Interagency Ecological Studies Program for the Sacramento-San Joaquin Estuary

NEWSLETTER

Summer 1992

Readers are encouraged to submit brief articles or ideas for articles. Correspondence, including requests for changes in the mailing list, should be addressed to Randy Brown, California Department of Water Resources, 3251 S Street, Sacramento, CA 95816-7017.

Phytoplankton Biomass

During the past several weeks, there have been algal blooms in the Delta. Following are a few details.

In the southern Delta, chlorophyll concentrations remained high in June. Concentrations were between 21 and 44 μg/L through the first part of May. At Mossdale, concentrations had increased to 149 μg/L by May 22 and to 271 μg/L by June 19. These high chlorophyll concentrations were accompanied by elevated midday dissolved oxygen concentrations (14 mg/L) and pH levels (9). Phytoplankton species associated with the May/June bloom have not yet been identified.

The lower San Joaquin River was characterized by a *Melosira granulata* bloom during May. From May 7 through May 11, the bloom was centered near Potato Slough, Little Potato Slough, and Connection Slough. On May 7, chlorophyll concentrations were 79 μg/L at Disappointment Slough, 68 μg/L at the South Fork Mokelumne River, and 67 μg/L at Potato Point. On May 19, chlorophyll concentrations from Stockton to Bradford Island ranged from 17 to 65 μg/L. High percent chlorophyll *a* concentrations (72 to 86 percent) in extracted samples suggested this was still an actively growing population. However, by May 22, concentrations decreased to 37 μg/L at the South Fork Mokelumne River and to 15 μg/L at Disappointment Slough.

Water quality conditions during the peak of the bloom (May 8 through May 26) were optimal for *M. granulata* and were characterized by decreased nutrient concentrations. At sampling sites near the center of the bloom at the South Fork Mokelumne River, Disappointment Slough, and Potato Point, specific conductance ranged from 196 to 428 μS/cm and water temperatures were 21 to 22°C. Dissolved oxygen concentrations increased somewhat to between 7.7 and 10.3 mg/L, accompanied by somewhat elevated pH levels (7.4 to 8.8). Nutrient concentrations decreased to between 0.12 and 0.21 mg/L for nitrate, <0.01 mg/L for ammonia, 0.04 to 0.05 mg/L for dissolved orthophosphate, and 3 to 13 mg/L for silica.

Chlorophyll concentrations were low throughout the rest of the Delta. For Suisun Bay, concentrations increased from <1 μg/L in March and April to <4 μg/L in June. A small increase to 12 μg/L was measured for Grizzly Bay in May. For San Pablo Bay, chlorophyll concentrations remained below 4 μg/L, except during April, when they increased to 9 μg/L. For the central Delta, chlorophyll concentrations rose to 20 μg/L in May, but otherwise remained below 3 μg/L.

—Peggy Lehman (DWR)

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Winter-Run Chinook Salmon

A few recent developments may be of interest.

The preliminary estimate of 1,180 spawners passing Red Bluff Diversion Dam is an encouraging improvement over the 191 spawners estimated for 1991. A final estimate should be available in August.

As a result of NMFS and DFG concerns about winter-run juveniles entering the Delta via Georgiana Slough, DWR is preparing an initial study of the impact of closing the slough from February 1 through April 30. Major issues being addressed in the initial study include impacts on water quality, other fish species, other threatened and endangered species, and navigation (especially recreational boating). The target is to have the draft study available for comments by interested parties by mid-August.

