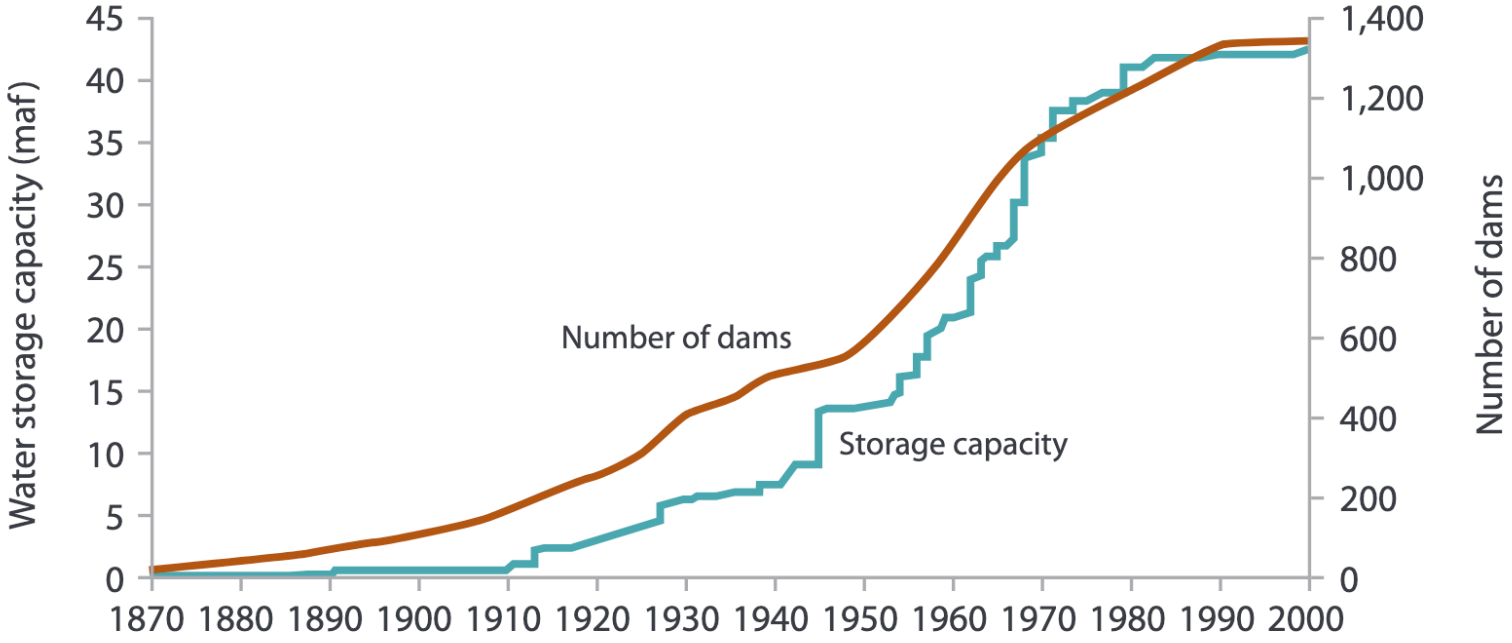


Source: Escriba-Bou et al., 2023, The Future of Agriculture in the San Joaquin Valley

