

Monitoring Statia's Marine Ecosystems

By Kimani Kitson-Walters PhD

CNSI continues to monitor the vulnerable ecosystems of St. Eustatius coordinated by Data Monitoring Officer (DMO) Kimani Kitson-Walters. Coral reef surveys are conducted in collaboration with St. Eustatius National Parks (STENAPA) using the Global Coral Reef Monitoring Network (GCRMN) Protocol. Data on the island's fisheries are collected and assessed by the DMO with plans to automate data collection using a mobile application under the Statia Blue Project. The aim is to create sustainable practices for Statia's fisheries while putting the fish buyers in touch with the suppliers on a "real-time" basis.

St. Eustatius' coral reefs like many others in the Caribbean are under threat from the impact of climate change and other anthropogenic stresses. In an effort to assess the response of these fragile ecosystems, the Global Coral Reef Monitoring Network (GCRMN) supported by the International Union for Conservation of Nature and other international partners developed a standard coral reef monitoring protocol to strengthen coral reef ecosystem management in the region. This is to ensure that useful data is collected for efficient comparison across Caribbean territories.

The GCRMN protocol utilizes eight criteria for data collection on coral reef ecosystems:

abundance and biomass of reef fish taxa, relative cover of hard corals and their dominant competitors, health assessment of hard corals, coral recruitment, abundance of key macro-invertebrates (lobsters, queen conch, sea urchins, sea cucumbers), water quality and three-dimensional reef structure. Data within these categories are collected at 20 sites across four monitoring zones. Two of which are marine reserves where it is prohibited to fish with all types of fishing gear except handlines.

According to the Reef Health Index, the coral reef ecosystem of St. Eustatius is in a critical condition. Statia's coral reefs have been on the decline over the last 20 years, due to the impact of hurricanes and in particular the massive bleaching event of 2005 which reduced our coral abundance by 50%. In 2017, corals were found to occupy 4.94% of the benthos with macroalgae continuing to dominate. The species composition of corals has also changed. Researchers studying the reefs in 1999 observed an abundance of reef-building boulder corals such as *Orbicella annularis*, *O. faveolata*, *O. franksi*, *Montastrea cavernosa* and *Psuedodiploria strigosa*. These accounted for 54% of the species assemblage. Eighteen years later, they represent 34% of the assemblage, with *O. annularis* not being observed during our survey. Only *M. cavernosa* maintained its abundance since 1999 however, multiple

colonies were observed to be experiencing some degree of bleaching. The impact on Statia's reefs due to the reduction of these reef-building species is still unclear.

Herbivorous fish (parrotfish/surgeonfish) biomass which aid in keeping macroalgal biomass in check, has suffered a 58% reduction over the last 18 years with no clear indication for this decrease. Fishing pressure on the island has remained relatively the same during this time. The impact of this reduction is observed in the increased macroalgal cover suggesting that parrotfish were the dominant algal grazers in the past since the black urchin (*Diadema antillarum*) die off across the region in the 1980's. Reports on coral reef surveys done on the island in 1999 described low macroalgal cover in the presence of very high parrotfish/surgeonfish biomass. Grouper/snapper biomass is also poor with no large grouper species being observed on any of our survey dives. Even though these species were observed in relatively frequent numbers in 1999 at similar survey sites.

These annual surveys continue to provide insight into the state of Statia's marine ecosystems. Bringing to our attention the need for further research into the anthropogenic drivers of coral reef degradation on the island and the development of mitigative measures.



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Monitoring Statia's Fisheries

The marine ecosystems of St. Eustatius have supported a small artisanal fishery for over 30 years with fishing effort being relatively the same during this time. In 2017, there was an average of < 1 fishing trip per day. Lobster traps are the most common gear type used followed by spearguns with SCUBA. Caribbean spiny lobster is the primary product but fish (reef and pelagic) and conch are also caught. Landed lobster are normally exported to St. Maarten but exports declined in the last quarter of 2017 due to the collapse of the tourism market on surrounding islands by Hurricanes Irma and Maria. Landed reef/pelagic fish are sold locally. Morphometric data for all catch types are collected for 20-30 % of fishing trips throughout the year. This is done to assess Statia's fishable stocks for signs of overexploitation.

For 2017, a total of 5864 kg of lobster and 2293 kg of fish (mixed reef and pelagics) were landed on St. Eustatius. Monthly landings of lobster for ranged from 17.6 – 885.5 kg while those for fish ranged from 50.8 – 553.6 kg (Figure 1). Fishing effort and catch were significantly reduced for the month of September due to Hurricanes Irma and Maria.

A morphometric assessment of the Caribbean spiny lobster landings (9 % of fishing trips) revealed that 28 % of males and 41 % of females were undersized. The average carapace length of females (97 mm) was close

to the size limit (95 mm), which is concerning. Length frequency data of mixed reef fish was collected for 26 % of trips. Surgeonfish and small groupers accounted for 44% of the sampled catch by number of individuals while squirrelfish and small groupers accounted for 46 % by weight. Parrotfish in both weight and number accounted for 3 %.

Parrotfish are an important species to monitor as it has a significant impact on reef health by keeping macroalgae in check. The species is caught by both lobster traps as by-catch and intentionally using spearguns with SCUBA. Four species (princess, redband, redband and stoplight parrotfish) were landed by traps but only the stoplight parrotfish was recorded as being landed by SCUBA. The average length of stoplight parrotfish landed by pots (33 cm) was larger than those landed by SCUBA (29 cm). The average length of landed princess parrotfish was 27 cm, redband parrotfish 22 cm and redband parrotfish 26 cm. According to Fishbase.org, the common size of the stoplight parrotfish is 38 cm which indicates that mature individuals are present but are smaller than commonly seen throughout the region. The other parrotfish species are slightly larger (by ≤ 2 cm) when compared to those in the region (Figure 2).

