



TURLOCK GSP

PROJECTS & MANAGEMENT ACTIONS

TECHNICAL ADVISORY COMMITTEE
SEPTEMBER 13, 2021



TODD 
GROUNDWATER

AGENDA: PROJECTS & MANAGEMENT ACTIONS

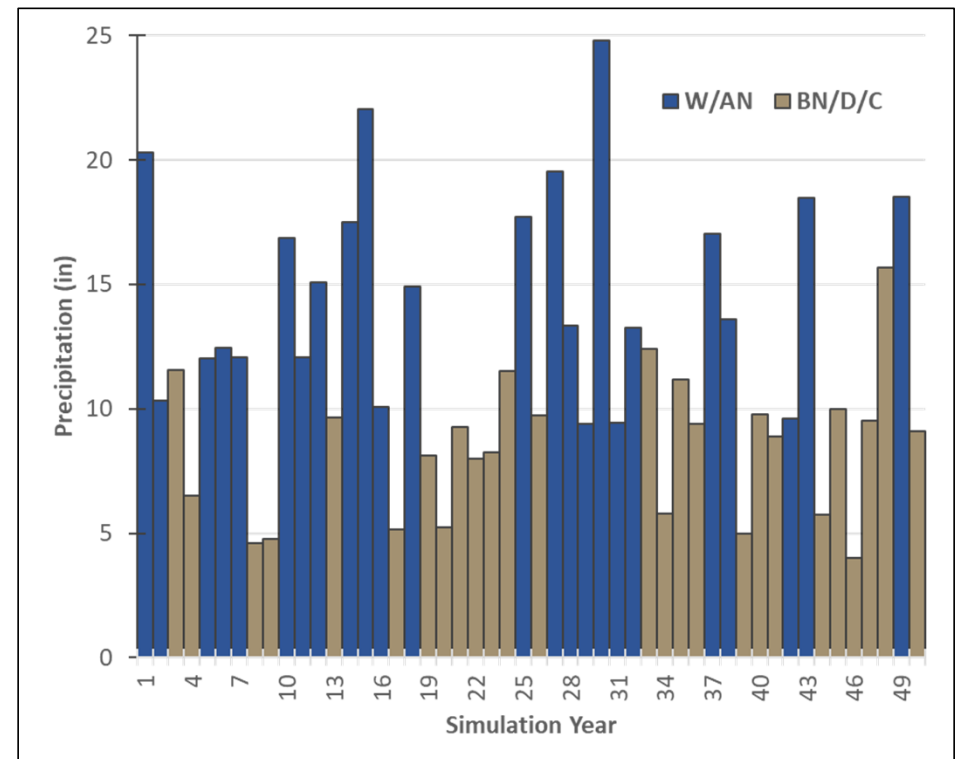
- Introduction
 - Review of existing projects
 - Explanation of scenario breakdown
- Projects and Management Actions
 - Model Input: Proposed Agricultural Projects
 - Model Results: Water Budgets
 - Model Results: Groundwater Hydrographs
- Next Steps

PROJECTS & MANAGEMENT ACTIONS

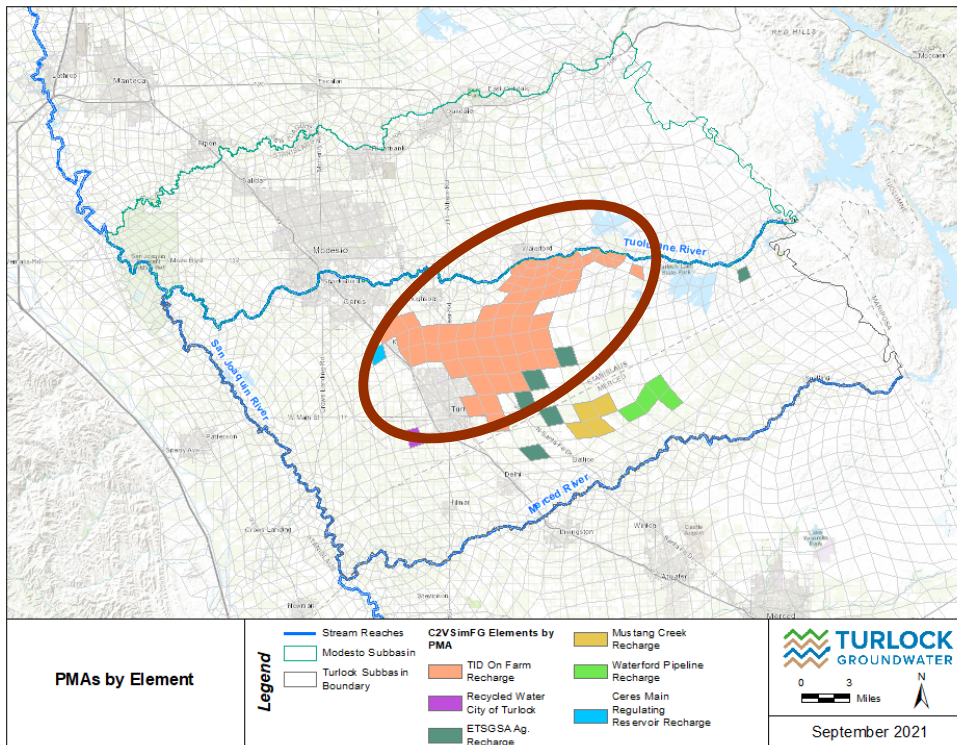
| # | Urban and Municipal Projects | Scenario 1 | Scenario 2 | Scenario 3 | Scenario 4 | Scenario 5 |
|------------------------|---|------------|------------|------------|------------|------------|
| 1 | Regional Surface Water Supply Project | X | X | X | X | X |
| 2 | Waterford/Hickman Surface Water Supply Project | X | X | X | X | X |
| 3 | Dianne Storm Basin | X | X | X | X | X |
| 4 | Stanislaus State Stormwater Recharge | X | X | X | X | X |
| WTSGSA Projects | | | | | | |
| 5 | TID On-Farm Direct Recharge Project (in WTSGSA) | | X | | X | X |
| 6 | Recycled water to TID from City of Turlock | | X | | X | X |
| 7 | TID Ceres Main Regulating Reservoir | | X | | X | X |
| ETSGSA Projects | | | | | | |
| 8 | Agricultural Recharge Project (in ETSGSA) | | | X | X | X |
| 9 | Mustang Creek Flood Control Recharge Project | | | X | X | X |
| 10 | Upland/Waterford Pipeline | | | X | X | X |
| Subbasin | | | | | | |
| 11 | Demand Reduction | | | | | X |

MODELING APPROACH & ASSUMPTIONS

| Water Year Type | Number of Years | Percentage |
|-----------------|-----------------|------------|
| W | 17 / 50 | 34 % |
| AN | 7 / 50 | 14 % |
| BN | 4 / 50 | 8 % |
| D | 8 / 50 | 16 % |
| C | 14 / 50 | 28 % |
| W/AN | 24 / 50 | 48 % |
| BN/D/C | 26 / 50 | 52 % |



MODELING APPROACH & ASSUMPTIONS



TID On-Farm Recharge (within TID Service Area)

Application

- 2,000 acres of non-ponded crops
- Applied at two feet per month

On W and AN water years

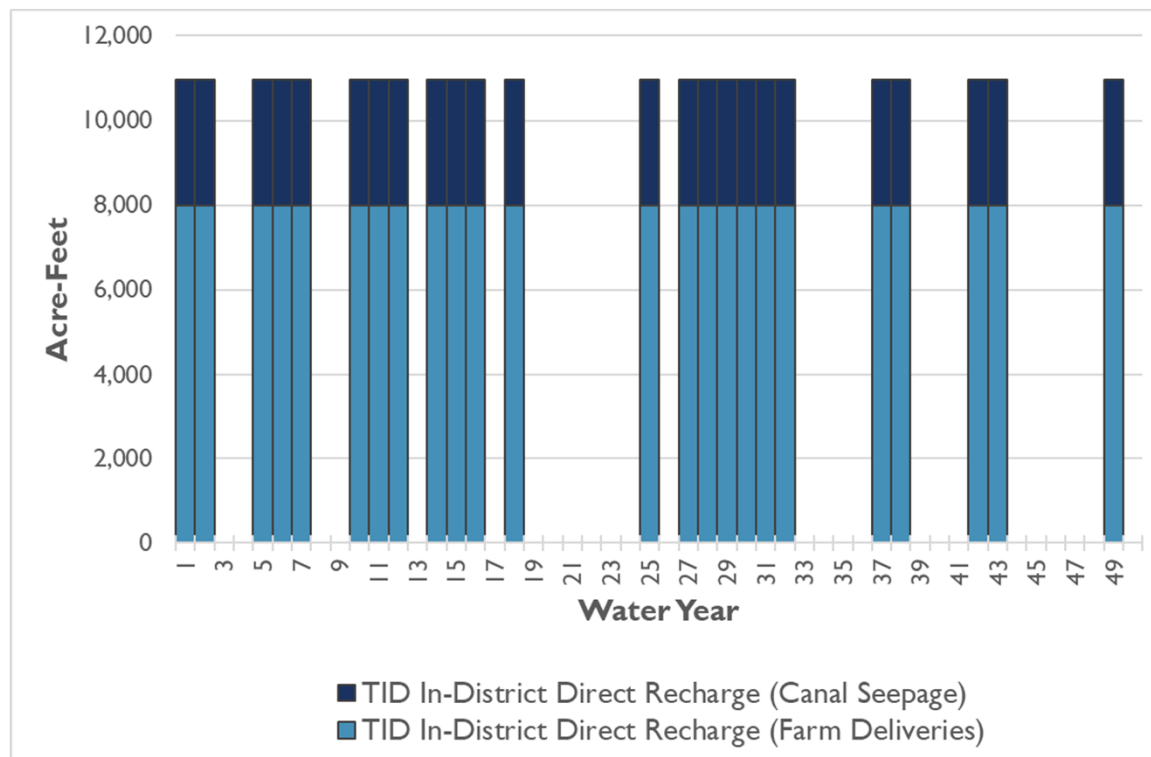
- Direct Recharge: 8,000 AFY
- Canal Seepage: 2,950 AFY
- Total: 10,950 AFY

