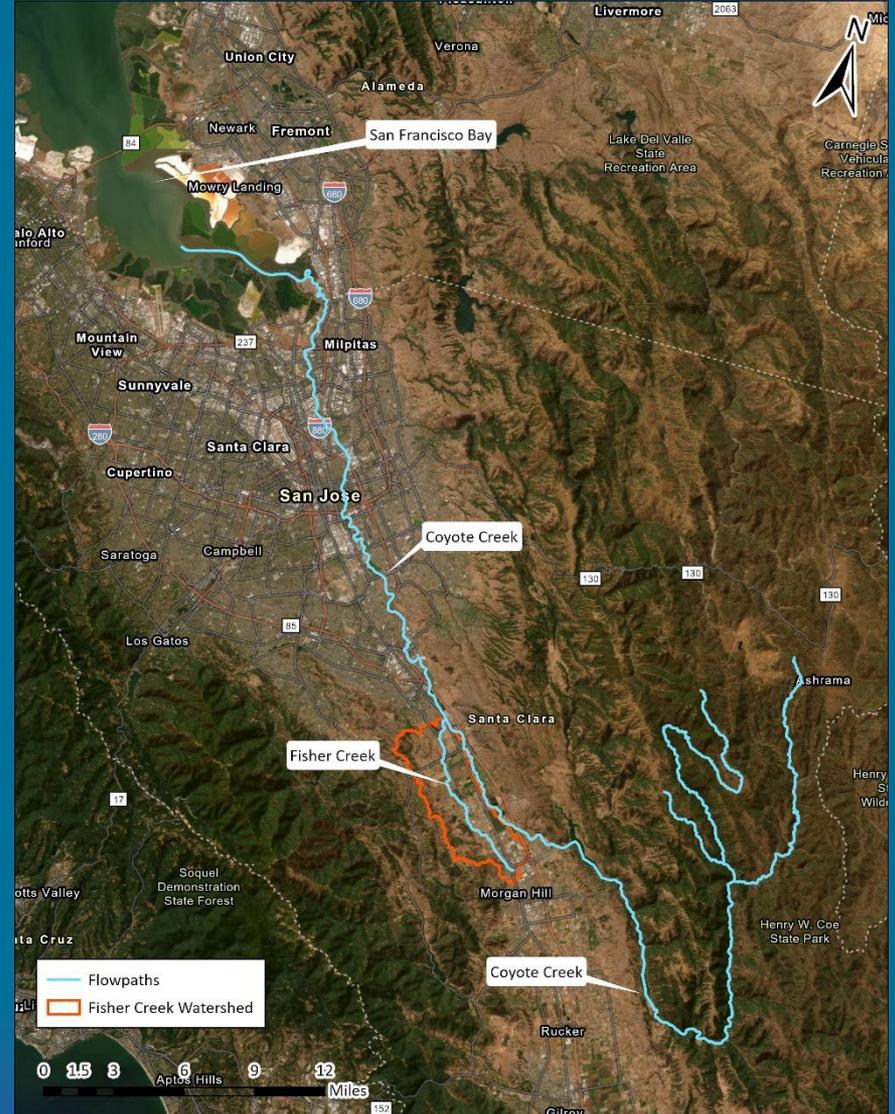


A Methodology for Long-Term Habitat Suitability Assessment in Coyote Valley, CA

Megan Casey
cbec eco engineering

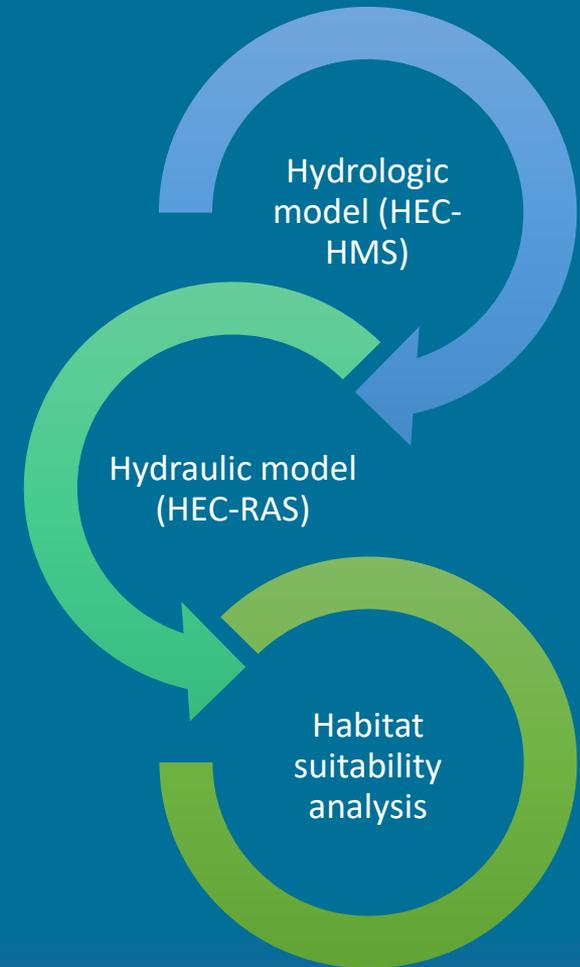


Project Overview



