

# Scott Valley Projected Future Water Budget

Scott Valley GSA Advisory Committee

May 25, 2021

LARRY  
WALKER



ASSOCIATES

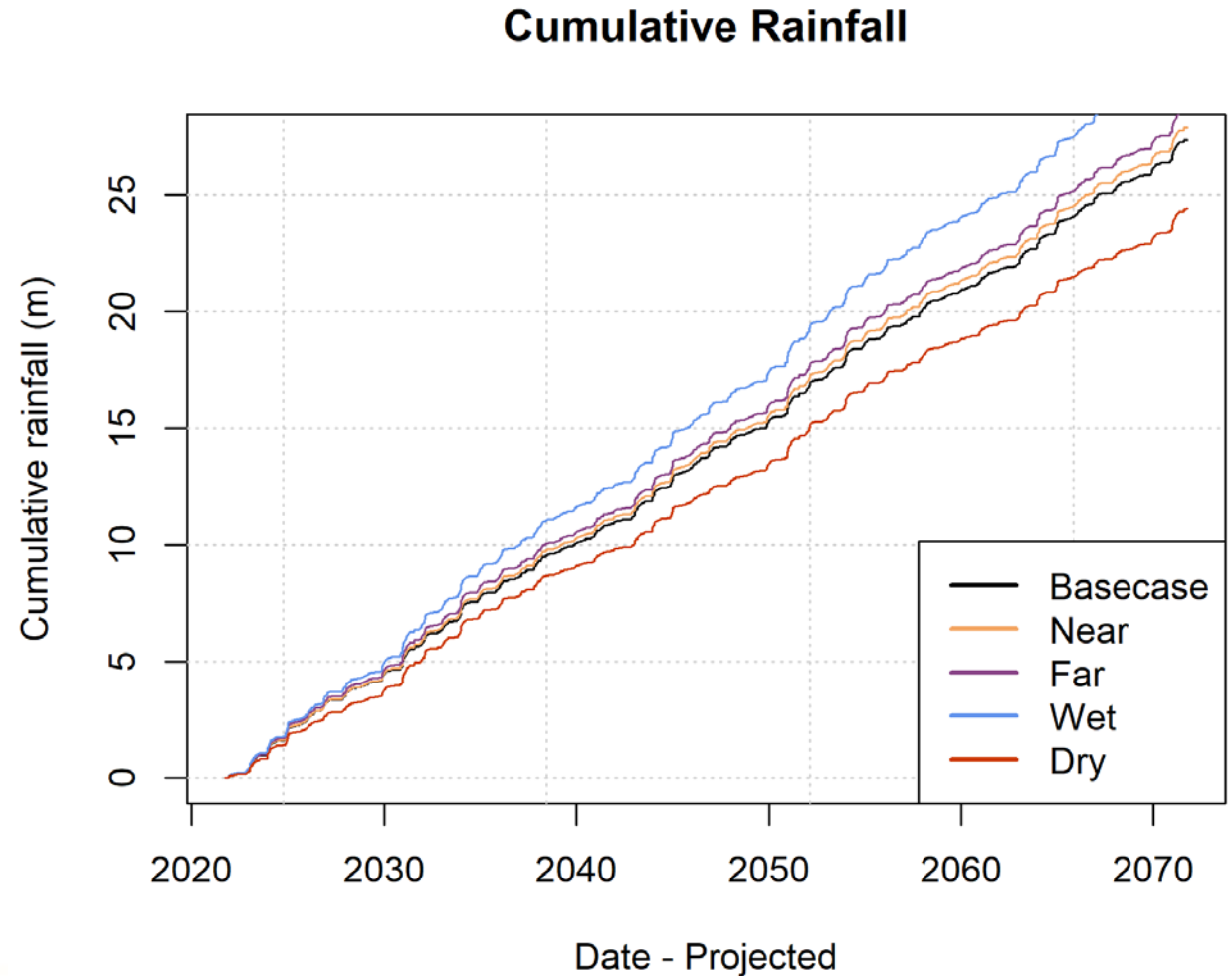
 Stantec

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# Projected Climate

- 50 years
- Brief comparison future climate change scenarios

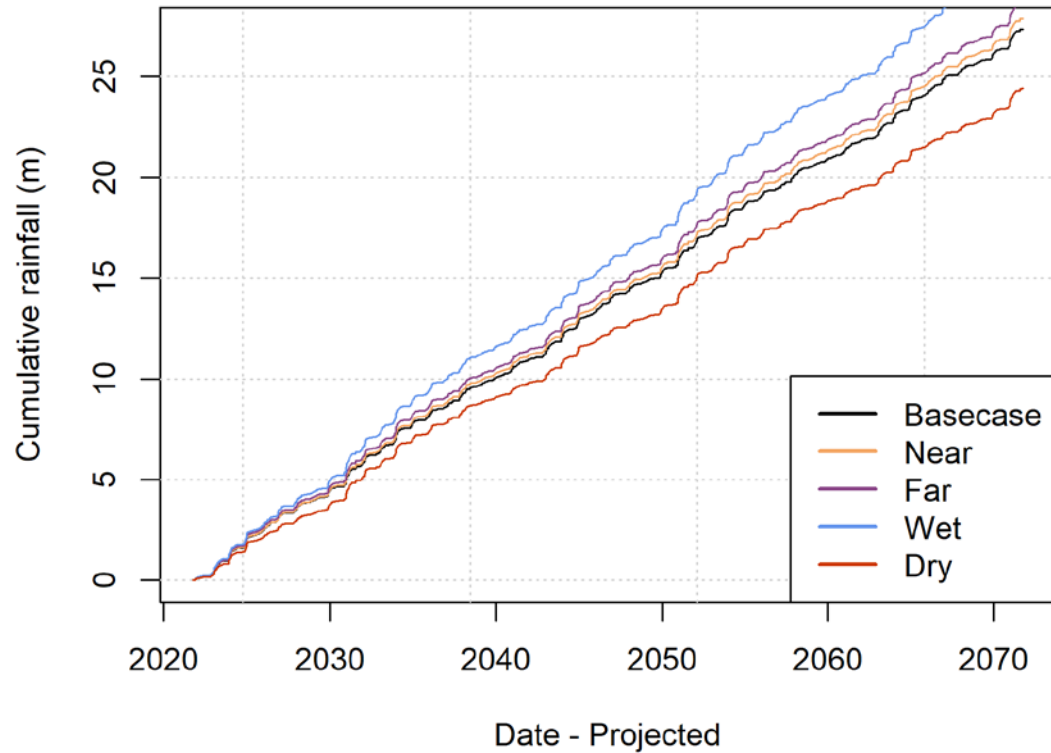


# DWR Guidance for Future and Climate Change

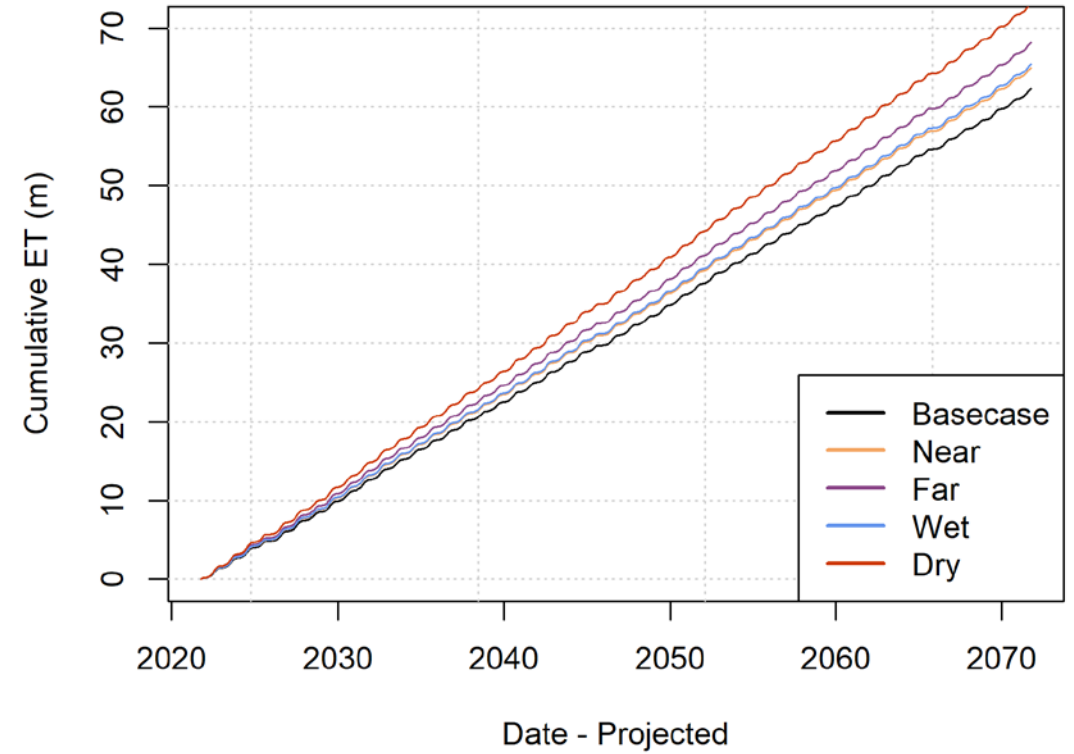
- DWR requires a future baseline of 50 years
  - Water years 1991-2011 used multiple times to make a 50-year scenario
