SFCWA State and Federal Contractors Water Agency

FACT SHEET

Water quality, contaminant, and nutrient assessments in California waterways (13-33)

Deliverables: Background document for Biomarker Workshop. SFCWA Request for Proposals and Science Program document, Review of proposals and other documents and participation in Technical Team meetings.

Status: Ongoing

Primary Investigator: Richard E. Connon	**Recipient Organization:** University of California, Davis
Project Cost: $95,585	**SFCWA Funding: $95,585**

Partners: None.

Introduction

Water quality in the San Francisco Estuary and delta is impacted upon by numerous point- and diffuse sources of contaminants and nutrients. While chemical analyses can be utilized to determine presence of contaminants, the resulting impacts on individuals, populations and ecosystems require effect-based assessments upon organisms of concern; ecotoxicological studies. Ecotoxicology, is closely related to, but sometimes distinguished from stress ecology, which considers a broader range of natural stressors such as the effects of temperature or oxygen depletion on individuals, populations and communities, however these parameters directly impact on toxicity. One of the core missions of ecotoxicology is to understand the mechanisms by which contaminants perturb normal biological performance (their mode of action), in order to develop appropriate measures to prevent adverse outcomes resulting from environmental contaminants. Biomarkers are tools that allow for a direct understanding of mechanisms of action and thus need further development towards their application in contaminant regulation and management.

Objective

To provide SFCWA management and staff with information the applicability of biomarkers in the evaluation of ecosystem health. projects.

Results

- Drafted background document on the past, current and planned use of biomarkers in the assessment of San Francisco Estuary and Delta ecosystem health. The purposes of the document were (1) to summarize ongoing and planned biomarker research and application within the San Francisco Estuary Delta, and (2) to bring together a panel of experts in the field of ecotoxicology that would direct future research involving biomarkers.
- Reviewed numerous research proposals, manuscripts, and documents (e.g. , MAST, DSP) as requested.
- Participated in SFCWA Technical Team meetings.
- Participated in SFCWA Board meetings
- Chaired Estuary Ecology Team meeting.
- Presented research at various workshops and conferences.
- Prepared and submitted manuscripts for publication

Conclusions

Contaminants, at sublethal, and environmentally relevant concentrations, can impact behavior and reproduction that can directly affect populations. The use of biomarkers were discussed at a recent workdhop (October 24-25th, 2013) and are powerful tools that can be used in the assessment of organismal health.

Relevance

It is only through effect-based assessments and evaluations that an understanding of the impacts of multiple-stressors in the San Francisco Estuary will be obtained. Biomarkers, in conjunction with physiological assessments offer a means of generating the required knowledge.

Next Steps

- Complete the SFCWA Request for Proposals and Science Program background document.
- Assist panel of experts on Biomarker Workshop and address workshop outcome.
- Assist IEP with 2014 workshop