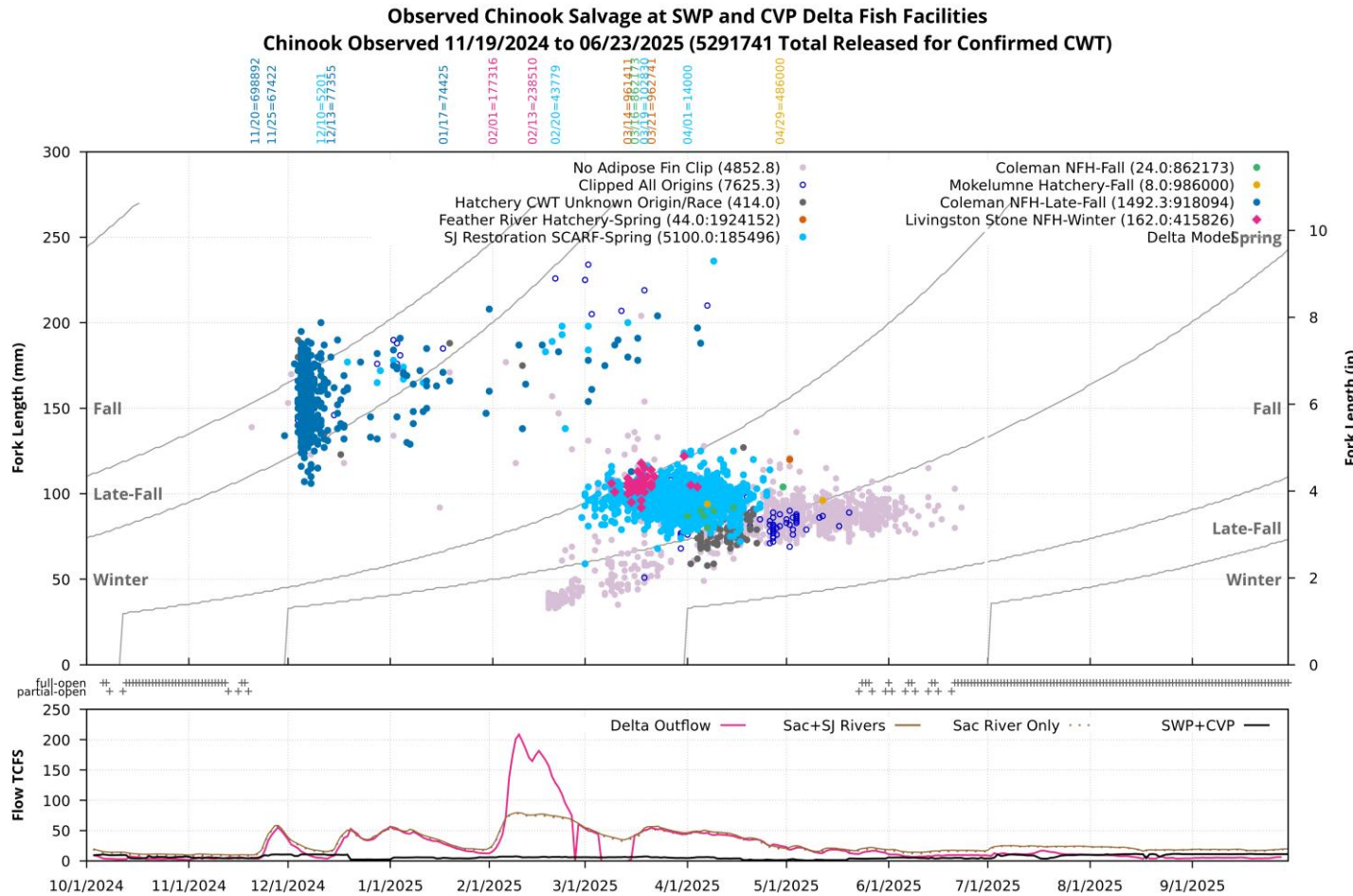


Introducing Delta Daily Data Displays

Russ Brown

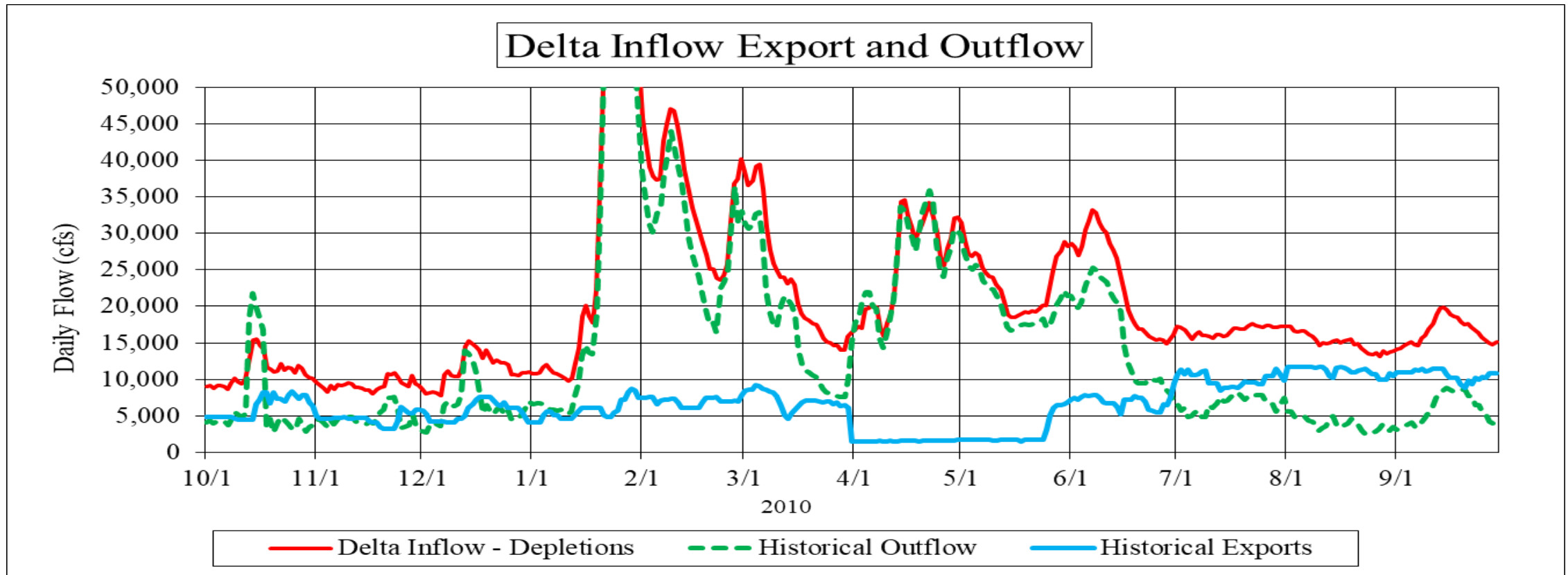


Preliminary data from CDEC, CDFW, CDRW, and BOR; subject to revision. Key: Location-Observation Type (#total estimate:#released for observed) www.cbr.washington.edu/sacramento/
Chinook not measured for length and Chinook outside of the length-at-date criteria (Delta model) are not included.

