

Estuarine Retention and Production of Striped Bass Larvae: A Mark-Recapture Experiment

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Mark-recapture experiments were conducted in the tidal Nanticoke River (Chesapeake Bay) to evaluate the role of the salt front in retaining striped bass larvae and controlling nursery production. During two spring spawning seasons, 25.1 million hatchery-produced larvae were released with chemically marked otoliths at selected locations and times. Surveys tracked the spatial and demographic fates of released and naturally produced larvae. Released larvae dispersed rapidly within the freshwater tidal portion of the estuary, and were retained above the salt front. Their distributions overlapped with naturally produced larvae. Growth and mortality rates did not differ with respect to release location, but did vary with day of release, influenced by storm events and seasonal changes in temperature. In 1993, a group released during a storm event did not yield any recaptured larvae. Zooplankton concentrations in 1992 and 1993 were sufficient for successful larval feeding. Large differences in estuarine nursery volume and overall larval production occurred between years. In spring of 1993, a period of relatively high freshwater flow, nursery volume was 2.1-fold larger than in 1992. Naturally produced larval instantaneous mortality was lower in 1993 (0.13 d^{-1}) than in 1992 (0.20 d^{-1}), and juvenile production resulting from larval releases was 4-fold higher. We propose that the oft-reported correlation between late winter-early spring freshwater flow and strong striped bass recruitments results in part from increased nursery volume, which increases overall carrying capacity by buffering water quality against variation caused by within-season meteorological events, thus enhancing production of larval striped bass.

Key words: Chesapeake Bay, Estuary, Estuarine Turbidity Maximum, Fish recruitment, Frontal Regions, Larval Retention, Salt front, Striped bass

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