Project Overview

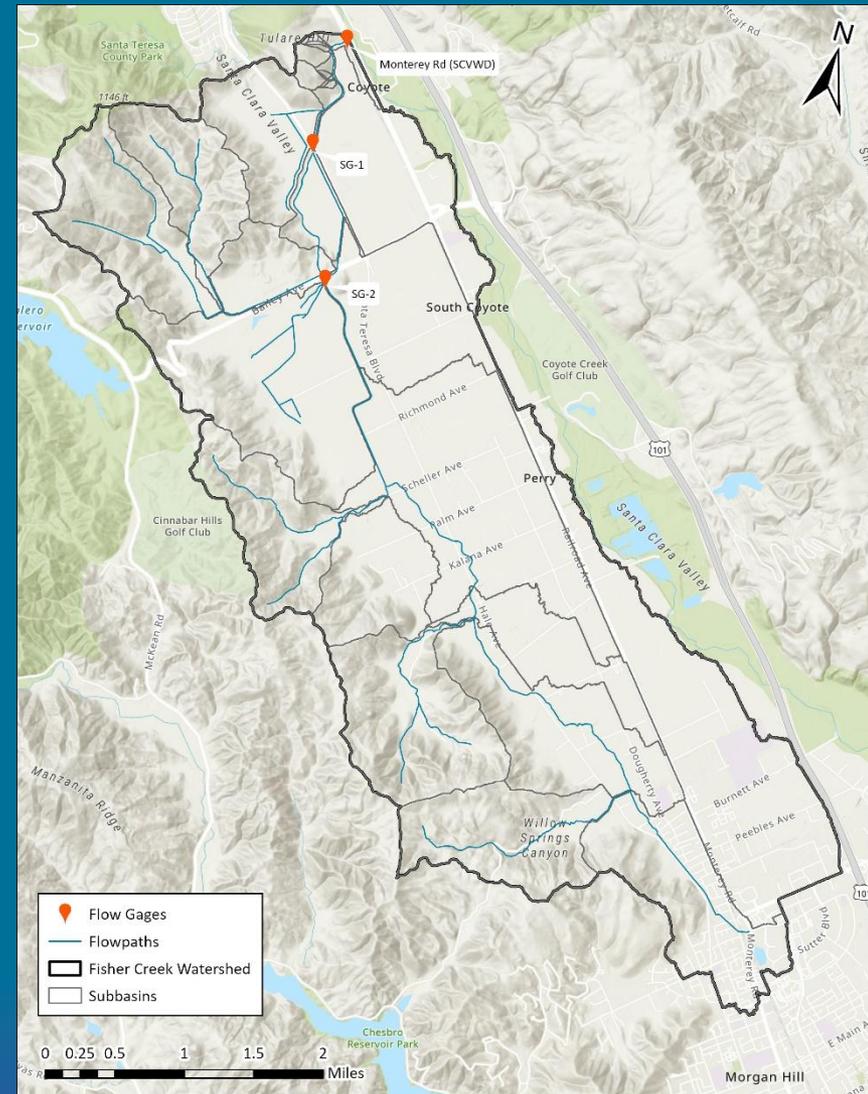
Goal: identify opportunities to restore ecosystem function for threatened native species (primarily California tiger salamander and California red-legged frog)



