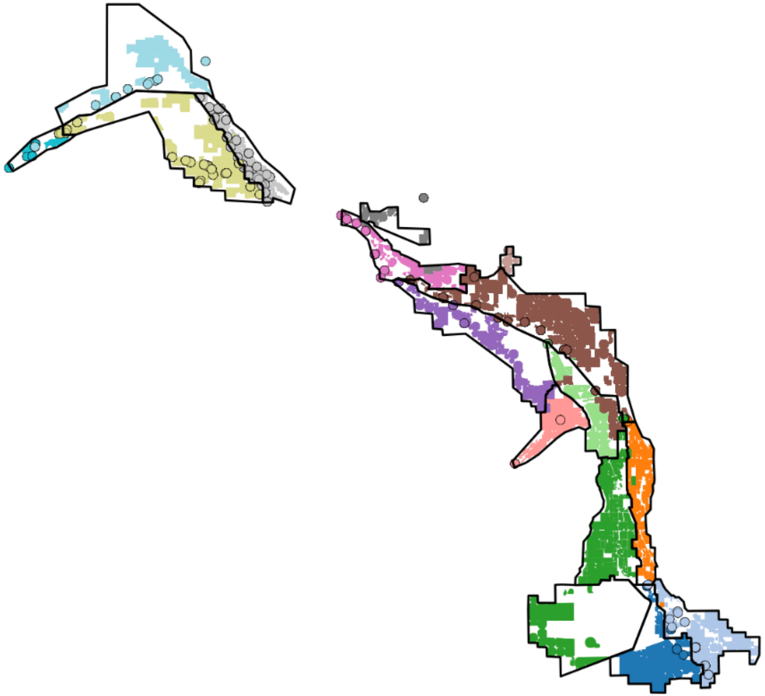

BLRM Scenarios Framework

MTAC #7 Status Update
2025.02.19

BLRM Scenario Framework Discussion

- **Revisit Service Area Calculator**
- Inputs and outputs
- Assumptions and limitations
- **Hypothetical pumping and canal lining scenarios**
- Inputs and outputs
- Assumptions and limitations

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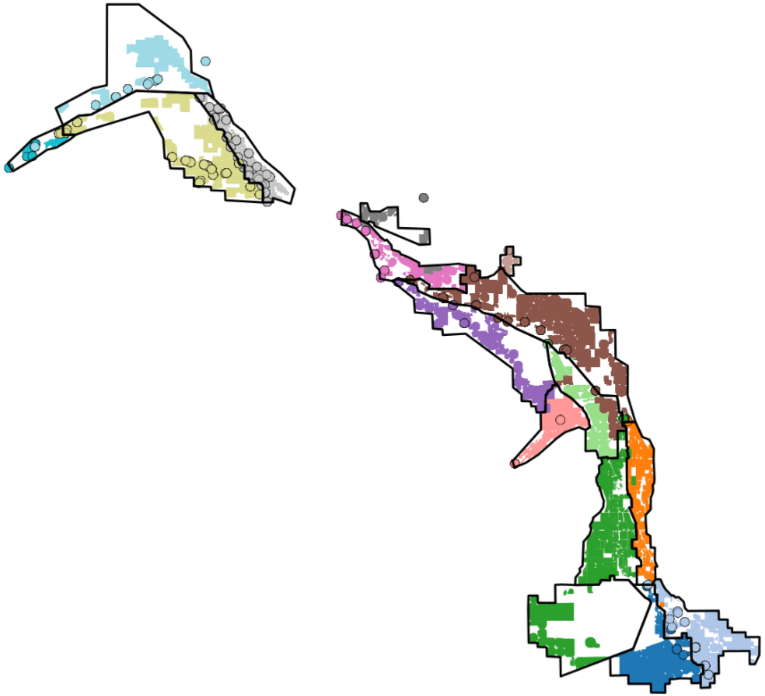

Service Area Calculator checkup

MTAC #7 Status Update
2024.05.15

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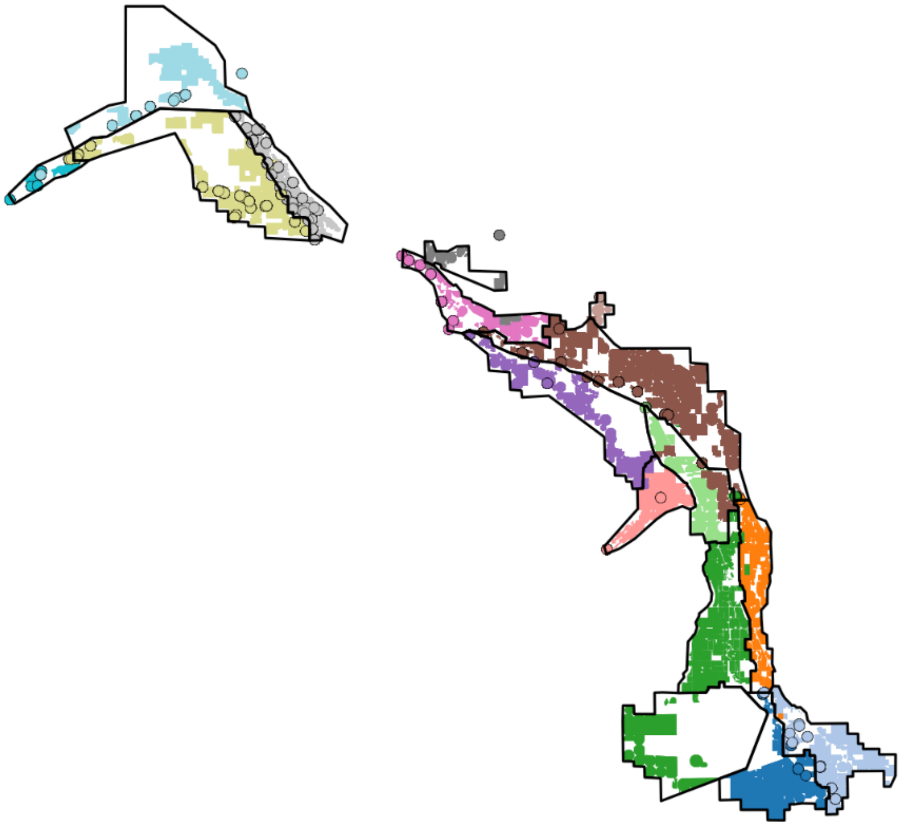
Service Area Calculator Discussion

- Purpose and scope
- Service areas defined
- Inputs and outputs
- Request for stakeholder feedback



Purpose and Scope

- Agriculture is a major component of the groundwater budget, but we do not have the data or computational ability to simulate individual fields
- By combining irrigated lands into groups, we can make reasonable calculations of supply and demand based on available data
- Supply and demand calculations are performed before running the groundwater model simulation. The results of the calculator are “hard wired” into the simulation.

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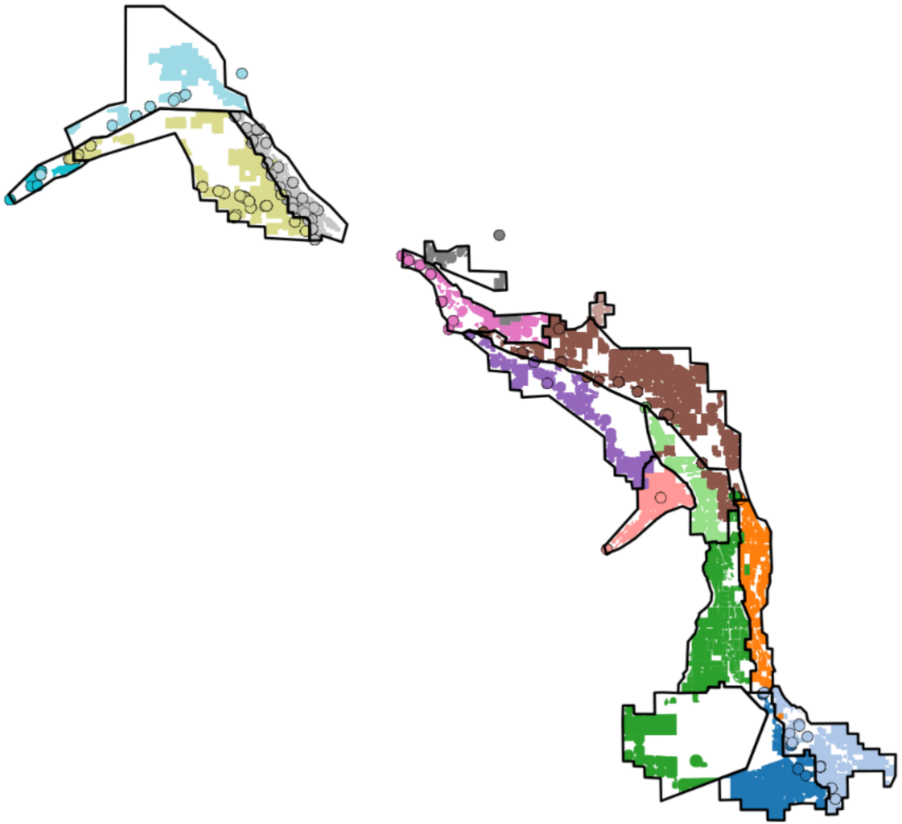

Service Areas Defined

- Service areas are artificial groupings of irrigated lands, used to simulate spatially-averaged fluxes into and out of the groundwater system
- BLRM service areas were identified as areas containing clustered or overlapping Points of Use (POU) polygons that are all linked to one or more surface water Point of Diversion (POD).
- Demand and supply is calculated for each service area individually. Shortages or excesses of water are not spread over multiple service areas
- Calculations are performed for each month Apr-Oct, 2003-2022

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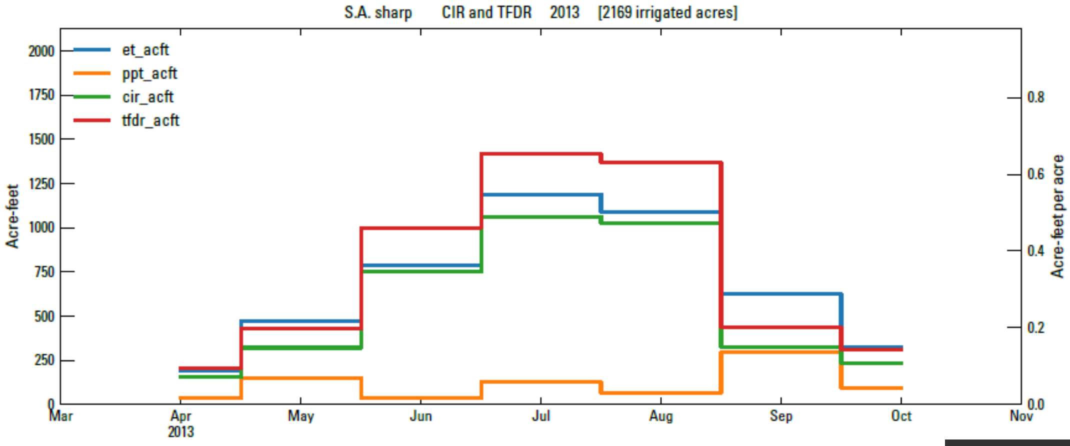
Calculator inputs



- IDWR Irrigated Lands shapefiles are used to mask out non-irrigated land each year of the simulation
- METRIC ET gridded monthly data is used to calculate average ET rates for the irrigated lands in each service area
- WD34 diversion data for the POD(s) of each service area is used to calculate monthly supply of surface water.
- PRISM gridded monthly precipitation data is used to calculate average rainfall on irrigated lands

