

HC324 Queen Conch distribution and ecology around the Cayos Cochinos Honduras

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The Cayos Cochinos Islands are located about 18km off the northern Honduran coast and comprises the very southern end of the Meso-American Barrier Reef System (MBRS), the second largest barrier reef in the world. The islands and surrounding seas were designated as a National Marine Monument by the Honduran Government in 1993 and remains the only such area in Honduras. The islands have been established as a protected area by the Honduran Government under the banner of the Cayos Cochinos Marine Protected Area (CCMPA) and managed by the Honduran Coral Reef Foundation (HCRF). This agreement established specific protection for both the marine and terrestrial environments within the archipelago and offered special protection for economically important and vulnerable species

The Queen Conch (*Strombus gigas*) is a large mollusc found throughout the Caribbean. It holds a highly important position with both the ecology and economy of the area. Ecologically, the Queen Conch is a deposit feeder, grazing off algae, detritus and epiphytic algae, this is coupled with a large level of sediment disruption and turnover during feeding and movement. This feeding and continued cycling of the sediment prevents it becoming stagnant and a potential source of disease and pollutants on the reef. The Queen Conch is also a major food source for some large species of fish on the reefs including sharks and eagle rays. Between these roles, the Queen Conch holds a vital position in the functioning of a healthy and diverse reef system.

However, in addition to the ecological importance of the species, the Queen Conch is also commercially valuable as a food source for the local communities, or more often a catch that is sold by local fishermen nationally and internationally. Unfortunately, unsustainable exploitation of the species has resulted in Queen Conch populations declining significantly on many reefs, and despite many areas where they are protected or their populations managed, their general abundance remains low.

The reefs around the Cayos Cochinos archipelago are no exception to this, with historically large fishing pressure on the species resulting in low numbers on the reefs. However, with the establishment of the CCMPA, the fishing of Queen Conch was made illegal in the area. It is one of the few species to receive complete protection in this manner, with most other fish and invertebrate species only receiving partial spatial or temporal protection.

The establishment of a complete no-take zone provides a unique opportunity to assess the recovery of the Queen Conch population after the removal of fishing pressures in the CCMPA. Research is aimed at firstly determining an accurate population estimate for conch within the MPA and developing a monitoring program that allows this to be tracked each year. Secondly, elements of the ecology and life cycles of the Queen Conch are studied, with the intention of better understanding the species and, therefore, instigating effective conservation management strategies.

The Cayos Cochinos MPA contains many different reef, seagrass and sediment areas, all of which are surveyed for Conch populations through both scuba and snorkelling. Sites are surveyed by laying out a 50m tape measure, and searching for conch 3m either side of the tape

(giving a transect area of 300m²). Three 50m transects are conducted per site. The temperature and start/end depth of the transect are recorded. Any conch encountered within the study area are marked using a plastic tag with a unique 3 digit code, attached to the non-growing spire of the shell using a cable-tie.

The shell length is then measured from tip of the spire to the siphonal canal. Shell width is measured from the base of the ventral-most spine to the base of dorsal-most spine of the largest whorl using plastic callipers. The thickness of the flared lip is also measured using callipers. The age class of the individual can be ascertained within 4 possible classes – juvenile, individuals where no flared lip present; sub-adult, with a lip thickness of less than 4mm; normal adult, with a lip thickness of greater than 4mm and little to moderate epibiotic fouling; and stoned adult, with a lip thicker than 4mm and heavy epibiotic fouling. Benthic photo-quadrates are also taken every 5m along the transect line using a 50x50cm quadrat in order to analyse the benthic communities at each of the survey sites.

Mark-recapture data from previous years will be available to students to allow for detailed studies of growth rates, movement and abundance. Using the freely available software *Program Mark*, mark recapture data may also be used to create capture histories in order model survival and detectability and generate population size estimates.

Since the initiation of the study, clear evidence of illegal poaching of Queen Conch in the Cayos Cochinos MPA has been observed, where researchers found empty tagged shells which showed the characteristic horizontal linear hole in the spire created by a conch-fisherman's knife. Students may also be able to quantify the level of illegal fishing of Queen Conch in the CCMPA.

Suggested Reading

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