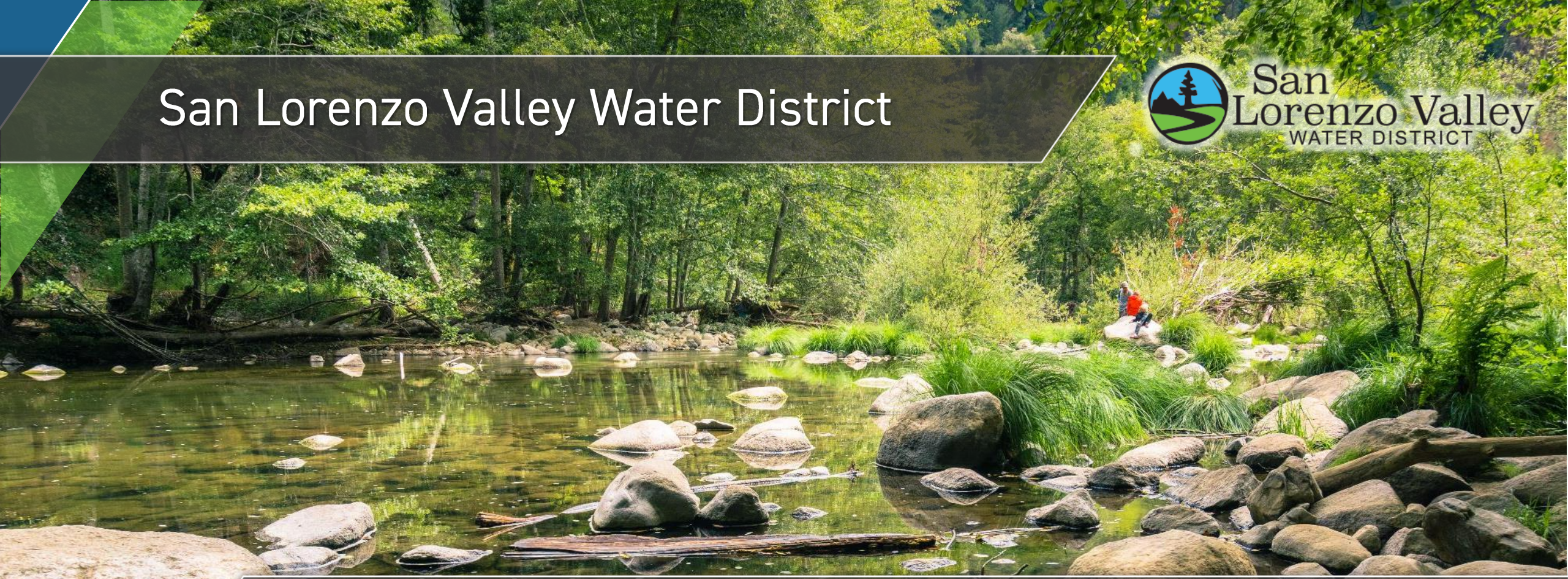
San Lorenzo Valley Water District



Conjunctive Use Plan for the San Lorenzo River Watershed

August 17, 2023

Introduction

San Lorenzo River Watershed Conjunctive Use Plan (CUP)

- Goal to identify opportunities for improving the reliability of surface and groundwater supplies through conjunctively managing water supplies while also increasing stream baseflows for fish.
- The SLVWD has developed the following reports to support the Conjunctive Use Plan;
  - Water Availability Assessment for San Lorenzo River Watershed Conjunctive Use Plan
  - Fisheries Resource Considerations for the San Lorenzo River Watershed Conjunctive Use Plan
- SLVWD is now working on completing Environmental Impact Report (EIR) CEQA analysis and the final CUP.

Water Availability Analysis

2. Conjunctive Use Scenarios

TABLE 2-1
SUMMARY OF CONJUNCTIVE USE SCENARIO ALTERNATIVES ASSUMPTIONS (SELECTED SCENARIOS HIGHLIGHTED)

No.	Base Case and Alternative Conjunctive Use Scenarios	Stream Diversion Capacities		Felton System Water Rights			Stream Diversion Exports Using System Interties						Import from Loch Lomond			Scotts Valley In-Lieu Recharge with Exported Diversions	
							North System to			Felton System to							
		Existing	Double	Comply	Not Comply	Comply with Bypass Only	Felton System	South System	Olympia ASR	South System	North System	Olympia ASR	to North System	to Felton System	to South System	from North System	from Felton System
	Historical Record, WYs 2000-2017	▾			▾		○	○									
	Synthesized Records, WYs 1970-2017:																
1	Base case Simulated historical record (calibrated to WYs 2000-2017)*	▴			▴												
	Scenario 1 Alternatives Using Existing and Modified Infrastructure and Water Rights Variations																
2	1a. Felton system complies with water rights.	▾		○													
3	1b. Felton system complies with required bypass flows, but not SLRST low-flow no-diversion requirements	▴				∩											
4	1c. All diversion capacities doubled; Felton system complies with water rights.		▾	○													
5	1d. All diversion capacities doubled; Felton system diverts without regard to water rights.		▴		▴												
6	1e. All diversion capacities doubled; Felton system complies with required bypass flows only.		▴			∩											
7	1f. South system imports North system unused potential diversions for in-lieu recharge; Felton system complies with water rights.	▴		∩			X	▴									
8	1g1. South system imports Felton system unused potential diversions for in-lieu recharge; Felton system diverts without regard to water rights.	▴			▴		X			▴							
9	1g2. Scenario 1g1 except Felton system complies with water rights.	▴		∩			X			▴							
10	1g3. Scenario 1g1 except Felton system complies with required bypass flows only.	▴				∩	X			▴							
11	1g4. Scenario 1g2 except inertie capacities limited.	▴		∩			X										
12	1h1. South system imports unused potential diversion from North and Felton systems for in-lieu recharge; Felton system diverts without regard to water rights.	▾			▾		X	▾		▾							
13	1h2. Scenario 1h1 except Felton system complies with water rights.	▴		∩			X	▴		▴							
14	1i. North system imports Felton system unused potential diversions for in-lieu recharge; Felton system complies with water rights.	▴		∩			X				▴						
15	1j. Scenario 1i plus South system imports unused potential diversion from North and Felton systems.	▾		○			X	▾		▾	▾						
16	1k. Scenario 1j except inertie capacities limited.	▴		∩			X	▴		▪	▪						
	Scenario 2 - Import from Loch Lomond																
17	2a. North and Felton systems import from Loch Lomond to satisfy unmet demand in Scenario 1a.	▴		▴			X						▴	▴			
18	2b. Scenario 2a plus South system imports from Loch Lomond for in-lieu recharge.	▴		▴			X						▴	▴	▴		
19	2c. Scenario 2b plus South system also imports North system unused diversions, and North system imports unused Felton system diversions.	▴		▴			X	▴			▴		▴	▴	▴		
	Scenario 3 - Import from Loch Lomond and Operate Olympia Aquifer Storage and Recovery (ASR)																
20	3a. Scenario 2b plus North system operates Olympia area ASR using North system unused diversions.	▾		▾			X		⊖					▾	▾		
21	3b. Scenario 2b plus North system operates Olympia area ASR using Felton system unused diversions.	▴		▴			X		⊖			▴		▴	▴		
22	3c. Scenarios 3a and 3b combined.	▾		▾			X		⊖			▾		▾	▾		
23*	3d. *Scenario 3c, but replace Pasatiempo/Lompico baseflow diversions with pumping from Olympia wells*	▴		∩			X		⊖			▴		▴	▴		
	Scenario 4 - Contribute to Scotts Valley In-Lieu Recharge while Operating Olympia ASR and Importing from Loch Lomond																
24	4. Scenario 3c plus SVWD imports North and Felton system remaining unused potential diversions.	▾		▾			X		⊖			▾		▾	▾	▾	▾

