

**Non-Detriment Finding Regarding
the Export of Queen conch
(*Lobatus gigas*) from St Eustatius
(Caribbean Netherlands)**

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Executive summary

Queen conch (*Lobatus gigas* (Strombidae; Gastropoda)) is a large, long-lived marine gastropod that is widely distributed throughout the coastal zones of the Wider Caribbean region. It is one of the most important commercially harvested marine animals in the Caribbean and has been heavily exploited for its meat, shell and pearls for decades. Because of concern for its future the species was listed in Appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) in 1992. Appendix II species are species that are not necessarily threatened with extinction, but for which trade must be controlled to avoid unsustainable exploitation. Article IV of the Convention requires that exporting countries restrict trade in Appendix II species to levels that are not detrimental either to species' survival, or to their role within the ecosystems in which they occur. This is known as the so-called "non-detriment finding".

Before the constitutional changes on 10 October 2010, queen conch caught by the small scale fishery at St Eustatius could be transported freely to St Maarten as both islands were part of the same country, the Netherlands Antilles. Since 10/10/10 St Eustatius and St Maarten are two different countries within the Kingdom of the Netherlands and it is not allowed to transport queen conch between these countries without the shipment being accompanied by the proper CITES export and import documentation.

This non-detriment finding was written following the most recent checklist for CITES non-detriment findings. The suggested annual (export) quota for the small scale, artisanal queen conch fishery on St Eustatius is based on recent scientific data on the status of the wild population and follows the recommendations of the first CMFC/OSPESCA/WECAFC/CRFM/CITES Working Group on Queen Conch (QCWG) to ensure a sustainable harvest and trade.

Biology and Ecology: Within the boundaries (30m depth) of Statia National Marine Park, adult queen conch predominantly occurred at depths >16m and were mainly associated with coral-rubble habitat and algae beds on the leeward side of the island and in similar habitat on the edge of the Marine Park on the windward side. The Marine Reserves (no-take zones) within the Statia National Marine Park provide limited protection for adult conch. The two Marine Reserves were originally designed in the 1990s to especially protect the vulnerable, complex coral reef habitat. Adult conch avoid complex, reef habitat. The size of the adult conch population within the boundaries of the Statia National Marine Park in 2013 was estimated to be around 184,100 adult queen conch. The conch population observed during the dive surveys consisted predominantly of adults (86%) with few intermediate or juveniles. It is at this stage unclear if juvenile conch are rare due to poor recruitment or that juvenile conch were simply not observed because the nursery areas have not been identified yet.

Fisheries: Conch meat is the only traded product of the small-scale, artisanal conch fishery (one operator and one diver) on St. Eustatius. In 2013 an estimated 5000 adult conch were landed and consumed locally. It is unclear at this point to what extent conch are harvested legally and/or illegally by recreational fishers.

Management: Enforcement of the fisheries rules and regulations regarding queen conch in the waters of the Statia National Marine Park (SNMP), the territorial waters and EEZ is the responsibility of Stenapa and the Dutch Caribbean Coast Guard. Management of the queen conch stock and queen conch fishery is the responsibility of the island government within the territorial waters and the responsibility of the Ministry of Economic Affairs in the waters of the EEZ.

Most conch appears to be harvested using SCUBA *within* the boundaries of the SNMP. However, according to the current regulations SCUBA can only be used by commercial fishermen *outside* the 30m depth boundaries. The fishery is technically illegal but has been tolerated for a considerable number of years. Co-operation and transparency of the fishing activities of the local commercial conch fisherman are reasonable but should be further improved.

A maximum of 20 conch per year is in place for people harvesting conch for personal use within the boundaries of the SNMP, however, an overall Total Allowable Catch (TAC) for the harvest by recreational fishermen has not been set. Despite the reporting obligation for recreational fishers, no recreational conch catches have ever been reported to the Marine Park manager. The recreational catch is expected to be low as conch occur in water deeper than 15 meters and can only be legally collected by free diving. However, no reported catches at all raises concern about the confidence in the current reporting system. At this stage it is unclear how many conch are harvested for personal use by local residents.

Precautionary quota and recommendation

The main reason for the current reasonable status of the stock is the low fishing pressure but not the result of controlled harvest and efficient management. The proposed annual combined quota of the commercial and recreational catches within the boundaries of the SNMP for the period 2015-2017 is 7500 (adult) queen conch or 4 % of the estimated adult conch population. The proposed conservative quota lies within the recommended precautionary limits of 8% of the mean fishable biomass and is expected to be not detrimental to the survival of the species. However, this conservative quota will allow the current fishery to operate ("business as usual") while it will enable local authorities to develop a proper management plan and implement the recommendations with regards to biology, management, control, monitoring, and protection.

Biology

- Conduct regular fishery independent surveys (every 3-5 year) to assess abundance and population structure and adjust quota if required
- Locate nursery areas of juvenile queen conch
- Assess small scale connectivity between deep water and shallow water populations and large scale connectivity among conch population on neighbouring islands

Management

- Replace current minimum legal size based on shell length with a minimum legal size based on lip thickness and regulate obligatory landing of whole animals with shell
- Develop appropriate rules and regulations to legalise the current "tolerated" fishery in SNMP

Control

- Develop a full reporting, monitoring and enforcement system for queen conch harvest and export by commercial and recreational fishers

Monitoring

- Develop and conduct fishery (in)dependent surveys to monitor the stock, harvest and export

Protection

- Develop appropriate rules and regulation in co-operation with neighbouring islands and stake holders on minimum legal size and closed season.
- Develop rules and regulations in co-operation with stake holders to protect the queen conch between the boundaries of the Statia Marine Park and the territorial waters and the economic exclusive zone.

1 Introduction



Fig. 1.1 Distribution of Queen conch in the wider Caribbean (Source: Prada et al. 2009).

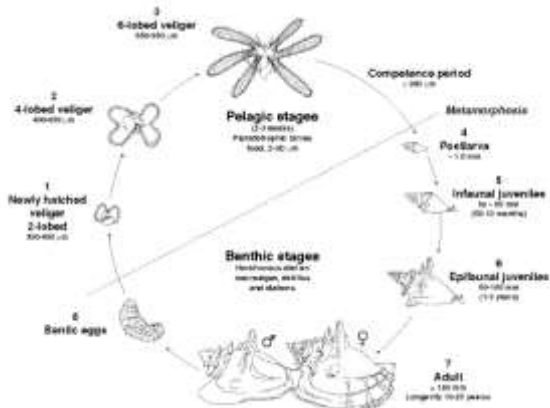


Fig. 1.2 Life cycle of Queen conch (Drawing by Bonnie Bower-Dennis).



Fig.1.3 Juvenile (SL <10 cm, no flared lip, 1-2 years), intermediate (SL >10 cm, no flared lip, 2-3 years old) and adult queen conch (SL > 19 cm, flared lip, >3 years old).

Queen Conch

Queen conch (*Lobatus gigas* (Strombidae; Gastropoda)) is a large (max. shell length (SL) 30 cm), long-lived (25 years) marine gastropod that is widely distributed throughout the coastal zones in the Caribbean (Fig. 2.1). They are found in clear water of (near)-oceanic salinities at depths less than 75-100m. The preferred habitats are seagrass, algae beds, coral rubble and sandy areas (Randall 1964; Stoner 1997). Queen conch are probably limited to the depth range of vegetation such as seagrass and algae and hence they are most common in water less than 25 meters deep. The herbivorous queen conch feeds on a variety of algae, detritus, diatoms and epiphytes associated with seagrass (Robertson 1961, Stoner & Waite 1991). Queen conch mature at around an age of 4 years (Appeldoorn 1988) when the thickness of the flared lip reaches 10-15 mm (see references Table 2.4). They may form large spawning aggregations during the 6-8 month reproductive season (see references Table 2.3). Spawning activity increases with increasing water temperature, peaking in July to September. Fertilization is internal and females lay several egg masses during the reproductive season. After hatching, the larvae drift (dispersal stage) for 2 to 8 weeks in the water column before settlement in sand, seagrass and algae beds in shallow waters (Paris et al. 2008). Juvenile (shell length <10cm) conch are vulnerable to predation and spend most of their first year buried in the sand. When the flared lip starts to develop conch move to deeper water along the reef (Stoner & Ray 1996). Predation risk decreases with shell length, and natural mortality of queen conch with a shell length of more than 15 cm is low (Appeldoorn 1988, Ray et al. 1994). Predators can remove the animal from the shell by crushing, drilling or pulling. Known predators of (juvenile) queen conch are different species of octopus, snail and crabs, spiny lobster, loggerhead turtle, spotted eagle ray, stingray, nurse shark, tiger shark and several snapper, grouper and grunt species (Randall 1964).

Exploitation and CITES

The queen conch has a long history, dating to the period of the Arawak and Carib Indians, as a prized species in the Wider Caribbean region. Besides its meat, early human civilizations utilized conch as tools, ornamentation, for trade and during religious ceremonies. The occurrence of the large, slow moving queen conch in the shallow clear waters of the Caribbean has, however, made it vulnerable to (over)exploitation in the 20th century. Queen conch is one of the most important commercially harvested marine animals in the Caribbean region (Berg & Olsen 1989) and has been heavily exploited for its meat (Fig. 1.4), shell and pearls for decades. The 30+ nations in the Wider Caribbean region have very different management strategies for queen conch ranging from no control at all, closed season and/or areas, restrictions on size to complete moratoria on fishing.

