Meeting Summary: ECC GSP

East Contra Costa GSP Model Meeting

When: Thursday May 27, 2021, 10:00 a.m. to 11:00 a.m.
Where: Zoom call

Attendees: Barb Dalgish, Bill Brewster, Dan Muelrath, Debbie Cannon, Faithe Lovelace, Jackson Cook, James Wolfe, Lisa Beutler, Maggie Dunton, Nacho Mendoza, Paul Seger, Ryan Hernandez, Scott Buenting, Vicki Kretsinger

Link to watch the model presentation: https://lsce1-my.sharepoint.com/:f:/g/personal/flovelace_lsce_com/EmgVfsR3-71EvRE3unEjVaQBbFIEIFtIsn52KF1C0iFyAA

ACTION ITEMS May 2021

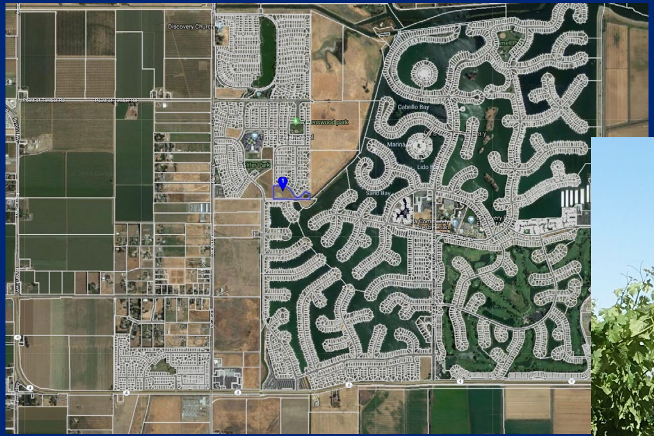
ITEM	OWNER	DUE
1. Check to see if DWR has plans to release a transport model that is compatible with the current ECC Model	Jackson Cook	June 9th
2. Provide budget for a transport model development	LSCE	June 9th
3. What are mechanisms for drains in model?	LSCE	June 9th
4. Provide model input for GSA wells.	LSCE	June 9th

1. **Meeting Summary** Barb Dalgish (LSCE) provided a summary on the ECC groundwater flow model and the information it provides to the GSP and the Subbasin.
2. Ryan asked if the model used the best data available for sea level rise estimates.
   a. Barb used the median sea level rise estimates provided through DWR. DWR sources sea level rise from the Natural Resource Conservation Service (NRCS)
   b. Ryan asked for verification that the sea level rise scenario is consistent with assumptions used by the Delta Stewardship Council and other groups.
3. Dan asked if the model could determine how water demand in GSAs will affect other GSAs.
   a. Barb indicated that water budget components can be extracted from the model, but noted that the size of model elements is less accurate at a GSA scale than, say, for the subbasin.
   b. Dan followed up asking whether the model can be used for future planning by GSAs.
      i. Barb indicated that the model can be used to assess how changes in future demands or other parameters will affect the Subbasin.
      ii. Tom let the group know that the bulk of the model is developed but can be updated in the future.
4. Dan wanted to know how the model handles Water Quality.
   a. Barb informed the group that the model is a flow model not a transport model. For example, the model can be used to assess groundwater gradients and flow direction to assess potential for sea water intrusion along the Delta margins.
      i. Dan asked how much effort would be required to develop a new model or modified to model for transport.

1. Barb noted that there is no publicly available version of a transport model and stated that it would be a large effort to develop such a tool.
    a. Jackson will ask DWR modeling group if a transport model available or in development.
2. Dan requested a cost estimate to develop a transport model to assist GSAs with future planning activities.

5. Barb asked if there was any specific graphs or tables that the GSAs would like to see?
    a. Dan asked if actual well characteristics were used in the model for DWD production wells.
        i. Barb responded that well data provided by the GSAs were incorporated into the model scenarios and that LSCE could provide information to the GSAs on input used in their areas.
6. Dan asked how de minimis water users were calculated.
    a. The model used wells that are reported to DWR Well Completion Report Database (by section) and based on demand.
7. Ryan asked if canals modeled in the subbasin are assigned to the Irrigation districts or to the county.
    a. Barb will provide a map of where the drainage canals are located.
8. Dan wanted to know haw drainage on Bethel Island is being handled in the model. Barb will check.
9. Dan: It is important to have a transport model to know what is happening around contaminated sites (e.g., water quality concerns around Byron Airport).
10. Next meetings:
    a. Wednesday June 9th,10 am to 11:30 am, ECC GSP Working Group.
    b. Tuesday June 15th, 11 am to noon, Communications Meeting
    c. Wednesday June 23rd 4-5:30 pm: Public Meeting

