Hydrology aspects of Coyote Valley Water Resources Investment Strategy

January 22nd

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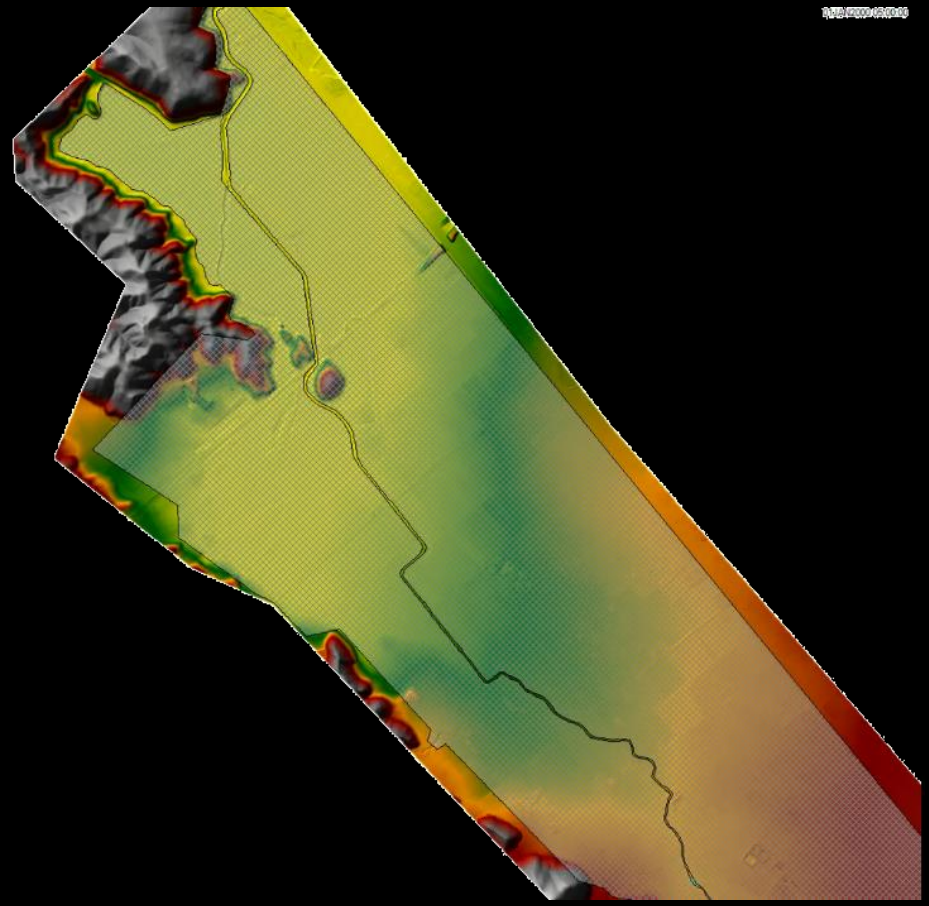
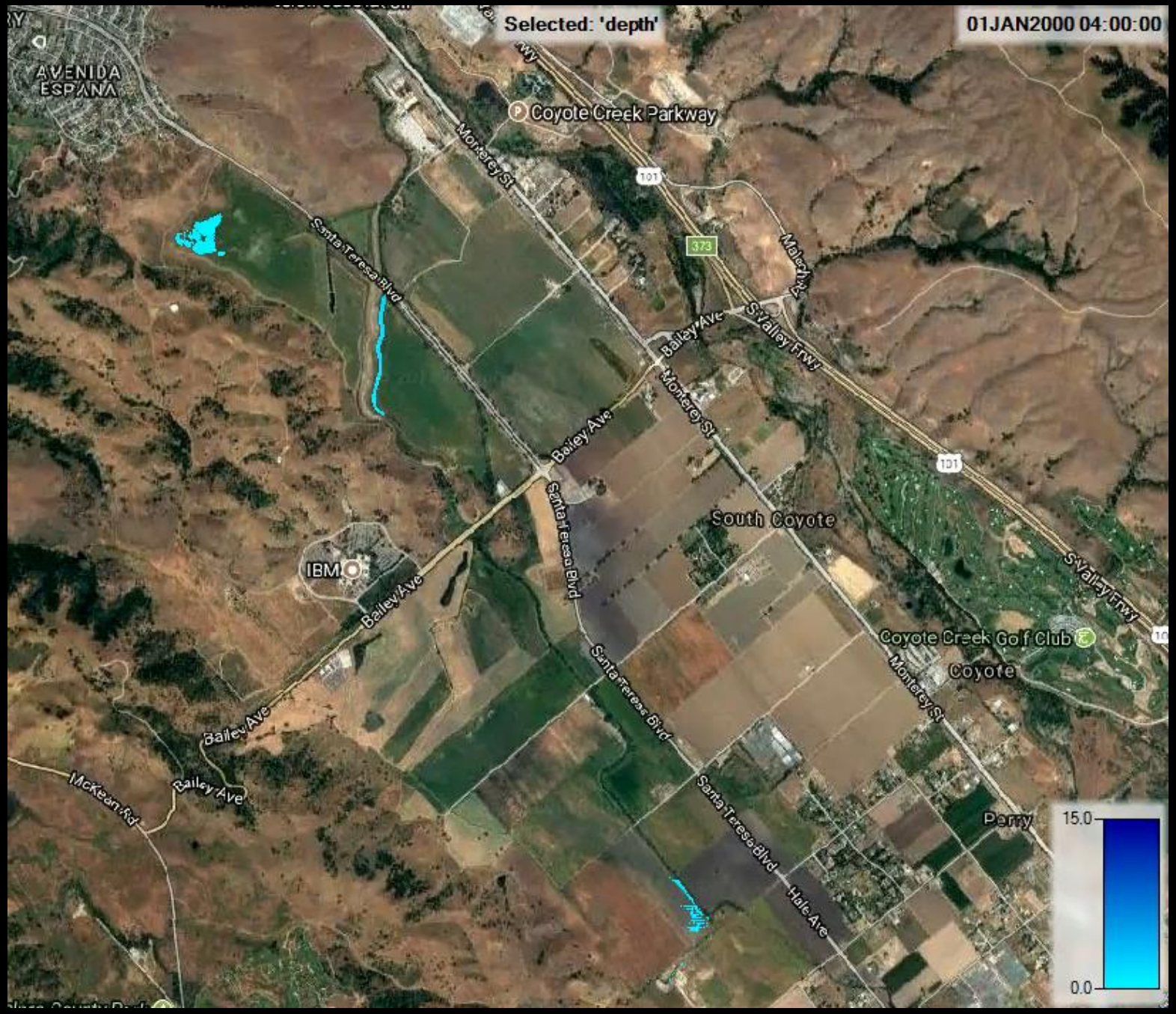
Fisher Creek
Laguna Seca
Bailey Rd
Monterey Rd
Coyote Creek
Ogier Ponds
Hwy 101

