**Presenter Name:**

Wayne Landis

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Patterns of risk in the Upper San Francisco Estuary due to contaminants, water quality parameters and in consideration of climate change

**Authors:**

Wayne G. Landis1, Mikayla Bowers1, Ethan Brown1, Steven Eikenbary1, Skyler Elmstrom1, Allie Johnson1, Eric Lawrence1,2, April J. Markiewicz1, Emma E. Sharpe1, Erika Whitney1.

1Institute of Environmental Toxicology and Chemistry, Western Washington University, Bellingham WA, 2Texas State Department of State Health Services, Austin, TX

**Abstract:**

We have built a Bayesian network relative risk model to evaluate multiple stressors and then to apply an adaptive management process to the Upper San Francisco Estuary(the Delta) in California. A major development is the building of a dataset that incorporates unique entries for water quality variables, species counts, precipitation, contaminant concentrations and appropriate GIS data. We are now using two pathways to estimating risk. One is the use of the dataset to establish relationships between macroinvertebrate structure with water quality data and contaminant exposure. This effort is based on examining water quality variables and groups of toxicants such as metals, organophosphates, neonicotinoids, pyrethroids, glyphosate and atrazine into pathways to predict effects to Striped Bass, Chinook salmon and Long-smelt using a toxic units approach to combine toxicity. To compliment the monitoring database, we have built an extensive data repository incorporating exposure-response data, the derived curves, ECxs when exposure-response data are not available, and other measurements. We will present the importance of water quality parameters in predicting macroinvertebrate community structure in specific regions of the USFE.  We  have also been able to rank the importance of a series of contaminants in estimate risk to the fish endpoints.  This research is supported by the Metropolitan Water District, California Department of Pesticide Regulation, State Water Contractors and the California Delta Program.