EAST CONTRA COSTA SUBBASIN
Groundwater Sustainability Plan



East Contra Costa Subbasin GSP Model, Future Water Budget, and Sustainable Yield

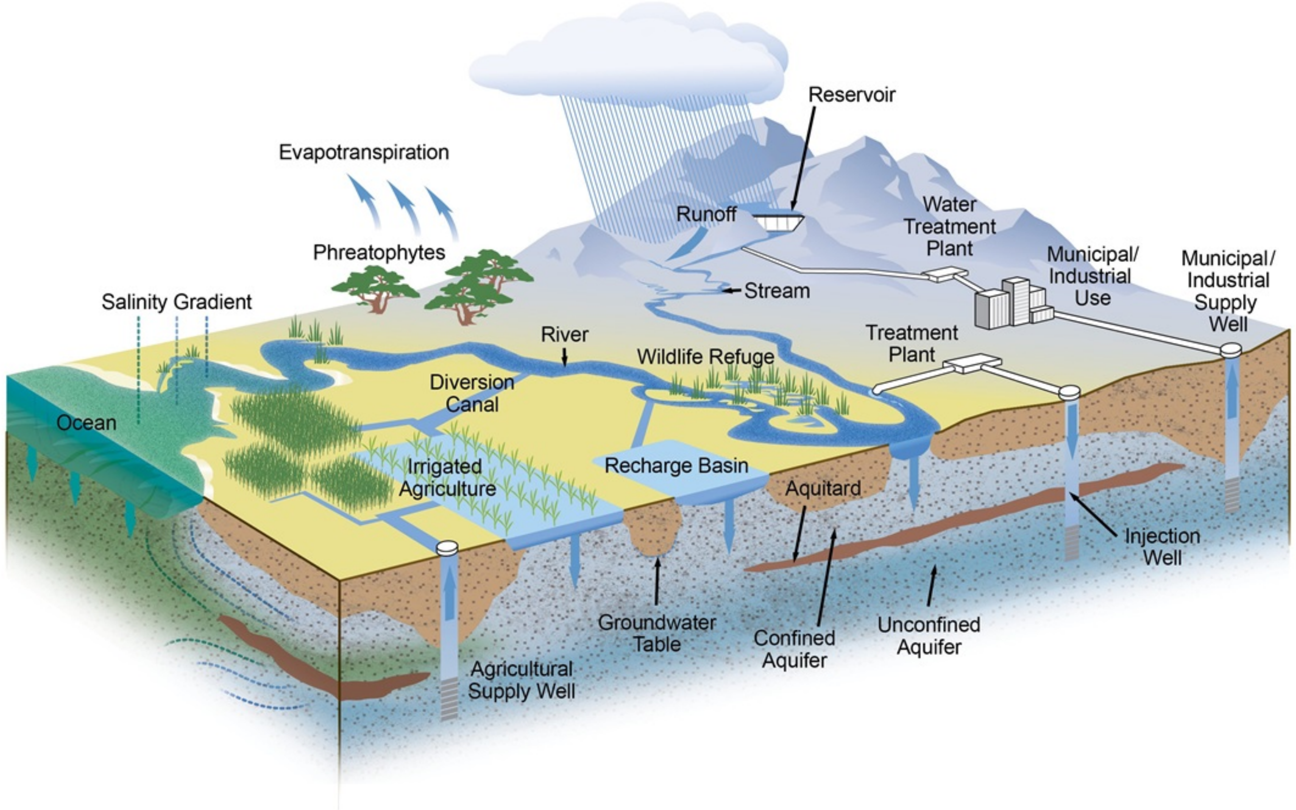
May 27, 2021 GSP Working Group Meeting

Barb Dalgish
Luhdorff & Scalmanini, Consulting Engineers

ANTIOCH CALIFORNIA | BYRON BETHANY IRRIGATION DISTRICT | THE CITY OF BRENTWOOD | CONTRA COSTA WATER DISTRICT | CONTRA COSTA COUNTY | DIABLO WATER DISTRICT | TOWN OF DISCOVERY BAY CALIFORNIA | ECCID

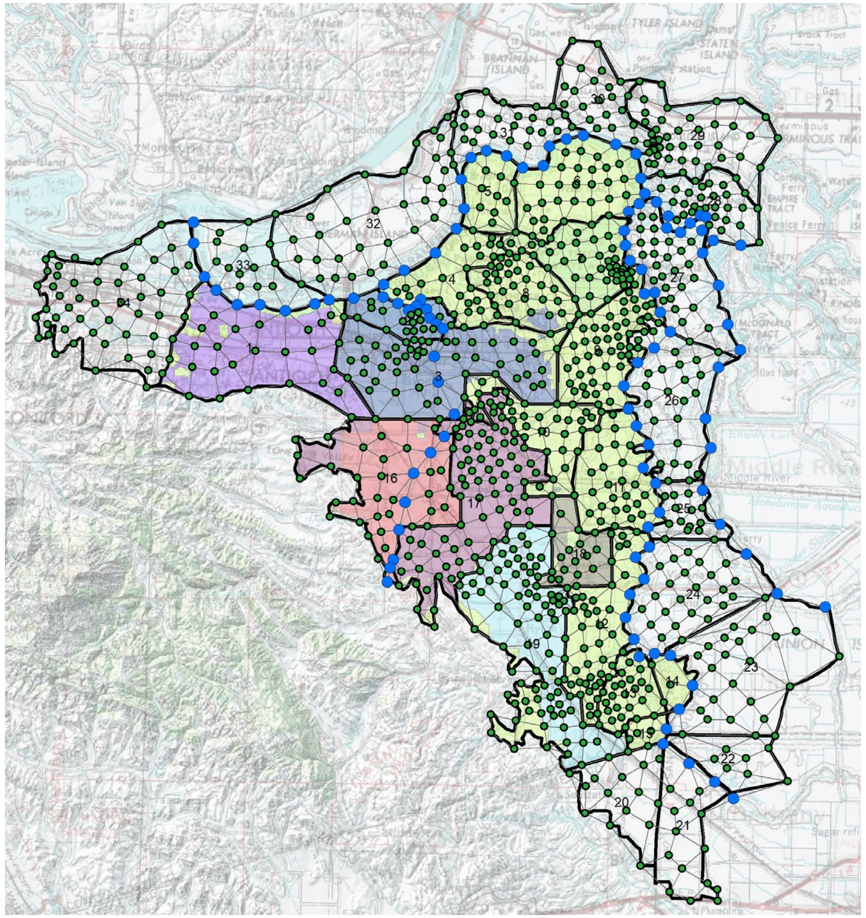
Outline

- Model Overview
- Water Budget Components
- Future Scenarios
- Sustainable Yield
- Model Reliability