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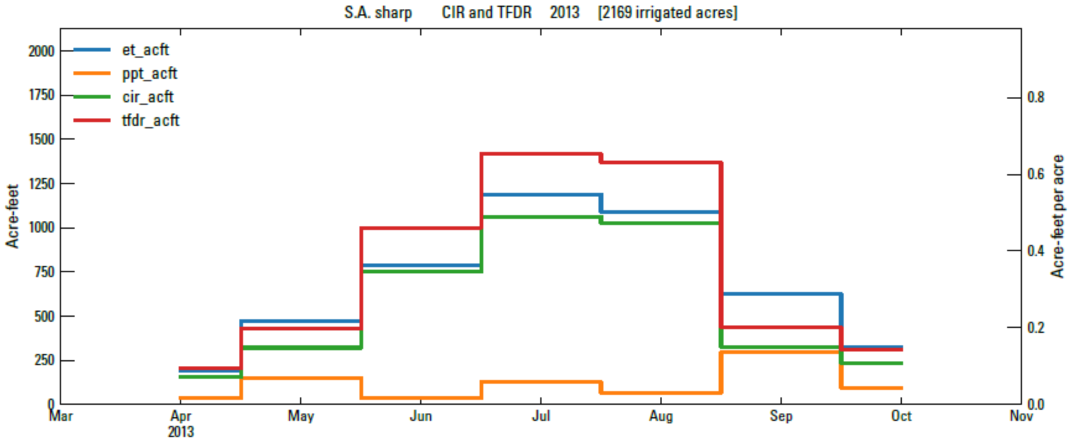
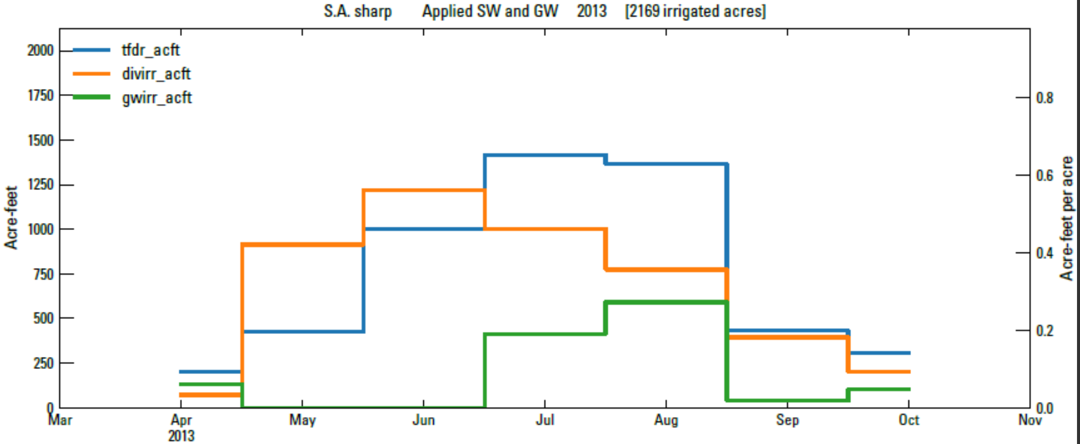
Calculator outputs





- ET demand is reduced by precip, then increased by a factor to account for on-farm irrigation efficiency
- Resulting Total Farm Delivery Requirement (TFDR) is satisfied by available surface water diversions **and supplemented as needed with groundwater pumping**
- Surface water and groundwater deliveries **are reduced by a canal loss factor** before being applied to satisfy TFDR

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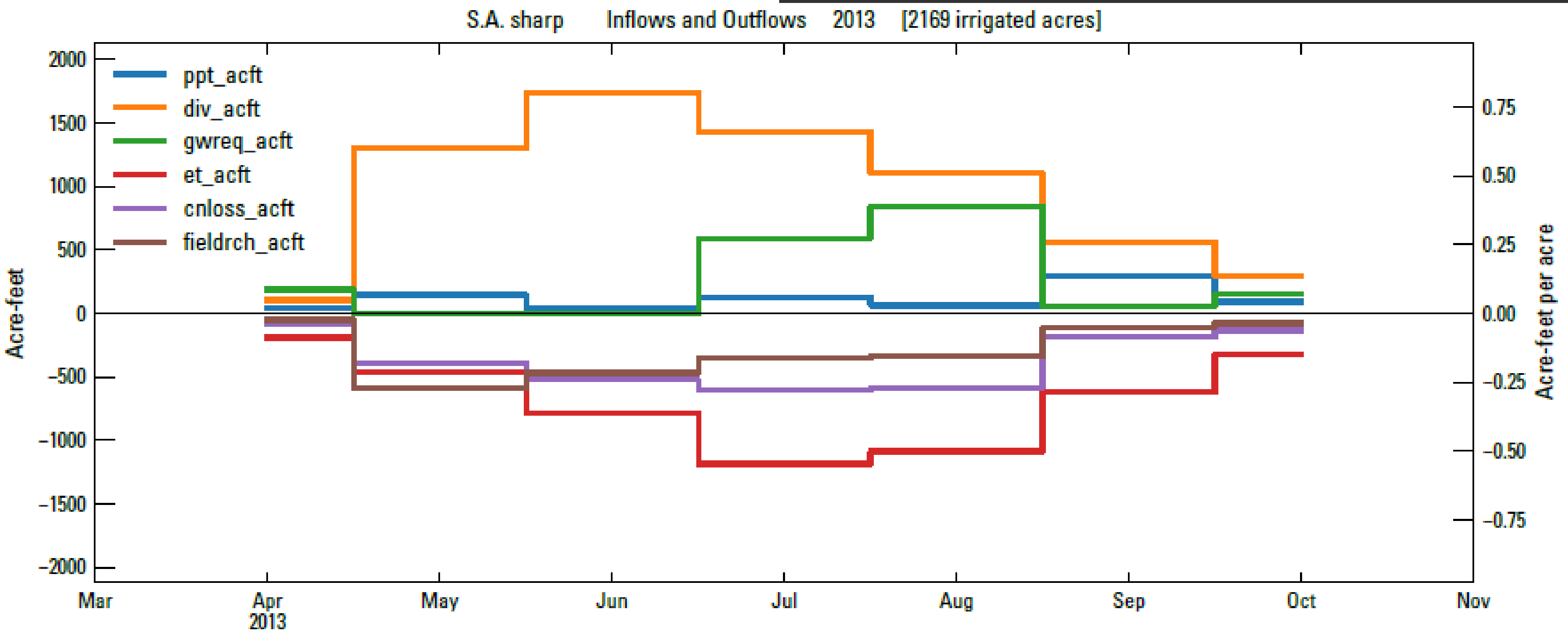
Calculator outputs



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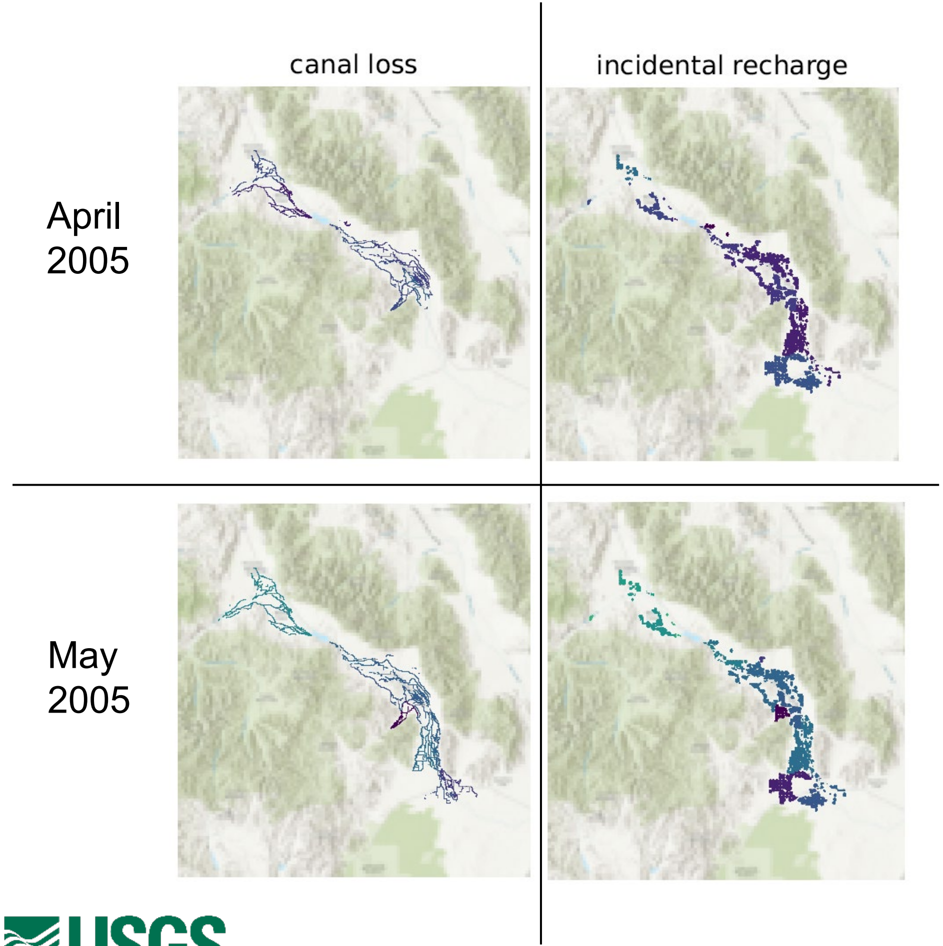
Calculator outputs



- Canal losses are applied evenly among model cells crossed by canals
- Incidental recharge is applied evenly among model cells underlying irrigated lands
- Supplemental pumping is extracted from model cells containing wells linked to POU in the service area

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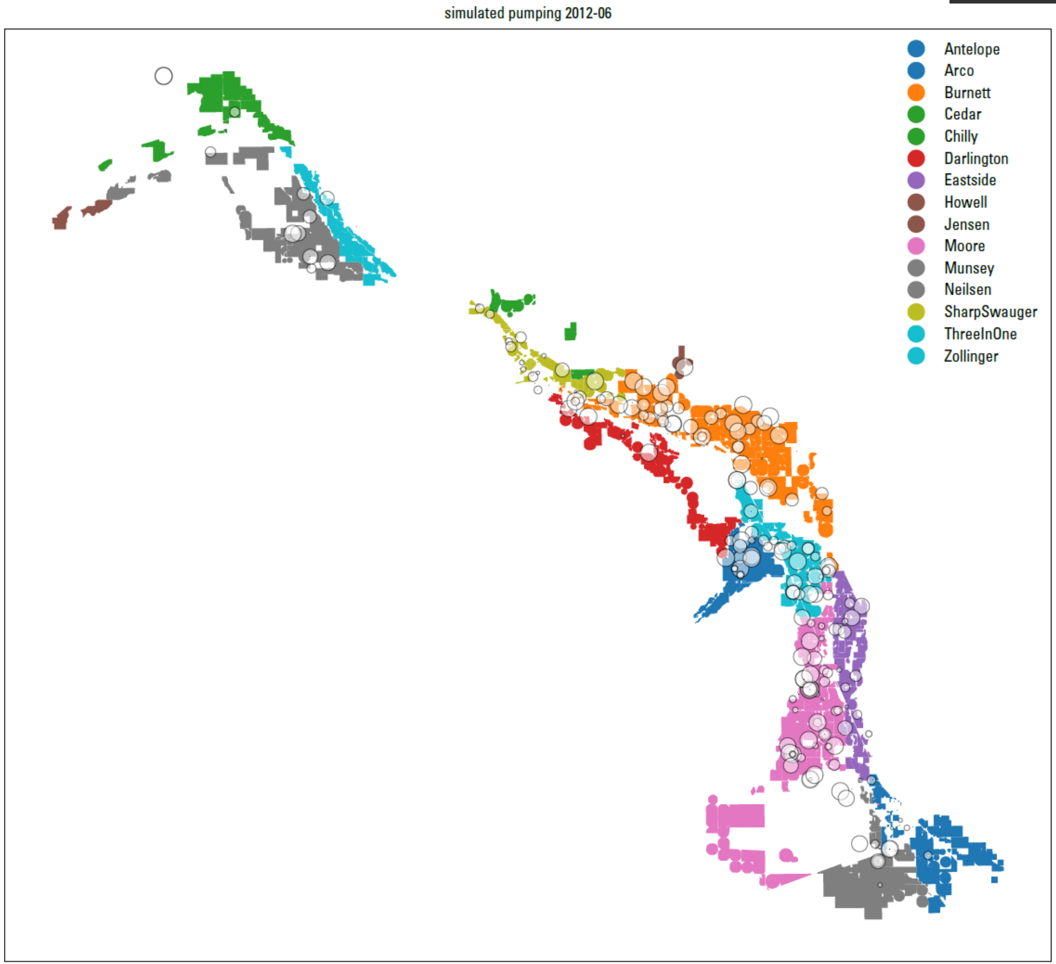

