Juvenile Production Estimates

Annotated Bibliography

Copeland, T. and D.A. Venditti. 2009. Contribution of three life history types to smolt production in a Chinook salmon (Oncorhynchus tshawytscha) population. Canadian Journal of Fisheries and Aquatic Sciences 66: 1658-1665.

Adult summer-run Chinook salmon escapement to the Pahsimeroi River, Idaho was estimated using redd counts. Initial cohort size of Chinook salmon juveniles was derived from the redd count. The number of downstream migrants was estimated using a rotary screw trap. Survival to the first dam on the Snake River was estimated using PIT-tag mark-recapture. The age-0 smolt phenotype had the highest relative survival, and the fall parr phenotype, the lowest with the age-1 smolt phenotype being intermediate between these.

Kinsel, C., M.S. Zimmerman, L. Kishimoto, and Pete Topping. 2008. 2007 Skagit River Salmon Production Evaluation. Washington Department of Fish and Wildlife, Olympia, Washington.

http://wdfw.wa.gov/publications/00093/wdfw00093.pdf

Production of natural origin sub-yearling juvenile Chinook salmon was estimated in the Skagit River using a rotary screw trap and a scoop trap fished in parallel. Abundance was estimated using a time stratified mark-recapture sampling design and the Petersen estimator (as modified by Chapman). Egg to migrant survival was estimated with the assumption that females comprised 45% of the escapement and had a fecundity of 5.500 eggs/female. Escapement data were based on spawner surveys. A total migration of 2.2 million natural-origin 0+ Chinook salmon is estimated to have passed the trap. Egg-to-migrant survival was 3.9%. The low egg-migrant-survival is believed to be due to high flow events during egg incubation.

Kiyohara, K. and M.S. Zimmerman. 2012. Evaluation of Juvenile Salmon Production in 2011 from the Cedar River and Bear Creek. Washington Department of Fish and Wildlife, Olympia, Washington.

http://wdfw.wa.gov/publications/01380/wdfw01380.pdf

Juvenile Chinook salmon production in the Cedar River and Bear Creek was estimated using incline-plane traps (early season) and rotary screw traps (late season). In the Cedar River fry migrants comprised 82% of all sub yearling migrants. In Bear Creek fry migrants comprised 5.1% of all sub yearling migrants. Abundance was estimated using a single trap design and mark-recapture approach with a Bailey estimator.

Lamperth, J., M.S. Zimmerman, D.J. Rawding, L. Campbell, B.G. Glaser, and C. Sharpe. 2013. Coweeman River Salmonid Production Evaluation: 2011 Completion Report. Washington Department of Fish and Wildlife, Olympia, Washington.

http://wdfw.wa.gov/publications/01471/wdfw01471.pdf

Juvenile production of tule fall Chinook salmon was estimated in the Coweeman River (Washington State) using a rotary screw trap (5-foot diameter) with a Bayesian spline analysis of the time-stratified mark recapture data. Estimated 260,476 fry migrants (84%) and 48,469 subyearling migrants (16%). Adult Chinook salmon escapement estimated using the combination of a weir and carcass mark-recapture surveys. Using two different mark-recapture estimates, the escapement was estimated to be 668 (pooled-Petersen) and 459 (Jolly-Seber).

Martin, C.D., P.D. Gaines and R.R. Johnson. 2001. Estimating the abundance of Sacramento River juvenile winter Chinook salmon with comparisons to adult escapement. Red Bluff Research Pumping Plant Report Series, Volume 5. U.S. Fish and Wildlife Service, Red Bluff, CA.

http://www.fws.gov/sacramento/fisheries/CAMP-Program/Documents-Reports/Documents/Sacramento%20River%20%28RBDD%29%20winter-run%20chinook%20salmon%20BY%201995-1999%20%283.4%20MB%29.pdf

Rotary-screw traps at Red Bluff Diversion Dam (RBDD) were used to index juvenile winter-run Chinook salmon production (JPI). Estimates of juvenile winter-run Chinook salmon production derived from escapement estimates based on ladder counts at RBDD, winter-run Chinook salmon carcass surveys and NMFS's JPE were compared to the JPI. Between 81% and 44% of winter-run production used areas below RBDD for nursery habitat. Paired comparisons between JPI and JPE did not differ significantly. NMFS's JPE model based on carcass survey escapement estimates performed better than the JPE model based on escapement using ladder count data.