- Climate change guidance is to model 4 scenarios;
  - Near-future climate (2030 – **Near**)
  - Far-future climate (2070 – **Far**)
  - Far-future, wet (2070WMW – **Wet**)
  - Far-future, dry (2070DEW – **Dry**)
- Climate guidance is done through perturbing Reference ET, Precipitation, and Streamflow (inflow) values

# Changes to Precipitation and Reference ET

## Cumulative Rainfall

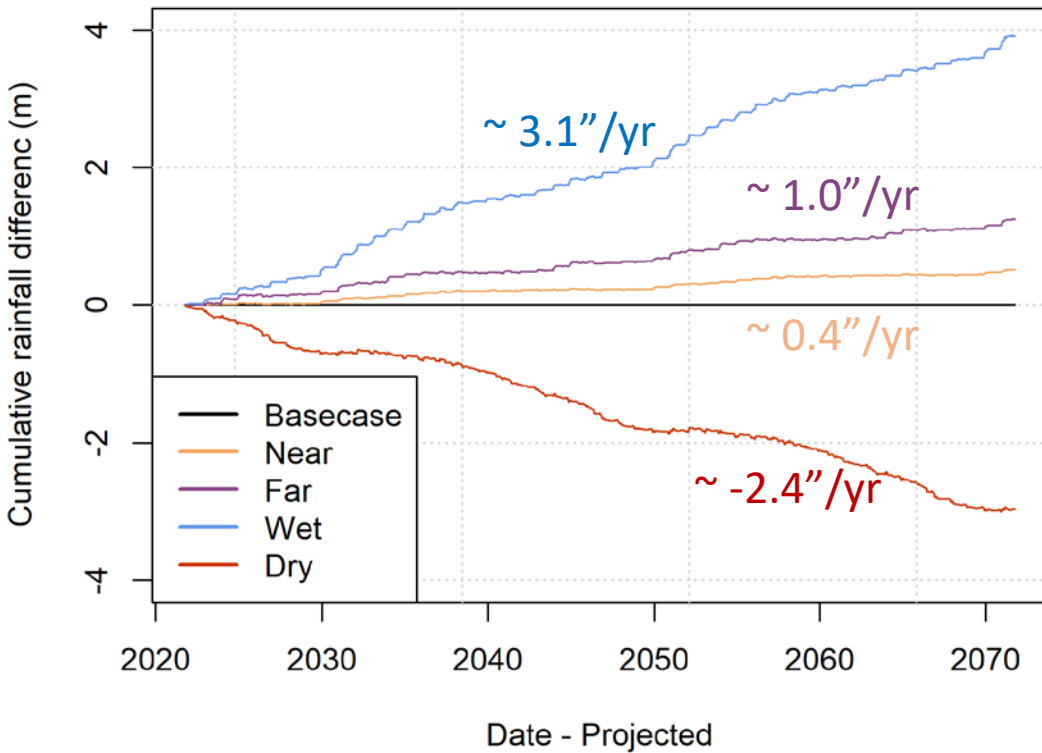


## Cumulative ET

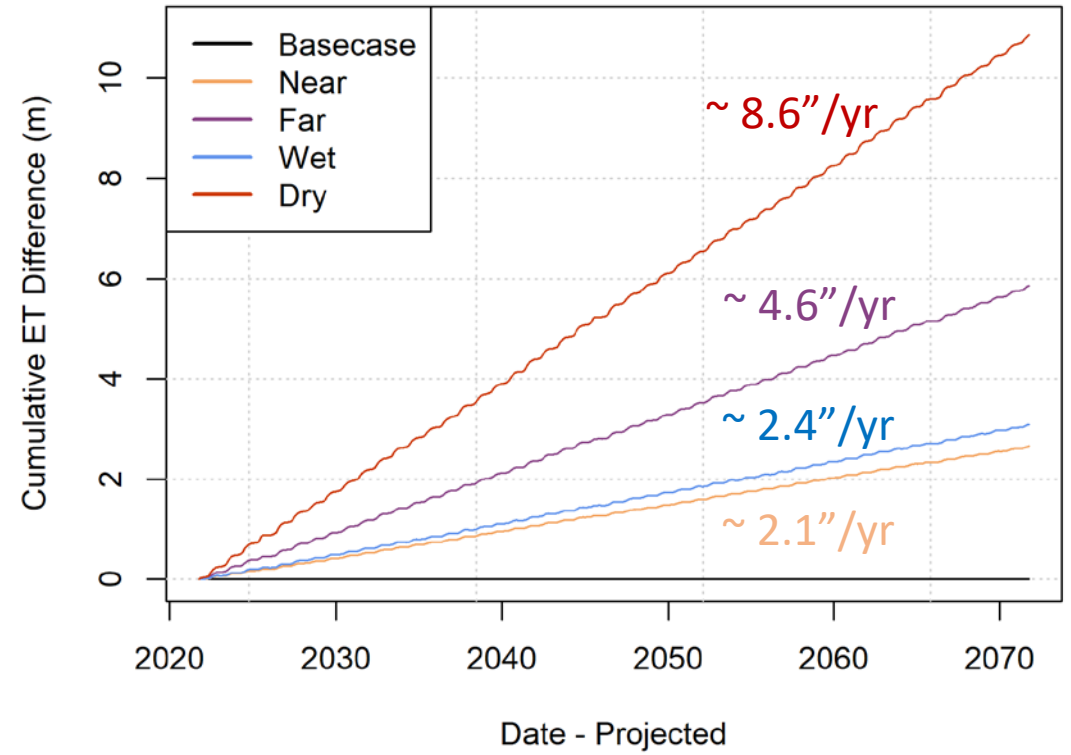


## Changes to Precipitation and Reference ET

Cumulative Rainfall (Difference from Basecase)



