



The Bay Institute of San Francisco

PRELIMINARY RESPONSE TO COMMENTS OF CALIFORNIA URBAN WATER AGENCIES (CUWA) ON THE X2 STANDARD

Statistical problems: The CUWA documents find significant statistical variances which supposedly weaken the relationship between downstream movement of X2 position and increasing species abundance, based on the inclusion of an outlier year and interannual variability in sampling results. CUWA's criticism appears flawed because 1) 1983 is included in the analysis (given the choice of fitting the curve to include 1983 or finding that the X2-abundance relationship applies only in a limited range, the latter is preferable because of the likelihood that the population was not adequately sampled that year and that other mechanisms operate above a certain range of values) and 2) the correct measure of variance between years is estimated by the residual variance from the regressions, not variance between monthly samples (the patchy distribution of many aquatic organisms in time and space limits the accuracy of sampling techniques, and a mean or sum of the data from several months is necessary to estimate the annual population index).

Response of aquatic species to X2 position: The CUWA documents show changes in habitat of various species in response to X2 position, and assert that several species lose habitat as X2 moves downstream. The habitat measure used was longitudinal distance between two isohalines, selected depending on the species. No effort was made to calculate a real index of habitat availability, such as area in a certain range of depth or volume. In addition, those species that do appear to lose habitat as X2 moves downstream are for the most part marine species with access to expansive habitat areas in the lower Bay or the Pacific Ocean. Certainly, the claim that positioning X2 at Roe Island may harm many species has no basis in fact. Peak abundance of Delta smelt, the only estuarine species that does not show steadily increasing abundance as X2 moves downstream of Chipps Island to Roe Island or locations downstream, is positively correlated to occurrence of X2 between Roe Island and Middle Ground, not upstream at Chipps Island.

Use of X2 as a management tool: The CUWA documents assert that freshwater outflow is the controlling factor on most estuarine species, not X2 position. Actually, it appears that quantity of outflow assumes less direct importance for most species once they enter the range of tidal influence. At or below the entrainment zone, flow most likely influences position and stratification. Longitudinal position of X2 and other isohalines probably directly affects many more species within the estuary. Although operating to an X2 standard may be more difficult for water right permit holders than operating to a Delta outflow standard, X2 is much easier to define and measure than outflow, in addition to being a more appropriate parameter of water quality for regulation. This is not to say that improved flow standards should not also be required for greater protection of estuarine species.

GB:CUWA response memo 4/26/94