Water Rights Reporting & Measurement, The Delta Alternative Compliance Plan, and Support For A New Delta Water Balance

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CALIFORNIA
Water Boards

Office of the Delta Watermaster

Tidal Channels and Subsided Islands

SB88 Water Measurement Regulations / Proposed Revisions in Process

- Requirement for all diverters >10 AF to measure diversions. . .
  - Alternative compliance plans (ACPs) **"*in circumstances where strict compliance. . . is not feasible, is unreasonably expensive. . .*"** etc.
- SWRCB staff proposed changes to:
  - Regulations text and organization
  - Accuracy and telemetry requirements
  - Format of datafiles and submittal process
- Retains flexibility for ACPs
- Prospective adoption of revised regs later in 2025

Delta Measurement Experimental Consortium (DMEC) and ACPs

- Wide stakeholder engagement
- Consensus-building
- Essential role of agents in quality water reporting
- OpenET as alternative to measuring everywhere
- Journey of continual improvement...

2015:

SB-88 Passes

2016:

DMEC Founded

2018:

OpenET presents to DMEC

2020:

DMEC creates workplan to develop Delta ACP

2021:

ODWM endorses Delta ACP

CDWA initiates website contract

2023:

First annual water use reports filed using DeltaACP.com

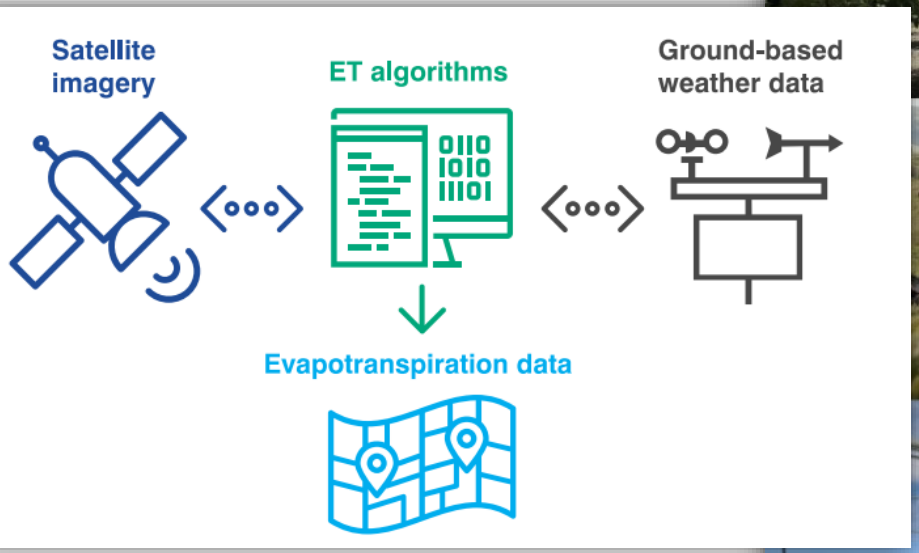
2025:

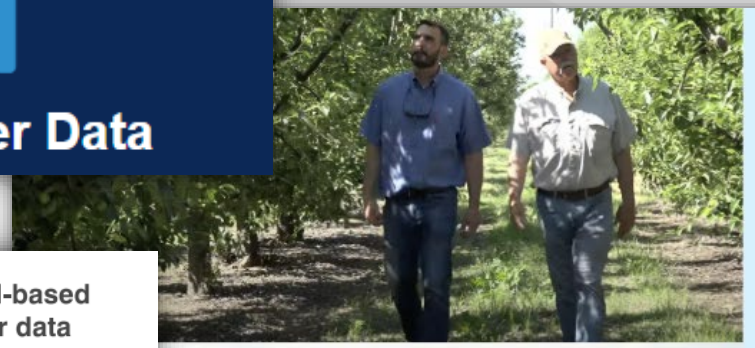
CalWATRS scheduled to go live

SB88 Measurement Regulations Update

OPENET

Filling the Biggest Gap in Water Data



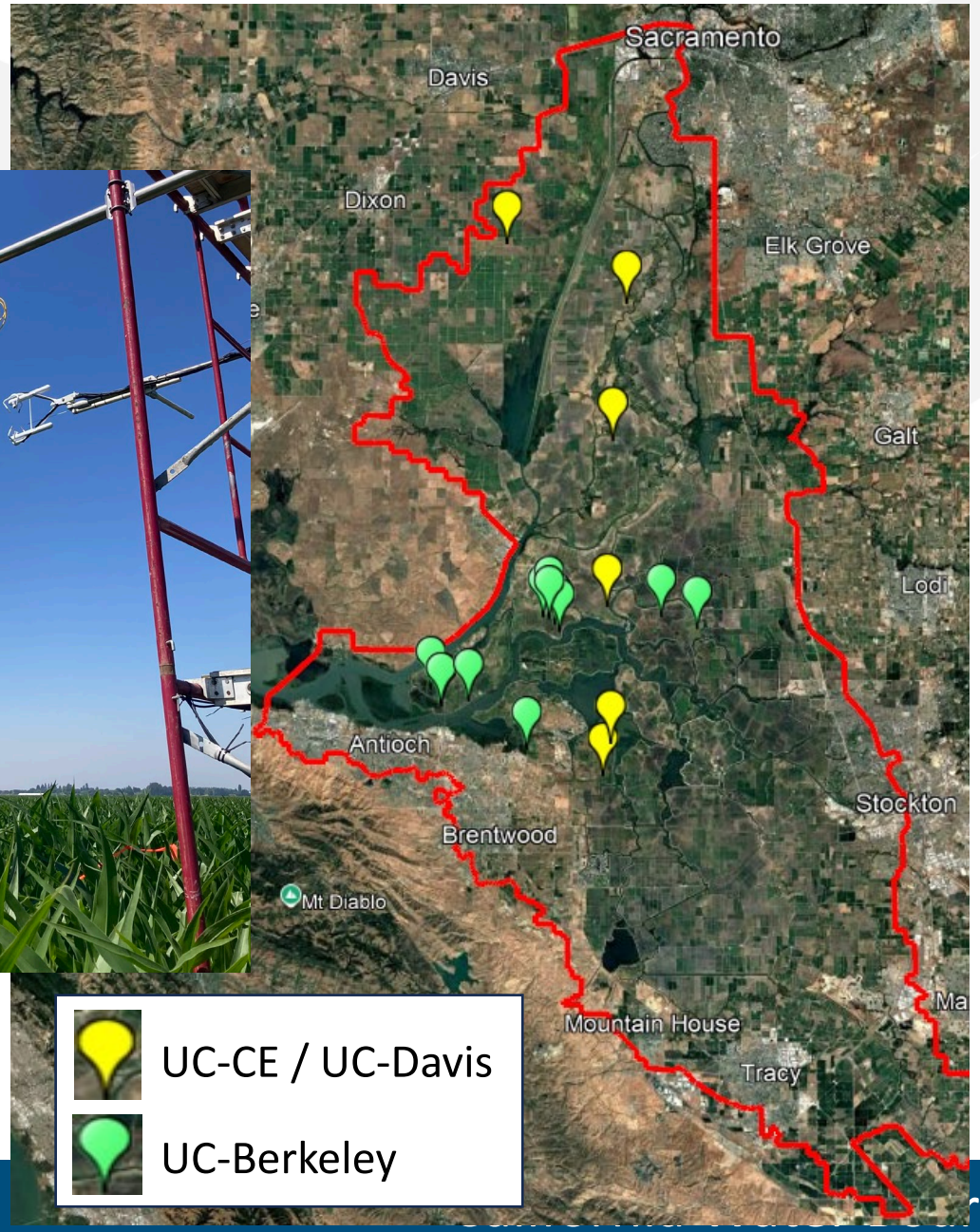


OPENET NASA EDF ENVIRONMENTAL DEFENSE FUND DRI USGS science for a changing world USDA ARS

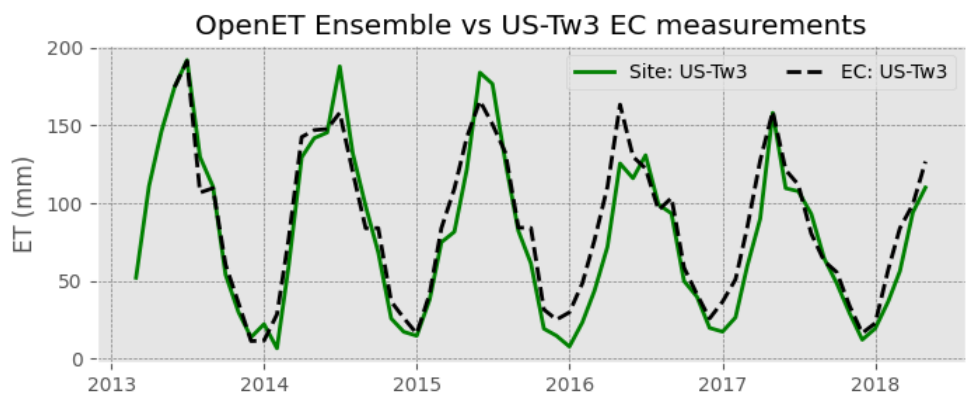
University of Idaho · Berkeley · University of Nebraska Lincoln · California State University MONTEREY BAY · HabitatSeven · UFRGS · Google Earth Engine