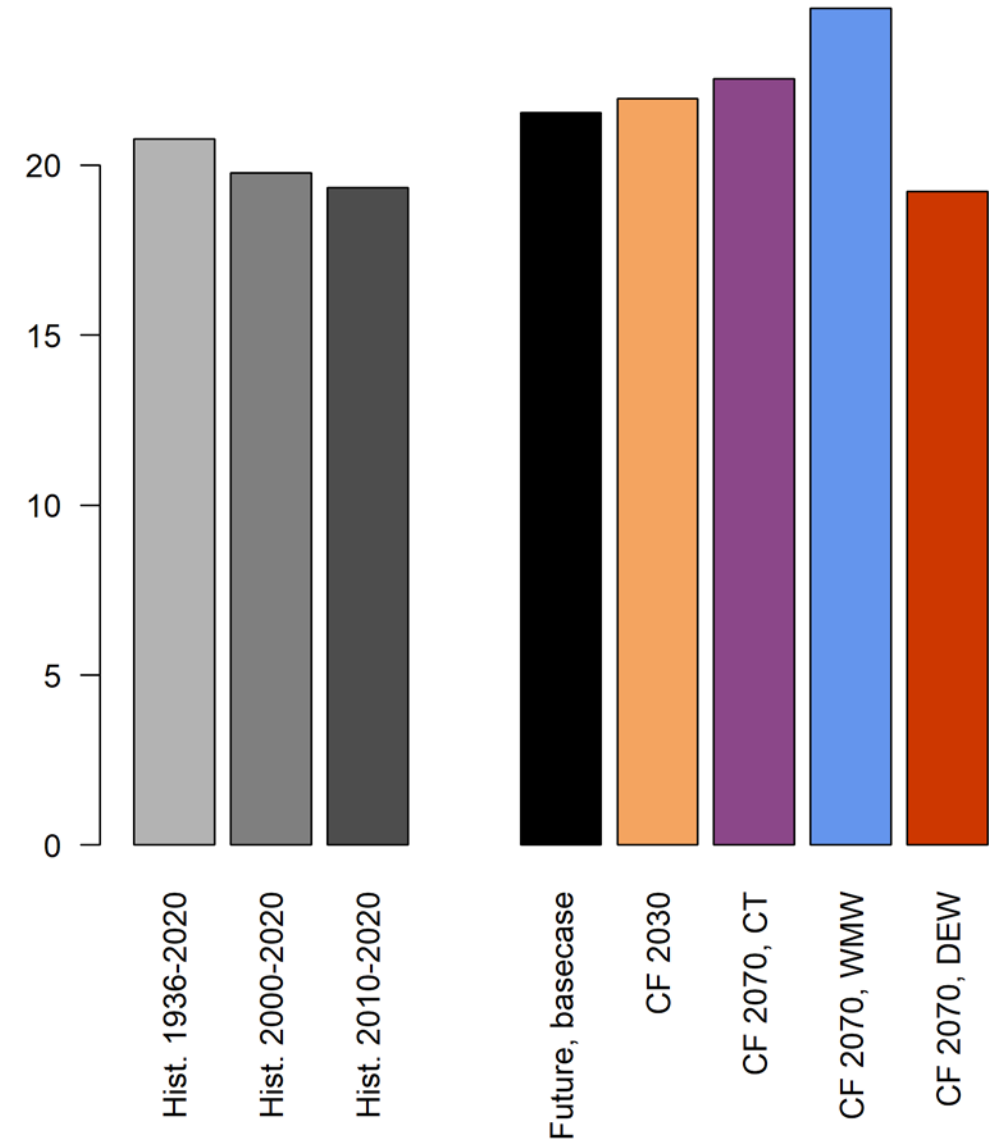
Cumulative ET (Difference from Basecase)



# Historical context

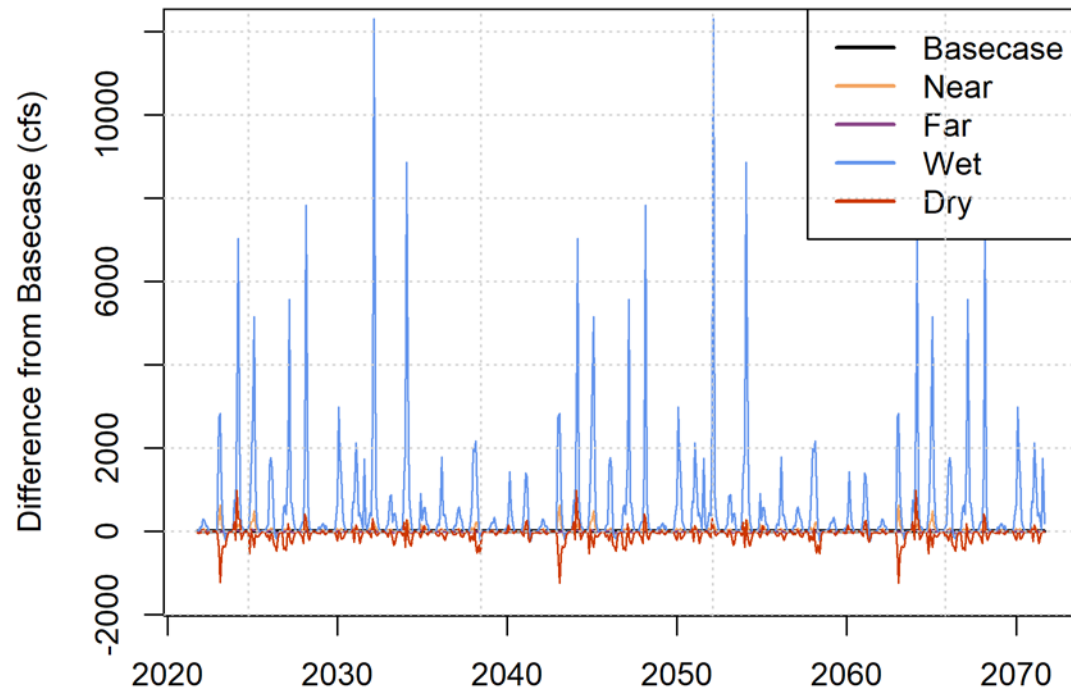
Historical Period or Future Scenario	Average Rainfall (in/year)
Long-term historical (1936-2020)	20.8
Last 20 years (2000-2020)	19.8
Last 10 years (2010-2020)	19.3
Future projected (2022-2071) <b>(basecase)</b>	21.5
Future projected, 2030 change factors <b>(Near)</b>	21.9
Future projected, 2070 change factors <b>(Far)</b>	22.5
Future projected, 2070 WMW change factors <b>(Wet)</b>	24.6
Future projected, 2070 DEW change factors <b>(Dry)</b>	19.2