50-Year Average

- Direct Recharge: 3,800 AFY
- Canal Seepage: 1,400 AFY
- Total: 5,200 AFY

PRELIMINARY DRAFT; SUBJECT TO REVISION

MODELING APPROACH & ASSUMPTIONS



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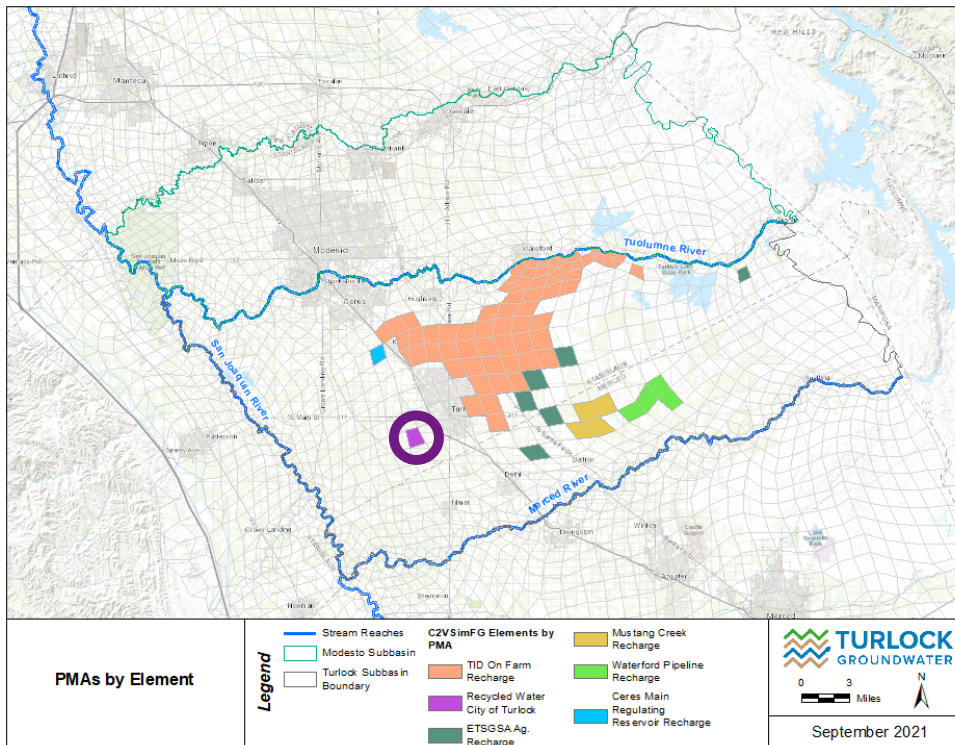
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MODELING APPROACH & ASSUMPTIONS

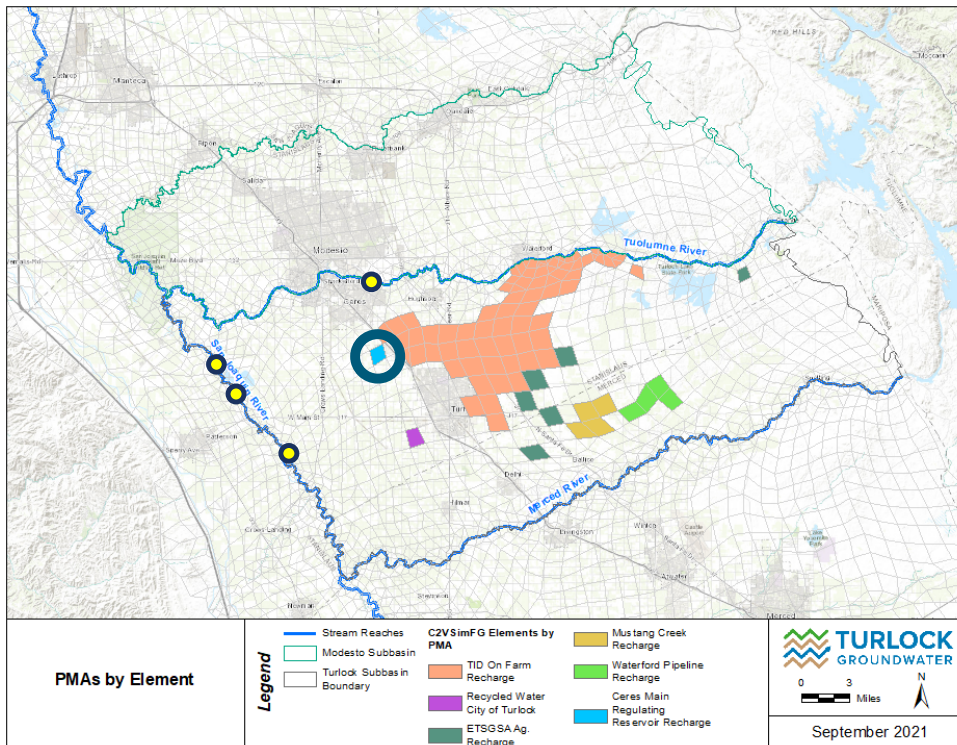


Recycled water from the City of Turlock

- Recycled water to parcels within TID
- 2,000 AFY of in-lieu recharge during the irrigation season

PRELIMINARY DRAFT; SUBJECT TO REVISION

MODELING APPROACH & ASSUMPTIONS

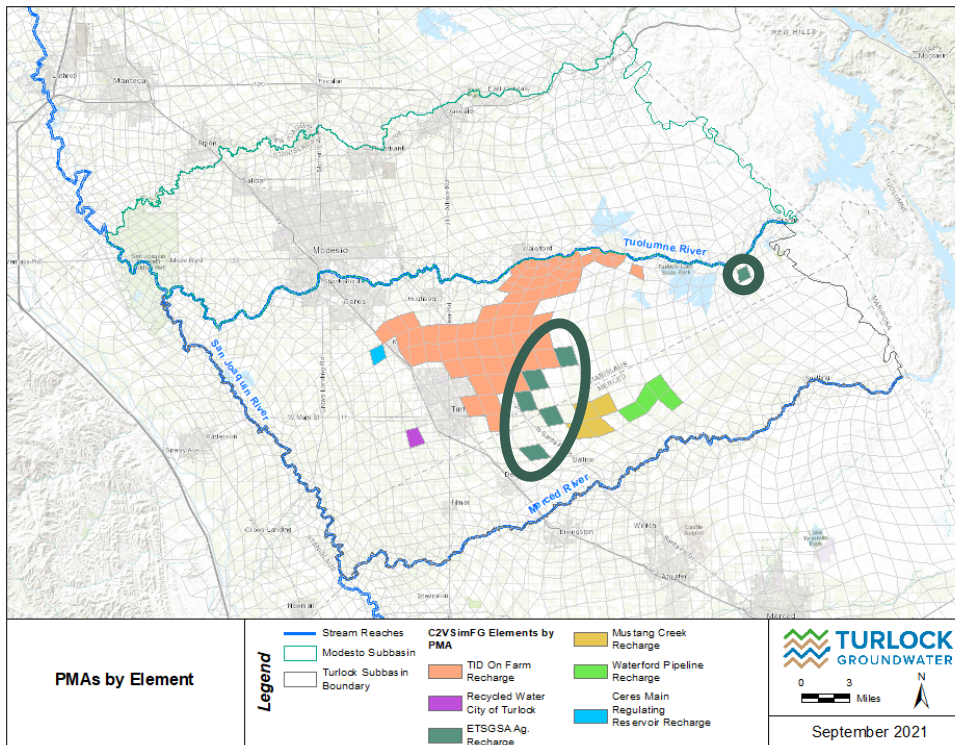


Ceres Main Regulating Reservoir

- New reservoir on Ceres Main Canal resulting in a spill reduction of 10,000 AFY
- Reduced pumping 600 AFY
- Direct Recharge 400 AFY

PRELIMINARY DRAFT; SUBJECT TO REVISION

MODELING APPROACH & ASSUMPTIONS

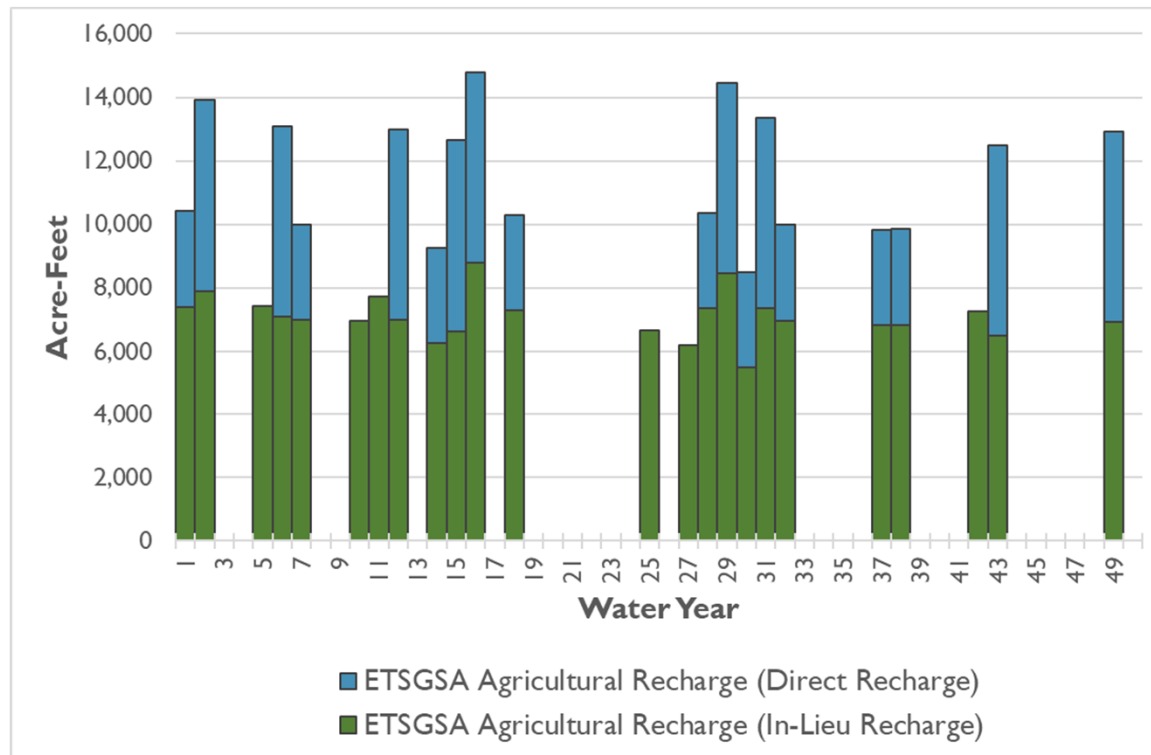


ETSGSA Agricultural Recharge (TID out of district deliveries)

- In-lieu Recharge Assumptions
 - SW deliveries to existing users
 - Meet demand in irrigation season
- Direct Recharge Assumptions
 - Total Area: 3,000 acres
 - Participation Rate: 1,500 acres
 - Recharge Rate: 2 feet/month
 - Recharge Period: Jan-Feb*
 - Total Capacity: 6,000 AFY

PRELIMINARY DRAFT; SUBJECT TO REVISION

MODELING APPROACH & ASSUMPTIONS



ETSGSA Agricultural Recharge (TID out of district deliveries)

