

Migration Characteristics of Juvenile Chinook in the Lake Washington System: PIT Tag Studies

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ABSTRACT

This pilot study involves evaluating the feasibility of using Passive Integrated Transponder (PIT) tag technology to monitor smolt migration and survival characteristics as they pass through the Lake Washington Ship Canal (LWSC) system, including the Hiram M. Chittenden Locks (Locks). Four smolt flumes and PIT tag detection devices (tunnel readers) were installed over the spillway dam of the Locks to monitor outmigration during spring of 2000 and 2001. Data are presented primarily from 2001, although selected results from the 2000 study are also included. In 2001, juvenile chinook, coho, and sockeye salmon were captured, PIT tagged, and released at two locations in the LWSC (Lake Union and Montlake areas) and in the lower reaches of the Cedar River and Bear Creek. Hatchery-reared chinook were also PIT tagged, held, and released at the Issaquah Creek Hatchery and the University of Washington Hatchery. Samples of fish captured by purse seining in the large lock and by beach seining in saltwater areas below the Locks were interrogated using hand-held detectors for PIT tagged fish. The data describe seasonal and diurnal migration and passage timing, average migration rates, passage routes through the Locks, and time to transition to saltwater. Passage rates were compared with flume discharge to evaluate optimal water allocation to the smolt flumes. The data were also used to evaluate survival for different portions of the migration route, although the uncertainty in the estimates was high because of variable detection rates according to tagging group, date of passage, daily fluctuations in detection efficiencies, and low detection rates below the Locks. This information can be used for shaping spill timing and volume requirements at the Locks, and for evaluating causal mechanisms of decline.