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Using Physiological and Molecular Ecology for Conservation of Sacramento Perch

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The Question: *Can Sacramento perch effectively be reintroduced to their native range?*

Sacramento perch (*Archoplites interruptus*) are native to the Sacramento-San Joaquin watershed and non-native (introduced) to Abbotts Lagoon at Point Reyes National Seashore. The Point Reyes population may be a source for reintroductions of Sacramento perch to their native watershed, due to their unique genetic diversity of the Point Reyes population. By studying Sacramento perch at Point Reyes we can gain a greater understanding of the optimal physiological and habitat requirements of this species so as to select "appropriate" reintroduction sites.

Sacramento Perch populations are waning in their natural, native habitats (due to habitat destruction), but are paradoxically flourishing in habitats into which they have been introduced.

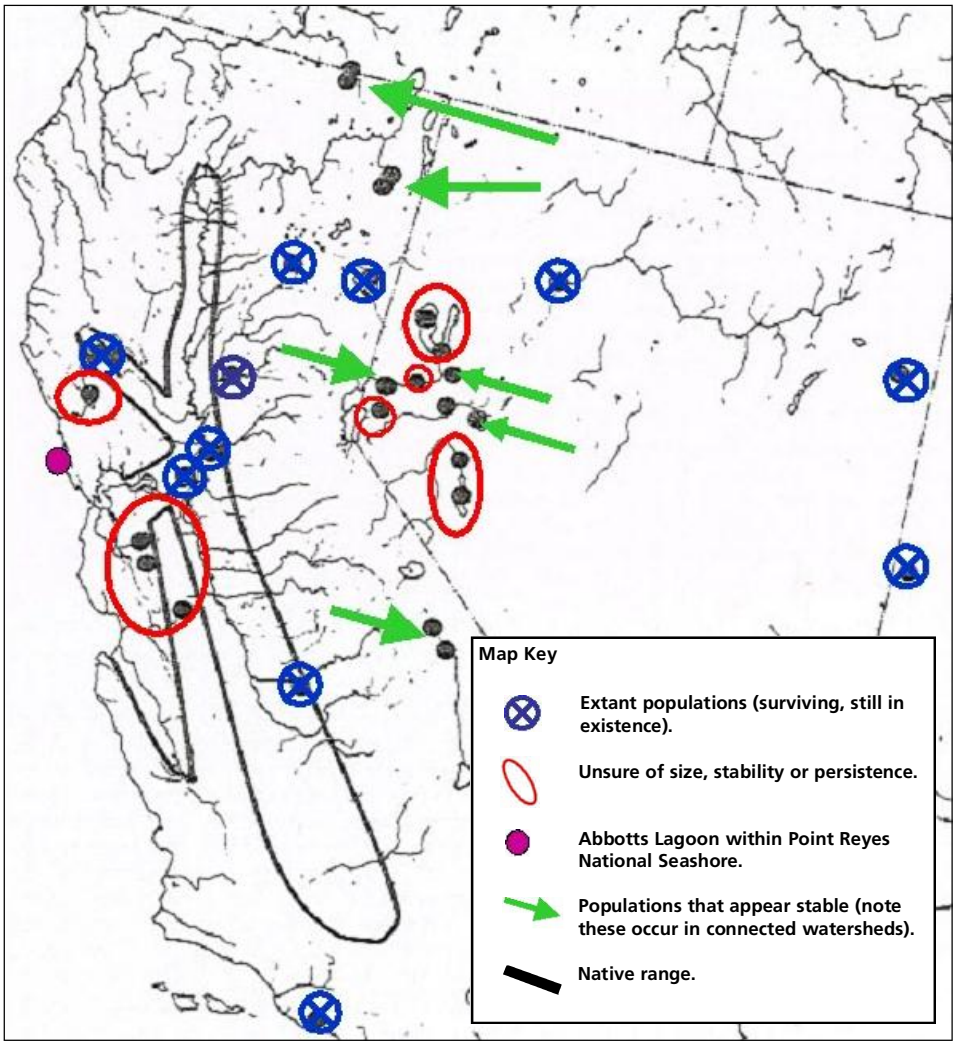
The Project: *Analyze genetic diversity, and document habitat use and water quality preferences of Sacramento perch.*

Researchers at the University of California-Davis are using genetics and physiology to develop a successful reintroduction program for Sacramento perch. Analyzing the genetic diversity within and among populations, including that in Abbotts Lagoon, allows us to maximize diversity at reintroduction sites and monitor reintroduced populations to determine the number of reproducing adults. Habitat use will be documented by snorkeling and remote video. Observations will focus on breeding and nest guarding behavior, and movements within and between lagoons. Water quality fluctuations within lagoons will be used to determine the physiological tolerances, behavioral preferences, and habitat use of the species.

Sacramento perch in Abbotts Lagoon appear to preserve ancestral variation that has not been preserved in other populations.

Preliminary Results: *Sacramento perch in Abbotts Lagoon are more genetically diverse than other populations and are genetically distinct from other populations. Initial observations show that these Sacramento perch are behaviorally sophisticated and tolerant of a wide range of conditions.*

Many populations of Sacramento perch have experienced a loss of genetic diversity. The population in Abbotts Lagoon is diverse and retains ancestral variation that has not been preserved in other populations. Conservation of genetic diversity will minimize the effects of inbreeding. In other locations, Sacramento perch have been observed to spawn in



Map above (modified from Lee et al. 1980) shows known locations of Sacramento Perch in California and Nevada. The Sacramento Perch originally occurred in the San Joaquin, Pajaro, and Salinas River drainages, and Clear Lake in Lake County, California; it is now declining in its native range due to competition with habitat degradation, overfishing, and introduced species.

shallow water and exhibit complex social behaviors such as nest guarding. Spawning cues may be related to water flow and temperature, rather than a temperature lunar phase combination. Sacramento perch can withstand extreme water temperatures, salinity, and dissolved oxygen levels. Similar observations and tests need to be conducted at Abbotts Lagoon to verify that different populations have not behaviorally and physiologically adapted to the unique conditions of their habitat. These results will allow managers to select reintroduction sites where Sacramento perch will flourish.

Additional Resources

"Using Physiological and Molecular Ecology for Conservation of Sacramento Perch" Seminar DVD available through the Pacific Coast Science and Learning Center (approximately 1 hour).