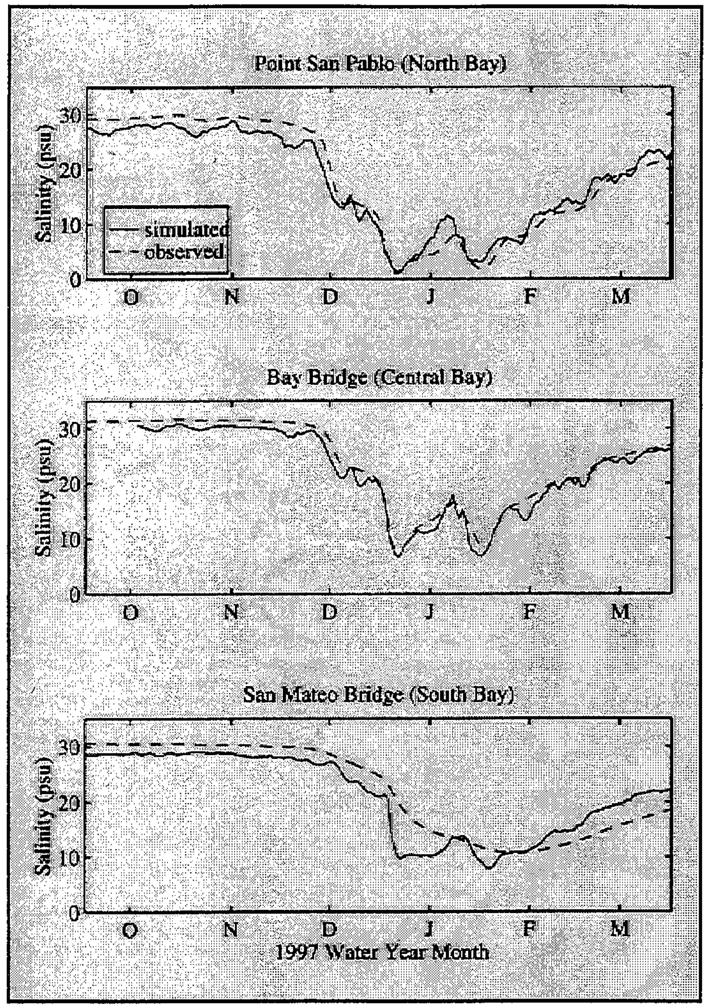

Figure 3
OBSERVED AND SIMULATED SALINITY AT
THREE STATIONS THROUGHOUT THE BAY

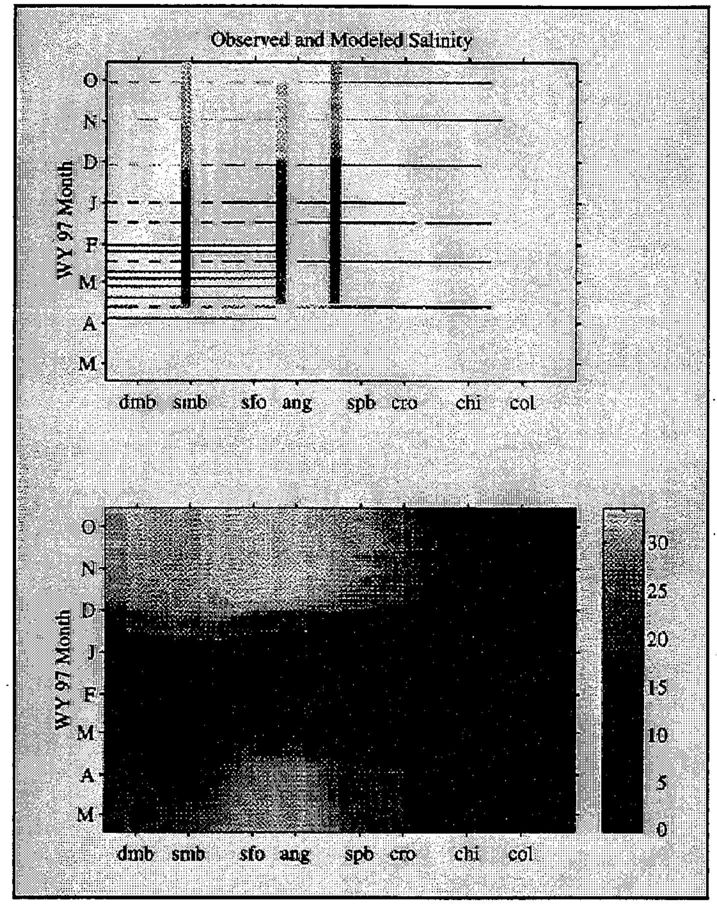

Figure 4
OBSERVED (upper) AND SIMULATED (lower) SALINITY VARIATIONS
Reference points are Dumbarton Bridge, San Mateo Bridge, San Francisco Airport, Angel Island, San Pablo Bay, Crockett, Port Chicago, and Collinsville