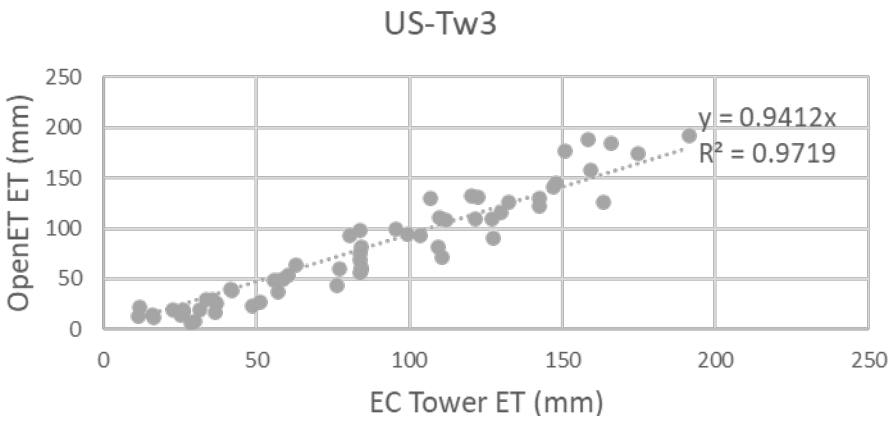
Science supporting OpenET methods – Field Sites

- 12 active eddy covariance (EC) towers
  - 6 sites by UC-Cooperative Extension
  - 6 sites by UC-Berkeley
- <u>Instruments measure:</u>
  - Evapotranspiration
  - Precipitation
  - Soil moisture
  - Runoff
  - CO_2
- In-situ comparison to OpenET results



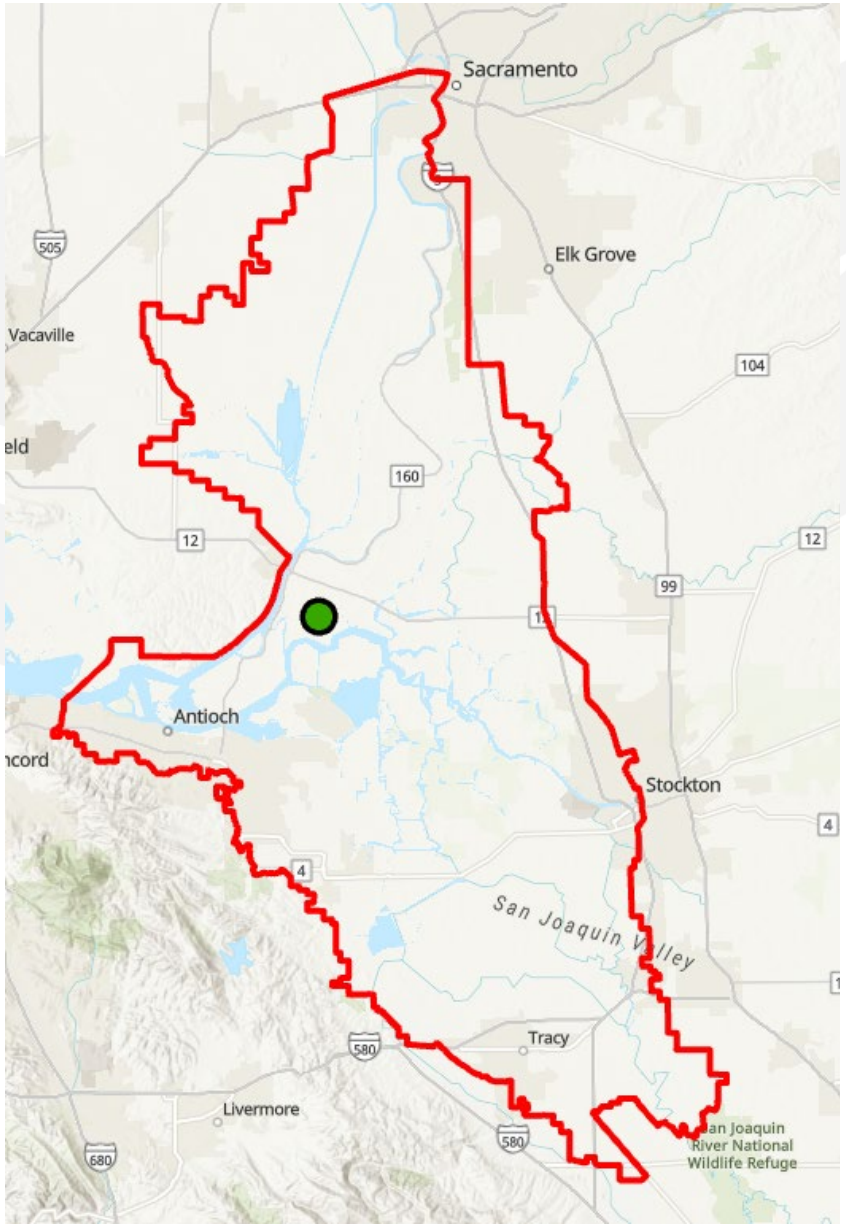
Science supporting OpenET methods: EC data comparison





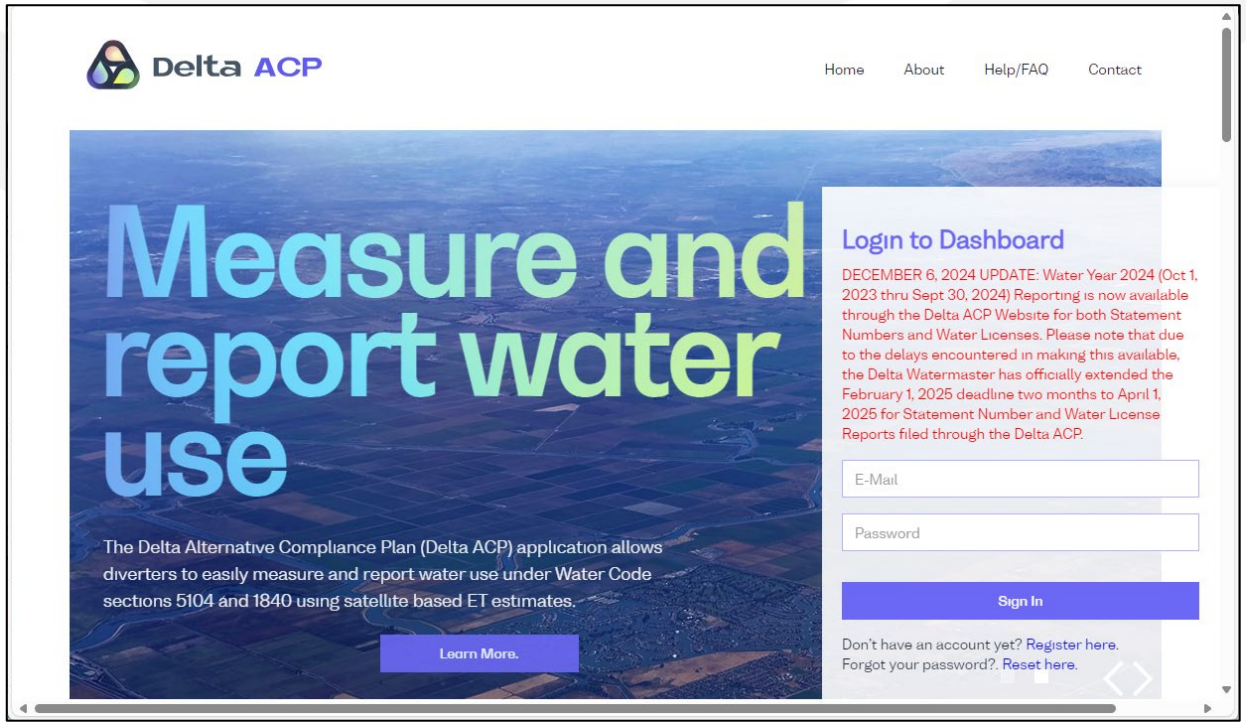
	Bi1	Bi2	Tw3	Twt	Total
Mean Absolute Error	11.4	6.5	7.8	1.8	5.7
mean Eddy Covariance ET	92.6	78.6	86.0	91.0	87.5
Mean Absolute Error %	12%	8%	9%	2%	6%
R^2 value	98%	98%	97%	99%	98%

Eddy Covariance Data from [Volk et al., 2024]