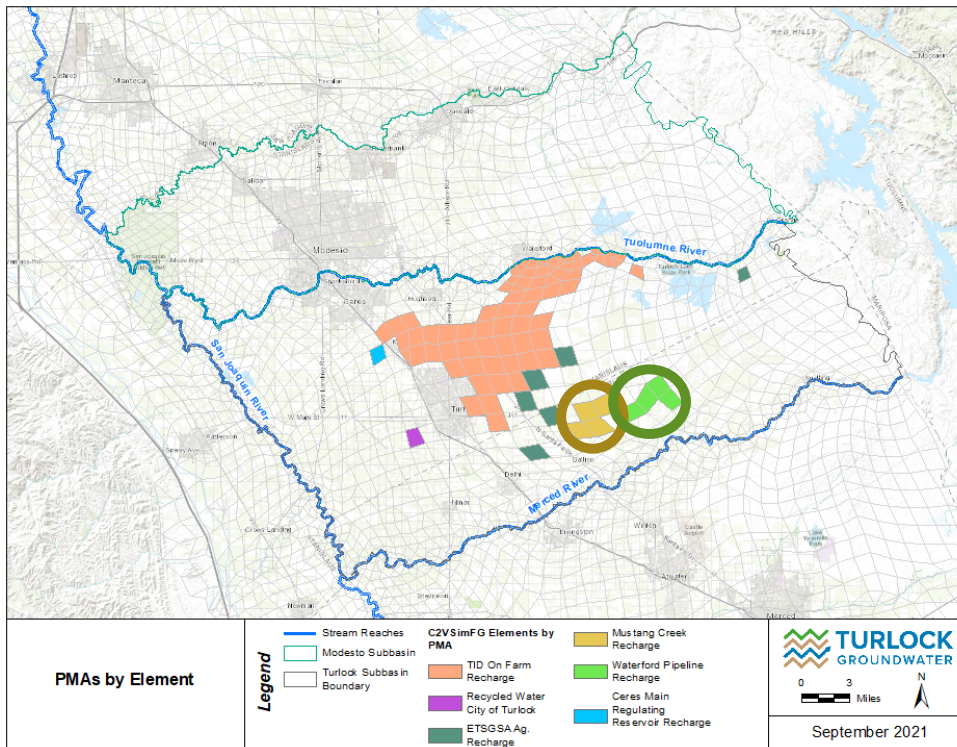
- **In-lieu Recharge**
 - Up to 8,800 AFY in W and AN years
 - Split across irrigation season
 - Long term avg of 3,400 AFY

- **Direct Recharge**
 - Up to 6,000 AFY of flood flows
 - Long term avg of 1,600 AFY
 - In January and February

- **Total Recharge**
 - Up to 14,800 AFY
 - Long term avg of 5,000 AFY

PRELIMINARY DRAFT; SUBJECT TO REVISION

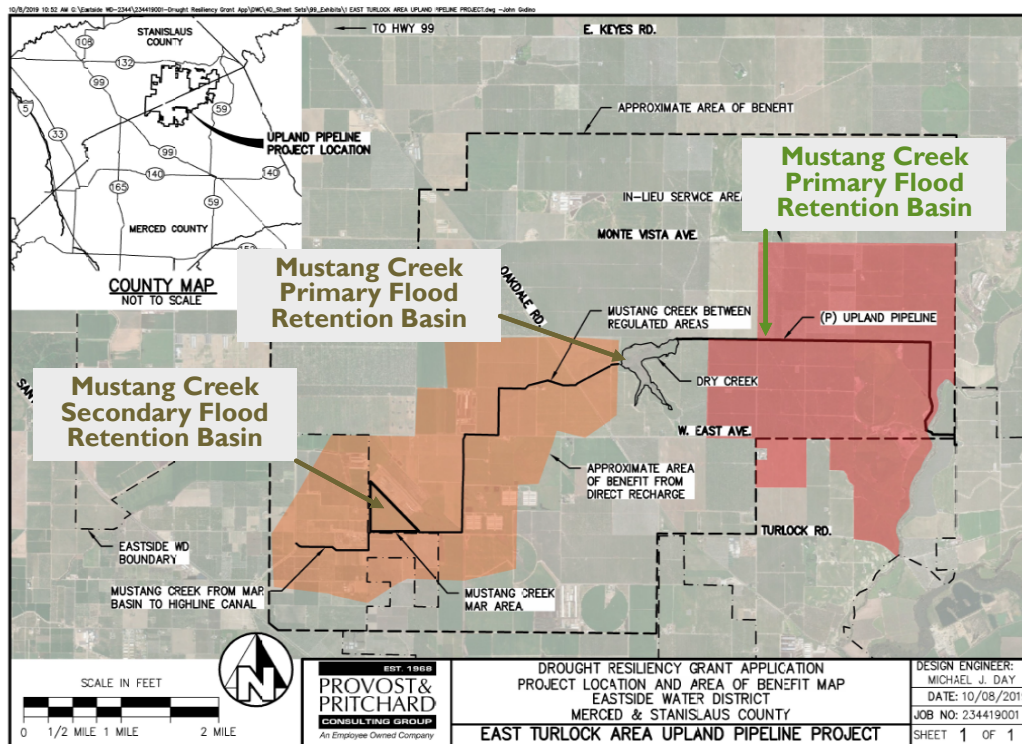
MODELING APPROACH & ASSUMPTIONS



| | Mustang Creek | Upland Pipeline |
|----------------|----------------------|------------------------|
| W | 980 | 1,770 |
| AN | 600 | 1,770 |
| BN | 495 | 900 |
| D | 325 | 400 |
| C | 265 | 400 |
| Average | 583 | 1,098 |

PRELIMINARY DRAFT; SUBJECT TO REVISION

MODELING APPROACH & ASSUMPTIONS



Mustang Creek Flood Control Recharge

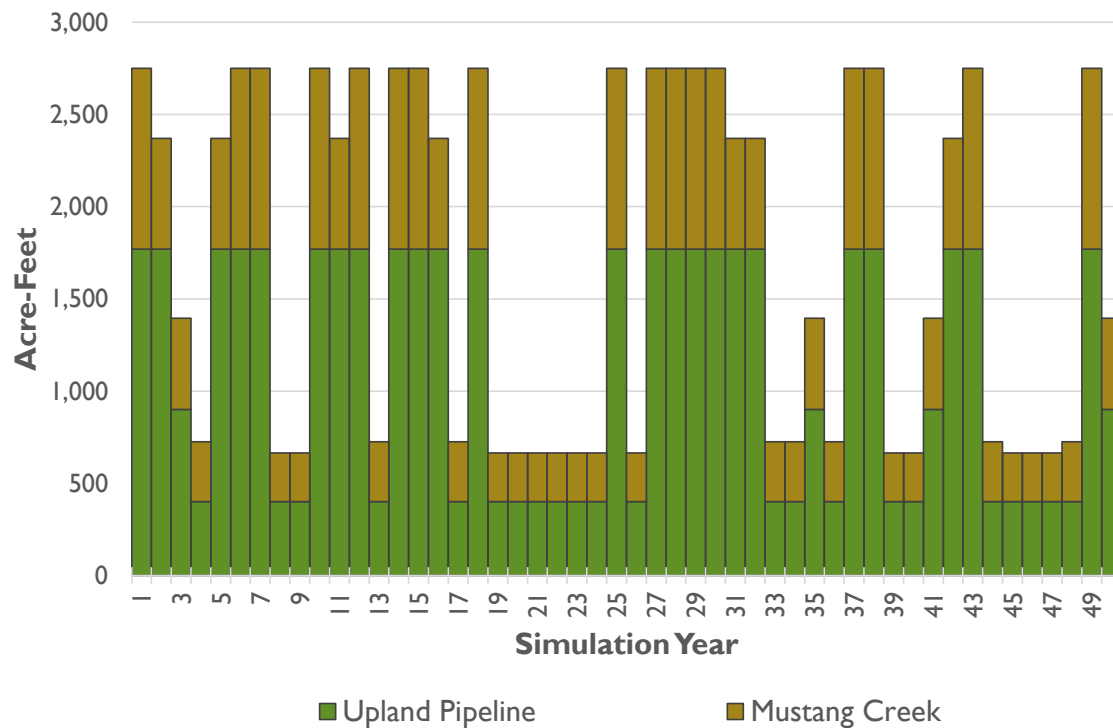
- Direct Recharge Volume 583 AFY
- Data Source: Mustang Creek Watershed Proposed Drywell Pilot Study of Enhanced Groundwater recharge

Upland/Waterford Pipeline Recharge

- Direct Recharge Volume 1,098 AFY
- Data Source: ETSGSA & Merced ID

PRELIMINARY DRAFT; SUBJECT TO REVISION

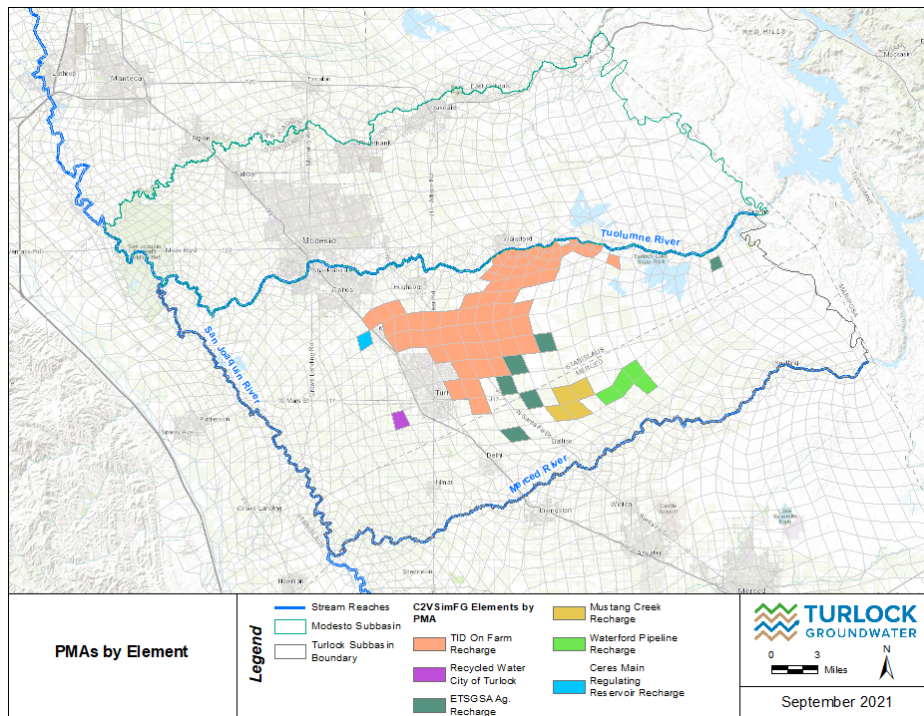
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PRELIMINARY DRAFT; SUBJECT TO REVISION

MODELING APPROACH & ASSUMPTIONS



| Scenario | Project | Direct Recharge | In-Lieu Recharge | Pumping |
|------------------------------|---|-----------------|------------------|-------------|
| WTSGSA Projects (Scenario 1) | TID On-Farm Recharge | 5,200 | | |
| | Recycled water from TUR | | 2,000 | |
| | Ceres Main Regulating Reservoir | 400 | | -600 |
| | WTSGSA Projects | 5,600 | 2,000 | -600 |
| ETSGSA Projects (Scenario 2) | ETSGSA Agricultural Recharge | 1,600 | 3,400 | |
| | Mustang Creek Flood Control Recharge | 600 | | |
| | Upland/Waterford Pipeline Recharge | 1,100 | | |
| | ETSGSA Projects | 3,300 | 3,400 | |
| ALL | All Projects | 8,900 | 5,400 | -600 |

Note: All values are in acre-feet per year and represent the average annual yield over the 50-year simulation period