EAST CONTRA COSTA SUBBASIN Groundwater Sustainability Plan

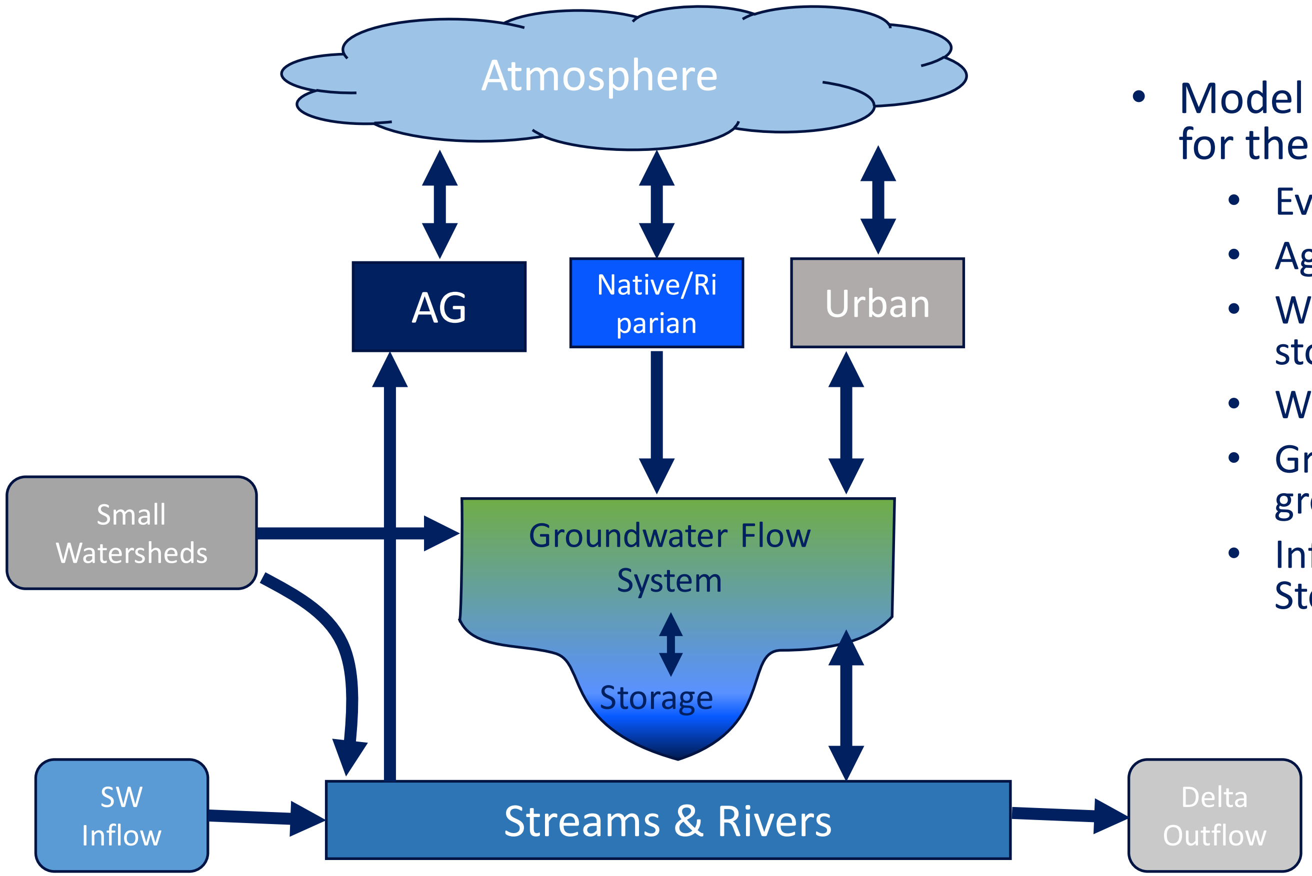
ECCSim Model Features



- Local pumping amounts
- Local surface water delivery amounts
- Water Balance Subregions within the basin
- Improvements to vertical model layering to match Hydrogeologic Conceptual Model (HCM)
- Improved calibration well network and surface water gages
- Calibration – groundwater level agreement

Water Budget Components

EAST CONTRA COSTA SUBBASIN
Groundwater Sustainability Plan



- Model output for each Water Balance Subregion and for the entire ECC Subbasin
  - Evapotranspiration
  - Agricultural and Urban Water Use
  - Water Supply (precip, diversions, groundwater pumping, storage)
  - Water Use (recharge, evapotranspiration, storage)
  - Groundwater storage & cumulative change in groundwater storage
  - Inflows & Outflows (Recharge, Boundary Flows, Streams, Storage, Pumping)