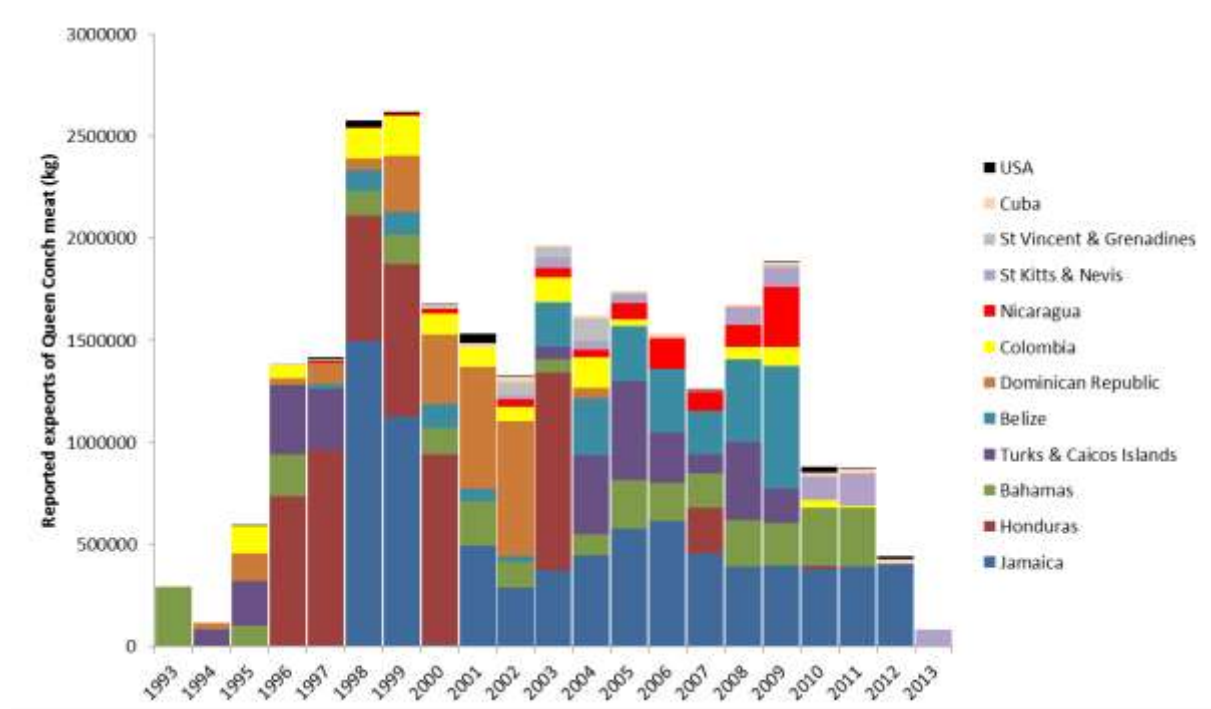


Fig. 1.4 Reported (CITES) exports of Queen conch meat (kg) (source: trade database at www.cites.org).

In 1975 the Convention on International Trade in Endangered Species of Wild Fauna and Flora was established to guarantee that trade in wildlife species is managed properly, ensuring the sustainability of the species subjected to international trade. Conch populations have been decreasing most likely due to high fishing pressure (Bell et al. 2005, Stoner et al. 2012a) and because of concern for its future the species was listed in CITES Appendix II in 1992. Appendix II species are species that are not necessarily threatened with extinction, but for which trade must be controlled to avoid utilization incompatible with their survival. With respect to volume, value and socio-economic significance, queen conch is the most important species regulated under CITES in the Wider Caribbean region.

Article IV "Regulation of Trade in Specimens of Species Included in Appendix II" of the Convention requires that exporting countries restrict trade in Appendix II species to levels that are not detrimental either to species' survival, or to their role within the ecosystems in which they occur. This is known as the so-called "non-detriment finding".

Non-detriment finding

In the past, the Netherlands dealt predominantly with imports and re-exports of CITES-listed wildlife and not as an exporter of such wildlife products. However, in 10 October 2010 three Caribbean islands (Bonaire, Saba and St Eustatius) which host several CITES listed species such as queen conch, joined the Netherlands as special municipalities.

As in other areas in the Caribbean, queen conch was already exploited by the earliest, preceramic inhabitants of St. Eustatius more than 2000 years ago. Hardly any records exist of the annual landings of the small scale, artisanal conch fishery on St Eustatius. However, during the past decade only 1-2 fishermen actively targeted queen conch in the coastal waters. Roughly 3000-5000 queen conch (~1500-2500 kg meat) are probably harvested annually (White 2005; Meijer zu Schlochtern 2014).

Before the constitutional changes on 10 October 2010, queen conch caught by the small scale fishery at St Eustatius could be transported freely to St Maarten as both islands were part of the same country, the Netherlands Antilles. Since 10/10/10 St Eustatius and St Maarten are two different countries within the Kingdom of the Netherlands and it is not allowed to transport queen conch between these countries without the shipment being accompanied by the proper CITES export and import documentation. The regulated export of Queen Conch will be one of the first ambitions of the Netherlands in the involvement of a non-detriment finding for the sustainable international trade of a CITES Appendix II listed species.

The following non-detriment finding was written following the checklist for CITES non-detriment findings as described in Rosser and Haywood (2000). The suggested annual (export) quota for the small scale, artisanal queen conch fishery on St Eustatius is based on recent scientific data on the status of the wild population and the current levels of harvest and follow the recommendations of the first CMFC/OSPESCA/WECAFC/CRFM/CITES Working Group on Queen Conch (QCWG; FAO 2013) to ensure a sustainable harvest and trade.



2 Biology and ecology

2.1 St Eustatius



Fig. 2.1 Geographical location of St. Eustatius in the Caribbean (left) and the boundaries of the Statia National Marine Park (right) and its Reserves in the coastal waters of St. Eustatius.

The island of St. Eustatius is located in the north-eastern Caribbean between $17^{\circ}28'$ and $17^{\circ}32'$ N latitude and $62^{\circ}56'$ and $63^{\circ}0'$ W longitude and is part of the inner arc of the Lesser Antilles. The surface area of St Eustatius is 21 km^2 . The Statia National Marine Park extends from the high tide level out to a depth of 30 m (St. Eustatius Marine Environmental Ordinance (AB 1996, No. 3). The total surface area of the Statia National Marine Park is 2700 ha (27.5 km^2). The Statia National Marine Park, which includes two marine reserves, the Northern Reserve (163 ha) and the Southern Reserve (364 ha), was established in 1996. In these two reserves no fishing or anchoring is allowed (Fig. 2.1).

2.2 Distribution and abundance

No historical fishery (in)dependent survey data are available for quantitative analysis of long-term patterns in distribution and abundance of conch within the boundaries of the Statia National Marine Park. Both Davis (2003) and White (2005) only surveyed for four sites in the Statia National Marine Park. In 2012 and 2013 an extensive habitat and depth stratified conch survey was conducted in Statia National Marine Park combining dive surveys and innovative towed video surveys (Fig. 2.2) (Meijer zu Schlochtern, 2014).

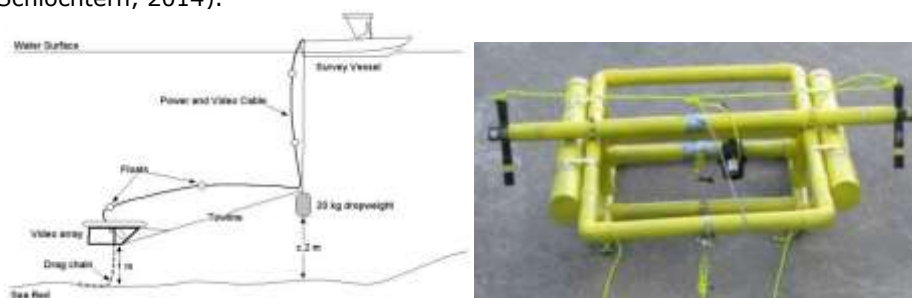


Fig. 2.2 Towed video set-up (left; source Stevens 2006) and close-up of towed video frame (right).

Depth

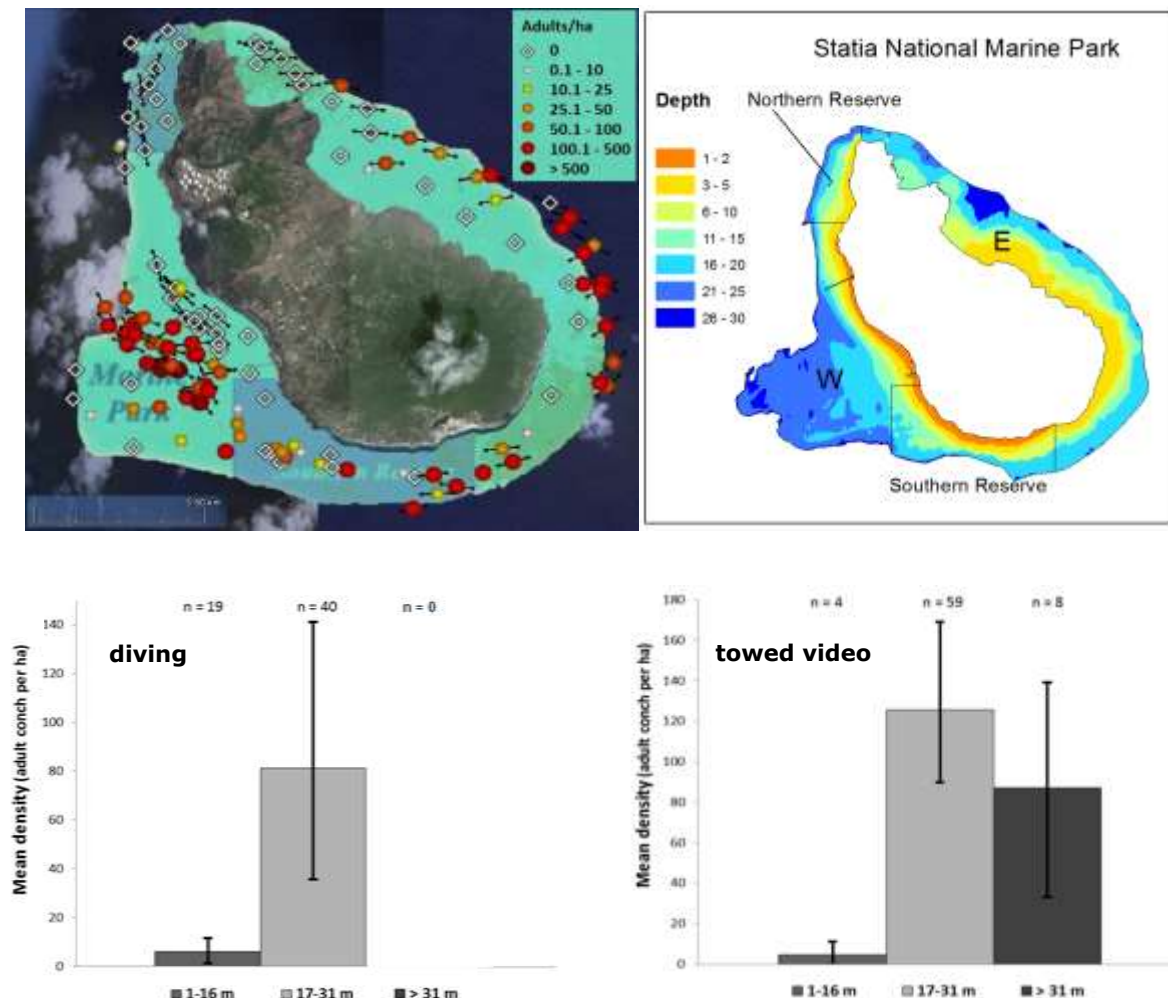


Fig 2.3 Top left: Adult conch densities per hectare determined by diving surveys(marker without black line) and towed video surveys (black line on marker represents transect length and direction). Top right: Bathymetrical map of the Statia National Marine Park. Bottom left: Dive survey, mean conch density per depth category. Bottom right: Towed video survey, mean conch density per depth category. Error bars are 95% confidence intervals. Data from Meijer zu Schlochtern (2014).