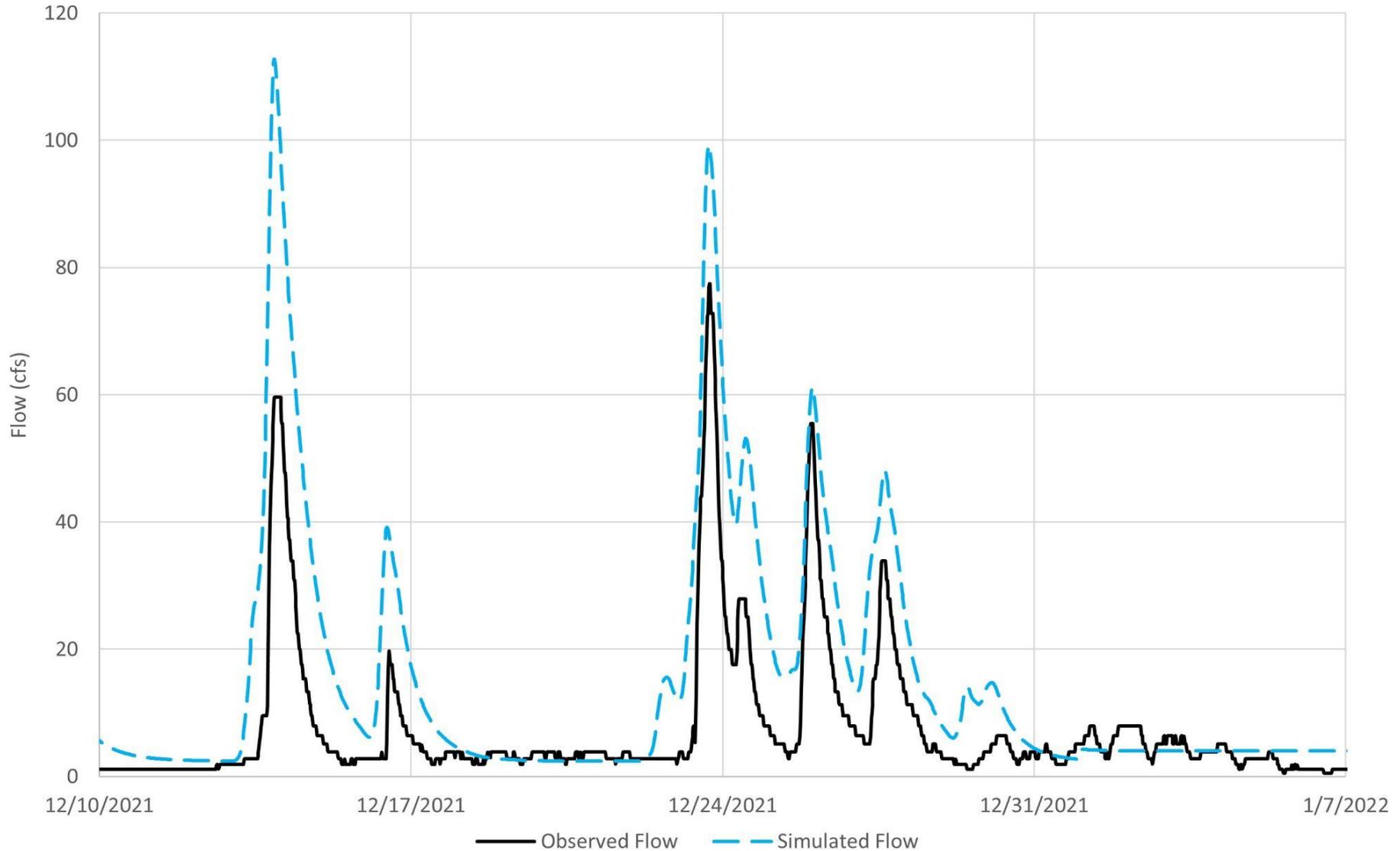
Hydrologic Model Development

- Long term simulation (WY 1993-2023) to capture inter-annual variability in watershed conditions
- Calibrated to three flow gages

Challenge: high variability in watershed response year-to-year; cannot use same parameterization