Finally: storage does not work without an elaborate conveyance system

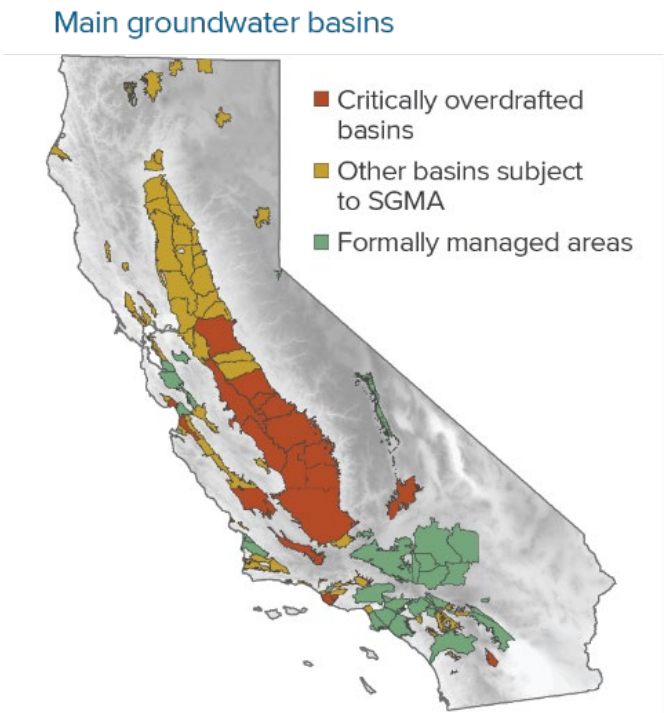


The large dam building era is over

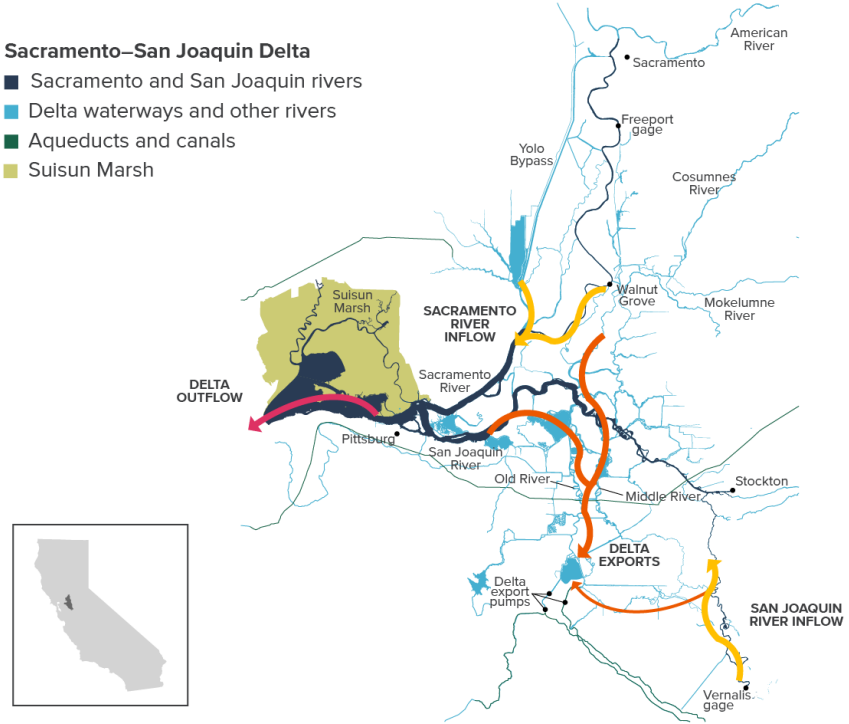


The promise and perils of groundwater storage

- Opportunities for new surface storage limited (Proposition 1 Water Supply Infrastructure Program)
- Greater interest in taking advantage of abundant potential groundwater storage capacity through managed recharge
- Must improve wet-year management to get through the dry years (other speakers will cover this)
- Only works if paired with demand management and conveyance



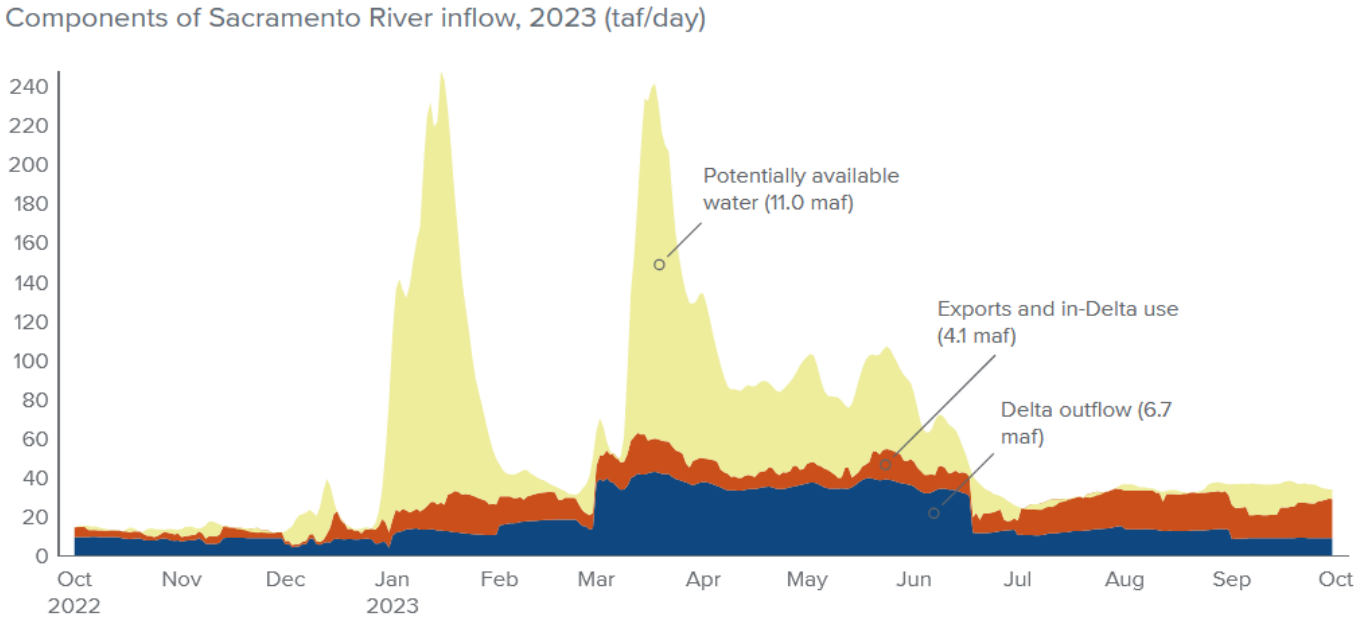
Management of the Delta is a central issue for recharge in the Central Valley