Adult queen conch predominantly occurred at depths >16m in the coastal waters of St. Eustatius (Fig. 2.3). Shallow lagoons or banks do not occur in the waters around St. Eustatius. According to local fishermen, Queen conch were common on the leeward side in shallow (<16m depth) *Thalassia* (?) seagrass beds, especially in Oranje Bay. However, hurricane Lenny in 1999 destroyed the shallow seagrass beds on the leeward side of St Eustatius. The seagrass beds have not recovered and loose sand is now the dominant substrate in these shallow areas. Queen conch are rare on pure sandy areas without any vegetation (algae or seagrass). The lack of queen conch in the shallow part of Orange Bay is most likely the result of the change in habitat after hurricane Lenny and is unlikely the result of (over)exploitation. Overall, seagrass beds of *Thalassia* were not observed during a recent extensive habitat survey in the Statia National Marine Park (Debrot et al., 2014). The few remaining seagrass beds consist of native *Halophila decipiens* but are dominated by dense beds of the invasive seagrass species *Halophila stipulacea*.

Habitat

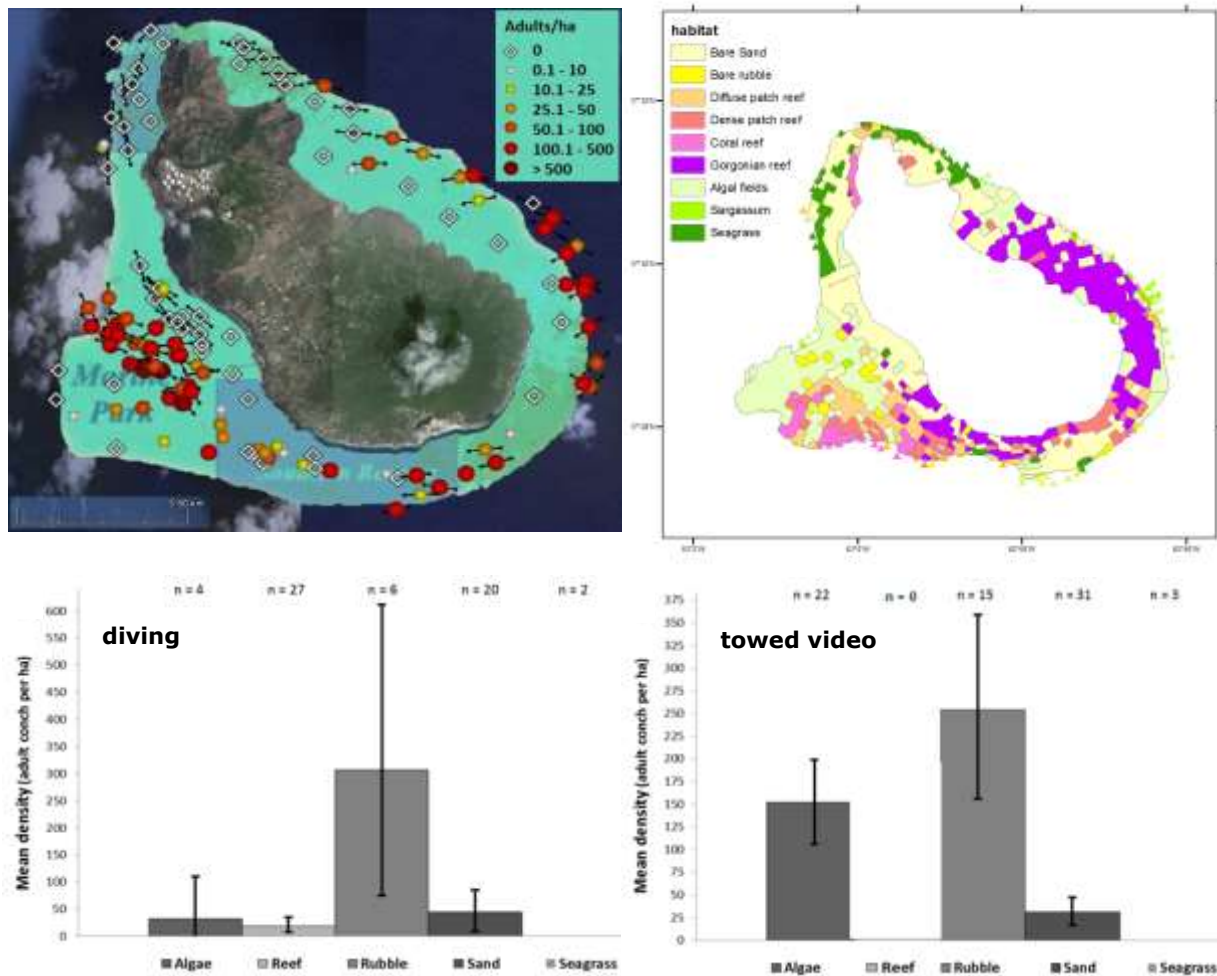


Fig 2.4 Top left: Adult conch densities per hectare determined by diving surveys (marker without black line) and towed video surveys (black line on marker represents transect length and direction). Top right: Habitat map of the Statia National Marine Park. Bottom left: Dive survey, mean conch density per habitat category. Bottom right: Towed video survey, mean conch density per habitat category. Error bars are 95% confidence intervals. Data from Meijer zu Schlochtern (2014).

In many areas in the Caribbean (Cuba, Turks Caicos Islands, Bahama's, Mexico, Dominican Republic; Stoner 2003, Glazer and Kindney 2004 and references in both papers), juvenile and adult conch are associated with shallow seagrass beds (especially turtle grass *Thalassia testudium*). As mentioned before, *Thalassia* beds appear to be absent at present, and the few remaining seagrass beds (Fig. 2.4) were dominated by the invasive species *Halophila stipulacea* and contained few adult queen conch. Within the Statia National Marine Park, adult queen conch are mainly associated with coral-rubble habitat and algae beds on the leeward side of the island and in similar habitat on the edge of the Marine Park on the windward side. The occurrence of queen conch on rubble or coarse sediment has been reported for Florida, Cuba, Bahama's, Puerto Rico and the Virgin Islands (Stoner 2003, Glazer and Kindney 2004 and references in both papers). Note, however, that few conch were observed within the current boundaries of the two Marine Reserves (no-take zones) within the Statia National Marine Park.

Marine Reserves

The current boundaries of the Marine Reserves (no-take zones) within the Statia National Marine Park provide limited protection for adult conch. The two Marine Reserves were originally designed in the 1990s to especially protect the vulnerable coral reef habitat. Adult conch do not prefer complex reef habitat but are common in habitat such as rubble, seagrass and/or algae beds (Fig. 2.5). These preferred conch habitats are hardly available within the boundaries of the two reserves, especially the Southern Reserve. At present no queen conch were observed in the Northern Reserve despite the presence of seagrass and only a few areas with high adult queen conch densities ($>100/\text{ha}$) were observed in the Southern Reserve.

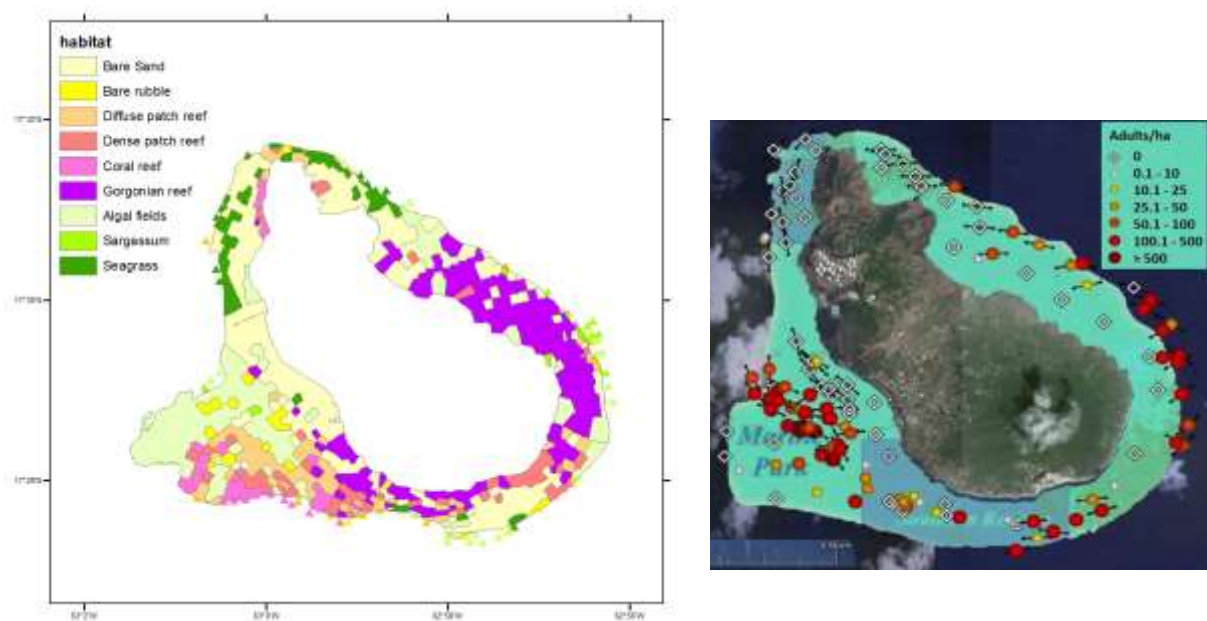


Fig. 2.5 Spatial distribution of macro-habitats (left) and adult conch densities (right) in relation to the boundaries of the two Marine Reserves within the Statia National Marine Park.

2.3 Population size and structure

Population size

As described above, conch densities at different depths and habitats were determined by fisheries independent dive and towed video surveys. The size of the stock was estimated by multiplying the conch densities in different habitat/depth categories with the corresponding surface area of each habitat/depth within the boundaries of the Statia National Marine Park (Table 2.1). Total (adult) conch stock in 2013 was estimated to be around **184,100** queen conch (109,700-271,800 95% confidence intervals) in the Statia National Marine Park (Meijer zu Schlochteren, 2014).

Table 2.1 Overview of the average density of adult conch per habitat/depth category and the corresponding surface area of each habitat/depth category in Statia National Marine Park.