Average rainfall, historical periods and future projected scenarios

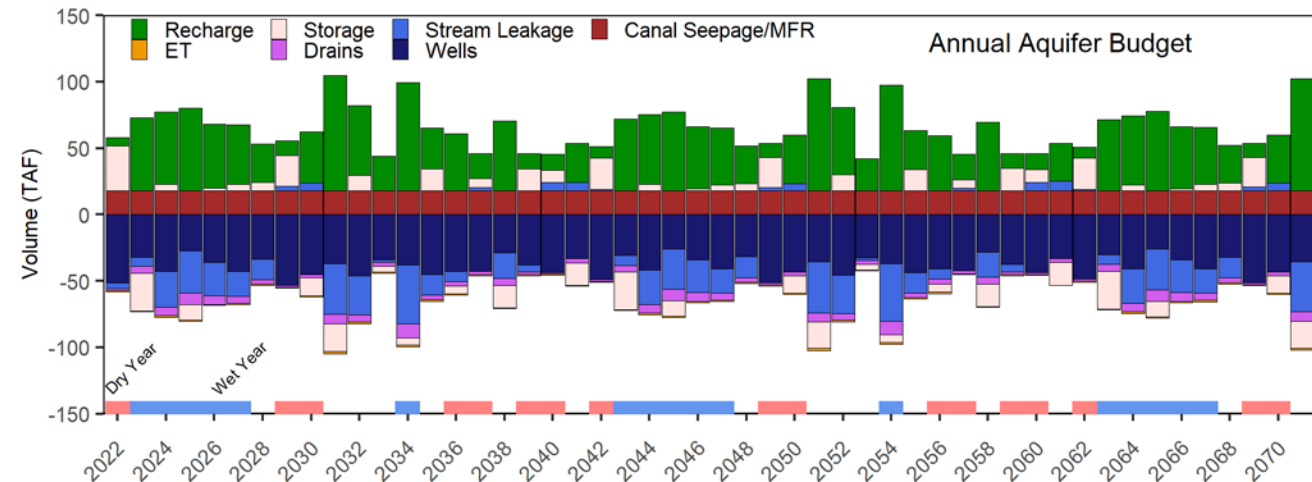
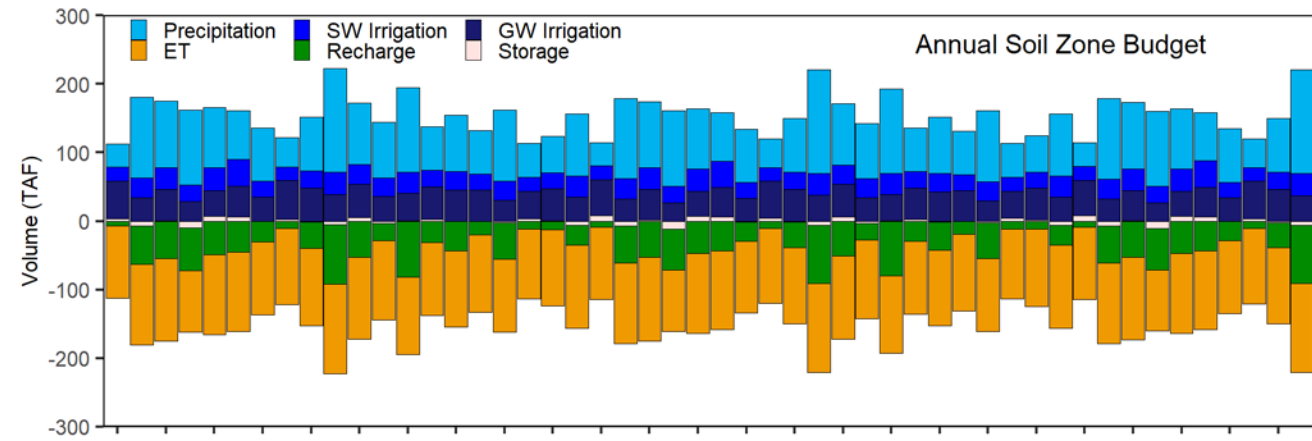
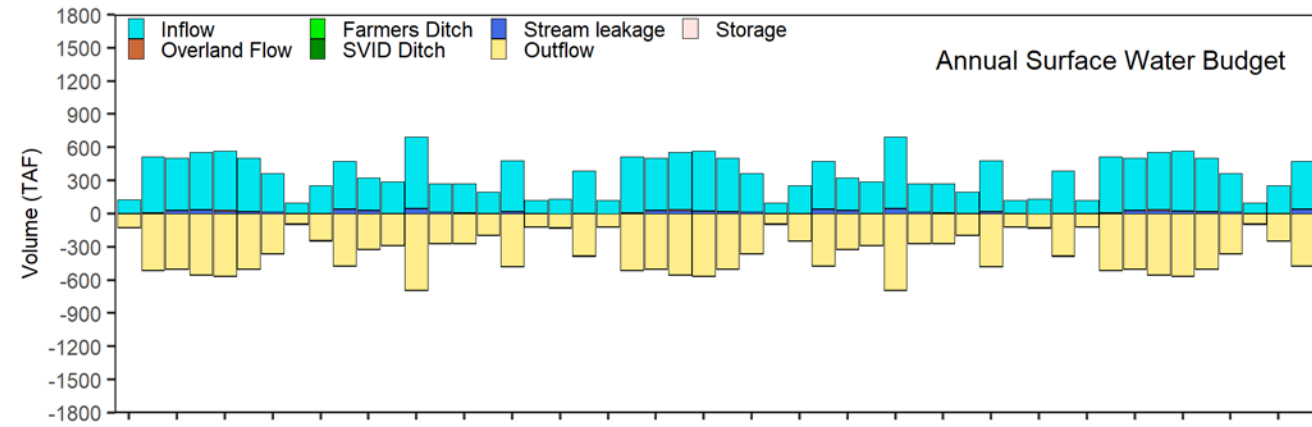


# Climate change streamflow differences plot

Projected Fort Jones Flow Differences

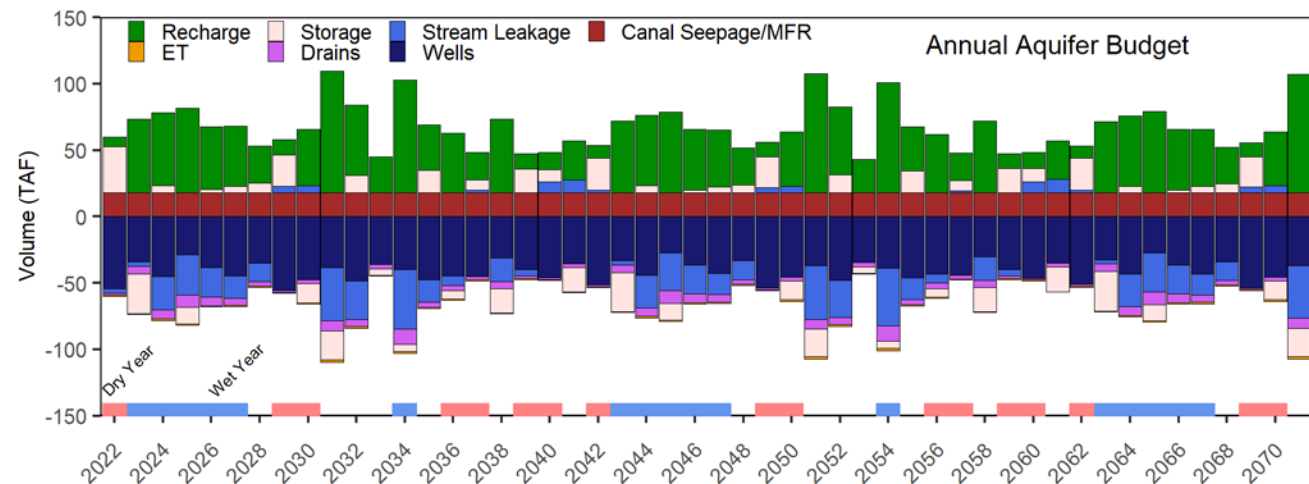
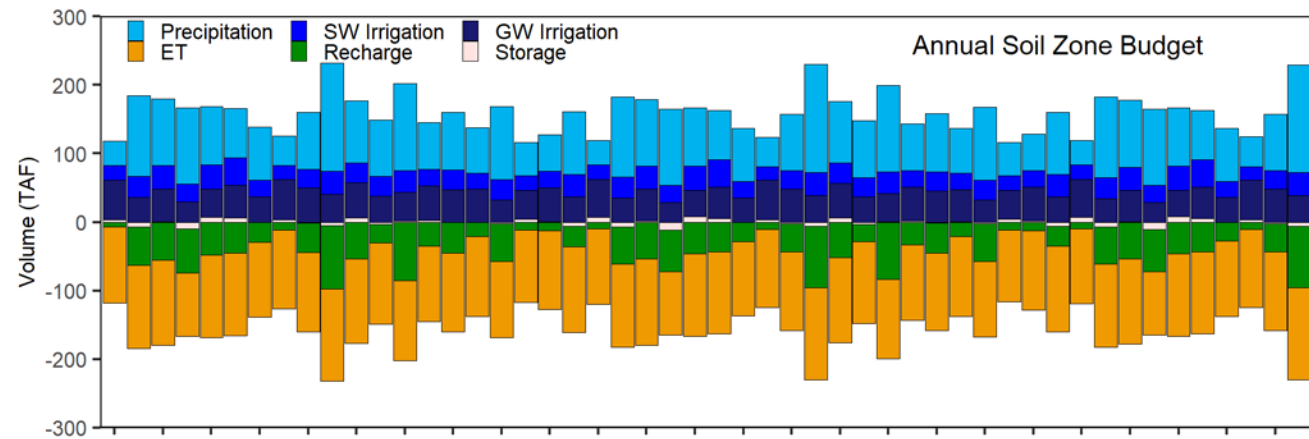
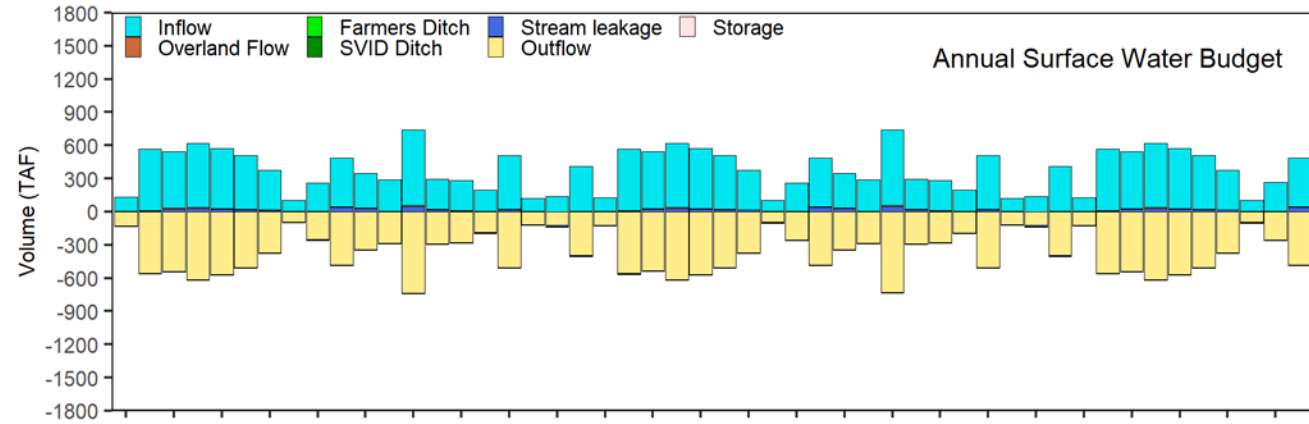


