

Shrimp on the rocks: endangered species and diversity in California rock pools

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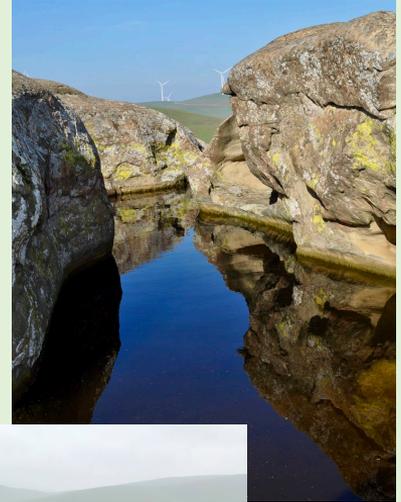
Rocky Outline

- Rock Pool Ecology
- Fairy Shrimp
- Bureau of Reclamation Grant
- 30 x 30 Grant



Ecology of Rock Pools

- Ephemeral freshwater pools – wet/dry
- Depressions in rock substrata
- Vary greatly in size
- Cultural - Ecological values but understudied



Ecology of Rock Pools



- Wet phase only
- Migrate before drought
- Adults disperse



**Passive
Dispersers**

- Survive drought
- Resting eggs
- Vectors to disperse



Endangered and Threatened Fairy Shrimp



Life Histories – Arrested Development



	<i>LFS</i>	<i>VPFS</i>
<i>Maturity</i>	22.4 days	18.0 days
<i>Reproduction</i>	43.0 days	39.7 days
<i>Longevity</i>	114 days	90.6 days
<i>Substrate</i>	Soil & Rock	Soil & Rock
<i>Landform</i>	bedrock escarpments, basin rim, floodplain	alluvial fan, bedrock, bedrock escarpments, basin rim, floodplain, high terrace, stream terrace, volcanic mud flow, low terra



