



A SUSTAINABLE FUTURE FOR QUEEN CONCH

NEW APPROACHES TO THE CONSERVATION AND SUSTAINABLE DEVELOPMENT OF *STROMBUS GIGAS* AND RELATED SPECIES

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INTRODUCTION

This paper outlines a new approach to the conservation and sustainable development of Queen Conch and related marine shell species. We hope this new approach will secure income and employment for thousands of Caribbean conch fisher-folk and their families whose livelihoods are threatened by both environmental pressures and increasingly complex regulatory controls.

The mollusk, known internationally as the Queen Conch or Pink Conch, and scientifically as the *Strombus gigas* of the Strombidae family, is a Caribbean marine animal of great importance to the diet and livelihood of thousands of families throughout the Caribbean. On the one hand increased demand has impacted negatively on the supply of *strombus gigas* while on the other present current harvesting methods are very inefficient thus failing to maximize the value of the whole animal and causing huge amounts of wastage. This document, drafted by Caribbean based Sustainable Gigas Aquaculture outlines an innovative strategy in support of sustainability and protection of the species for international trade.

Sustainable Gigas Aquaculture (SGA) is an international Non-Government Organization (NGO) concerned with the sustainability of the Queen Conch and related marine animals. SGA aims to establish new *commercially* sustainable markets for the Queen Conch and its by-products and more rationale and efficient regulatory controls of this valuable resource. Our efforts, and those of our affiliates and members, include research into breeding, reseeding, habitat protection and advancements in value added shell product harvesting of *Strombus gigas* and other related marine animal species. SGA membership includes representatives from the Bahamas, Belize, Columbia, France, Germany, Honduras, Italy, Puerto Rico Switzerland, Singapore, Thailand, Turks & Caicos, United Arab Emirates, the United Kingdom and the United States of America.

Our sponsors include private individuals and organizations working with the Queen Conch and the Queen Conch value-added by-products of the species. Our long-term mission is to promote a prosperous and sustainable *Strombus Gigas* industry. SGA also wants to ensure that regulations affecting the global trade of the Queen Conch better reflect the long-term cultural and socio-economic needs of the communities whose livelihoods depend on these species.

SGA in order to further its objectives will work closely with organizations like the Caribbean Fisheries Management Council (CFMC) via the International Queen Conch Initiative, the Ministries of Fisheries of CARICOM (Caribbean Community), the Caribbean Regional Fisheries Mechanism (CRFM), the Organization of the Fisheries and Aquaculture Sector of Central America (OSPESCA), Oceana (conservation group) and the Food and Agriculture Organization of the United Nations Fisheries and Aquaculture Department (FAO).

BACKGROUND

In 1985 the *Strombus gigas*, Queen Conch, was first noted in the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) document, followed by inclusion in the Convention for the Protection and Development of the

Marine Environment of the Wider Caribbean Region (Cartagena Convention) in 1990, which also included the Queen Conch in Annex II of its Protocol Concerning Specially Protected Areas and Wildlife (SPAW Protocol). The fisheries of the world were beginning to acknowledge the importance of this species and started actions towards the protection of future harvests. The majority of the debate and policy planning related to *Strombus Gigas* have, to date, focused almost exclusively on conch meat as the tradable commodity and have not looked in detail at all the valuable by product items.

Following the destruction of Queen Conch fisheries off the Florida coast and other U.S territories in the Caribbean, due to unregulated commercial exploitation and over fishing , the United States of America in 1992 recommended to the **Convention on International Trade in Endangered Species (CITES)** that *Strombus gigas* be included in the Appendix II of CITES.

CITES (the Convention on International Trade in Endangered Species of Wild Fauna and Flora) is an international agreement between governments. Its aim is to ensure that international trade in specimens of wild animals and plants does not threaten their survival.

