

We believe that trends noted in the Bay Study are likely due to the large numbers of YOY fish that were collected during certain wet years. High outflows may transport juveniles from the Estuary to locations where Bay Study samples are collected. It is unclear what happens to these fish once they are transported to these areas. Fish transported to San Pablo Bay may survive to join, if not sustain, the Napa River and Petaluma River and Marsh subpopulations. Once located in these areas, it is not known what contribution is made to the Central Valley population as a whole.

In regard to trends in CVP and SWP salvage data, we believe that these too are driven by seasonal variation in hydrology. Though it is true that hydrology and production are strongly correlated, and that salvage would be expected to rise as populations rise, there are concerns with the data's application (see discussion of surveys under Abundance section, above).

In the case of splittail salvage, entrainment is likely influenced by the rate, or volume per unit of time, of export. As stated before, salvage data are expressed as fish captures per acre foot and lack a time value. At higher rates of export, splittail are likely to be disproportionately entrained because of higher velocities in the channels adjoining or approaching the facilities and thus, abundance could be overestimated. All sampling gears may be more effective at capturing splittail during high outflows due to increased velocity and turbidity, but only the pumps have the ability to draw fish towards them at different rates. The rate at which fish may become pulled towards the pumps cannot be described using existing data. Differing rates of export also introduce variability, which cannot be discerned without a time factor. Salvage data, as mentioned previously, do not effectively sample a large extent of the splittail population, as fish reared in the Sacramento River and/or Yolo Bypass are likely to largely avoid the pumps. Salvage data do however collect the largest number of splittail of any survey.

*Comment 9:* Several respondents cited an analysis that took issue with us for adopting a non-traditional alpha-value of 0.20 (instead of 0.05) for evaluating results of the CDFG/USBR MLR Model.

*Our Response:* Available literature customarily demands a rigid adherence to the traditional alpha value of 0.05. In this particular analysis, we chose to take a far more conservative approach in terms of how we evaluated the splittail's abundance. Accordingly, we used the non-traditional alpha value of 0.20. We

believe while unusual it is conservative, and results in a more robust determination of whether the species should be listed.

*Comment 10:* Several respondents cited an analysis that criticized our treatment of separate surveys of splittail abundance indices as statistically independent.

*Our Response:* We followed a long established practice in the peer-reviewed literature on splittail of treating these surveys as statistically independent (e.g., Meng and Moyle 1995; Sommer *et al.* 1997) including papers repeatedly cited by the respondents in previously submitted comments. We accept at face value Manly's (2002) conclusion that an analysis of corrections among residuals provides evidence for some degree of interdependence among the different sets of survey data (Manly 2002:4–6). We also accept at face value Manly's (2002) attempt to correct our meta-analysis of survey results to account for the interdependence in the data sets. We have consistently stated that the abundance index data for splittail suffer from several fundamental inadequacies that make them far from ideal for decision-making purposes (an opinion with which the respondents and their statistical consultant concur (Manly 2002:3,8)).

*Comment 11:* Several respondents criticized us for evaluating the results of the CDFG/USBR MLR Model for all 20 data series of splittail abundance index data, instead of limiting the evaluation to the nine data series that the respondents view as most representative of overall splittail populations.

*Our Response:* We note that these and other respondents have previously criticized us, while employing different analysis, for not treating all 20 data series equally and for not including all available data series in statistical evaluations of abundance trends.

We are aware of no other party who has rigorously evaluated abundance index data (e.g., Sommer *et al.* 1997; Meng and Moyle 1995; Moyle *et al.* 2001 in prep.) that has deemed it appropriate to limit the evaluation to the nine data series favored by the respondents. Further, CDFG and USBR elected to include all 20 data series in the CDFG/USBR MLR Model applications submitted to us as part of earlier comments.

We disagree with the respondent's suggestion that only data from a select group of nine survey indices that sample a wide geographic area (we assume the respondent is referring to three age classes each of the Bay Study MWT, Bay Study OT, and Fall MWT)

should be given greater weight for making population-scale determinations. Weighting such a select group of surveys necessarily could require inappropriately combining their indices. The nine surveys are a composite of appreciably different gear types, some of which suffer from the same detection limitations as were used by other respondents to advocate against accepting certain other surveys. Mid-water trawling is an inappropriate match to splittail habitat preferences and other aspects of splittail biology, so even geographically extensive mid-water surveying would not necessarily be any more representative of overall splittail populations than geographically more restricted surveys better matched to splittail biology.

We disagree with respondents' claims that Bay Study MWT, Bay Study OT, and Fall MWT data are more indicative of splittail abundance trends than are those found in data collected at the SWP and CVP salvage facilities, Chipps Island, and in Suisun Marsh because they each suffer from gear or location difficulties. We postulate that each of these surveys is, to varying degrees, unsuited to the task of assessing splittail abundance. The Bay Study OT employs the efficient otter trawling technique but only infrequently captures splittail; surveys are conducted on the periphery of the species' range. The Bay Study MWT employs an inefficient (at capturing splittail) mid-water trawl. The Fall MWT fails to sample near-shore areas and the benthos (bottom), where splittail are most likely to occur. The Fall MWT does not sample shallow waters; in Suisun Bay/Marsh 8 of 25 sites are shallow, 1 of 38 in the Delta are shallow. We acknowledge that the Chipps Island Survey is a midwater trawl of deep channels and that it too would suffer from a similar bias. The CVP and SWP salvage data may suffer from an unquantifiable differential entrainment based on export rates (see Abundance section, above).

We also do not believe it is necessarily correct to infer that the wider geographical coverage of the nine surveys in question, alone, is sufficient to guarantee that those surveys are more representative of overall splittail populations. The Bay Study MWT, Bay Study OT, and Fall MWT are geographically wider in distribution, but given that estuarine conditions are specifically managed to maintain optimum habitat conditions within Suisun Marsh, the wider survey areas of the Bay Study MWT, Bay Study OT, and Fall MWT are not likely to contribute to a more informed trend analysis. Surveys need not cover large areas if a fixed