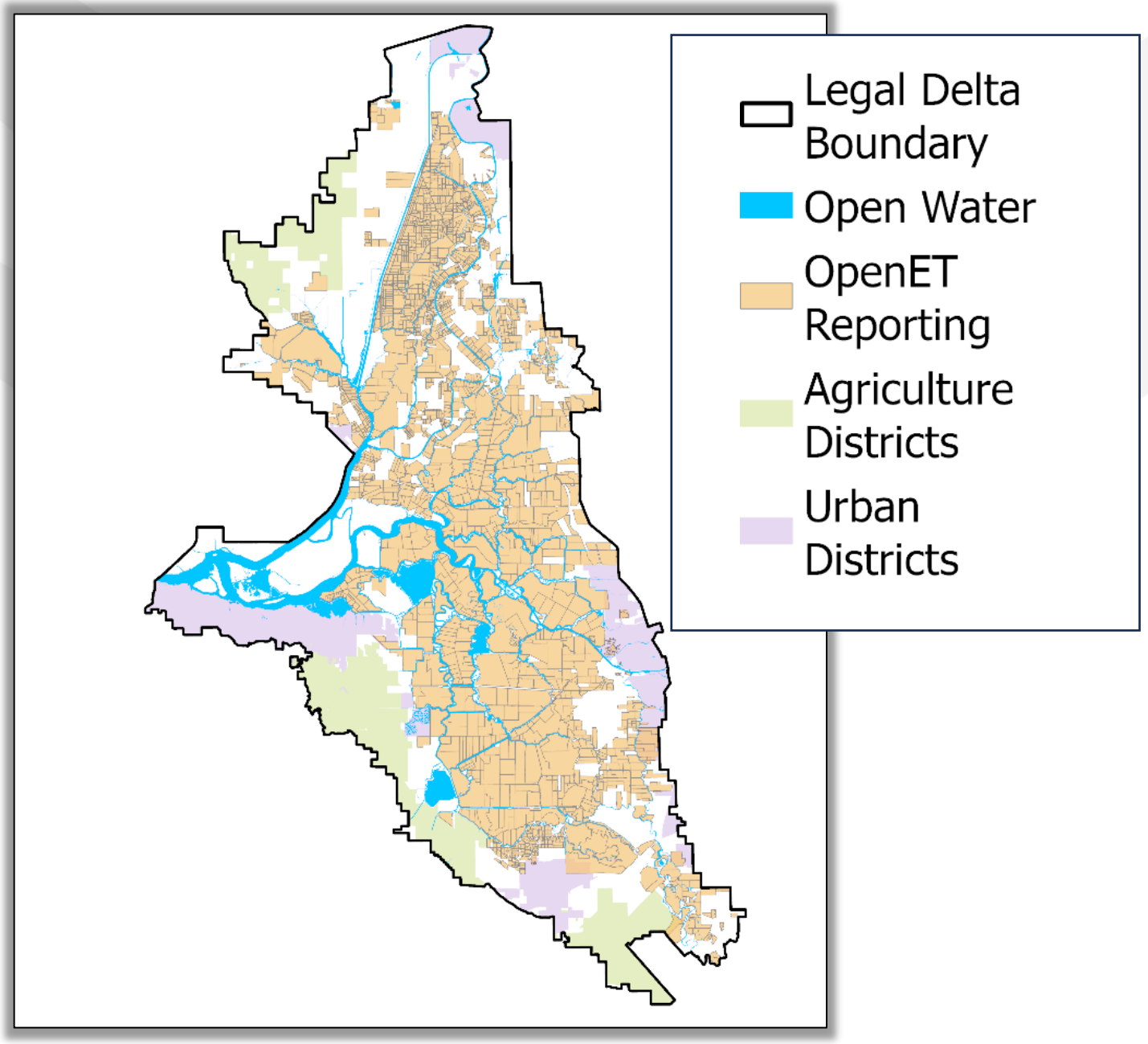
Delta Alternative Compliance Plan (Delta ACP)

- Central Delta Water Agency (CDWA) developed and maintains web portal DeltaACP.com
- Since 2023, required mapping Place of Use for 1,908 water rights
- Delta ACP interfaces with APIs at OpenET and SWRCB Report Management System (RMS)
- SWRCB will offer OpenET reporting for many Legal Delta users in new CalWATRS database for WY2025



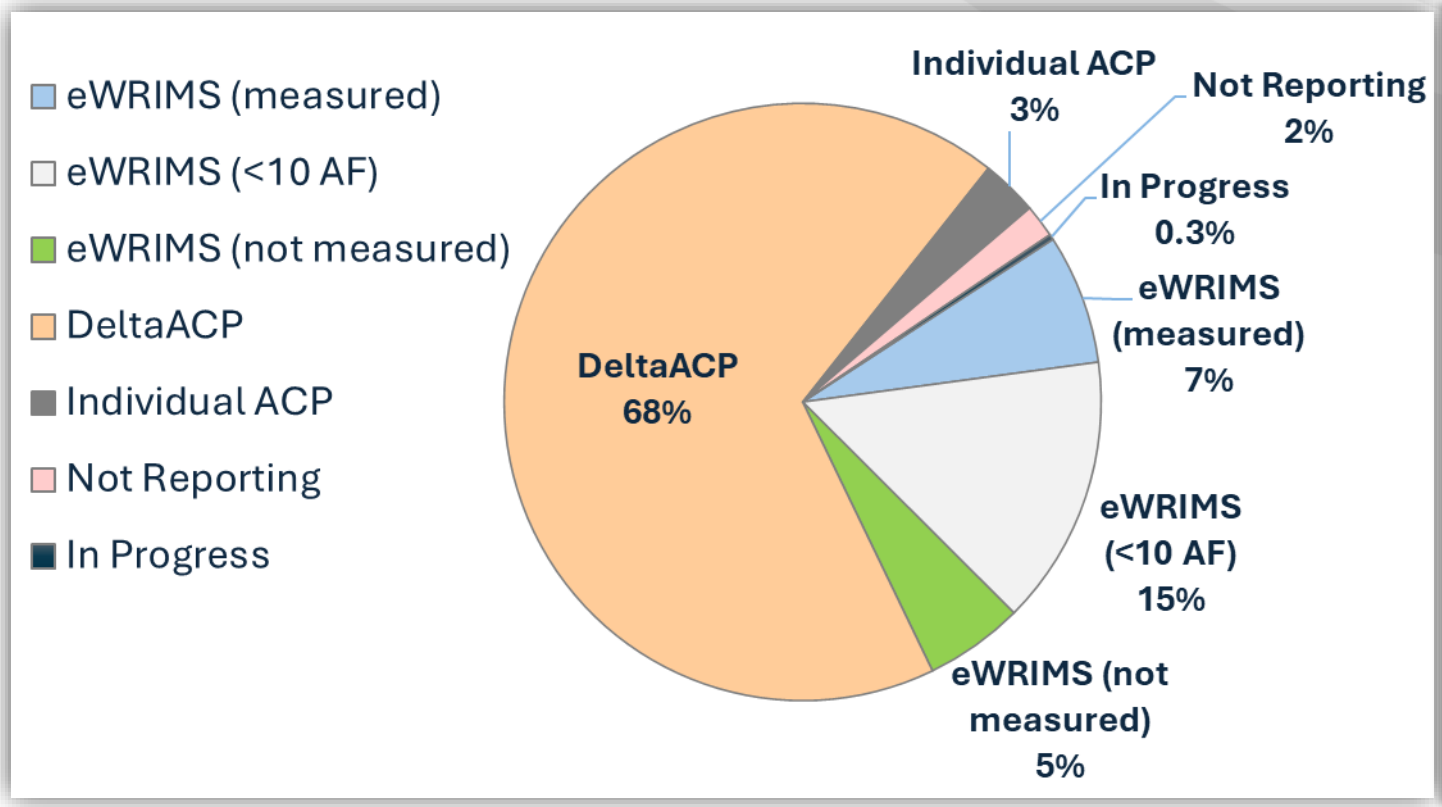
Delta Reporting Coverage

- Water right points of diversion linked to places of use (POUs)
- 268,000 acres, well over half of irrigated agriculture in Delta ACP
- Water rights agents essential to mapping POUs

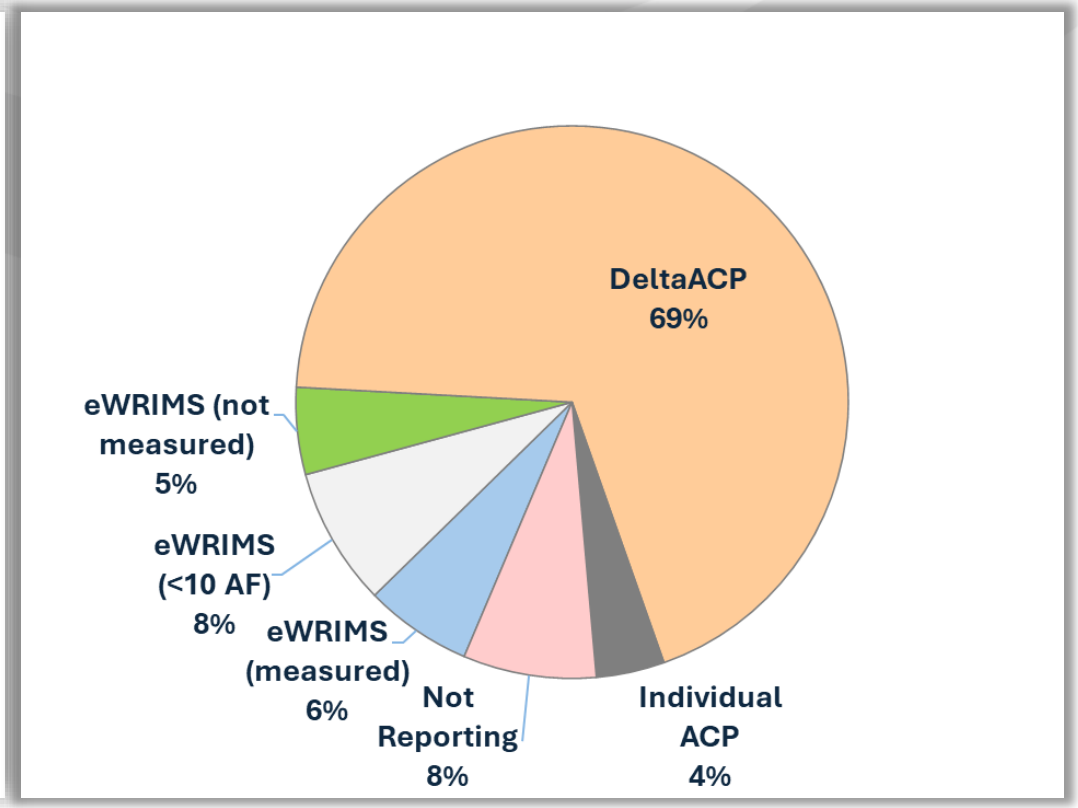


Water Rights Reporting Summary

Water Year 2023 (98%)