An Appendix II listing in CITES raised awareness of the possibility of extinction of the species if previous harvesting practices were not changed. Of note is that the listing protects the commercial significance and continued availability of the conch meat product. Up to this point, the USA was the largest consumer and importer of conch meat; however, the damage to their own conch resources sent ripples of concern for this cash cow from the sea. The consideration for the future of conch fishing was commendable and adopted into legislation to include readily recognizable specimens of the species, I.E.: live specimens, meat, shells, pearls, carvings and all other parts of wild, ranched, or maricultured origin. According to CITES 2009, "When a species is included in one of the Appendices, all parts and derivatives of the species are also included in the same Appendix unless the species is annotated to indicate that only specific parts and derivatives are included". Seven years after the first mention of *Strombus gigas* in a CITES document the inclusion of all parts of the species came under the legislation.

Since 1995, CITES has encouraged review of the biological and trade status of the queen conch under the Significant Trade Review process and has included local, regional, national and international organizations to assist with ensuring that the species is harvested in a sustainable manner. In the 20 years since the Appendix II listing some of the more significant protection measures have been Marine Protected Areas, Harmonized Fisheries Regulations (size, weight,

catch quotas, lip thickness, fishing gear usage), Seasonal Closures, Data Collection on catch and export as well as research on the *Strombus gigas* reproduction, growth, and pearl development. CITES regulations have provided the governance and control for the export and import of this commercially threatened species (savetheconch.org). Management plans have been implemented for the protection and sustainability of this listed species to ensure future harvests and trade. According to NOAA (2009) import data of Queen Conch meat to the United States showed a substantial reduction from 1998 to 2009; 1,832,000 kg to 387,000 kg respectively. The USA is now joined by the European Union (EU) as the primary importers of conch meat despite the 80% decrease of conch meat imports over the past twelve years (NOAA 2009). Other indicators of continued sustainability for the species will be discussed later in this brief.

HISTORICAL AND CURRENT USES

Fossil evidence indicates that the Queen Conch first appeared about sixty-five million years ago (Conch Facts.com). It has been hunted as a food source for approximately 5000 years. The conch meat has been valued for several centuries dating back to Pre-Columbian times (Brownell and Stevely, 1981). Commercial harvest and inter-island trade have been recorded since the Mid-18th century when the Turks and Caicos Islands shipped dried conch meat to the neighbouring island of Hispaniola, now known as the Dominican Republic and Haiti (Ninnes, 1984).

Conch shell mounds, archaeologically known as middens, can be found around the Caribbean also dating back to Pre-Columbian/Pre-Hispanic times; 3000BC-1492AD. The middens found on land and underwater do not biodegrade or decompose. They remain as waste after claiming the meat.

Picture 1 displays a Pre-Columbian conch shell midden in the British Virgin Islands. Picture 2 shows a 2000 year old conch shell midden at a newly recognized archeological site in Belize.

Approximately 2000-3000 years ago conch shells became useful as building materials, cooking pots, dippers and cups, chisels, knives, scrapers, fish hooks, earrings, buttons, pendants and more (Neptune's Conch Facts).

Picture 3 shows a Pre-Columbian engraved conch shell cup. Once the ancient, indigenous cultures developed the skills of carving and tool making very little of the conch animal

Picture 1



Pre-Columbian conch shell midden (platform) on East End of Anegada, British Virgin Islands (source: www.flmnh.ufl.edu).

Picture 2

was wasted.



2000 year old conch shell midden at the Marco Gonzalez Maya Site, Ambergris Caye, Belize (source: J. Brown, 2010, with permission).

Picture 3



Conch shell engraved cup from Craig Mound at Spiro, Oklahoma, USA (source: <http://www.lithiccastinglab.htm>).

Picture 4



Antique 9k gold and pink conch shell cameo pin c 1880, (source: www.ebay.com).

Modern uses of the Queen Conch include not just the meat, but also follow the historical uses for both the shell and the pearl. Picture 4 displays a conch shell cameo trimmed in nine carat gold from the late 1800's. The elusive conch pearl, one found in every 10 000 shells, has gained a place in history with the regal example of the Queen Mary Conch Pearl Broach (see Picture 5). In the Caribbean the conch is well known as an artisanal catch and is a popular handicraft product as well as other artisanal uses. Picture 6 shows the artisanal value of the Queen Conch shell being sold on the internet as a lamp.

Picture 5

Picture 6



Queen Mary Conch Pearl Brooch, 1901-1915
(source: Smithsonian Institution).



