The Last of the Aggregations: Validation of an Extant Grouper Spawning Aggregation in Honduras

La Última de las Agregaciones: Validación de un Mero Agregación Reproductiva Existentes en Honduras

Le Dernier des Agrégations: Validation D'un Mérou Agrégation de Frai Existant au Honduras

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EXTENDED ABSTRACT

As part of an ongoing study which is documenting the ecological importance of the Cordelia Bank site of special importance for wildlife, we evaluated a spawning aggregation site within the 17 km^2 area during the 2012 - 2013 reproductive season. A total of six species of large-bodied grouper were identified during the season, black grouper (*Mycteroperca bonaci*), Nassau grouper (*Epinephelus striatus*), scamp grouper (*M. phenax*), tiger grouper (*M. tigris*), yellowfin grouper (*M. venenosa*) and yellowmouth grouper (*M. interstitialis*). We determined that aggregation behaviour (colour changes, rubbing and chasing) was exhibited in four of these species of grouper, *M. bonaci, E. striatus, M. tigris* and *M. venenosa,* with the January full moon being the most important lunar event for these species (ANOVA; F = 17.9, p = 0.001). No spawning was observed despite recordings of reproductive behaviour and the majority of individuals recorded being greater than size at first maturity (mean 72% of individuals greater than Lm_{50}). Abundances of grouper were low, a combined total of 632 individuals were recorded during the monitoring period, of which 502 of these were recorded during the January full moon by the four species determined to be aggregating, *M. tigris* 260 individuals*; M. bonaci* 118 individuals; *E. striatus* 63 individuals and; *M. venenosa* 61 individuals.

Overfishing has been the direct cause of the decline of the abundances of grouper throughout the Caribbean. We therefore assessed the local fishery during this period to determine if large-bodied grouper were being targeted and landed. The fishery of Cordelia Bank is associated with occasional and part-time fishers who exert limited fishing pressure, an estimated 10.2 fishers enter the fishery per day with a mean catch per unit effort of 7.7 lbs per fisher per trip, selling their catch within the local market, these fishers are not connected to international markets like other fishers in the area. Cordelia Bank is associated with unfavourable weather conditions and high levels of wave exposure may reduce access to this fishery, based on vessel type, access to the fishery was reduced by wind speeds of 5.0m/s^{-1} or greater and wave height of 3ft or greater. Fishing activity was concentrated around the January full moon coinciding with peak observation of large-bodied groupers, however the local fishery was dominated by small-bodied species of grouper, coney (*Cephalopholis fulvus*), graysby (*C. creuntatus*), red hind (*E. guttatus*) and rock hind (*E. adscencionis*), of which only the graysby was identified at the spawning aggregation. No large-bodied species of grouper were observed at the landing site within the local fishery, suggesting that fishers target fishing grounds away from the spawning aggregation where fish assemblages are markedly different. Our results contrast previous evaluations of other spawning sites in Honduras which found few individuals aggregating and suggested sustained overfishing of reproductive areas by artisanal fishers.

These data suggest that declines in the number of individuals aggregating are likely to be due to fishing pressure within the home ranges of the grouper, not at the spawning aggregation at Cordelia Bank. Fisheries regulations in Honduras protect Nassau grouper aggregation sites from fishing between December and March, thereby protecting other species that share their spawning sites. The spawning aggregation site has been actively patrolled by the Roatan Marine Park in recent times which may be a deterrent to fishers causing them to change their fishing behaviour, however fishing effort within this fishery is low. Fortuitous geographical location and the associated prevailing weather conditions may be a primary reason as to why this spawning aggregation still exists, although in low numbers, whilst others within Honduras, the Mesoamerican barrier reef system and wider Caribbean region have collapsed. Therefore whilst the protection of grouper at spawning aggregation sites and during reproductive seasons is vital, it is imperative that they are afforded protection in their home range to allow for sufficient abundances to migrate to spawning grounds and successfully reproduce.

KEY WORDS: Fisheries, grouper, spawning aggregation, Cordelia Bank, Honduras