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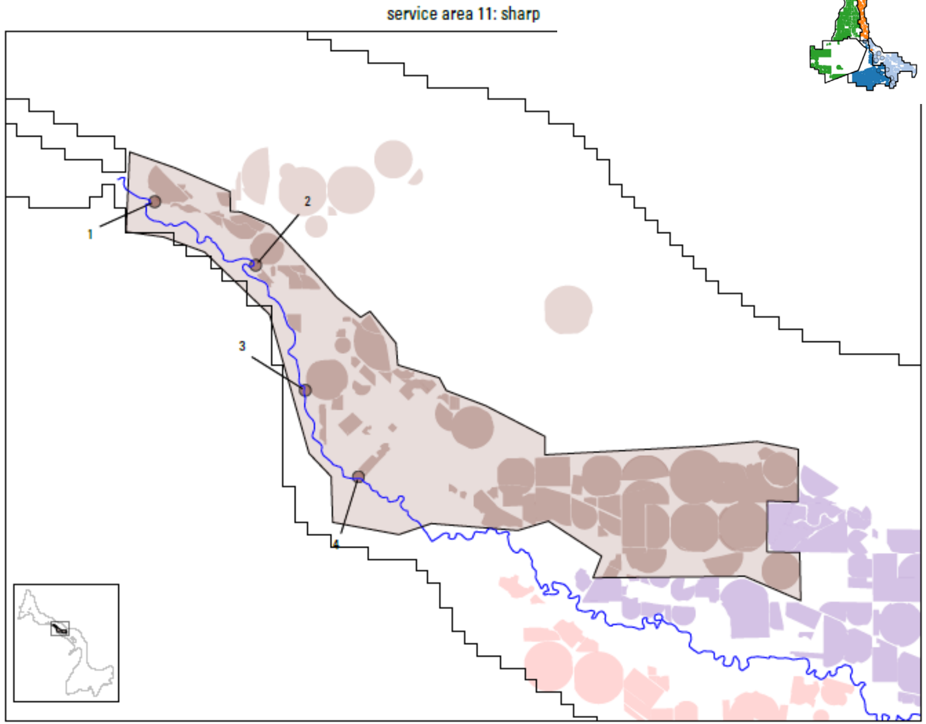
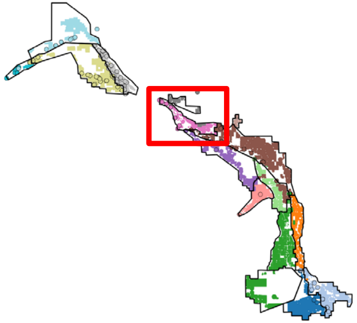
Calculator outputs

- Supplemental pumping is extracted from model cells containing wells linked to POU in the service area

Hypothetical Scenarios Discussion

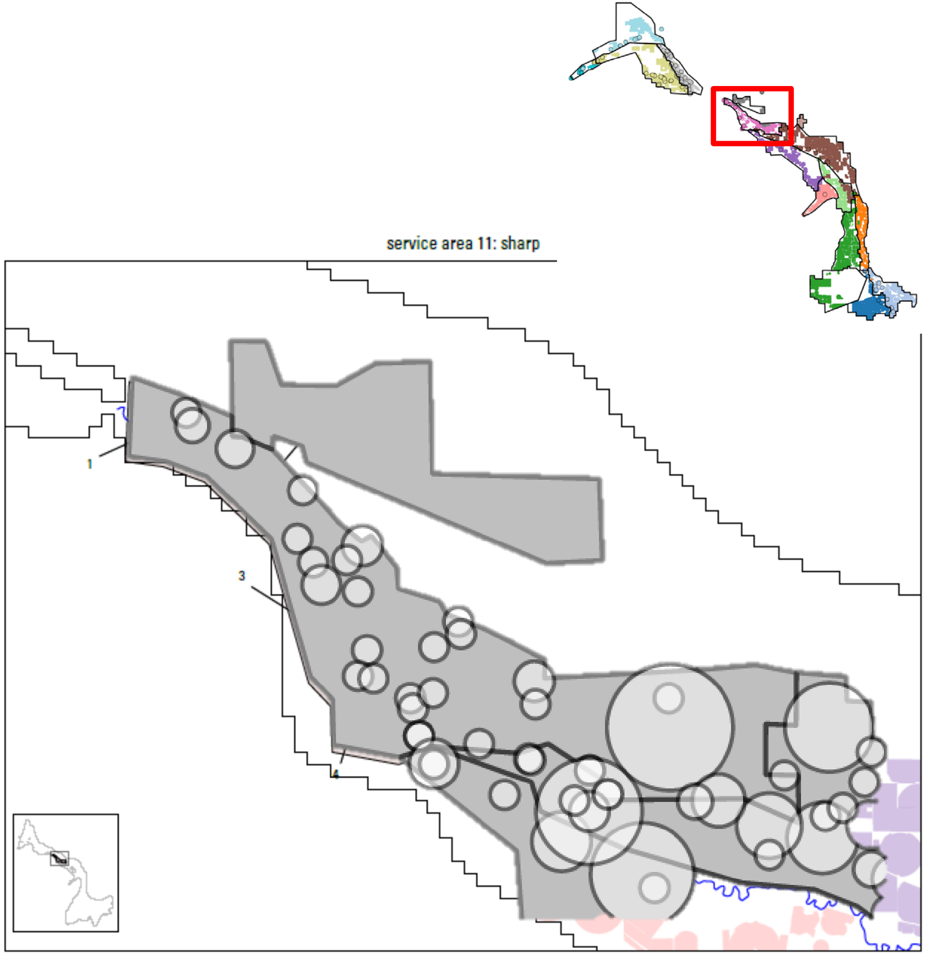
- Pumping scenario and Canal loss scenario
- Modification of Service Area Calculator
- Assumptions and Limitations





Example:

- Sharp/Swauger service area
- Historical scenario
- No pumping scenario
- No canal loss scenario



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Example:

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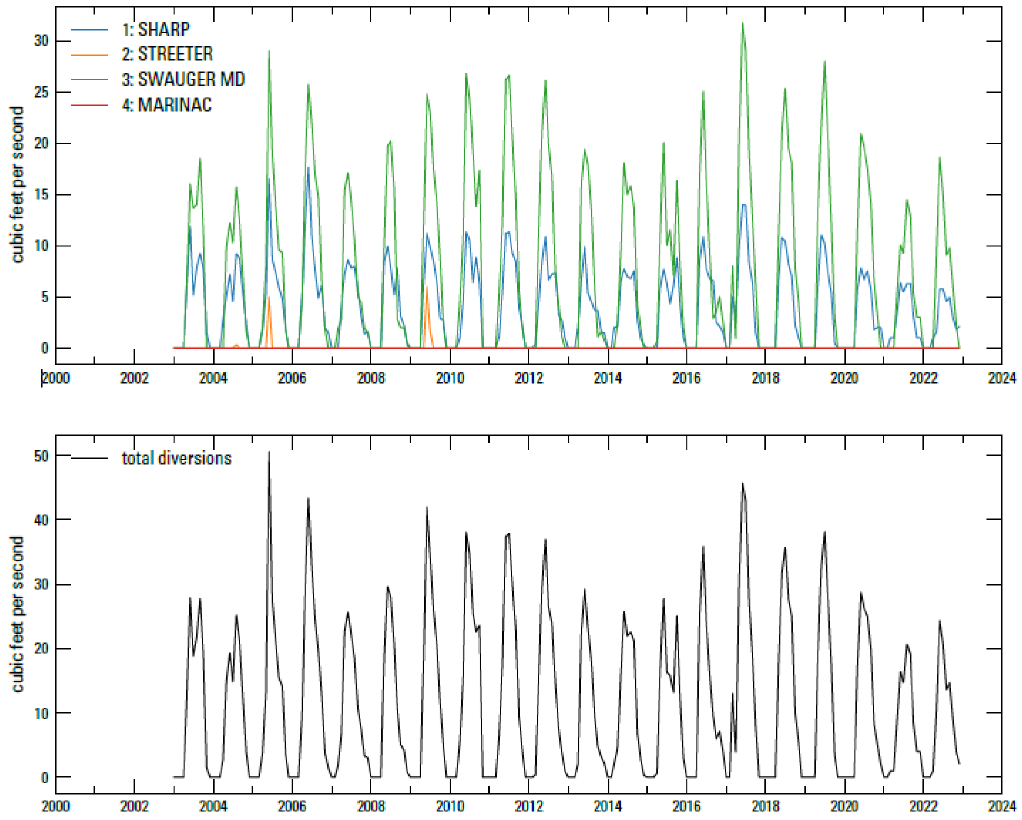

Example:

- Sharp/Swauger service area
- Historical scenario
- No pumping scenario
- No canal loss scenario

