

California Department of Fish and Game  
California Department of Food and Agriculture

Sampling for Tributyltin at Tahoe Keys, Marina, Lake Tahoe  
and Shelter Island Yacht Basin  
San Diego Bay, California

August 1989

INTRODUCTION

Tributyltin (TBT) has been found in high enough concentrations in coastal areas of California to pose a threat to marine life. A survey of ten marinas in six California lakes conducted during the summer of 1987 also revealed high concentrations of TBT in a freshwater marina in Lake Tahoe. The results of more extensive monitoring in September, 1987 indicated an unacceptable hazard to aquatic life exists in Tahoe Keys Marina. Observed concentrations of TBT in the Tahoe Keys Marina exceeded chronic values (0.03 to 0.10 ug/L) and approached lethal levels (0.30 to 4.0 ug/L) for fish and invertebrates. Tissue residue levels in Lake Tahoe indicated fish in the main body of the lake were also exposed to TBT.

Program, under the overall supervision of Brian Finlayson (DFG) and Randy Segawa (DFA). Other key personnel are listed below:

Project Leaders - Jim Harrington (DFG), Bonnie Turner (DFA)

Field Sampling - John Waithman (DFA)

Chemical Analysis - DFG, Water Pollution Control Laboratory

Madeline Ames will be the primary contact person for other agencies and the public. All questions should be directed to her at (916) 324-8916.

## STUDY DESIGN

### Monitoring Locations

Sampling for the freshwater environment will occur at Tahoe Keys Marina, Lake Tahoe and for the saltwater environment at the inner harbor of Shelter Island Yacht Basin, San Diego Bay, (Figure 1). One site in Shelter Island Yacht Basin and three in Tahoe Keys Marina will be monitored.

### 1989 Schedule

Sampling at Lake Tahoe will be conducted on September 19-21, 1989. Sampling at San Diego will be conducted on November 14-15, 1989. Therefore, mussels will be transplanted from Bodega Bay, California to Shelter Island Yacht Basin on August 20, 1989, to allow for three months bioaccumulation of TBT.

## Collection

**Water** - At Lake Tahoe and San Diego, six replicate samples in one-liter polycarbonate bottles will be collected at mid-depth. *from depths.* Samples will be cooled on wet ice, then frozen on dry ice, and kept at 0°C or less until analyzed.

**Sediment** - A coring device will be used to obtain eight sediment samples from three sites at Lake Tahoe and one site at San Diego. The upper 10 cm of each core will be removed from the coring device and placed in polycarbonate jars. Sediment samples will be cooled on wet ice, then frozen on dry ice, and kept at 0°C or less until analysis.

**Biota** - At Lake Tahoe, fish will be collected in the marina area using gill nets set on the bottom substrate. Twenty-four fish of the same species will be taken from gill nets to produce eight composite samples containing 3 fish each. Fillets from both sides of each fish will be removed for analysis. The target species will be tui chub (*Gila bicolor*), but if not enough are caught, Tahoe sucker (*Catostomus tahoemis*) will be used. Fish will be wrapped in aluminum foil, put in airtight plastic bags, placed on dry ice and kept at 0°C or less until analysis.

Approximately 1500 mussels (*Mytilus californianus*) will be collected from Bodega Bay and divided into 37 groups of 40 individuals. One group will be retained as a control and the other 36 groups will be divided into three sets of twelve groups.

samples from each site will be composited and divided into three split samples for intralaboratory quality control and three split samples for interlaboratory quality control.

**Sediment** - Sediment cores will be thawed overnight, and homogenized. A portion of the volume from the eight replicate sediment samples from each site will be composited, homogenized, and divided into three split samples for intralaboratory quality control and three samples for interlaboratory quality control.

**Biota** - Fish from Lake Tahoe and mussels from San Diego Bay will be thawed overnight. A portion of the volume from the eight replicate tissue samples of biota will be composited, rehomogenized, and divided into three split samples for intralaboratory quality control and three split samples for interlaboratory quality control. Similar quality control will be done for the mussels.

#### Sample Allocation

The DFG Water Pollution Control Laboratory (WPCL) will be responsible for analysis of replicate water and sediment samples from Lake Tahoe and the DFA laboratory will be responsible for analysis of replicate water and sediment samples from San Diego. DFA will contract analysis to Cal-Enseco Laboratory, Sacramento. DFG will be responsible for replicate tissue samples from both Lake Tahoe and San Diego. The DFG laboratory and DFA will

Estimated Number of Samples to be Analyzed

	<u>DFG</u>		<u>DFA</u>		<u>Navy</u>
	<u>Rep.</u>	<u>Split (QC)</u>	<u>Rep.</u>	<u>Split (QC)</u>	<u>Split (QC)</u>
<b>Tahoe Keys</b>					
Water	6	3		3	
Sediment*	24	9		9	
Fish	8	3			3
<b>Shelter Island</b>					
Water		3	6	3 (12)	
Sediment		3	8	3 (12)	
Fish	8	3			3
<b>Total:</b>	<u>46</u>	<u>24</u>	<u>14</u>	<u>18</u>	<u>6</u>

\* 3 sites in Tahoe Keys Marina.