

MANIPULATIONS OF STOCKING MAGNITUDE; ADDRESSING DENSITY-DEPENDENCE IN JUVENILE POPULATIONS OF A MARINE CARNIVORE

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Densities of a marine carnivore (Common snook *Centropomus undecimalis*) were analyzed in nursery habitats to assess if experimental hatchery releases actually increase abundance of snook populations. As density-dependent processes are more likely to occur early-on in juvenile populations, our studies focused on releases of late age-0 hatchery-reared common snook. Releases were used to artificially manipulate juvenile snook abundance in four nursery habitats of Sarasota, Florida, USA. A before-after, control-treatment design was used, and we attempted to double juvenile densities overall (through hatchery releases) at two treatment creeks, and only increase juvenile densities by 10% in two control creeks. We monitored densities of wild and hatchery-reared juveniles before and after snook releases. Before release, depletion sampling was performed at the four predetermined release sites to quantify pre-treatment densities and estimate seining efficiency. In each creek, our standardized sampling program was designed to thoroughly and systematically seine 30m of shoreline habitat for every 90 m of shoreline. Catch from the sampled shorelines was extrapolated to the total estimated shoreline area of each creek to obtain localized population estimates of the juvenile snook. Release magnitude was based on these data.

Hatchery fish were identified with coded wire tags and visible implant elastomers, and releases occurred in May. Follow up standardized sampling occurred in June, July, September, November, and the following February at each release site. Overall, density estimates showed a clear pattern of increased abundance (>100%) at treatment sites relative to control sites, even nine months after release. After initial increases in abundance, hatchery populations experienced a disproportionately greater loss rate compared to wild populations, and most of this occurred within one month after release. Furthermore, loss rates of wild stock in control and treatment creeks were detectably different. All study creeks showed a decline in abundance during the fall for both hatchery and wild populations, but by winter, abundance levels were very similar to summer abundance, indicating a return of juveniles to the creek habitats (potential ontogenetic habitat shifts occurred during fall, but snook are cold intolerant, and use creek habitats as a thermal refuge during winter). Overall, these results indicate an additive effect of snook releases on juvenile populations; however future studies must address potential discrepancies of dispersal rates of hatchery and wild stocks, and the effects of various stocking magnitudes on wild populations.