# Projected Future Water Budget - basecase

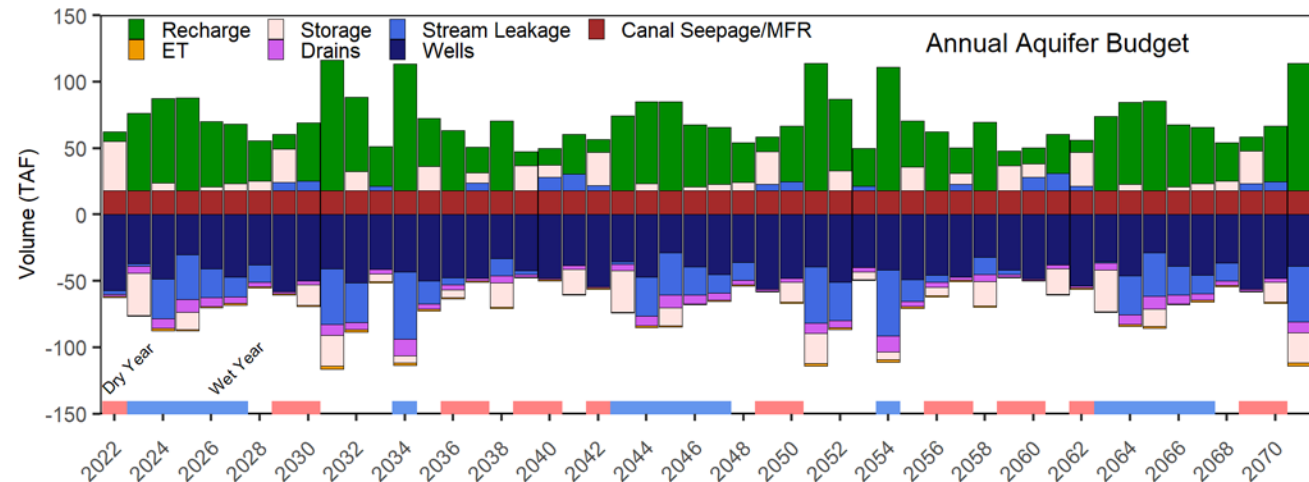
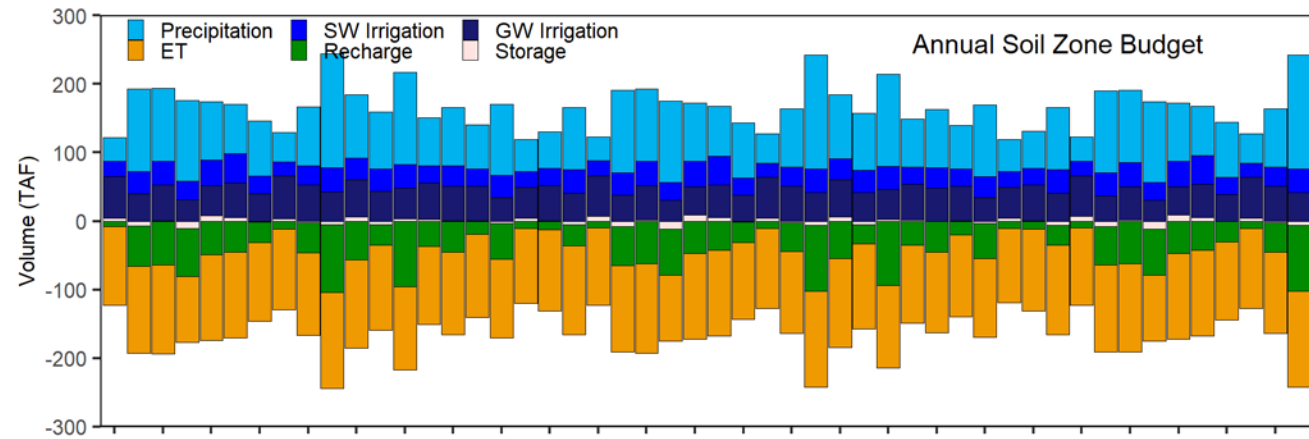
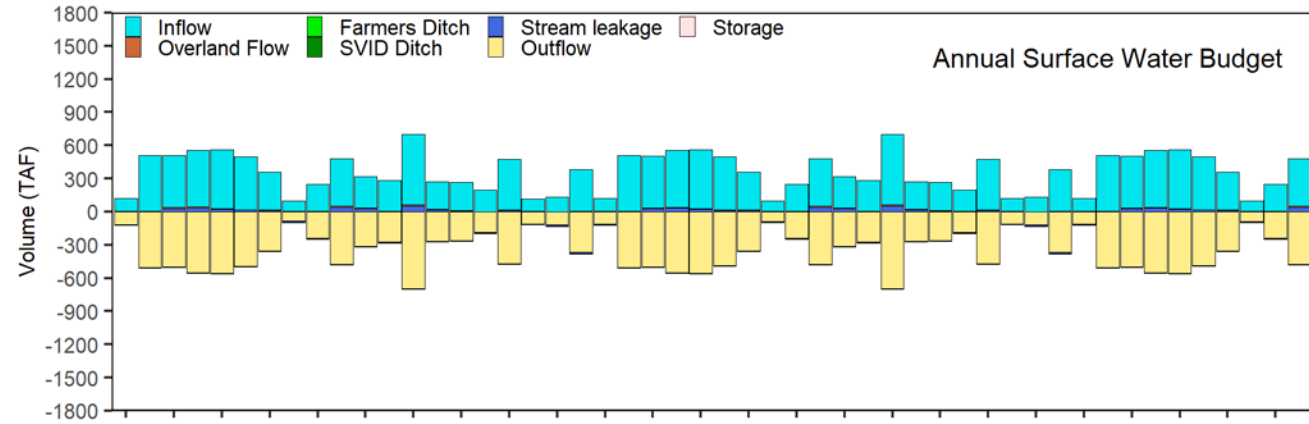