Modeling Existing and Proposed Conditions

- Adapted and merged the SCVWD models of Fisher and Coyote Creeks
- Tested how flow moves through the valley under existing conditions
- Developed several restoration alternatives
- Worked with SCVWD to test whether those flood peaks can provide an incremental benefit to flood prevention



10-year Fisher Creek flood under existing conditions



Existing Flood Protection Benefits from Fisher Creek Floodplain

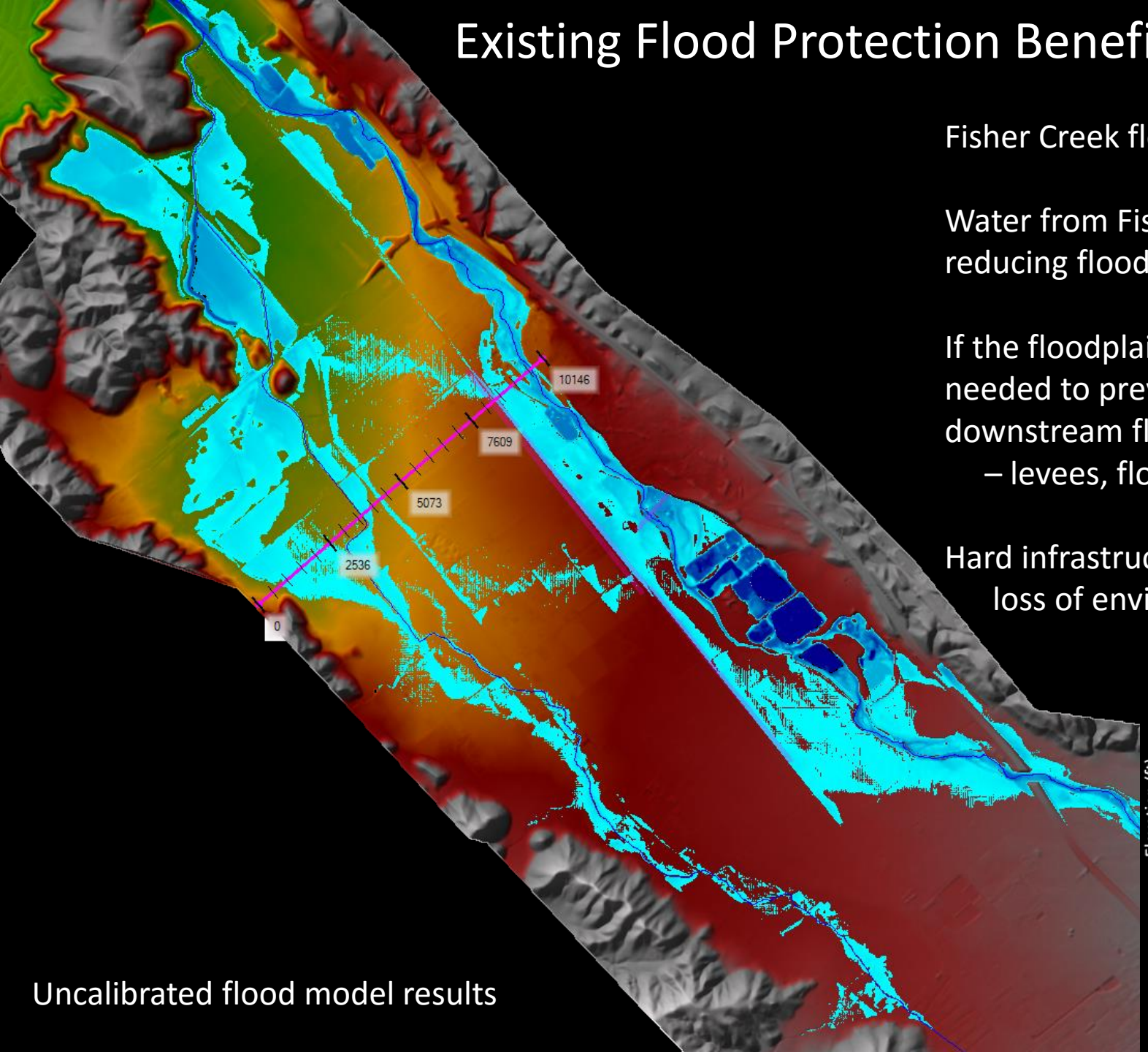
Fisher Creek floodplain is 20 feet <u>below</u> Coyote Creek in places

Water from Fisher Creek naturally collects on floodplain, reducing flooding downstream

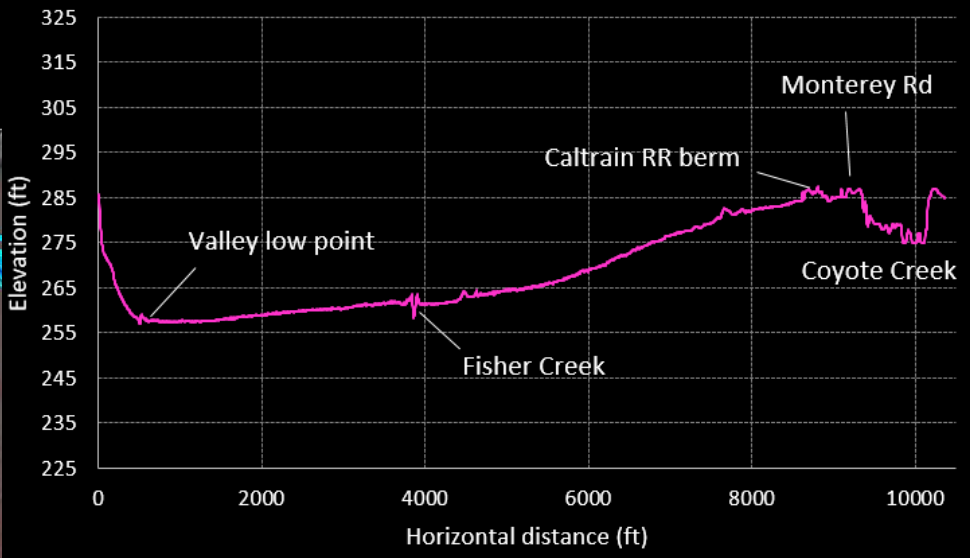
If the floodplain is developed, “hard” infrastructure will be needed to prevent the displaced water from increasing downstream flooding:

– levees, floodwalls, pump stations, detention basins

Hard infrastructure can fail, requires ongoing maintenance, loss of environmental benefits, permitting



Uncalibrated flood model results

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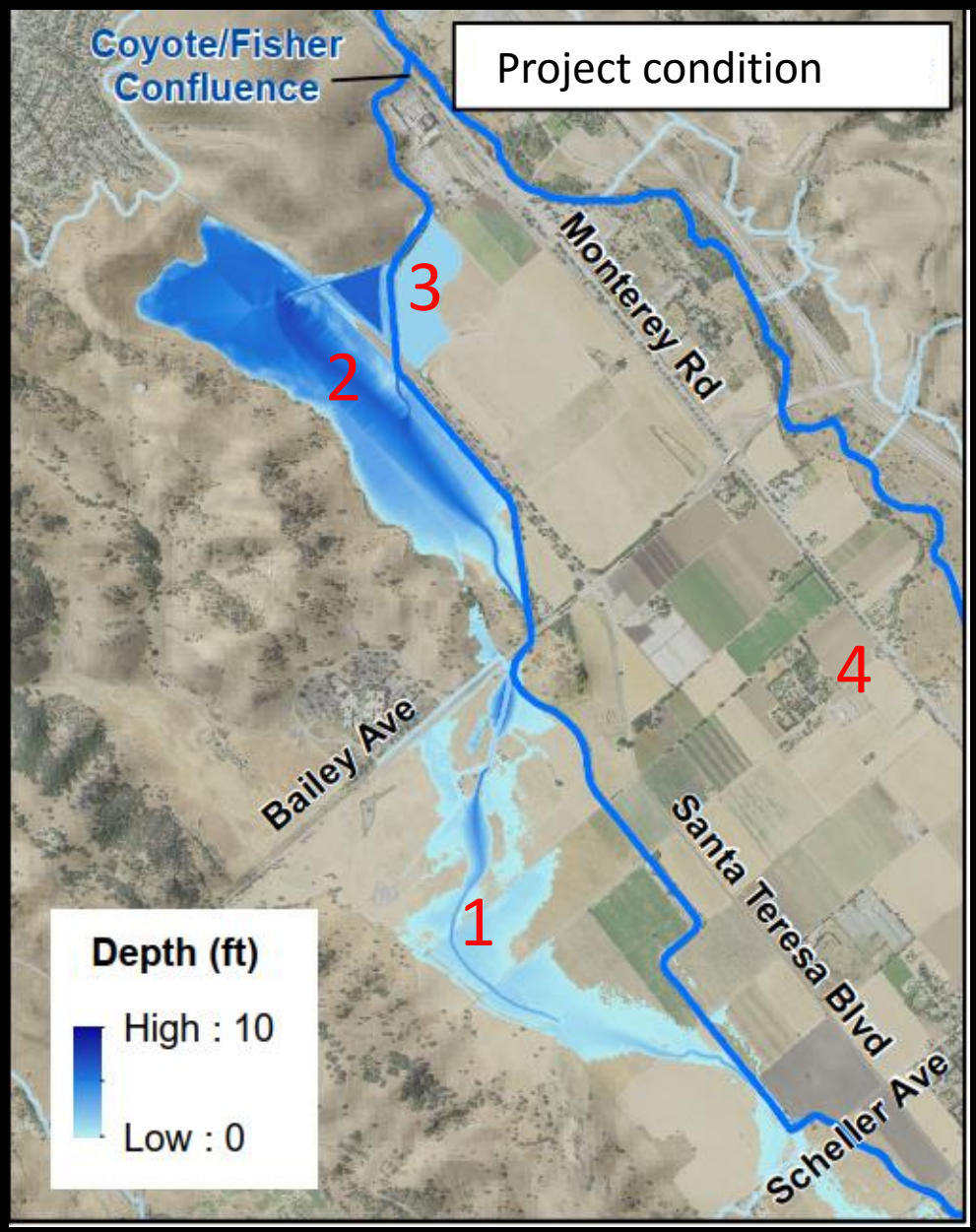
Modeling the effects of restoring the floodplain and Laguna Seca

1. Restore Fisher Creek
2. Breach Laguna Seca
3. Breach downstream
4. Cross valley flows

Benefits

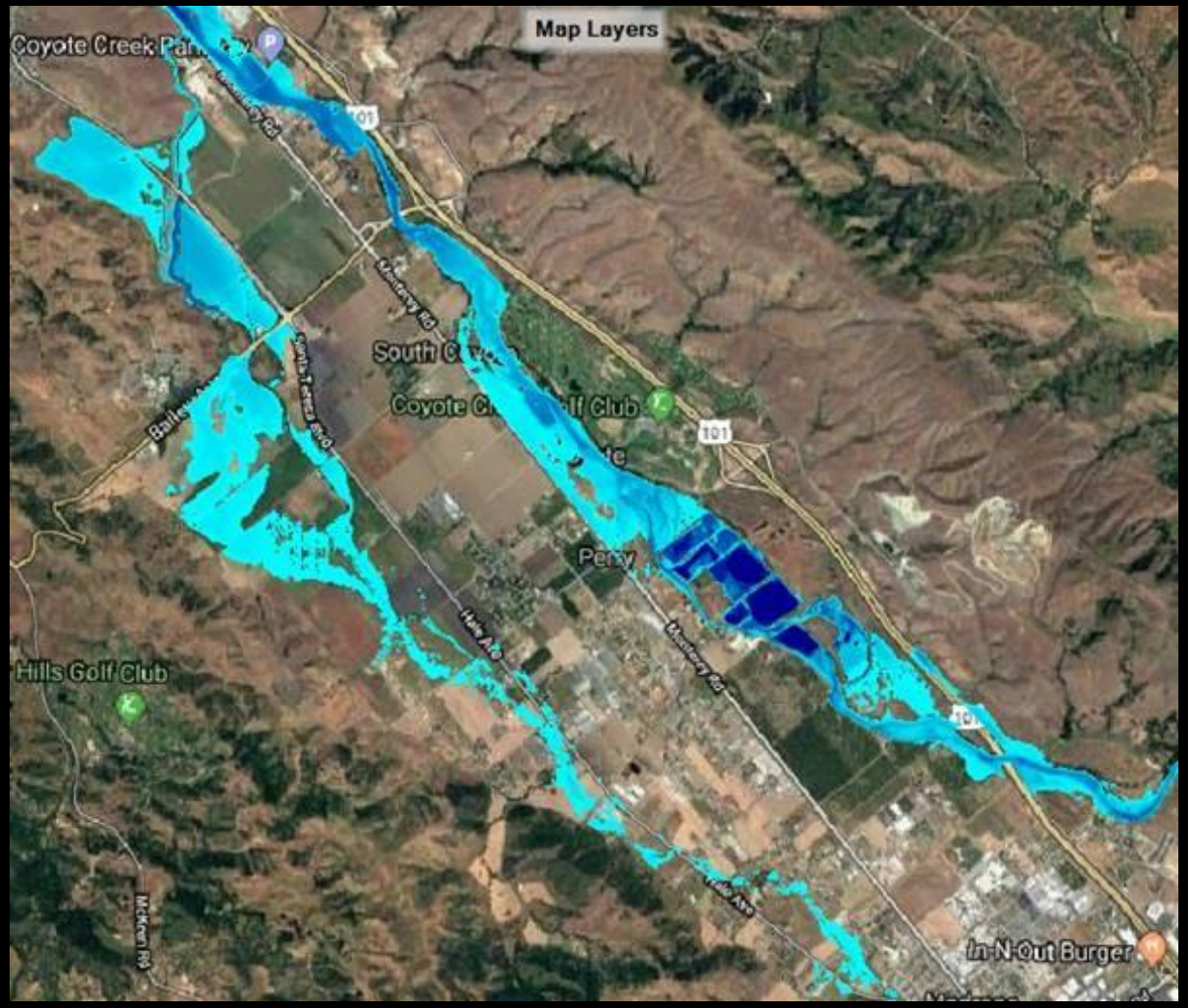
- Water quality
- Ecology
- Percolation
- Flood detention