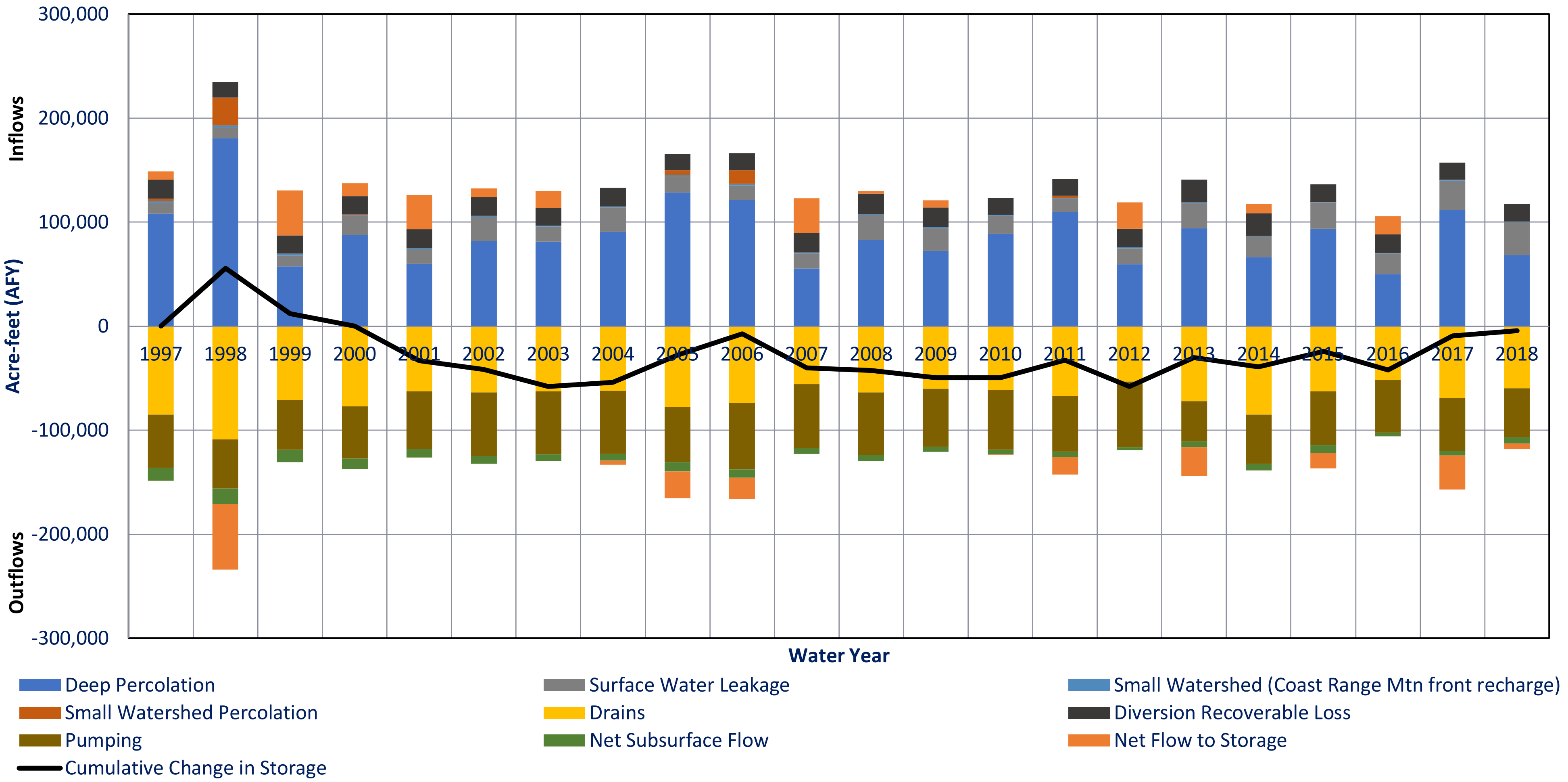
Groundwater Budget Components Entire Subbasin

EAST CONTRA COSTA SUBBASIN
Groundwater Sustainability Plan

Inflows
- Deep Percolation
- Surface Water Leakage
- Small Watersheds (Coast Range Mtn front recharge)
- Diversion Recoverable Loss

Outflows
- Drains
- Pumping
- Net Subsurface Flow

Inflow or Outflow
- Storage



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Groundwater Budget for East Contra Costa Subbasin
Historical Calibration Period (1997-2018)

East Contra Costa Groundwater-Surface Water Simulation Model (ECCSim) Report

Groundwater Budget Components by GSA

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Groundwater Sustainability Plan

Inflows

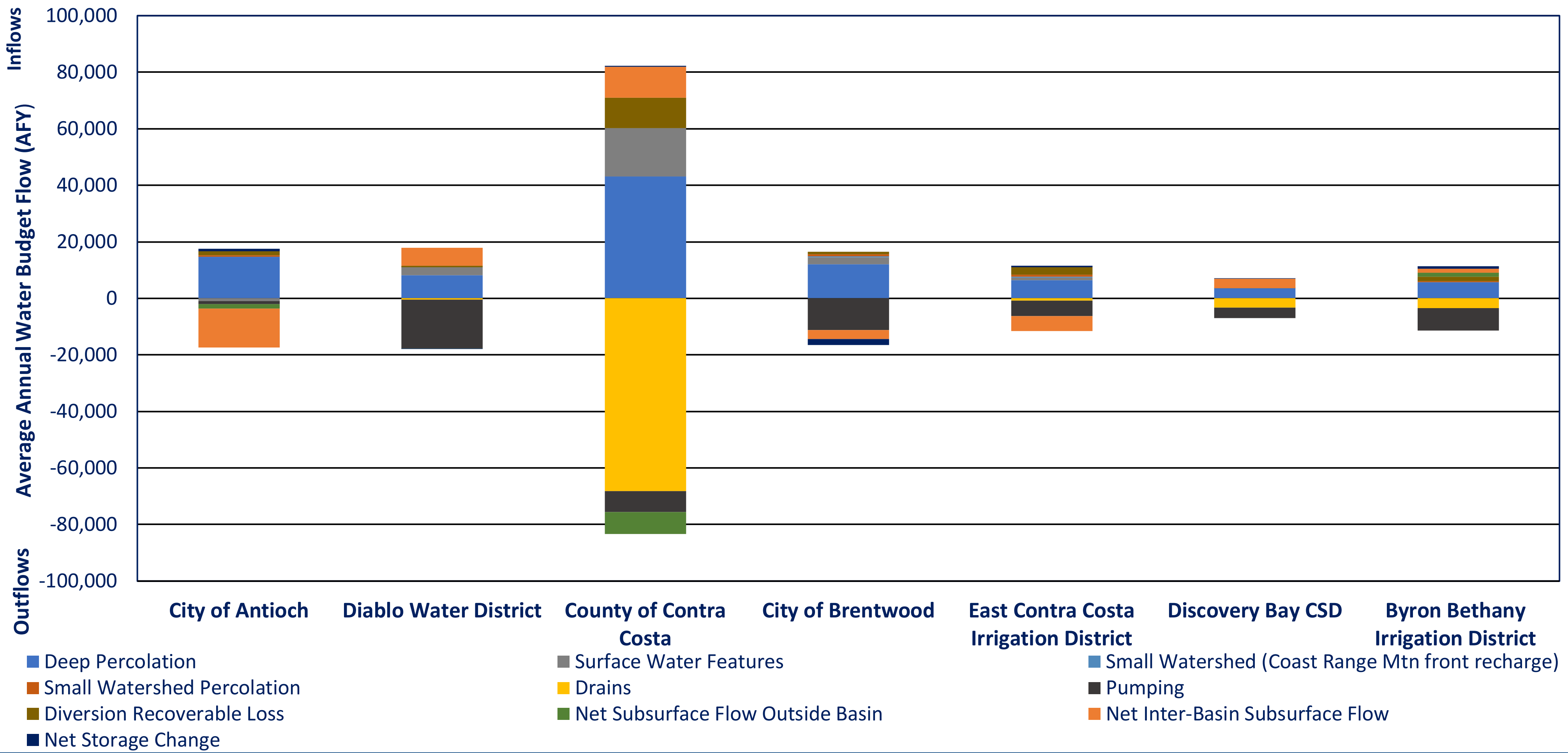
- Deep Percolation
- Surface Water Leakage
- Small Watersheds (Coast Range Mtn front recharge)
- Diversion Recoverable Loss