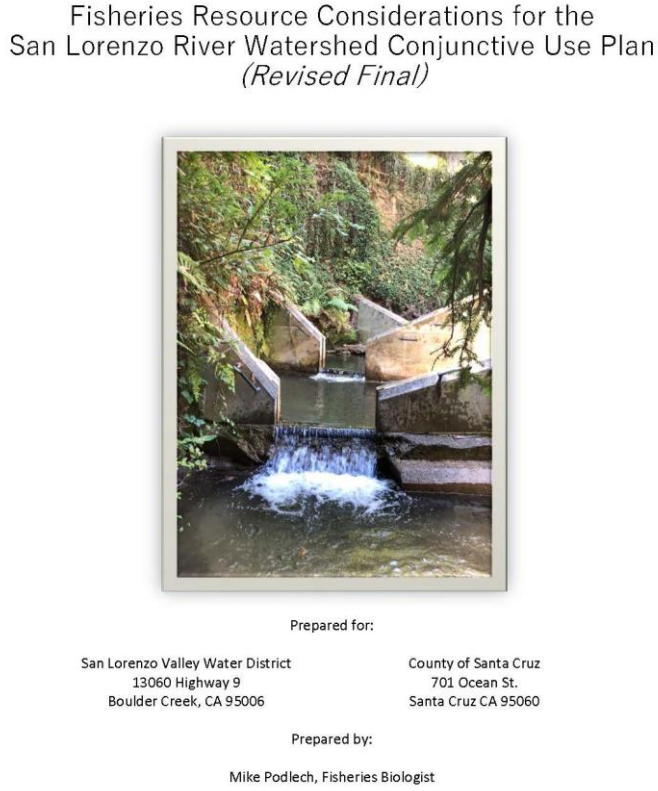
▴ Base case condition or scenario assumption.
○ Minor use since 2016.
∩ Water rights compliance results in unmet demand some years.
X North system has no unused diversions when needed by Felton.
▪ Inertie capacities limited to rated values.
⊖ Diversions exported to Olympia ASR; imported back to North system.
All scenarios assume estimated 2045 demand and repeat of WY 1970-2017 climatic cycle.
*Simulated base case does not reflect minor use of system interties in actual use since 2016.
* Additional scenario identified after completion of WAA

SOURCE: adapted from Exponent (2019) and Johnson (2019)

- 24 conjunctive Use scenarios
- Focused primarily on water supply reliability and sustainability, with particular emphasis on groundwater sustainability
- Based on simulated monthly flow

Fisheries Resource Considerations Assessment

- Planning-level analysis of fisheries effects (benefits) of District-selected WAA scenarios
- Used WAA simulated flow results and streamflow monitoring data
- Did not establish habitat-flow relationships / instream flow needs



Fisheries Resource Considerations for the
San Lorenzo River Watershed Conjunctive Use Plan
(Revised Final)

Prepared for:

San Lorenzo Valley Water District
13060 Highway 9
Boulder Creek, CA 95006

County of Santa Cruz
701 Ocean St.
Santa Cruz CA 95060

Prepared by:

Mike Podlech, Fisheries Biologist

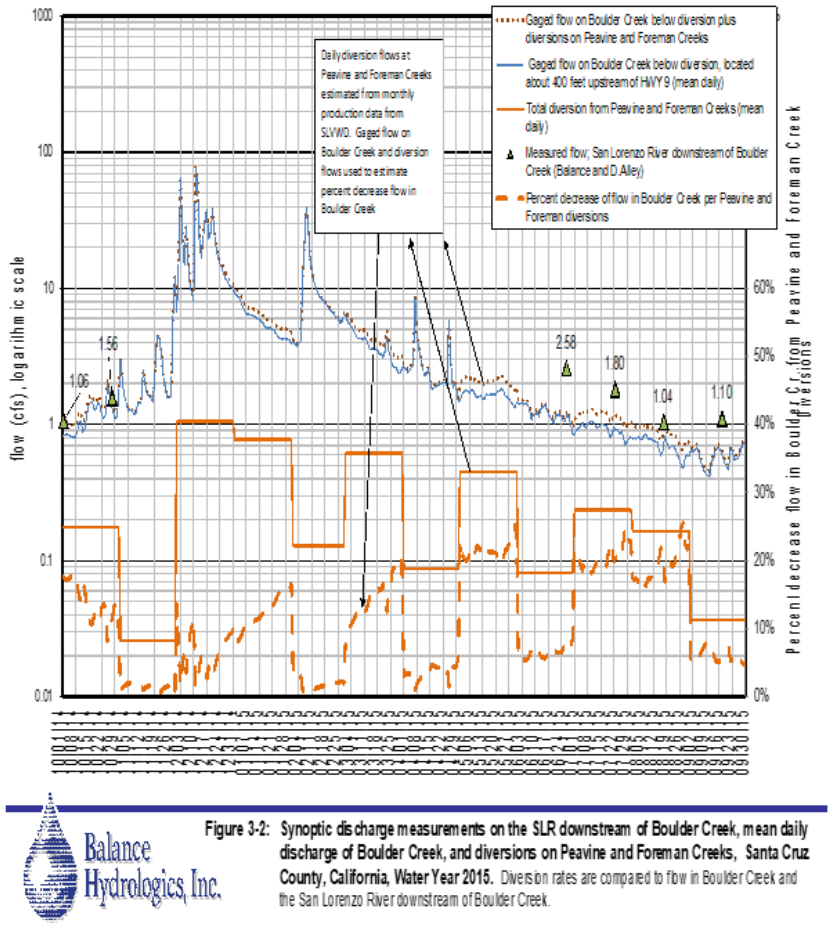
Existing Operations

- **North System:** Surface water & groundwater sources
- **South System**: Groundwater only;
- **Felton System**: Surface water only;
- **Emergency Interties**: North-Felton, North-South, South- Scotts Valley WD

Not Currently Used:

- **Loch Lomond**: 313 afy allotment
- **Lompico/Zayante**: Petition for Water Code section 1707 streamflow dedication submitted

Stream Flow & Temperature Monitoring



Balance Hydrologics, Inc.