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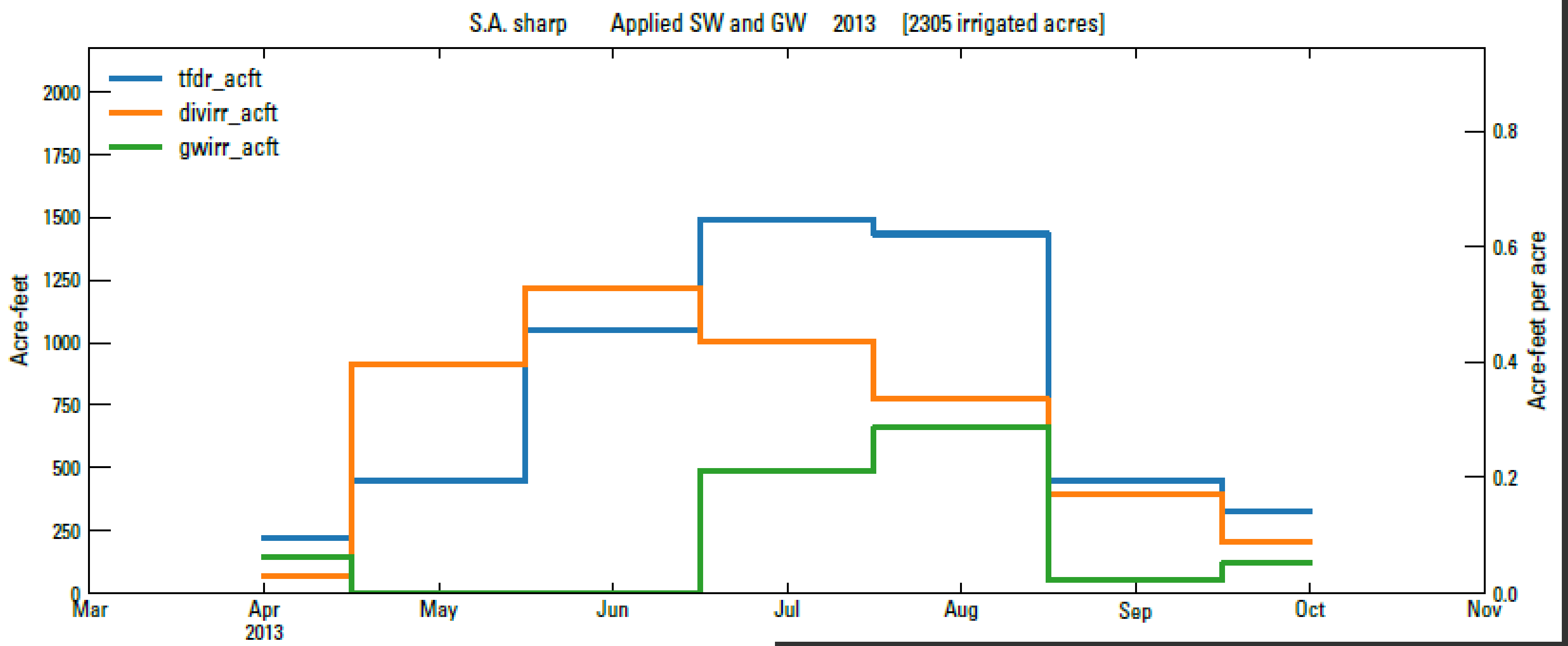
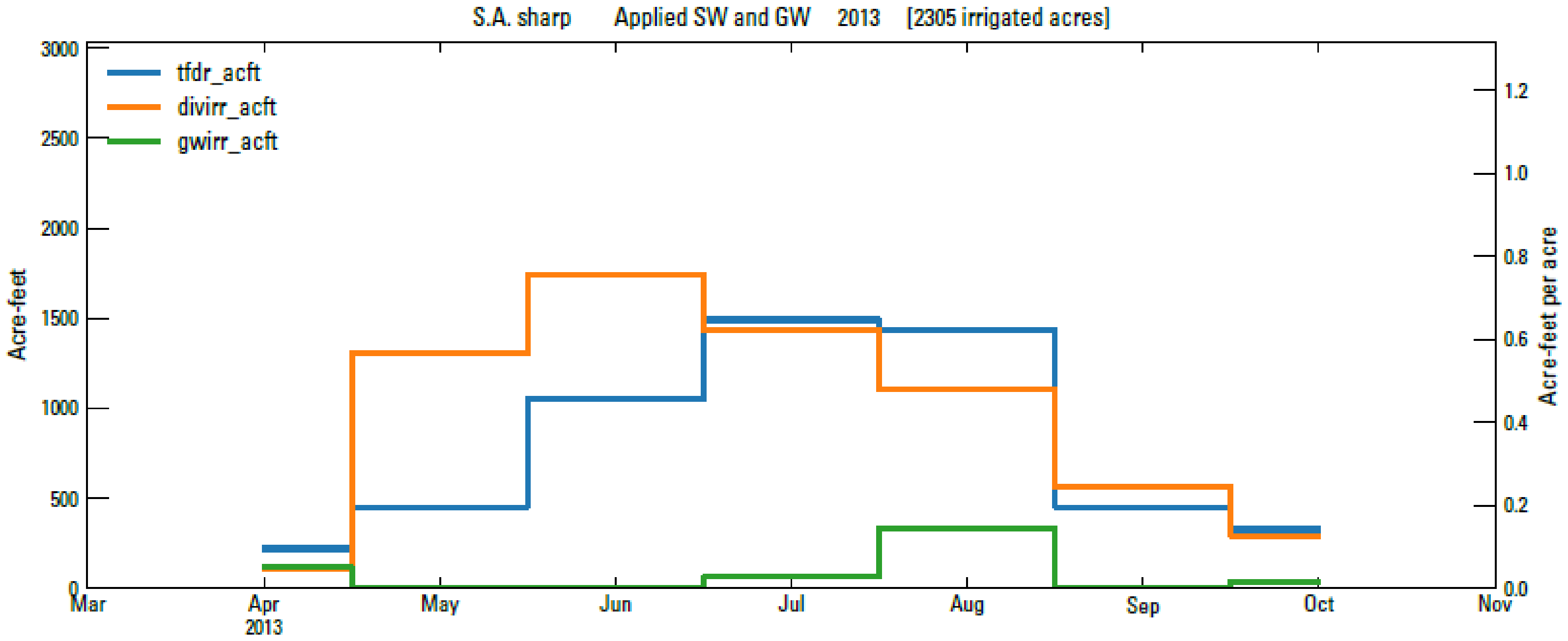
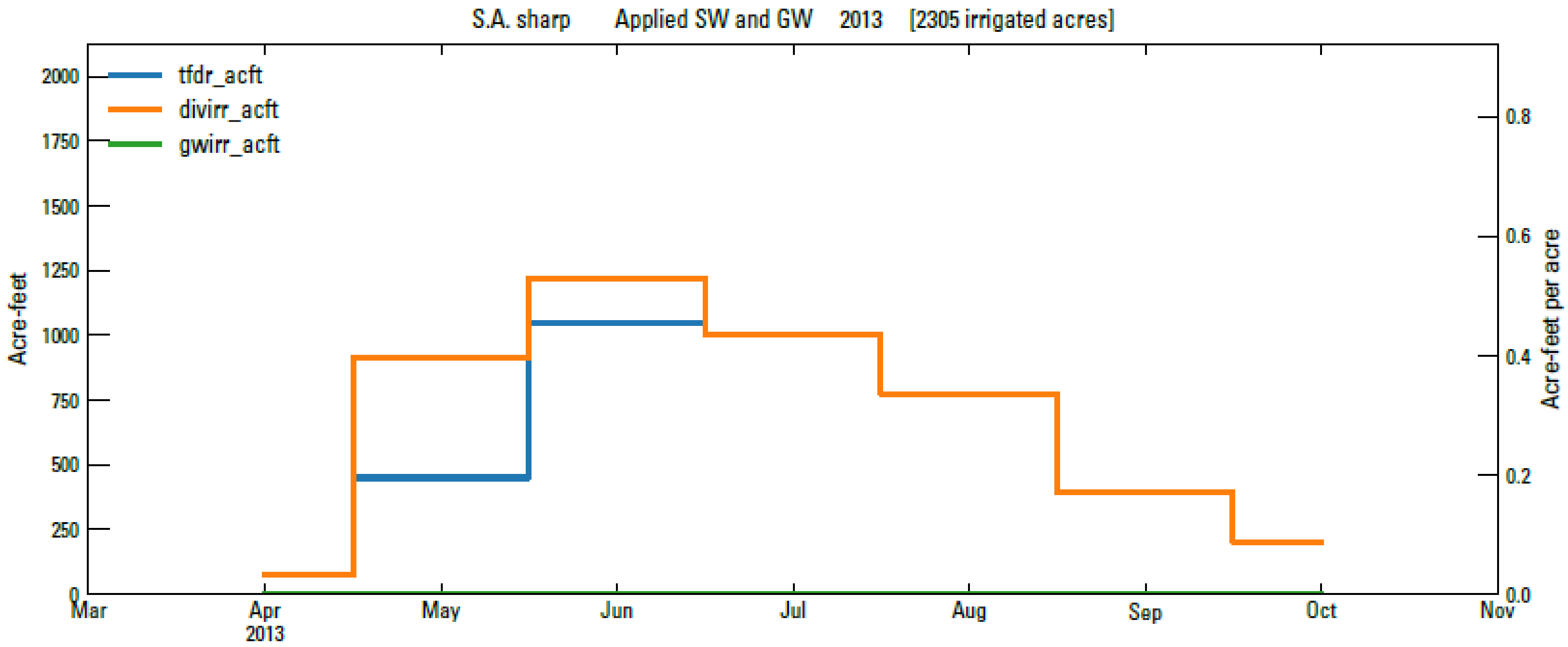
Calculator inputs Historical (monthly)



Calculator inputs
No Canal Loss (monthly)



Calculator inputs
No GW Pumping (monthly)



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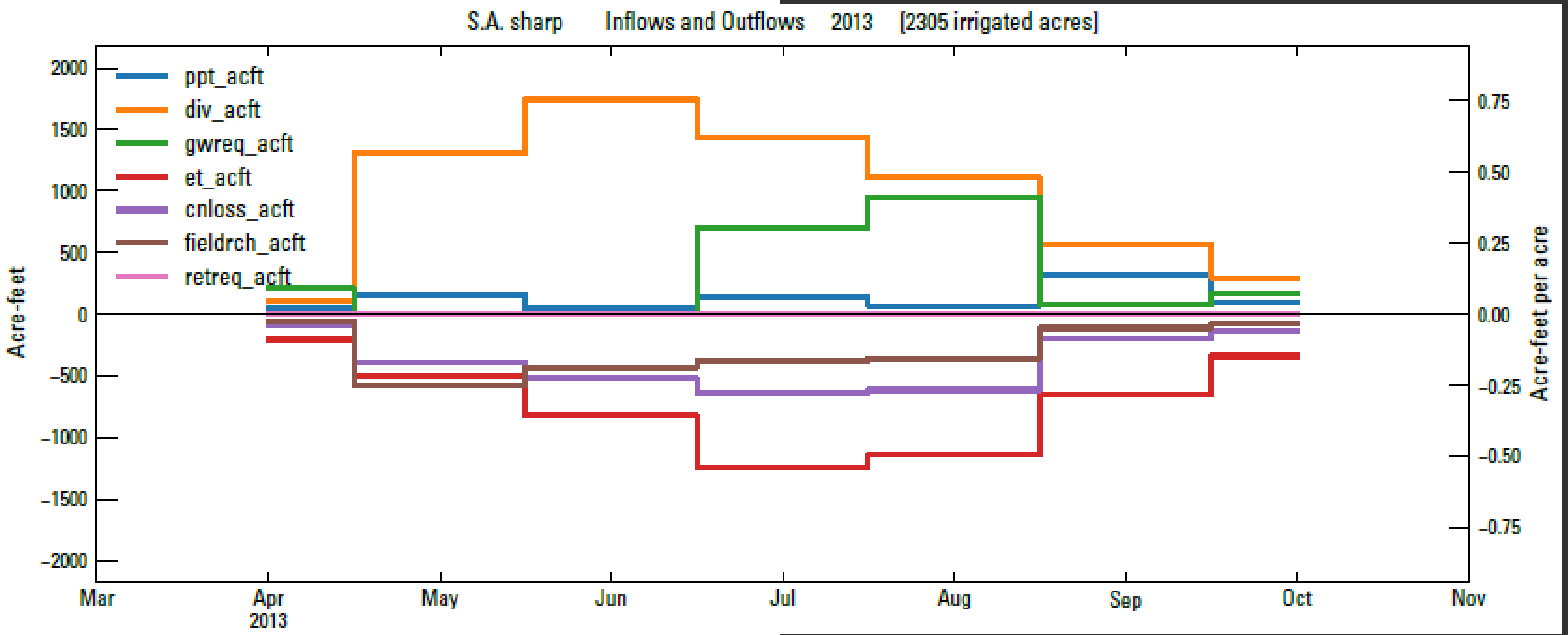
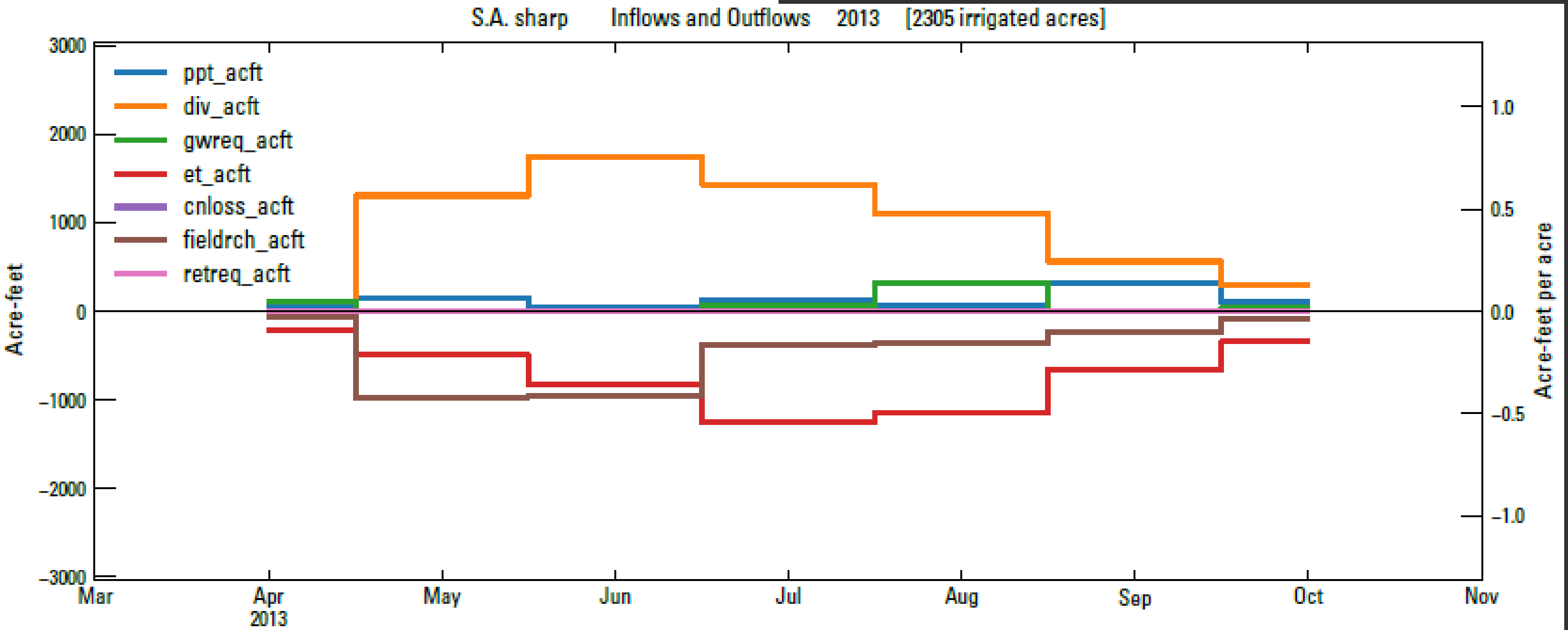
Calculator outputs Historical (monthly)