Outflows

- Drains
- Pumping

Inflow or Outflow

- Storage
- Net Subsurface Flow



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Average Water Budget Components During the Historical Calibration Period (1997-2018)

East Contra Costa Groundwater-Surface Water Simulation Model (ECCSim) Report

Predictive Future Model Scenarios

50-year future

Land Use Change

Climate Change

Sea level rise

Sustainable Yield

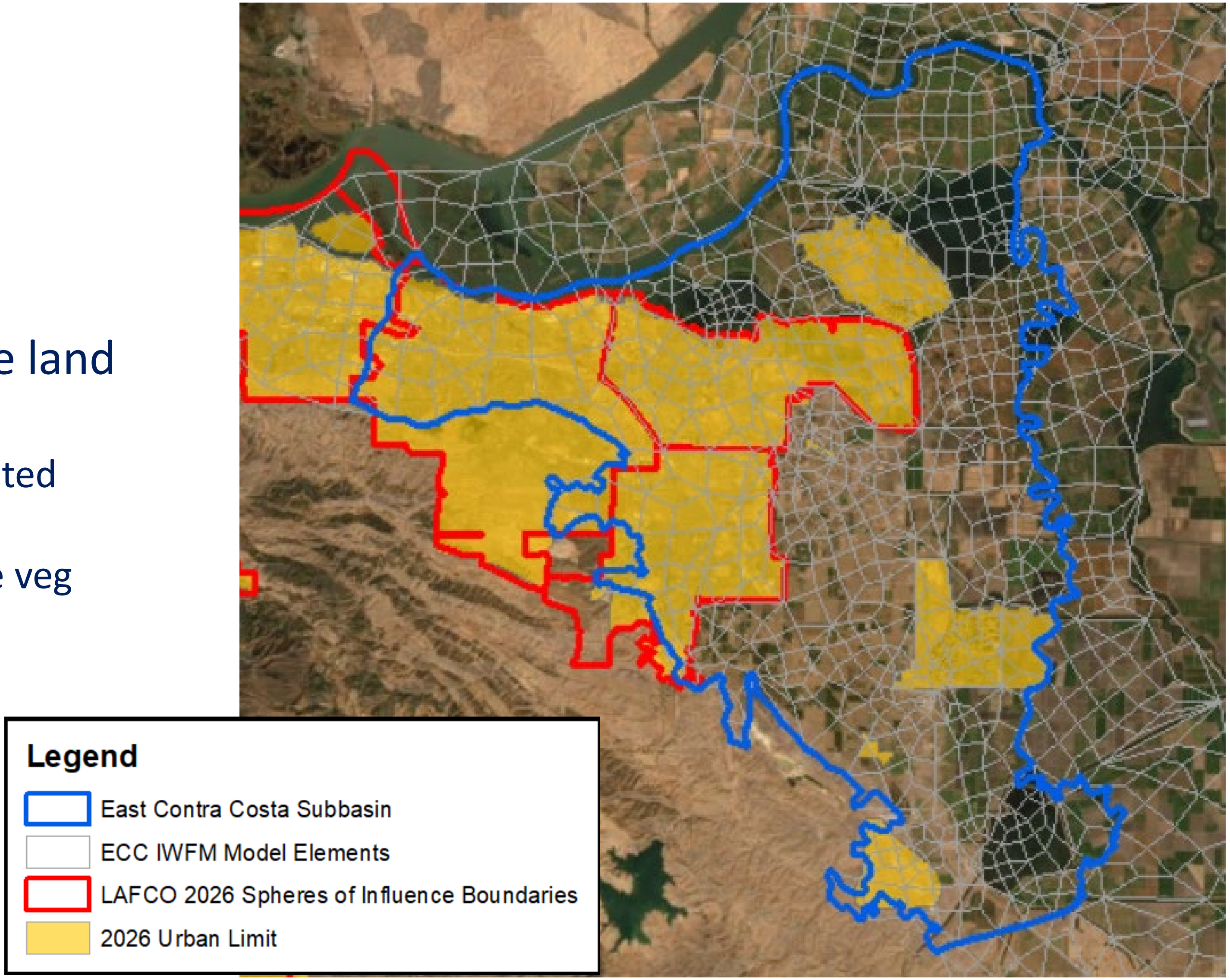
- Contra Costa County future land use – urban growth
  - New urban footprint, expected 2026
- Climate Change Scenario – Use DWR's guidance document
  - 2070 Central Tendency Future Climate Adjustments
- Sea Level Rise Scenario
- Sustainable Yield Analysis