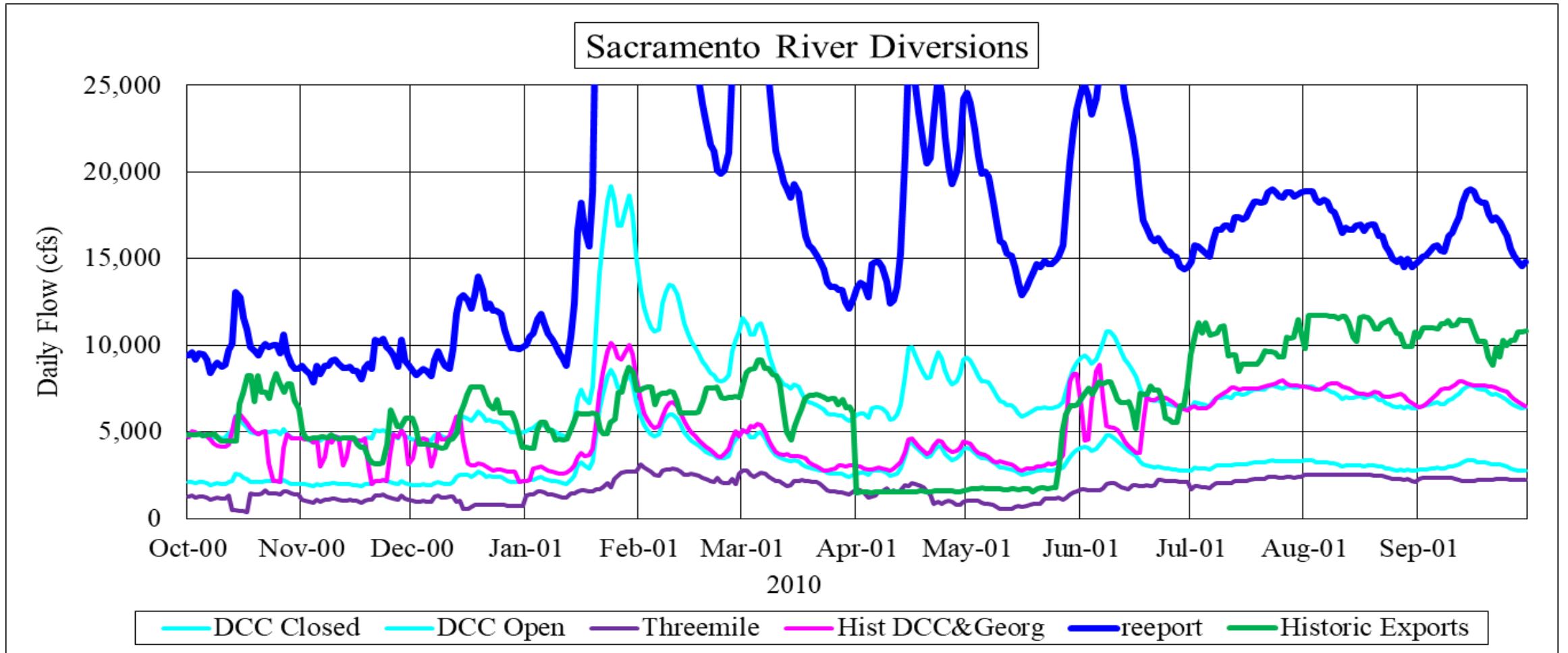
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- Graphs are simple models that transform data into patterns and relationships
- Our understanding of biological processes and populations cannot emerge from physical and chemical data alone
- We could extend our modeling by displaying biological data along with our physical and chemical data
- This 'beautiful' graph can be found at the SacPAS Project sponsored by Reclamation at Univ. of Washington cbr.washington.edu/sacramento/

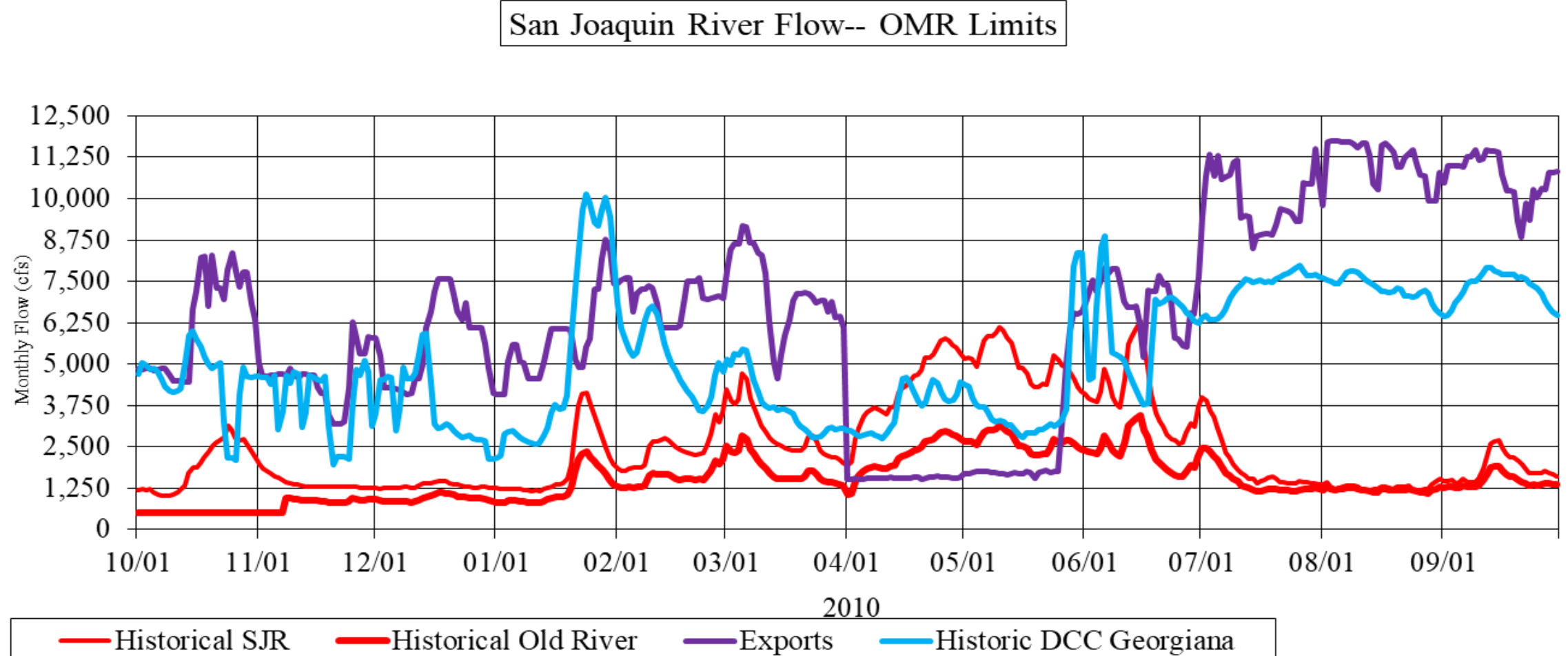
- Historical daily data of all kinds, including fish data (counts from trawls, rotary screw traps, and CVP and SWP salvage facilities) could be compiled by SWRCB in cooperation with IEP agencies, to provide a consistent record of the historical conditions observed in the Delta and tributaries over the past 50 years. Let's start with DAYFLOW data graphs.