Calculator outputs
No Canal Loss (monthly)



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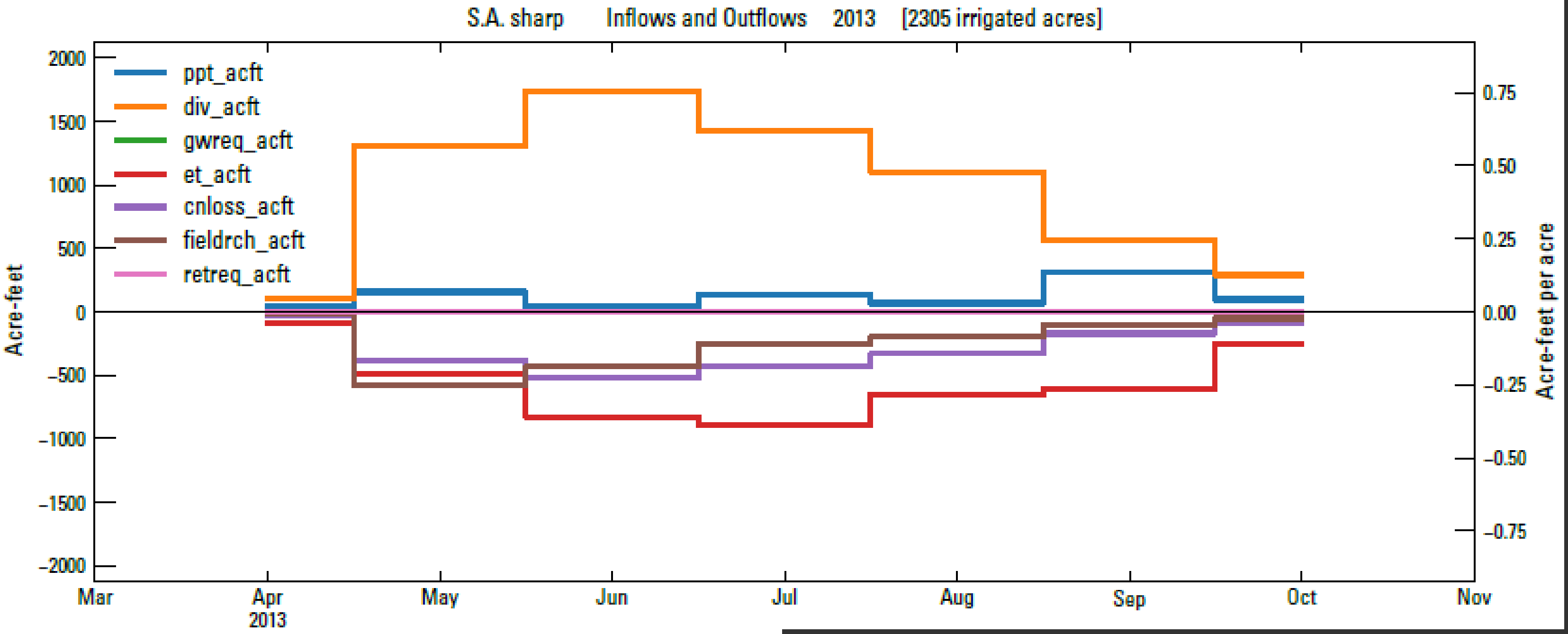
Calculator outputs
No GW Pumping (monthly)



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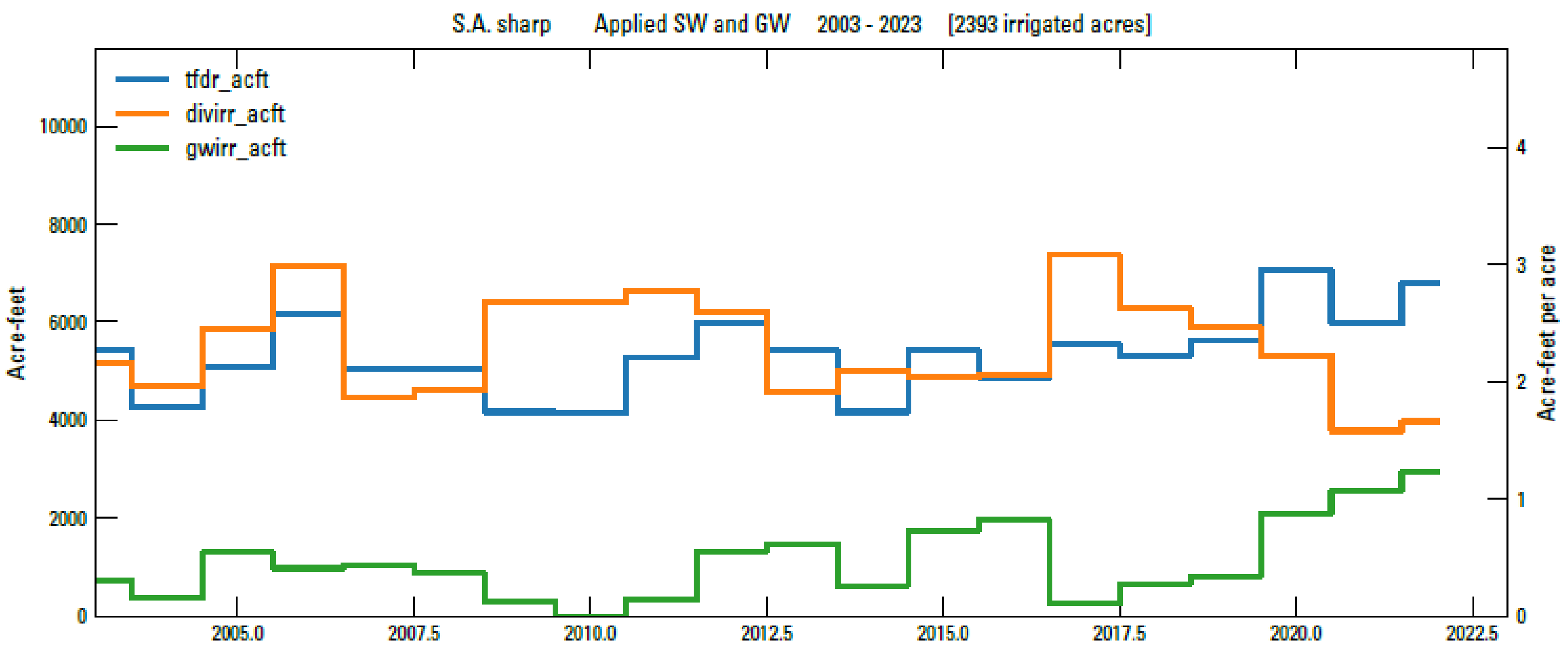
Calculator inputs Historical (annual)



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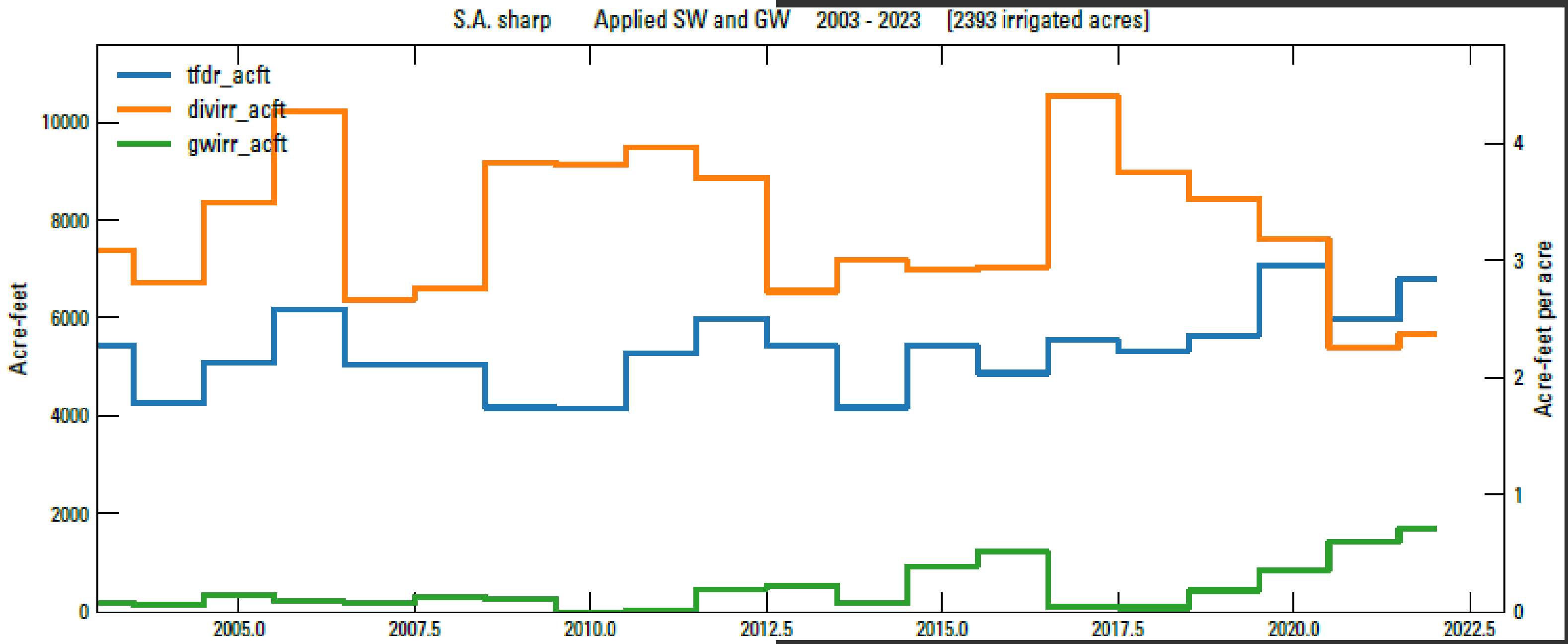
Calculator inputs
No Canal Loss (annual)