Figure 3-2: Synoptic discharge measurements on the SLR downstream of Boulder Creek, mean daily discharge of Boulder Creek, and diversions on Peavine and Foreman Creeks, Santa Cruz County, California, Water Year 2015. Diversion rates are compared to flow in Boulder Creek and the San Lorenzo River downstream of Boulder Creek.

- 5-year extensive gaging (2014-2018) with agency input and annual updates
- Broad range of water year types
- Included water temperature effects analysis by Don Alley
- Reduced scope since 2019
- Limited data from 2020-2023 due to natural disasters

Revised Conjunctive Use Project Description

- Interties: Use existing emergency interties for non-emergency operations to move water through entire District to improve system reliability and expand conjunctive use

- Transfer of Unused Potential Diversions: Surface water diversion at existing PODs and capacities during high-flow/low-demand periods to offset groundwater pumping (in-lieu recharge with drought baseflow benefits)

- Loch Lomond: Utilize allotment to offset groundwater pumping and/or meet demand during low surface flow periods
  - Loch Lomond Feasibility Study Request for Proposals

- Felton Place of Use: Request water right permit modification to expand POU

NOT Included:

- Changes to Felton Water Right Permit terms ("SLRBT Low-Flow Requirements Modifications Scenario" in IS/MND)

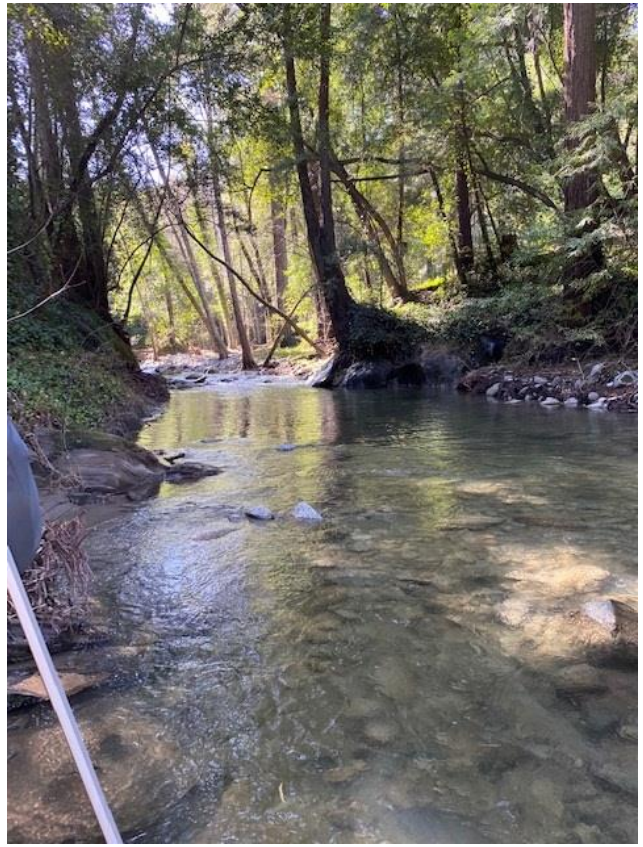
- Aquifer Storage and Recovery

CEQA Next Steps

- Environmental Impact Report (EIR) contract awarded to Rincon Consultants Inc., on August 18th, 2022.
- Updated project description brought to the Board of Directors on August 4, 2022
- Staff working to develop CUP operations plan (and select WAA scenario) to base EIR project description
- Model potential climate change impacts
- Working with the City of Santa Cruz to understand potential impacts to their operations

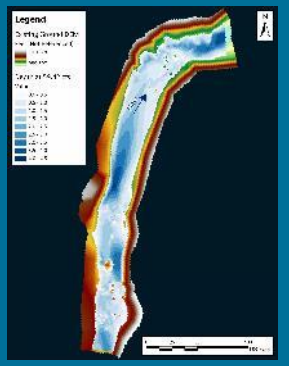
Modeling & Technical Support - cbec

- cbec brought onto CUP planning effort to assist with operational data gaps & climate change modeling
- Initially started with $30,000 under the General Manager's purchasing authority

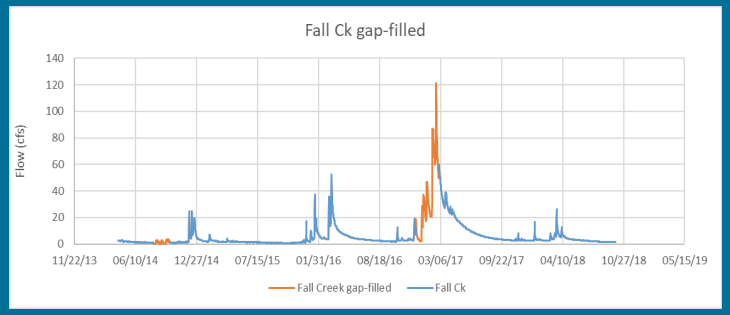


cbec's Tasks

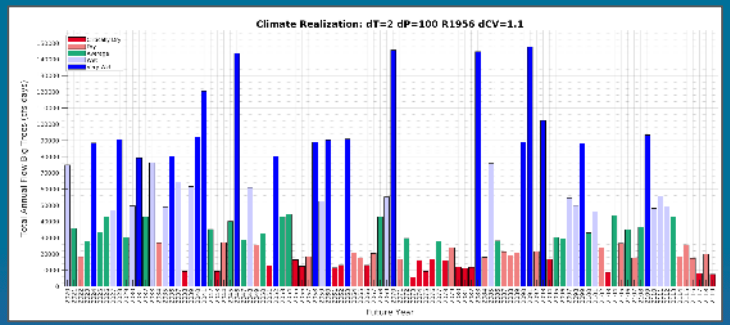
Assess changes in habitat availability and fish passage due to changes in flow



Synthesize "without project" daily streamflow records for use by others in CUP EIR CEQA analysis