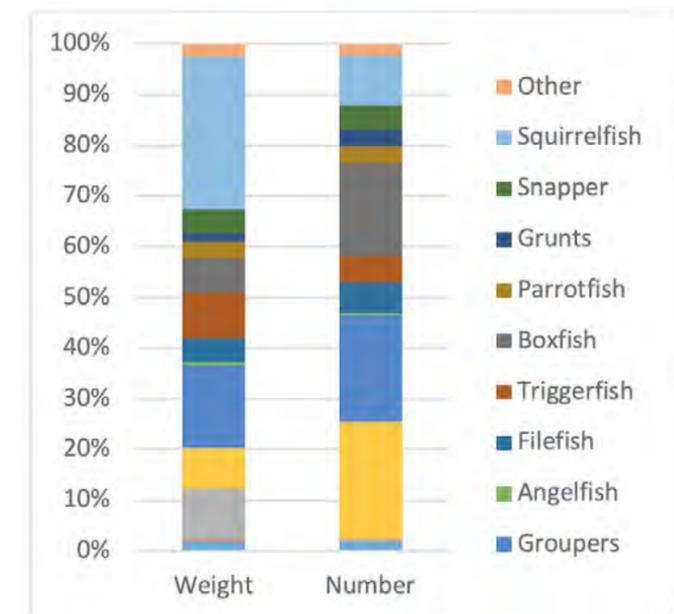
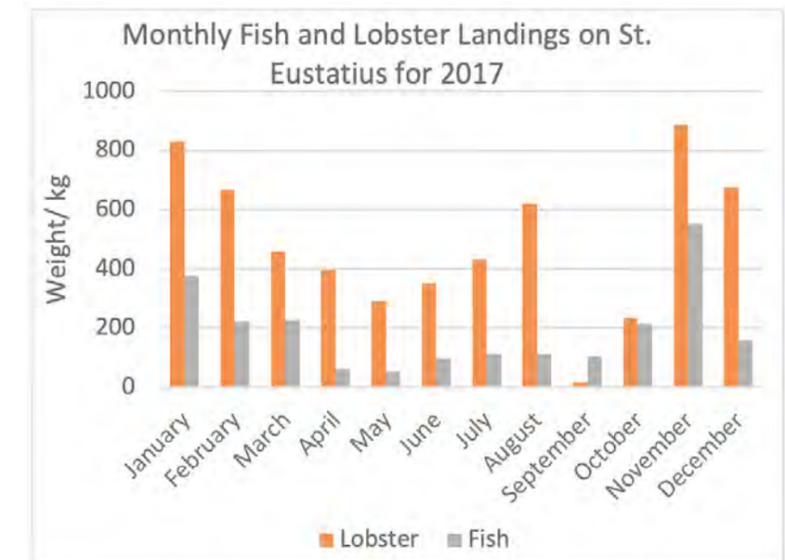
Morphometric data was collected for 39 % of the queen conch landings for 2017 (1831 individuals harvested). Analysis of the data revealed that Statia's conch populations are

sustainably harvested with no indication of overexploitation. It is currently illegal to export queen conch but local consumption is allowed. The National government is in the process of assessing the feasibility of exporting the resource which would bring increased earnings for the island. This is being done in consultation with the Convention on International Trade in Endangered Species (CITES), the regulatory body responsible for the international trade of queen conch.

St. Eustatius' fishable resources are currently harvested at a sustainable level due to limited fishing effort. Keeping this fishing effort in check will reduce the pressure on the island's limited fishing grounds. This will aid in securing the resource for future generations as well as maintaining marine biodiversity. Fisheries data will continue to be collected with the support of the Ministry of Economic Affairs.



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Statia Blue

A key component of Statia Blue is to ensure that fishermen increase compliance with the principles of sustainable fisheries and thereby play an active role as stewards of the protected reefs, parks and species which form the fragile natural endowments of islands and their people.

Sint Eustatius Foundation (SEF), initiated an, even for global standards, highly innovative project for developing sustainable Caribbean fisheries. The app will be launched in Statia but will be marketed towards the entire Caribbean. Antonio Media, Eindhoven, NL has been contracted to develop the StatiaBlue App. Other partners on the project include the Caribbean Netherlands Science Institute (CNSI) and Sint Eustatius National Parks (STENAPA).

Statia Blue is funded by the EU-EDF Innovation program and involves the support and engagement of fisher-folk in education on pricing and the market mechanism using mobile application technology for creating a real-time market place for fish and seafood. The application will be used for ongoing research and education, supporting market clearing prices and monitoring and evaluation of catches to encourage sustainable practices, such as fishing a safe distance from protected zones and management of invasive species.

Working with a group of Statian fishermen, the project develops a mobile app ("Statia Blue") and provides fishermen with waterproof mobile phones. As fish are caught, the fish is identified and described and reported back to a central database. At the central database the price of that fish and the total catch is estimated based upon the fish caught by all fishermen on that day. Prices are reported back to the fishermen so that they can make informed decisions about the harvesting of those fish. Fishermen can continue or stop fishing depending upon their satisfaction with the price estimated on the market. A pricing mechanism will be used to signal fishermen as to which fish are in demand. The app will also have an educational element, administered by STENAPA.

Statia Blue will also have a consumer interface, reporting on which fish are advisable for eating during the season based upon data on the stock of fish in waters. The pricing element will also help reduce adverse selection.

The project is expected to directly benefit Caribbean fishermen while at the same time work to innovate and enhance the sustainability of their fisheries.

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