Tracy Research Technical Report Abstract

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Helfrich, L.A., Bark, R., Liston, C.R., and B. Mefford, 2003. *Survival and Condition of Striped Bass, Steelhead, Delta Smelt, and Wakasagi Passed through a Hidrostal Pump at the Tracy Fish Collection Facility, Tracy, California*, Tracy Fish Collection Facility Studies, Volume 24, U. S. Bureau of Reclamation, Mid Pacific Region and Denver Technical Service Center.

A 41-cm diameter Wemco-Hidrostal pump was evaluated for fish passage as part of research to improve salvage operations at the Bureau of Reclamation's Tracy Fish Collection Facility, Tracy, California. Immediate and 96-hour (h) mortality, descaling, and injury rates were evaluated for striped bass, *Morone saxatilis*, steelhead, *Oncorhynchus mykiss*, wakasagi, *Hypomesus nipponensis*, and delta smelt, *Hypomesus transpacificus*. Test fish inserted into the intake of the Hidrostal pump were compared to control fish that were inserted into the exit. The pump had no significant effect on immediate or 96-h mortality for all species tested, with immediate and 96-h mortality below 3 percent for all trials. Averaged scale loss was below 2.6 percent for all species. Some non-lethal injuries to the head, eyes, skin, and fins of pumped fish occurred, however; these injuries were not significantly different among quality control, control, and treatment fish. No statistically significant relationships were detected between fish mortality and pump speed, injected fish density, or debris load. Wakasagi appeared to be more tolerant to pump passage than Delta smelt and may not be an appropriate surrogate species for delta smelt. Our results suggest that large Hidrostal pumps have the capacity to transport live fish with low mortality and minimal body injury.