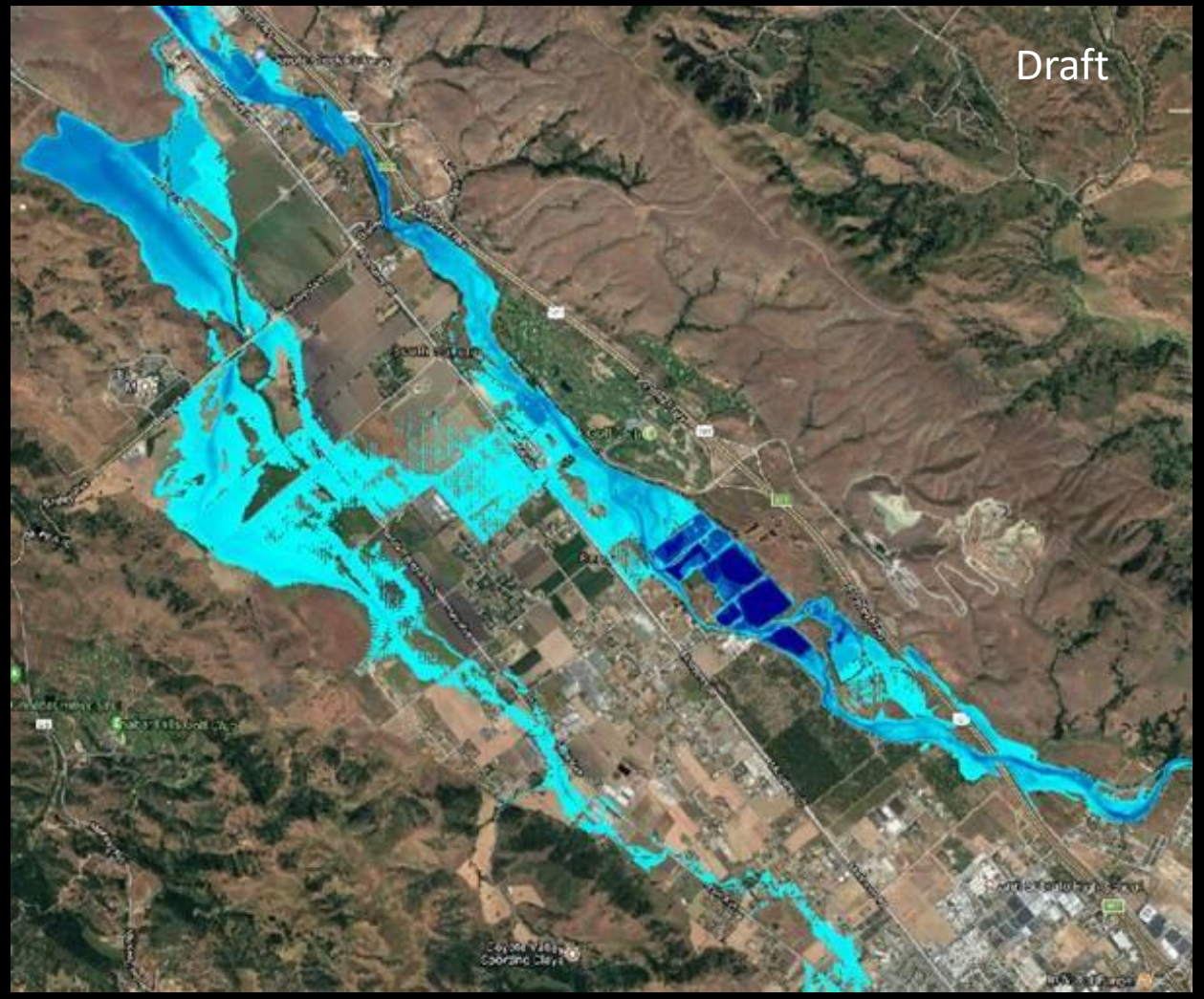
Draft

Restoration Vision For Coyote Valley

Increased cross-valley flows to reduce downstream flooding

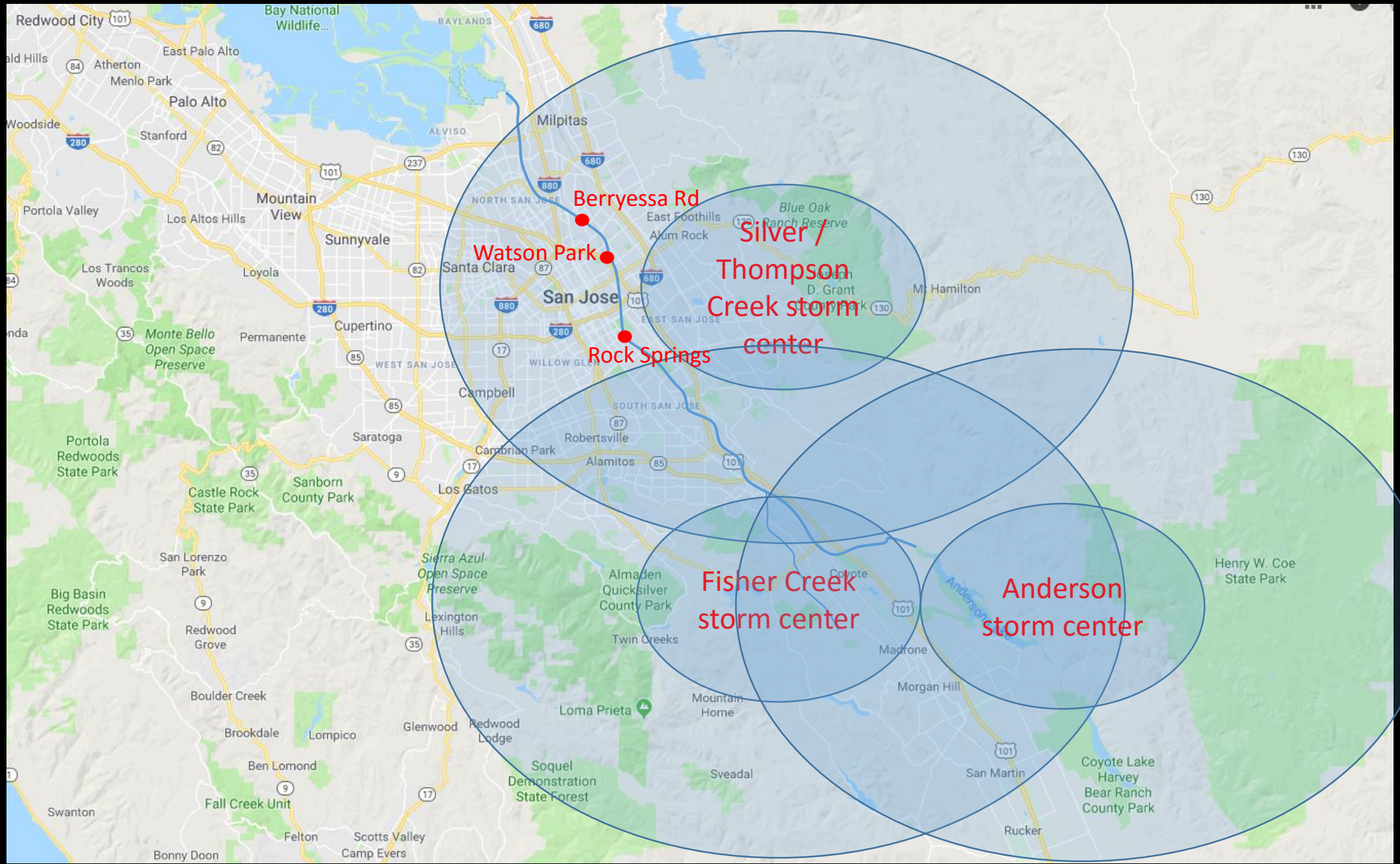


Existing condition

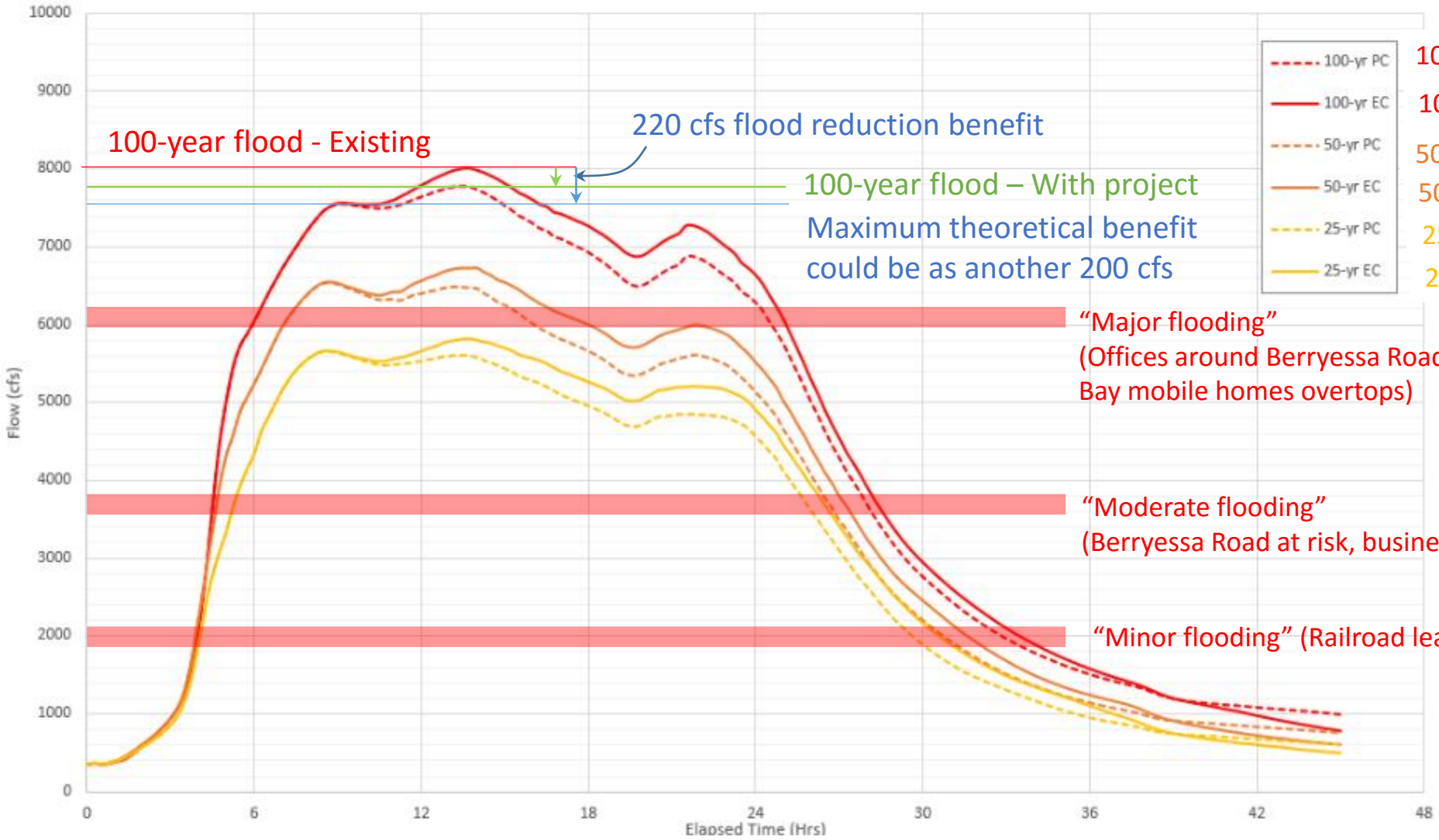


Conceptual Project condition

Project Flow Reductions Vary with Location, Size and Duration of Storm Event



Example model results: Berryessa Road – storm centered over Fisher Creek



100-year flood - Project

100-year flood - Existing

50-year flood - Project

50-year flood - Existing

25-year flood - Project

25-year flood - Existing

"Major flooding"
(Offices around Berryessa Road flood, floodwall at South Bay mobile homes overtops)

