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Passage survival, descaling, and injury rates of marked Sacramento splittail *Pogonichthys macrolepidotus* and juvenile chinook salmon *Oncorhynchus tshawytscha* which were inserted into the entrance (suction side) of the Hidrostal pump were compared to those of control fish which were inserted at the exit (pressure side) in 130 paired trials conducted from December 1998 to July 1999. The Hidrostal pump had no significant effect (P< 0.001) on immediate or latent mortality (96 hours(h)), descaling, or body injury rates for all flow rates, and sizes and densities of fish tested, except for 96 h mortality of Sacramento splittail in June. Immediate survival rates for splittail and chinook salmon pumped averaged 99 percent, and cumulative (96 h) survival for these species averaged 93 and 96 percent, respectively. Average scale loss on Sacramento splittail and chinook salmon usually was low (1.9 and 2.4 percent, respectively) and the frequency of injury to head, eyes, skin, and fins was typically low and not significantly different among quality control, control, and treatment fish. Observations on wild fish (26 species; 7,197 fish) entrained from the Sacramento-San Joaquin River Delta during the pumping trials indicated high immediate survival (99 percent). The Hidrostal pump transported a variety of sizes and numbers of native fishes with low mortality and injury rates over a range of pump velocities and environmental conditions. Hidrostal pumps that can safely transport fish screened from a water diversion canal through a bypass return to a river may have significant fisheries management application.