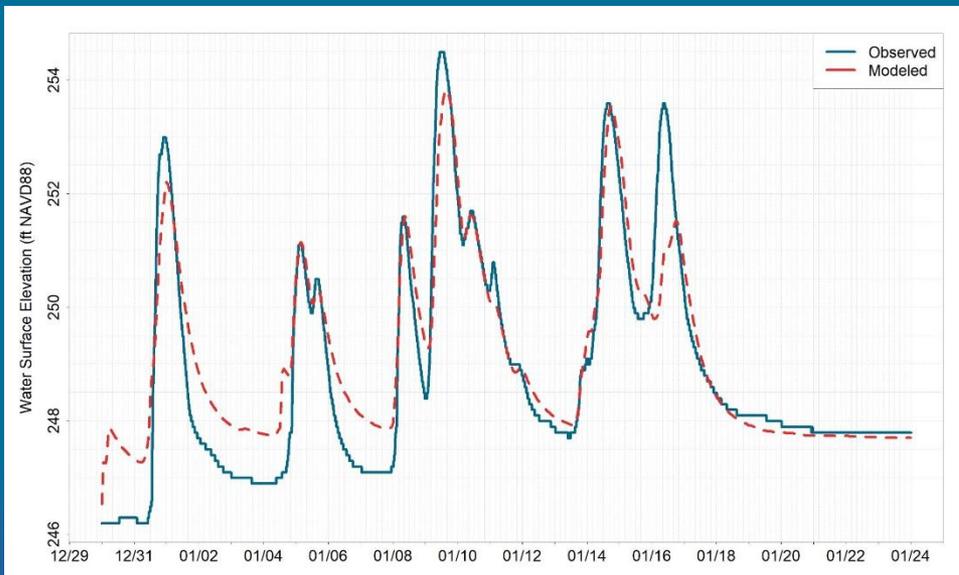


Hydrologic Model Calibration



Hydraulic Model Development

- 2D HEC-RAS model incorporating structure data from surveys and construction plans
- Calibrated to same three gages used for HEC-HMS model (January 2023)