"Moderate flooding"
(Berryessa Road at risk, businesses NW of road flooded)

"Minor flooding" (Railroad leading to Granite Rock flooded)

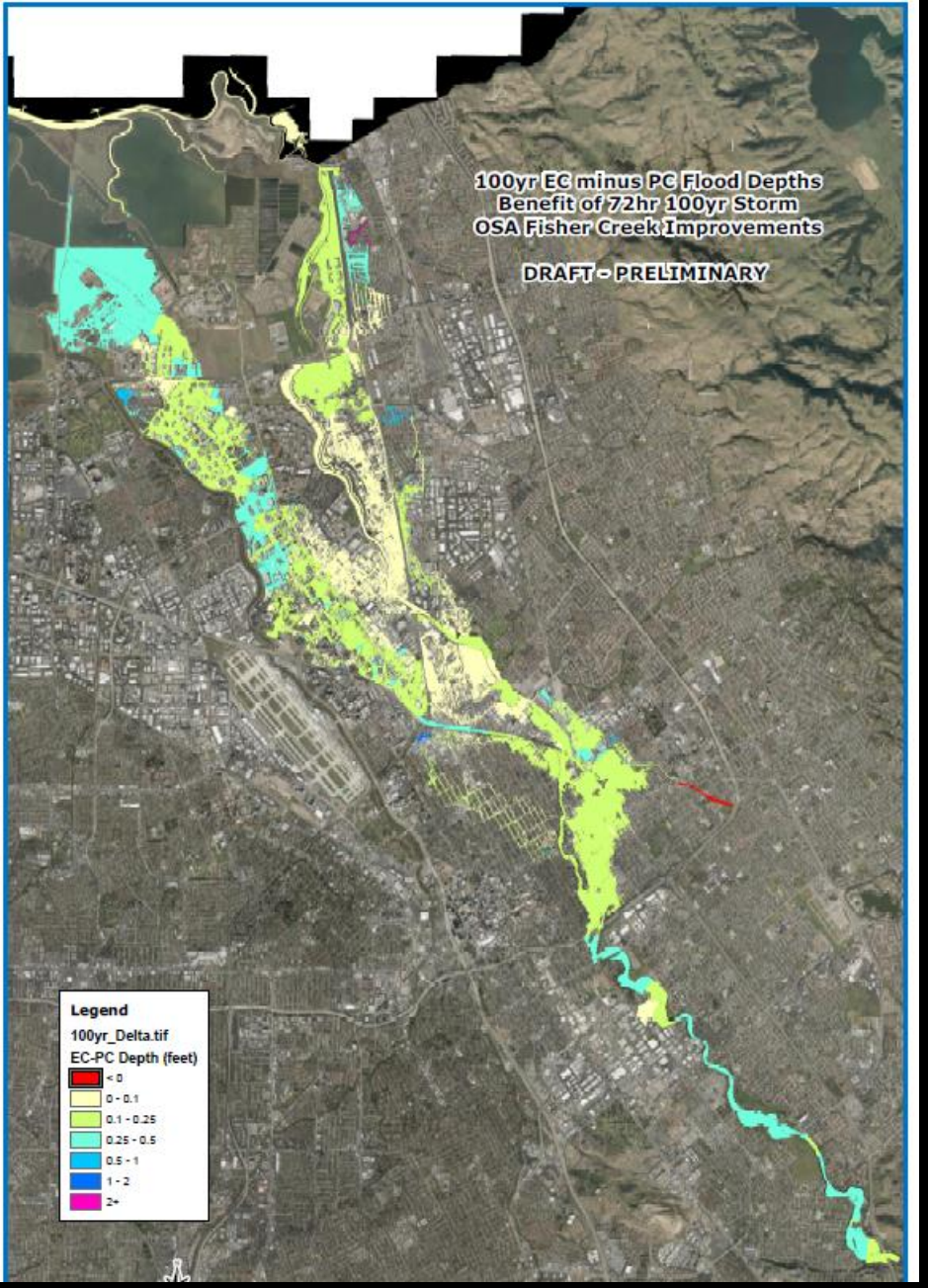
Summary of downstream flood reductions at 3 locations

Storm center	Event	Rock Springs				Watson Park/Mabury Rd			Berryessa Rd/Mobile Home Park		
		Amount of flooding	Peak flow reduction		Channel flow depth reduction	Amount of flooding	Peak flow reduction		Amount of flooding	Peak flow reduction	
			(cfs)	%			(cfs)	%		(cfs)	%
Thompson - centered 24 hr	25 yr	No flooding	150	6%	0.5 ft	Moderate to Major flooding	0	0%	Major flooding	0	0%
	50 yr	No flooding	170	6%	0.4 ft	Major flooding	0	0%	Major flooding	0	0%
	100 yr	Minor to Moderate flooding	170	5%	0.3 ft	Major flooding	70	1%	Major flooding	0	0%
Fisher - centered 24 hr	25 yr	No flooding	240	10%	0.7 ft	Major flooding	200	4%	Major flooding	160	3%
	50 yr	Minor to Moderate flooding	270	9%	0.6 ft	Major flooding	230	4%	Major flooding	180	3%
	100 yr	Minor to Moderate flooding	270	8%	0.5 ft	Major flooding	220	3%	Major flooding	220	3%
Anderson - centered 72 hr	100 yr	Major flooding	500	4%	0.1 ft	Major flooding	190	2%	Major flooding	480	4%

No benefit (no flow reduction, or reduction below flood stage)

Small benefit (v. small reduction, or reduction when flooding is minor)

Benefit (flow reduction when flooding would occur)



Reduction in flood water depth during 100 year storm with Anderson Dam overtopping

Summary of flood reduction benefits

- Flood benefit varies depending on location, storm location and size
- Project doesn't provide flood benefit when storms are centered on Thompson Creek / lower watershed: local tributaries control flooding there
- For storms centered on Fisher Creek and Anderson area, project provides flood peak reduction of 2-9%, up to 0.6 feet inundation depth in channel
- Flooding is delayed by 0-3 hours, providing a potential evacuation benefit
- Volume of flow is reduced by 400-500 acre feet
- There is potential to optimize the design and obtain additional flood benefits for several scenarios by a similar amount