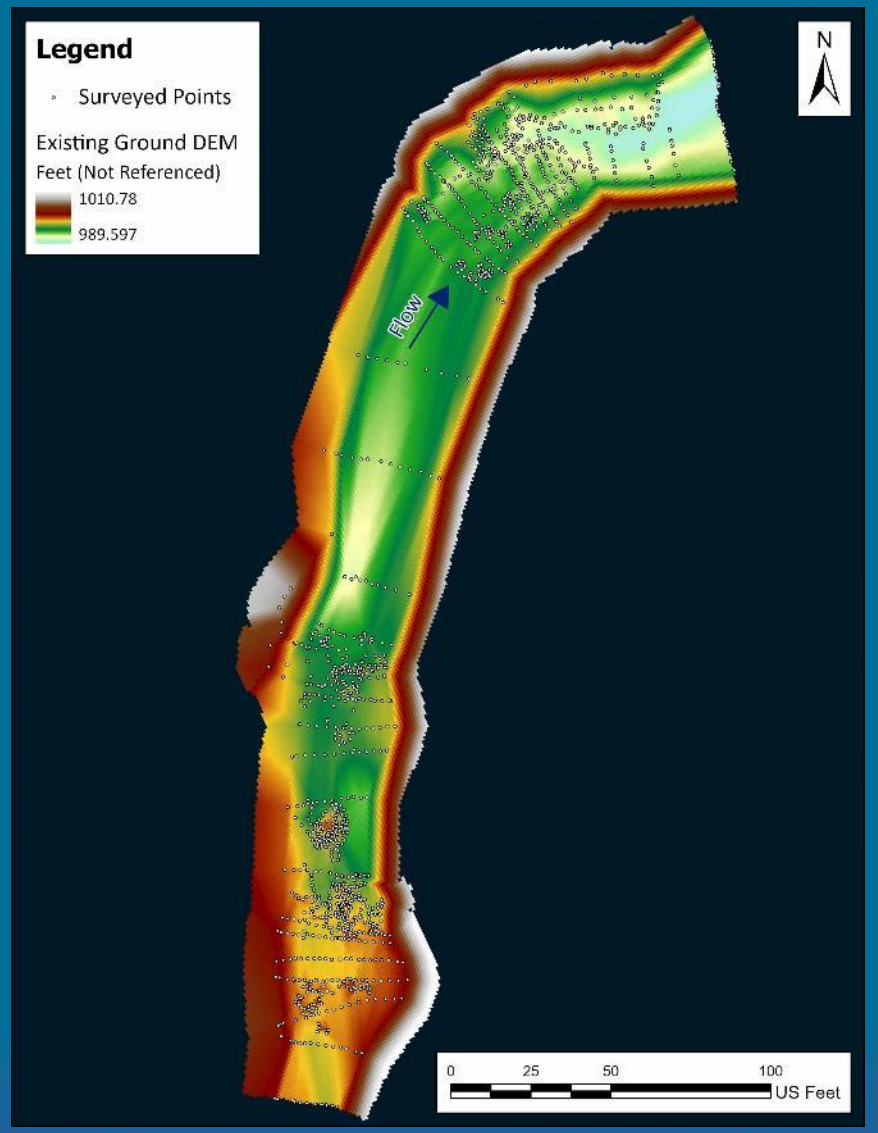


Scale existing hydrology to potential future conditions due to climate change



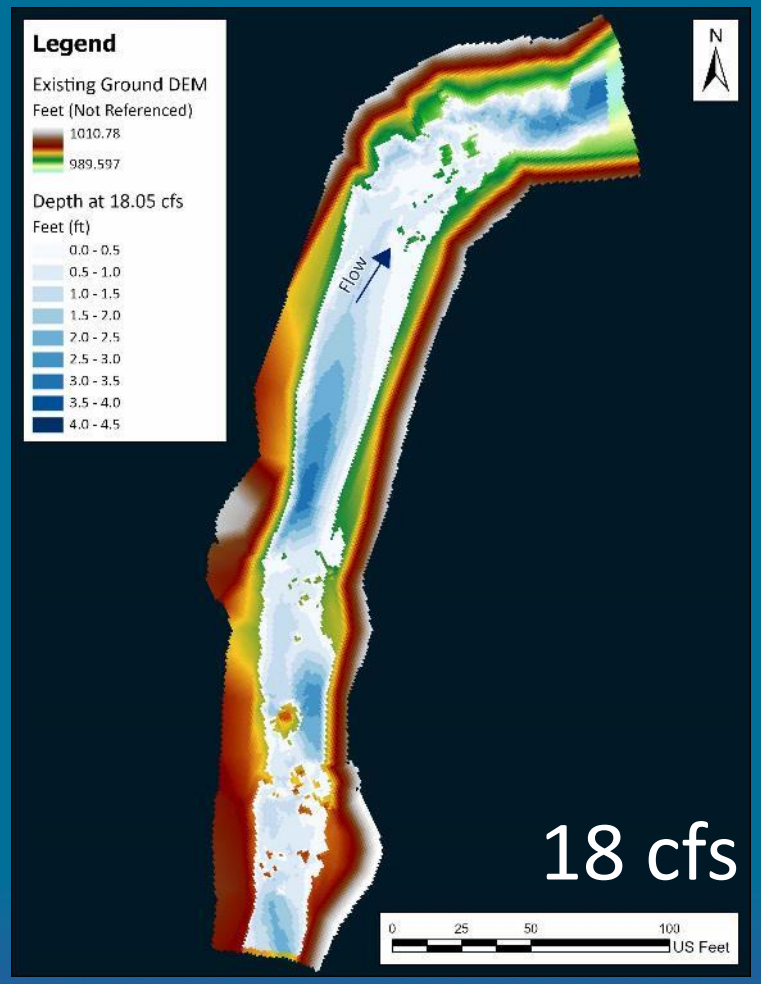
Habitat and Fish Passage Analysis

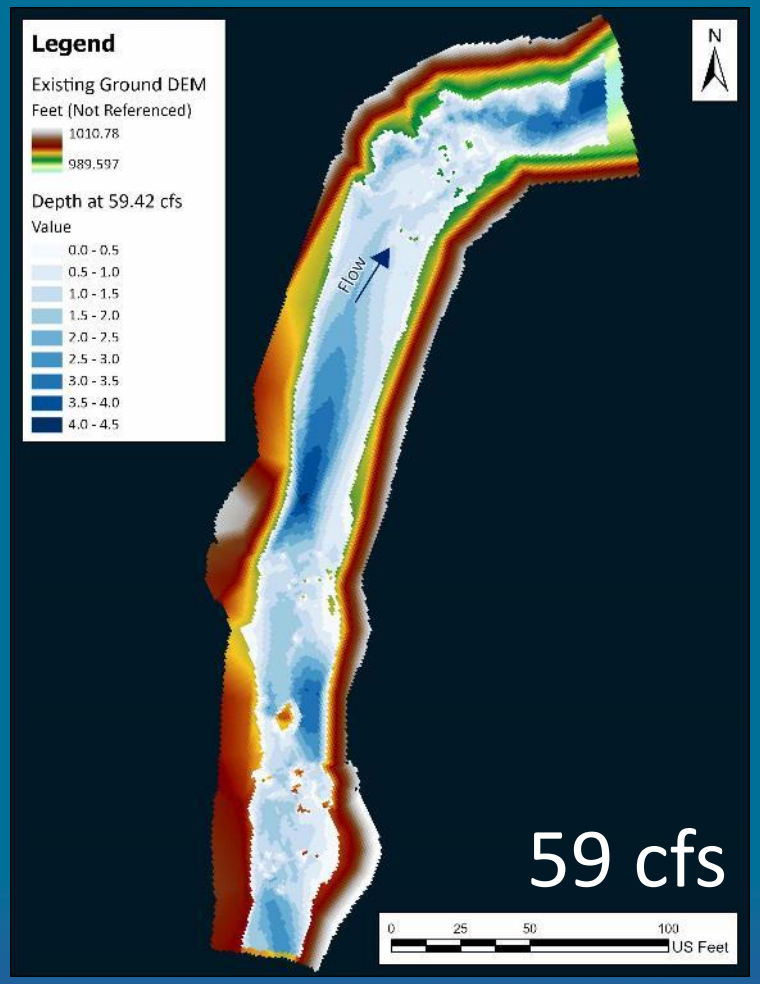
