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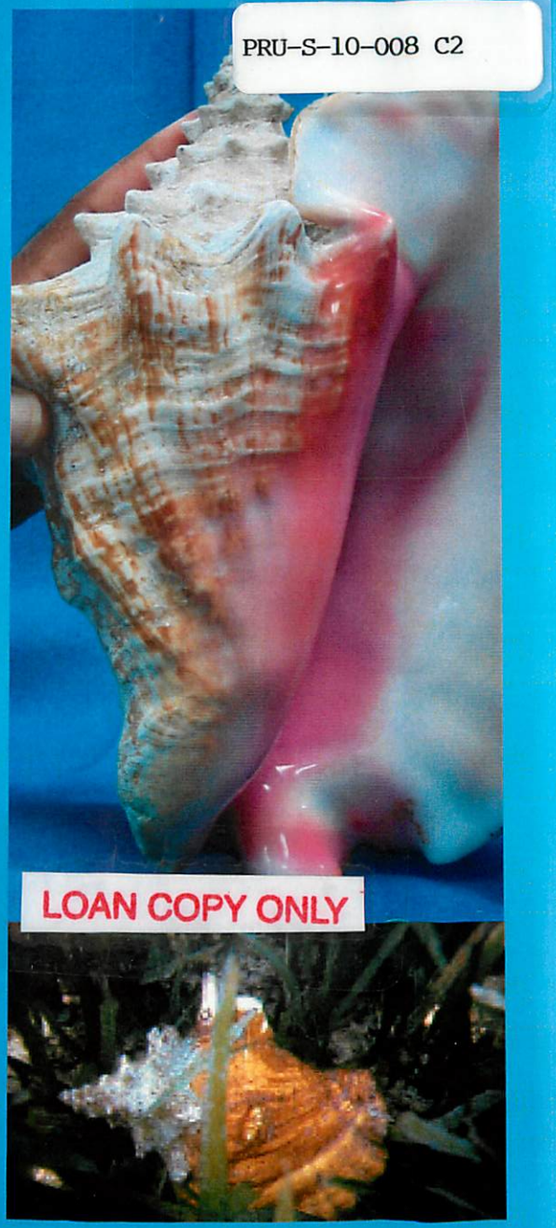
Conch *(Strombus gigas)*

US Virgin Islands

Caribbean South East Area Monitoring and Assessment Program (SEAMAP-C)



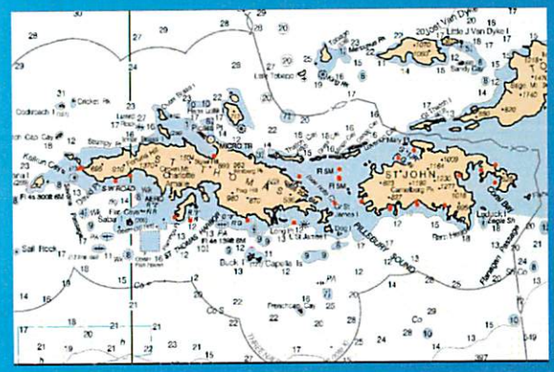
Introduction

Queen conch (*Strombus gigas*) is a large marine gastropod found through the Caribbean and tropical Western Atlantic, and is a primary target of artisanal fisheries. Conch are benthic grazers, feeding on macroscopic and unicellular algae and detritus; where clear water and sandy substrate support algae and seagrass production. The preferred habitats for conch are areas shallower than 18 to 24 m, which include: seagrass, sandy algal beds, gravel coral rubble, smooth hard coral and beach rock bottoms. Conch are of great economic significance throughout the Caribbean and adjacent regions. The high market value for conch makes the resource an important source of foreign exchange, either through domestic sale within the tourist industry or through export. The fishing pressure on the resource has resulted in its overexploitation throughout most of its range. Accessibility, ease of harvest, and its high demand has resulted in generally overfished stocks around the Caribbean. In 1992, conch was included by the Convention on International Trade in Endangered Species (CITES) as a species that, although not threatened with extinction, may become threatened without trade controls. Actually, conch is locally protected by size limits, harvest quotas, landing and sale restrictions and season closures. Fishing for or possession of queen conch in the EEZ is prohibited, with the exception of Lang Bank, St. Croix, USVI (east of 64°34'W). Fishing for conch on Lang Bank is allowed from October 1 through June 30 each year. Landings for queen conch declined markedly during the 1980's and remained low during the 1990's. At that time management measures limiting catch were implemented; however, the adequate information needed on stock status to assess the effectiveness of these measures was not available. Conch landings on St. Croix soared to 240,000 pounds in 2007 due to exports to Puerto Rico.

Conch length was measured to the nearest cm, and its adult age was estimated as one of four relative age classes, based on the degree of shell erosion: newly mature, adult, old adult, and very old adult. Records were kept of habitat type and depth, time covered over each habitat, and time when each conch was observed. Habitat types were classified based on bottom characteristics.

Objectives

- Create baseline data of the queen conch population status and time series changes on a variety of critical marine habitats in the USVI.
- Monitor queen conch populations in marine reserve areas and other protected habitats.
- Collect, analyze, manage and disseminate fisheries independent data on the queen conch resources in the USVI.



Survey Method

Scooter Transect Survey Method

Conch surveys were made by paired-divers along strip-transects using underwater scooters. Divers were trained to maintain speed while the parallel transect were made; keeping the scooters at approximately one meter above the substrate so that path width remained constant (4 meters). For each transect, the depth and the start and finish time were recorded. Transect length was variable based on depth, but a maximum survey time was set at 45 minutes.