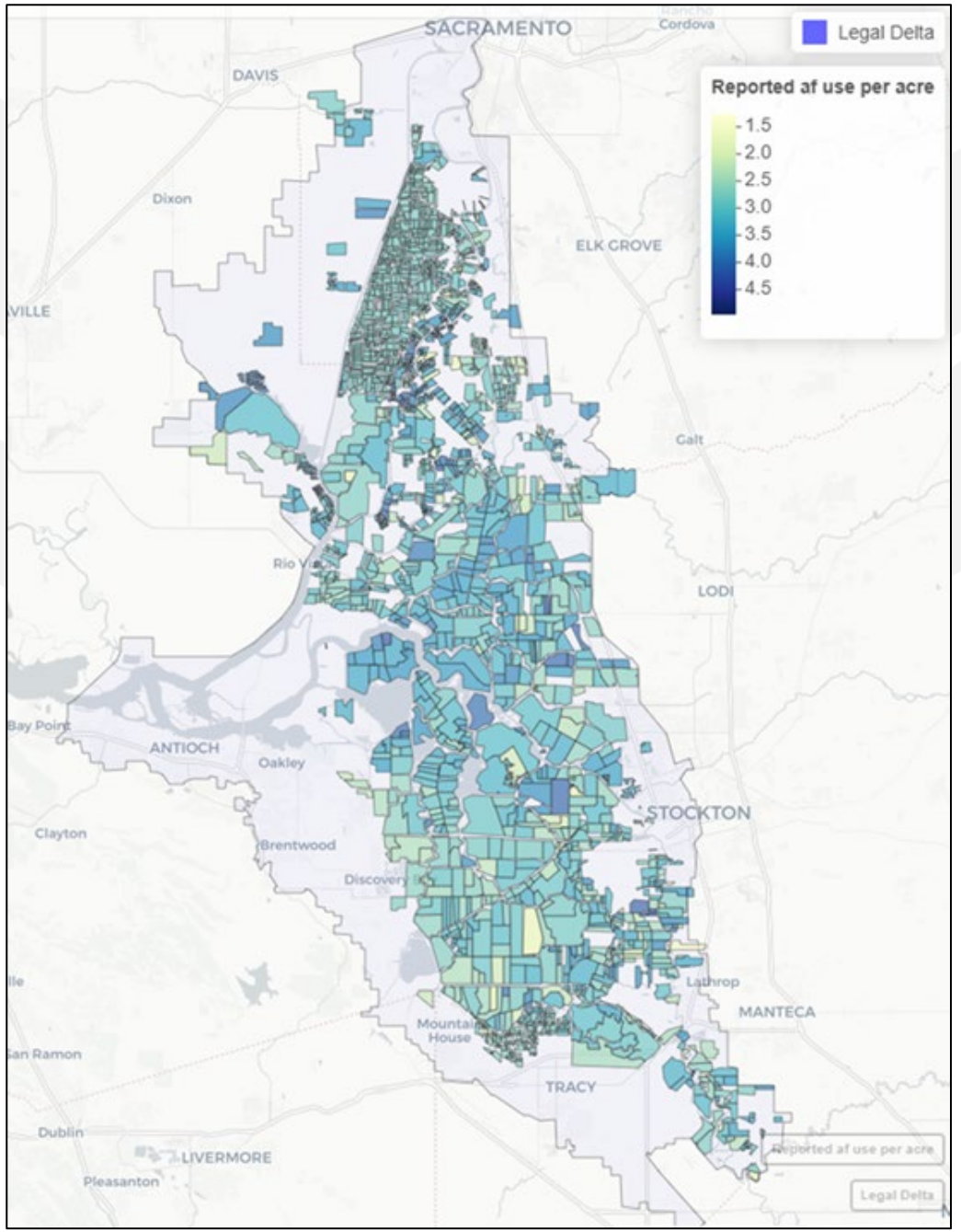
Water Year 2024 (92% to date)*



*Updated 5/8/2025

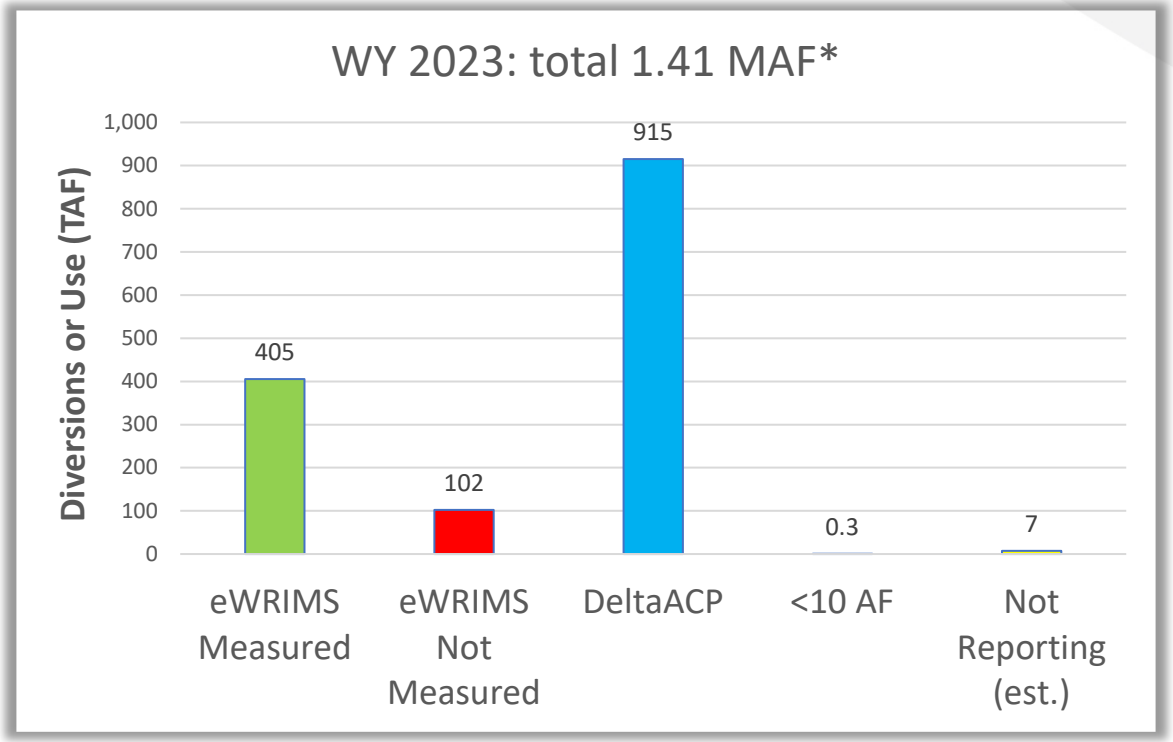
Legal Delta Summary Water Year 2024

- Combining eWRIMS RMS and DeltaACP / OpenET reports
- Total in-Delta use ~1.4 MAF
- Total export ~4.2 MAF
  - Includes upstream water rights
  - Water from Sacramento, Feather, Trinity, American, etc.