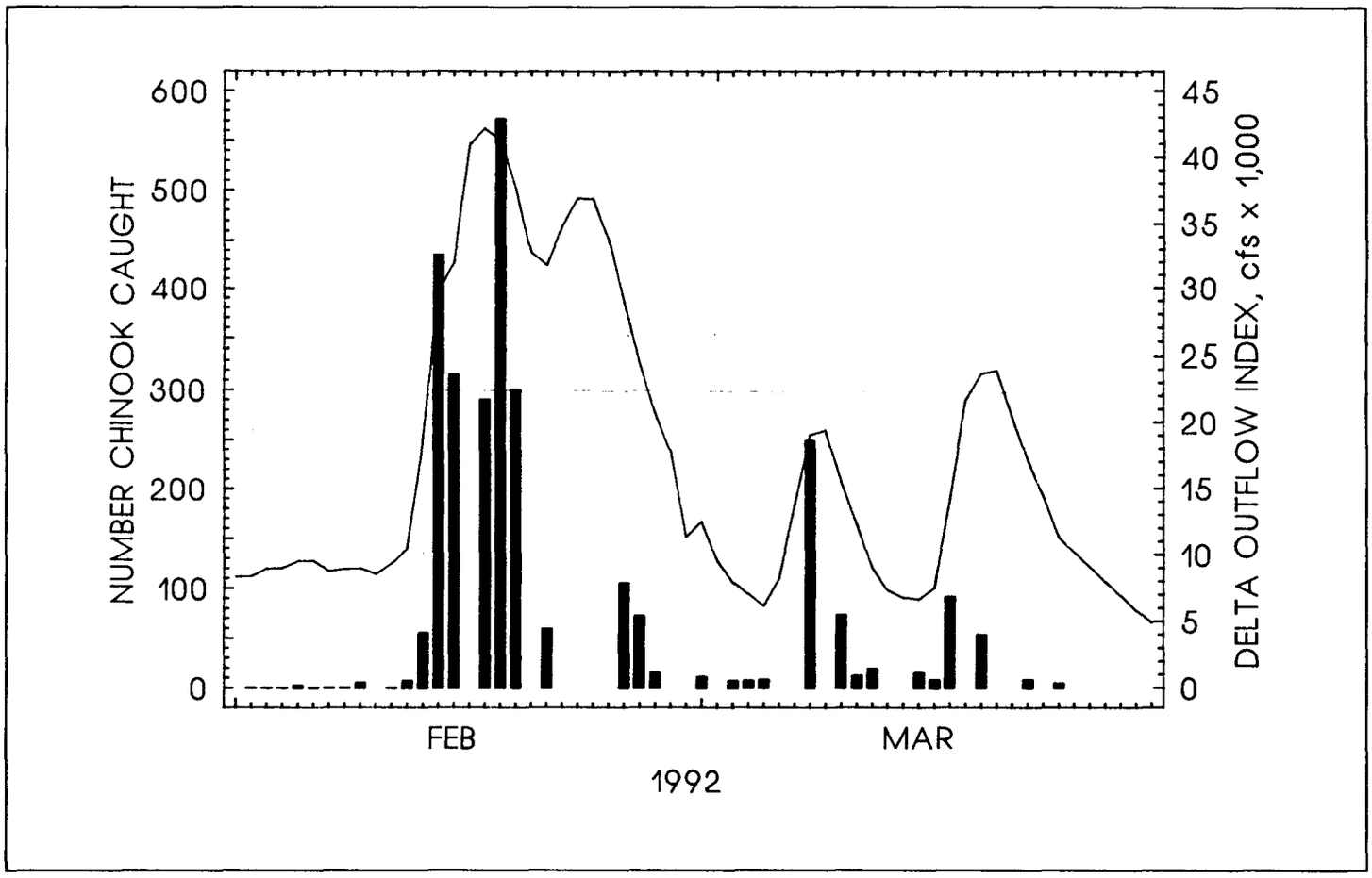
A captive breeding program for winter-run salmon is being established to provide, among other things:

- An insurance policy to preserve the winter run's genes.
- A source of eggs and sperm for the winter-run hatchery program.
- Eggs and fry for research.

About 1,000 young from last year's spawn are being reared at either the Steinhart Aquarium or Bodega Bay. The cost of this program is estimated to be about $4.5 million over 10 years. Complete funding has not been secured.

One important component of this program will be to develop specific genetic and other techniques to help resolve issues related to stock identification — techniques that can be used on juveniles in fresh water and on adults in the ocean fishery. Such techniques are not yet available.

As part of our interagency effort to determine when winter-run juveniles enter the Delta, Marty Kjelson's crew (USFWS) trawled in the Sacramento River from early December 1991 through late March 1992. The figure below shows the daily catch during these trawls, plotted with Sacramento River inflow, for part of this period. It appears that the outmigrating salmon moved with flow peaks. These data are also being used to help evaluate impacts of CVP and SWP Delta operations on winter-run Chinook salmon.