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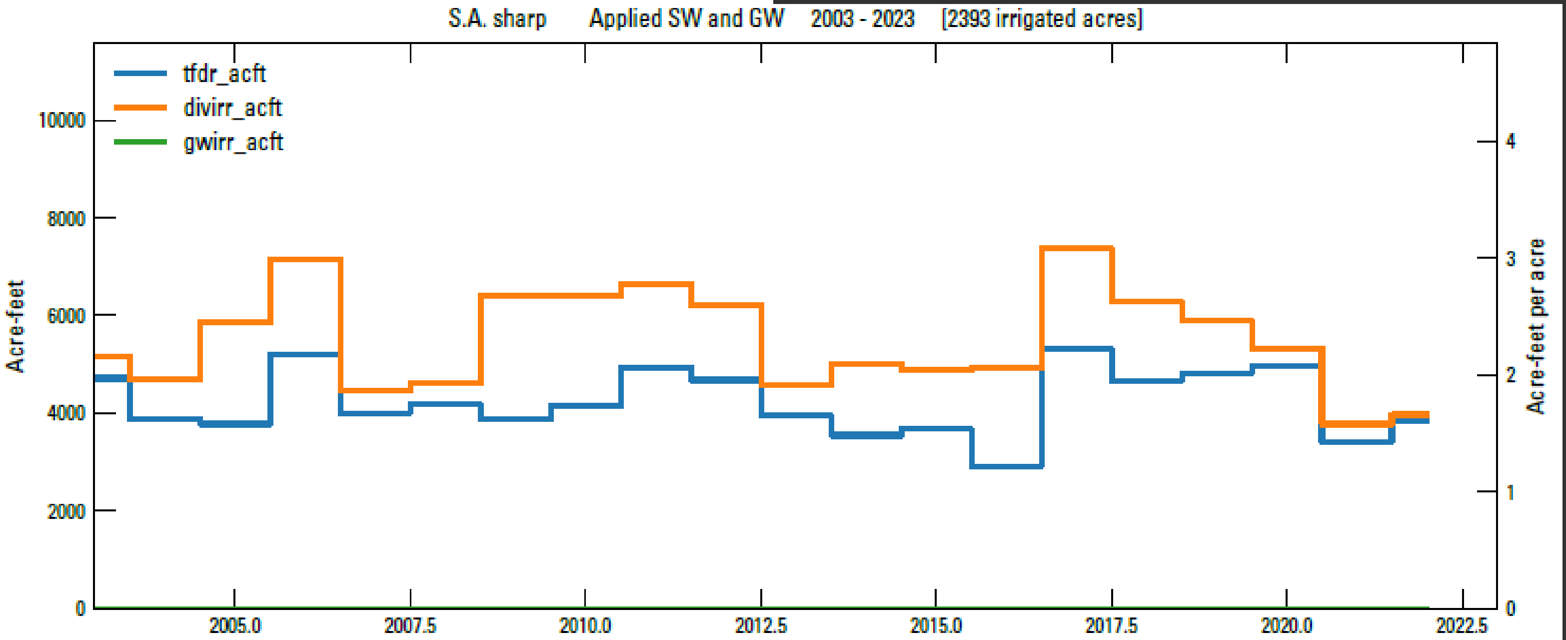
Calculator inputs
No GW Pumping (annual)



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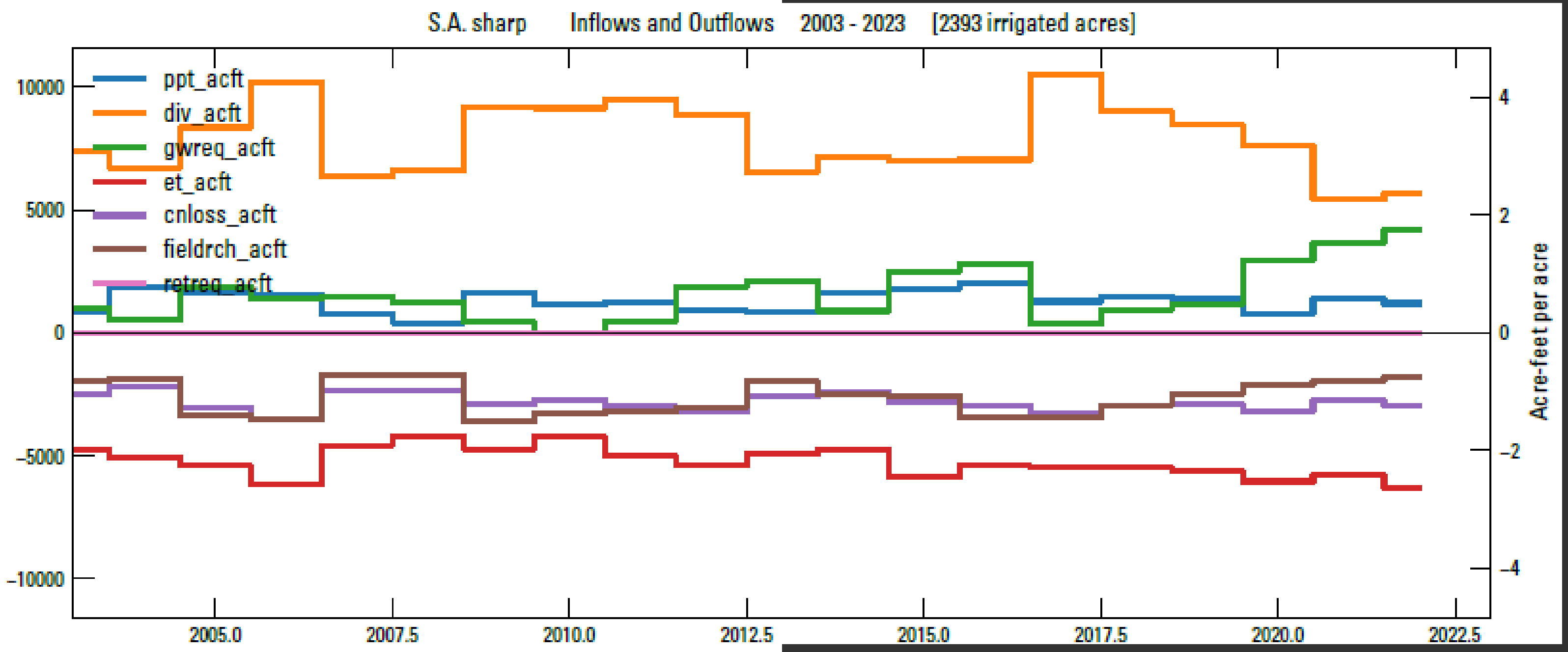
Calculator inputs Historical (annual)



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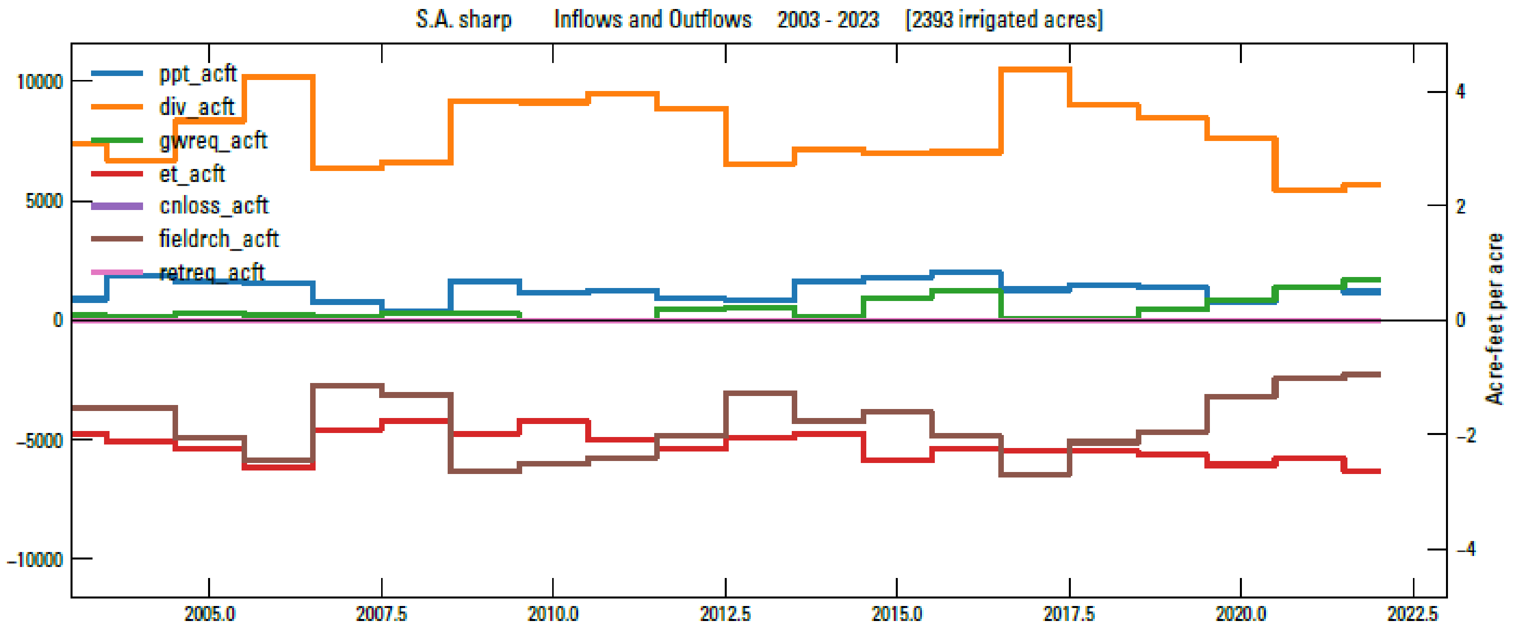
Calculator inputs
No Canal Loss (annual)