Swiming Transect Survey

For each bay, a 20 x 20 m grid was established over a nautical chart, and the intersecting points were given a consecutive number. Transect locations were then selected using random numbers from intersecting points on the grid. Ten, 50 meter transects were randomly selected for location and direction in each embayment. A weighted transect tape with buoys was used to identify the transect from the surface. Upon deploying the transect, two divers entered the water at the starting point and simultaneously conducted the conch censuses along a 2 m wide belt transect on either side of the transect line (survey area = 100 m^2 per diver).

All queen conch encountered along the transect were counted and their total shell length was measured (mm). Habitat information type was recorded and the percent habitat cover was estimated from linear coverage along transects.The proportional composition of the habitat covered was estimated for each transect by measuring the combined length of the transect line overlying each substratum type and dividing it by the transect length. The benthic habitat categories selected were similar to the habitat classification scheme used by NOAA's National Ocean Service (Kendall et al., 2001), and were classified as patch reef, rubble, sand, algal plain, and seagrass.

Findings

Over the past two decades, Gordon (2002) found that overall conch densities around St. Croix were higher than St. Thomas and St. John; while St. Thomas had higher densities compared to St. John in 2001. Between the 1990 and 1996 surveys, an apparent increasing trend in adult conch abundance was observed. A large portion of this increase (60% of all conch observed) were due to high densities at two specific sites, Water Island (St. Thomas) and Lakeshore Bay (St. John). The overall density increase went from 13.4 conch/ha in 1990 to 63.7 conch/ha in 1996 in St. Thomas, suggesting that the imposed moratorium was effective in increasing the densities of conch (Gordon, 2002). However, low conch densities at other locations reflected the real lack of recovery over much of the shelf area and the patchy distribution of the species (Friedlander 1997).

In St. Thomas and St. John, there was a substantial decrease in conch densities for common transects between 1996 and 2001. This decline occurred despite current bag limits, minimum size limits, and seasonal closure (Gordon, 2002). Tobias (2005) found that the overall densities of conch for St. Croix was 43.8 conch/ha in the St. Croix backreef embayments. The conch abundance was higher at the northeast embayments than in the southeast enmbayments (52.6 conch/ha vs. 33.6 conch/ha). For both embayment areas, conch densities were found to be greater than those determined by Wood and Olsen (1983) of 7.6 conch/ha for offshore sites.

Adult Trend

A significant decline in adult conch abundance was recorded from 1981 to 1996 despite management recommendations of northern USVI. Comparisons between 1990 and 1996 showed a slight but not statistically significant increase in adult abundance in St. Thomas ans St. Jonh (Friedlander, 1997).

Since 1981 to 2001, the mean adult conch density in St. Croix increased from 7.6 to 27.4 adult conch/ha (Wood and Olsen, 1983; Gordon, 2002). In 2001 mean adult conch densities for all common transects was similar on St. Thomas and St. Croix with 24.2 and 27.4 adult conch/ha, respectively. However, the density in St. John was lower with only 7.2 adult conch/ha. Many of the adult conch observed around St. Thomas were old individuals.

Juveniles

Juvenile conch densities were greater in 1996 than in 1990, but only around St. Thomas. This increase may be the result of the minimum size limits regulation and/or deep water habitats acting as refugia from fishing (Friedlander, 1997). During 2001, very high juvenile conch densities were observed at several sites around St. Croix. At four sites, counts ranged from 138 to 487 conchs/ha. The juvenile conch densities in St. Thomas (27.5 juv-conch/ha) and St. John (7.5 juv-conch/ha) were much lower than in St. Croix (72.3 juv-conch/ha), compared to previous years. These low numbers of juvenile queen conch found during 2001 at most sites in St. Thomas and St. John may be due to the lack of successful recruitment, patchy distribution of the species, and/or more importantly intensive fishing pressure (Gordon, 2002).

Reproduction

For St. Croix, during the period of 2001, Gordon (2002) found sustainable conch densities for reproduction, but a later study (Tobias 2005) indicated that backreef adult conch densities were in extremely low abundance for reproduction and may not be sufficient to sustain inshore populations. In most sites around St. Thomas and St. John conch densities were not high enough for optimal reproduction (Gordon, 2002).

Habitat

Adult and juvenile conch are both more abundant on algal plains and seagrass beds (Gordon, 2002). In a recent study conducted in St. Croix, 98% of the conch recorded were found in algal plain, sand and seagrass habitats, or a combinations of the three (Tobias, 2005). In this same study, 79% of juvenile conch and 63% of adult conch were found in seagrass or seagrass combination habitats (Tobias, 2005). Friedlander (1997) surveyed deeper water habitats mostly around St. Thomas, and found that juveniles prefer algal plains, coral rubble, and sand; while adult conchs were more abundant on algal plain, seagrass, and sand habitats. Around St. John where much of the habitat surveyed was shallower than St. Thomas, conchs were found almost exclusively in seagrass beds. Maximum adult conch densities were in the 13 to 18 m depth range, around St. Thomas and St. John (Gordon, 2002; Friedlander 1997). In St. Croix, maximum adult densities were found in the 19 to 24 meter depth range (Gordon, 2002). Back reef embayments in St. Croix where *Thalassia testudinum* and *Syringodium filiforme* comprise a 71% of the cover, contained predominately juvenile conch, indicating the importance of the area as a nursery ground (Tobias, 2005).