Habitat and Fish Passage Analysis



Habitat and Fish Passage Analysis

Simulated Water Depth





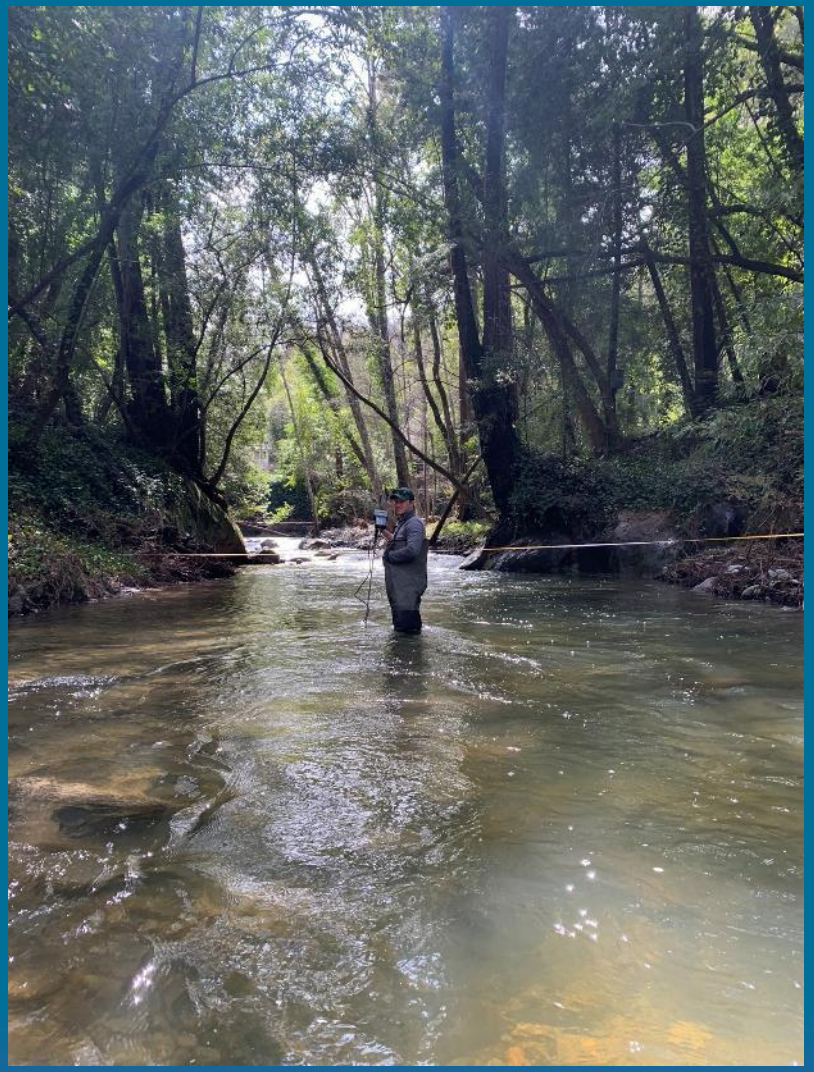
Use model to assess:

- When reach becomes impassable for steelhead
- How rearing habitat availability changes with with flow