Habitat	Depth (m)	Mean conch/ha	Lower CI	Upper CI	Surface area (ha)
Sand	<16	4	0	22	392
	>16	43	10	164	586
Rubble	<16	0	0	0	0
	>16	300	148	720	152
Loose Reef	<16	2	0	5	262
	>16	116	15	215	320
Intermediate reef	<16	0	0	0	179
	>16	10	4	18	228
Dense reef	<16	21	10	33	72
	>16	66	5	127	122
Algae	<16	0	0	9	34
	>16	186	126	246	335
Seagrass	<16	0	0	18	4
	>16	0	0	18	65
					2750

Hardly any historical fishery (in)dependent data are available for quantitative analysis of long-term patterns in population size and structure of conch within the boundaries of the Statia National Marine Park. Davis (2003) conducted an exploratory survey at 10 sites (three 3000m² at 10 site; no. 1-10 in Fig 2.6). No conch were observed at sites 4, 8, 9 & 10 and only dead conch shells were observed at site 5. Both Davis (2003) and White (2005) conducted twelve 400m² transects at four sites (no. 1, 2, 3 & 6 in Fig 2.6). Due to the low sampling intensity it is nearly impossible to draw any firm conclusions regarding the development of the adult conch population between 2003 and 2013. In 2013 adult queen conch are still present at similar densities at the four study sites (see Figs. 2.3, 2.4 & 2.5). Furthermore, in 2013 conch beds were observed in the south-east in contrast to the 2003 survey.

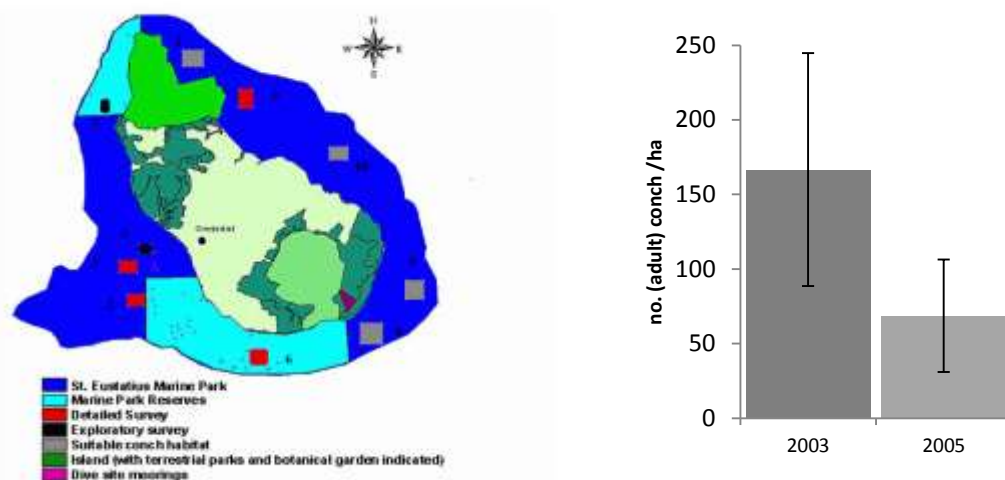


Fig. 2.6 (left) Map of the study sites used by Davis (2003) and White (2005; only sites 1, 2, 3 & 6). (right) Average density of adult conch/ha on the four sites (1, 2, 3 & 6) in 2003 and 2005. Error bars are 95% confidence intervals.

Population structure

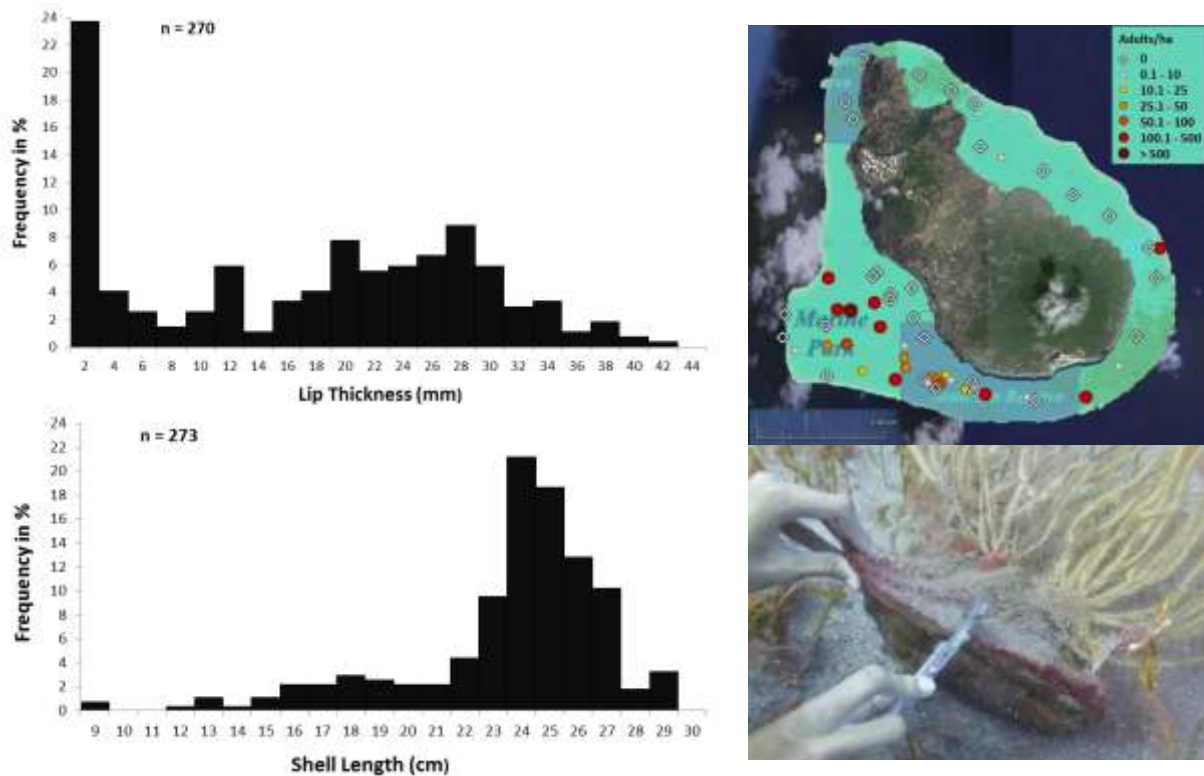


Fig. 2.7 Lip thickness (top, left) and shell length (bottom, left) frequency distribution of queen conch recorded during the diving surveys (top, right).

Table 2.2 Overview population characteristics of queen conch recorded during diving surveys on St Eustatius.

Year	Lip thickness (mm)	Shell length (cm)	# sites (transects)	# conch	Reference
2013	17	24	56 (140)	273	Meijer zu Schlochtern (2014)
2005	17	24	4 (12)	33	White (2005)
2003	10	22	4 (9)	86	Davis (2003)

The conch population observed during the dive surveys consisted predominantly of adult (>19 cm SL, flared lip) queen conch (86%) with few intermediate (>10 cm SL, no flared lip) queen conch (13%) (Fig. 2.7). The majority of the observed queen conchs with < 3mm lip thickness were intermediates (Fig. 2.7 top). Only 2 juvenile (<10 cm SL, no flared lip) queen conch were recorded during the dive surveys in 2012 and 2013. Similar results were reported by Davis (2003) and White (2005), both small-scale surveys also found mainly large, thick lipped queen conch (Table 2.2) in the waters of the Statia National Marine Park. It is at this stage unclear if juvenile conch are rare due to poor recruitment or that juvenile conch were simply not observed because the nursery areas have not been identified yet. If recruitment is poor then the increase in lip thickness and shell length (Table 2.2) is a sign of an ageing population.

2.4 Reproductive biology

Spawning season

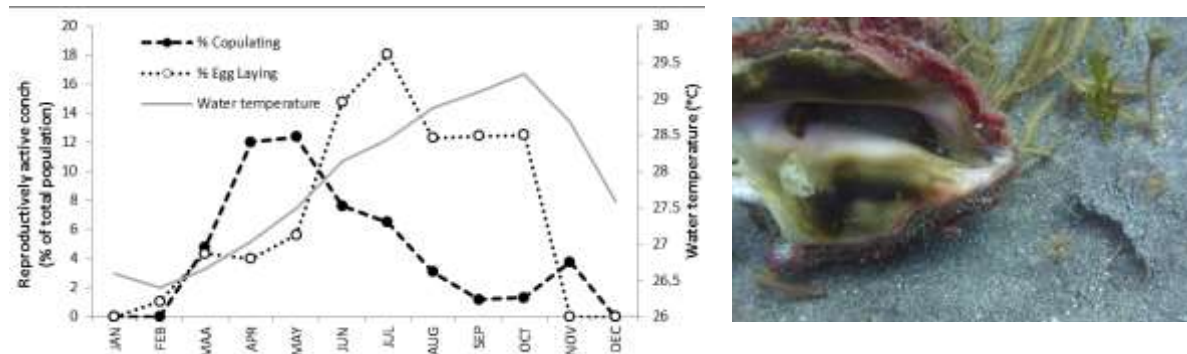


Figure 2.8 (right) Seasonal changes in water temperature and various reproductive behaviours of Queen conch (lip thickness >10mm) on St Eustatius (Mar 2013 – Apr 2014). (left) Egg-laying female Queen conch.

On St Eustatius reproductively active (female) conch were observed from March till November, peaking in the period May-Jul (Fig. 2.8). Reproductive activities appear to increase with increasing water temperature. The spawning season, defined as the observation of reproductively active (copulating or egg-laying) queen conch, on St Eustatius is similar to conch spawning seasons reported for other areas in the Wider Caribbean Region (Table 2.3).

Table 2.3 Overview of spatial variation in observed reproductive behaviour (copulating or egg-laying) of for queen conch in the Wider Caribbean Region.

Location	Months												Reference
	J	F	M	A	M	J	J	A	S	O	N	D	
St Eustatius													unpublished results
Bermuda													Berg et al. (1989)
Florida Keys													D'Asaro (1965)
Bahama's													Stoner et al. (1992)
Turks and Caicos													Davis et al. (1984)
Mexico													Pérez-Pérez & Aldana-Arana 2002
St Kitts/Nevis													Wilkins et al. 1987
Puerto Rico													Appeldoorn et al. (1987)
US Virgin Islands													Randall (1964), Coulston et al. (1987)
Colombia													Avila (2004), Prada (2009)
Venezuela													Brownell (1977), Weil & Laughlin (1984)

Size-at-maturity

The minimum size (~10mm lip thickness) of reproductively active male and female queen conch on St Eustatius was similar to values reported for other areas in the Wider Caribbean Region (Table 2.4). The lip thickness at which 50% of the males and females are mature is currently being determined by IMARES using histological gonad analyses following the protocol described in Stoner et al. (2012).