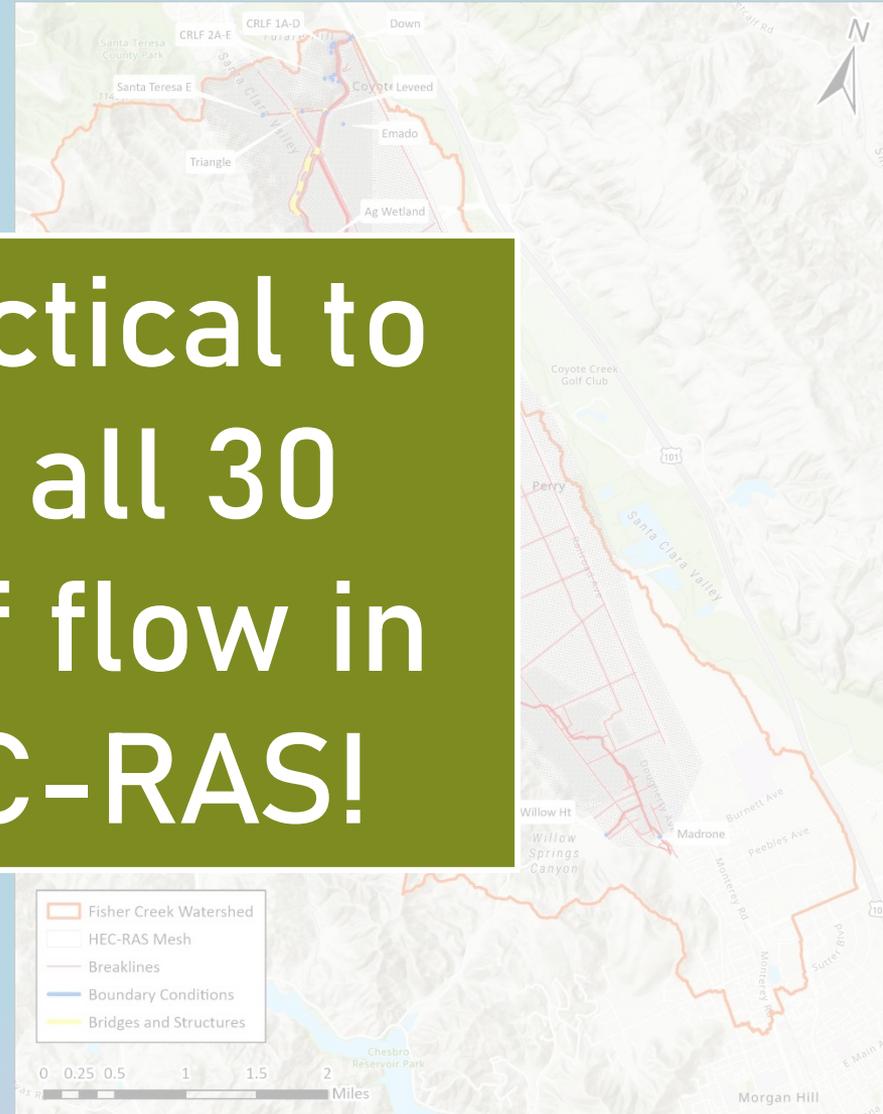


Habitat Suitability Calculations

Species	Habitat types	Inundation Duration	Depth (in)	Velocity
California red-legged frog	wetlands, ponds	Dec 1 – July 31	4 – 24	slow or still
California tiger salamander	wetlands, ponds, slow creek	Jan 1 – May 31	24 – 48	slow or still
Breeding shorebirds	wetlands, ponds, slow creek	Perennial	0 – 4	N/A
Non-breeding shorebirds		Oct 1 – Mar 31		
Breeding waterfowl	wetlands, ponds, slow creek	Perennial	4 – 18	N/A