PRELIMINARY DRAFT; SUBJECT TO REVISION

LAND & WATER USE BUDGET

| | | Baseline | Scenario 1 (Urban) | Scenario 2 (WTSGSA) | Scenario 3 (ETSGSA) | Scenario 4 (Cumulative) | Scenario 4 Impact |
|---------------------------|---------------------------------------|----------|-----------------------|------------------------|------------------------|----------------------------|----------------------|
| Urban Water Use | Urban Demand | 75,800 | 74,200 | 74,200 | 74,200 | 74,200 | -1,600 |
| | Urban Surface Water | 0 | 17,600 | 17,600 | 17,600 | 17,600 | +17,600 |
| | Urban Pumping | 75,800 | 56,600 | 56,600 | 56,600 | 56,600 | -19,200 |
| Agricultural Water Use | Demand | 781,600 | 781,600 | 781,600 | 781,600 | 781,600 | 0 |
| | Surface Water Deliveries | 491,400 | 487,800 | 487,800 | 491,200 | 491,200 | -200 |
| | Muni. Offset Pumping to Ag | 0 | 2,200 | 2,200 | 2,200 | 2,200 | +2,200 |
| | Recycled Water to Ag | 0 | 0 | 2,000 | 0 | 2,000 | +2,000 |
| | Private Pumping | 290,200 | 291,600 | 289,600 | 288,200 | 286,200 | -4,000 |
| Other | Canal, Reservoir, and Direct Recharge | 85,400 | 85,900 | 91,500 | 89,200 | 94,800 | +9,400 |
| | TID Agency Pumping | 51,200 | 51,200 | 50,600 | 51,200 | 50,600 | -600 |

Impact = Scenario - Baseline

PRELIMINARY DRAFT; SUBJECT TO REVISION

GROUNDWATER BUDGET

| | Baseline | Scenario 1 (Urban) | Scenario 2 (WTSGSA) | Scenario 3 (ETSGSA) | Scenario 4 (Cumulative) | Scenario 4 Impact |
|---|----------|-----------------------|------------------------|------------------------|----------------------------|----------------------|
| Deep Percolation | 258,400 | 258,200 | 258,600 | 258,700 | 259,100 | +700 |
| Canal, Reservoir, and Direct Recharge | 85,400 | 85,900 | 91,500 | 89,200 | 94,800 | +9,400 |
| Net Stream Seepage | 36,900 | 31,300 | 28,600 | 29,600 | 26,900 | -10,000 |
| Inflow from Foothills | 2,100 | 2,100 | 2,100 | 2,100 | 2,100 | 0 |
| Net Subsurface Flow from Adjacent Subbasins | 28,900 | 21,400 | 16,700 | 17,000 | 12,300 | -16,600 |
| Groundwater Pumping | 417,200 | 401,600 | 399,000 | 398,200 | 395,600 | -21,600 |
| Groundwater Storage Deficit | 5,500 | 2,700 | 1,500 | 1,600 | 400 | -5,100 |

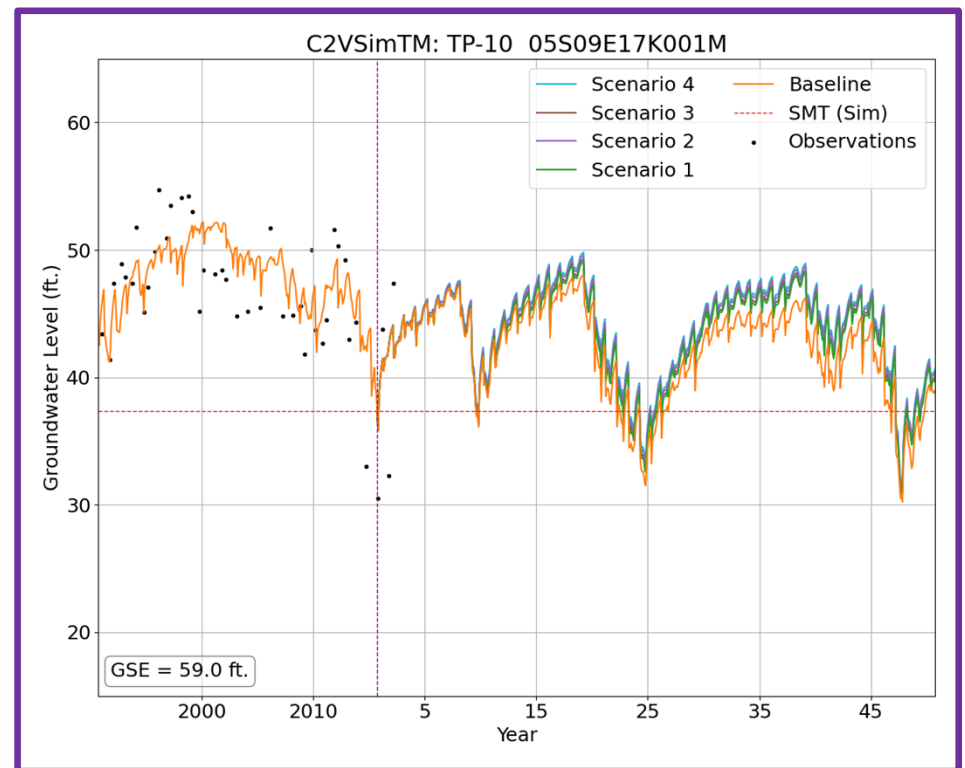
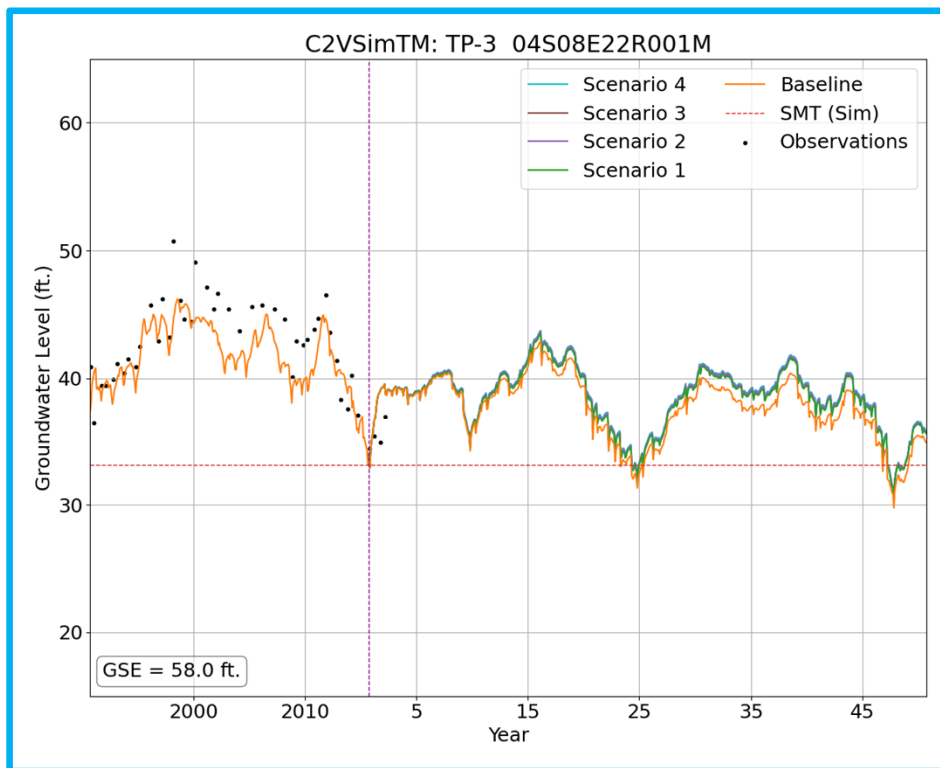
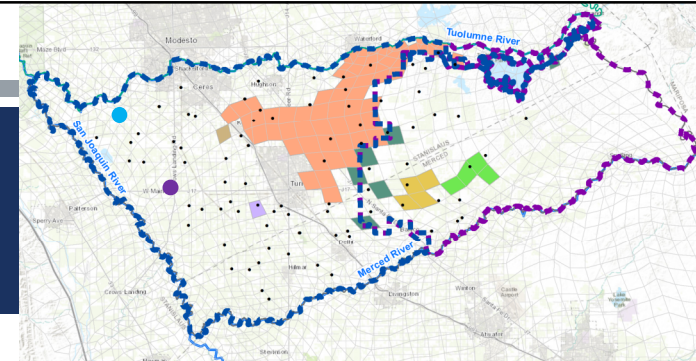
Impact = Scenario - Baseline

SGMA SUSTAINABILITY INDICATORS

Undesirable results are significant and unreasonable conditions for one or more of the following :