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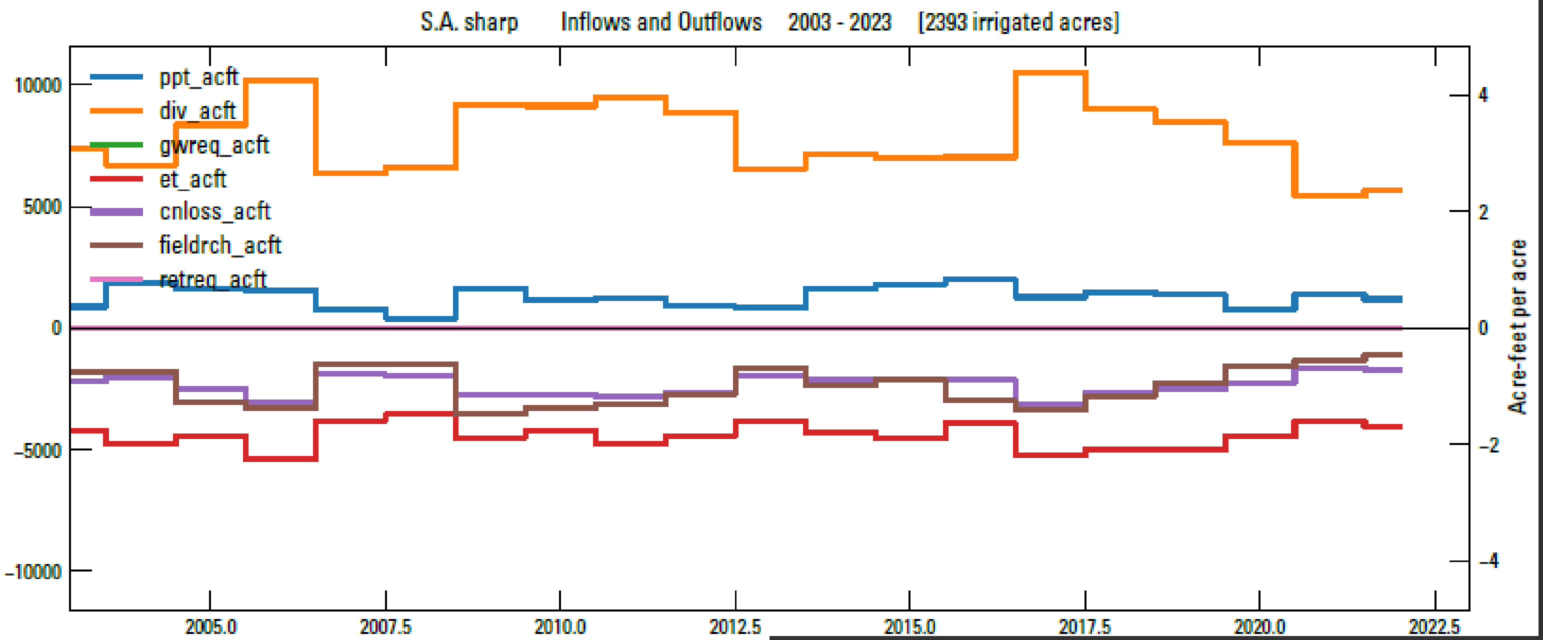
Calculator inputs
No GW Pumping (annual)



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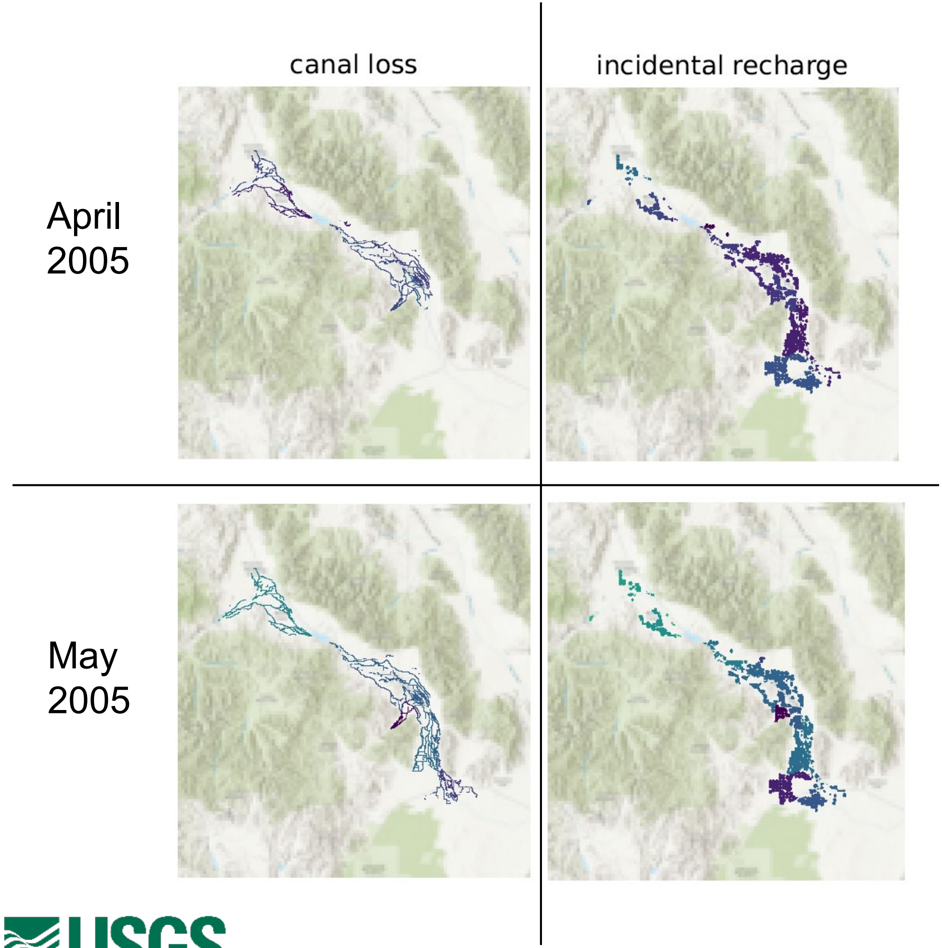
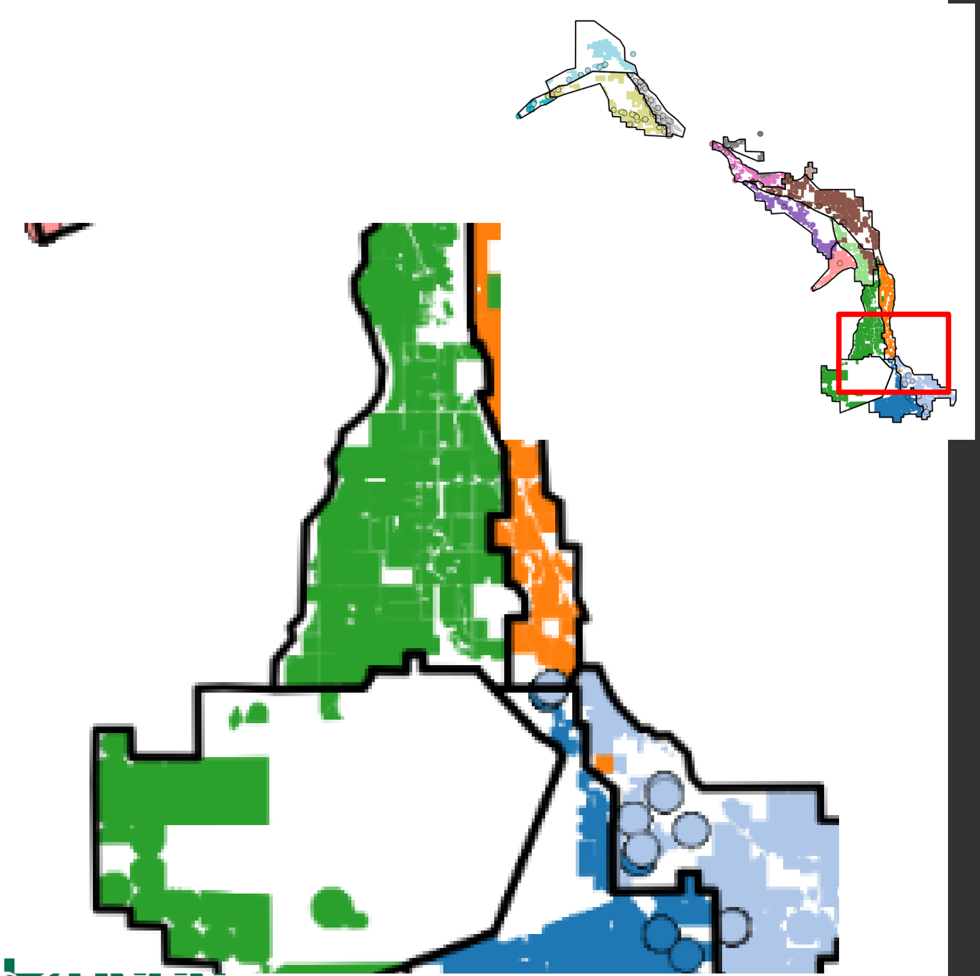
Calculator outputs = MODFLOW inputs



- Boundary conditions modified in hypothetical scenario simulations:
  - Canal Loss Recharge
  - On-Farm Recharge
  - GW pumping



Special consideration for no pumping scenario:

- Arco and Munsey areas are partly supplied by Eastside return flows
- Eastside return flow is a combination of excess surface water passing through Eastside and supplemental pumping into eastside canal
- In a no pumping scenario, need to account for reduced availability of surface water to divert into Munsey and Arco
- Calculator is rerun with reduced SW supply to Munsey and Arco

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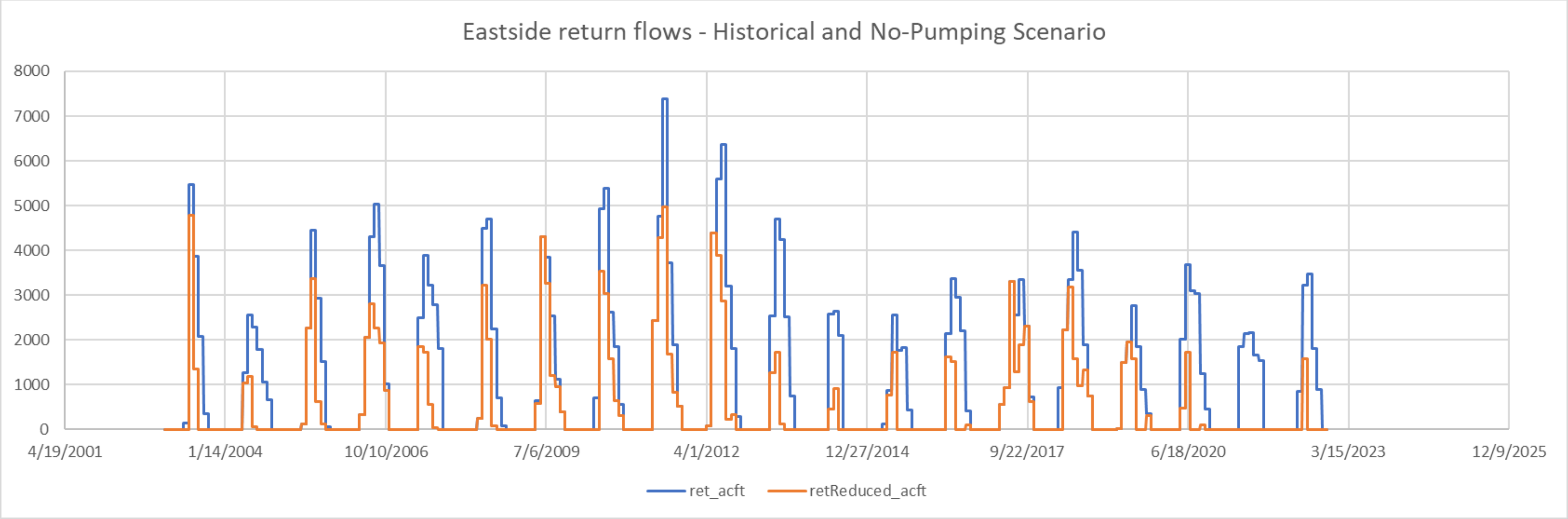
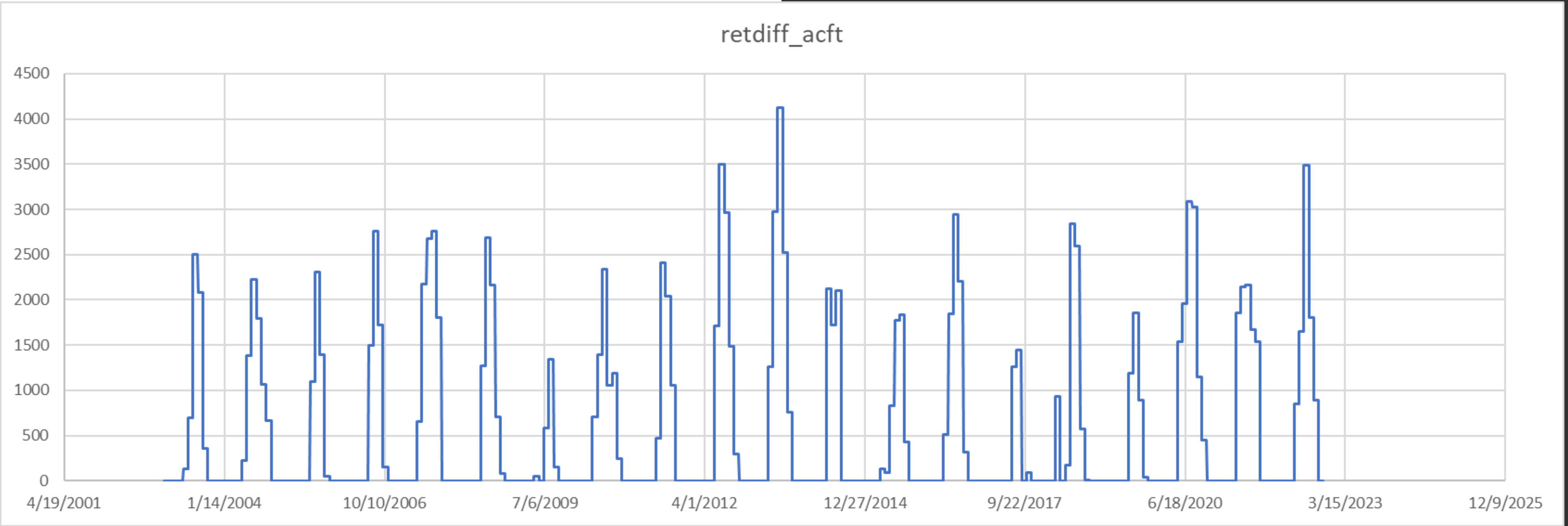
Special consideration for no pumping scenario:



Special consideration for no pumping scenario:



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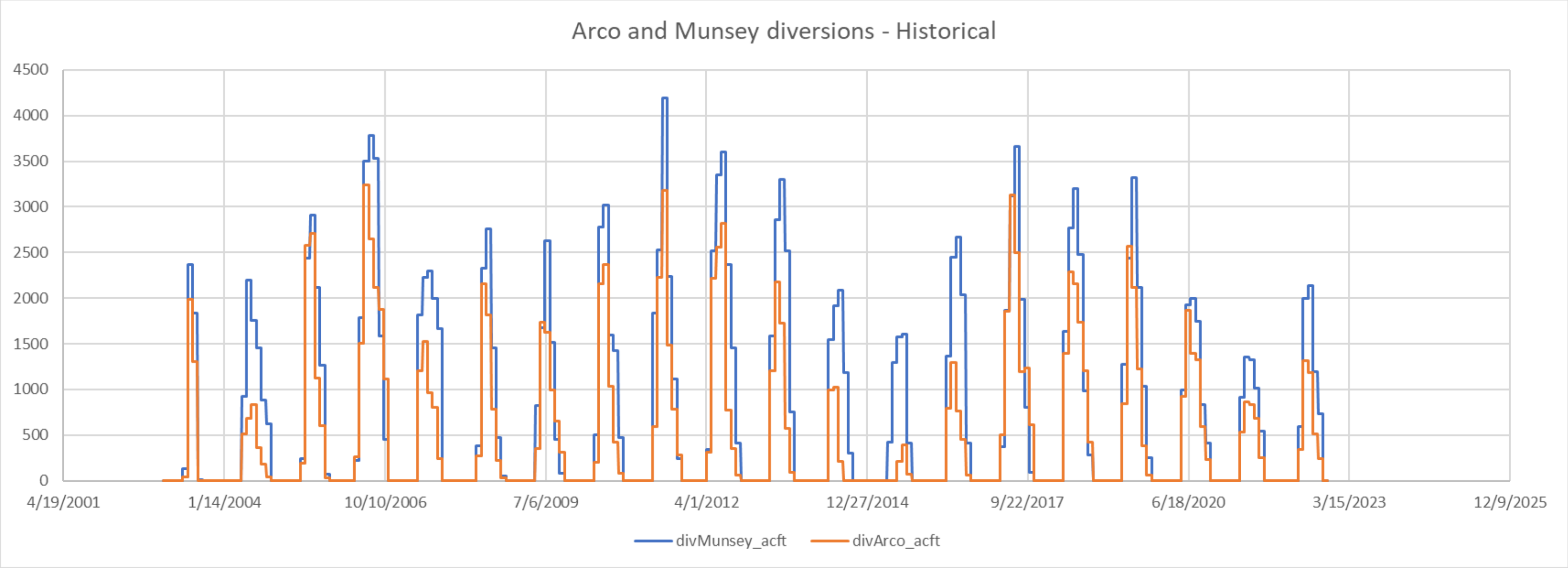
Special consideration for no pumping scenario:



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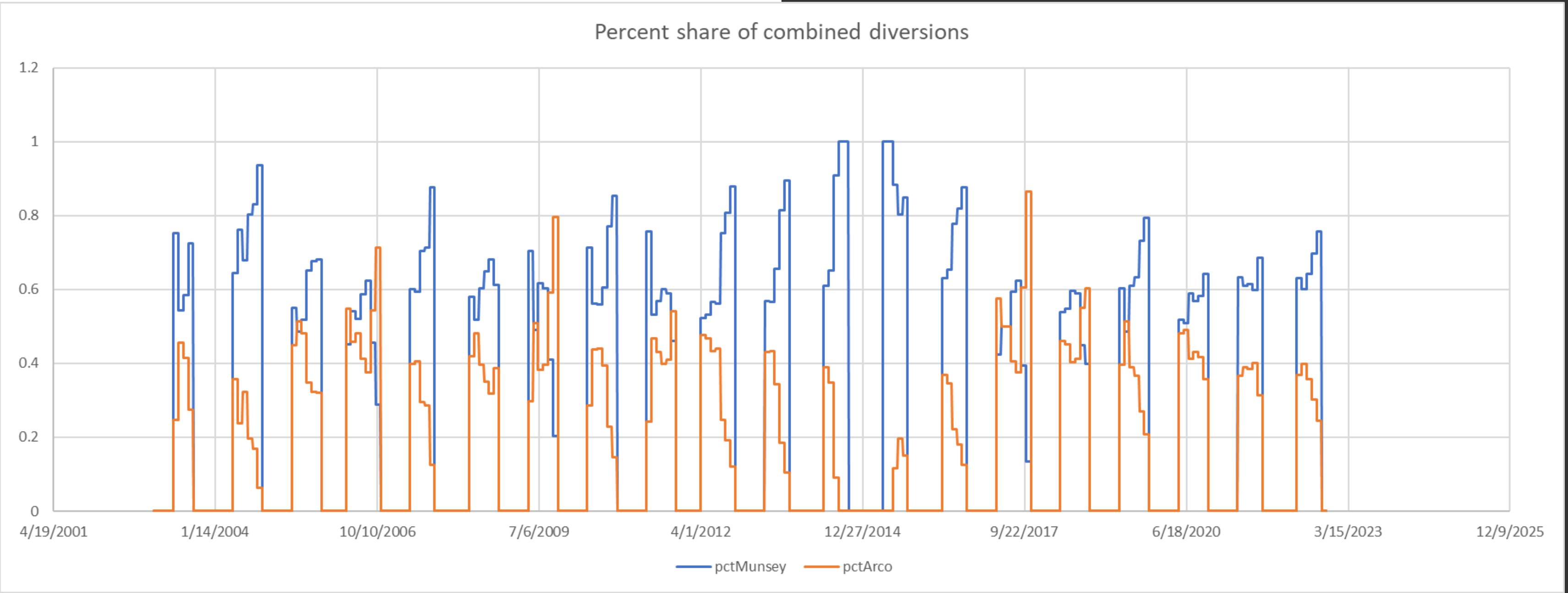
Special consideration for no pumping scenario:



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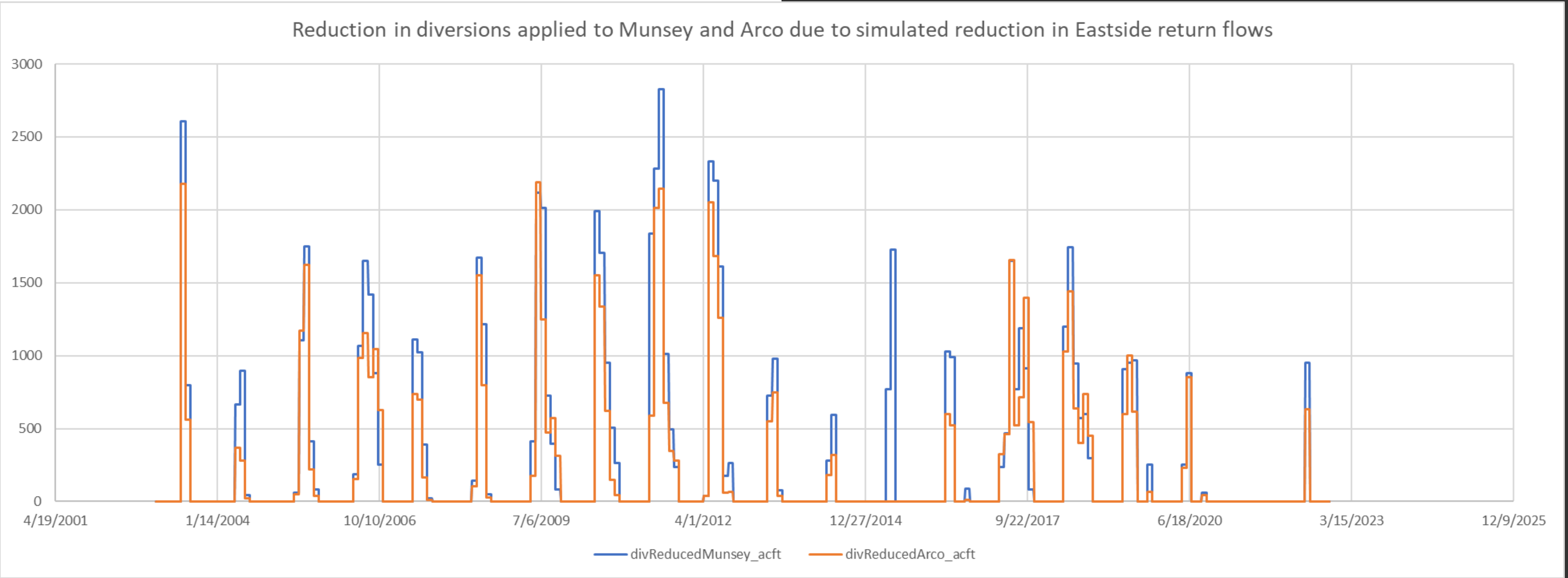
Special consideration for no pumping scenario:



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Thanks!

jknight@usgs.gov