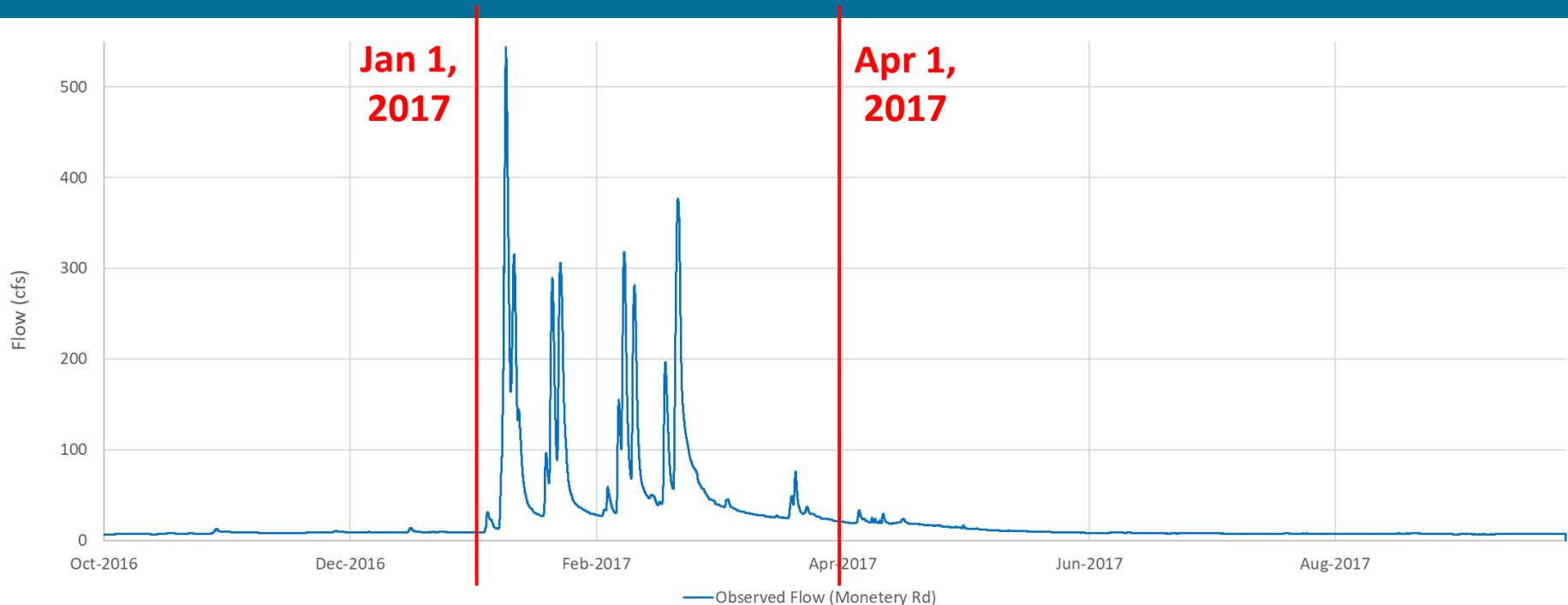
Habitat Suitability Calculations

Not practical to
model all 30
years of flow in
2D HEC-RAS!