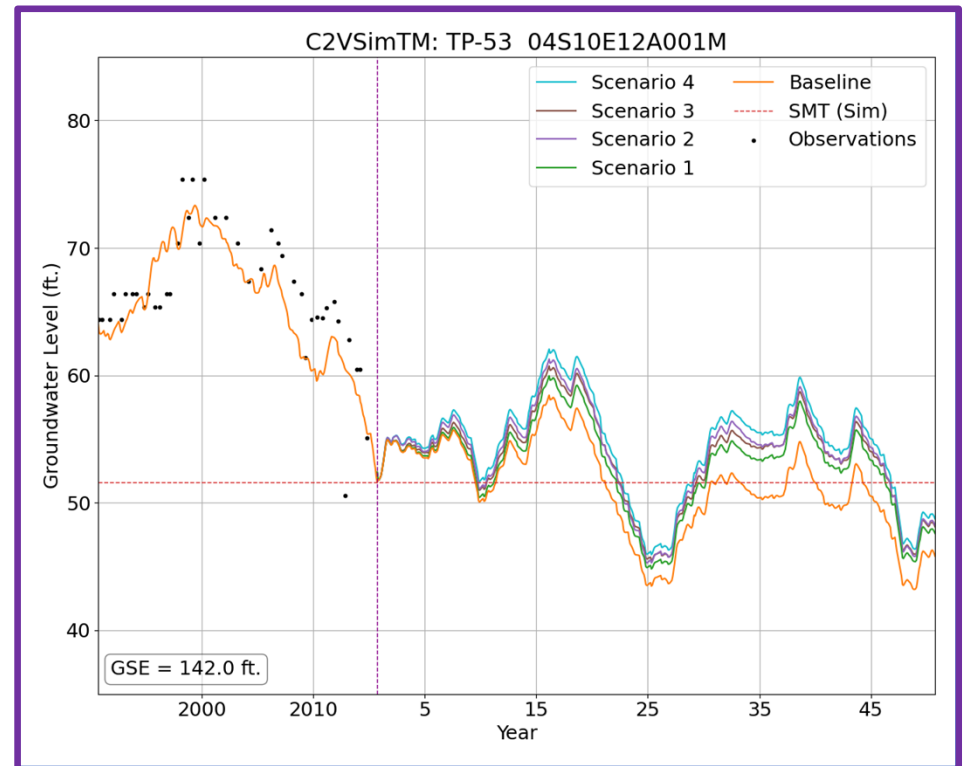
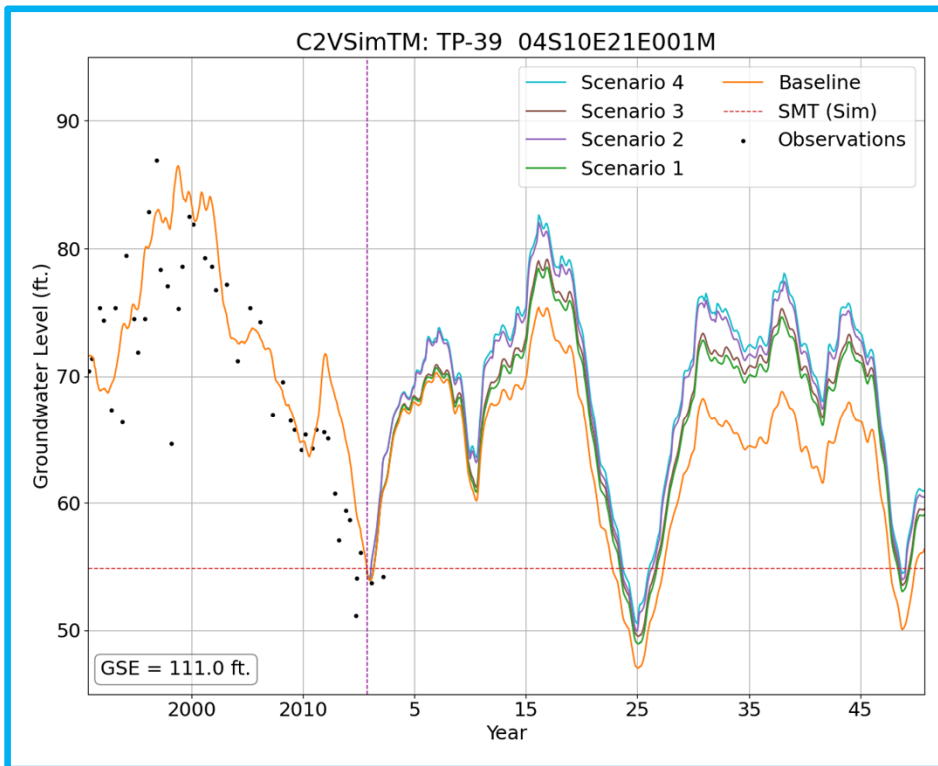
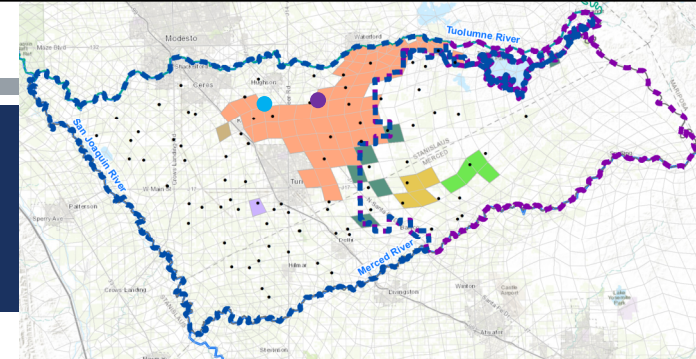
- 1. Chronic lowering of groundwater levels**
- 2. Reduction of groundwater in storage**
3. Seawater intrusion – not applicable to Turlock Subbasin
4. Degraded water quality
- 5. Land subsidence (use GWL as a proxy)**
- 6. Depletions of interconnected surface water that have significant and unreasonable adverse impacts on beneficial uses of the surface water**

GROUNDWATER HYDROGRAPHS



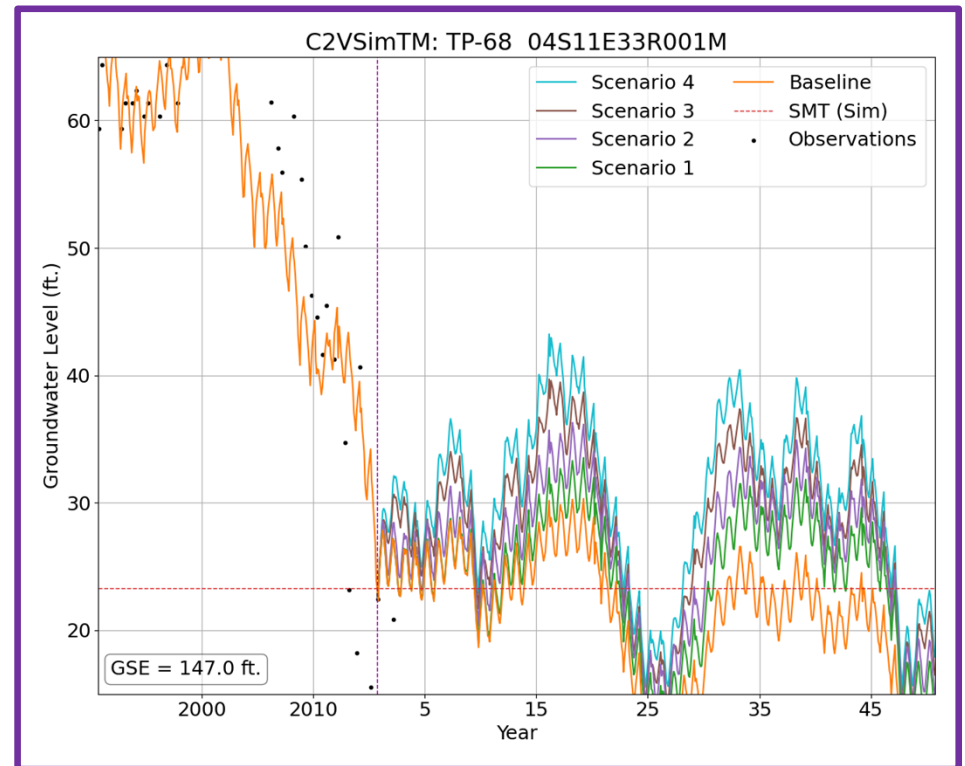
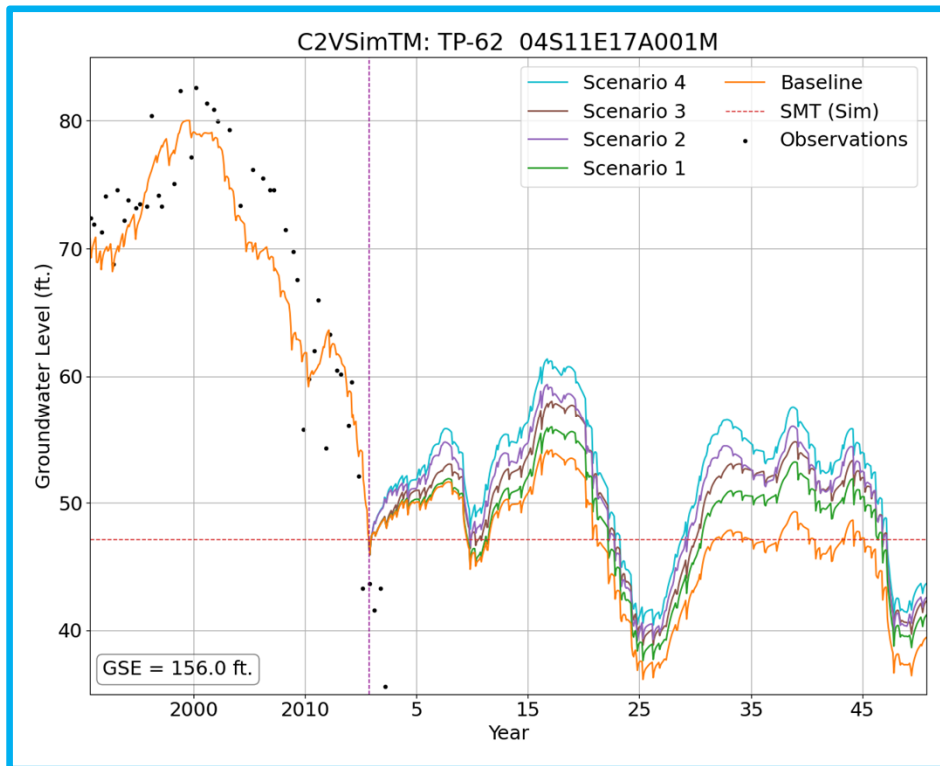
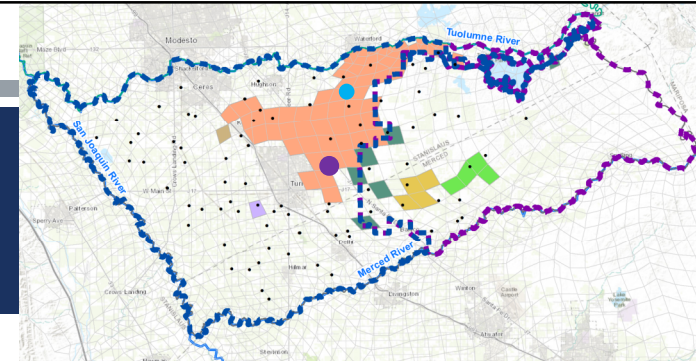
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GROUNDWATER HYDROGRAPHS