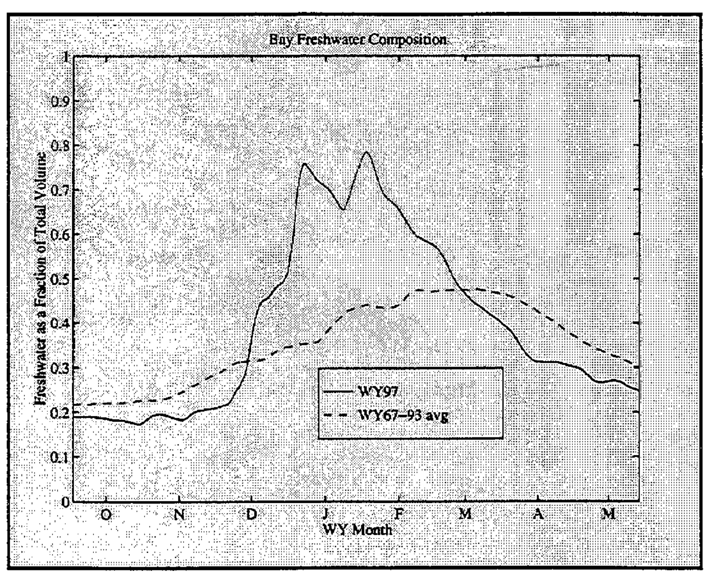

Figure 5
FRACTION OF BAY VOLUME COMPOSED OF FRESH WATER
AS A FUNCTION OF WATER YEAR MONTH

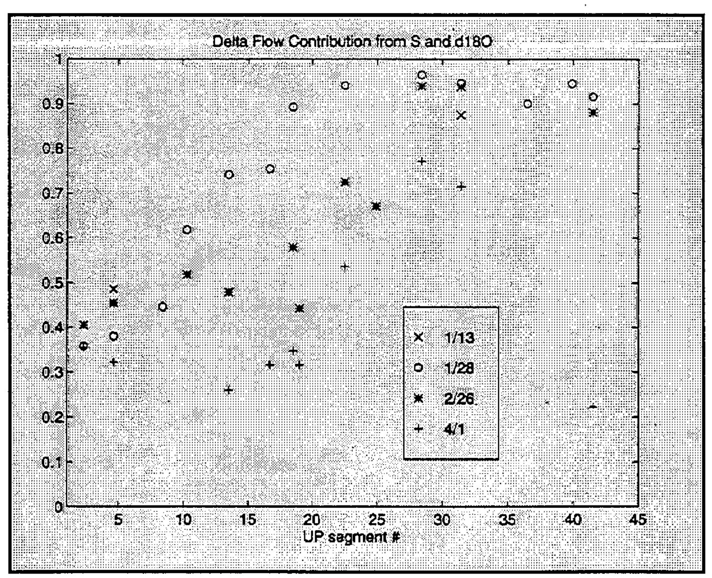

Figure 6
DELTA WATER DISTRIBUTIONS INFERRED FROM
SALINITY AND $\delta^{18}O$ MEASUREMENTS DURING FOUR CRUISES
Refer to Figure 2 for model segment locations.

Total bay modeled salt content reached a minimum of about 40x10^9 kg on February 1 and had recovered to nearly 150x10^9 kg by mid-May. This compares to an average minimum over the last 30 years of over 90x10^9 kg and a typical dry-season maximum of nearly 170x10^9 kg. The recovery rate between mid-February and mid-April was fairly steady at about 800x10^6 kg salt per day, or about 5 psu/month at North Bay stations.

The oxygen isotope ratio data ($\delta^{18}O$), when combined with concurrent salinity observations, may be used to infer water composition based on known values of $\delta^{18}O$ for the various water sources (ocean, delta flow, and local inflows). This provides an excellent test of the model's ability to capture the movement of water that underlies the evolution of the salinity field. Figure 6 shows the distribution of delta-sourced waters throughout the bay for the four $\delta^{18}O$ cruises. Although these data are not sufficient to determine the effects of the January 3 flow pulse, the influence of broad pulse centered on January 27 is clear. On January 28, water near the Bay Bridge was 90% delta-sourced, decreasing to about 40% in southern South Bay. This peak distribution agrees well with modeled water composition. As ocean water gradually mixed back into the estuary, delta water composition declines until the entire South Bay is composed of about 30% delta water on April 1.

Conclusions

The combination of model results and observed data provides insight into the impact of extreme events such as the flood of January 1997. Where the accuracy of model inputs or of the model itself is uncertain, observations supply missing information. Conversely, simulations can be used to fill in gaps in the observations. Here, the Uncles-Peterson model fills the gaps in a broad but sparse dataset. The oxygen isotope data help to complete the picture in South Bay, where the model inputs are uncertain. The oxygen isotope data provide an excellent tracer to infer water composition in the bay, and data of this type will continue to aid in future model refinements.

An on-line version of this article can be found at: http://meteora.ucsd.edu/~knowles/papers/iep97/

Delta Outflow

Kate Le, DWR

Between October 1, 1996, and June 30, 1997, the average Delta Outflow Index was 59,800 cubic feet per second. The largest outflow — 584,500 cubic feet per second on January 3 — was due to increased precipitation and high reservoir flood control releases. Combined SWP/CVP pumping averaged about 6,000 cubic feet per second during this period. SWP pumping was curtailed in December because water demands were being met. SWP pumping ceased in January because Banks Pumping Plant was at full capacity. SWP pumping was curtailed on April 24 due to weed spraying and on May 21 to maintain a high outflow to achieve the number of X_2 days. CVP pumping ceased from January 20, through February 7 for canal maintenance work and from February 11 through February 24 for fish facility maintenance.