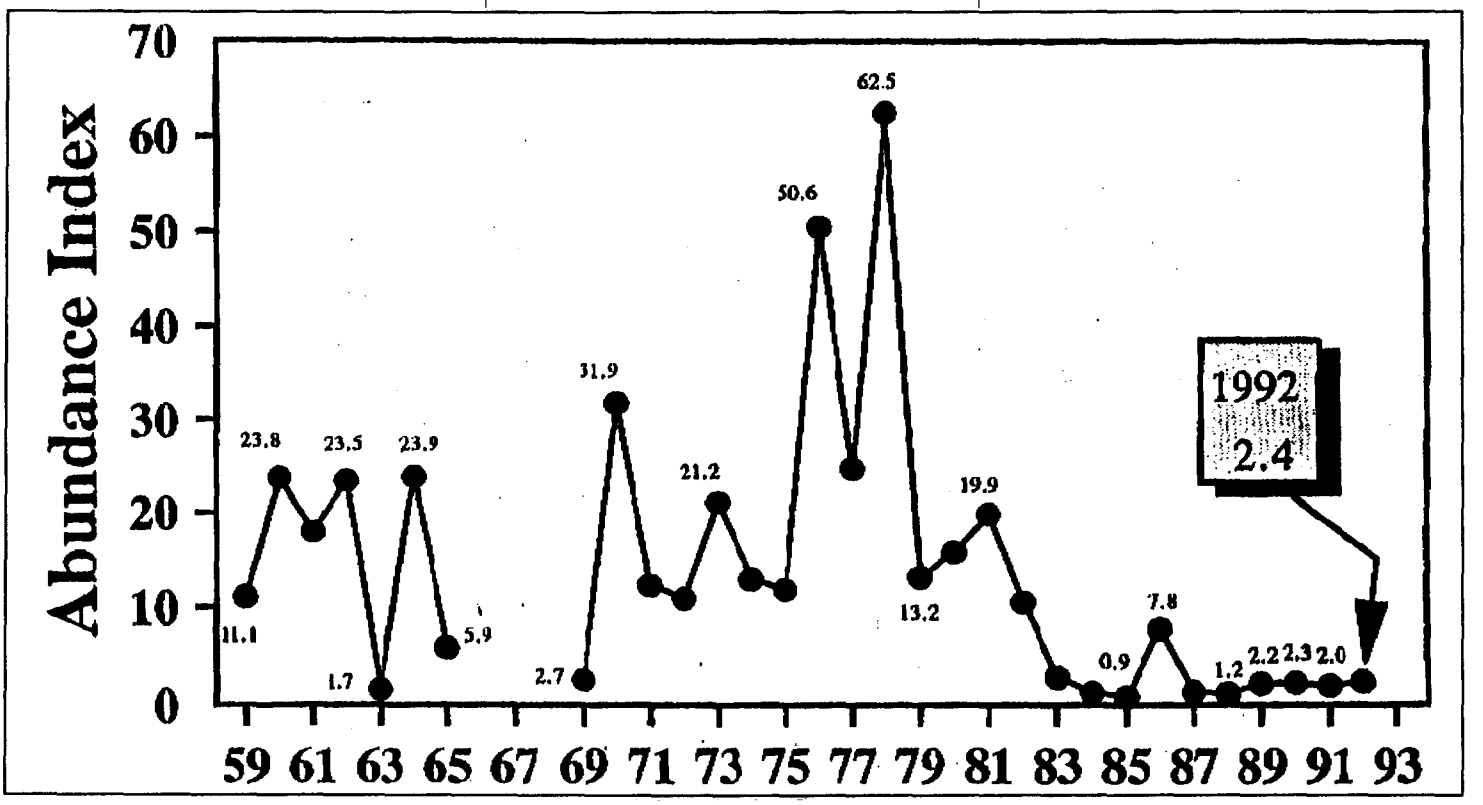
CHINOOK SALMON TRAWL CATCH AT MILLER PARK NEAR SACRAMENTO, SPRING 1992
(USFWS Data)

Delta Smelt

On July 2, DFG reported that the Delta smelt index for the first two surveys of the summer tow-net sampling was 2.4. The index is slightly higher than the past few years (see figure below) but is consistent with low values observed since 1987.

This past winter, Joan Lindberg of Biosystems and Serge Doroshov of UC-Davis, attempted to culture Delta smelt in the laboratory. Initial problems keeping fish captured in the wild alive in the laboratory were solved by collecting prespawning adults with a purse-type net instead of the midwater trawl used by DFG in its fall/winter surveys. Both investigators attained successful spawning, fertilization, and hatching. There was high larval mortality due to infections of ich, a common problem in aquaria. This problem can be controlled by treatment. Although the larvae seemed to take natural and artificial food, neither investigator was able to keep larvae alive more than about 30 days. A report describing this year's results will be available this summer.

