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California Rapid Assessment Method: Using vernal pool CRAM to evaluate past restoration success & prioritize future restoration goals

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California Rapid Assessment Method:

Using vernal pool CRAM to evaluate past restoration success & prioritize future restoration goals

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What is CRAM?

- CRAM is a cost-effective, time-efficient method of monitoring the condition of a wetland (cramwetlands.org)
- Developed by ecologists, for ecologists – scientifically informative index of ecosystem conditions
- Specific CRAM scoring systems for different types of wetlands, including vernal pools

What are the benefits of using CRAM?

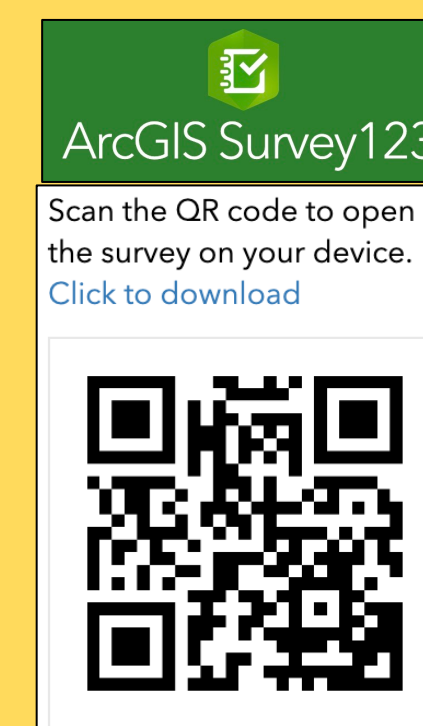
- Standardized & systematic – certified CRAM practitioners are trained & calibrated so that CRAM scores can be compared across the practitioners, pools, projects
- Takes 30-60min per pool
- Useful monitoring method for practitioners, researchers, agencies
- Can be used independently of or complimentary to other assessment methods

What does my CRAM score mean?

4 Attribute Scores determined by metrics

- 1) Buffer & Landscape Context Score:** condition of surrounding buffer landscape & proximity of pool to other wetlands
 - Pool is evaluated based on categorical metrics (A = highest rating, B, C, D = lowest rating, based on reference pools)
- 2) Hydrology Score:** water source, hydroperiod, hydrologic connectivity of pool
 - CRAM manual provides detailed & systematic guide to rating metrics
- 3) Physical Structure Score:** structural patches/heterogeneity within pool, basin topography
 - Metrics are used to calculate Attribute Scores (100 = maximum score)
- 4) Biotic Structure Score:** pool zonation, dominant native species, dominant exotic species
 - Overall CRAM Score of pool = average of the 4 Attribute Scores

You can see the online CRAM survey we used here:



We conducted both CRAM and quadrat percent cover vegetation surveys for 77 pools in Santa Barbara County to evaluate how these survey methods can assess the biotic vegetation composition