Future Scenarios

EAST CONTRA COSTA SUBBASIN
Groundwater Sustainability Plan

Land Use Change

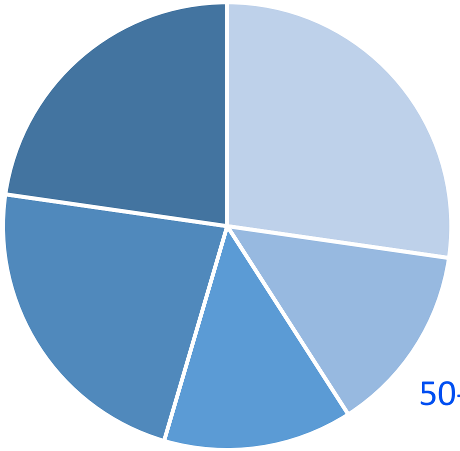
- Contra Costa County future land use – urban growth
  - New urban footprint, expected 2026
  - Conversion of ag and native veg land to urban land



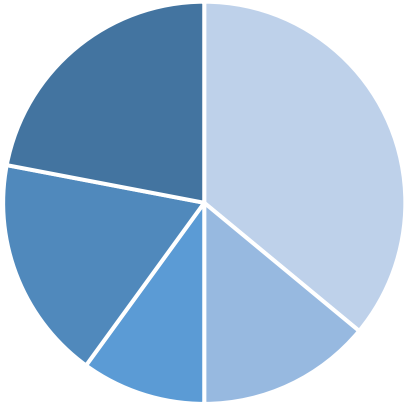
Future Scenarios

Climate Change

Base Period 22-Year Water Year Types



Future Climate Change
50-Year Period Water Year Types



Water Year Types
- Wet
- Above Normal
- Below Normal
- Dry
- Critical

- Climate Change Scenario – Use DWR's guidance document
  - 2070 Central Tendency Future Climate Adjustments for time period 2019-2068, using DWR Reference Years 1954-2003
  - Match water year types and patterns to repeat hydrology already simulated during the base period.
  - Apply adjustments to precip, ET, diversions, and stream flows based on geographical location

	Average Annual Precipitation		Average Annual Evapotranspiration	
Land Use Type	**Base Period**	**Future Climate Change Scenario**	**Base Period**	**Future Climate Scenario**
Ag	56,657	46,131	190,388	145,505
Urban	23,439	45,517	20,458	31,638
Native/Riparian	47,321	46,669	38,137	36,255
Total	*127,417*	*138,317*	*248,982*	*213,398*

Future Scenarios

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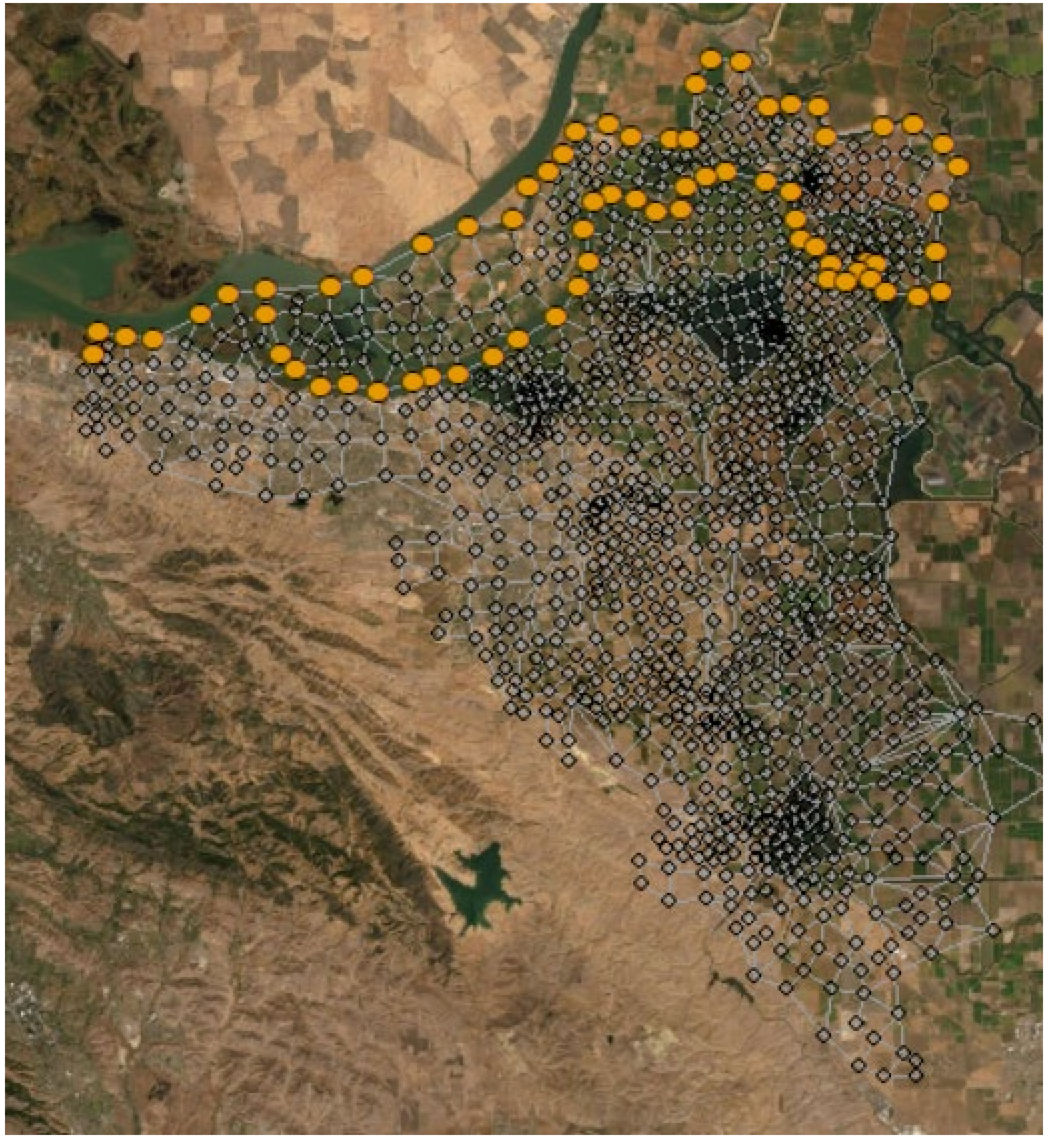
Groundwater Sustainability Plan

