

Determining Larval Dispersal and Natal Origins of Marine Fishes Using Geochemical Signatures in Otoliths

Dr. Simon R. Thorrold

Woods Hole Oceanographic Institution

sthorrold@whoi.edu , 508 289-3366

Abstract: Quantifying connectivity among fish populations remains a significant hurdle in fisheries management, the design of marine reserves, and the assessment of essential fish habitat. Determining larval trajectories and natal origins of marine fish is challenging because of difficulties in conducting mark-recapture studies in marine systems. We are developing techniques that utilize stable isotope and trace element signatures in otoliths (ear stones) as natural markers in marine fishes. Laboratory studies confirmed that the composition of otolith aragonite is related to physico-chemical properties of ambient waters. We are now applying the technique to determine population structure of weakfish

(*Cynoscion regalis*), and to examine larval dispersal pathways of coral reef fishes. In the weakfish study, we have used geochemical signatures in adult otoliths (parameterized by groundtruthed signatures from two annual cohorts of juvenile weakfish) to retrospectively determine natal origins of spawning weakfish collected from 5 major estuaries along the US east coast. We found much more population structure, as evidenced by natal homing, than was implicated by genetic approaches. We suspect that such behavior may be much more common in marine fishes than is currently assumed, and believe that there is an urgent need to acknowledge spatial context in the management of marine fish populations.