

Alameda and Contra Costa County Wildlife-Friendly Livestock Pond Initiative

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The survival and recovery of two California amphibians is dependent on the land stewardship of land-managers and cattle ranchers in the east San Francisco Bay Area. The California red-legged frog and California tiger salamander occur primarily on rangelands, where the dominant management activity is cattle grazing. Livestock ponds provide alternative, high-quality aquatic habitat for these species and have become vital features on the landscape as the amphibians' natural habitat is lost due to land development and conversion to cropland. Many of the stockponds in Alameda and Contra Costa counties were built 30-60 years ago and have met the end of their lifespan. They are now failing due to erosion and siltation. The Wildlife-Friendly Livestock Pond Initiative provides funds through the Natural Resources Conservation Service, with matching funds from California Rangeland Conservation Coalition signatories and other partners, to rehabilitate ponds specially for habitat and to provide a reliable source of drinking water for livestock. It is expected that this Initiative will not only directly improve breeding habitat for these amphibians and other native animal species, but will assist our local livestock operators with implementing a healthy land management strategy.

Keywords: rangeland, amphibians, grazing, habitat, restoration, partnerships, conservation, voluntary, livestock, ponds

Poster Topic: Biological Species

Evaluating Tidal Restoration: A Comparison of Restored and Managed Wetlands in the Suisun Marsh

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Suisun Marsh is the largest contiguous brackish water marsh in the western United States. Located in the center of the San Francisco Estuary, the marsh serves as important habitat for a number of fish and wildlife species including native fishes like delta smelt and Sacramento splittail. Much of the marsh consists of diked wetlands that are managed to support waterfowl; however, the Suisun Marsh Plan proposes to restore 5,000-7,000 acres in the marsh to full tidal action over the next 30 years. While there is a major push for tidal restoration in this area, little is known about the effectiveness of restoration actions for the benefit of native fishes or how current wetland management practices influence fish populations. To explore these issues, California Department of Fish and Wildlife scientists teamed up with researchers from UC Davis in order to evaluate the effectiveness of a restoration site at Blacklock (a property in the northeastern region of the marsh) that was restored in 2006. Adjacent habitats were also sampled, including a diked wetland that is managed as waterfowl habitat. A variety of methods were used to evaluate the effectiveness of the restoration and explore the benefits of current management practices. Monthly sampling included trawling for fish and zooplankton, as well as water quality monitoring. Results have found that while fish are using the restored site, fish abundance and diversity is lower than in adjacent slough channels. In addition, it was shown that diked wetlands can be beneficial by supporting productivity as well as abundant and diverse fish populations. The results from this project will have important implications for future restoration and wetland management actions in the Suisun Marsh and can serve as a model for evaluating other tidal restoration efforts in the future.

Keywords: Tidal Restoration, Managed Wetlands, Native Fish, Suisun Marsh

Poster Topic: Biological Species

The “Blob” Brings Subtropical Visitors to San Francisco Estuary

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A “blob” of warm ocean water was first noticed off of Alaska in late 2013. Now extending from Alaska to Baja California and about 5 degrees Fahrenheit warmer than normal, this is reportedly the most extensive and longest-lasting temperature anomaly in the eastern Pacific Ocean in the modern record. Many northern shifts of ocean species, from zooplankton to sea turtles, have been reported. Less well publicized are changes in the San Francisco Estuary’s fish and invertebrate communities.

CDFW’s San Francisco Bay Study first noticed increased catches of species associated with warmer ocean water in 2013. The number and abundance of these warm-water species increased in 2014 and 2015 and by summer 2015, we collected several subtropical species normally found off of Southern and Baja California.