Table 2.4. Overview of spatial variation in male and female size at maturity in the greater Caribbean region. SL = shell length, LT = lip thickness.

Location	SL _{min} female (mm)	SL _{min} male (mm)	LT _{min} female (mm)	LT _{min} male (mm)	Reference
St Eustatius	unknown	unknown	9	11	Meijer zu Schlochtern (2014)
San Andres Archipelago, Providencia, & Santa Catalina, Colombia	205	~214	2	8	Avila-Poveda and Baqueiro-Cárdenas (2006)
San Andres Archipelago, Colombia	>170	>170	>5	>5	Aldana-Aranda and Frenkiel (2007)
Barbados	~260	~260	12	9	Bissada (2011)
Exuma Cays, Bahamas	176	179	12	9	Stoner et al. (2012b)
Location	SL _{50%} female (mm)	SL _{50%} male (mm)	LT _{50%} female (mm)	LT _{50%} male (mm)	Reference
San Andres Archipelago, Providencia, & Santa Catalina, Colombia	249	234	17.5	13.0	Avila-Poveda and Baqueiro-Cárdenas (2006)
Barbados	282	280	18.8	19.2	Bissada (2011)
Exuma Cays, Bahamas	206	210	26.2*	24.0*	Stoner et al. (2012b)

**the data of this study is currently being re-analysed using a more appropriate method, the presented figures are most likely overestimating LT_{50%} by at least 10mm.*



3 Fisheries

3.1 Commercial fisheries

Conch meat is the only traded product of the small-scale, artisanal queen conch fishery on St. Eustatius. At present, the fishing unit consists of one operator and one scuba diver. Queen conch are collected, brought to the surface and cleaned at the landing site in the only harbour of the island. Empty shells are discarded in the harbour. Since the constitutional change in 2010 no legal international trade of queen conch has taken place between St Eustatia and neighbouring islands. When international trade is allowed the majority of the catch is expected to be exported to neighboring islands like St Maarten and St Barth's. The trade of conch pearls and conch shell as jewelry and souvenirs for tourists is negligible. Without the required CITES export permits tourists are not allowed to remove any queen conch products from St. Eustatius.

Hardly any (historical) information is available on landings of queen conch by the small scale, artisanal fishery in the coastal waters of St Eustatius. White (2005) recorded the majority of conch catches (10 fishing trips) of the only active conch fishermen for a two-and-a-half month (May-Jul) period in 2005. Shell length (average 24 cm) and lip thickness (average 9 mm) was only recorded for 19 landed conch during a single fishing trip. Meijer zu Schlochtern (2014) reported shell length and lip thickness of hundreds of landed conch. Average shell length of landed conch did not differ between 2005 (24cm) and 2013 (24 cm for both male and female; Fig. 3.1b). However, average lip thickness of landed conch was thinner in 2005 (9 mm) compared to a lip thickness of 26 mm for both male and female landed conch in 2013 (Fig. 3.1a). The possible relevance of this difference is doubtful due to the small number of measured conch in 2005. In 2013 almost the entire catch consisted of large adult (mature) conch well above the minimum legal size of 18 cm shell length and well above the minimum size at maturity of 10 mm lip thickness (see Table 2.4). Juvenile or sub-adult conch without flared lips are not harvested.

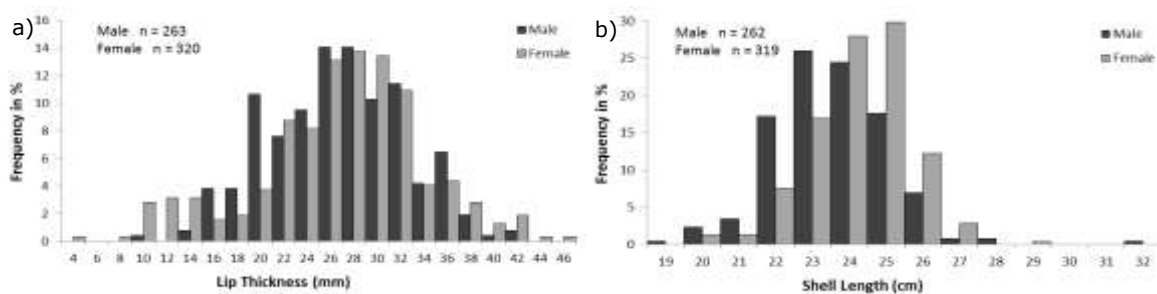


Fig 3.1 Length frequency distribution of landed male and female queen conch in 2012 and 2013, a) lip thickness (mm) and b) shell length (cm). Data from Meijer zu Schlochtern (2014).

In 2005 on average 65 conch were landed per fishing trip (~2.5 dive tanks per trip). Extrapolating these numbers (65 conch per trip, 4 trips per month) would result in an estimated annual landing of around 3100 conch in 2005. Based on nine conch catches between November 2012 and July 2013, Meijer zu Schlochtern (2014) estimated (108 conch per trip, 4 trips per month) the annual landing of the same fisherman in 2013 to be around 5100 conch, roughly 3% of the estimated adult conch stock (see 2.3).

3.2 Recreational fisheries

At present anybody, both Statians and non-Statians, are allowed to collect a maximum of 20 conch per annum for personal use within the boundaries of the Statia National Marine Park. Recreational catches have to be reported at once to the Marine Park manager. However, no catches have ever been reported to date (pers. comm. manager Marine Park). It is unlikely that recreational catches are “zero”, however, it is likely that recreational catches are low as queen conch occur in water deeper than 15 meters and can only be legally collected by free diving. It is unclear at this point to what extent conch are harvested legally and/or illegally by recreational fishers.



4 Management

4.1 Conservation status

Global conservation status (according to IUCN Red list):

- | | |
|--|--|
| <input type="checkbox"/> Critically endangered | <input type="checkbox"/> Near threatened |
| <input type="checkbox"/> Endangered | <input type="checkbox"/> Least concern |
| <input type="checkbox"/> Vulnerable | <input type="checkbox"/> Data deficient |

IUCN has not assessed the conservation status of Queen Conch. Queen conch was listed in CITES Appendix II in 1992. Species listed in Appendix II are not necessarily threatened with immediate extinction but may become extinct if trade is not closely managed and controlled.

Queen Conch is listed in Annex III of the SPAW protocol. Species listed in Annex III are species for which special measures must be taken to ensure their protection and recovery whilst authorising and regulating the use of these species

National conservation status

Queen Conch has no national conservation status in addition to the listing in CITES Appendix II and SPAW Annex III.

Main threats

- | |
|---|
| <input type="checkbox"/> No Threats |
| <input checked="" type="checkbox"/> Habitat loss/Degradation (human induced): anchoring by oil tankers |
| <input checked="" type="checkbox"/> Invasive alien species (directly affecting the species): Indian Ocean seagrass (<i>Halophila stipulacea</i>)* |
| <input checked="" type="checkbox"/> Harvesting |
| <input type="checkbox"/> Accidental mortality (e.g. bycatch) |
| <input type="checkbox"/> Persecution (e.g. pest control) |
| <input checked="" type="checkbox"/> Pollution (affecting habitat and/or species): imposex** has been observed in a few conch (<1%) |
| <input type="checkbox"/> Other |
| <input type="checkbox"/> Unknown |

**The impact of the replacement of endemic seagrass by the invasive species is unclear.*

***Imposex is a disorder in marine snail caused by toxic effects of marine pollutants such as Tributyltin, an anti-fouling agent used on boats. These toxic chemicals can disrupt reproductive success as it causes female marine snails to develop male reproductive organs.*

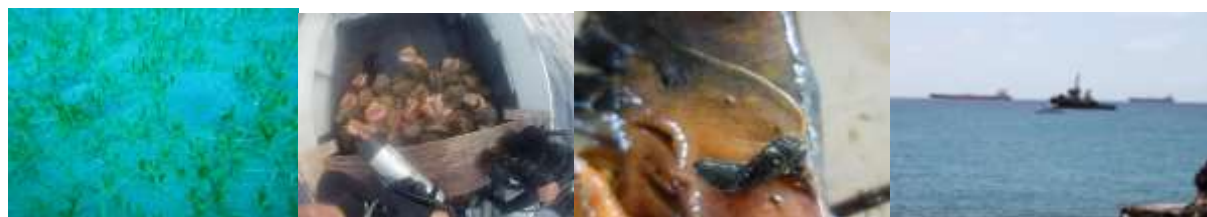


Figure 4.1: Potential threats to Queen Conch on St Eustatius are, from left to right, a) alien species (Indian Ocean seagrass), b) harvesting (fishing), c) pollution (imposex; male penis and female groove) and d) habitat loss (anchoring oil tankers).

4.2 Legal framework and law enforcement

With the Netherlands (including the Caribbean Netherlands) a signatory party to CITES and SPAW, St Eustatius is bound to the restrictions regarding international trade and the management of queen conch to ensure sustainable exploitation.

Enforcement of the fisheries rules and regulations regarding queen conch in the waters of the Statia National Marine Park, the territorial waters and EEZ is the responsibility of Stenapa and the Dutch Caribbean Coast Guard. Management of the queen conch stock and queen conch fishery is the responsibility of the island government within the territorial waters and the responsibility of the Ministry of Economic Affairs in the waters of the EEZ.

4.3 Management measures

The following management measures, rules and regulations are in place for queen conch (*Lobatus gigas*) on St Eustatius. Currently, there is no management plan for queen conch on St Eustatius.

General:

Lobatus gigas (queen conch) is listed in Annex II of the CITES Convention, therefore trade in this species requires an export or re-export permit, and an introduction certificate for specimens introduced from the sea. *Lobatus gigas* (queen conch) is listed in Annex III of the SPAW protocol, therefore their capture, and trade in live or dead species (or their parts or products) should be regulated.

Commercial fisheries:

National Fisheries Resolution (PB1992, No.108), Article 3: "In the fisheries zone or for permit holders (vessels over 12m or 6 gross register tons capacity) fishing in the territorial sea, it is forbidden to fish for *Lobatus gigas* (queen conch) of less than 18cm, or less than 225g (whole animal) without shells."

St. Eustatius Marine Environment Ordinance (AB1996, No. 03), Article 7: "When collecting conch in the Marine Park (for vessels under 12m or 6 gross register tons capacity) it is prohibited to use SCUBA or Hookah, to take conch less than 19cm (7.5 inches) or without a well-developed lip, or to take more than 20 conch per person per year. Collection of conch is only for private use and consumption, and catch must be reported at once to the Marine Park manager."