Streamflow Synthesis

Prepare daily streamflow data for use in Conjunctive Use Planning (CUP) efforts

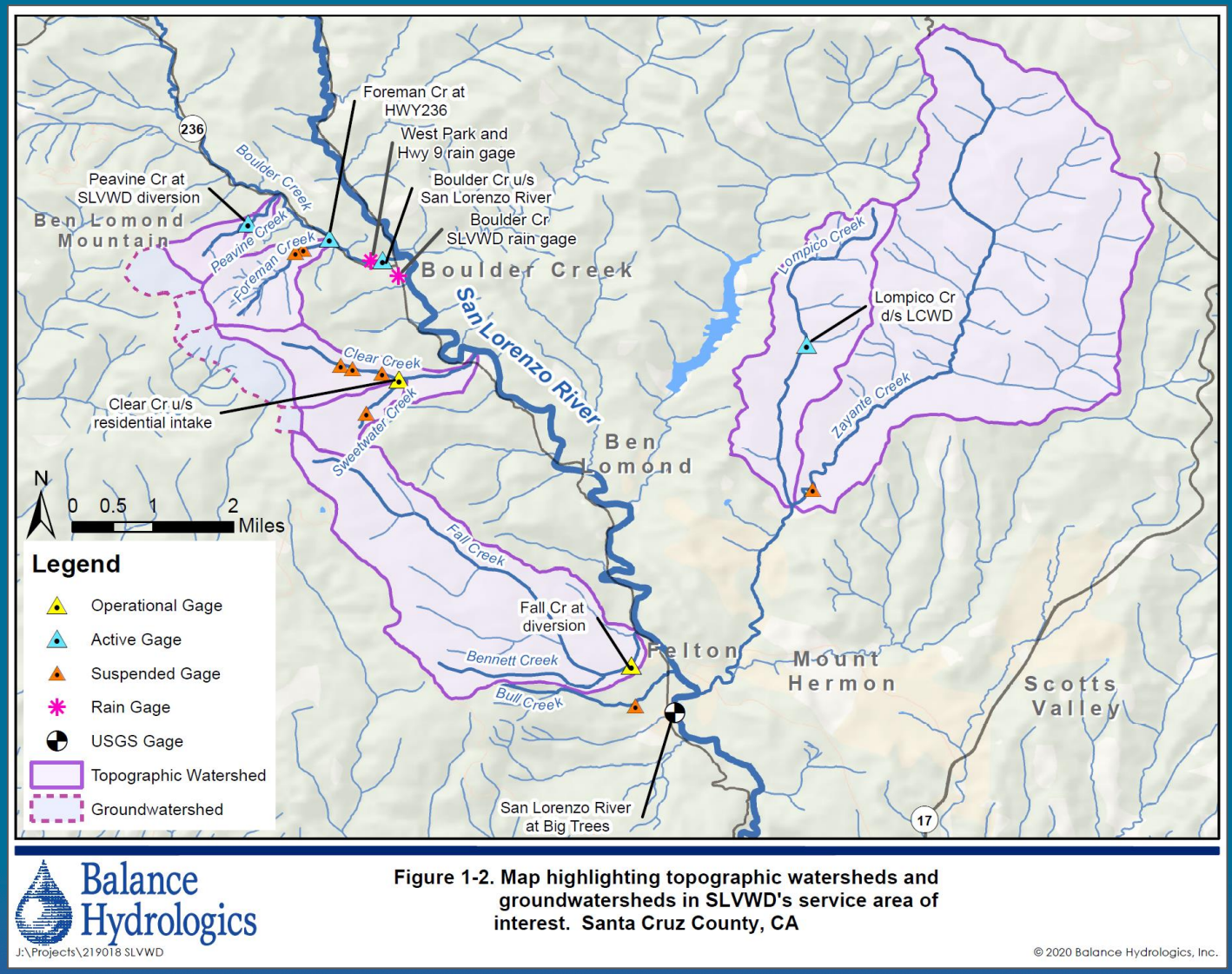
- Use monitoring records across the SLVWD service area from 2014-2018
  - Captures wide natural variation in water years
- Prepare data by filling gaps and removing diversion effects



Streamflow Synthesis

Streamflow monitoring in the SLVWD service area

- Performed by Balance Hydrologics
- Full tributary monitoring 2014-2018
  - **North System**
    - Peavine Creek
    - Foreman Creek
    - Boulder Creek
    - Clear Creek
    - Sweetwater Creek
  - **Felton System**
    - Fall Creek
    - Bull Creek
  - **Lompico System**
    - Lompico Creek
    - Zayante Creek
- Final record: 4/15/2014 – 9/30/2018



Streamflow Synthesis

Monitored streamflow gap-filling

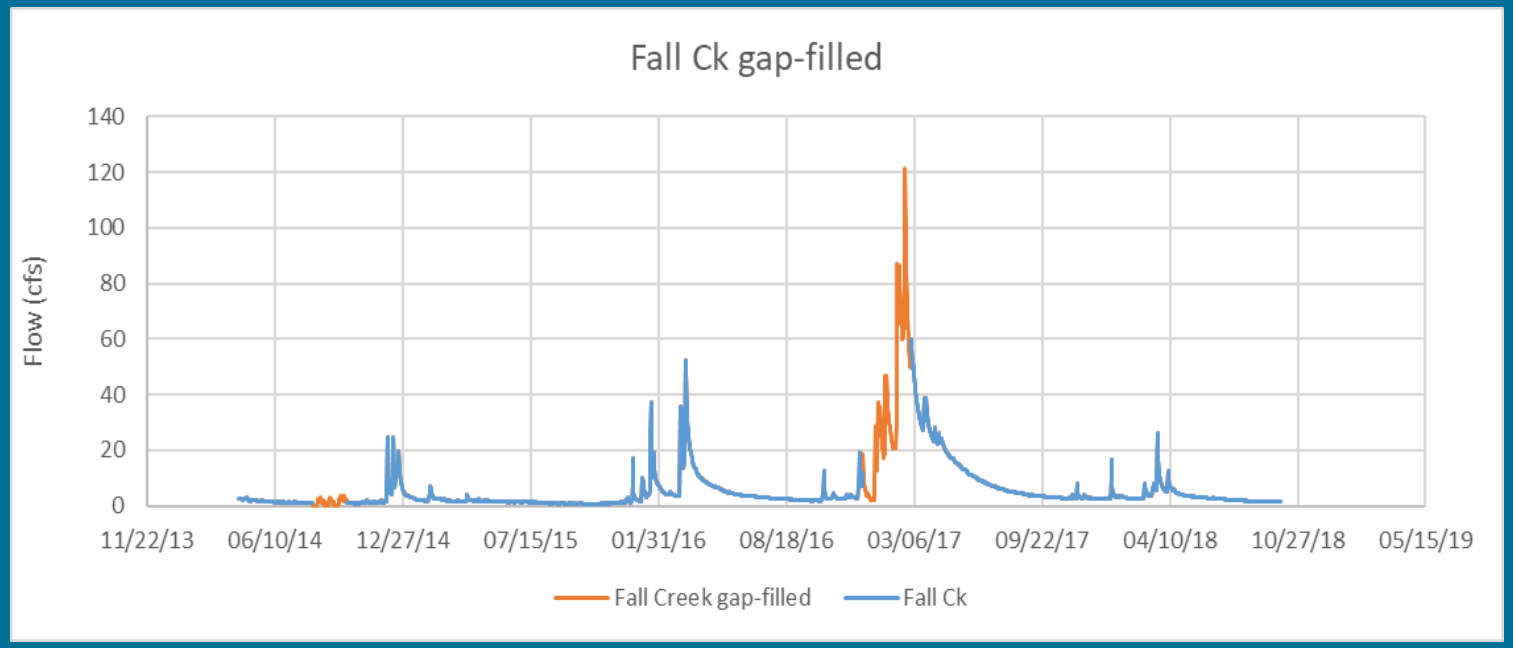
- Gaps in data collection caused by gage damage during storms, equipment malfunction, decisions to move gage sites
- Gaps range from few weeks to few months
- Largest data gap: Foreman Creek, 2 years
- Gaps filled by linear correlations with neighboring gages

