Estimation Of Fish Age Using Otolith Relative Mass

Craig P. Stafford, Division of Biological Sciences, 32 Campus Drive, University of Montana, Missoula, MT 59812, craig.stafford@mso.umt.edu

Otolith and body growth rates are non proportional, resulting in fast growing fish with relatively small otoliths at a given body size and vice versa. Thus use of otolith mass alone to estimate fish age will be biased when body growth rates vary from those in the established age versus otolith mass relationship. By accounting for the otolith mass at a given body size (defined as otolith relative mass) it should be possible to improve age models particularly when growth rates are variable. Herein I compared two multiple regression models incorporating otolith relative mass to predict Flathead Lake lake trout (*Salvelinus namaycush*) annuli with a conventional otolith mass regression. I found that the models incorporating otolith relative mass were less prone to growth bias, and produced growth curves that better mimicked the empirical relationship. The best performing otolith relative mass model was applied to archived otoliths, revealing a pattern of sharply declining growth from 1986-1991 to 1998, and a smaller decline from 1998 to 2005. Coherent with these temporal growth declines I observed increases in otolith mass at a given body length, suggesting that the otolith mass vs. body length relationship can be used to monitor growth rates.