Conch shell lamp by a local craftsman in Cruz Bay, St. John, Virgin Islands (source: <http://seestjohn.com>).

CURRENT HARVESTING PRACTICE

The Queen Conch thrives in the sandy, shallow, warm waters of the Caribbean at depths less than 100 meters, which are abundant with sea grass and algae. This relatively slow moving animal has always been vulnerable to predators, especially the human predator. For an animal that has been hunted for 5000 years, modern man has not yet learned what our indigenous ancestors practiced; that sustainability of a species should include total usage of the animal. Instead, the discard from current fishing practices endorses mounds of wasted by-products (see Picture 7).

Throughout the millennia we have finally learned that overfishing and commercial exploitation has led to a decline of the *Strombus gigas* species. Yet it is necessary to kill the animal in order to gain the meat product. The purpose of the CITES Appendix II listing was to protect the future of the conch meat under the auspices of sustainability. The meat is the main product of this commercially exploited species; the remainder is considered to be the derivatives and “are rarely the results of a direct harvest” (Mulliken, 1996; Chakalall and Cochrane, 1996). The by-product includes the conch shell, the undesirable meat scrapings (tissue loss) and the pearl, if one should happen to be found. Once the meat is removed from the shell, current approved fishing practices allow the shell to be discarded at sea.

Picture 7



Piles of empty *Strombus gigas* shells at the Southwest Cay of Pedro Bank, Jamaica (Source: A. Tewfik).

“Local fishers report that, if freshly cleaned conch shells are discarded in the sea, living conch will in fact abandon the area” (Julie Gauthier, personal communication, December 2002). The means of harvest and wasted by-products have become detrimental to the limited habitats that nurture the Queen Conch to maturity. This acceptance of wasteful fishing practices has provided fishers with the option to waste a majority of the animal at sea thus hindering repopulation in the vicinity. Though not illegal, the disproportional wasted parts of the animal are a recurrent theme with human predators, I.E.: The elephant carcass left abandoned for its tusks as the conch shell is discarded for only the meat.

The meat is then processed either at sea or on land. Depending on the desired level of processing the original tissue weight of the animal can be reduced by 50% or more (Thiele 2001). Table 2 outlines the classifications of processing commonly used.

Table 2: Processing grades and tissue loss of Queen Conch in the Jamaican processing industry

Processing	Grade	Tissue Loss
Unprocessed	Dirty conch	None; animal is simply removed from shell
50% cleaned		Removal of operculum (claw) and viscera (bag)

65% cleaned	Semi-fillet	All the above plus head (eyes, stalks and proscobis) and parts of the mantle (skirt)
85% cleaned		All the above plus verge, mantle and part of the skin
100% cleaned	Fillet	Only the pure white meat remains

(Source: Tewfik, 1996; Smikle, 1997 in Thiele, 2001)

Some commonly acknowledged facts about the harvesting of the Queen Conch are outlined below:

- The meat is the commercial product of the *Strombus gigas*; the remainder is called the by-product (Chakalall & Cochrane, 2009; Medley 2008).
- Each mature conch (3-5 years on average) with shell and animal is approximately two pounds, or 908 grams (www.conchfacts.com).
- Depending on the size and age of the animal, and the processing practice, the meat accounts for only 15% of the weight of a live animal (Formoso, 2001).
- The „meat weight' is averaged between 72-78g per animal for processed meat and 183g per animal for unprocessed or dirty meat (Thiele 2001), see Appendix B.
- 500 kg of unprocessed Queen Conch meat is harvested from approximately 3,500 animals, assuming an average meat weight of 143g (Theile 2001).
- 500 kg of 100% cleaned Queen Conch meat at an average of 72g would equal almost 7,000 animals (Theile 2001).