At present, the queen conch appears to be harvested using SCUBA *within* the boundaries of the St Eustatius Marine Park. However, according to the current regulations SCUBA can only be used by commercial fishermen *outside* the 30m depth boundaries of the Marine Park. The small scale, artisanal fishery (one boat) that occurs within the boundaries of the Statia National Marine Park seems technically illegal but has been tolerated for a considerable number of years. The fishery is not controlled by a Total Allowable Catch (TAC), permit and/or closed season.

It is at this stage unclear to what extent illegal fishing from neighboring islands like St Kitts and Nevis occurs in the coastal waters of St Eustatius, however, reports of illegal fishing by foreign vessels are rare.

Recreational fisheries:

National Fisheries Resolution (PB1992, No.108), Article 3: "In the fisheries zone or for permit holders (vessels over 12m or 6 gross register tons capacity) fishing in the territorial sea, it is forbidden to fish for *Lobatus gigas* (queen conch) of less than 18cm, or less than 225 g (whole animal) without shells."

St. Eustatius Marine Environment Ordinance (AB1996, No. 03), Article 7: "When collecting conch in the Marine Park (for vessels under 12 m or 6 gross register tons capacity) it is prohibited to use SCUBA or Hookah, to take conch less than 19 cm (7.5 inches) or without a well-developed lip, or to take more than 20 conch per person per year. Collection of conch is only for private use and consumption, and catch must be reported at once to the Marine Park manager." Initially the Marine environment Ordinance (Paragraph e. of Art. 7) specified that "non-Statians" were prohibited from collecting queen conch. However, in the late 1990s that limitation was annulled by the Governor of the Netherlands Antilles as it was deemed discriminatory.

Although a maximum of 20 conch per year is in place for people harvesting conch for personal use within the boundaries of the Statia National Marine Park, an overall Total Allowable Catch (TAC) for the harvest by recreational fishermen has not been set. No closed season is place for the recreational fishery.

4.4 Monitoring system

Fishery dependent

Commercial: At the start of 2012 a fisheries monitoring programme was initiated on St. Eustatius. Using logbooks and a combination of frame, boat activity and landings surveys basic information on catch and effort of the small Statian fishing fleet is collected. Co-operation and transparency of the fishing activities of the local commercial queen conch fisherman are reasonable but should be further improved.

Recreational: Despite the reporting obligation for recreational fishers (see 4.3 Recreational fisheries), no recreational conch catches in the Statia National Marine Park have ever been reported to the Marine Park manager. The recreational catch is expected to be low but no reported catches at all raises concern about the confidence in the current reporting system. At this stage it is unclear how many conch are harvested for personal use by local residents.

Fishery independent

In 2012 and 2013 the first comprehensive fishery independent survey was conducted to estimate the number of adult conch within the Statia National Marine Park. The survey combined visual surveys conducted by divers (50x10=500 m² transects) with towed video (1x500= 500m²) transects in all available habitats to a depth of 30m (Meijer zu Schlochtern, 2014). The fishery independent surveys to estimate mean density of adult conch at different habitats and depths and by which to extrapolate adult population size appear satisfactory.

5 CITES Criteria for non-detriment

5.1 Summary of harvest regime

A summary of the harvest regime of Queen Conch using the format provided by Rosser and Haywood (2002) is presented in Table 5.1. The table was designed to provide a brief overview of the possible effects of harvesting the target species at the national level. The table includes basic information on the type of harvest, degree of control over the harvest, level and reason of harvest, which part of the population is harvested and the destination of the harvest.

Table 5.1: Summary of harvest regime for Queen Conch on St Eustatius, Dutch Caribbean. Species: queen conch (Lobatus gigas). Country: St Eustatius. Date: Dec 2014. Period to be covered by finding: 2015-2017. Is the species endemic, found in a few countries only, or widespread? Widespread. Conservation status of the species: IUCN Global status: na, National status: na, Other: na

Type of harvest	Main product	Degree of control	Demographic segment removed from wild population					Relative level of harvest (include actual number or quantity if known)				Reason for harvest			Commercial destination(s) (numbers and percentages if known)		
			Eggs	Juveniles	Adult males	Adult females	non-selective	Low	Medium	High	Unknown	Subsistence	Commercial	Others	Local	National	International
1.1 Captive breeding		a) regulated															
		b) illegal or unmanaged															
1.2 Non-lethal harvesting for parts/products		a) regulated															
		b) illegal or unmanaged															
1.3 Removal for ranching		a) regulated															
		b) illegal or unmanaged															
1.4 Pest or problem animal control		a) regulated															
		b) illegal or unmanaged															
1.5 Live capture		a) regulated															
		b) illegal or unmanaged															
1.6 Killing of individual	meat	a) regulated			Yes	Yes		5000				Yes	Yes		Yes*		No*
	meat	b) illegal or unmanaged			Yes	Yes		X				Yes			Yes*		No*

5.2 Analysis of factors affecting the management regime of queen conch

An overview of the factors affecting the management regime of Queen Conch on St Eustatius has been prepared using the checklist for CITES non-detriment findings as described in Rosser and Haywood (2002). Answers in the checklist apply to the national level and are ranked from one (high confidence in sustainability of the harvest) to five (low confidence in sustainability of the harvest) providing an indication of the sensitivity of the species to the impact of the harvest.

The questions and answers of the checklist results are presented in Table 6.1. The radar plot (Fig. 5.1) provides a graphic overview of the outcome of the checklist.

Rosser and Haywood (2002) point out the checklist does not necessarily constitute a finding of non-detriment. It merely informs the non-detriment finding and can guide the Scientific Authority in obtaining the necessary information.

Please note that the checklist results and the radar plot are based on the island of **St Eustatius** only. In the check list and radar plot "national" refers only to St Eustatius and not to the Netherlands and Caribbean Netherlands (Saba, St Eustatius and Bonaire).

Table 5.2 Factors effecting management of the harvest regime on St Eustatius.

Biological characteristics		
2.1 Life history: What is the species' life history?	High reproductive rate, long-lived	
	High reproductive rate, short-lived	
	Low reproductive rate, long-lived	
	Low reproductive rate, short-lived	
	Uncertain	
2.2 Ecological adaptability: To what extent is the species adaptable (habitat, diet, environmental tolerance etc.)?	Extreme generalist	
	Generalist	
	Specialist	
	Extreme specialist	
	Uncertain	
2.3 Dispersal efficiency: How efficient is the species' dispersal mechanism at key life stages?	Very good	
	Good	
	Medium	
	Poor	
	Uncertain	
2.4 Interaction with humans: Is the species tolerant to human activity other than harvest?	No interaction	
	Pest/Commensal	
	Tolerant	
	Sensitive	
	Uncertain	
National (St Eustatius only) status		
2.5 National distribution: How is the species distributed nationally?	Widespread, contiguous in country	
	Widespread, fragmented in country	
	Restricted and fragmented	
	Localized	
	Uncertain	
2.6 National abundance: What is the abundance nationally?	Very abundant	
	Common	
	Uncommon	
	Rare	
	Uncertain	
2.7 National population trend: What is the recent national population trend?	Increasing	
	Stable	
	Reduced, but stable	
	Reduced and still decreasing	
	Uncertain	
2.8 Quality of information: What type of information is available to describe abundance and trend in the national population?	Quantitative data, recent	
	Good local knowledge	
	Quantitative data, outdated	
	Anecdotal information	
	None	
2.9 Major threats: What major threat is the species facing (underline following: overuse/habitat loss and alteration/invasive species/other) and how severe is it?	None	
	Limited/Reversible	
	Substantial	
	Severe/Irreversible	
	Uncertain	
Harvest management		
2.10 Illegal harvest or trade: How significant is the national problem of illegal or unmanaged harvest or trade?	None	
	Small	
	Medium	
	Large	
	Uncertain	

Biological characteristics		
2.11 Management history: What is the history of harvest?	Managed harvest: ongoing with adaptive framework	
	Managed harvest: ongoing but informal	
	Managed harvest: new	
	Unmanaged harvest: ongoing or new	
	Uncertain	
2.12 Management plan or equivalent: Is there a management plan related to the harvest of the species?	Approved and co-ordinated local and national management plans	
	Approved national/state/provincial management plan(s)	
	Approved local management plan	
	No approved plan: informal unplanned management	
	Uncertain	
2.13 Aim of harvest regime in management planning: What is harvest aiming to achieve?	Generate conservation benefit	
	Population management/control	
	Maximize economic yield	
	Opportunistic, unselective harvest, or none	
	Uncertain	
2.14 Quotas: Is the harvest based on a system of quotas?	Ongoing national quota :based on biologically derived local quotas	
	Ongoing quotas: "cautious" national or local	
	Untried quota: recent and based on biologically derived local quotas	
	Market-driven quota(s), arbitrary quota(s), or no quotas	
	Uncertain	
Control of harvest		
2.15 Harvesting in Protected Areas: What percentage of the legal national harvest occurs in State-controlled Protected Areas?	High	
	Medium	
	Low	
	None	
	Uncertain	
2.16 Harvesting in areas with strong resource tenure or ownership: What percentage of the legal national harvest occurs outside Protected Areas, in areas with strong local control over resource use?	High	
	Medium	
	Low	
	None	
	Uncertain	
2.17 Harvesting in areas with open access: What percentage of the legal national harvest occurs in areas where there is no strong local control, giving de facto or actual open access?	None	
	Low	
	Medium	
	High	
	Uncertain	
2.18 Confidence in harvest management: Do budgetary and other factors allow effective implementation of management plan(s) and harvest controls?	High confidence	
	Medium confidence	
	Low confidence	
	No confidence	
	Uncertain	
Monitoring of harvest		
2.19 Methods used to monitor the harvest: What is the principal method used to monitor the effects of the harvest?	Direct population estimates	
	Quantitative indices	
	Qualitative indices	
	National monitoring of exports	
	No monitoring or uncertain	
2.20 Confidence in harvest monitoring: Do budgetary and other factors allow effective harvest monitoring?	High confidence	
	Medium confidence	
	Low confidence	
	No confidence	
	Uncertain	
Incentives and benefits from harvesting:		

