SFCWA State and Federal Contractors Water Agency

FACT SHEET

Integrated chemical and genomic assessment of contaminant effects on invertebrate fish prey in Cache Slough (15-15)

Deliverables: 1) Final report in the form of one or more publication-format manuscripts, 2) at least one presentation at a professional conference, 3) quarterly reports, 4) final factsheet.

Status: Initiated October 2014

Primary Investigator: Donald Weston- University of California Berkeley, Thomas Young– University of California Davis, Helen Poynton– University of Massachusetts, Boston	**Recipient Organization:** University of California, Davis and Berkeley campuses
Project Cost: $324,978 (UC Davis and Berkeley, combined)	**SFCWA Funding:** $324,978

Partners: Dixon-Solano RCD Water Quality Coalition

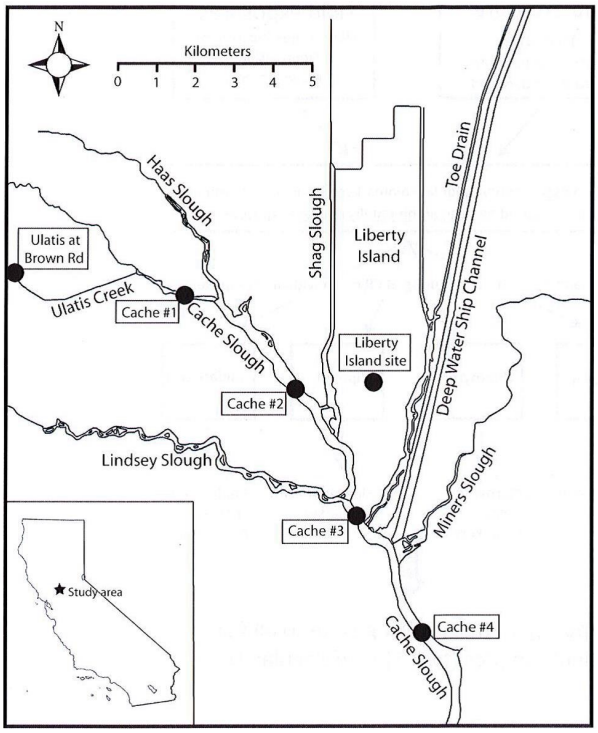

Figure 1. Sampling Locations in the Cache Slough Complex.

Introduction

Winter storms provide a mechanism for off-site movement of pesticide residues from urban areas of Vacaville and agricultural lands within the Ulatis Creek watershed. These residues enter Ulatis and New Alamo Creek via runoff, and are then transported to the Cache Slough Complex (CSC). Ulatis-borne pesticides enter CSC at concentrations capable of causing toxicity to important invertebrate prey species for delta smelt, and planktivorous fishes in general.

We will identify potential toxicants and characterize the area of impact in CSC using a newly available analytical method to chemically "fingerprint" Ulatis Creek contaminants and track them as they disperse throughout CSC. We will use a highly novel biological TIE method to identify substances responsible for toxicity in CSC with far more confidence and specificity than traditionally done with TIE tools. Using innovative genomic techniques and leveraging new resources including the just-completed H. azteca genome sequence, we will characterize sublethal toxic effects of pesticides in CSC, and identify environmentally robust genetic signatures of contaminants.

Objective

Our general objective is to protect fish populations of the Cache Slough Complex (CSC) by reducing pesticide-related toxicity to their prey. Existing data are sufficient to demonstrate a risk to aquatic invertebrates upon which several fish species in CSC depend. However, traditional chemistry and toxicity testing methods crudely and inadequately characterize the risk, and the methods available to identify the causative agents for toxicity are primitive and imprecise. Recent scientific advances provide an opportunity to do better. We will use CSC as a proving ground for three new technologies, not only to inform decision-making there and protect fish species in that habitat, but ultimately to promote Delta-wide adoption of powerful new tools.

Results

To be determined at project completion.

Conclusions

To be determined at project completion.

Relevance

The CSC is expected to be an important site for ecosystem restoration in the coming years. It is a critical spawning habitat for delta smelt and an important migration route and foraging area for juvenile salmon. Given its significance to the Bay-Delta ecosystem, past findings of aquatic toxicity in the upper portion of Cache Slough are of considerable concern. This study will better characterize the spatial extent of toxicity, characterize effects using sublethal (genomic) measures more sensitive and ecologically relevant than past work in the region, and establish the specific substances causing the effects so as to guide mitigation actions.

Next Steps

To be determined at project completion.