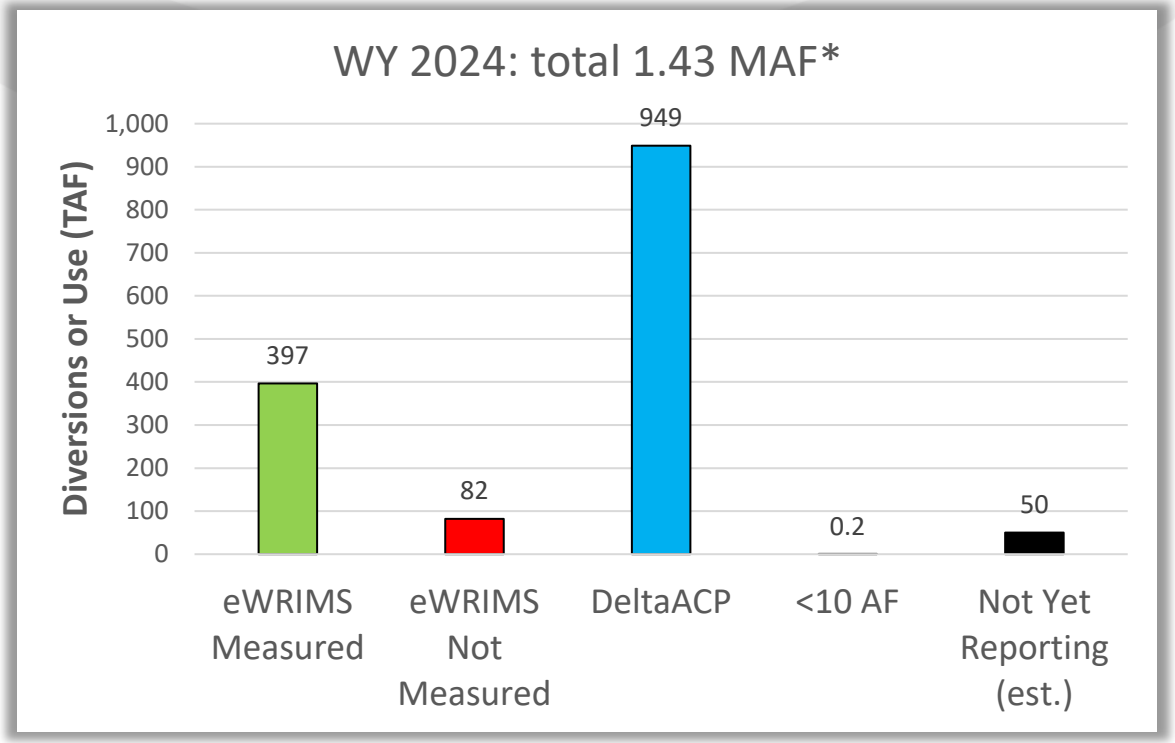


Reported Diversions / Consumptive Use Volumes within Legal Delta

In-Delta Diversions or Use, WY 2023



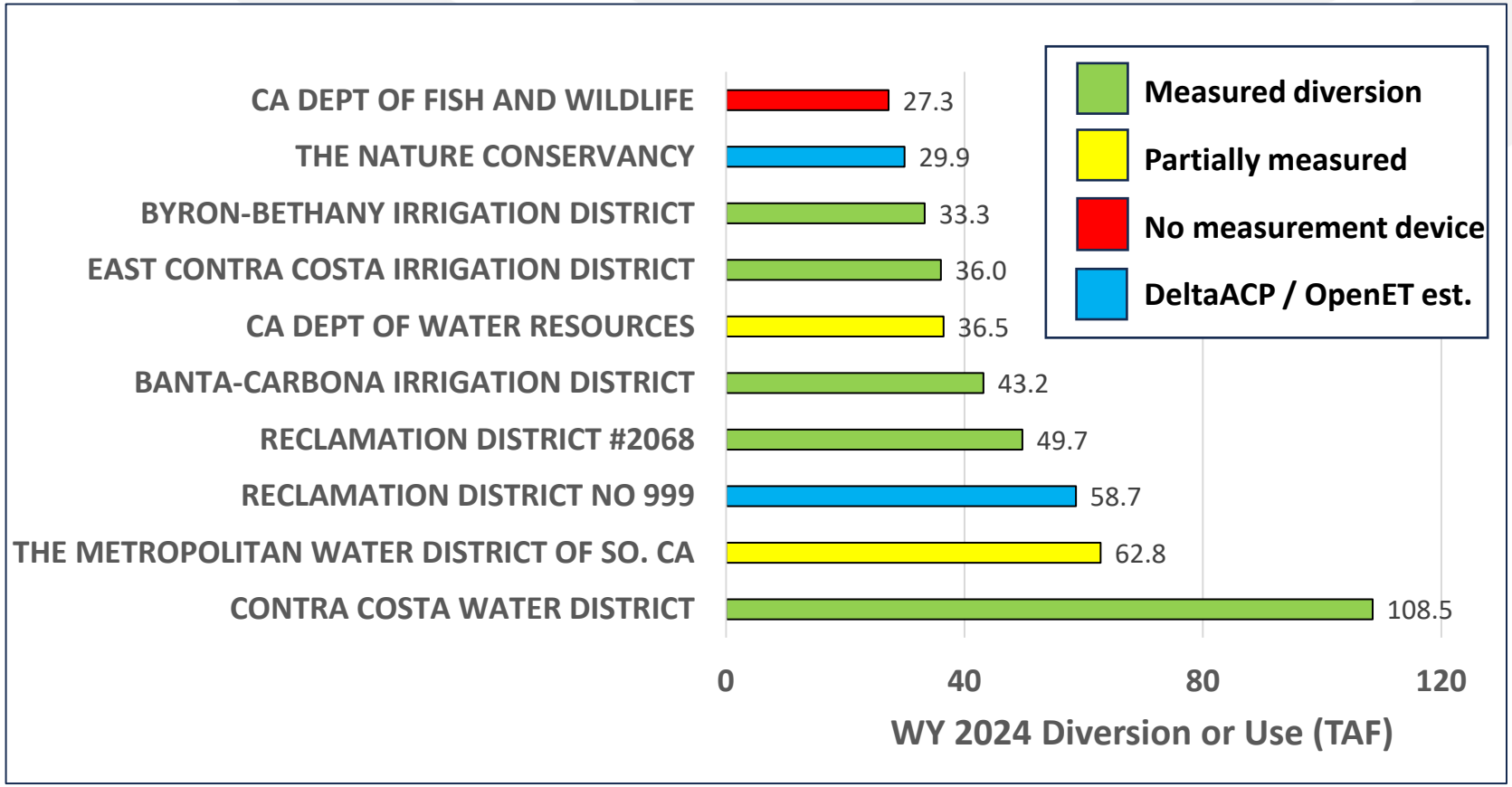
In-Delta Diversions or Use, WY 2024



**estimated Not-Reporting quantities not included in total*

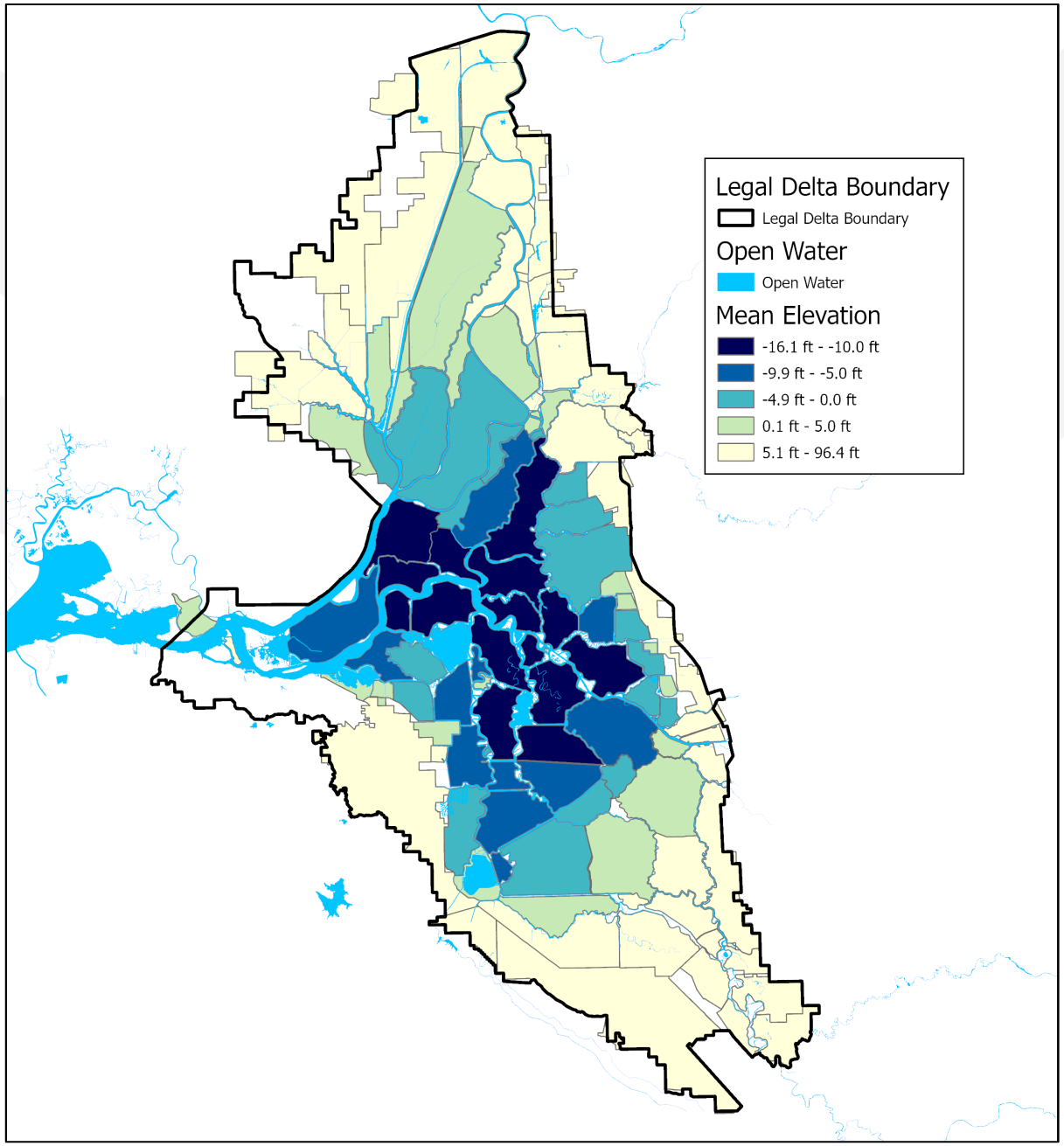
Top 10 In-Delta Water Users, WY 2024 (excludes exports)