DWR and USBR will be funding additional intensive culture efforts as part of the Interagency Delta Smelt Study.



DELTA SMELT ABUNDANCE INDEX, SUMMER TOW-NET SURVEY, 1959-1965 AND 1969-1992

Source: California Department of Fish and Game

DAYFLOW

Sheila Greene, an Environmental Specialist with DWR's Environmental Services Office, is considering some fairly major revisions to the DAYFLOW program. Changes being contemplated are:

- Add year-specific Delta consumptive use and precipitation.
- Check for accuracy of published records by reacquiring historical streamflow data from USGS and others and checking against DAYFLOW values.
- Add North Bay Aqueduct diversions.

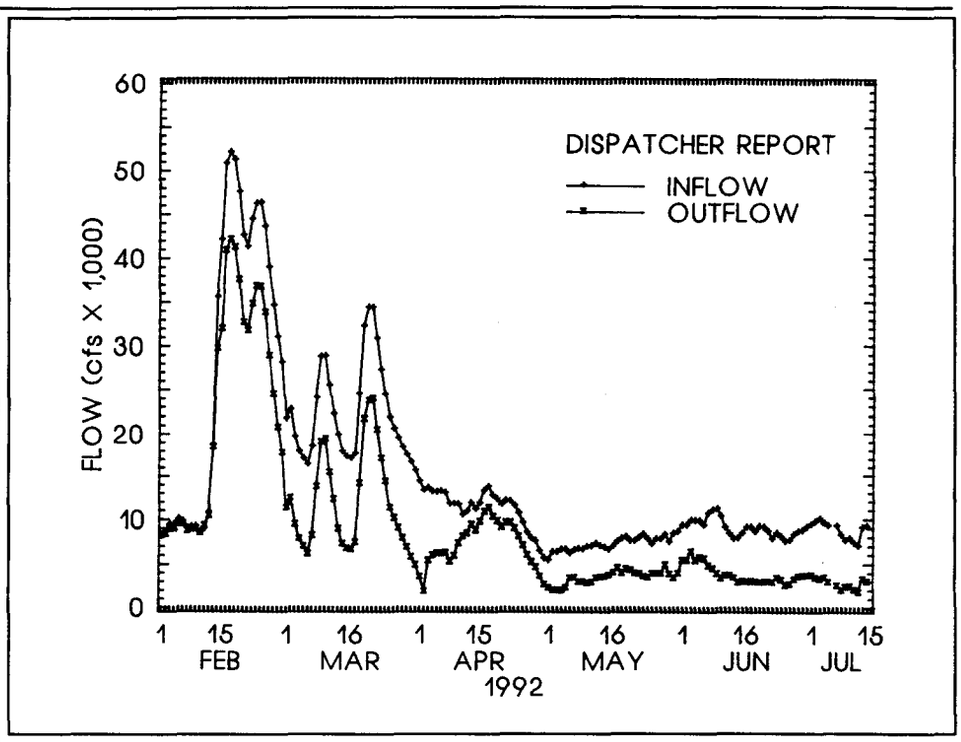
Since DAYFLOW is an important data source for many researchers working on the estuary, we are requesting suggestions on how it might be improved to increase its usefulness. Suggestions should be geared to improving DAYFLOW's use as basically an accounting model of Delta flows and diversions. It cannot provide estimates of actual internal Delta flows. If you have suggestions, please contact Sheila at 916/323-8978.