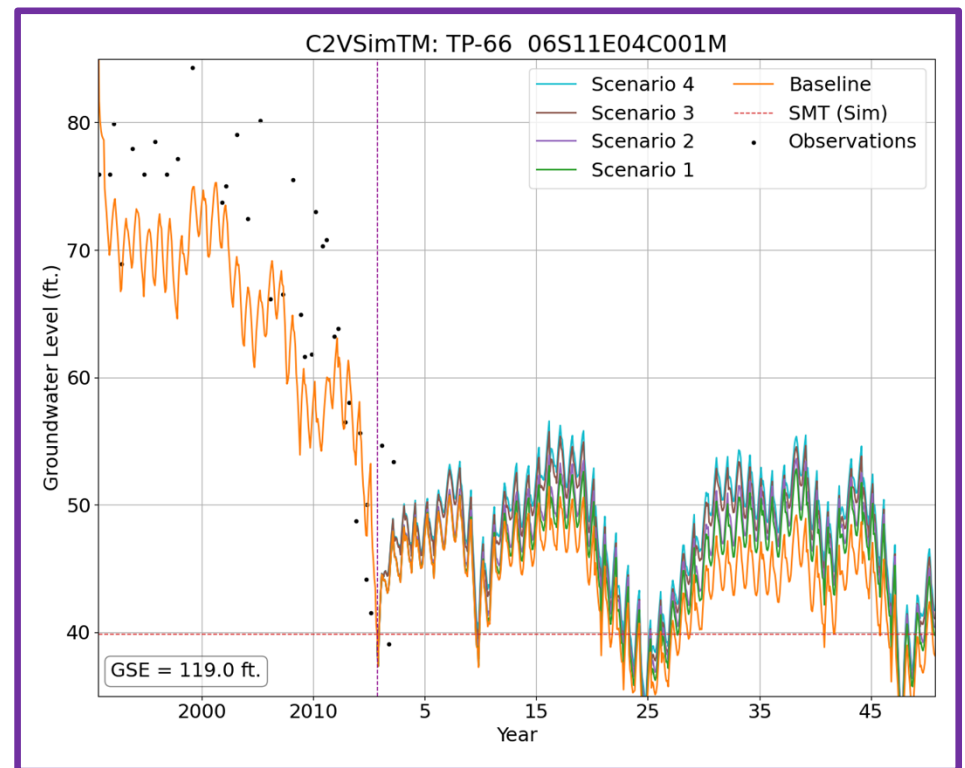
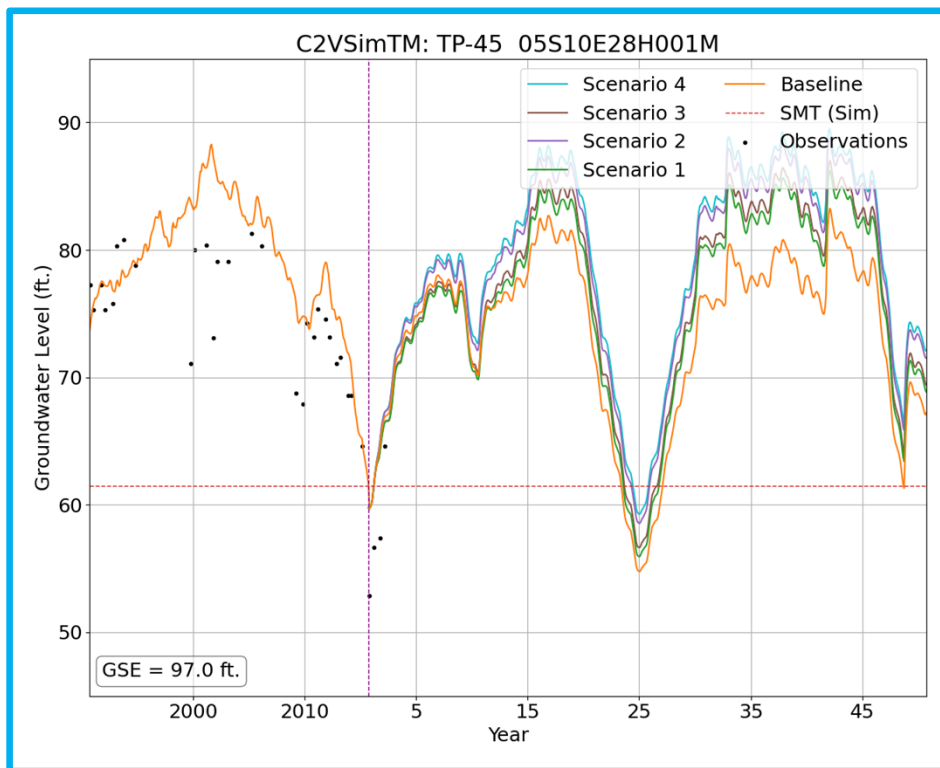
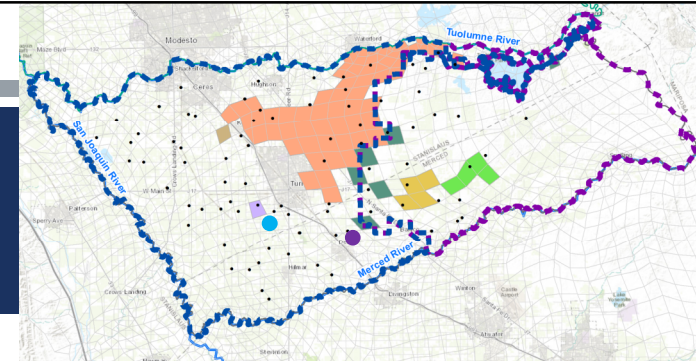
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GROUNDWATER HYDROGRAPHS



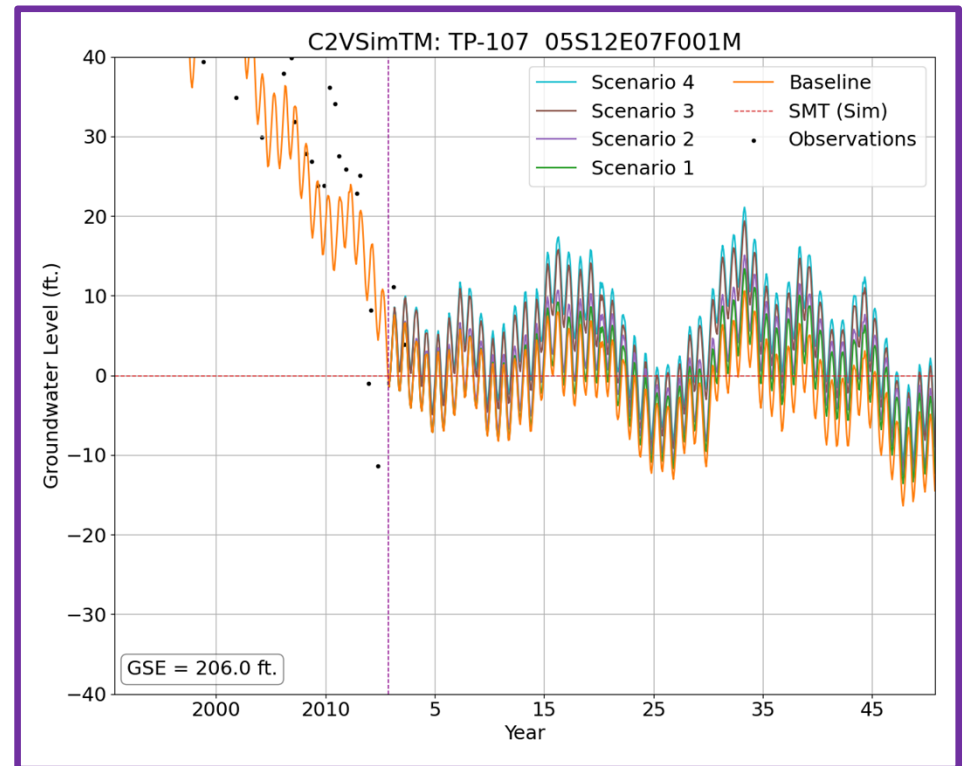
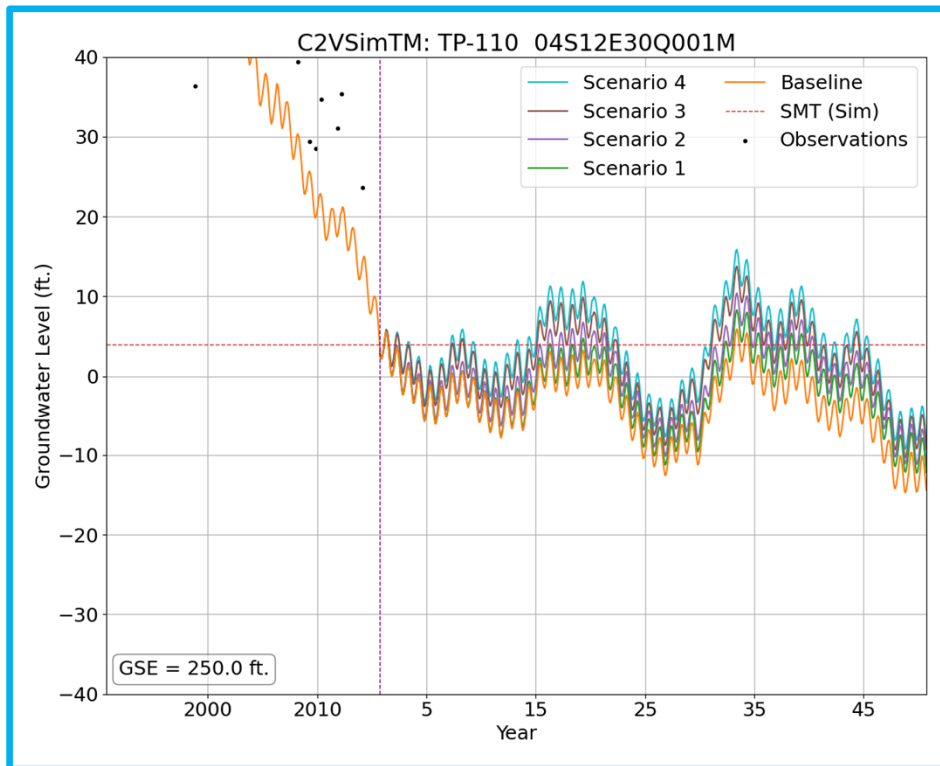
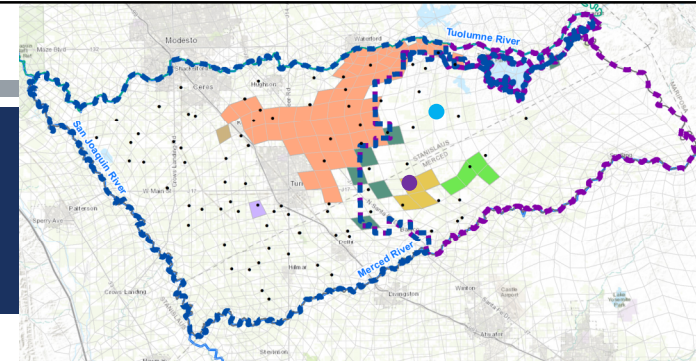
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GROUNDWATER HYDROGRAPHS



