Impacts of bifenthrin, an endocrine disrupting pesticide, on the reproductive health of Delta Smelt (*Hypomesus transpacificus*)

C. Valdivia[1], S. M.R Abdelrazek[1], S. M. Brander[2], M. J. Lydy[3], R. E. Connon[1]

[1] School of Veterinary Medicine, University of California, Davis, Davis, CA, USA; [2]Department of Fisheries and Wildlife, Oregon State University, Corvallis, OR, USA; [3]Center for Fisheries, Aquaculture and Aquatic Sciences and Department of Zoology, Southern Illinois University, Carbondale, IL, USA

Endocrine disrupting chemicals (EDCs) describe a range of xenobiotics that block or mimic hormone signaling pathways in vertebrates such as fish. EDCs, like the pyrethroid pesticide, bifenthrin, elicit hormonal changes with known estrogenic and antiestrogenic effects in various fish species. Employed across agricultural and urban settings worldwide, bifenthrin has become the most commonly detected pyrethroid in the San Francisco Bay Delta (SFBD). With such high prevalence in the SFBD, bifenthrin exposure is of significant concern; affecting reproductive health, and potentially exacerbating the decline of fish populations like that of the endangered Delta Smelt (*Hypomesus transpacificus*). Quantitative polymerase chain reaction (qPCR) was used to investigate the effects of environmentally relevant concentrations of bifenthrin (10 ng/L and 100 ng/L) on the expression of endocrine- and metabolic-related genes of interest in the liver tissues of adult female Delta Smelt. Specifically, we measured the transcription of vitellogenin (VTG), choriogenin (CHG), androgen receptor (AR), estrogen receptor 1 α (ESR1), cytochrome P450 family 1 subfamily A member 1 (Cyp1a1), apolipoprotein A1 (APOA1), fatty acid-binding protein 1 (FABP1), isocitrate dehydrogenase (IDH1), glutathione-S-transferase (GST), sodium-potassium-transporting ATPase subunit alpha-1 (ATP1A1), and caspase-9 (CASP9). Preliminary results reveal non-monotonic dose responses for VTG, CHG, and ESR1. Furthermore, APOA1 and FABP1, genes involved in lipid metabolism, demonstrate linear dose-dependent upregulations. Analysis of transcriptional data is ongoing with future work elucidating the impacts of acute bifenthrin exposure on the reproductive health of Delta Smelt and the implicit consequences incurred upon the behavior and development of maternally-exposed offspring.