Sea level rise

- Sea Level Rise Scenario
  - DWR provides median predicted values (developed by NRC) for the years 2030 and 2070 that translate to about 0.5 to 1.4 feet of sea level rise respectively.
  - Sea level rise changes were applied to the northern waterways, for areas with elevations lower than sea level.



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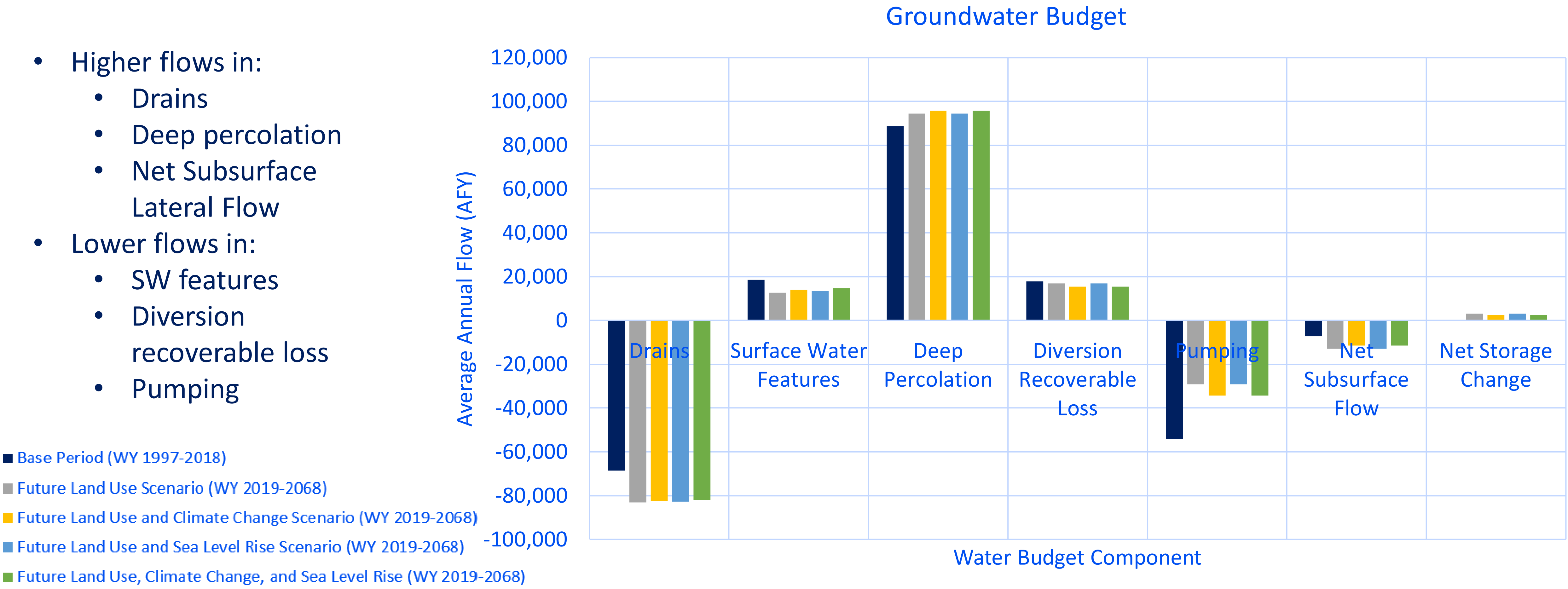
Results from Predictive Future Model Scenarios

- Higher flows in:
  - Drains
  - Deep percolation
  - Net Subsurface Lateral Flow
- Lower flows in:
  - SW features
  - Diversion recoverable loss
  - Pumping



Future Scenarios

EAST CONTRA COSTA SUBBASIN
Groundwater Sustainability Plan

Sustainable Yield

- Sustainable Yield Analysis
  - Reduce diversion amounts to force groundwater pumping to increase to meet demands.