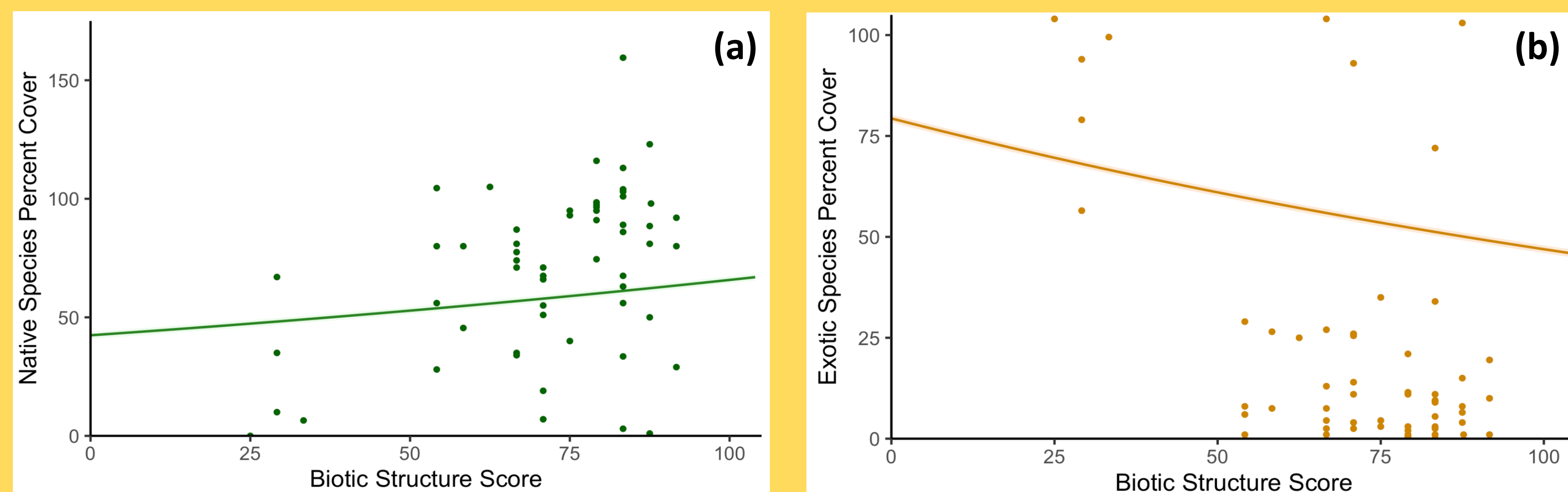


Fig. 1. CRAM Biotic Structure Score correlated with total native species percent cover (a) and total exotic species percent cover (b). Data plotted with GLM predictions and ± 1 SE as linear models ($p < 0.05$).

CRAM surveys are faster & less detailed than percent cover vegetation surveys but can provide analogous info about vegetation quality

How can CRAM scores be used in statewide initiatives?

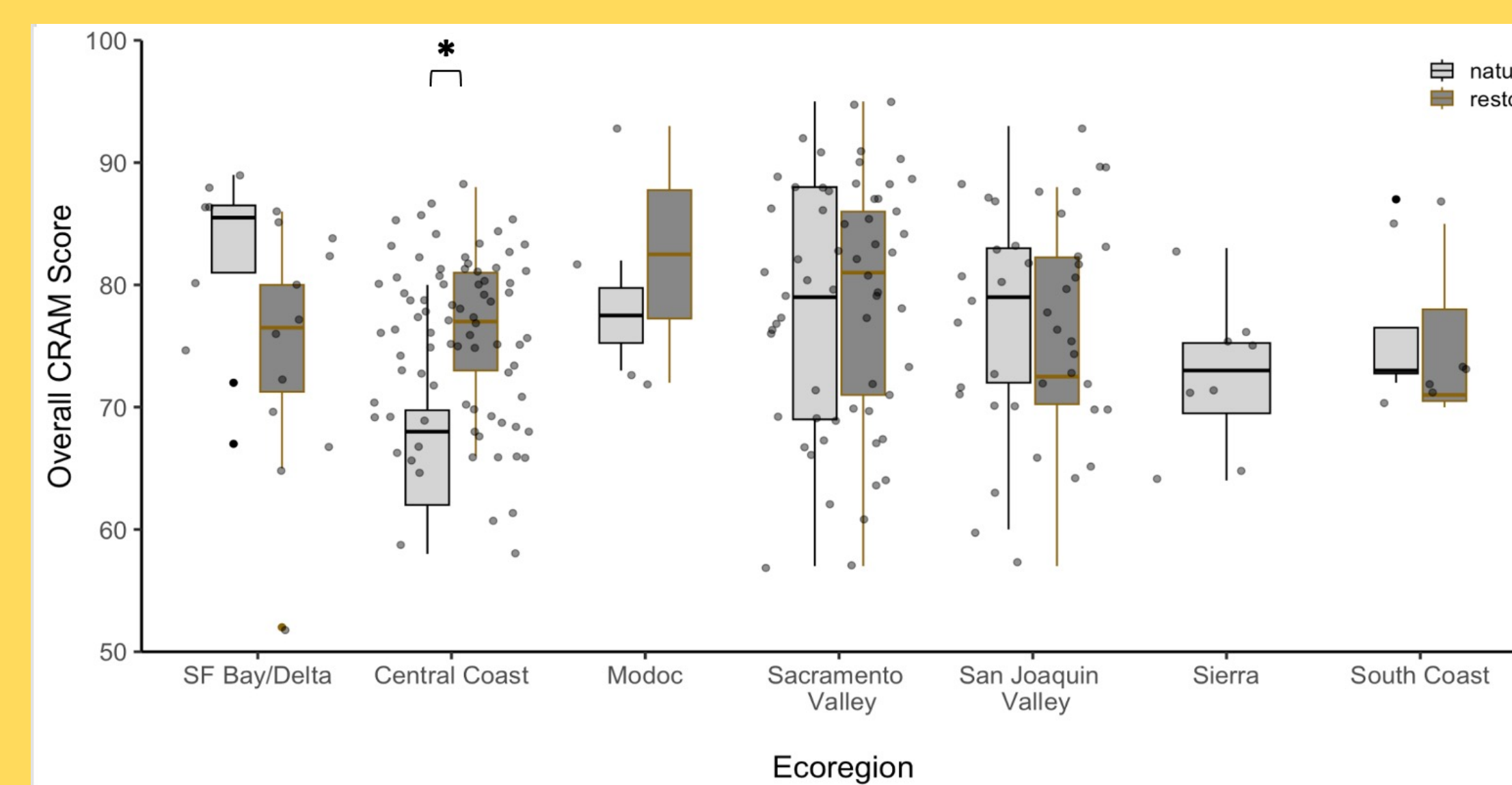
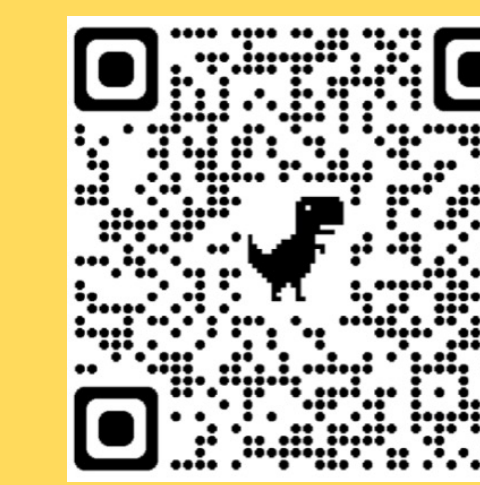