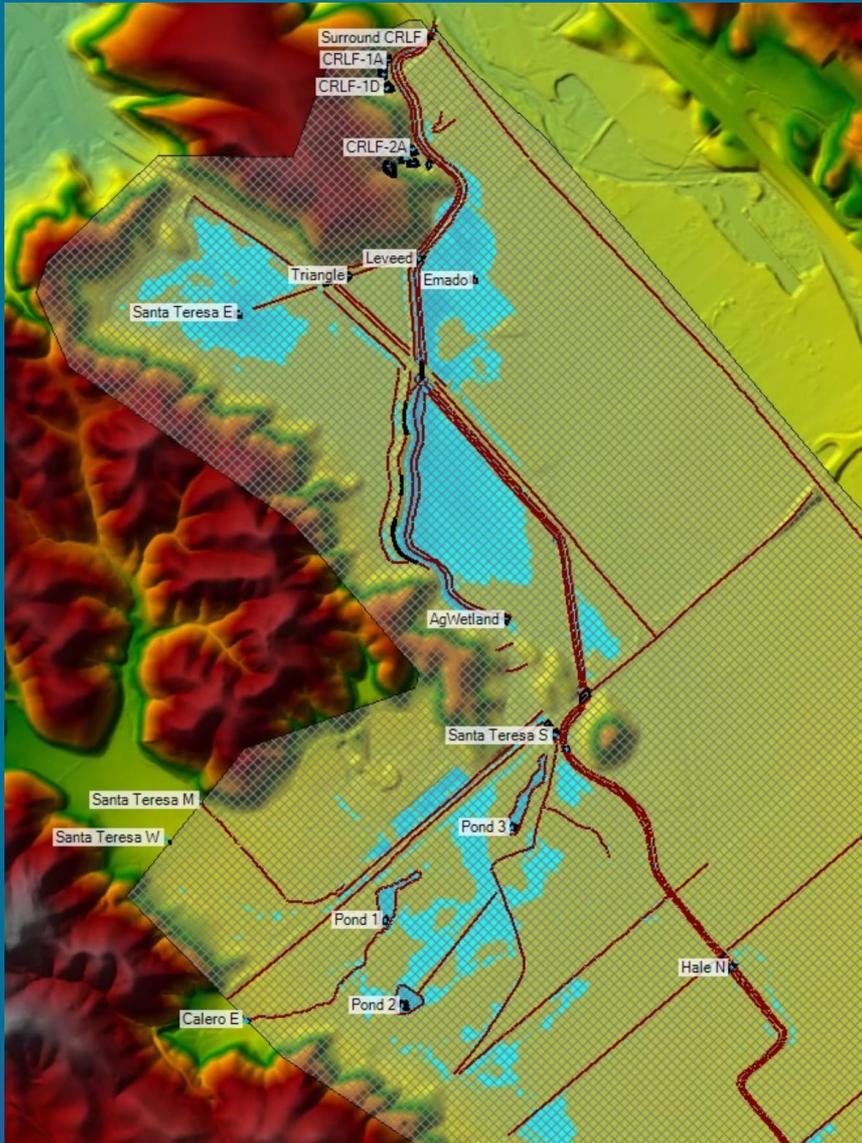


Habitat Suitability Calculations

1. Subset WY to from 1993 – 2023 to 2013 – 2017
2. Subset 2013 – 2017 based on observed flow at downstream boundary condition (greater than / less than 10 cfs)