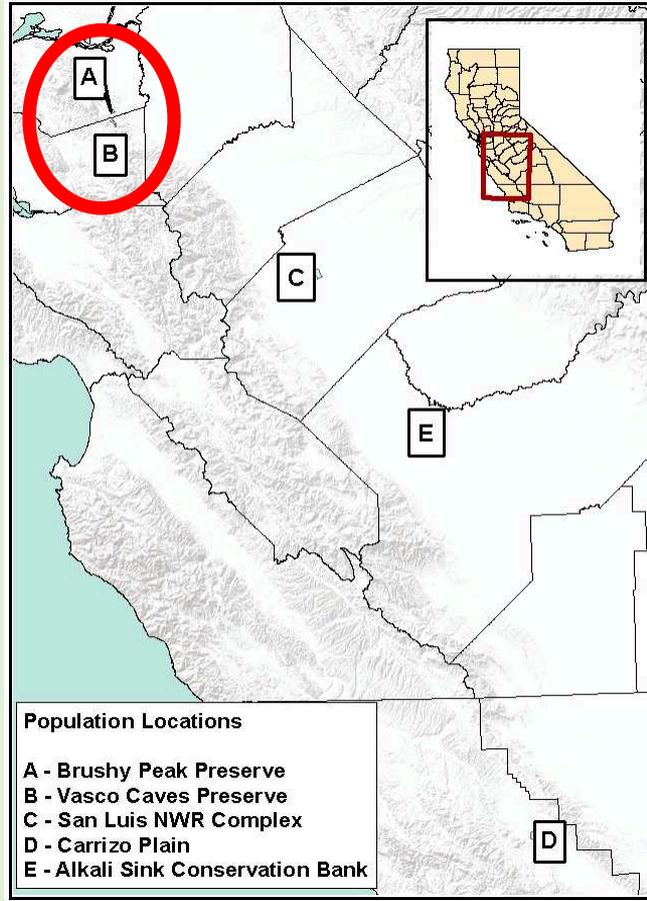
Dry Rock Pools



Fairy Shrimp Cysts

LFS Distribution

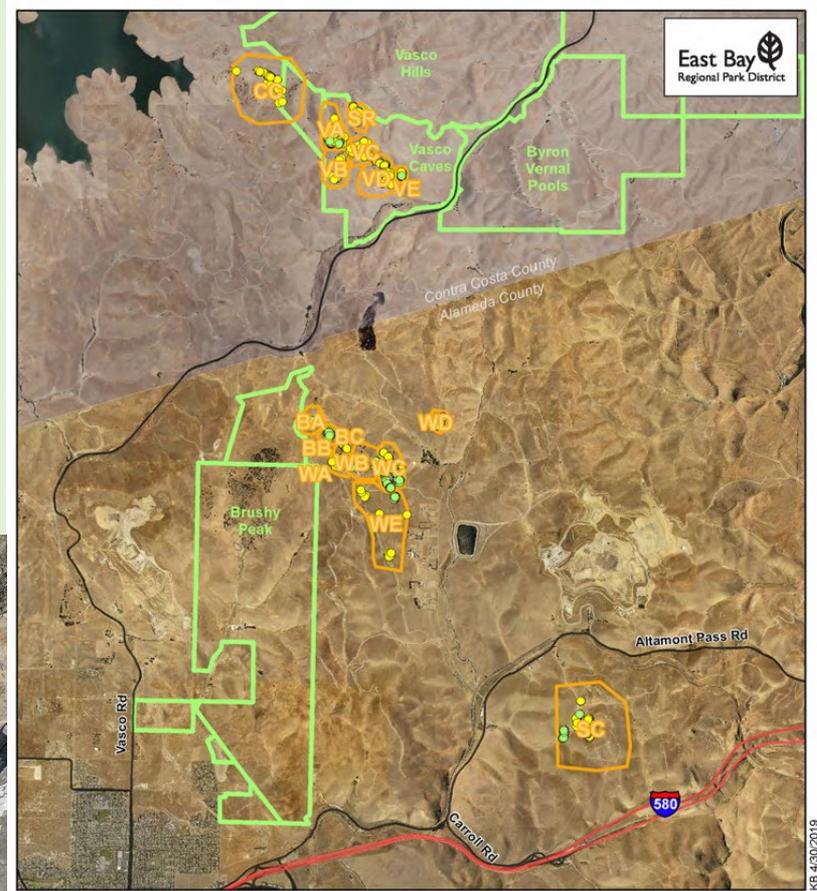
Study Area



2009-2012 LFS:
Only two rock pools!

Bureau of Reclamation Grant

- Wet /Dry Season Surveys
- Soil/Cyst Samples
- Genetic Differentiation
- Biotic/Abiotic Parameters
- Restoration Potential