Biological characteristics		
2.21 Utilization compared to other threats: What is the effect of the harvest when taken together with the major threat that has been identified for this species?	Beneficial	
	Neutral	
	Harmful	
	Highly negative	
	Uncertain	
2.22 Incentives for species conservation: At the national level, how much conservation benefit to this species accrues from harvesting?	High	
	Medium	
	Low	
	None	
	Uncertain	
2.23 Incentives for habitat conservation: At the national level, how much habitat conservation benefit is derived from harvesting?	High	
	Medium	
	Low	
	None	
	Uncertain	
Protection from harvest:		
2.24 Proportion strictly protected: What percentage of the species' natural range or population is legally excluded from harvest?	>15%	
	5-15%	
	<5%	
	None	
	Uncertain	
2.25 Effectiveness of strict protection measures: Do budgetary and other factors give confidence in the effectiveness of measures taken to afford strict protection?	High confidence	
	Medium confidence	
	Low confidence	
	No confidence	
	Uncertain	
2.26 Regulation of harvest effort: How effective are any restrictions on harvesting (such as age or size, season or equipment) for preventing overuse?	Very effective	
	Effective	
	Ineffective	
	None	
	Uncertain	



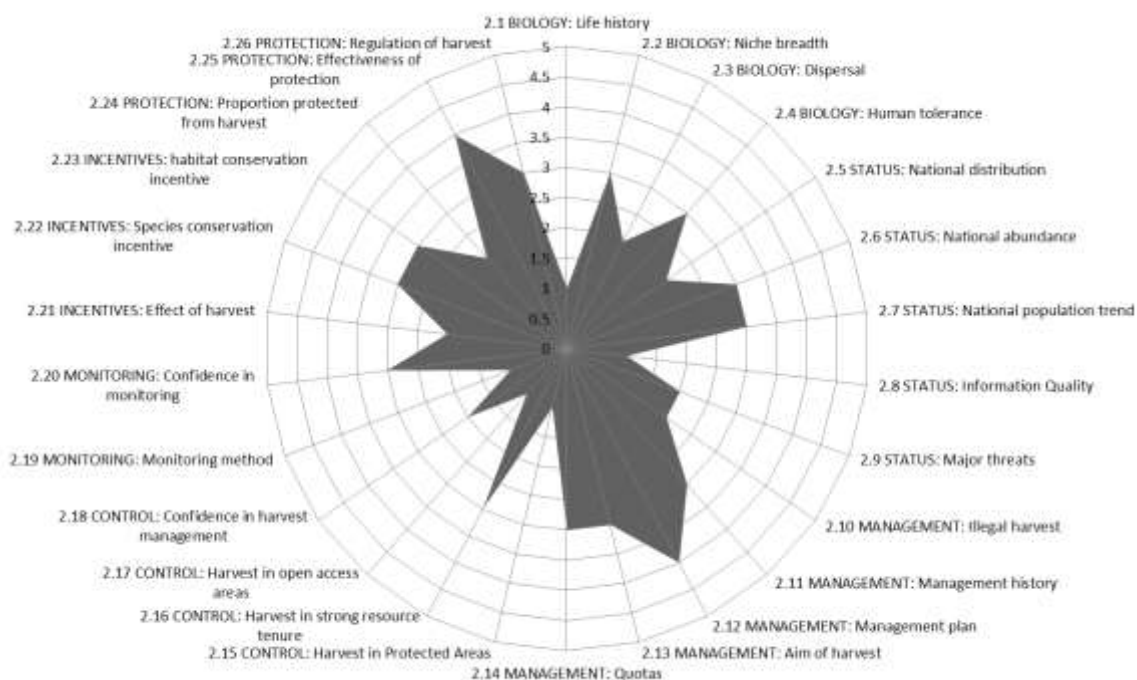


Figure 5.1 Radar plot of the factors affecting the management of Queen Conch *Lobatus strombus* in the coastal waters of St Eustatius (see Table 6.2 for data). Note that "national" only refers to St Eustatius only and does not include the other islands (Saba, Bonaire) in the Caribbean Netherlands.

The queen conch (*Lobatus gigas*) is a large, marine gastropod snail that is widely distributed in the coastal waters in the Wider Caribbean Region (2.5). It is a relatively long-lived species with a high reproductive output (2.1). Dispersal occurs during the pelagic larval stage. While drifting on the ocean current for several weeks, the larvae can be dispersed over hundreds of kilometres (2.3). The herbivorous queen conch is a specialist, feeding on algae and epiphytes on algae and seagrass in shallow coastal waters (2.2). The main threats to its survival are exploitation and habitat degradation (2.4). It is at this stage unclear if the few observations of imposex (<1%) due to pollution (anti-fouling paint) form a potential threat impairing reproductive output (2.9). Conch is wide-spread and common in the coastal waters of St Eustatius as was recently determined by an extensive survey (2.5, 2.6, 2.7, 2.8). Illegal harvest is expected to be small but uncertain at this stage (2.10). A management plan does not exist (2.12) and while the harvest of queen conch has a long history the development of a properly managed fishery is in its infancy (2.11, 2.12, 2.13, 2.14). The current fishery takes place within the boundaries of the Statia National Marine Park (2.15, 2.16, 2.17) which has the potential to develop on the short term a harvest management of medium confidence (2.18). Direct population estimates were recently used to determine the status of the conch population (2.19). In contrast to the fishery independent survey, the fishery dependent survey needs to be improved by increasing the compliance of commercial and recreational fishermen with regards to recording their catches (2.20). Harvest is the main threat with little incentives for species and/or habitat conservation (2.21, 2.22, 2.23). Two Marine Reserves (no-take zones) are present in the Statia National Marine Park. However, these reserves were developed to protect the vulnerable coral reef habitats. Queen conch rarely occur in complex reef habitats but are mainly found in the coral rubble, sand, algae and seagrass habitats which are largely located outside the current boundaries of the two reserves (2.24). There is little confidence in the compliance, control and effectiveness of the existing protection measures (2.25, 2.26). The current small scale fishery is tolerated but technically illegal as the conch are harvested using SCUBA within the boundaries (30m depth) of the Statia National Marine Park.

The main reason for the current reasonable status of the stock is the low fishing pressure but not the result of controlled harvest and efficient management.

5.4 Precautionary quota

The proposed annual combined quota of commercial and recreational catches within the boundaries of the Statia National Marine Park for the period 2015-2017 is 7500 (adult) queen conch or 4 % of the estimated adult conch population.

The proposed conservative quota lies within the recommended precautionary limits of 8% of the mean fishable biomass as advised by the CMFC/OSPESCA/WECAFC/CRFM/CITES Working Group on Queen Conch (QCWG). However, this conservative quota will allow the current fishery to operate ("business as usual") while it will enable local authorities to develop a proper management plan and implement the necessary recommendations with regards to biology, management, control, monitoring, and protection.

Mating success in queen conch is density dependent (Stoner & Ray-Culp 2000, Stoner et al 2011). QCWG conch recommended that a minimum mean or median density of 100 adult conch/ha should be used (in the fished areas) as a reference point to avoid the risk that recruitment might be impaired. At present it appears that the mean adult conch densities in the fished areas within the Statia National Marine Park are above the recommended reference point of 100 adult conch/ha.

While the overall status of queen conch within the Statia National Marine Park appears to be good, there remains one reason for possible concern. It is unclear at this stage why so few juvenile queen conch were observed in the waters of the Statia National Marine Park in 2012-2013 (Meijer zu Schlochtern, 2014), 2005 (White, 2005) and 2003 (Davis, 2003). There are several possible explanations for the lack of juvenile conch in the published surveys. In the first place, a lack of juvenile conch could be an indication of recruitment limitation. This process may have been enhanced by the disappearance of the shallow (*Thalassia*) seagrass beds after the hurricane Lenny in 1999. Secondly, juvenile conch could simply be missed during the diving surveys as juvenile queen conch are known to burrow in the sand during the first 1-2 years of their life. Thirdly, the surveys simply failed to identify the nursery areas of juvenile queen conch. The last option might be easily the case for the studies in 2003 and 2005 where only four sites were surveyed. The survey in 2012 en 2013 was extensive, however, a large part of the transects were conducted with a towed video system which is expected to be less accurate for small, juvenile queen conch. While small, juvenile conch may have been rarely observed either due to sampling methods or recruitment limitation, young adult conch (lip thickness $\leq 2\text{mm}$) were still abundant (see Fig 2.7) in 2012-2013. However, due to the uncertainty with regards to recruitment, a conservative quota, safely within the advised limits of WG Conch, has been advised for the period 2015-2017.

5.5 Recommendations

Biology

- Conduct regular fishery independent surveys (every 3-5 year) to assess abundance and population structure and adjust quota if required
- Locate nursery areas of juvenile queen conch
- Assess small scale connectivity between deep water and shallow water populations and large scale connectivity among conch population on neighbouring islands

Management

- Replace current minimum legal size based on shell length with a minimum legal size based on lip thickness and regulate obligatory landing of whole animals with shell
- Develop appropriate rules and regulations to legalise the current "tolerated" fishery in SNMP

Control

- Develop a full reporting, monitoring and enforcement system for queen conch harvest and export by commercial and recreational fishers

Monitoring

- Develop and conduct fishery (in)dependent surveys to monitor the stock, harvest and export

Protection

- Develop appropriate rules and regulation in co-operation with neighbouring islands and stake holders on minimum legal size and closed season.
- Develop rules and regulations in co-operation with stake holders to protect the queen conch between the boundaries of the Statia Marine Park and the territorial waters and the economic exclusive zone.

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Quality Assurance

IMARES utilises an ISO 9001:2008 certified quality management system (certificate number: 124296-2012-AQ-NLD-RvA). This certificate is valid until 15 December 2015. The organisation has been certified since 27 February 2001. The certification was issued by DNV Certification B.V. Furthermore, the chemical laboratory of the Fish Division has NEN-EN-ISO/IEC 17025:2005 accreditation for test laboratories with number L097. This accreditation is valid until 1th of April 2017 and was first issued on 27 March 1997. Accreditation was granted by the Council for Accreditation.

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Justification

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The scientific quality of this report has been peer reviewed by the a colleague scientist and the head of the department of IMARES.

Approved: Dr. A.O. Debrot MBA
Senior Researcher



Signature:

Date: 17 December 2014

Approved: Drs. J.H.M. Schobben
Head of Fish Department



Signature:

Date: 17 December 2014

Appendix A: Article IV CITES

Convention on International Trade in Endangered Species of Wild Fauna and Flora

Article IV: Regulation of Trade in Specimens of Species Included in Appendix II

1. All trade in specimens of species included in Appendix II shall be in accordance with the provisions of this Article.

2. The export of any specimen of a species included in Appendix II shall require the prior grant and presentation of an export permit. An export permit shall only be granted when the following conditions have been met:

- (a) a Scientific Authority of the State of export has advised that such export will not be detrimental to the survival of that species;
- (b) a Management Authority of the State of export is satisfied that the specimen was not obtained in contravention of the laws of that State for the protection of fauna and flora; and
- (c) a Management Authority of the State of export is satisfied that any living specimen will be so prepared and shipped as to minimize the risk of injury, damage to health or cruel treatment.