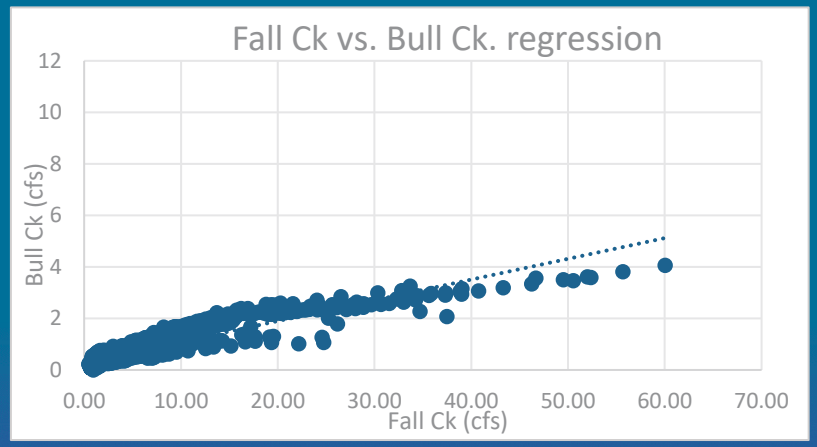
Image from Balance Hydrologics

Final gap-filled streamflow record

Fall Creek

- Gaps ranging 4-6 weeks
- Filled with Bull Creek linear regression
- Regression r^2=0.86

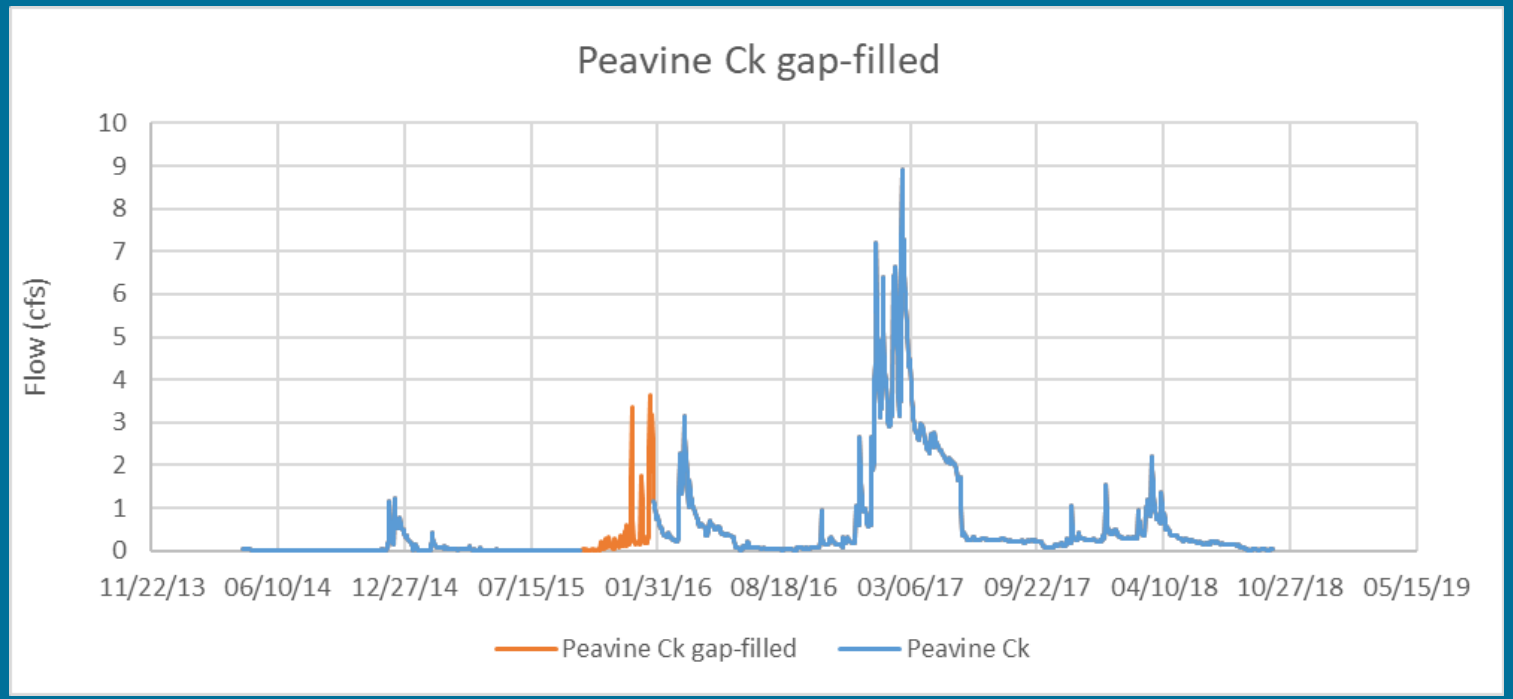


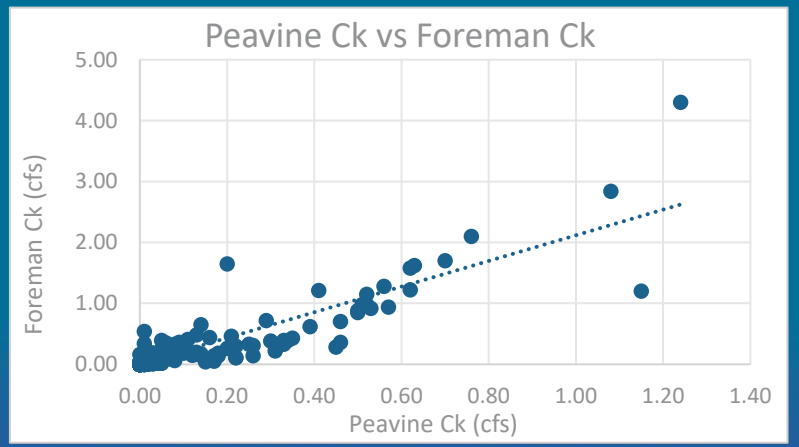


Final gap-filled streamflow record

Peavine Creek

- 4-month data gap Oct 2015 – Jan 2016
- Filled with Foreman Ck linear regression (Q< 10 cfs)
- Regression r^2=0.80



