SWAMP
Surface Water
Ambient Monitoring
Program

# SOURCES OF PYRETHROID INSECTICIDES TO CACHE SLOUGH DURING SPAWNING OF DELTA SMELT

## What is it?

This study is designed to answer the monitoring question: What are the principal routes by which pyrethroids are entering the Cache Slough complex during the February to June period when the habitat is used by spawning Delta smelt?

Pyrethroid pesticides are commonly used in commercial and household insecticide products. Pyrethroids have been shown to be toxic to some aquatic species at extremely low levels (a few parts per billion) and have been detected in water column and sediments samples collected from streams. For this study, unfiltered water column samples were collected at each site for analysis of the eight most commonly used pyrethroid pesticides.

Sampling sites were chosen to characterize as many potential sources as was feasible. Ten waterbodies were identified that flow into the Cache Slough complex and one or more sampling sites was located on each of these waterbodies. More intensive monitoring was conducted in a section along Ulatis Creek because it drains from Vacaville and was anticipated to be a significant source of pyrethroids. Additionally, over twenty agricultural return drains were identified that discharge directly to the Cache Slough complex. These drains were sampled when they were observed to be flowing. Samples were collected on six occasions, including both rain event and dry season sampling.

This study expands on a separate study funded by the Interagency Ecologic Program (IEP) that is monitoring pyrethroid pesticides in the Cache Slough complex and their effects on zooplankton

Ulatis Creek.

composition and water column toxicity. Because other recent studies have documented toxicity due to pyrethroids in this area, SWAMP thought it was important to identify the sources of pyrethroids.

## Why is it important?

The Sacramento-San Joaquin Delta is a maze of river channels and islands that create an important aquatic ecosystem. A wide variety of interests, including agriculture, urban, industry, fish and wildlife, environmental, and recreation, have a vital interest in the Delta and need to understand the complex interrelationships that determine its health. Recently the Delta has attracted attention because of the decline in populations of several pelagic fish species, including the delta smelt. The Cache Slough area is one of the most critical regions of the Delta for the delta smelt. While spawning is dispersed throughout the Delta in wet years, during dry years the Cache Slough area is the primary spawning grounds for the species. The cause of the decline in pelagic fish populations is not known, but toxic contaminants are one possibility.

Pyrethroid pesticides have been implicated as causing toxicity in the Delta in several recent studies, including sampling sites in the Cache Slough complex. Pyrethroids were found in urban and agricultural runoff. The concentrations of pyrethroids in Delta waters are unlikely to be toxic

Delta smelt (photo from US Fish & Wildlife).

to fish, but are consistent with levels toxic to sensitive invertebrates, including some critical prey species for delta smelt. Knowing the sources of pyrethroids and understanding their impacts on aquatic life is essential to protect water quality in the Delta.

## How will this information be used?

This study will provide important information to inform management decisions related to pesticide use and water quality impacts. Monitoring is being coordinated with the IEP and its multi-agency management team looking into the Pelagic Organism Decline (POD). Findings from this study will be communicated to these and other interested parties through presentations and a published report.

All monitoring data will be entered into the SWAMP database and will be available to the public through CEDEN.

For more information click here.