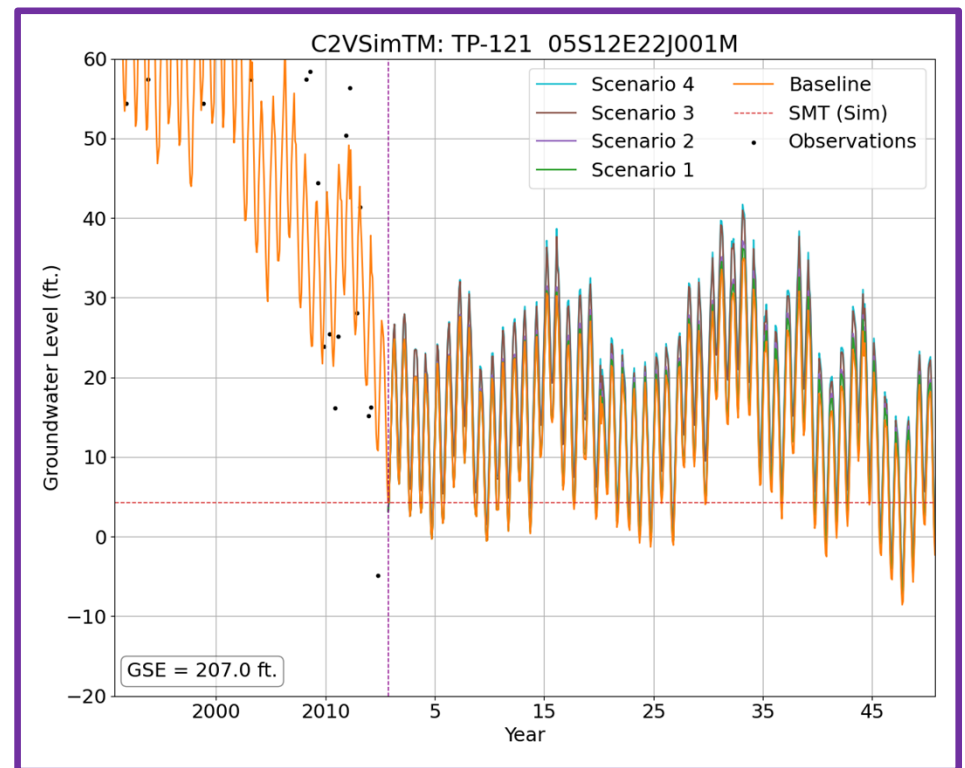
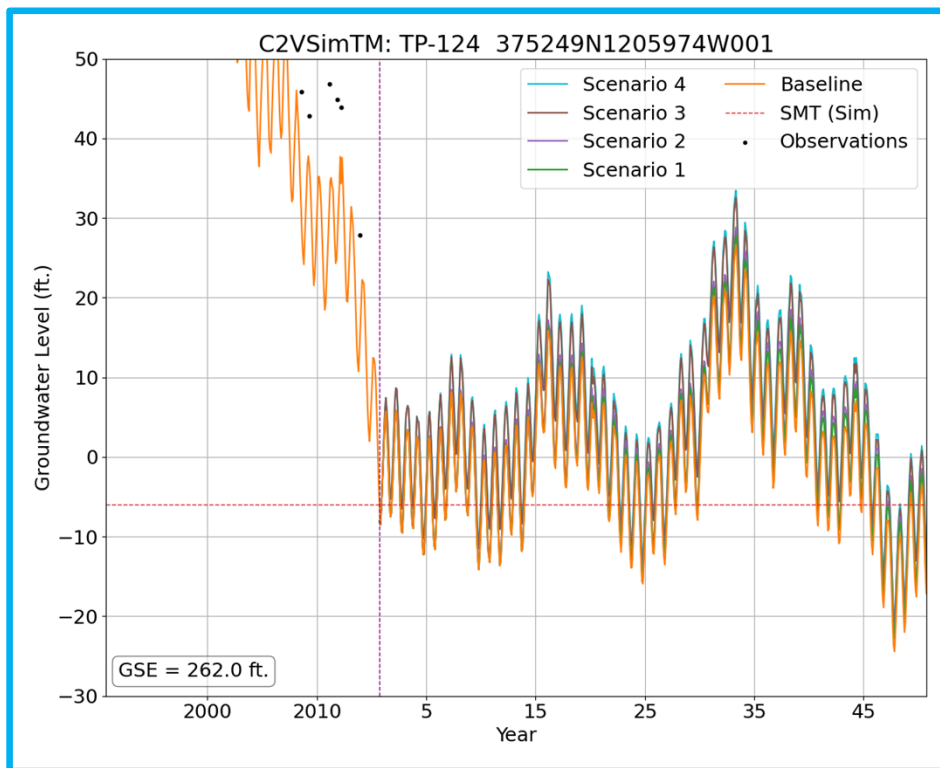
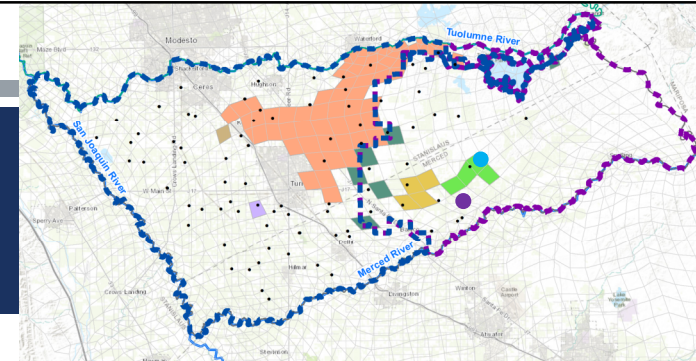
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GROUNDWATER HYDROGRAPHS



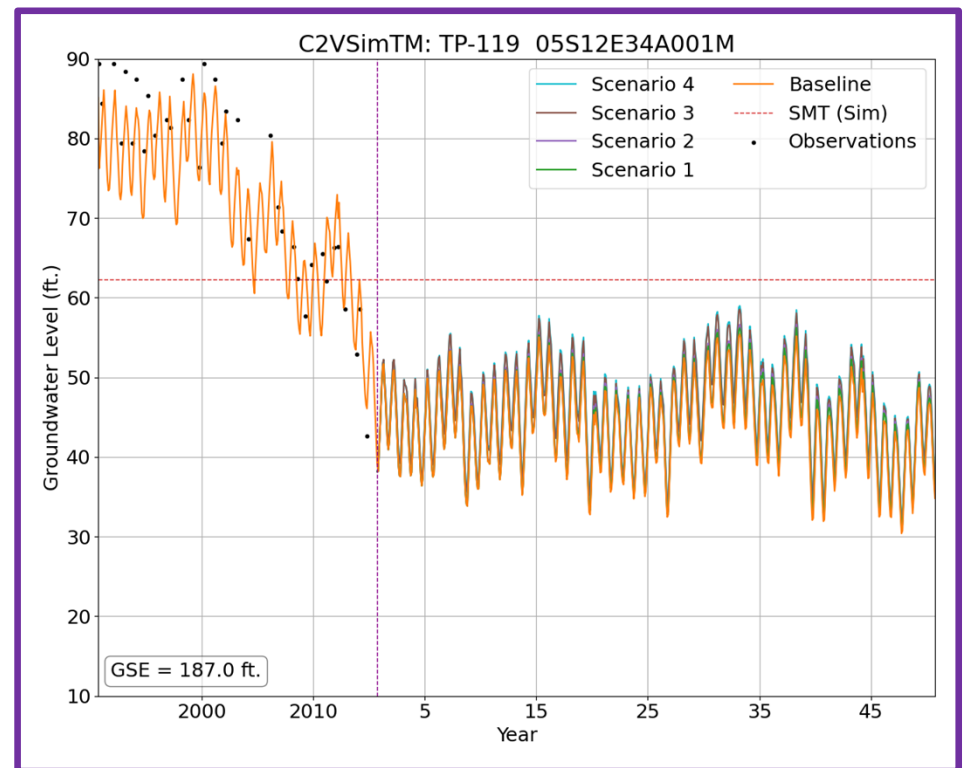
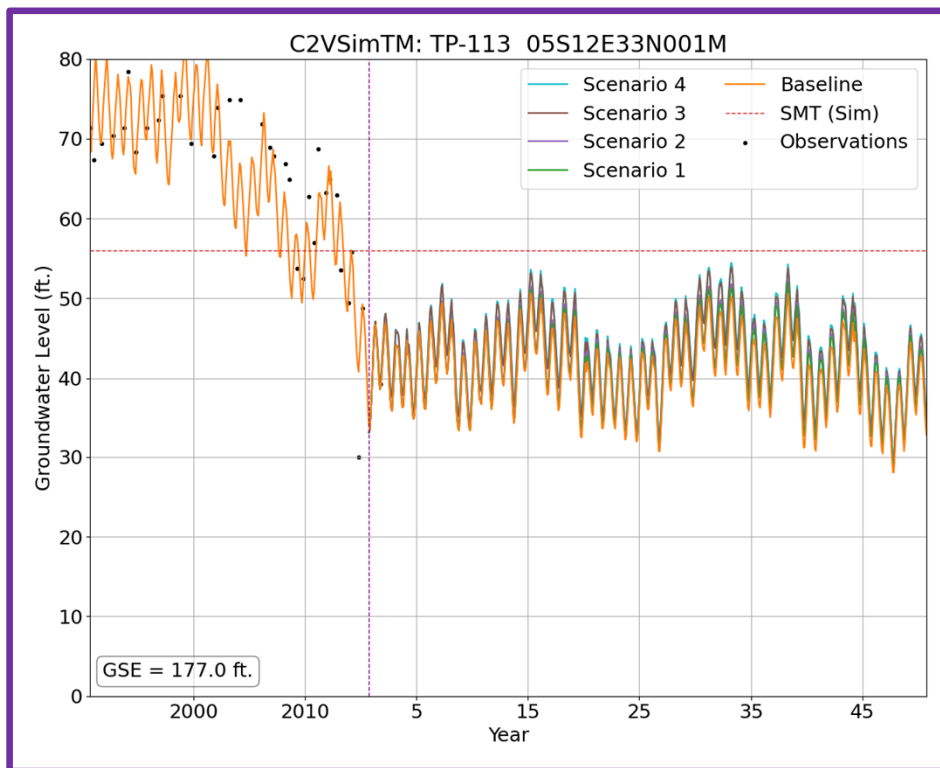
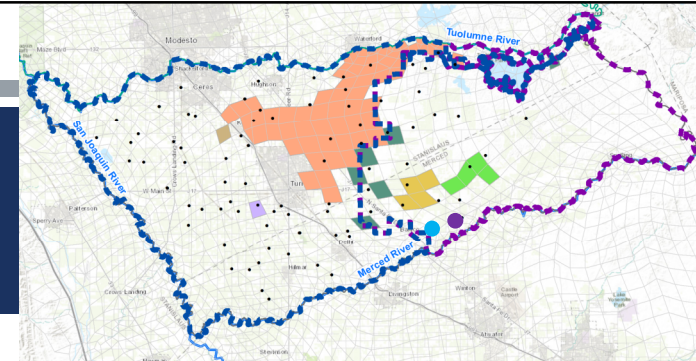
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GROUNDWATER HYDROGRAPHS



