

Incorporating Mutton Snapper Spawning Aggregation Length Demographics Reveal Disparities Between Physiological and Functional Maturity in Snapper

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Snapper form spawning aggregations that are predictable in time and space making them susceptible to over-exploitation. To address this, a seasonal fishing closure at Western Dry Rocks in the Florida Keys was implemented to protect multiple reef fish species, including mutton snapper (*Lutjanus analis*) and gray snapper (*Lutjanus griseus*), during this critical life stage. The Fish and Wildlife Research Institute is currently monitoring the efficacy of this management action and has developed an interdisciplinary science plan focused on monitoring changes in spawning activity within the closure and surrounding area. By incorporating long-term population-level data sets – such as reef fish point count surveys, commercial and recreational landings – with targeted research at the closure site, FWRI identified gaps in our understanding of spawning contributions to spawning stock biomass. Site specific methodologies to the spawning closure including acoustic telemetry networks, underwater point count surveys, transect surveys, hydroacoustic mapping and targeted lethal sampling. Notably, utilizing these techniques at spatial and temporal scales different from traditional methodologies has enhanced our understanding of current data limitations and highlighting the value of focused information collection. Overlaying datasets from these multiple techniques uncovered previously unknown trends in biological and behavioral reproductive characteristics. Traditional stock assessments utilize granular information population wide to calculate age/size-at-maturity and spawning stock biomass. Contrasting results from population surveys with observations of spawning aggregations appear to show a decoupling of the physiological and functional maturity of mutton snapper. We propose the reliance on physiological size at maturity as a regulatory threshold for minimum size regulations might be improved by developing measures of size at functional maturity.