

James A. Morris, Jr. INVESTIGATION OF GENETICS, DEMOGRAPHICS, AND LIFE HISTORY STRATEGIES OF STRIPED BASS, *Morone saxatilis* USING OTOLITH MICROCHEMISTRY. (Under the direction of Roger A. Rulifson). Department of Biology, July 2001.

Otolith microchemistry was used to investigate genetic, demographic and life history characteristics of striped bass, *Morone saxatilis*. Striped bass were collected from three river systems along the eastern seaboard; the Neuse and Roanoke rivers, North Carolina and the Stewiacke River, Nova Scotia. Ca, Mn, Fe, Cu, Zn, Br, and Sr were analyzed in otolith nuclei using broad-beam particle induced x-ray emission (PIXE). Genetic subgroups (Roanoke River only) showed that Cu:Ca ratios were different in one subgroup possibly of a resident genotype; however, because Cu concentrations were near the limit of detection, further investigation is warranted. Two dorsal coloration patterns found in Stewiacke River fish indicates the presence of ocean-going (green) and resident (black) contingents, but results of trace elemental analysis showed no differences in elemental signatures of otolith nuclei suggesting that the contingents are from the same population. Sr:Ca ratios were not stable among Roanoke River year classes; decreased levels of strontium in one year class corresponded with a flooding event. 94% of the Neuse River fish were classified correctly, 72% of Stewiacke, and 52% of Roanoke. Obvious outliers to these classifications suggest that more open populations (Stewiacke and Roanoke) were frequented by wandering individuals from other populations.