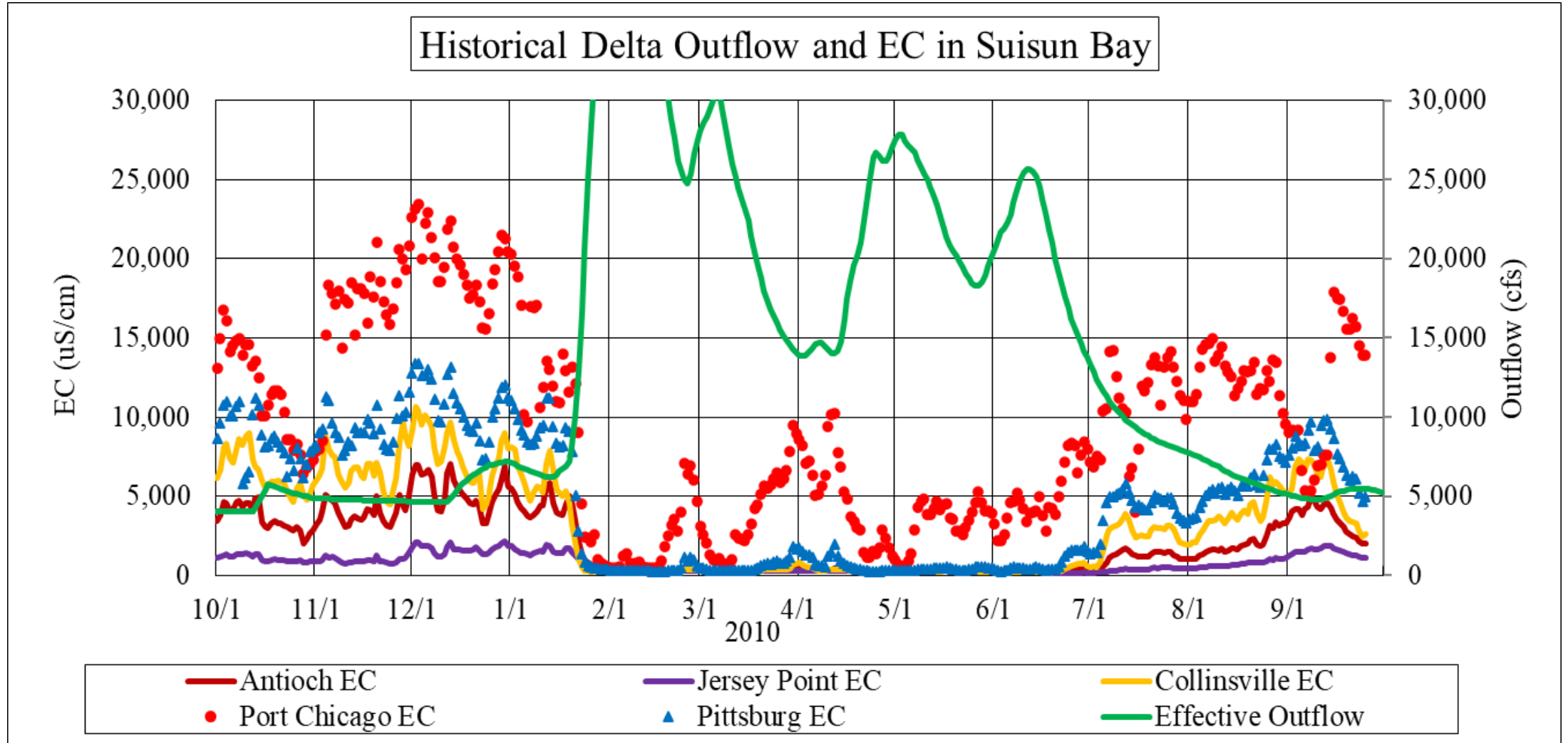
Our best “views” of Delta processes are revealed in daily data. Calculations can help understand the data patterns and relationships. One example is the calculation of net channel flows based on measured tidal flows or modeling results (flow splits)



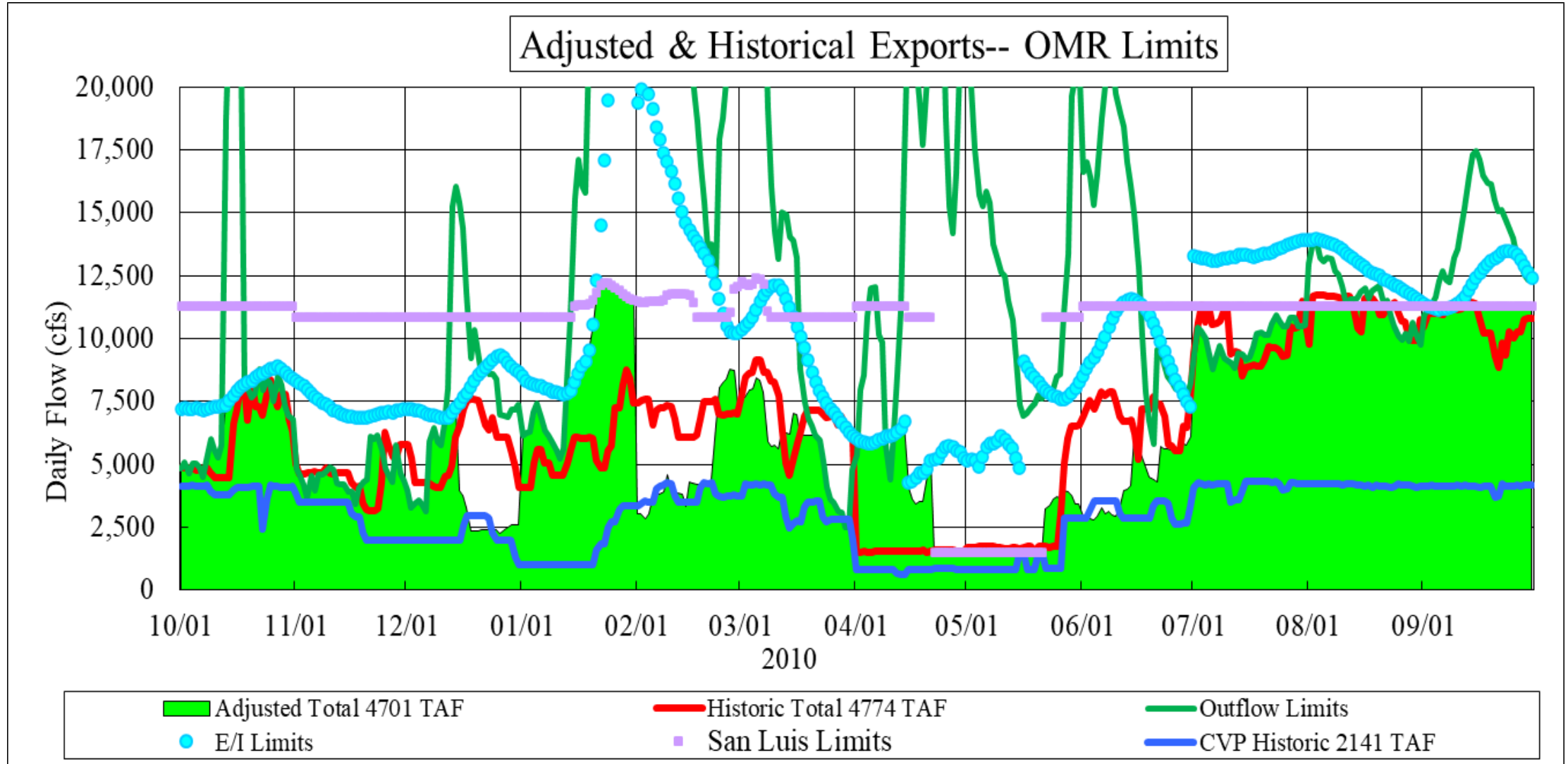
The calculation of flows reaching the CVP and SWP exports from the SJR and the Sacramento, and from reverse flows at Antioch are useful for understanding the fish salvage at CVP and SWP