Overall Summary

- The Coyote Creek project will preserve floodplain areas that currently provide a flood reduction benefit along Coyote Creek, avoiding the need to add hard infrastructure if those floodplains are developed (levees, floodwalls, detention basins)
- Project will improve water quality by spreading out and retaining water on a vegetated floodplain
- Restoring the floodplain and Laguna Seca appropriately can provide an additional layer of resiliency that will complement, though not replace the need for, more traditional flood management approaches
- Modeling shows that restoration can provide an additional safety margin that reduces flood peaks by 0-9% depending on the event, with the potential for additional benefits with project refinement

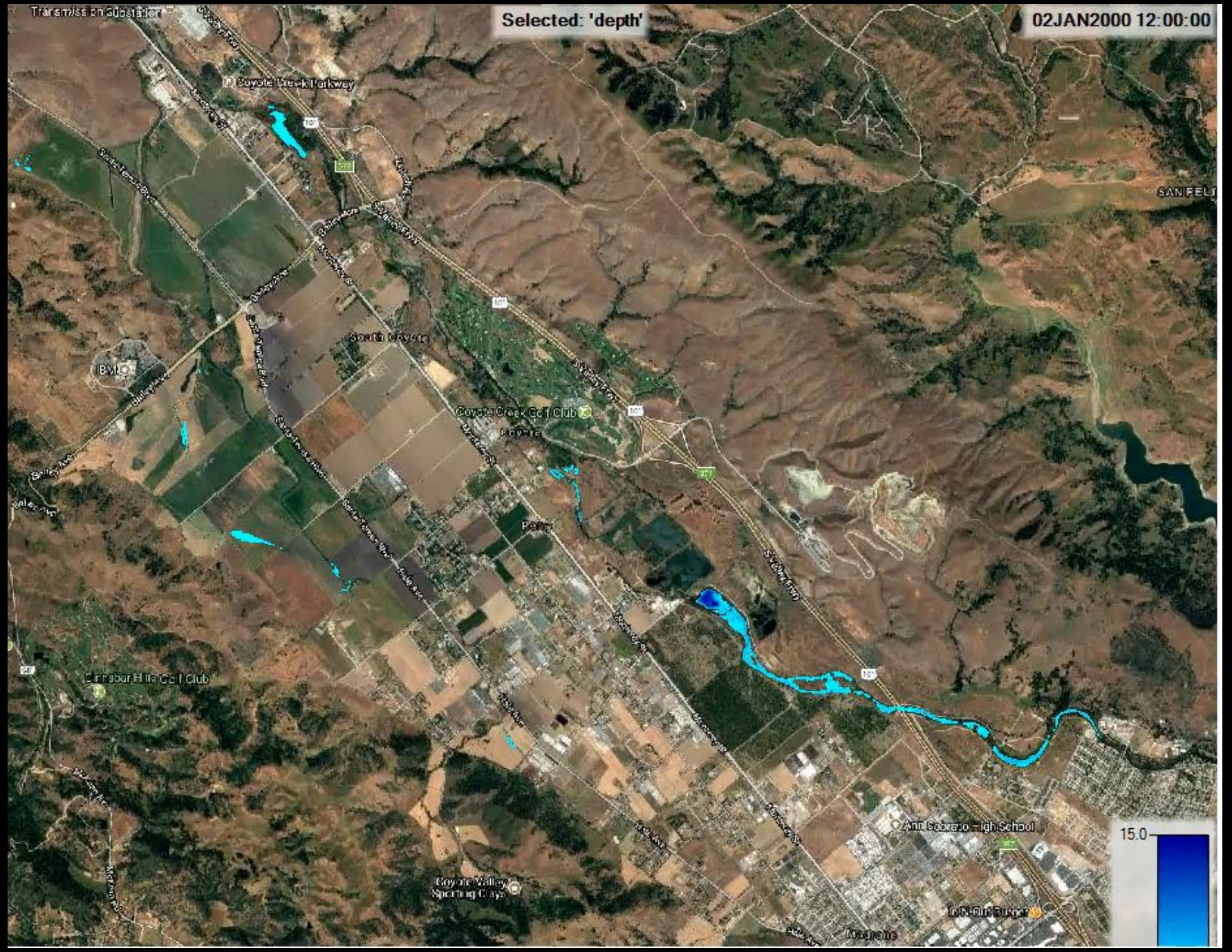
Next steps – restoration design and hydrology

- Complete technical report for this phase of conceptual design and analysis (winter 2019)
- Refine restoration concepts for additional downstream flood benefit and other benefits in coordination with related planning efforts.
- Following land purchases from willing land owners- advance site-level assessments and restoration designs in support of public planning efforts.
- Develop phased implementation plan, and support permitting, construction design, and implementation.

End of Presentation

Additional slides (if need)

