

*Our Response:* We do not consider the pre-SWP and CVP extent of saltwater intrusion to be detrimental to splittail. Saltwater intrusion was defined by the respondent as the location of the chloride concentration of 1000 milligrams per liter (mg/L) (1000 parts per million (ppm)), measured 90 minutes after high tide. It is not clear if the inference is that brackish water such as this is detrimental to the splittail. Splittail occupy brackish water at various stages of their life and such habitat may actually be essential to the species' life history. The 1000 parts per million value is equivalent to 1 part per thousand (ppt), which differs little from the 2 ppt standard identified as X2. The White Paper (Moyle *et al.* 2001) includes numerous references to the use of brackish water near X2 by splittail, indicating that it may actually characterize optimal rearing habitat for fish greater than 75 mm (3.0 in) in standard length (typically late year 0 or early year 1 fish). Non-reproductive (rearing juvenile and adult) splittail are most abundant in shallow brackish tidal sloughs, such as those found in Suisun Marsh. Growth of splittail in brackish sloughs is rapid in the first year of life, with fish reaching a size of 12 to 14 cm (4.7 to 5.5 in) TL. Further, historic, pre-reclamation conditions in the Delta would have allowed the "natural", non-SWP and CVP manipulated X2 location to exist within extensive flooded wetlands. Also note that splittail have wide salinity tolerance (10 to 18 ppt) (Moyle 1976; Moyle and Yoshiyama 1992), with an absolute observed tolerance of 29 ppt for short periods (Young and Cech 1996). Inland brackish water intrusion may have thus been at tolerable or even desirable concentrations for the species. We do not consider the changes in estuarine hydrology induced by the SWP and CVP to be beneficial to the splittail and traditionally the Service and other wildlife agencies have accepted as fact the supposition that splittail habitat was degraded as a result of the operation of these projects (see the section entitled Summary of Factors Affecting the Species).

*Comment 30:* The court directed that we respond to the issue that splittail have a broader distribution than previously thought, including a broader range in the Sacramento and San Joaquin Rivers. Another respondent noted that larval, Age 0 and Age 1 splittail have all been collected above the Delta.

*Our Response:* The greater range of the splittail was acknowledged in the January 12, 2001, notice (66 FR 2828). The above Background section of this

final document contains a discussion of the range of the splittail.

*Comment 31:* Nearly all respondents felt that we should not classify the Yolo and Sutter bypasses as a threat to the splittail, as we did in the January 12, 2001, reopening of comment period (66 FR 2828), based primarily upon the data found in Sommer *et al.* (1997) and Sommer (2001a). The bypasses have demonstrated the capability of producing large numbers of splittail when inundated.

*Our Response:* We have determined, based on consideration of scientific data and information provided by respondents, that the Yolo and Sutter bypasses are not, in and of themselves, a threat to the splittail. Our reevaluation of this issue is discussed in Factor E of the section entitled Summary of Factors Affecting the Species.

*Comment 32:* Some respondents stated that the bypasses, the Sacramento River Flood Control System, and other reclamation and flood control efforts are beneficial to the splittail because they redirect water into the Sacramento River that, prior to the 1920s, would have spilled into the Colusa, Yolo, Butte, Sutter, and American basins, thus entraining significant numbers of fish.

*Our Response:* Splittail evolved in the Central Valley and we postulate that the species is likely evolutionarily equipped to exist in the presence of natural flood basins inundated during unaltered hydrologic conditions. The splittail's high salinity tolerance (see Background section, above) also indicates its ability to persist in detached, increasingly saline waters. The number of confounding factors as well as lack of any historic data severely limits our ability to assess with any real authority the ultimate effect of the Sacramento River Flood Control System, the CVP and the SWP. Following is our assumed scenario regarding the effects on splittail of past reclamation and flood control efforts. However, we acknowledge that alternative assumptions and conclusions could be drawn from existing information.

Reclamation activities, including the Sacramento River Flood Control Project and similar efforts to prevent flooding of urban and agricultural lands, have resulted in the confinement of the Sacramento River primarily to a single, leveed or otherwise artificially-confined channel, with much of the former American and Colusa basin habitat no longer available to fish occupying the mainstem river. The respondent claimed this was a benefit in that splittail were no longer subject to entrainment in these basins. While it is true that splittail are no longer subject to

stranding in these basins, no data were provided to indicate that these basins, in their unaltered state, were a source of mortality sufficient to cause a decline of the species. There were no hydrologic data provided to indicate when the historic basins would have become connected or isolated from the Sacramento River in a typical year. These basins, being situated lower than the adjoining river and likely maintaining an alluvial (stream bed sediment) water connection, may have existed as perennial marshes wherein splittail could persist until inundation was restored. Indeed, the White Paper (Moyle *et al.* 2001) states that splittail historically occurred in alkaline lakes on the valley floor. The Butte Basin remains connected to the Sacramento River via the Sutter Bypass and Butte Creek; splittail are known to spawn in this area (Baxter 1999a).

It is also possible that, for the American River, Feather River, and other eastside streams, pre-European habitat conditions contained more complete and/or longer duration surficial (surface water) hydrologic connections between rivers and sinks than they did following the period of massive hydraulic mining. Hydraulic mining resulted in massive deposition of sediments in the beds of many eastside streams. The streambeds then became elevated. Rivers began to meander, as gradient and sinuosity are inversely related. When hydraulic mining ceased, the rivers began to straighten, eroding back through the deposits, and leaving elevated banks as effective barriers for the basins' receding flood waters. These elevated banks could have exacerbated the tendency for the rivers to become disconnected from the natural basins.

*Comment 33:* Several respondents felt that our determination that the Sutter and Yolo bypasses would require inundation for at least 30 continuous days between March and April in order for them to be considered a beneficial splittail spawning habitat was inaccurate and could affect water supply and flood management. Another respondent indicated that constant flows, related to inundation of the bypasses, would favor non-native fish.

*Our Response:* We have not proposed inundation of the bypasses for any specific interval, duration, or frequency. Rather, we have suggested that the bypasses would have their greatest benefits to splittail if they became inundated at a frequency and duration that as closely as possible mimics the natural, precipitation-driven hydrograph. The reference to 30 days is a statement regarding how the