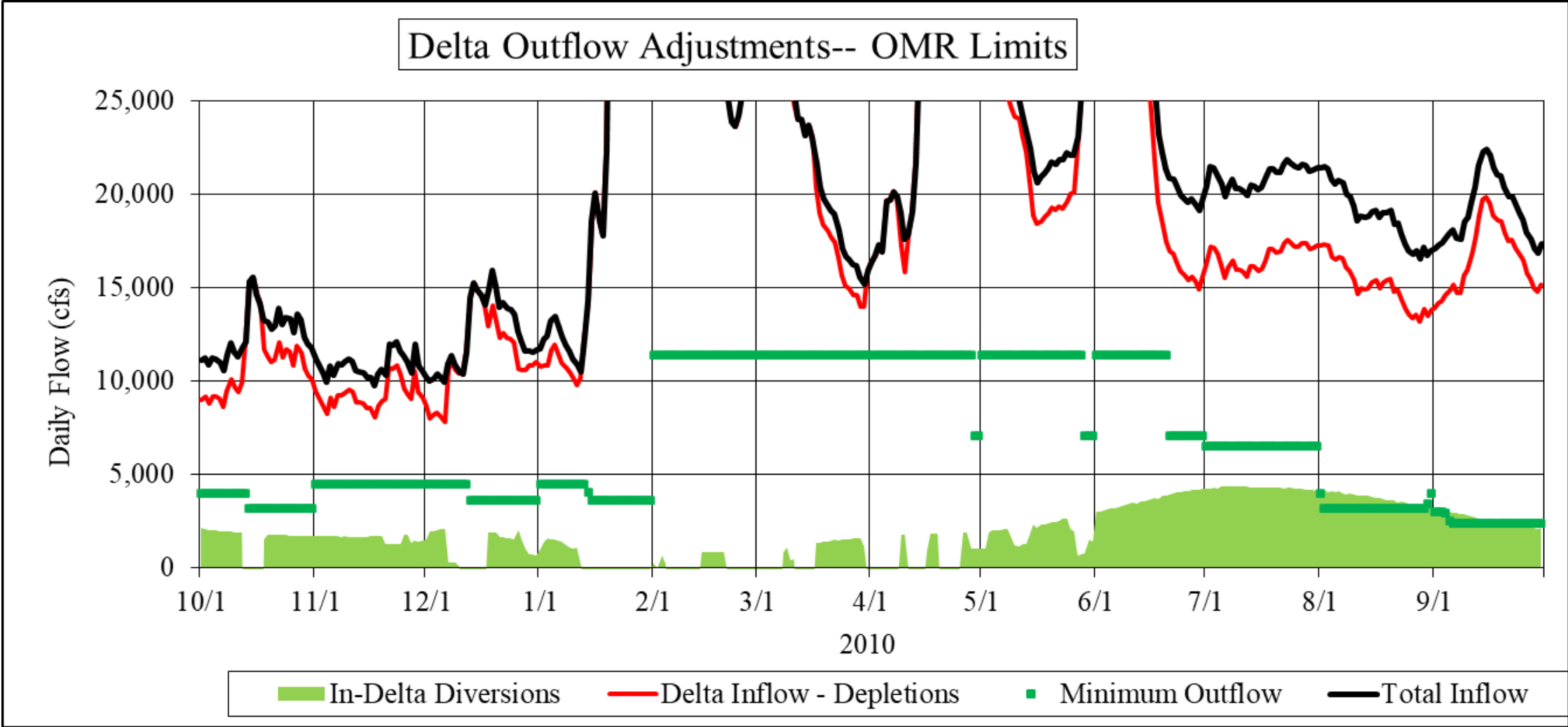
The combination of EC data from the Delta and Suisun Bay provides important information for fish that rear in the “Low Salinity Zone” which moves with X2.



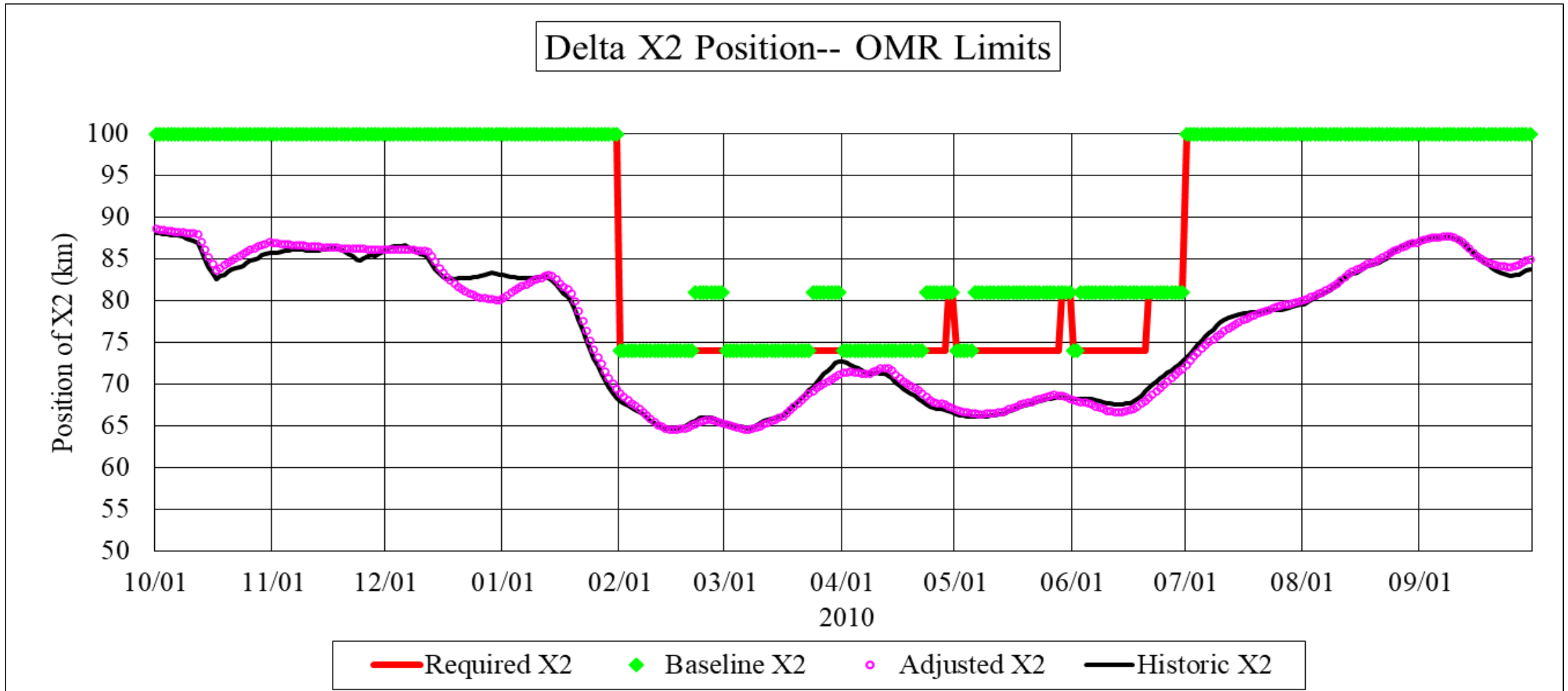
Delta 3D could show the seasonal and daily flow patterns and allow the effects of Delta objectives and upstream required flows to be accurately visualized. Every day is different



