

Title: eDNA Methods and Application for several State and Federally Listed Aquatic Species

California's aquatic and semi aquatic ecosystems are replete with rare, visually evasive, ESA listed or otherwise protected species that occur at low density, which results in low detection probability using standard field survey methods. In addition, the waterways of California are susceptible to an ever increasing exposure to invasive aquatic species. Perhaps more importantly, low population abundances restrict 'take' under the State and Federal Endangered Species Act, which limits monitoring activities permitted that target or may encounter protected species. At the current rate of climate change, landscape change and bio-invasion, enhanced survey methods with increased sensitivity, lower impacts (risks) and efficient scaling costs are much needed and would dramatically improve monitoring program capabilities to associate species occurrence with relevant habitat attributes.

Environmental DNA (eDNA) methods provide a means to address limitations of traditional surveys, because they are 1) cost effective and feasible to deploy over a large survey area 2) unambiguously identify single or multiple target organisms simultaneously and 3) are sensitive, capable of detecting trace amounts of DNA in sampled material. The eDNA approach differs from traditional sampling and monitoring in that a given survey does not capture or directly observe the target organisms themselves, but the biological material those organisms leave in their environment. This presentation highlights the methodology, application and interpretation of an eDNA survey for several state and federally listed aquatic species.

Presenter: Gregory Schumer, Genidaqs Laboratory at Cramer Fish Sciences

Gregg is the Director of Lab Services for the Genidaqs Laboratory at Cramer Fish Sciences. For the past 8 years Gregg has worked to adapt and transfer the technology of traditional lab based molecular biology techniques for use in the fields of ecology and resource management. This 8-year pursuit has resulted in dozens of eDNA surveys across the Western United States in both aquatic and terrestrial environments, as well as, population genetic studies for some of California's endangered and protected fish species.