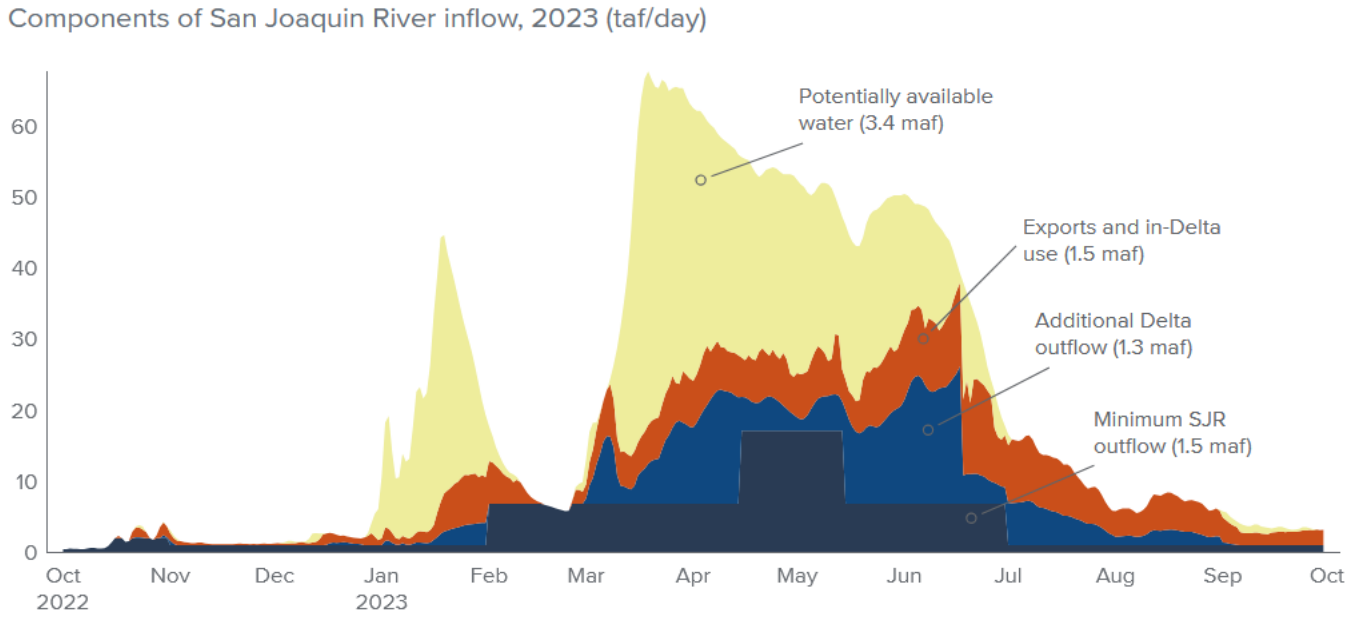
CVP and SWP exporters are responsible for meeting e-standards:

- Minimum Delta outflows:
  - If Delta is not "in excess", new diversions can reduce exports
- Additional restrictions related to inflows from San Joaquin River:
  - Old and Middle River (OMR) Flow Limit
  - Inflow:Export (IE) ratio
  - New diversions can cut exports when river is below flood stage