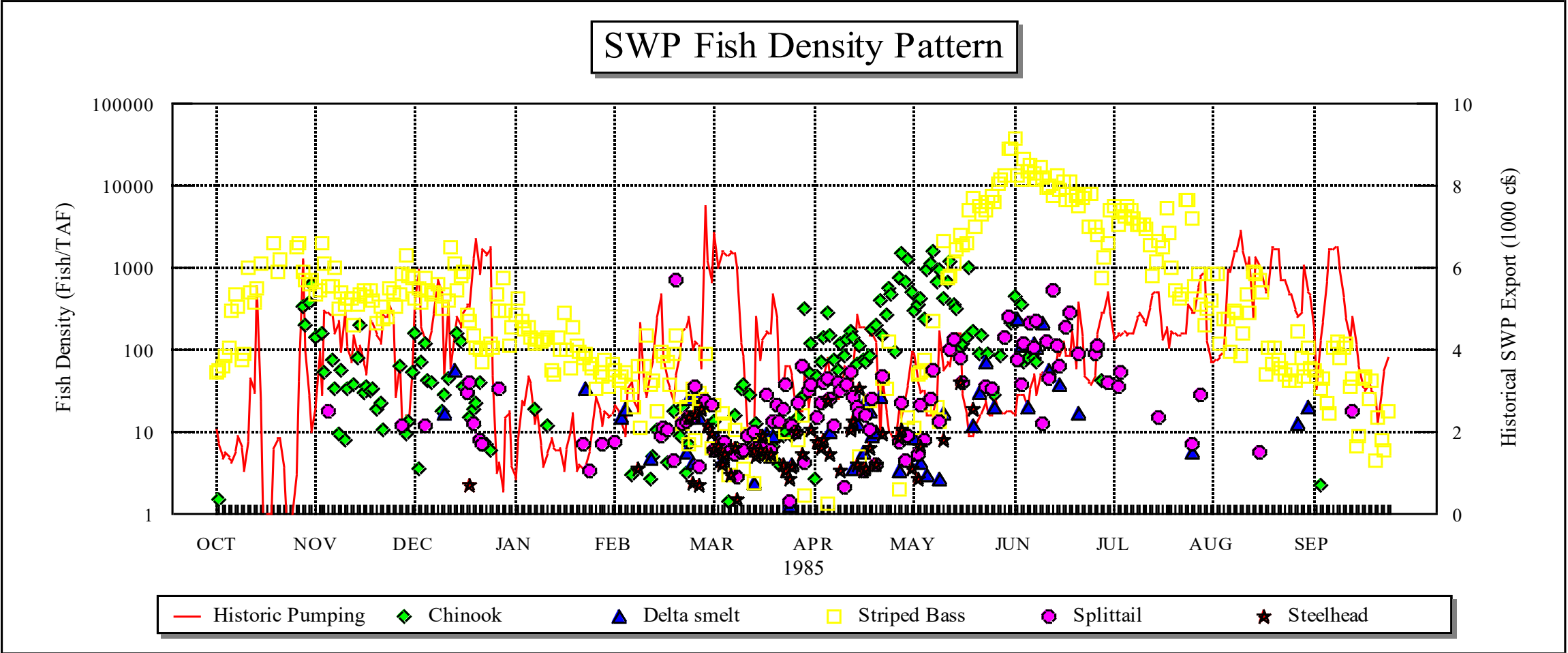
Displaying the calculated daily objectives could be useful for reviewing the effects of existing Delta objectives and evaluating effects of potential changes in Delta objectives. Each rule should have a fish protection rationale that can be demonstrated with data.



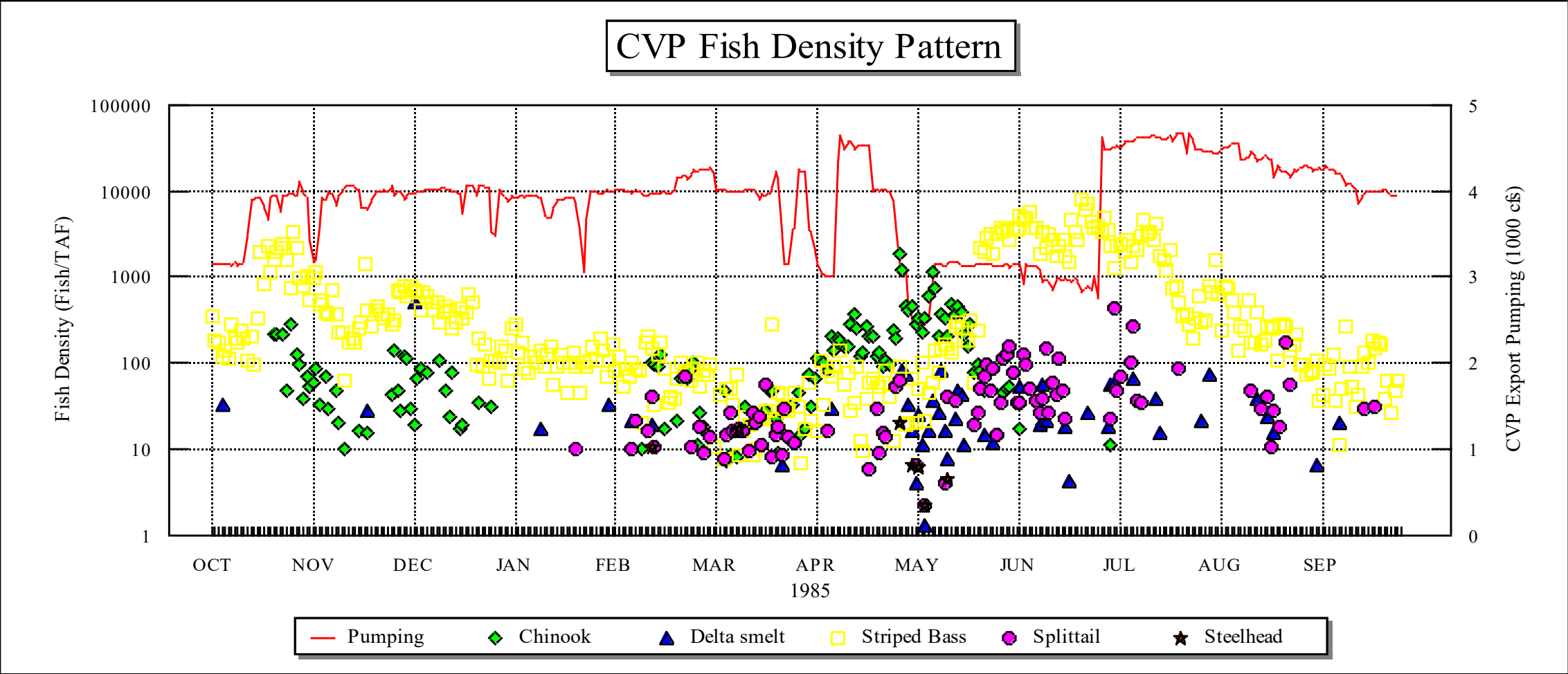
The salinity gradient (X2 to X10) could be added to display the seasonal movement of the estuarine habitat. Temperatures and turbidities could be added to display more habitat conditions for fish evaluations.