- Top 10 users comprise 486 TAF
  (~1/3 of total)
- <u>Of the Top 10:</u>
  (by volume):
  Measured ~61%
  Unmeasured ~8%
  DeltaACP / OpenET ~31%

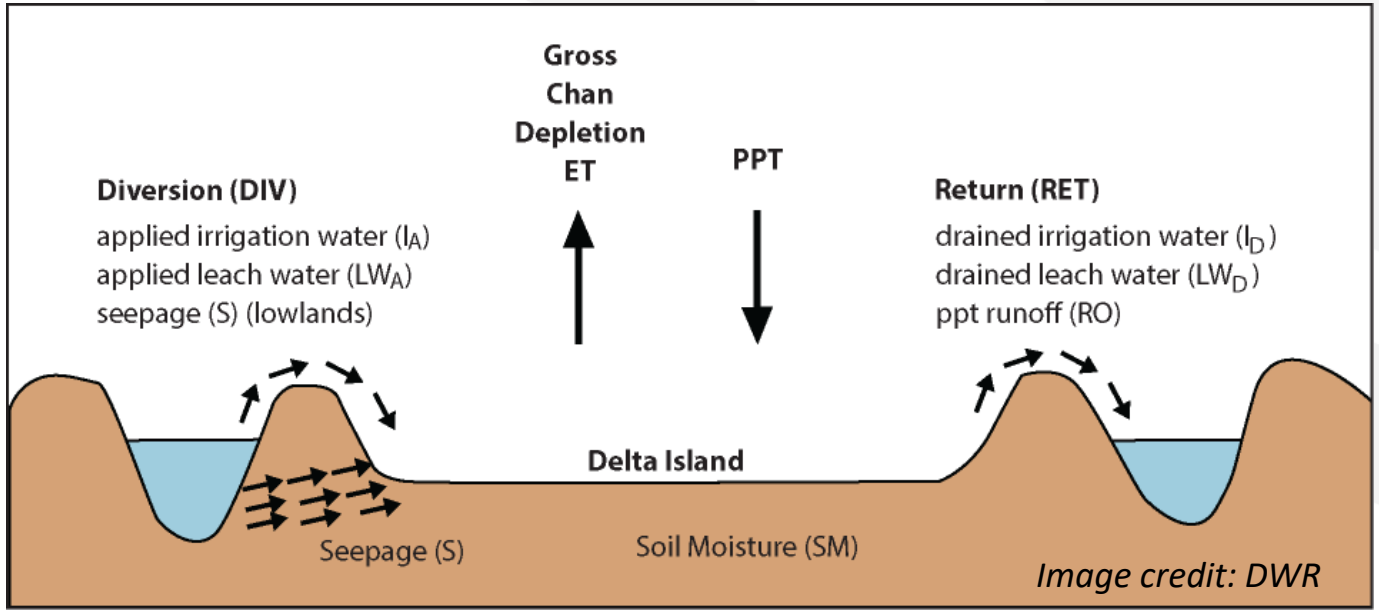


Delta Lowlands and Consumptive Use

- ***ET approximates diversion***
  - Excess on islands generally returned
  - Levee seepage supports crop use
  - Seasonal soil moisture trend
  - Annual totals good, but not timing
- ***Why is Delta water use critical?***
  - Water rights priority system
    - Drought risk
  - Operational / modeling assumptions
  - Delta outflow regulations
  - Water quality protection & circulation



Conceptual Island Water Balance

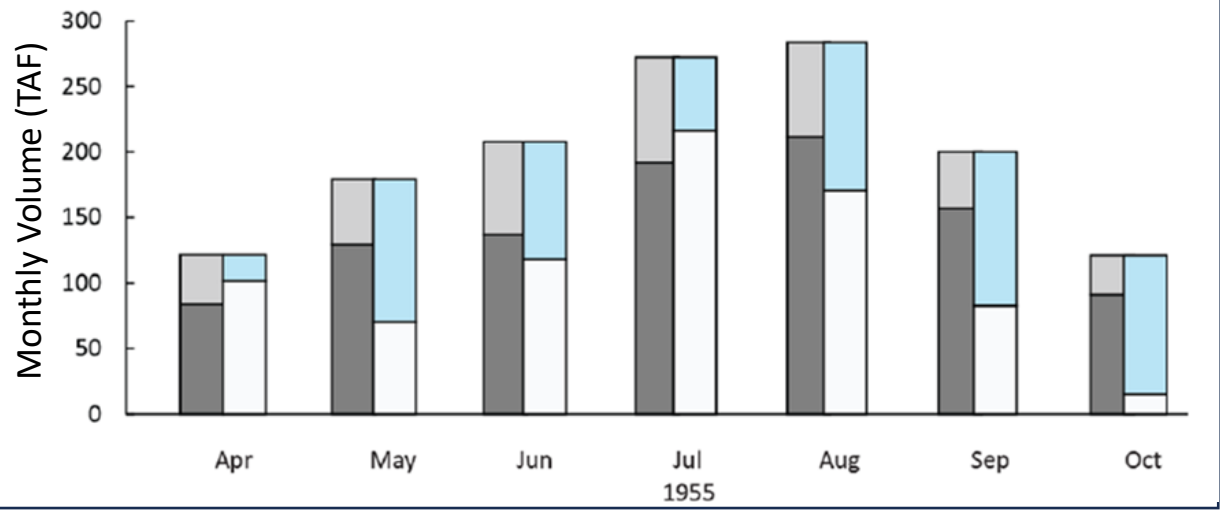


- Long-term:
  ET = Gross Channel Depletions (DAYFLOW approach)
- Shorter-term:
  ET = Diversions + Seepage + Precip. + ΔSoil Moisture – Returns

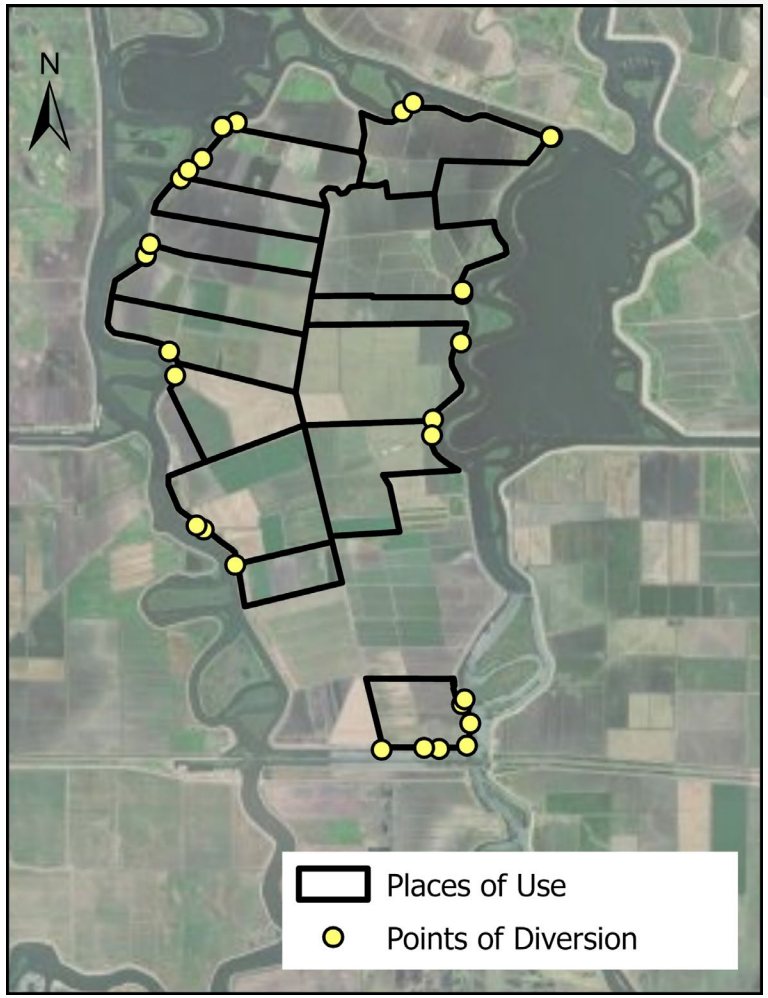
Water Supply and Disposal for Delta Lowlands Reported in DWR Report 4 (1956) (DWR 2016 *On Estimating Net Delta Outflow*)