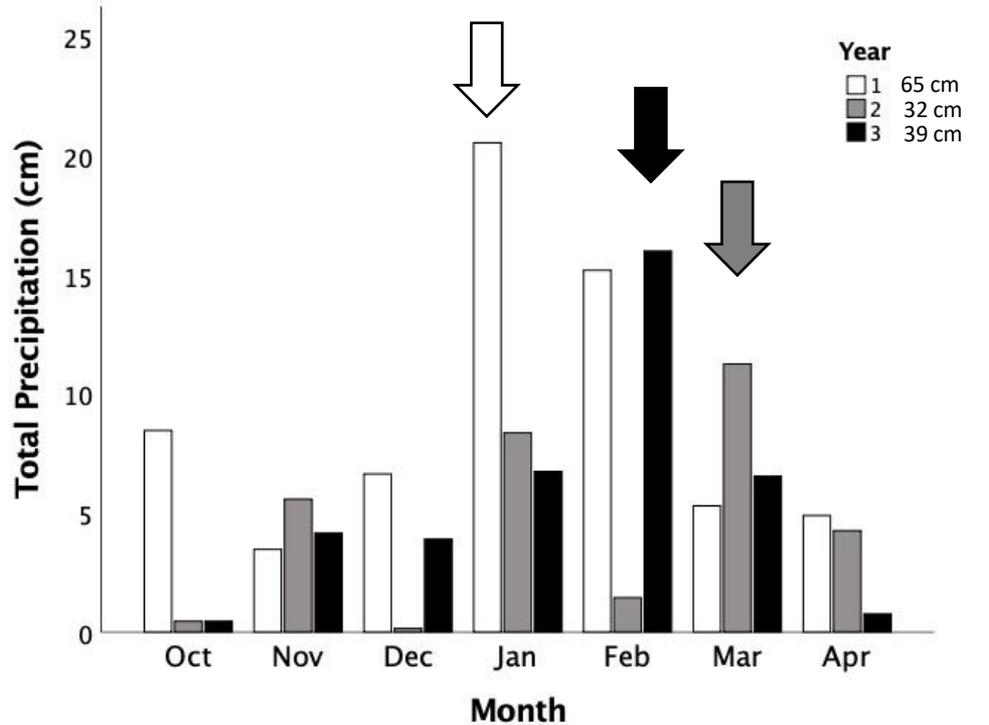


Wet and Dry Season Surveys

- Contra Costa & Alameda Counties
- 2016 – 2022
- 931 pools sampled
 - LFS: 75 pools
 - VPFS: 652 pools