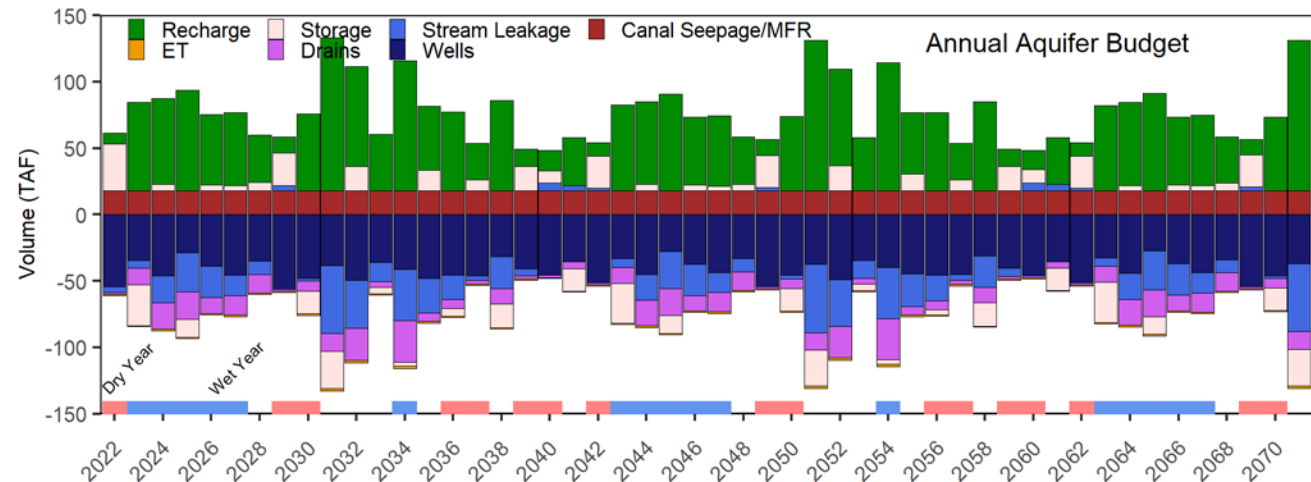
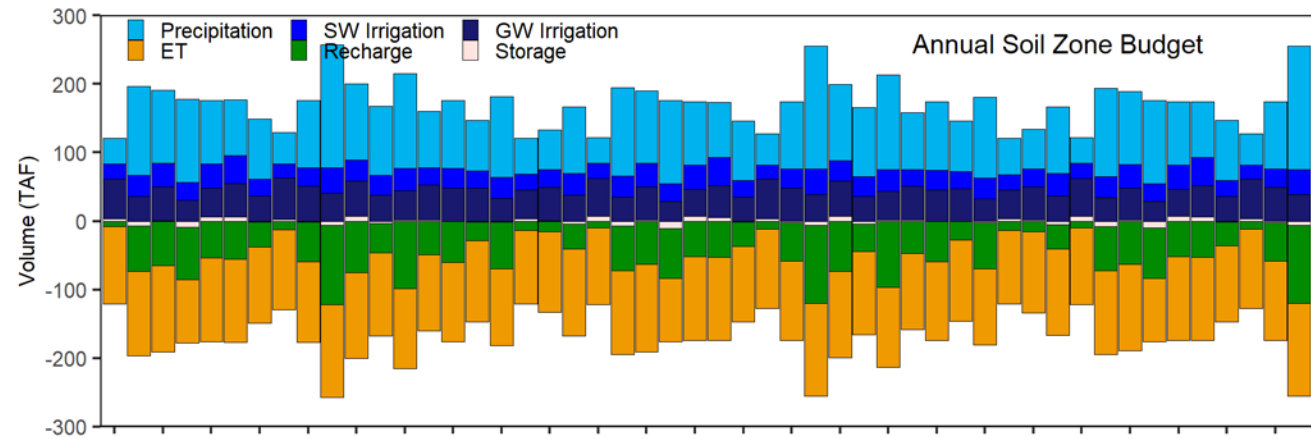
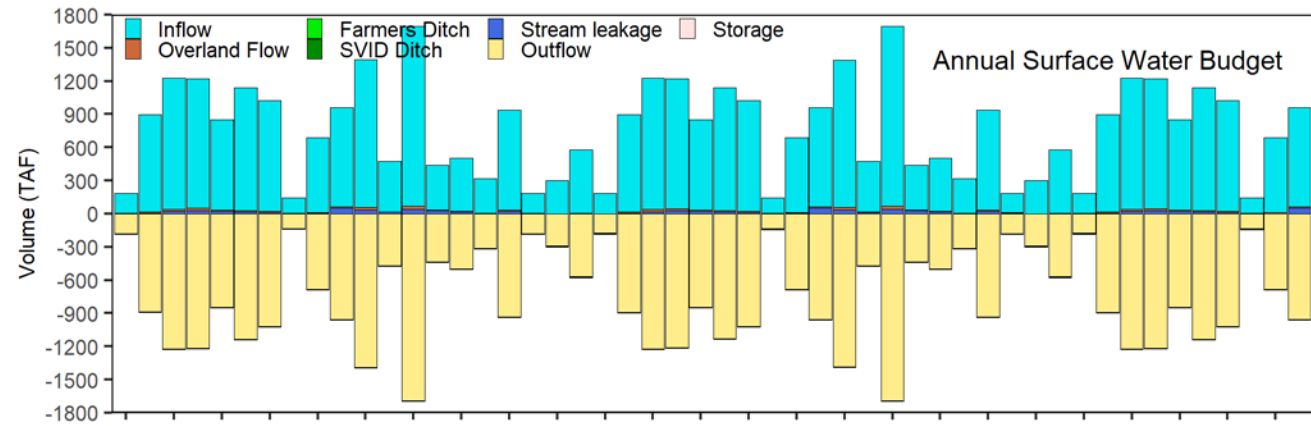
# Projected Future Water Budget - Near



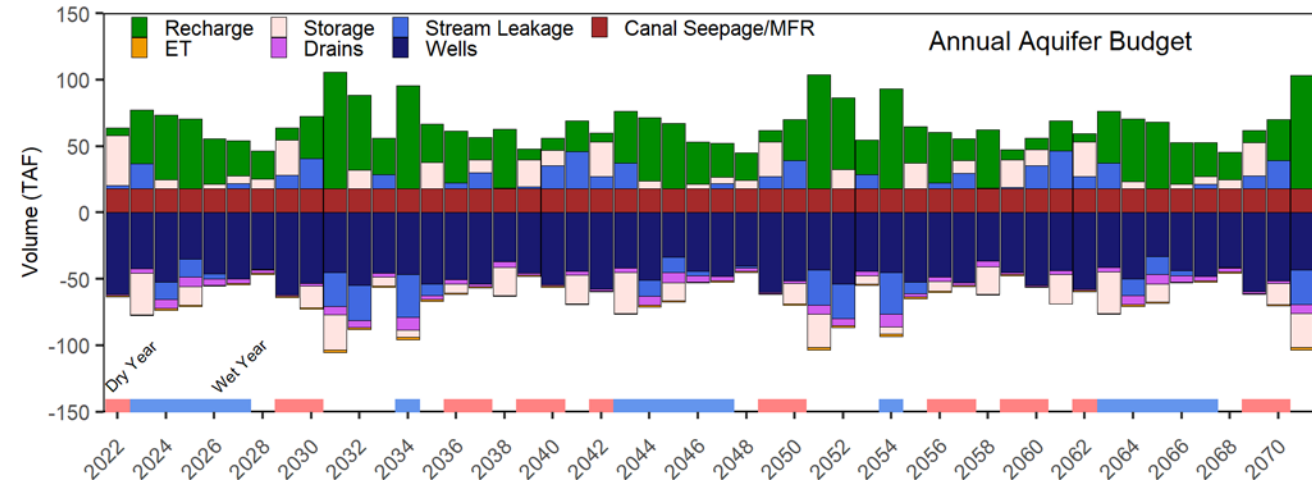
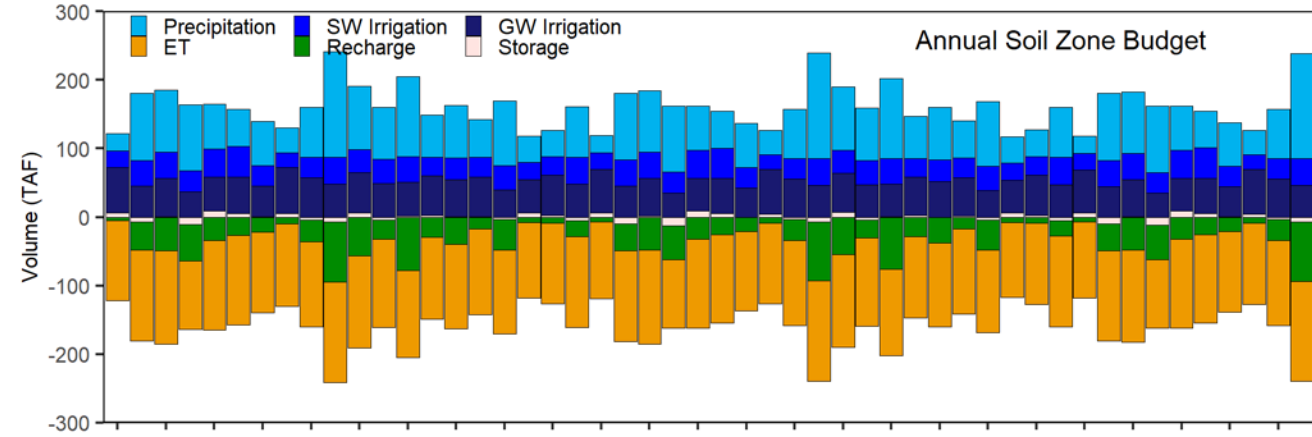
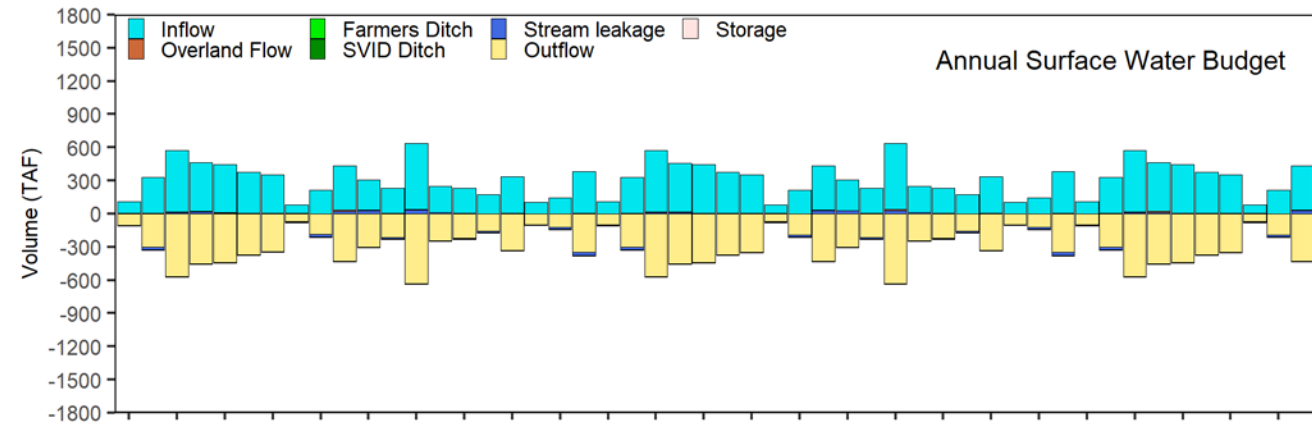
# Projected Future Water Budget – Far