Situation is simpler for diversions from the Sac River, where key issue is meeting Delta outflow requirements

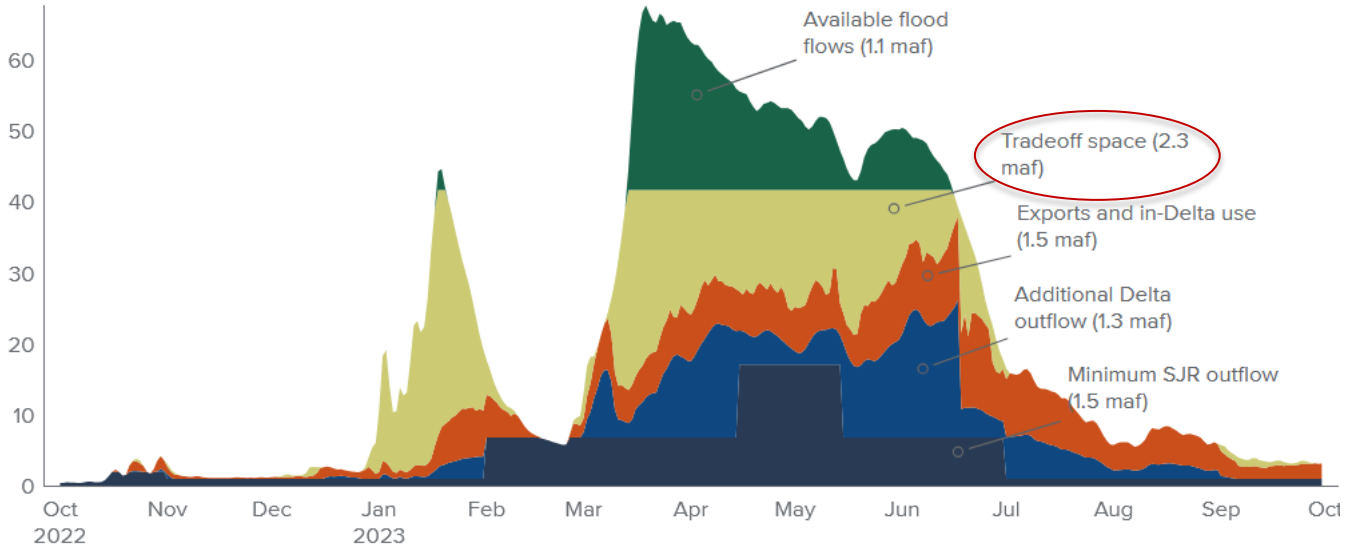


Situation is more complex for diversions from the SJ River, which has less water and more demand for recharge



With full (maximum) exports, most potentially available SJV water entails tradeoffs with exports

Components of San Joaquin River inflow, 2023 (taf/day): Maximum export scenario



Implications for policy and practice

The tradeoffs between new upstream diversions and existing exports can be significant

- Some upstream diverters might appeal to "Area of Origin" laws to make the case that they should nevertheless have priority over exports
- But given the potential impacts, this will need to be worked out in policy discussions

When exporters don't operate at capacity, this creates more opportunities for mutually beneficial recharge

- In both 2017 and 2023, about 0.6 maf might have been diverted upstream to mutual benefit
- Recharging more "tradeoff" water is also possible if exporters are compensated
- Recharge partnerships between exporters and upstream diverters will be key

Blueprint and Metropolitan Water District of Southern California Sign Historic MOU

May 28, 2024

Other state and local policies can help make the most of available water

- Permits for building and operating projects remain a major hurdle (e.g., streambed alteration permits)
- Local incentives for landowner recharge can help unlock potential for this cost-effective approach to storing water while reducing flood risk

Thank you!

Related PPIC resources

- Understanding water available for recharge in the Central Valley (December 2024 explainer & dataset on the results shown in this briefing)
- Replenishing groundwater in the San Joaquin Valley: 2024 Update (June 2024 report detailing results of our survey on recharge in the SJV)
- Tracking where water goes in a changing Sacramento-San Joaquin Delta (May 2022 report & dataset on Delta water accounting from 1980-2021)

Notes on the use of these slides

These slides were created to accompany a presentation. They do not include full documentation of sources, data samples, methods, and interpretations. To avoid misinterpretations, please contact:

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Thank you for your interest in this work.