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FLaSH Fish Health Study: Health and Nutritional Analysis of Delta “Benchmarks for Health”

Abstract: In collaboration with Interagency Ecological Program (IEP) long-term fish monitoring surveys this project was investigating the health of delta smelt, *Hypomesus transpacificus*, occupying three regions in the upper San Francisco Bay Delta Estuary; Cache Slough complex, the Sacramento/San Joaquin river confluence and Suisun Bay during the critical fall period. This study examined the potential effects of water quality, xenobiotics and nutrition on the health of delta smelt. To assess the health of delta smelt a rigorous and comprehensive examination of multiple morphometric, nutritional, histopathologic and enzymatic biomarkers. Results of all univariate analyses showed no significant relationship between any water quality parameter and recorded biomarkers; however using multivariate statistical method has revealed significant correlations of water quality parameters of temperatures, turbidity, and salinity and recorded biomarkers. This study shows that predictors of health indices in Delta Smelt should not be evaluated in isolation. This study also suggests advanced epidemiologic approaches such as multiple logistic regressions to discover the magnitude of each predictor’s effect on Delta smelt health and effect of an interaction between predictor factors.

Statement of Relevance: The results from this study will serve as baseline information on the general health status of delta smelt and will provide the essential groundwork for evaluating future changes on the health of these species and the delta ecosystem. Therefore, our study will contribute an essential strategic element to FLaSH goals and objectives of developing science-based techniques to protect the SFE.