sinks
- **Consumptive Use**
- **Drainage**

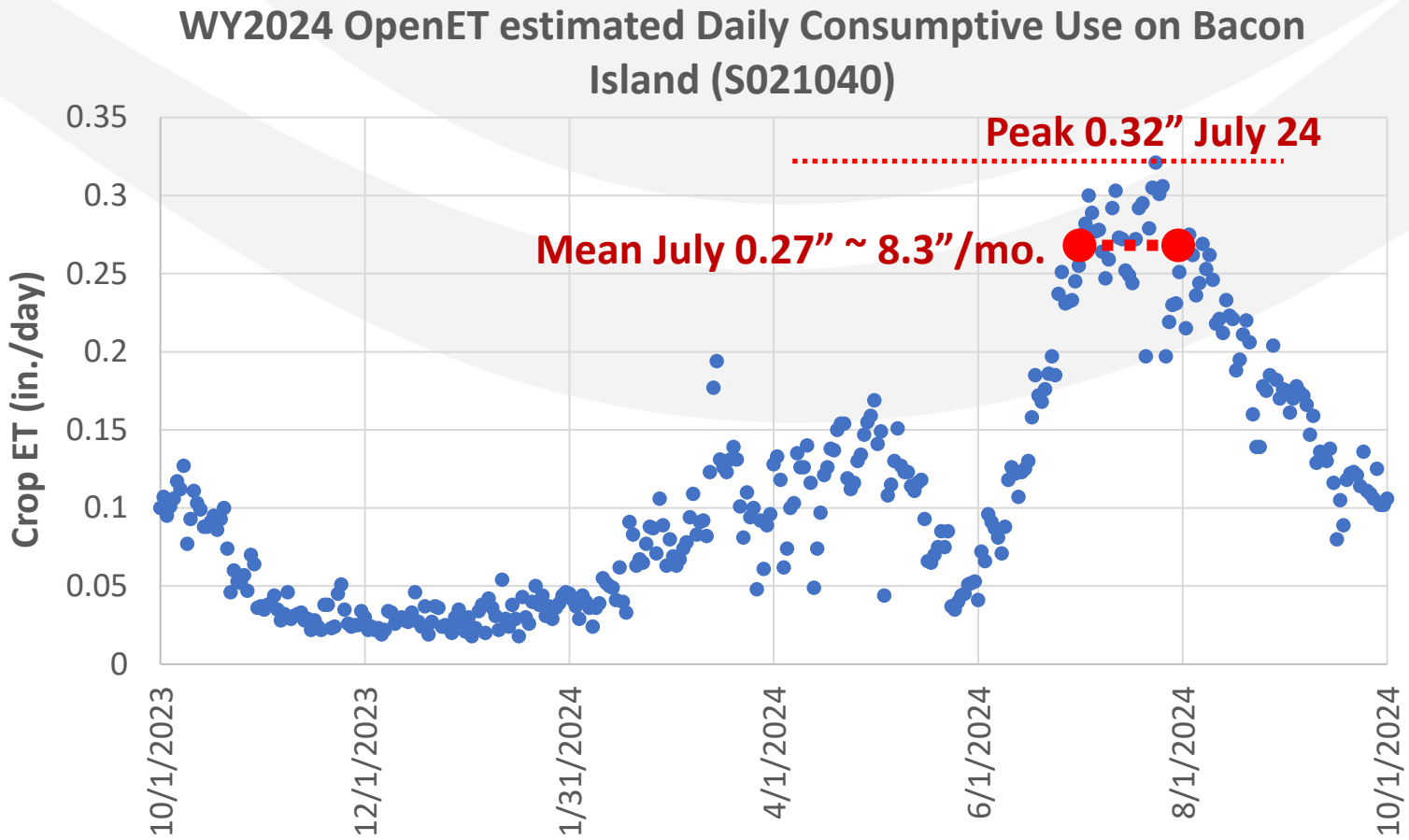
sources
- **Applied Water + Precip.**
- **Subsurface (Seepage + Groundwater)**



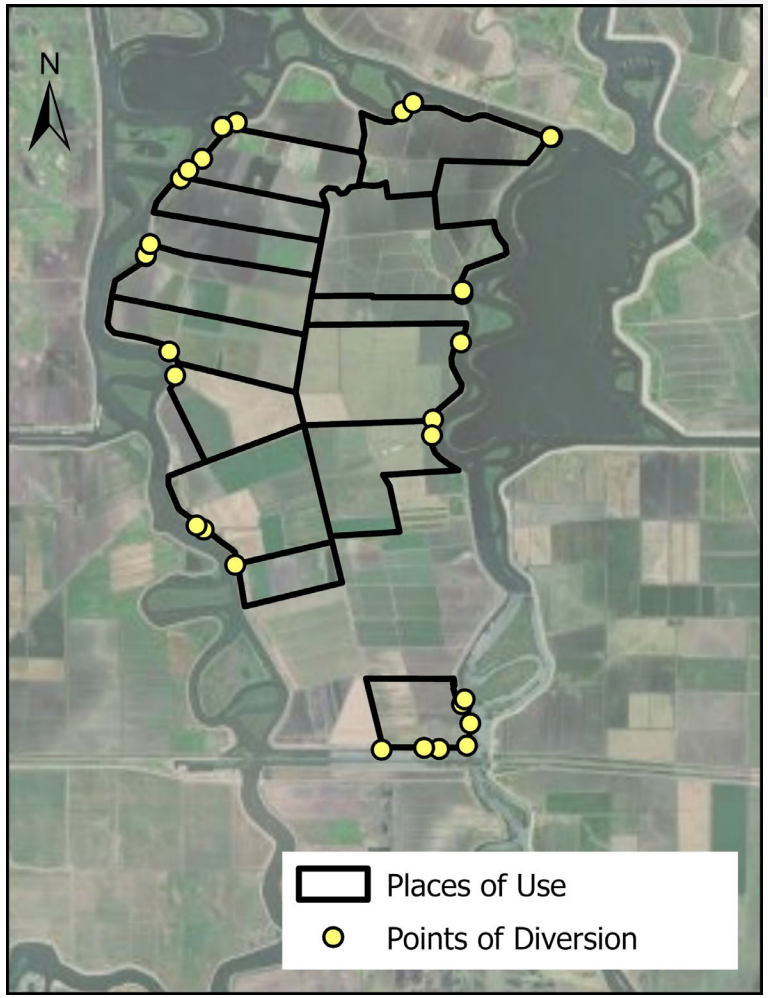
Daily OpenET Crop Consumptive Use



Selected POUs on Bacon Island (3,580 ac)



Diversion Measurement vs. OpenET Use



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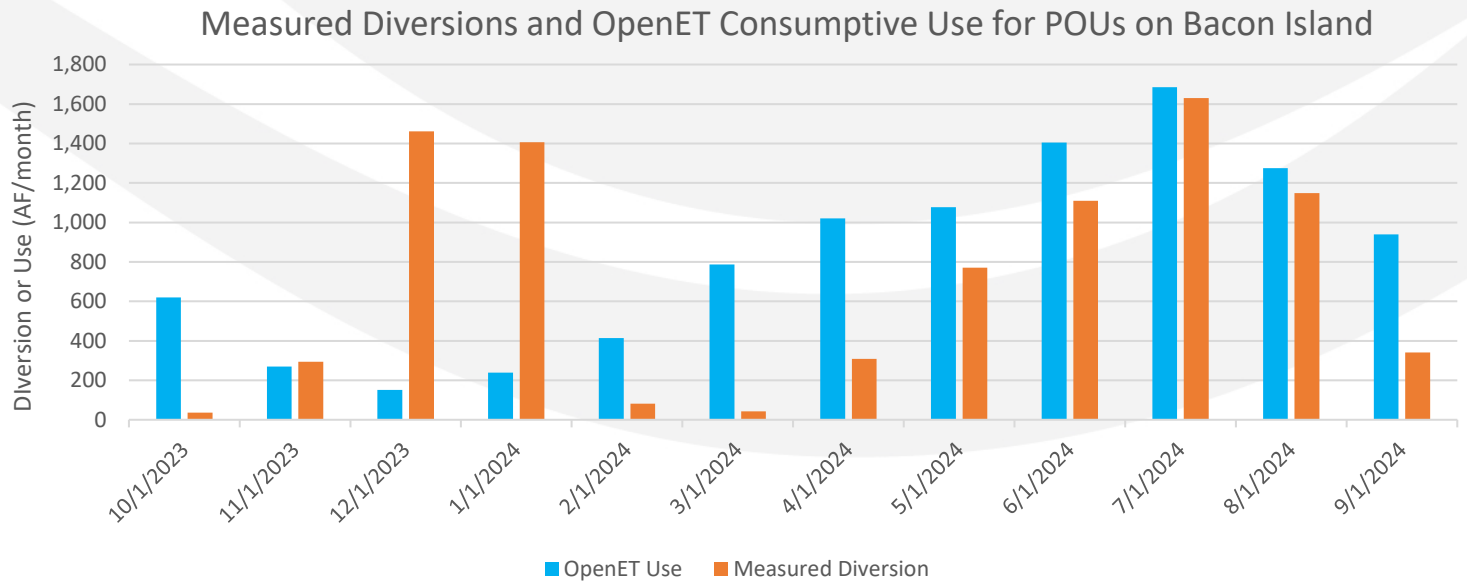
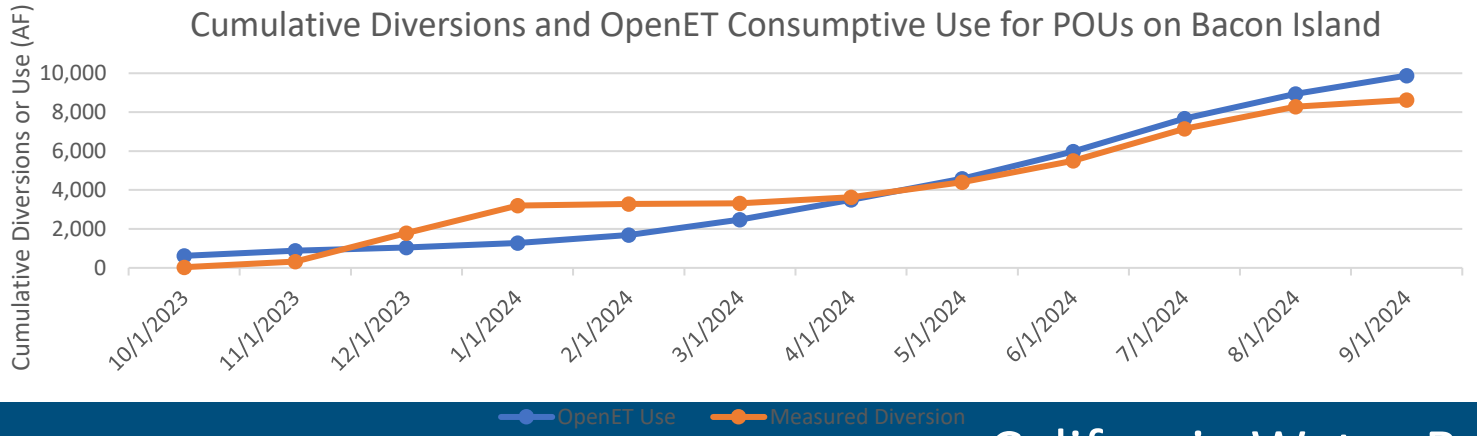