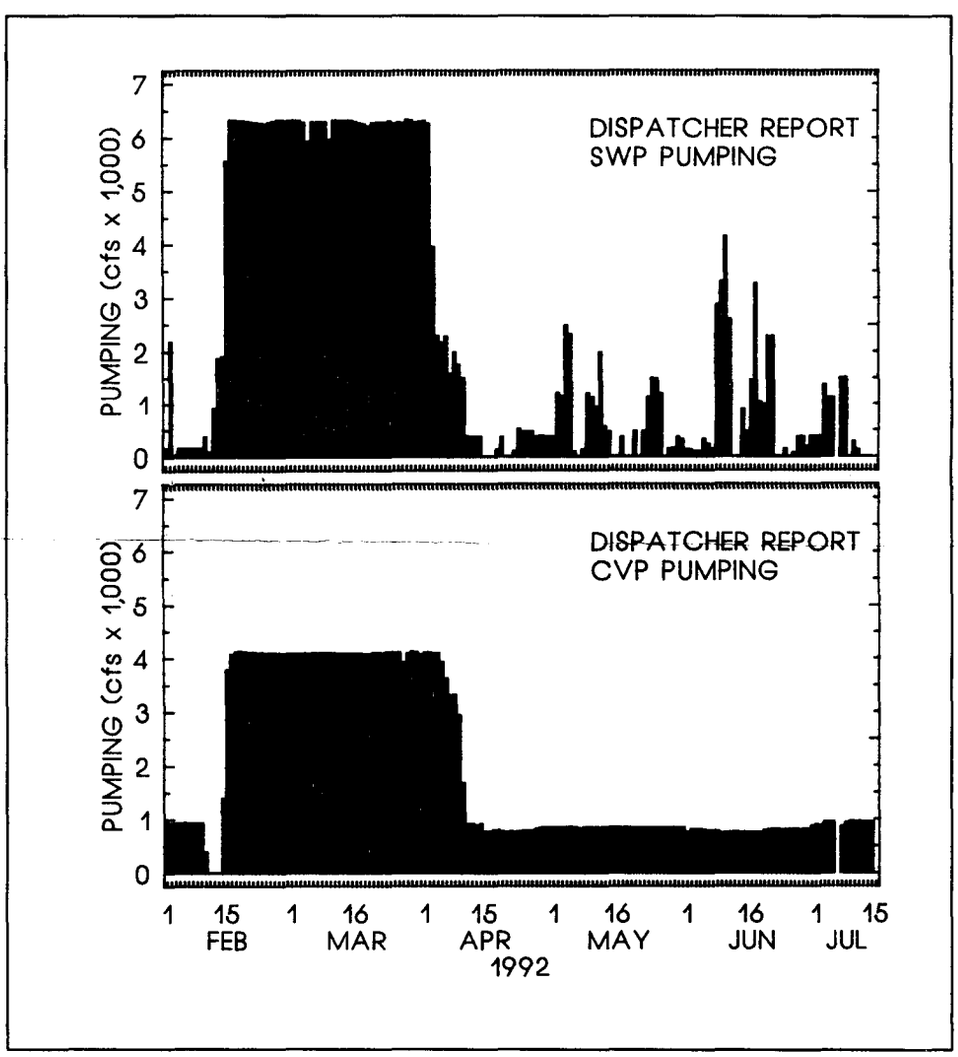
Delta Flows

As shown on the figure at top right, Delta inflow and outflow have been low and stable since about April 1. Computed net flow in the lower San Joaquin River has generally been positive during this period, although there have been some days of calculated reverse flows.

The bottom figure shows SWP and CVP pumping. High pumping occurred in February and March to capture water from the increased flows. Pumping was reduced in April due to winter-run salmon concerns and has continued at low levels because of low water availability due to the continuing drought.

These data are from DWR's daily dispatcher's report and generally represent flow that will appear in DAYFLOW at the end of the water year. Anyone interested in obtaining these data by mail can contact George Payton at 916/653-1077. Only those making use of these data on a daily or weekly basis should ask to be put on the mailing list.





New Directions for the Food Chain Group

The Food Chain Group has begun a comprehensive review to determine the current state of knowledge for various food chain levels and related processes in this estuary. Six categories were identified for examination:

- Primary energy sources (input sources and primary production).
- Primary consumers (zooplankton and microzooplankton).
- Fish.
- The benthos.
- Hydrodynamics (only issues directly relating to food chain processes).
- Anthropogenic impacts.

(Continued on Page 5)

The goal is to develop an information base and list of studies that can be used for planning future activities and as a source of information.

The review process involves three main steps. First, a conceptual model for each category will be developed to convey the current state of understanding and identify gaps in knowledge. These models will also help to identify links between the categories. Second, the models will be used to formulate questions that address gaps in knowledge. Third, testable hypotheses will be formulated that address each question, and special studies will be described to test each hypothesis. The process will take some time to complete because of the large body of information relating to many of the categories and the critical nature of the Food Chain Group. Results will be assembled and distributed as a Food Chain Group working paper.