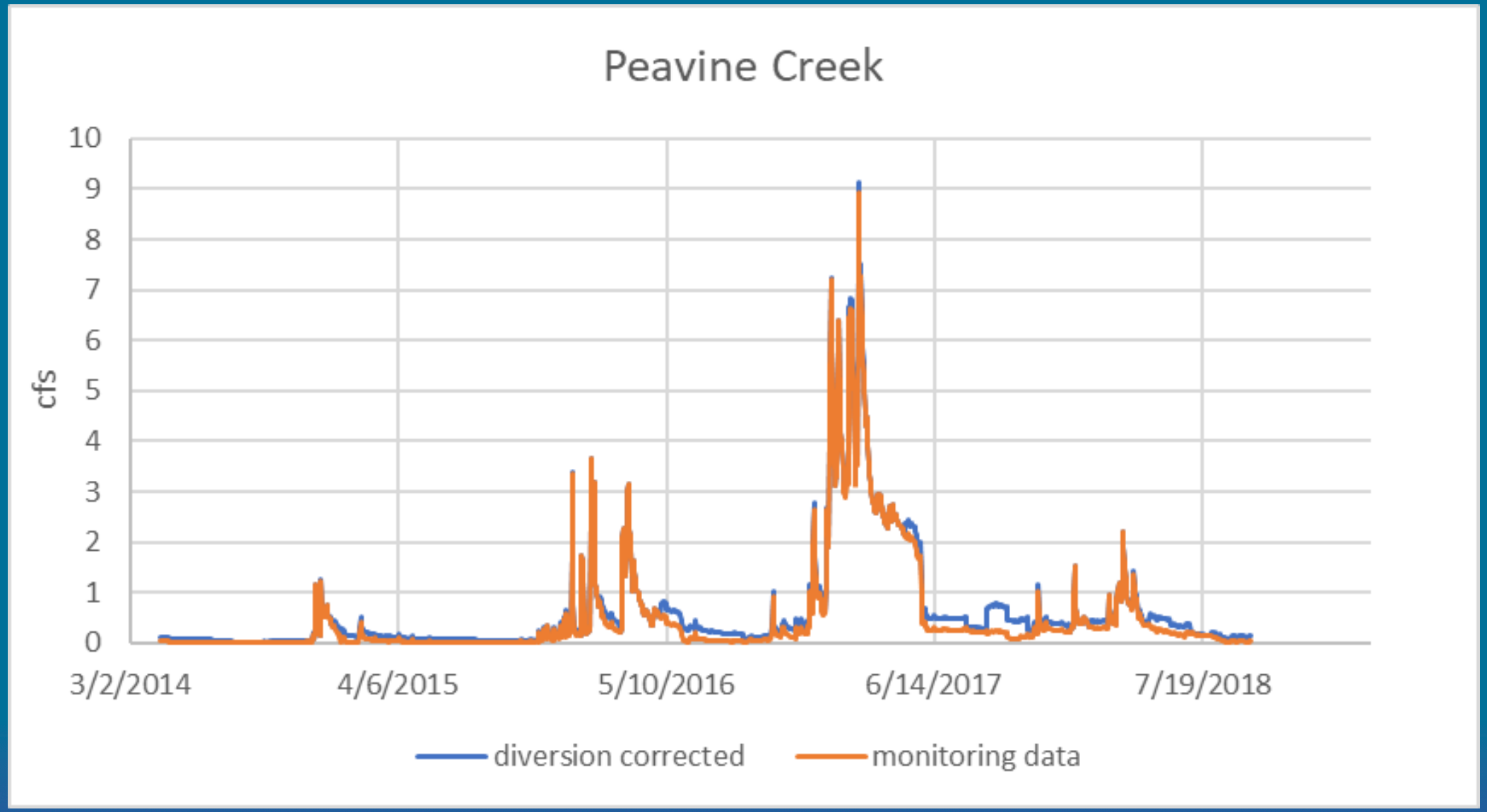


Flow Diversion Corrections

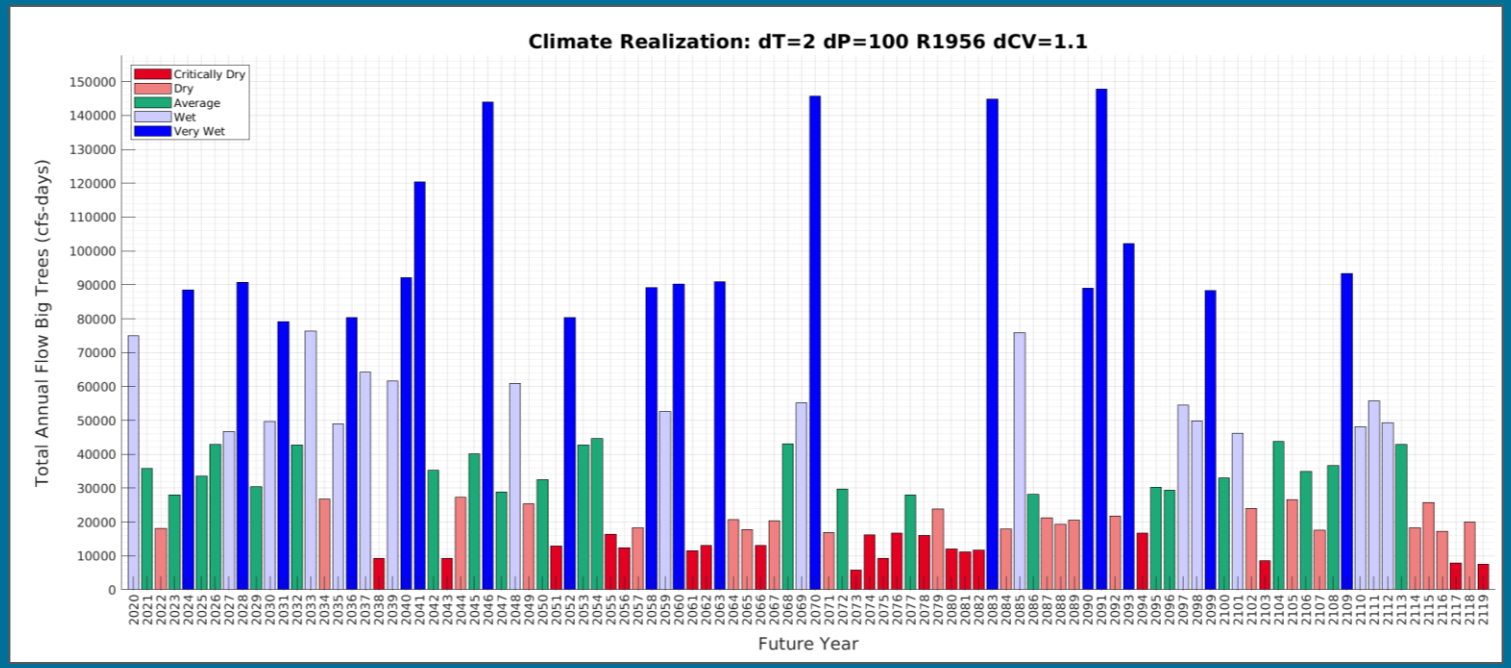
- Monitored flows do not account for system diversions
- Monthly reported diversions from SLVWD added back to monitored daily flow
- Result: natural condition, daily flow for 2014-2018

Image from Balance Hydrologics

Without Project Synthesized Flow



Next Steps: Climate Change Analysis



- Building off City of Santa Cruz's previous climate stress test work
- Scale results for 100-year chronologies to 4.5-year chronology for monitored daily flow
- Extrapolate results for Big Trees flow to monitored flow locations throughout service area (9 total sites)

Closing

Thank you for your time!

Questions & Answers