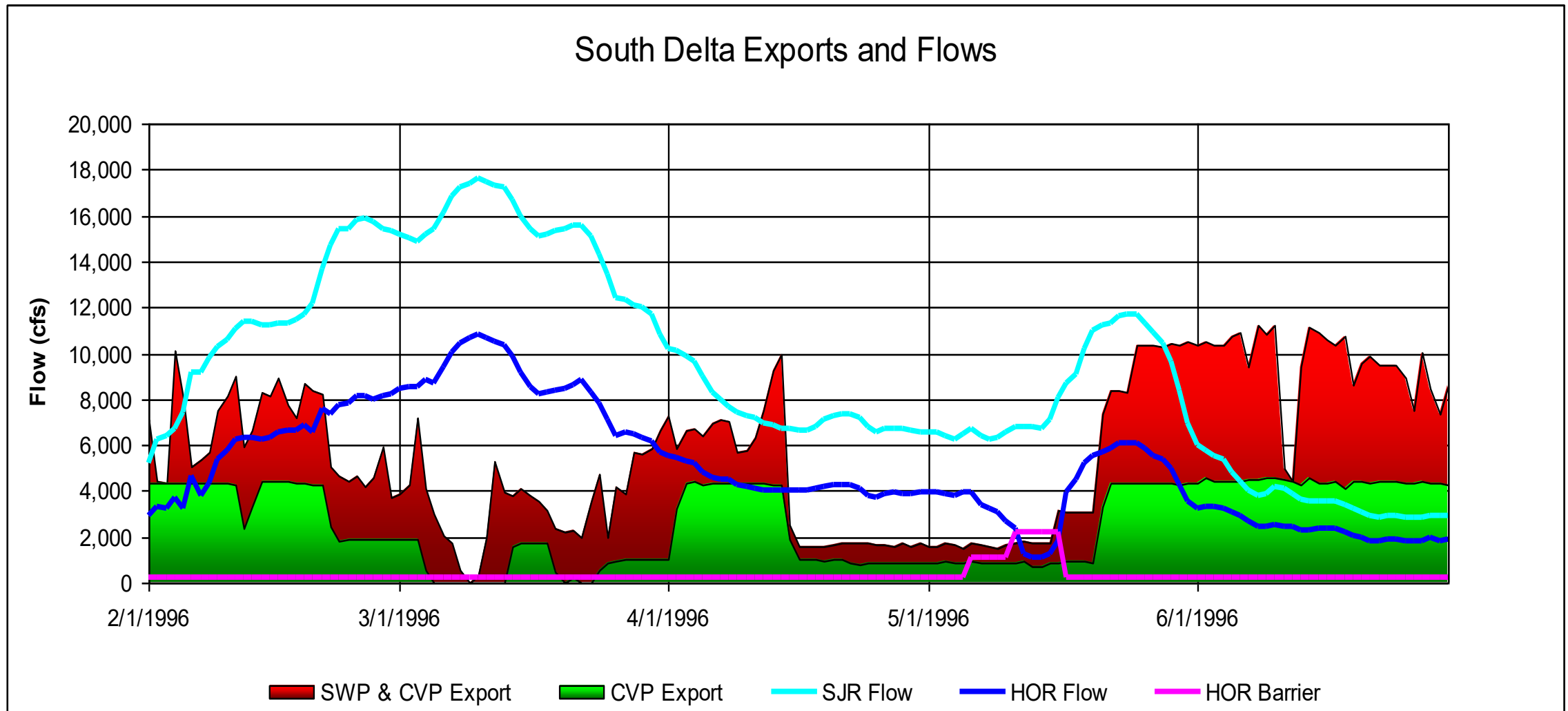
Fish data are needed to evaluate the effects of Delta operations on various fish species. Daily (expanded) salvage data from CVP and SWP were used in simulations of the CALFED EWA.