The above facts can be translated into the following mathematic equations; 908 grams of live conch, minus 72 grams of average meat weight, equals an industry approved accepted waste of 836 grams per animal harvested, or 92% of derivatives supporting an 8% commercial meat catch. $908 - 72 = 836$ AND $72 / 908 = 0.79295 \times 100 = 7.9\%$ (rounded up to 8%)

Referring back to the 2009 data on the reduced American imports of conch meat, 387 000 kg would require slightly more than 5.4 million animals to be caught, killed and discarded for only 8% of the total allowable catch. Commercial profit must be extremely high to accept 85-92% wasted by-products. It is our position, Sustainable Gigas Aquaculture (SGA) that this cannot be what was conceived of or intended by the drafters of the Appendix II legislation in 1992; something has to change.

Paul Medley (2008) highlights the significant points of the convention for Appendix II species as shown in the text box below. The first point of clarity (2) is the requirement of an export permit, to be obtained in advance of fishing, processing and exporting. The next point (2a) states the export permit is granted if regulatory authorities deem the export of the product will not be detrimental to the species survival. SGA questions if the stipulation “non-detrimental to the survival of the species” includes acceptable harvesting methods which allow a majority discard. The third area of importance Medley stresses is the need to limit the Total Allowable Catch so the species does not become endangered, thereby preventing commercial harvest indefinitely.

Significant Points of Appendix II Listing

“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; ...”, and

“3. ...[Appendix II species exports] 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.” (Paul Medley, 2008)

Whether at sea, discouraging future habitation of the species, or on land by creating wasteful mounds of non-degradable by-products, the stipulation of an export permit for the "garbage of the harvest" seems short-sighted; hence this proposal to gain support for amending the CITES Appendix II regulations.

The primary responsibility of the CITES Authorities is the implementation of the export permit system protecting the species for the main product; the meat (Medley 2008). The animal, as a whole entity, has not been considered for a permit. Instead, it is divided into commercial meat products and wasted by-products under the same governance. Relegated for secondary economics (handicrafts, jewelry, building materials) the derivatives are also regulated and restricted by the CITES agreement (Mulliken, 1996; Chakalall and Cochrane, 1996). Unfortunately this regulation has led to the seizure of thousands of shells annually and the nominal production of artisanal products. “German Customs authorities seized between 1997 and 2000 a total of 4,640 *Strombus gigas* shells, mostly from tourists that returned from their holiday destination with one to three shells in their luggage” (F. Boehmer, CITES Management Authority of Germany, pers. comm., Oct. 2001 in Thiele 2001). Other EU countries, as well as American and Canadian authorities have also enforced the CITES rules and confiscated the by-products. Thiele further states that the control of shells unwittingly exported by tourists is a major administrative burden for CITES Management Authorities (2001). Conch shells are difficult to regulate and monitor and, if salvaged as a wasted by-product,

time and effort are wasted to maintain compliance to the CITES regulations. Furthermore, issuing export permits to tourists is considered problematic as regulatory authorities may not be available or located near tourist centers.

Another complication with export permits is with the countries that have elected not to join sustainability efforts or sign with CITES. Cargo containers of conch shells end up in Asia where the import and export laws do not protect the use of the species in the marketplace. Nor do they assist in the sustainability of the species. Only those that abide by the regulations seem to be hindered. Both the exporting and the importing countries of non-CITES regulated countries should stop the trade in conch products and by-products; much like prohibiting the flood of Blood Diamonds out of the war torn countries of Africa. SGA believes it is time for CITES abiding countries and organizations to step up and do more towards the sustainability of the *Strombus gigas* in a commercially marketable and tradable manner.

SUSTAINABLE GIGAS AQUACULTURE MISSION AND GOALS

SGA's mission is to conserve Queen Conch and related marine shell products and promote the sustainable livelihoods of conch fisher folk and their communities.

Objectives

- To encourage sustainable production and harvesting of queen conch and related marine shell products
- To increase income and employment of conch fishermen and their families through the better use of by products and derivatives
- To develop and promote industry best practices and quality standards
- To promote national and international regulations that ensure the long term survival of the species

Overall Activities

SGA is a Non-Profit organization that will support the following activities directly related to its mission.