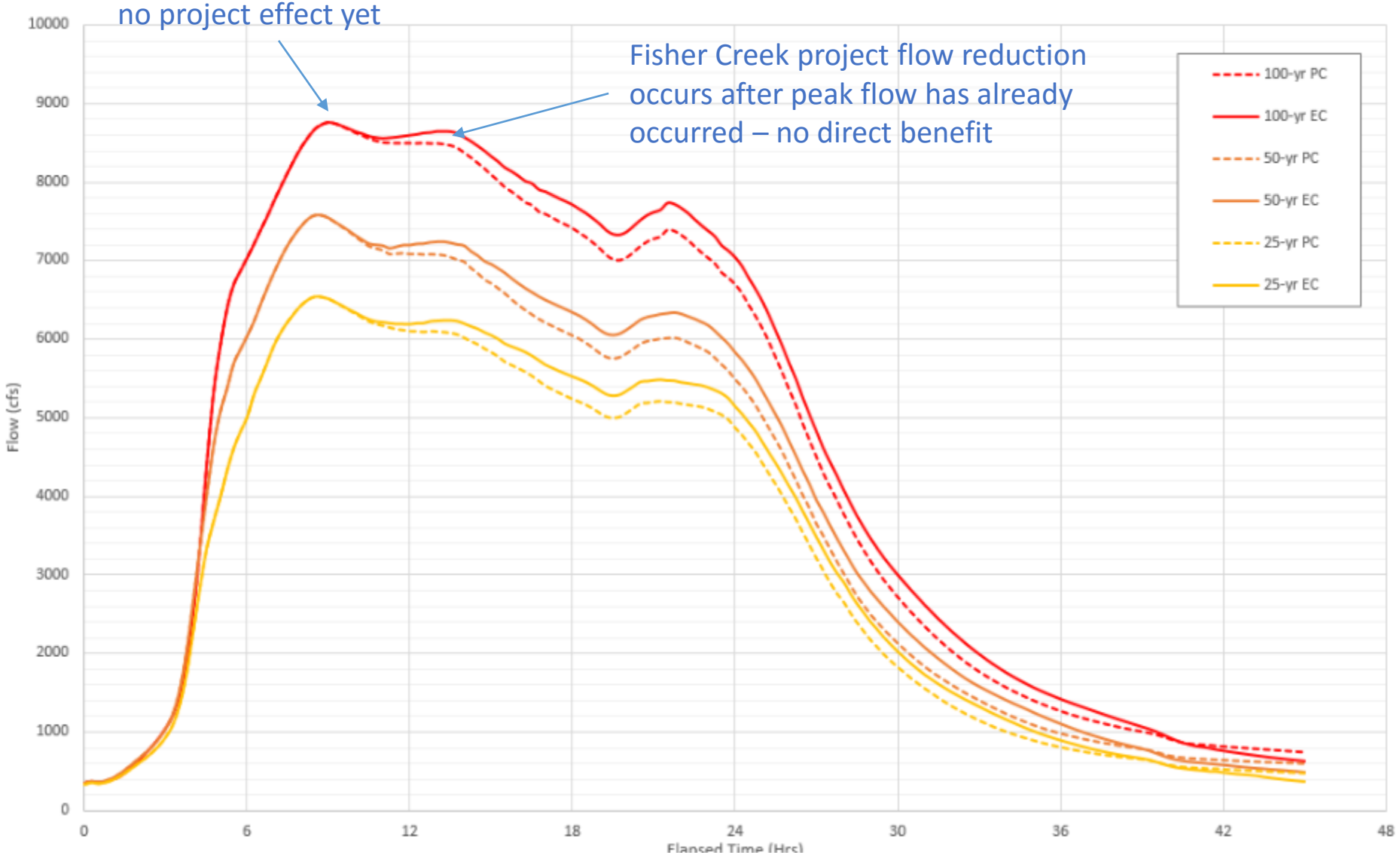
Project conditions
100-year 72 hour
Anderson-centered
event



Peak flood caused by flow from downstream of Fisher Creek – no project effect yet

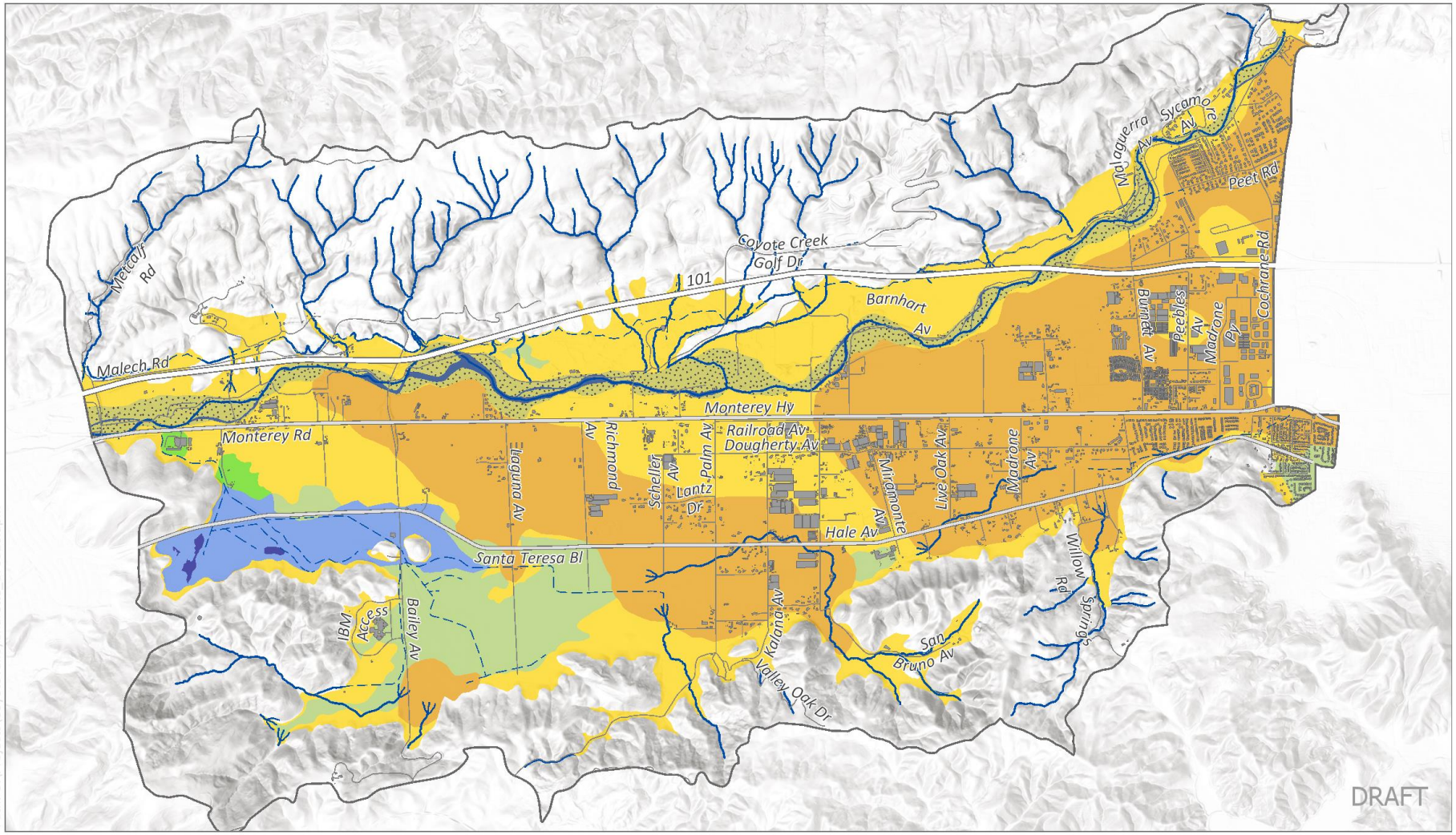
Fisher Creek project flow reduction occurs after peak flow has already occurred – no direct benefit

Berryessa Road – storm over Thompson Creek



Biodiversity

Historic Ecology



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- Historic Creek
- Modern Creek Addition
- Oak Savanna
- Oak Woodland
- Perennial Pond
- Freshwater Marsh
- Wet Meadow
- Willow Grove
- Riparian

0 0.25 0.5 1 Miles