

## **DISPERSAL, HABITAT ASSOCIATIONS, SURVIVAL, AND RESIDENCE TIME OF HATCHERY-REARED AND WILD JUVENILE RED DRUM, *SCIAENOPS OCELLATUS*, IN THE ALAFIA RIVER, TAMPA BAY, FLORIDA**

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In Florida, red drum *Sciaenops ocellatus* support an important recreational fishery. The Tampa Bay red drum population has been monitored for more than 12 years by the Florida Fish and Wildlife Commission Fisheries Independent Monitoring and Fisheries Dependent Monitoring programs by net sampling and creel surveys. Since few juvenile (180-300 mm TL) “rat reds” have been collected using conventional sampling gear or reported by anglers, there is limited information on their distribution, movement, habitat preferences, site fidelity, home range size, and ecology in the Tampa Bay estuary.

From 2003 to 2005, biologists from Mote Marine Laboratory and Florida Fish and Wildlife Commission implemented acoustic telemetry as a tool to examine dispersal, habitat use, survival, and residence time for juvenile red drum in the Alafia River, a major tributary of Tampa Bay. Three groups of juvenile red drum, 52 hatchery-reared (225–285 mm TL), 16 wild (253-354 mm TL), and 37 wild (201-300 mm TL) were implanted with seven-month acoustic pinger transmitters (Sonotronics, Tucson, AZ). The fish were randomly assigned to one of eight release sites (replicates) in each of four stratified regions (treatments) along the main stem of the river from the mouth to the freshwater and saltwater interface (upward reach of the tidal wedge), a distance of about 11 km. Fish were monitored using mobile hydrophones and receivers and by fixed receiver stations that were placed in strategic locations within the river. The entire 11 km reach of the river was covered approximately biweekly. Once encountered, fish were accurately located and the associated abiotic and biotic characteristics were documented. When fish with acoustic tags were located, angling for untagged wild fish was attempted.

In these studies, few fish moved from the river. The mean days-at-large for all groups was 71.9. The mean number of encounters for all groups was 6.0. Spatial distribution, dispersal, day time home range and use distribution were analyzed. To satisfy the assumptions of home range, group and sub-group dispersion and linearity (site fidelity) was evaluated using an extension of the Monte Carlo random walk test. Groups 1-3 were analyzed separately. Similarly, groups 1-3 were analyzed by individual release sites. Group site fidelity was high. In all three groups, the null hypothesis that movement was not random was accepted. When the three groups were analyzed by release site, fish released at all but one site exhibited a high degree of site fidelity. Preliminary day time home range assessments were made by use of minimum convex polygons (MCP). Because the main river stem was narrow and convoluted in some areas, a more accurate assessment of home range size was made using the minimum convex polygon/minimum stream polygon (MCP/MSP). Minimum stream polygons were constructed by identifying the outermost points of a fish’s distribution and connecting them using the poly-lines formed by the river banks. This provided a polygon covering the area a fish had to swim to reach the furthest points

of its distribution. The day time MCP/MSP areas for the eight release sites were calculated. The mean MCP/MSP daytime home range size for hatchery-reared fish was 250.4 ha, for fish released at site 104, the largest, and 173.8 ha for fish released at site 103, the smallest. An analysis of variance indicated that MCP/MSP daytime home range sizes among fish released at different sites were not statistically different. Numerous home range analyses were made based on different analytical parameters. This modeling is ongoing. Also, detailed habitat associations with multiple layers of habitat data are being modeled in GIS.

Through mobile tracking efforts, fish with acoustic tags were generally encountered in areas with steep bottom slope or areas where depth changed rapidly near shore, under and near dock structures, on shallow flats, along shorelines, and in bulkhead canals. The fish were found in all salinities of the river independent of their stocking salinity. Forty-two wild red drum (242-445 mm TL) were captured at sites where hatchery and wild fish with acoustic tags were located.