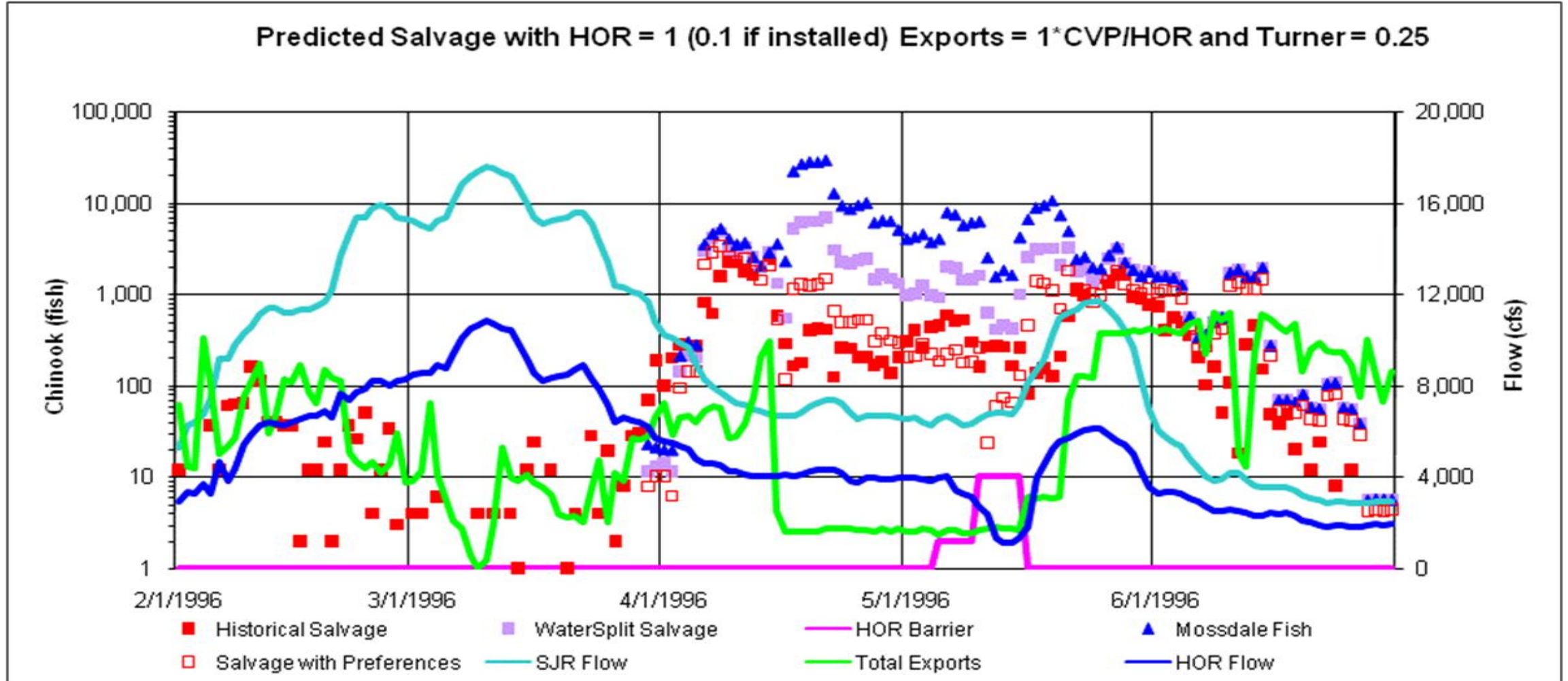
Several fish species spawn at various times and produce abundant juveniles throughout the year. Decisions to limit pumping are beneficial for some fish species but have small benefits for other fish species, depending on the fraction of the population entrained.



One goal of this talk is to encourage ideas for other daily data displays and calculations that could be included in Delta 3D. For example, the source of water for CVP and SWP exports could be estimated with calculations and this might improve our understanding of fish salvage data..



The fraction of the SJR fish that are caught at the CVP and SWP fish salvage facilities can be estimated from the flows and the fish densities (fish/TAF). Reduced exports (1,500 cfs) in April and May are required to protect the SJR Chinook. What if salvage is more protective?



Another goal of this talk is to encourage modeling the effects of habitat conditions (i.e., salinity, temperature, turbidity) on fish behavior (growth, survival, migration), so that the evaluation of the effects of Delta operations on fish populations could be more accurate.