Delta Consumptive Use Estimate in DAYFLOW (1978) Determines NDOI

- Decision 1641 Net Delta Outflow Index (NDOI)

Figure 3
NDOI and PERCENT INFLOW DIVERTED [1]

The NDOI and the percent inflow diverted, as described in this footnote, shall be computed daily by the DWR and the USBR using the following formulas (all flows are in cfs):

$$NDOI = DELTA\ INFLOW - NET\ DELTA\ CONSUMPTIVE\ USE - DELTA\ EXPORTS$$

$$PERCENT\ INFLOW\ DIVERTED = (CCF + TPP) \div DELTA\ INFLOW$$

where $DELTA\ INFLOW = SAC + SRTP + YOLO + EAST + MISC + SJR$

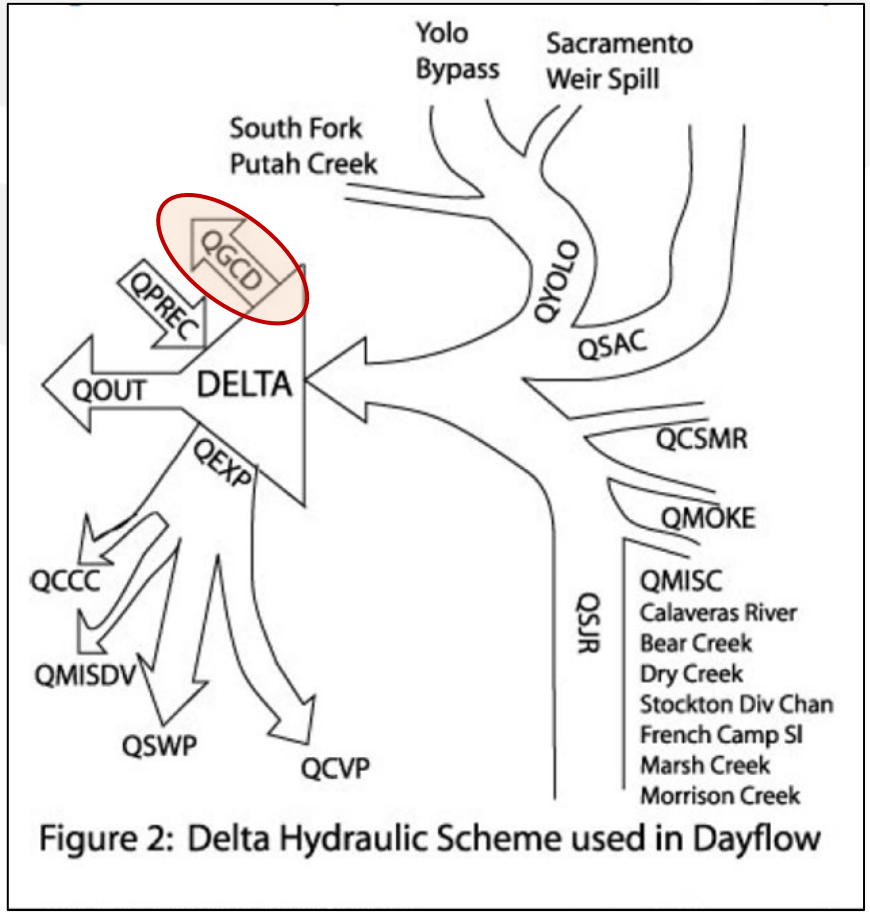
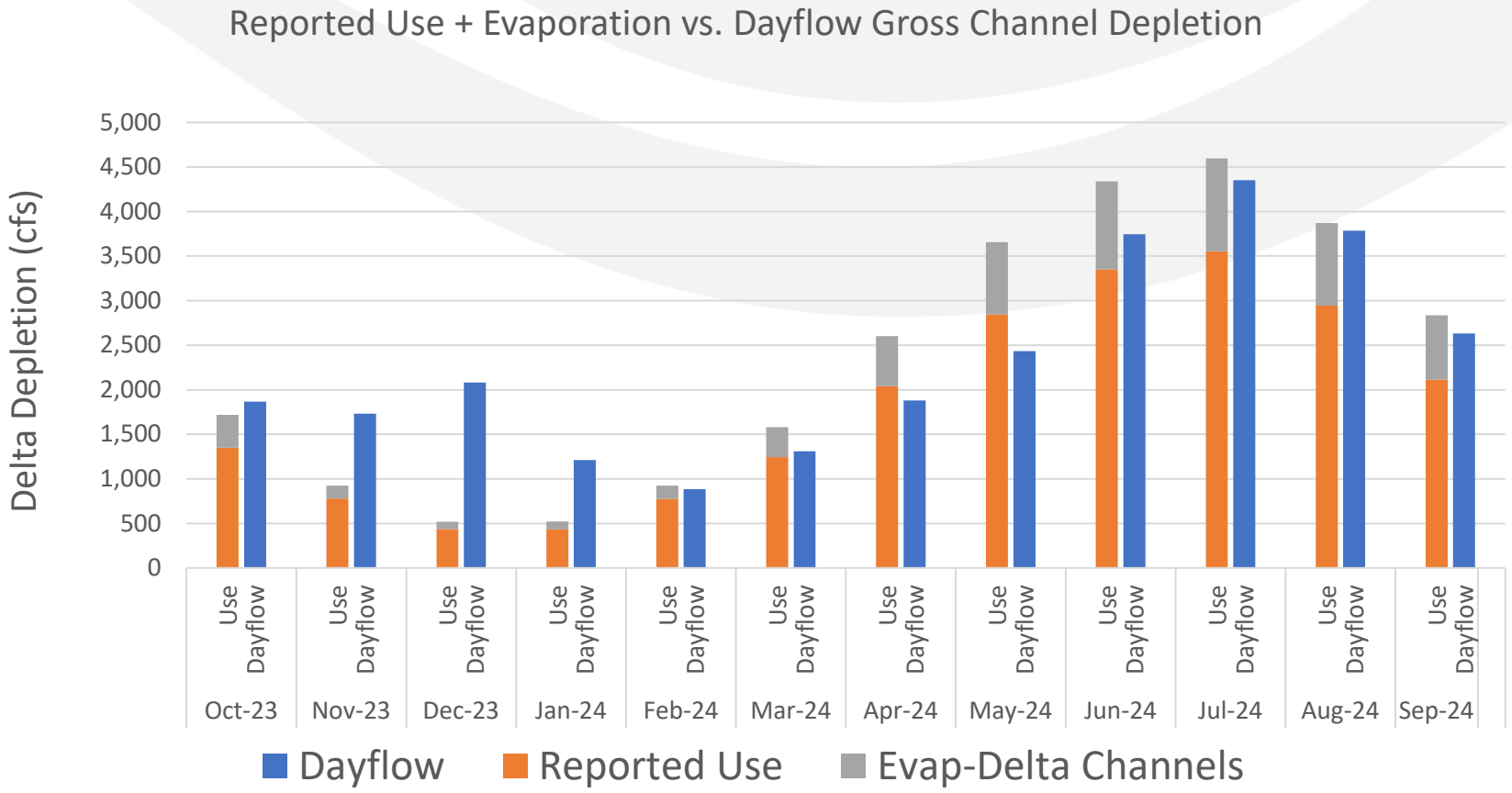


Figure 2: Delta Hydraulic Scheme used in Dayflow

Reported Use vs. DAYFLOW estimates

- With channel evaporation, modern estimates of Delta consumptive use can exceed DAYFLOW estimates
- Implications for model assumptions and operations



Future Directions

- Refresh inventory of diversion capacity and return flow pumping
- More diversion measurement vs. OpenET & eddy covariance data
- DMEC measurement pilot projects and water balance studies
- Anticipate potential collab with DWR DETAW / Delta Channel Depletion group