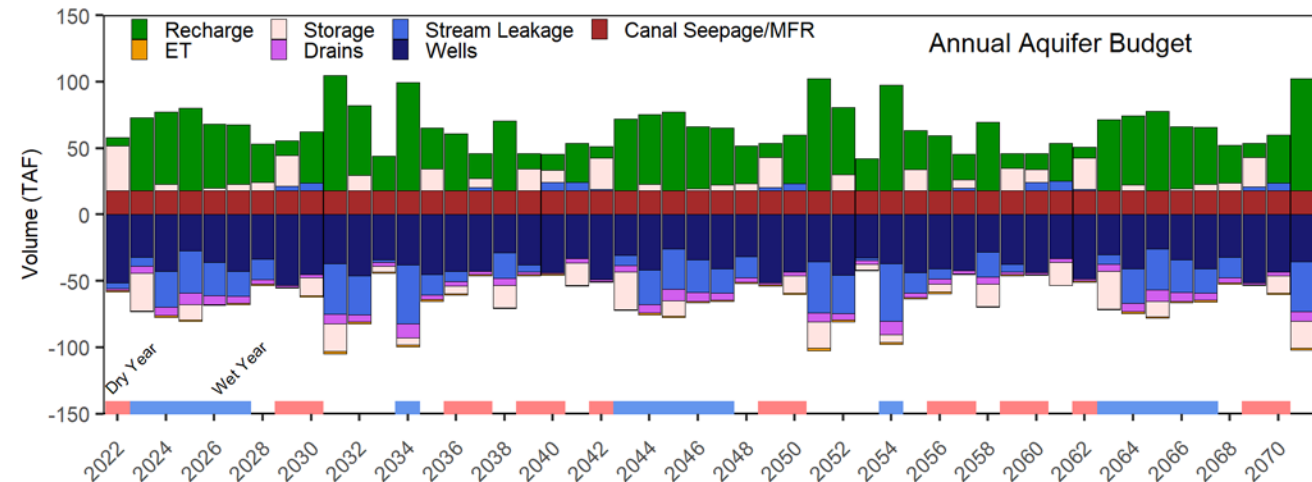
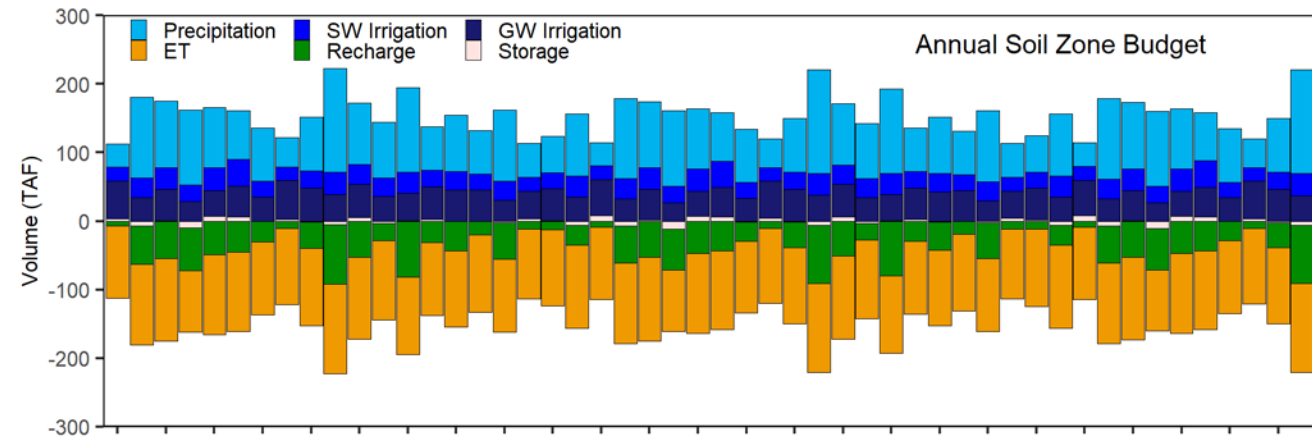
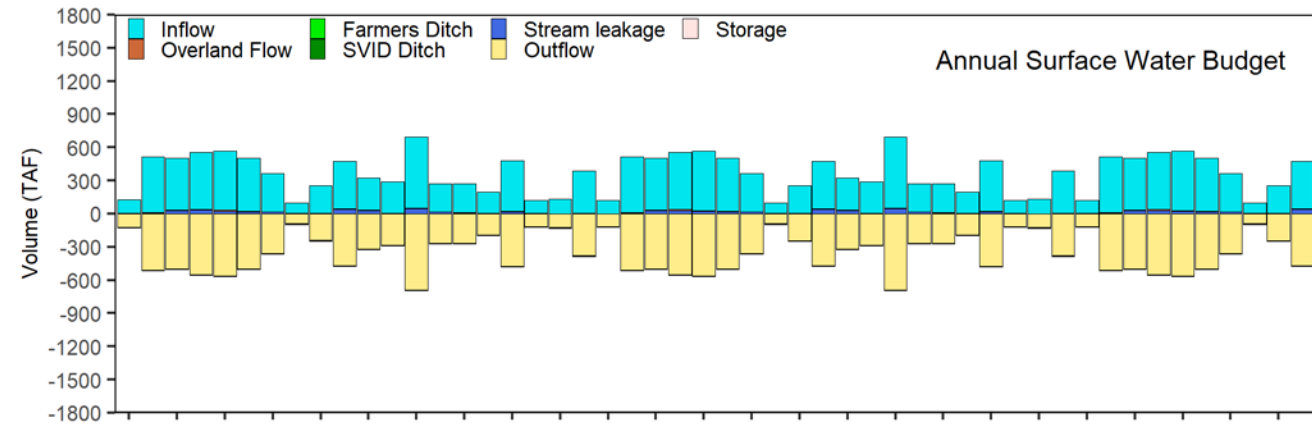
# Projected Future Water Budget – Wet