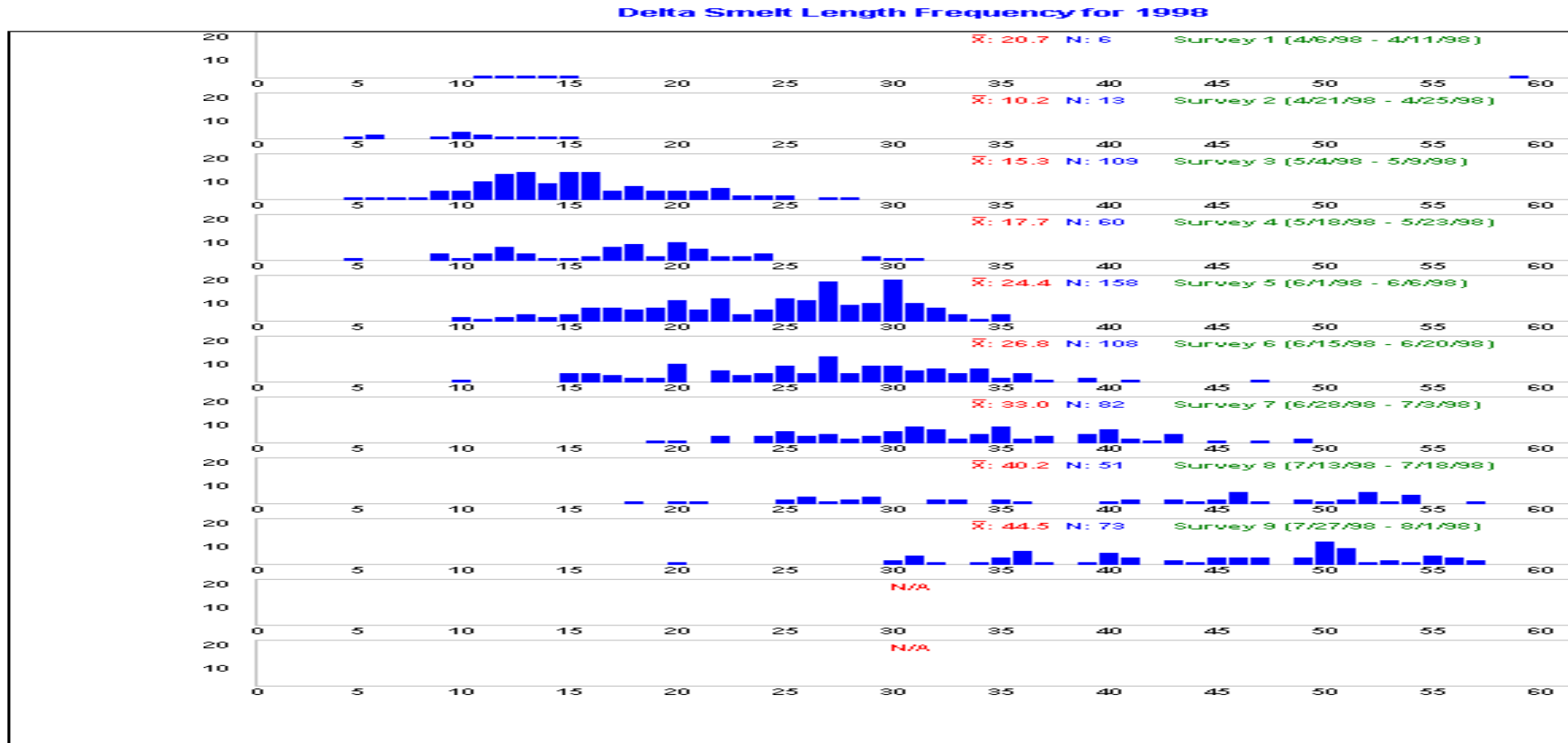
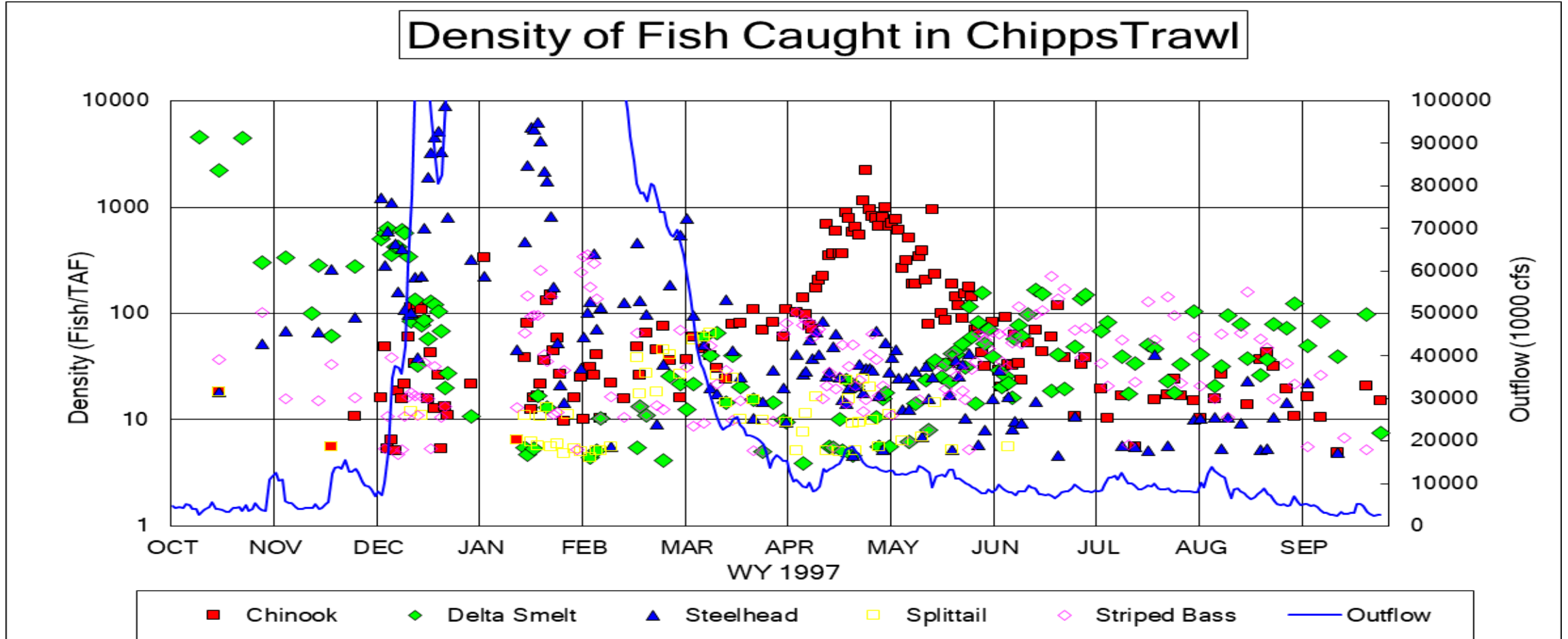
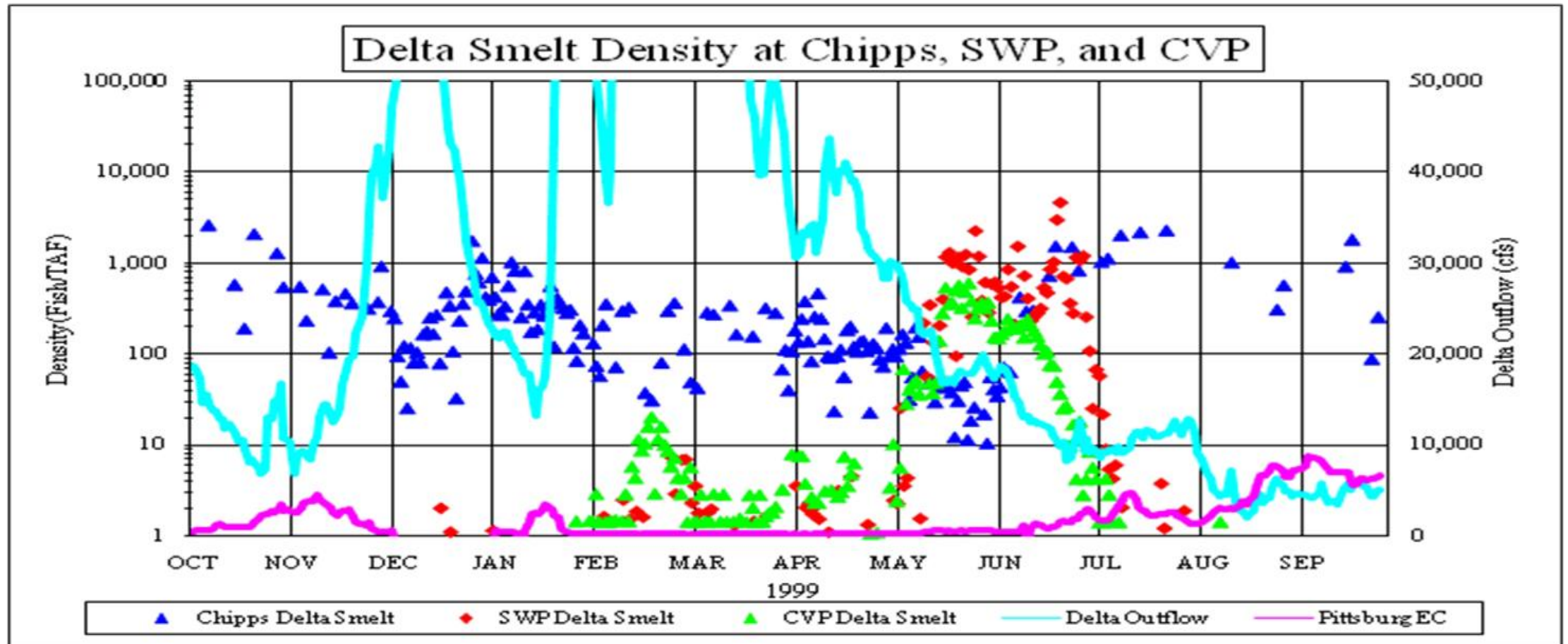


Figure 4. Length-Frequency Diagram for Delta-smelt in 1998

The Chipps Island Trawl is another great source of daily Delta fish data. The salinity, temperature and turbidity at Chipps Island could be added to provide additional understanding of Delta fish distribution and abundance.



Comparing the fish densities at the CVP and SWP exports with Chipps Island indicates a seasonal adult migration from the confluence to the Delta channels for spawning in the winter and a downstream movement of juveniles during the summer..



Delta Daily Data Display (Delta 3D) Benefits

- The daily data displays allow more accurate understanding of the Delta.
- Historical data are the source of our modeling ideas, provide our model inputs and allow model calibration and can verify our assumptions and relationships.
- Daily fish habitat conditions (velocity, salinity, turbidity, temperature) provide a framework for exploring likely fish effects within the Delta and tributaries.
- Fish data of all kinds (surveys, trawls, salvage) could be summarized and displayed as annual, monthly, or daily data for accounting and tracking.
- Assumed relationships between habitat conditions and fish behavior could be used to evaluate the likely effects of Delta operations on fish populations..
- The potential benefits of alternative objectives and modifies facilities could be evaluated with Delta 3D displays and calculations.