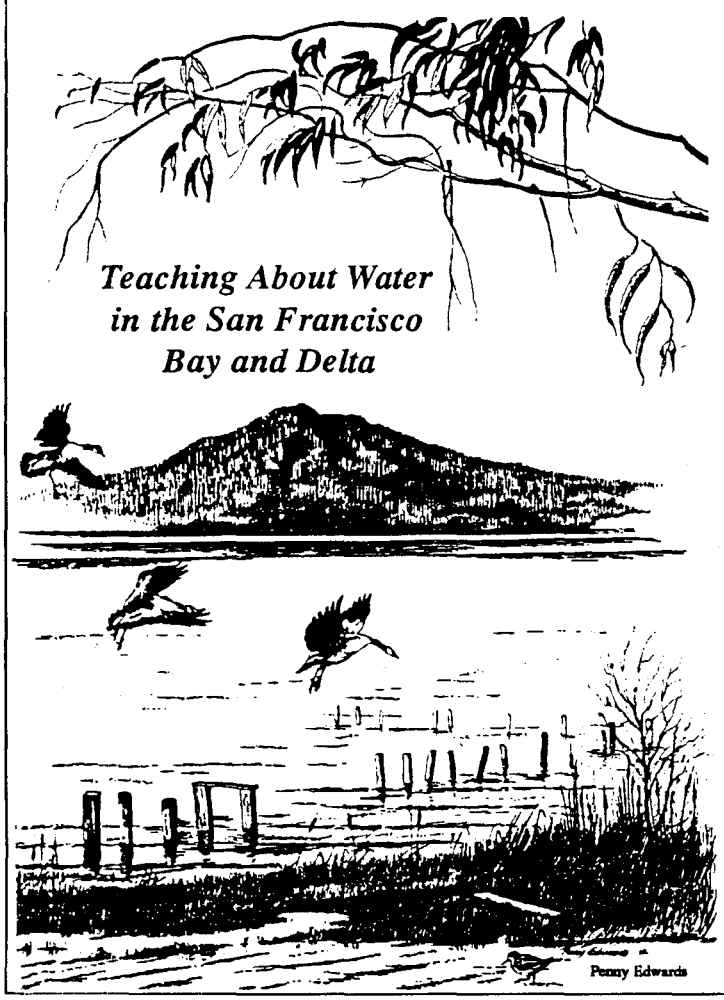
—Zachary Hymanson (DWR)

Striped Bass

The 1992 striped bass summer tow-net index is 10.6, a marked improvement over the past few years. The index was also set earlier than usual, probably the result of early spawning due to unseasonably hot weather in May.

DFG also completed the preliminary Petersen estimates for the 1991 adult population. The total estimate was over 1 million striped bass three years and older. Because of very low tag returns for the 3-year-old bass, DFG believes the estimate is unreliable. Sampling in 1992 will provide additional tagged fish data, which will improve estimates of the 1991 population.

Because of concerns over potential impacts of planted hatchery striped bass on winter-run Chinook salmon, DFG's Director Boyd Gibbons decided not to plant about 2.8 million mitigation bass in the Delta in 1992. Most of these yearling bass (about 5 to 7 inches long) were planted in the California Aqueduct, O'Neill Forebay, and San Luis Reservoir. Concerns about payment and mitigation credit had not been resolved by early July. The decision not to plant striped bass will also carry over into 1993.



The Aquatic Habitat Institute
and
The California Aquatic Science Education Consortium
present:

Teaching About Water in the San Francisco Bay and Delta
at the Califronia Academy of Sciences

Workshops	*Field Trips*
November 11, 1992 (Veteran's Day)	November 14-15

The conference, featuring symposia, workshops, a curriculum fair, and field trips, will provide K-12 educators with tools to effectively teach about the Estuary, and spark a greater interest in teaching about the Bay and Delta. Presenters include leading Bay area scientists, educators, and representatives from environmental groups.

To obtain a registration form or more information, please call or write the Institute.

Aquatic Habitat Institute, 1301 S. 46th St. #180.
Richmond, CA 94804. (510) 231-9539

Curriculum Fair! Door Prizes! Academic Credit!

Interagency Ecological Studies Program
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NEWSLETTER

A Cooperative Effort of:

California Department of Water Resources
State Water Resources Control Board
U.S. Bureau of Reclamation
U.S. Army Corps of Engineers
California Department of Fish and Game
U.S. Fish and Wildlife Service
U.S. Geological Survey
U.S. Environmental Protection Agency

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