- Research & Development
- Design and Innovation
- Marketing, Branding and Intellectual Property
- Community Development and Training
- Benefit Sharing and Corporate Social Responsibility
- International Trade and Regulatory issues
- Funding and Technical assistance

SPECIFIC INTERVENTIONS

Sustainable Gigas Aquaculture is directed by the following goals for sustainability of the Queen Conch:

1. To promote good harvesting and collection practices in existing Queen Conch harvesting areas (fishing practices)
2. To improve monitoring of supply and demand for the Queen Conch and its products (data collection)
3. To collect and disseminate information on the economic and social importance of Queen Conch harvesting (education)
4. To promote new technologies which enrich existing Queen Conch habitats (research)
5. To support and/or develop sustainable aquaculture facilities (farming and mariculture)
6. To promote value-added production of Queen Conch derivatives (total usage for sustainability)
7. To develop local businesses and new trade markets for value-added products (commercial development)
8. To seek reform in the licensing and certification process for the Queen Conch (update regulations for improved sustainability)
9. To ensure an equitable share of the benefits from the Queen Conch trade remains within the Caribbean communities (ethical business practices)

Each of the SGA goals is tied to improving the sustainability of the Queen Conch species and improving the commercial trade of the species in a sustainable way. Current regulations governing trade of the *Strombus gigas* was drafted to enable continued trade of the conch meat; the remainder of the animal has become caught in the definitions of the regulations guiding the Appendix II CITES listing, thus hindering authentic sustainability for the species. Each of the SGA goals requires time, money and effort to effect change. As an international NGO we seek your endorsement for the following recommendations aligned to our stated goals.

1. Fishing Practices

- a) Current fishing and meat harvesting practices endorse a majority loss of the animal. The meat product accounts for only 8-15% of the catch, wasting 85-92% of a tradable commodity called the by-product.
- b) The loss of the shell by-product when discarded overboard creates underwater middens or mounds (graveyards) discouraging future conch habitation.
- c) Conch shell middens on land are also a missed opportunity to enhance commercial trade of the species. Historical discards of shells prove they do not biodegrade, yet we let the shell lay waste.
- d) Minimum size limits and the pre-mature catch of individual animals is not easily regulated or enforced.

SGA Recommendation for Sustainability – Mandatory onshore shell landings

Onshore shell landings or barge landings will control the size limits of the individual animal. Shell sizes can be measured if they are landed (FAO, 2007b). It would prevent immature conch from pre-mature harvest and may be a useful control in the non-commercial and local usage sectors. A control requiring fishers to only take conch with a flared lip or applying a minimum lip-thickness is the most promising measure of size since shell length does not increase after maturity (Medley, 2008). The landing of shells would discourage the creation of undersea middens and conch mounds encroaching on the useable habitats. Most importantly, 100% of the animal is available for total usage as commercially tradable commodities.

2. Data Collection –Supply and Demand

- a) Minimum size requirement can also be easily enforced
- b) Determine age of individual animals to prevent pre-mature harvest
- c) Accurate count as opposed to estimates and mathematical equations for approximated catch quotas. An accurate count may also be useful for habitat seeding programs
- d) Gain information on specific catches matched to specific harvest areas
- e) Trace the supply chain for accurate counts of meat export and local usage (fishing families, local restaurants, tourism). Local usage is often blamed for export supply shortages though data is difficult to gain.
- f) Potential to gain and share data on future trade of derivatives; dirty meat, shells and pearls

SGA Recommendation for Sustainability – Simplified data collection

Again, onshore and barge shell landings would provide the simple solution. Regulations for size and age could easily be enforced, as well as accurate counts for catch quotas from specific habitat and harvest areas. Data collected could also provide the necessary information for projects focused on reseeding habitats.

3. Education (Knowledge Capital)

Education is an important component for effecting change. In the past 20 years since the CITES Appendix II listing education efforts on the Queen Conch have brought in seasonal closures, restrictions on gear use for fishing, total allowable catch limits, the provision of Marine Protected Areas and fisheries management plans. The programs are working. The development of Marine Protected Areas has provided spawning and growth habitats in many locations (See Appendix A, Mexico, Belize, Honduras and Guatemala). Other evidence, in 2012 and 2013, is when the conch harvest was closed two months early in Belize when the catch limit had been reached early. Currently, the Queen Conch population is reported to be stable according to the San Pedro Sun Newspaper, September 06, 2012 issue documenting a recent conch survey (see Appendix C).