3. A Scientific Authority in each Party shall monitor both the export permits granted by that State for specimens of species included in Appendix II and the actual exports of such specimens. Whenever a Scientific Authority determines that the export of specimens of any such species should be limited in order to maintain that species throughout its range at a level consistent with its role in the ecosystems in which it occurs and well above the level at which that species might become eligible for inclusion in Appendix I, the Scientific Authority shall advise the appropriate Management Authority of suitable measures to be taken to limit the grant of export permits for specimens of that species.

4. The import of any specimen of a species included in Appendix II shall require the prior presentation of either an export permit or a re-export certificate.

5. The re-export of any specimen of a species included in Appendix II shall require the prior grant and presentation of a re-export certificate. A re-export certificate shall only be granted when the following conditions have been met:

- (a) a Management Authority of the State of re-export is satisfied that the specimen was imported into that State in accordance with the provisions of the present Convention; and
- (b) a Management Authority of the State of re-export is satisfied that any living specimen will be so prepared and shipped as to minimize the risk of injury, damage to health or cruel treatment.

6. The introduction from the sea of any specimen of a species included in Appendix II shall require the prior grant of a certificate from a Management Authority of the State of introduction. A certificate shall only be granted when the following conditions have been met:

- (a) a Scientific Authority of the State of introduction advises that the introduction will not be detrimental to the survival of the species involved; and
- (b) a Management Authority of the State of introduction is satisfied that any living specimen will be so handled as to minimize the risk of injury, damage to health or cruel treatment.

7. Certificates referred to in paragraph 6 of this Article may be granted on the advice of a Scientific Authority, in consultation with other national scientific authorities or, when appropriate, international scientific authorities, in respect of periods not exceeding one year for total numbers of specimens to be introduced in such periods.

Appendix B. Recommendations Queen Conch Expert Workshop 2012

Recommendations of the Queen Conch Expert Workshop Miami, United States of America, 22–24 May 2012.

Data collection

Survey data

1. Recommendation: A default 8% of the estimated mean or median fishable biomass can be used to set a precautionary sustainable yield if only estimates of biomass are available and the stock is not depleted. Adjustments can and should be made to this value justified by the need for greater precaution or based on science showing that the stock is more or less productive than this. The biomass estimate and the derived yield should be based on the surveyed area only, and not expanded or extrapolated to areas not included in the survey. The survey should attempt to assess the different components of the population as well as the overall biomass.

The CFMC/OSPESCA/WECAFC/CRFM Working Group on Queen Conch noted that this yield estimate would be useful for data-poor fisheries and as a precautionary harvest level while further research and monitoring is conducted. However, the Working Group also emphasized the need for stock assessment and yield estimates based on best available science rather than basing harvest levels on the experience of a few countries. Therefore, range states should be encouraged to continue to develop precautionary harvest levels based on scientific research and the on-going evaluation of their harvest strategy.

2. Recommendation: To improve co-ordination and effectiveness of various management controls within the region, such as closed fishing seasons, it is important that information on the distribution of maturity and size composition, as well as estimates of fishable biomass are obtained for the conch population and shared amongst relevant States on a regular basis.

3. Recommendation: In the absence of other information, it is appropriate to survey the known fishing area with depth stratification. As better information becomes available, the survey area could be expanded to include additional areas based on habitat which might cover unexploited parts of the population such as juveniles or deeper water spawning stock.

4. Recommendation: In designing new surveys, previous experience of the different countries should be used. Good sampling design should cover at least the fished area, taking account of diver safety. Experienced conch fishers and conch biologists should be used to conduct the surveys.

5. Recommendation: Where a reference point is required for the median or mean, density estimated from surveys, 100 adult conch / ha (or higher) should be used. When the median or mean density falls below this level, there is a significant risk that recruitment might be impaired, and therefore special management action might be required to rebuild density above this level.

The CFMC/OSPESCA/WECAFC/CRFM Working Group on Queen Conch noted that for such a reference point to be useful, the survey area will clearly need to cover spawning stock. If the spawning stock is outside the survey area, then this reference point is not applicable.

6. Recommendation: If unexploited “deep water” biomass is a critical assumption of the harvest strategy, then its presence should be confirmed.

7. Recommendation: Where possible a habitat survey should be undertaken, which can be used to extend the conch survey to get improved estimates of juveniles.

8. Recommendation: Financial resources to carry out necessary management tasks should be raised from the fishing industry, possibly with government support. An export tax provides a useful way for targeted funding and also provides some bioeconomic protection for the stock, since it effectively lowers the price obtained for the product. Integrating fishery surveys with other types of survey may provide another opportunity to reduce costs on remote banks.

CPUE data

9. Recommendation: Catch and effort data should be collected routinely in all fisheries by requiring that the fishing industry provide the necessary information. These data provide abundance information in the absence of surveys, to confirm survey trends or as guidance between infrequent surveys. Importantly, they may provide a lower cost replacement for surveys as an abundance index.

10. Recommendation: Where appropriate, the fishery should be required to record and report data which are relevant for improving the measurement of effort and for CPUE standardisation. These include, but would not be limited to, measures of fishing power as well as the circumstances of the fishing activity.

11. Recommendation: Larger vessels (greater than or equal to 15m length) should be required to report their position routinely. GPS should also be used to map smaller vessel activity and improve measures of effort, even if not used routinely.

Catch data

12. Recommendation: It is important that estimates of all fishing mortality are obtained, including local landings and IUU as well as exports. While only one component of these might be measured routinely and accurately, the relative scale of all catches should be known.

13. Recommendation: If possible, landings should be periodically sampled to provide information on size composition and maturity. While these data may not be critical, they provide useful information for management as well as indices that complement other information from surveys, and catch and effort.

14. Recommendation: Conversion factors must be estimated so that catches can be compared through different levels of processing and among exports from different countries.

Stock assessment models

15. Recommendation: A conch population and fishery operational model should be developed to simulate data using current scientific research on conch. The model software would need to be publicly available for development by the conch scientific community, so that up-to-date biological research could be incorporated easily and it could be linked to stock assessment methods.

Harvest strategy

16. Recommendation: Well-defined harvest control rules should be developed for each fishery. This may codify current practice or improve current practice, but in all cases they should make management decisions clearer.

17. Recommendation: An independent peer review process should be developed to ensure that the best scientific advice is being supplied to the fishery, advise on additional precaution if necessary, and provide feedback on the performance of the harvest strategy. Independent review processes should also be used to ensure information quality meets minimum standards, which should be regionally agreed.

Precautionary controls

18. Recommendation: The following precautionary controls are recommended to be implemented by States where appropriate:

- Prohibit compressed air based diving (SCUBA and “hookah”) to protect the stocks in deeper water.
- Implement a 2-3 month closed period around main spawning periods, preferably harmonised with neighbouring fisheries.
- Clearly proscribe gears or methods for catching queen conch. New fishing gears or methods should require an evaluation of their impact on the ecosystem.
- Establish minimum size limits on shells (length / for flared lip) that can be enforced and are harmonised with neighbouring fisheries.
- Establish minimum meat weight that can be landed, and that can be enforced within the international trade.
- License vessels, and apply a limited entry system that can prevent increases in fishing capacity until the potential yield has been estimated.

Fishing capacity

19. Recommendation: If possible, measure fleet fishing capacity and ensure that it matches the productivity of fishing grounds to which it has access. If the capacity exceeds productivity, a capacity reduction programme should be implemented.

Ecosystem management

20. Recommendation: In designing and consulting on MPAs or no take zones, account should be taken of conch population distribution and structure.

21. Recommendation: Habitat maps of the coastal zone should be developed which identify, among other things, conch habitat particularly with respect to spawning and juveniles.

22. Recommendation: Improve information on stock identification and links between population and population components through larval surveys and/or genetic studies.

23. Recommendation: An ecosystem model with explicit treatment of conch, particularly as prey, would be useful to determine the wider implications of conch fisheries on the ecosystem. The wider implication of conch fisheries on predators would need to consider the different life history stages explicitly.

24. Recommendation: Given the limited information of the wider effects of conch fisheries, and the effects on other human activities on conch, an Ecological Risk Assessment would be valuable to identify the most important risks which could be subject to further research, mitigation by management and/or increased monitoring.

Decision-making process

25. Recommendation: Co-management approaches should, as far as possible, be implemented in all conch fisheries. Involving stakeholders in decisions on access to the resources and controls on harvest has been found to lead to greater compliance.

26. Recommendation: Establish or use current Working Groups to review scientific advice regarding queen conch fishery policies and practices, and regularly evaluate the management performance of States involved in queen conch fishery and trade.

27. Recommendation: National fishery management plans should be published for each fishery, documenting *inter alia* the harvest strategy, decision-making process and roles and responsibilities of all stakeholders.

Enforcement and compliance

28. Recommendation: The following recommendations represent a set of possible approaches to combat IUU and improve enforcement in the region. Given the on-going problems with enforcement, there are unlikely to be any simple solutions. However, there are a number of initiatives and procedures which could be enhanced and encouraged:

- a) Require that vessels which could be involved in IUU activity (i.e. larger vessels) carry a satellite Vessel Monitoring System (VMS). VMS should be harmonised across the region to allow range States to monitor activity of any vessel that may stray into national waters.
- b) Implement an auditable "chain of custody" procedure, so that catches can be traced back to their catch location, and not just their point of landing or point of export. Catch documentation procedures are already required by HACCP and the EU, and CITES permit and certificate system could track queen conch entering international trade.
- c) Research practical technology to enhance the traceability of queen conch, including labelling, marking, DNA stock identification, etc.
- d) Implement closed seasons such that they are similar among countries, so landing any conch within a larger region can be prohibited.
- e) Develop a regional vessel registration system or a positive vessel list.
- f) Develop a negative IUU vessel list for the region, so that vessels identified as involved in IUU activity can be publicly listed (see www.tuna-org.org/vesselneg.htm). This information can be used to discriminate against vessels which have an illegal record even if they are not captured and prosecuted at the time.
- g) Improve co-operation among countries and share enforcement information through bilateral agreements and improved data exchange protocols

CITES

29. Recommendation: Draft and submit a resolution for 16th meeting of the Conference of the Parties to CITES summarising in general terms the findings, conclusions and recommendations of this Expert Workshop and other relevant guidance concerning the management of and trade in Queen conch.