

has had relatively wet hydrologic conditions that benefit fish species, though water year 2001 was below normal. Because the splittail is a floodplain adapted species, a dramatic decline in abundance was observed during the 1987 to 1992 drought. Similarly, abundance peaks during years when there is extensive floodplain inundations, and of the Yolo and Sutter bypasses in particular (Sommer *et al.* 1997) (see below for a discussion of Yolo and Sutter bypasses). When another drought occurs, splittail indices will again invariably drop. We have speculated the drought cycle may at some point stress the species to extinction if populations are too depressed. However, we have no direct evidence this is the case, and in the context of the significant habitat improvements being undertaken, are far less concerned that populations will fall to levels that makes this a concern.

Invasive species: Chinese mitten crabs (*Eriocheir sinensis*) could reach concentrations sufficient to intermittently impede the operation of fish screens and salvage facilities, thus reducing the effectiveness of splittail salvage and repatriation efforts. Since the January 12, 2001, notice (66 FR 2828), USBR has installed a device, known as Crabzilla, to remove the Chinese mitten crab from their CVP fish salvage facilities. In addition, Chinese mitten crabs have not appeared in large numbers at either of the fish salvage facilities in recent years. Therefore, the Chinese mitten crab does not appear to be a current threat to splittail, as they have not appeared in large numbers at the fish salvage facilities and those that do are efficiently removed and destroyed before they are able to clog the pipes and intakes at the fish salvage facilities.

Of some concern is the presence of Brazilian pondweed (*Egeria densa*) and water hyacinth (*Eichhornia crassipes*), both of which tend to form dense near-shore and slough-wide mats of vegetation which serves as a retreat, foraging, and ambush site for splittail predators and which may divert upstream- and downstream-migrating splittail into channels rather than the more-productive bankside habitat (Moyle *et al.* 2001 in prep). The California Department of Boating and Waterways (CDBW) and the United States Department of Agriculture (USDA) Agricultural Research Service (ARS) are presently and have been for at least 10 years, engaged in a program to control these invasive plant species. To date, the control effort has not had a measureable effect on splittail.

CALFED includes numerous studies on the threats of non-native competitors (CALFED 2000a, 2000b) (see Factor A for a discussion of CALFED).

Detrimental flood bypass operations: It has been documented that splittail make use of the Sutter Bypass, and particularly heavy use of the Yolo Bypass for spawning under certain hydrologic conditions and that the shallow, vegetated waters provide excellent rearing conditions for juvenile fish (Sommer *et al.* 1997, 2001a, 2001b). The bypasses are primarily flood control facilities and secondarily agricultural lands, and are passively operated as such. Splittail using the bypasses are subject to many of the same threats found elsewhere, such as habitat loss, environmental contamination, harmful reservoir operations, pesticide loading, competition with and predation by non-native fish, etc.

The flood bypasses are only flooded when flows in the Sacramento River reach a certain level. This inundation tends to occur at the correct time of year for splittail spawning, but may be reduced in frequency and duration (Yates 2001), with direct implications for splittail spawning. This constitutes a threat in that adult fish, having migrated to suitable spawning habitats on a floodplain, could be denied the opportunity to spawn. In those cases where adult splittail have successfully spawned, the resulting eggs or larvae could become trapped and killed. Insufficient floodplain inundation could also force egress of juvenile splittail before they have attained a size and swimming ability sufficient to avoid predation.

Since the publication of our January 12, 2001, notice (66 FR 2828), we have determined, based on consideration of scientific data and information provided by the public, that the Yolo and Sutter bypasses are not, in and of themselves, a threat to the splittail. A threat is that which, if removed, will result in improvements in a species' status. The removal of the Yolo and Sutter bypasses would be highly detrimental to the splittail, as the bypasses constitute a substantial portion of the species available spawning habitat. We agree that the bypasses are presently important to the splittail when inundated and that they produce more fish than they harm. The bypasses likely have helped this resilient species to persist through over a century of largely unmitigated habitat destruction.

CALFED's ERP includes the development of a program to eliminate fish stranding in the Sacramento, Feather, and Yuba rivers and the Colusa Basin Drain and Sutter Bypass in the

active stream channels, floodplains, shallow ponds, and borrow areas (CALFED 2000a, 2000b) (see Factor A for a discussion of CALFED). In addition, the program will conduct instream flow studies to determine the flows necessary to support all life stages of anadromous and estuarine fish species, including splittail (CALFED 2000a, 2000b).

Entrainment as a result of water diversions: We conclude that diversion of water from any river or stream or other water course that results in the entrainment, injury or death of Sacramento splittail, including stranding of eggs, larvae, juveniles or adults; or diversions and subsequent runoff that results in the degradation of waters containing splittail is no longer a threat to splittail. Entrainment of splittail at diversions is reduced if fish screens are installed at diversions in splittail habitat areas. Two programs implemented under CVPIA, particularly the Anadromous Fish Restoration Program (AFRP) and allied Anadromous Fish Screen Program (AFSP), which were not analyzed in the January 12, 2001, notice (66 FR 2828), have had a net benefit to the splittail. Removal of migration barriers and placement of fish screens on water diversions is ongoing under the AFRP and AFSP, and several actions with adjunct benefits to splittail have been completed. Removal of migration barriers can provide additional splittail habitat where potential habitat is blocked, and entrainment of splittail at diversions can be reduced if fish screens are installed in splittail habitat areas. Though many small diversions remain unscreened, approximately 95 percent of water annually diverted has been or is in the process of being screened, including all water diversions greater than 40 cubic feet per second, and many of the remaining unscreened diversions are small and intermittently operated (O'Leary 2003 pers. comm.). CALFED's Ecosystem Restoration Program includes a program to consolidate and screen the remaining small agricultural diversions in the Delta, and the Sacramento and San Joaquin rivers. The NOAA Fisheries Restoration Center has also begun to fund small fish screen projects in the Sacramento River within the range of the splittail. This represents a near-total reduction in the threat of entrainment in unscreened diversions to the splittail, and thus removal of the threat.

Water quality and environmental contaminants: Metals such as copper, zinc and cadmium (Environmental Protection Agency (EPA) 1976) can be directly toxic to fish, and presumably to splittail, especially in their sensitive