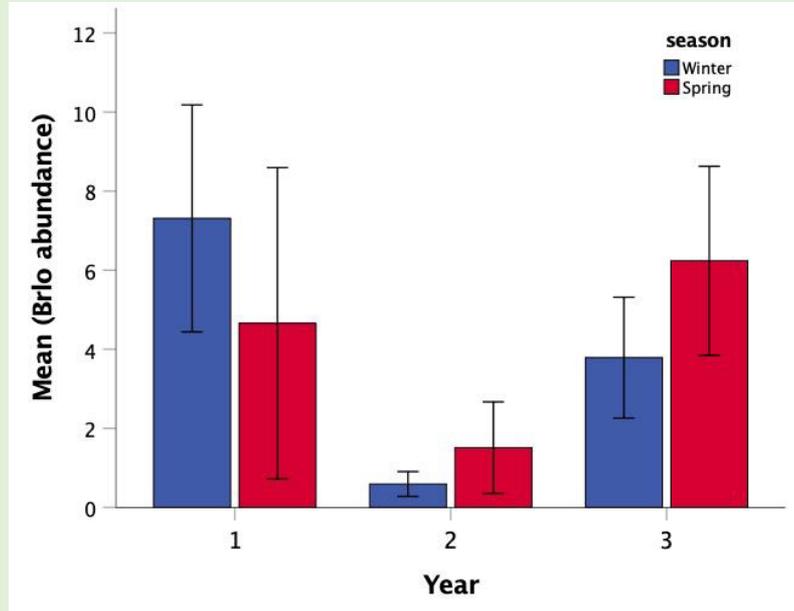


Hydrological Regime



Annual-Seasonal Patterns

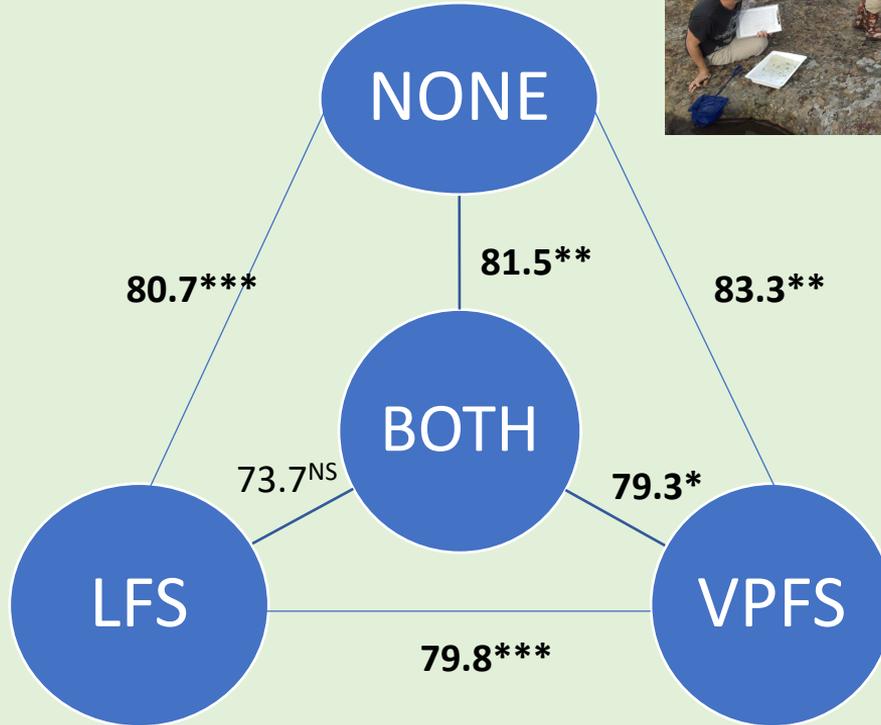
LFS



Year***
Season
Y x S***

Community Level

- Coexistence
 - Year, Season
 - Depth (-)
 - Richness (+)
- Dissimilarity (Bray-Curtis) among community types



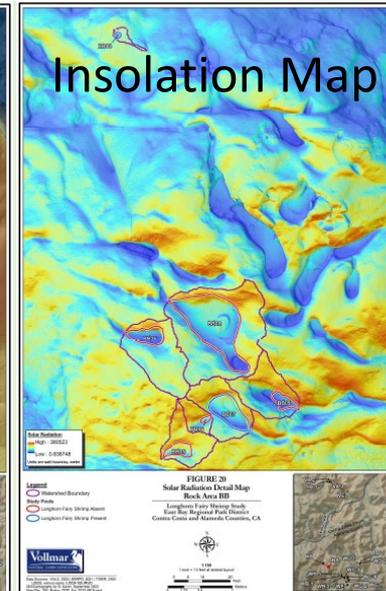
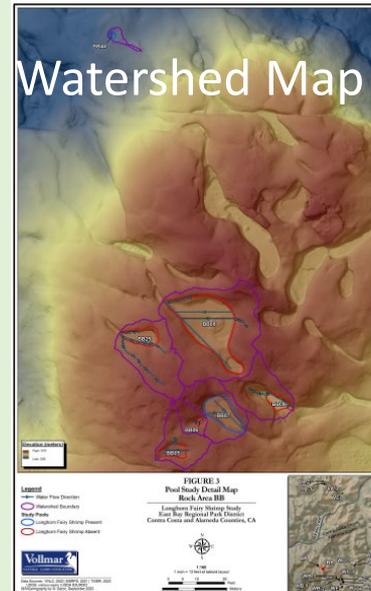
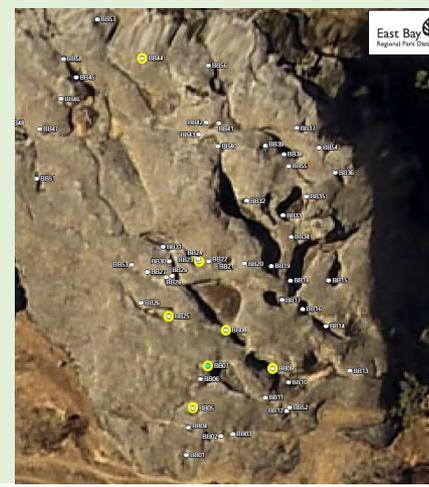
Conclusions From BoR

- Fairy Shrimp species exhibit different patterns in space and time
 - Abiotic and biotic factors
- Hydro-regime dominant factor
 - Coexistence
 - Community differences



30x30 Mini Grant

- ID candidate introduction pools
- Experimental cyst production in the lab
- Detailed wet-season measurements



30x30 Mini Grant

- Experimental cyst production in the lab
- Hatched VPFS and CAFS, but no LFS



30x30 Mini Grant

- Restore land-locked rock pools!



Goal



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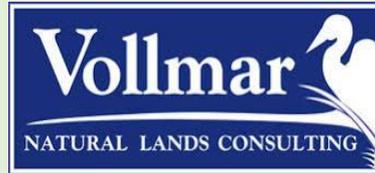
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East Bay 
Regional Park District



Thank You!