Avoid undesirable effects:

- Aquifer Storage Depletion
- Stream Depletion
- Subsurface Lateral Inter-Basin Flow Reversal

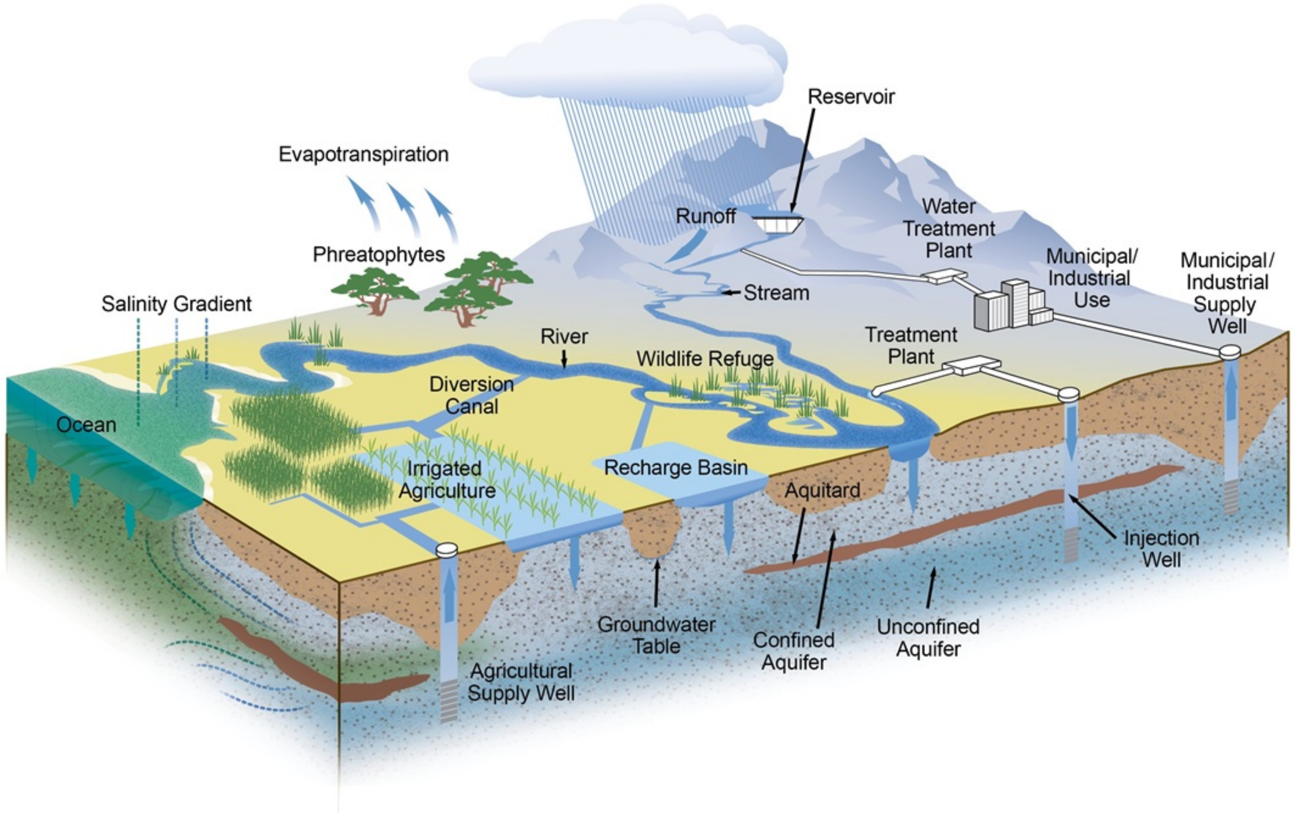
Groundwater Budget Flow Component	Base Period (WY 1997-2018)	Water Year 2015	*Minimum Annual Base Period Value*	*Maximum Base Period Value*	Future Land Use Scenario (WY 2019-2068)	Sustainable Yield Run: Reduce SW Deliveries by 75%	Sustainable Yield Run: Reduce SW Deliveries by 50%	Sustainable Yield Run: Reduce SW Deliveries by 48%	Sustainable Yield Run: Reduce SW Deliveries by 45%	Sustainable Yield Run: Reduce SW Deliveries by 40%
Drains	-68,460	-62,757	*-108,993*	*-51,735*	-83,060	-33,823	-56,134	-54,585	-54,355	-56,523
Surface Water Features	18,560	25,480	*10,135*	*31,887*	12,591	28,728	20,075	19,509	18,818	17,644
Deep Percolation	88,720	93,545	*49,915*	*180,801*	94,414	94,152	94,637	94,660	94,691	94,736
Small Watershed Baseflow	976	572	*498*	*2,320*	880	880	880	880	880	880
Small Watershed Percolation	2,260	0	*0*	*26,702*	2,051	2,051	2,051	2,051	2,051	2,051
Diversion Recoverable Loss	17,779	17,081	*14,568*	*22,330*	16,969	6,965	11,514	11,866	12,319	13,096
Pumping	-53,961	-51,691	*-64,017*	*-38,557*	-29,095	-117,559	-77,601	-74,504	-70,526	-63,694
Net Subsurface Flow	-7,197	-7,362	*-14,840*	*-2,972*	-12,895	11,656	-2,208	-3,057	-4,077	-5,767
Net Storage Change	-199	14,869	*-43,310*	*63,407*	3,119	-241	1,979	2,091	2,234	2,464

Sustainable Yield Estimate = 74, 500 AFY (with urban land use growth and a reduction of sw deliveries by 48%)

Model Reliability & Next Steps

EAST CONTRA COSTA SUBBASIN
Groundwater Sustainability Plan

- Model Uncertainty
  - Surface Water Features that are engineered
  - Stream gages that have not been recently surveyed
  - Areas to improve calibration
- Next Steps
  - Use the model as a tool to help guide selection of Minimum Thresholds.
  - Future Model Updates



Questions?