

Chelatna Lake Northern Pike Suppression Project - 2017

Executive Summary

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This project removed invasive northern pike from Chelatna Lake in May-June, 2017. Chelatna Lake supports the largest population of sockeye salmon in the Susitna River watershed with weir counts ranging from 17,721 to 84,899 representing an average 17% of the total escapement of sockeye salmon into the Susitna River watershed since 2006. Variable-mesh gillnets and hoop traps were used to capture and remove northern pike immediately after ice melted, because pike are more active and vulnerable to capture during their spring spawning season. Project success will be evaluated by (1) comparing northern pike catch per effort in variable-mesh gillnets with data collected in 2010–2012, (2) estimating the number of juvenile salmon that would have been consumed by northern pike if the project were not conducted, and (3) comparing average sockeye salmon adult returns per spawner during the 5 years preceding the project and the 5 years after project completion.

A total of 958 northern pike were captured and removed from Chelatna Lake and the stomach contents of 642 northern pike were examined. Pike catch per hour in variable-mesh gillnets declined during the season. Mean pike catch per hour was lower in 2017 ($CPUE=0.131$) compared with 2010 (0.524), 2011 (0.212) and 2012 (0.253). Twenty-nine percent of the captured pike were immature fish (ages 1-2) and 3-year olds were the most common (43%) age class. Juvenile sockeye salmon were found in 20% of the pike stomachs that were examined, and a total of 417 juvenile sockeye salmon were found in these stomachs. Eighty percent of sockeye salmon preys were age-0 fish <5 cm in length and the remainder were smolts. The number of sockeye salmon found in pike stomachs peaked during the first 2 weeks of June. Sockeye salmon prey length was positively correlated with the length of pike predators (mean prey-predator length ratio=0.19). We estimated the increase in adult sockeye salmon returns resulting from the removal of pike predators during this project assuming (1) feeding on age-0 sockeye salmon occurs over 150 days each year, (2) feeding on sockeye salmon smolts occurs over 90 days each year, (3) the average lifespan of northern pike is 7 years, (4) average fry-to-adult survival is 3.5% and (5) smolt-to-adult survival is size-dependent ranging from 13–46%. Given these assumptions, we estimated that removal of pike predators by this project will result in an additional 13,229 adult sockeye salmon returning in future years. The analysis also indicated that predation by age 1–3 pike accounted for 85% of the reduction in adult sockeye salmon returns. This information will be useful for fine tuning our future pike removal efforts to target those age classes having the greatest impact on sockeye salmon production. This project is currently funded for the 2018–2019 field seasons.