The appearance of these warm-water species varied based on several life history traits, including the planktonic larval duration, spawning temperature cues, and their normal northern distribution. Larvae of species with long planktonic phases typically ride the south to north current that drives many warm water events. One such species, the California Tonguefish, first increased in abundance in 2013, and was the dominant flatfish in the estuary in 2014 and 2015. Other species require a minimum temperature for spawning that is not typical of the coastal ocean here, resulting in local recruitment only during extended warm-water events. The California Halibut is a good example of a species that spawns locally with warmer ocean water. Beginning in 2014, we started to record the largest year classes of juvenile halibut since the 1997-98 El Niño event.

Other subtropical species not typically found in the estuary, but collected in 2014 and 2015, included the California Grunion, Pacific Sardine, Queenfish, Shovelnose Guitarfish, Striped Mullet, Thornback, yellow rock crab, and brown shrimp.

Concurrent with this increase in subtropical species, many of the cold-water species that dominated our catches since the early 2000s declined. This includes English Sole and Dungeness crab.

Keywords: Warm water, fish, invertebrates, community

Poster Topic: Biological Species

Community Patterns and Environmental Associations for Fish Dominated Assemblages in the Upper San Francisco Estuary

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Understanding how species are interrelated and respond to environmental and spatio-temporal variation are central ecological and management questions. Long-term declines of pelagic organisms in the Upper San Francisco Estuary (USFE), including native species like the listed Delta Smelt, and introduced species, justify the need for analyses that target adult Delta Smelt. The Spring Kodiak Trawl (SKT) is an annual survey conducted by the Interagency Ecological Program that samples the USFE monthly from January to May. Data were analyzed over the years 2002-2014 to evaluate: 1) species relative abundance, 2) species association patterns, and 3) community structure in relation to temporal-spatial covariates. Species associations were analyzed using cluster analysis and community-environmental relations were inferred through Canonical Correspondence Analysis (CCA). Two alternative sampling units were used to evaluate community patterns: SKT stations (n= 39), and areas (groups of geographically close SKT stations, n= 10). Collected taxa included fishes (19 native and 16 introduced species); decapods (2 introduced species and 1 genus); and 1 introduced jellyfish. The introduced Threadfin Shad comprised most (33.6%) of the total abundance, while Pacific Herring, Chinook Salmon, Delta Smelt and Mississippi Silverside, each comprised at least 8 % of the total relative abundance across all samples and years. Among the 35 species considered in cluster analysis, several species associations derived from stations and areas were consistent, suggesting similar spatial-temporal distributions. Community structure for species occurring in at least 5% of the sample units was significantly related to abiotic factors (salinity, water temperature, turbidity) and spatio-temporal scales (latitude, longitude, month) in CCA and accounted for 31% (areas, 15 species) and 35.8% (stations, 9 species) of the community variation. These preliminary findings highlight the presence of heterogeneous, non-coevolved, species assemblages and their overall response to abiotic and spatio-temporal variability in the USFE.

Keywords: fishes, survey, community, species, abundance, distribution, environmental factors, introduced species

Poster Topic: Biological Species

Fish Rescue, Deterrence, and Lessons Learned at a Former Naval Dry Dock

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In 2011, a private company reopened a former naval dry dock located in northern San Francisco Bay. The Mare Island dry docks facility operates two dry docks, each capable of servicing vessels up to 700 feet in length and holding over 13 million gallons of water. Due to the facilities location within San Francisco Bay, several protected fish species including longfin smelt, Delta smelt, green sturgeon and three species of salmonid have the potential to occur in the area. Because of this, state and federal regulators required a first of its kind fish rescue and relocation to identify, quantify, and relocated fish that enter the dry dock during the movement of vessels into and out of the facility. Working with the operating company, state, and federal resource agency regulators, fish deterrence measures were designed and incorporated into the dry docks operations. By using an adaptive management approach, the number of native and protected fish encountered within the dry docks was significantly reduced. This poster will present a summary of the unique fish sampling location, species encountered, deterrence measures used, and lessons learned with balancing fisheries management, regulation, and private industry in a dynamic environmental setting.

Keywords: fish salvage, management, monitoring, fish deterrence, protected species

Poster Topic: Biological Species