

**Otolith Microstructure Reveals the Importance of
Tidal Wetlands as Nursery Habitat For Chinook Salmon
in the Skagit River, Washington State, USA**

Abstract

Kim Larsen
U.S. Geological Survey

Little is known about the importance of estuarine habitats for juvenile Chinook salmon (*Oncorhynchus tshawytscha*), hence managers have been uncertain of the appropriate levels of protection or restoration efforts for such habitats. Our research efforts have focused on analysis of otoliths to determine length of residence and growth of juvenile Chinook salmon in the Skagit River estuary and indicate the importance of that estuary to salmon. Historically, more than 70% of the Skagit Delta habitat for juvenile salmon has been lost, primarily through diking. The methodology developed from this study has fostered similar studies within Puget Sound thereby enhancing our general understanding of Chinook salmon and their habitat requirements.

Otolith analysis has been a valuable tool for distinguishing between juvenile life history types that do or do not rear in the delta, and for evaluating the importance of the delta to the former. We found that the most common life history used the delta for extended rearing and growth which enhanced subsequent growth in other nearshore habitats. Data from tribal and other cooperators indicate density-dependent use of the delta presumably a result of the historic habitat losses. These data and our data show that restoring delta and pocket estuary habitat and improving migration pathways within and between habitats should substantially increase the numbers of wild Skagit Chinook salmon.

Kim Larsen¹, Eric Beamer², Lisa Wetzel¹, Reg Reisenbichler¹

¹USGS, Western Fisheries Research Center, Seattle, WA

²Skagit River System Cooperative, LaConnor, WA