Fig. 2. Overall CRAM Scores of pools throughout the state, comparing natural pools in each ecoregion to restored pools. Asterisks indicate a significant difference between natural & restored pools based on post-hoc Tukey's HSD of GLMERs ($p < 0.05$).



Scan to see the EcoAtlas map of all the statewide CRAM vernal pool scores!

Systematic state-wide scoring of vernal pools can help us:

- Evaluate how restored pools compare to natural pools
- Identify regional differences
- Identify what pool attributes are contributing to high or low scores
- Prioritize regions & methods that target specific attributes for future restoration

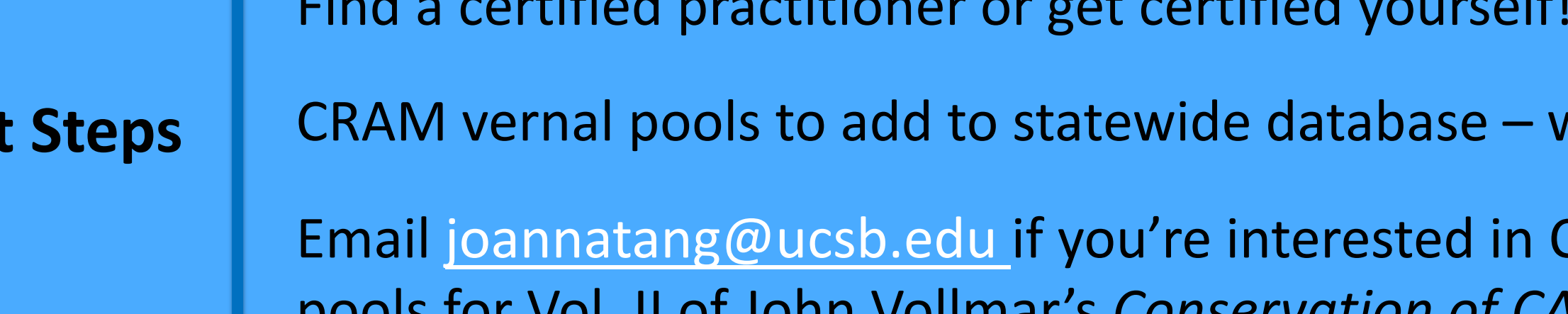
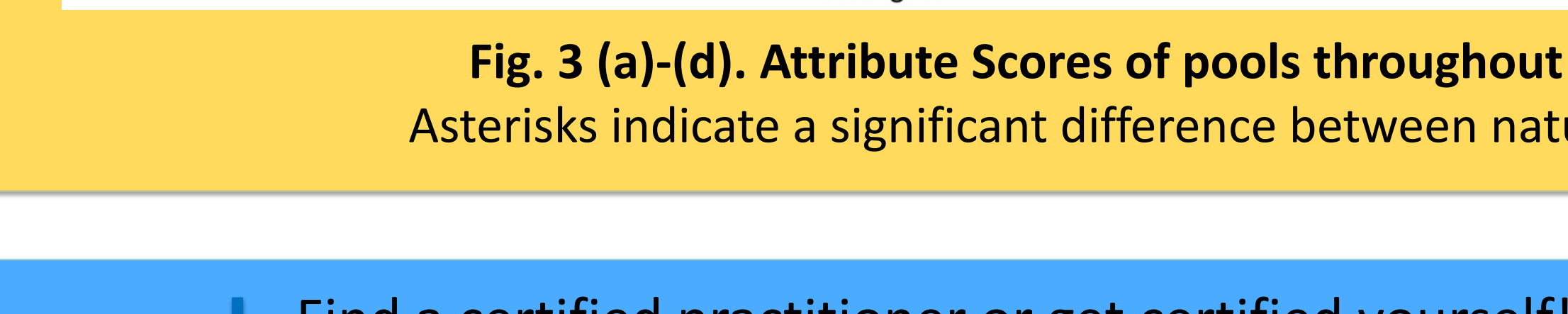
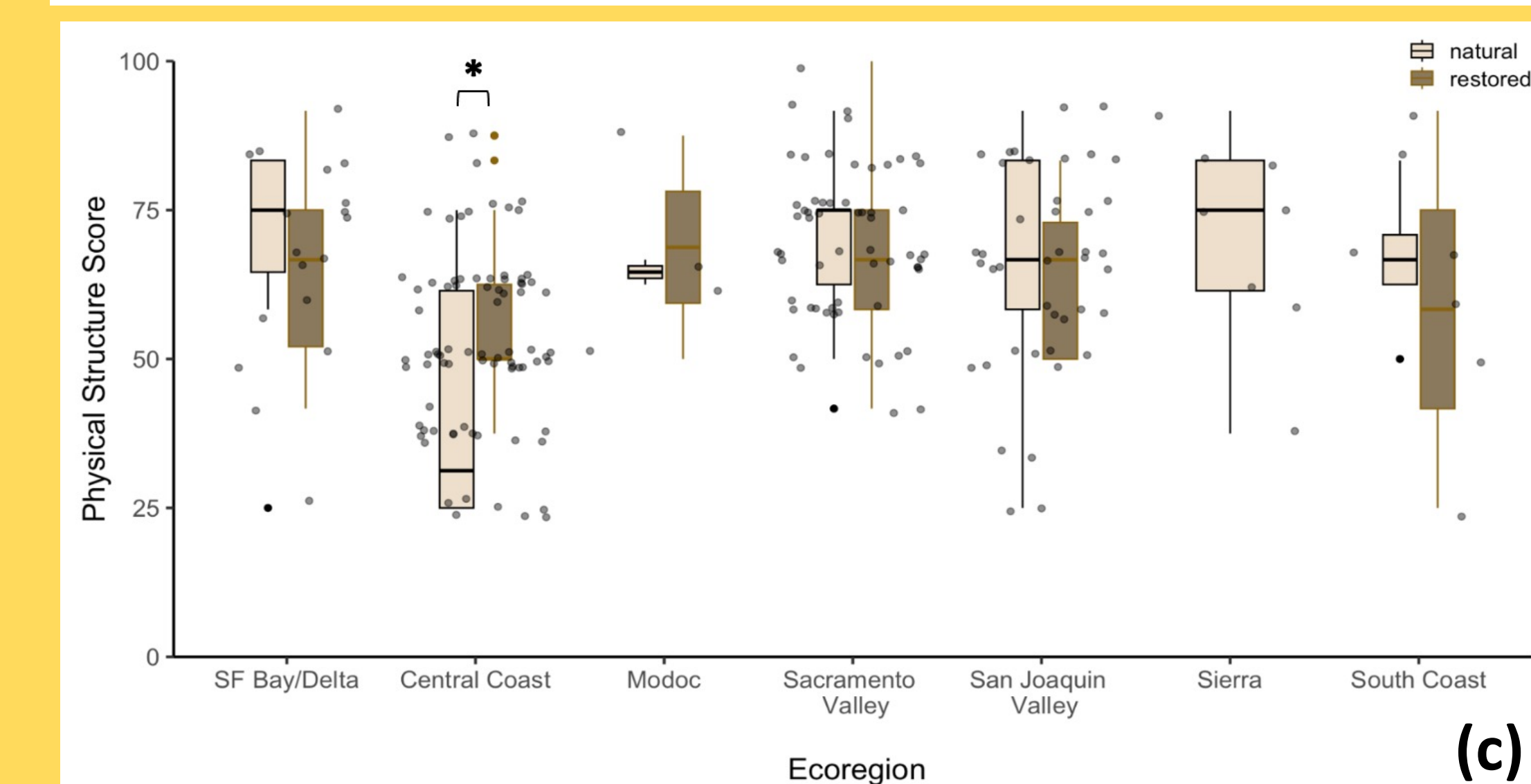
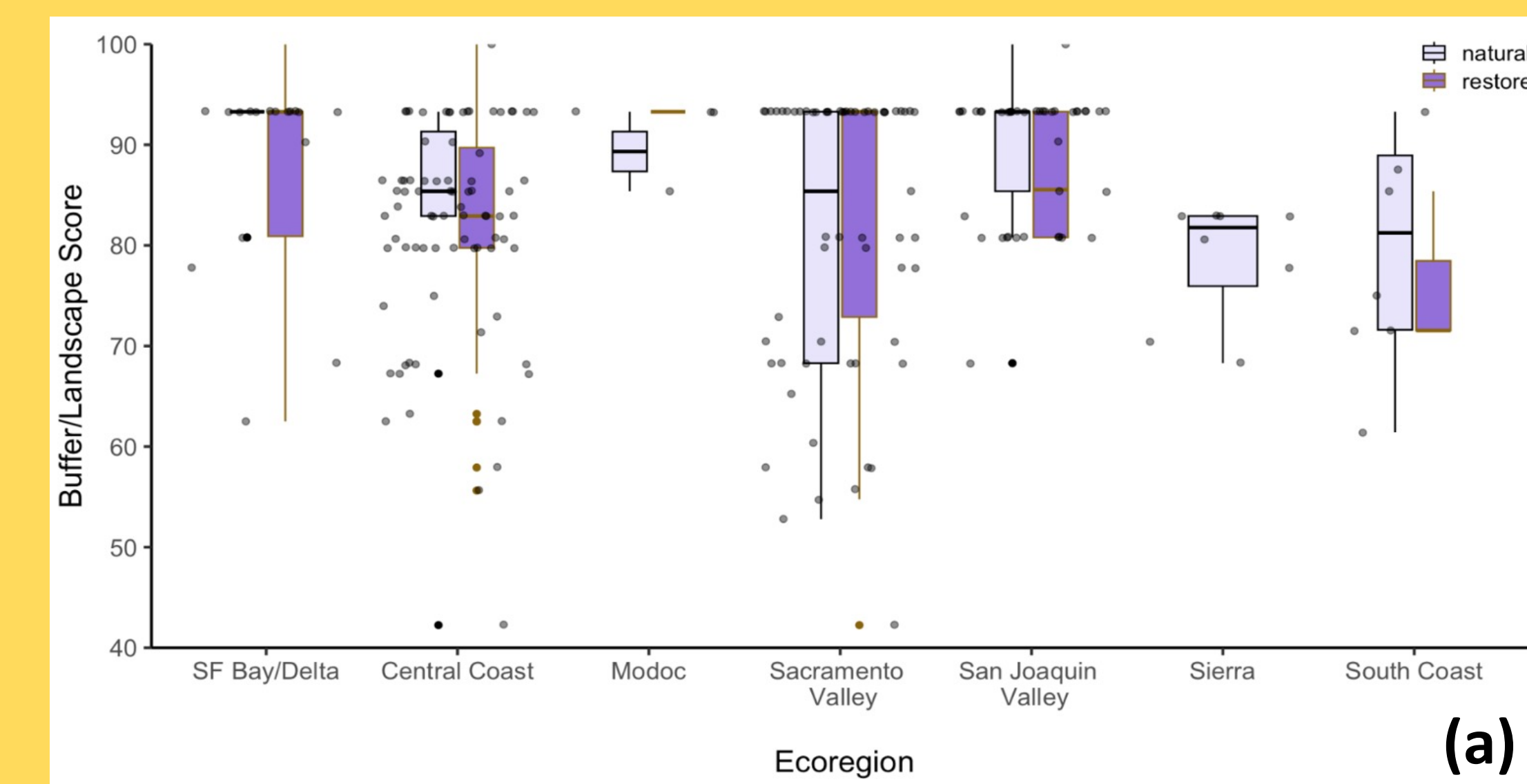


Fig. 3 (a)-(d). Attribute Scores of pools throughout the state, comparing natural pools in each ecoregion to restored pools. Asterisks indicate a significant difference between natural & restored pools based on post-hoc Tukey's HSD of GLMERs ($p < 0.05$).

Acknowledgements

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Next Steps

Find a certified practitioner or get certified yourself!

CRAM vernal pools to add to statewide database – we need more SoCal CRAM surveys!

Email joannatang@ucsb.edu if you're interested in CRAM surveying coast range vernal pools – we are seeking funding to survey pools for Vol. II of John Vollmar's *Conservation of CA's Great Valley Vernal Pool Landscapes* for coast range vernal pools!