# Projected Future Water Budget – Dry

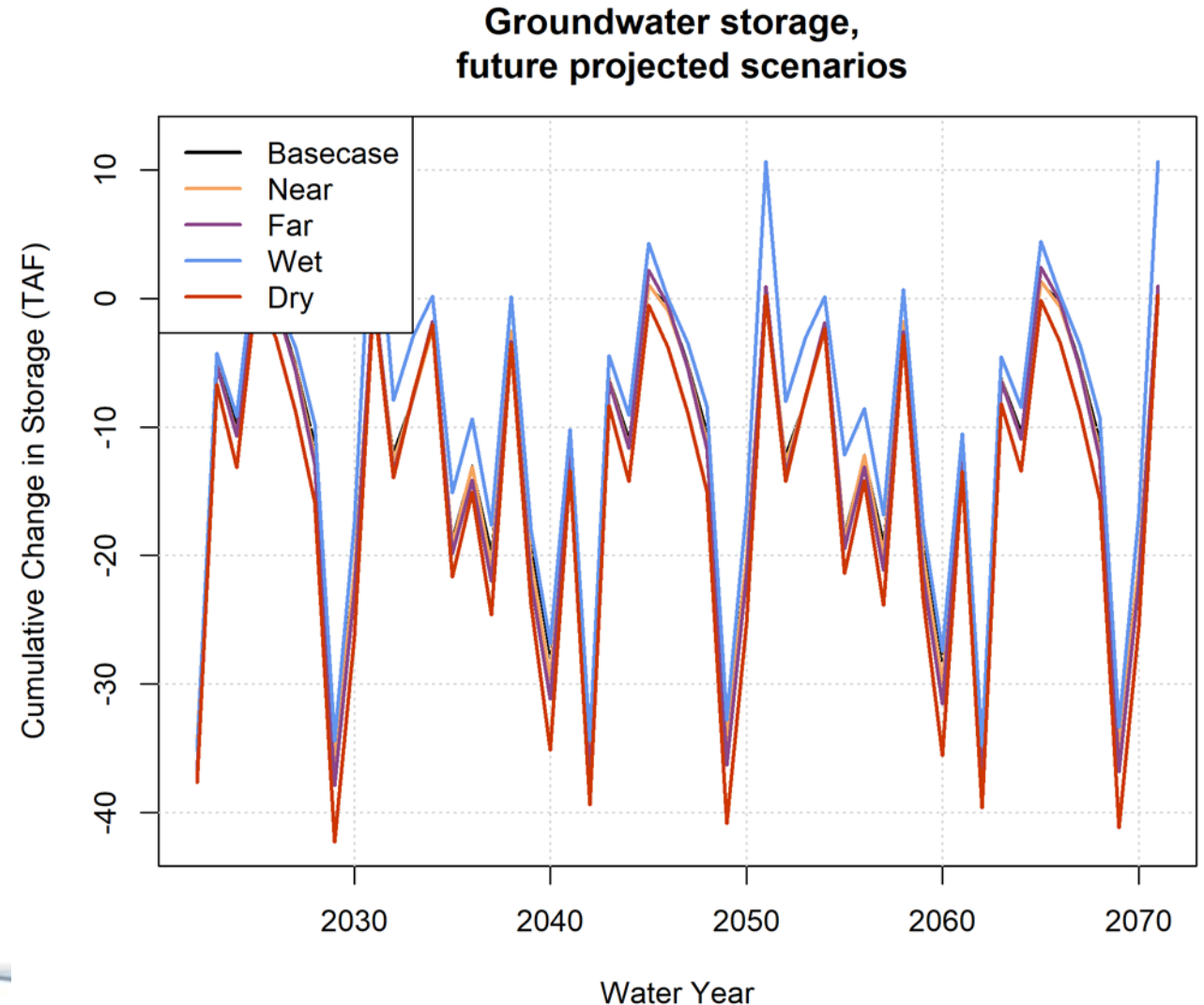


# Projected Future Water Budget - basecase



# Cumulative groundwater storage

- More stored groundwater in **Wet**, and less in **Dry**, scenarios (as expected)
- Interannual variability is a bigger driver of storage change than scenario selected



Scott Valley Management Scenario Results

Summary Table



Scenario Type	Scenario short name	Scenario ID	Scenario Depletion Reversal, Sep-Nov '91-'18 (TAF)	Depletion Reversal, Sep-Nov '91-'18 (avg. cfs)	Wet Year Depletion Reversal, Sep-Nov '91-'18 (avg. cfs)	Dry Year Depletion Reversal, Sep-Nov '91-'18 (avg. cfs)
Enhanced Recharge	mar	MAR (Managed Aquifer Recharge) in Jan-Mar	14	2.8	3.3	1.9
	ilr	ILR (In-Lieu Recharge) in the early growing season	13	2.6	2.4	2.1
	mar_ilr	MAR + ILR	26	5.2	5.6	3.6
	mar_ilr_max_0.019	Expanded MAR + ILR ( <i>assumed max infiltration rate of 0.019 m/d</i> )	61	12.1	14.8	7.1
Diversion Limits	flowlims	All surface water diversions limited at low FJ flows	52	10.3	14.9	4.9
	mar_ilr_flowlims	MAR + ILR, with all surface water diversions limited at low FJ flows	78	12.1	21.8	7.6
Crop change	irrig_0.8	80% Irrigation demand	83	16.5	18.9	12.9
	irrig_0.9	90% Irrigation demand	41	8.1	9.5	5.7
Irrigation Efficiency	irr_eff_improve_0.1	Improve irrigation efficiency by 0.1	6.8	1.3	0.0	1.7
	irr_eff_improve_0.2	Improve irrigation efficiency by 0.2	16.9	3.3	1.6	3.1
	irr_eff_worse_0.1	Reduce irrigation efficiency by 0.1	-2.2	-0.4	0.7	-0.3
Irrigation schedule change	alf_irr_stop_jul10	Alfalfa irrigation schedule - July 10 end date	118	23.2	21.2	23.6
	alf_irr_stop_aug01	Alfalfa irrigation schedule - Aug 01 end date	83	16.4	16.0	13.3
	alf_irr_stop_aug01_dry_years_only	Aug 01 end date, <i>dry years only ('91, '92, '94, '01, '09, '13, '14, '18)</i>	20	3.9	0.1	9.7
	alf_irr_stop_aug15	Alfalfa irrigation schedule - Aug 15 end date	46	9.1	9.0	6.7
	alf_irr_stop_aug15_dry_years_only	Aug 15 end date, <i>dry years only ('91, '92, '94, '01, '09, '13, '14, '18)</i>	10	2.0	0.0	5.1
Reservoir	reservoir_shackleford	9 TAF Reservoir, 30 cfs release, Shackleford	47	9.2	2.4	14.5
	reservoir_etna	9 TAF Reservoir, 30 cfs release, Etna	66	13.1	11.4	9.0
	reservoir_french	9 TAF Reservoir, 30 cfs release, French	79	15.7	22.3	2.5
	reservoir_sfork	9 TAF Reservoir, 30 cfs release, S. Fork	36	7.1	7.3	3.8
100% reliable reservoir	reservoir_etna_29kAF	29 TAF Reservoir, 100% reliability 30 cfs release	73	14.4	11.1	13.8
	reservoir_pipeline_etna_134kAF_60cfs	134 TAF Reservoir, 100% reliability 60 cfs release	251	49.6	42.3	52.7