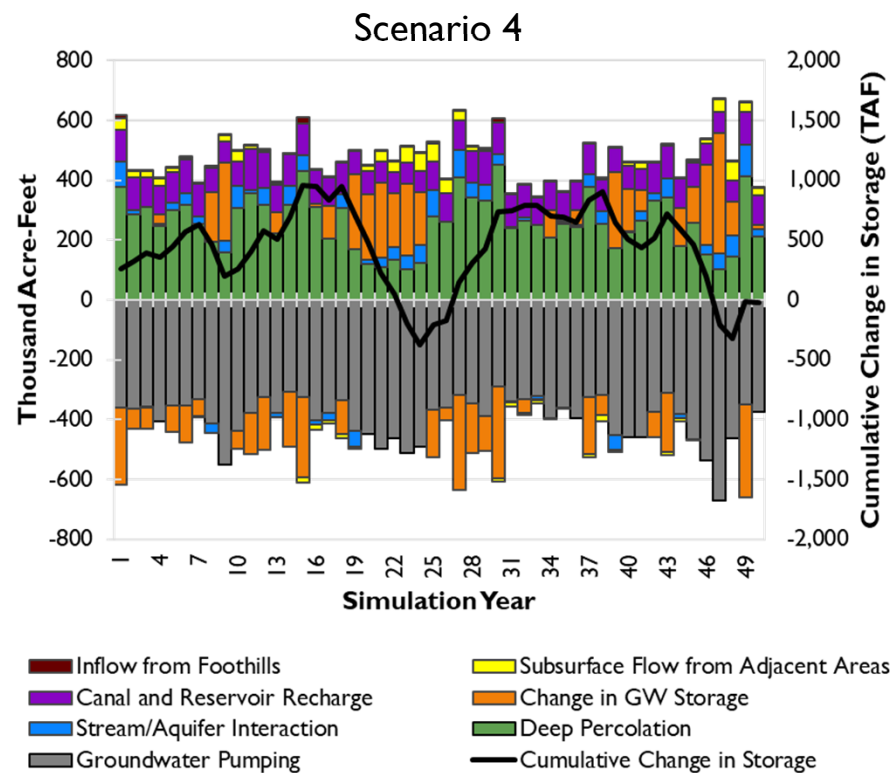
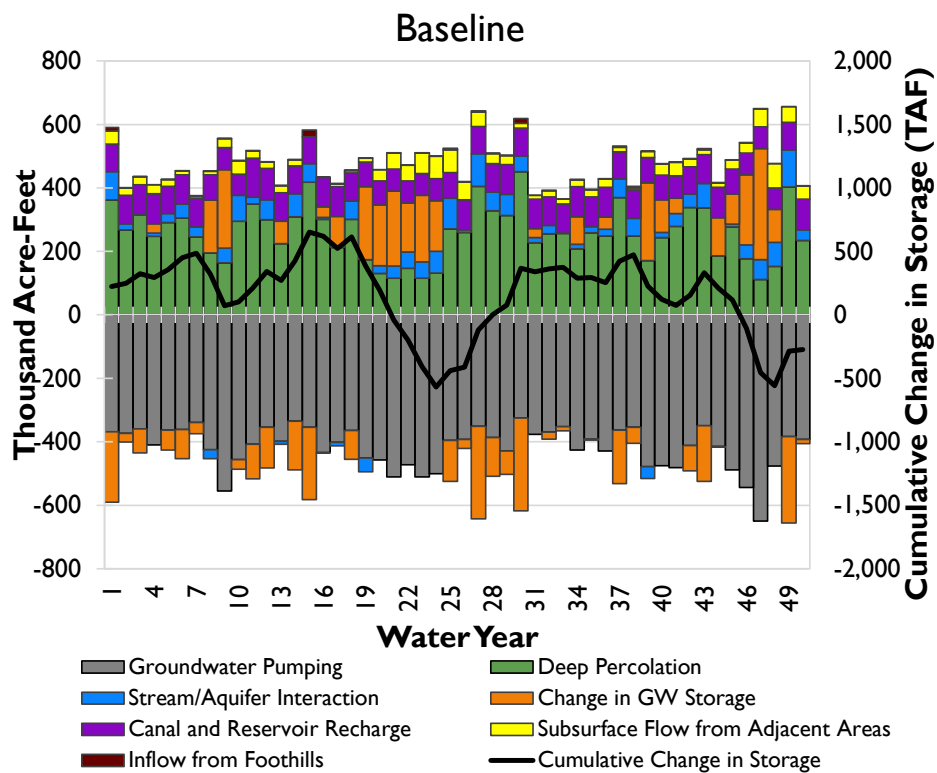
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GROUNDWATER HYDROGRAPHS



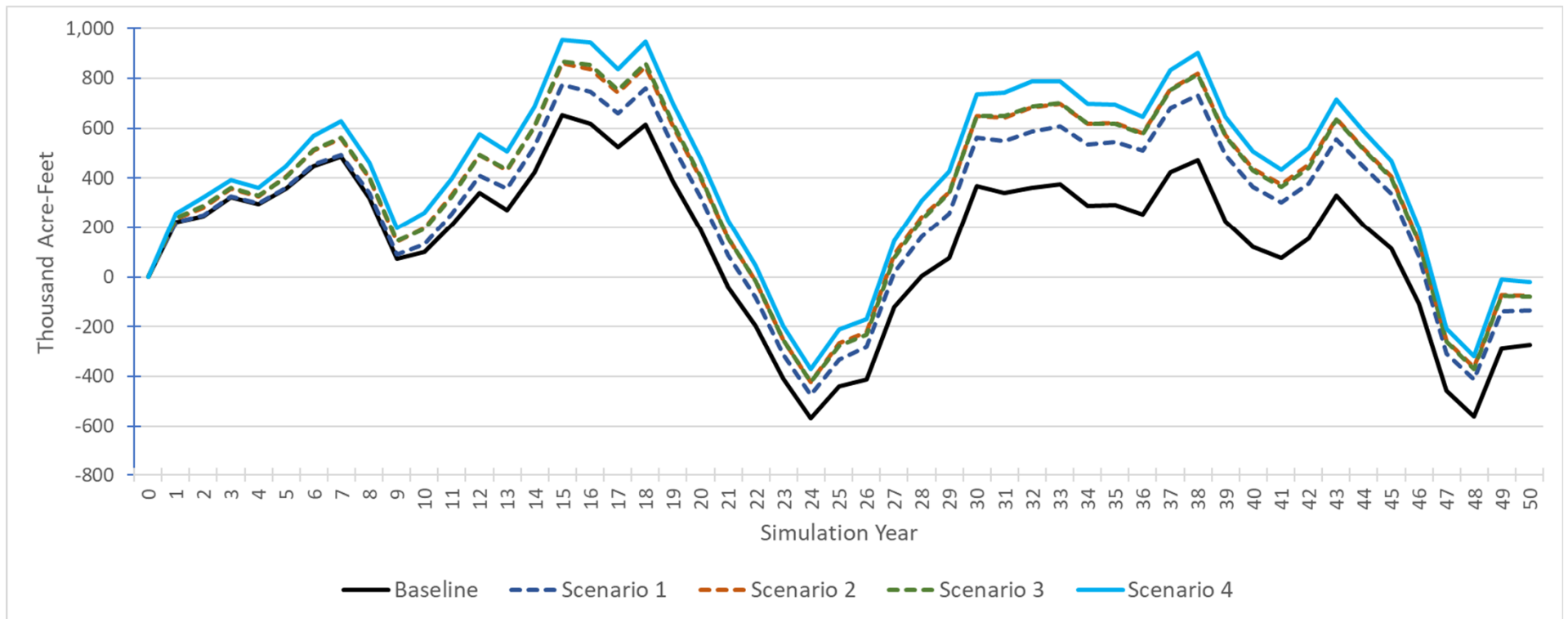
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GROUNDWATER BUDGET



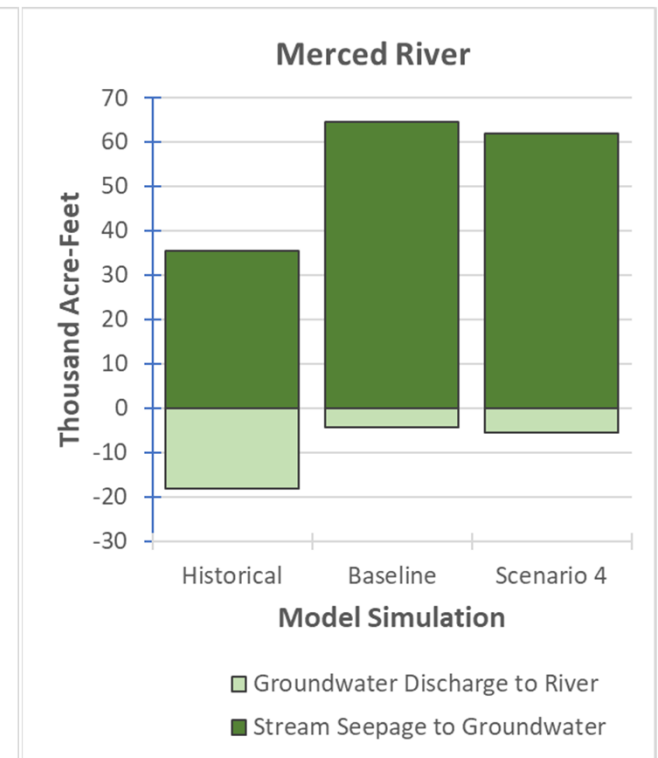
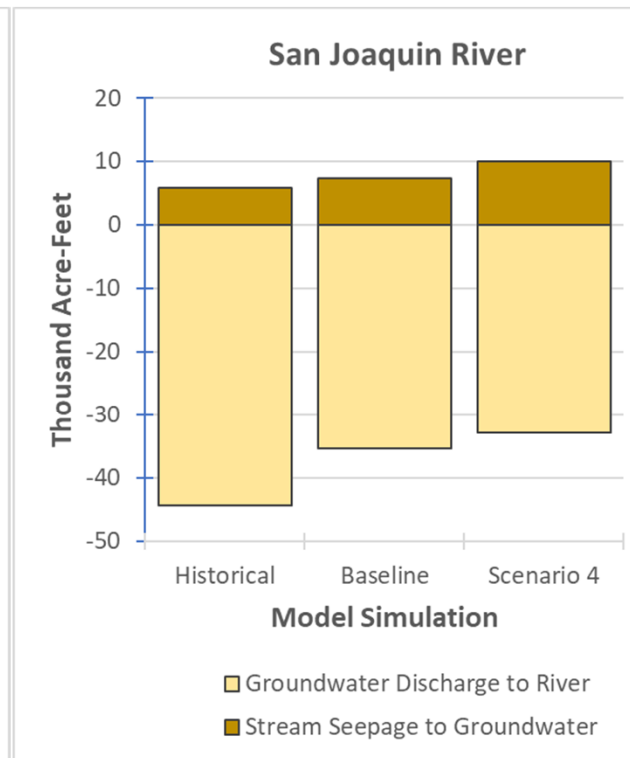
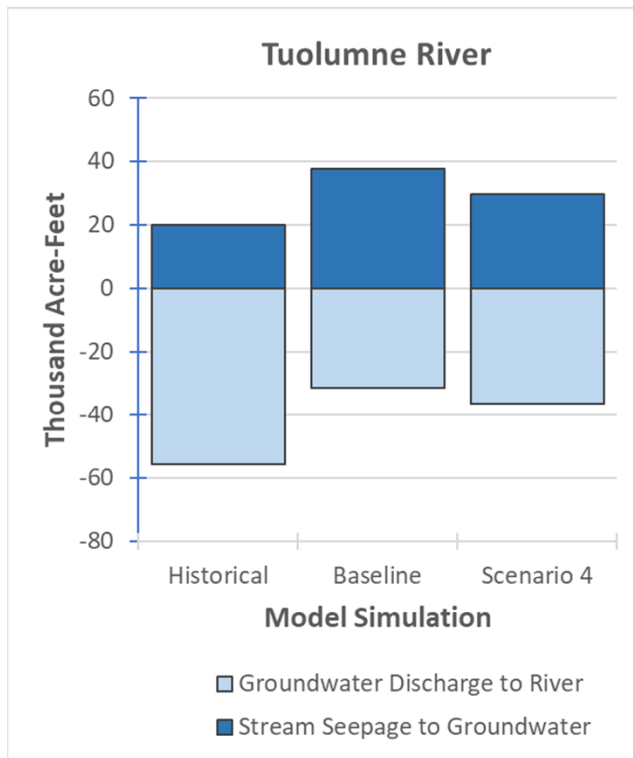
PRELIMINARY DRAFT; SUBJECT TO REVISION

CHANGE IN GROUNDWATER STORAGE



PRELIMINARY DRAFT; SUBJECT TO REVISION

INTERCONNECTED SURFACE WATER



PRELIMINARY DRAFT; SUBJECT TO REVISION

NEXT STEPS

- **Demand Management**

- **Compliance with SMC6** – Depletions of interconnected surface water that have significant and unreasonable adverse impacts on beneficial uses of the surface water.
- **Scenario 5** – Perform demand management scenario to ensure SMCs are met for the interconnected surface water.

QUESTIONS?