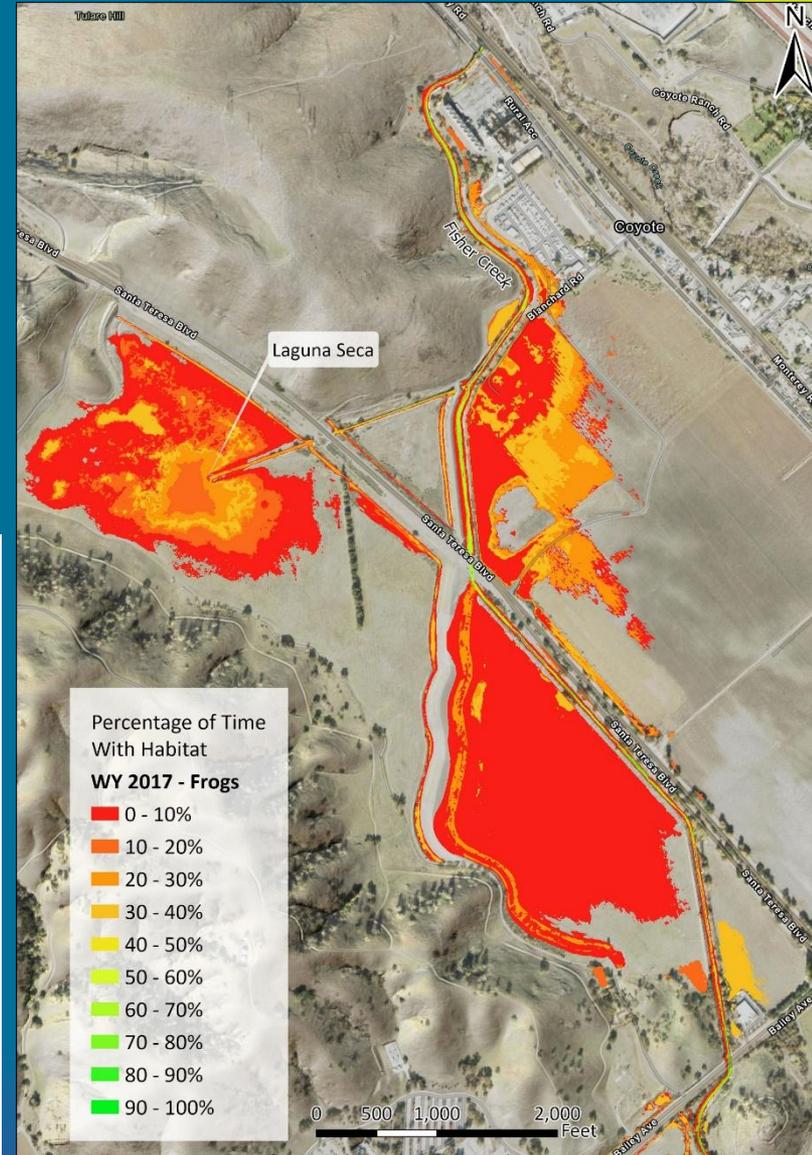
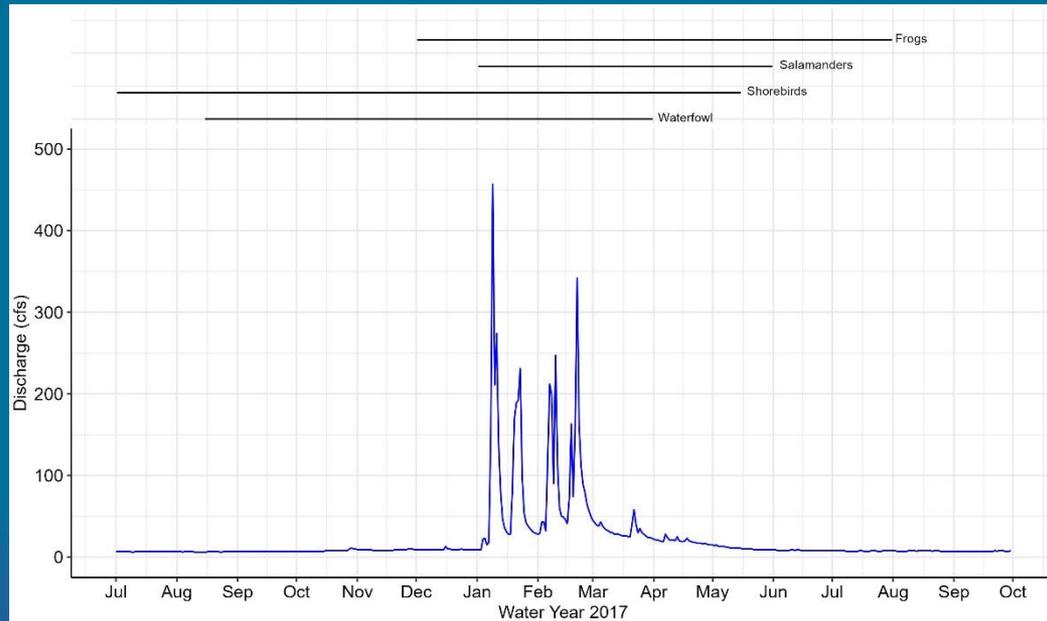
Habitat Suitability Calculations



- High flow (>10 cfs): modeled in HEC-RAS using flow time series from HEC-HMS at all boundary conditions
- Low flow (<10 cfs): stairstep hydrograph run through main channel and results matched to flow time series

Habitat Suitability Results

- All model results run through R script to match HEC-RAS results with habitat suitability criteria
- Low-flow HSI matched to real flow time series



Future Considerations

- Method suitable for broad goals
- Can increase confidence by modeling “high flow” periods of more water years
- Can expand assessment to include other habitat suitability factors



Questions?

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