National Marine Fisheries Service. 2014. Winter-run Broodyear 2013 JPE Letter. February 21, 2014.

http://www.westcoast.fisheries.noaa.gov/publications/Central_Valley/Water%20Operations/Operations,%20Criteria%20and%20Plan/nmfs__winter-run_broodyear_2013_jpe_letter_-_february_21__2014.pdf

The JPE for broodyear 2013 winter-run Chinook salmon is estimated to be 1,196,387 natural origin juveniles entering the Delta during water year 2014. The authorized incidental take under the ESA for the combined CVP/SWP Delta pumping facilities from October 1, 2013 to June 30, 2014 is 23,928 (2% of JPE) natural origin Sacramento River winter-run Chinook salmon. For the 2013 broodyear, NMFS revised the survival terms in the JPE calculator based on the latest acoustic tag studies and abundance estimates at Chipps Island. 2013 was the first year that in-river survival was directly estimated using hatchery-released juvenile winter-run Chinook salmon tagged with JSAT acoustic tags. Survival of acoustically tagged hatchery late fall-run Chinook salmon has been estimated from 2004 to 2011, as a surrogate for winter-run Chinook salmon.

Pinnix, W.D., A. Heacock, and P. Petros. 2013. Juvenile Salmonid Monitoring on the Mainstem Trinity River, California, 2011. U.S. Fish and Wildlife Service, Arcata Fish and Wildlife Office, Yurok Tribal Fisheries Program, and Hoopa Valley Tribal Fisheries Department. Arcata Fisheries Data Series Report Number DS 2013-29, Arcata, California.

http://www.fws.gov/arcata/fisheries/reports/dataSeries/2011_Trinity_River_Outmigrant_Monitoring.pdf

Estimated juvenile salmonid production of the Trinity River using multiple rotary screw traps at two different sites. Abundance of emigrating age-0 Chinook salmon estimated using weekly stratified mark-recapture population estimates.

Poytress, W.R. and F.D. Carrillo. 2012. Brood-year 2010 Winter Chinook Juvenile Production Indices with Comparisons to Juvenile Production Estimates Derived from Adult Escapement. Report of U.S. Fish and Wildlife Service to California Department of Fish and Game and U.S. Bureau of Reclamation.

http://www.fws.gov/sacramento/fisheries/CAMP-Program/Documents-Reports/Documents/Sacramento%20River%20%28RBDD%29%20winter-run%20Chinook%20salmon%20BY%202010.pdf

Winter-run Chinook salmon juvenile production indices (JPI) were compared to juvenile production estimate (JPE) for brood-year 2010. The JPI is derived from rotary screw trap catches at Red Bluff Diversion Dam and JPE is derived from a model developed by NMFS which uses adult winter-run Chinook salmon escapement from carcass surveys as the primary variate. The brood-year 2010 JPE fell within the 90% CI for the JPI. There is a strong correlation in trend between JPI and JPE. The 13-year average egg to fry survival rate is 25% which is the same value used in the JPE model. However, estimated egg to fry survival in 2010 was 37%.

Topping, P. and M.S. Zimmerman. 2011. Green River Juvenile Salmonid Production Evaluation: 2009-2010 Annual Report. Washington Department of Fish and Wildlife, Olympica, Washington.

http://wdfw.wa.gov/publications/01168/wdfw01168.pdf

Juvenile Chinook salmon production was estimated using a rotary screw trap (5-foot diameter). Freshwater production was estimated using a single partial-capture trap design with abundance estimated using a Bailey estimator. In 2009, fry migrants represented 61% of all sub yearling migrants while in 2010 fry migrants were only 10% of sub yearling migrants.