- a) As education is gained, the information must also be learned and applied (I.e.: Conch mounds are not degradable and inhibit future habitation). Can we train conch fishers to conduct their vocation in a more sustainable way? Most certainly, but it will take education as well as support for impending change.
- b) The following is a direct quote from the conservation group Oceana, “Conch shells are made primarily of a mineral called aragonite. Each mineral layer is reinforced by layers of protein, similar to the way a brick wall is reinforced by mortar. As a result the conch's shell is more than 100 times stronger than pure mineral aragonite, and its construction has inspired engineers in the development of stronger ceramics” (Oceana, 2012). The sharing of this information leads one to contemplate what more uses can be found for this strong shell.

SGA Recommendation for Sustainability – Forward education

Education needs to be shared. We support the collection and dissemination of educational materials and information. We focus on the economic and social importance of the Queen Conch and plan to use this information in ways that will promote sustainability of the species. Education spurs inspiration. We look forward to the inspirations that will come from the sharing of new knowledge and the plans to implement consistent sustainability.

4. Research

- a) At research facilities in the Turks and Caicos and the Harbor Branch Oceanographic Institute (HBOI), much research has been conducted on the reproduction of *Strombus gigas*; the fertilization of egg strands, reseeding habitats with juvenile conch and the study of developmental stages from growth to maturity. For the past 32 years it has been possible to cultivate the Queen Conch though the application has been under-utilized for sustainability.
- b) Another research advancement is the technological discovery for removing the conch meat without „knocking' or breaking the conch shell. The shell remains undamaged for other uses.
- c) Cultured conch pearls – Conch pearls occur in a variety of colors, gaining their hue from the interior color of the conch shell. Most popular is the pink conch pearl though they also develop in white, red, orange, yellow or brown (www.wikipedia.org & HBOI). Florida Atlantic University's HBOI has conducted research with the Gemological Institute of America (GIA) to create

cultured conch pearls. Dr. Héctor Acosta-Salmón and Dr. Megan Davis claim that the most significant outcome of their research is the 100% survival rate of the host conch. Furthermore, that same conch will produce another conch pearl when it is reseeded after the first pearl has been harvested. This is epitome of sustainability for a commercially tradable by-product.

SGA Recommendation for Sustainability – Promote research

Each of the three examples of recent research works to support sustainability of the species. SGA encourages new technologies and research while keeping in mind the economic factors that support sustainability of the species.

5. Farming (Aquaculture) and Mariculture

By definition, mariculture is the cultivation of sea animals and plants in their usual habitats, generally for commercial purposes. Similarly, aquaculture is the farming of ocean and freshwater plants and animals for human consumption (Microsoft Word definitions, 2012). Both these terms are attached to the Appendix II restrictions governing the Queen Conch. Should the Queen Conch ever become an Appendix I endangered species, mariculture or conch farming may be the only resource in the future. SGA is an advocate of mariculture and believes the restrictions have been applied indiscriminately to this species.

The Caicos Conch Farm was instrumental in supplying research to the study of the *Strombus gigas* as well as public awareness with its educational tours aimed at tourists. August 2012, the Caicos Conch Farm closed. The research has been done and is promising to others who can continue the quest of sustainability.

SGA Recommendation for Sustainability – Support farming and mariculture

The research conducted at the Caicos Conch Farm, and further research conducted in Florida and the Bahamas, has paved the way for the Dutch who are now planning to start a hatchery and grow-out farm in Bonaire. Hatcheries are important for increasing the number of egg strands which contain the eggs that develop into larvae and grow into the shelled animals. The grow-out farm is then essential to assist the juvenile conch in becoming a mature Queen Conch ready for harvest or to re-seed existing habitats. A mature Queen Conch is ready to breed ensuring a continuous supply of egg strands for a hatchery. It can also be harvested for meat. Applying the new advances of removing the conch meat from the shell, the shell remains undamaged for alternate uses. The cultured pearl is another marketable asset of mariculture technology. These results are a product of research and mariculture.

6. Total usage for sustainability (stop the waste of by-products)

SGA promotes the value-added production of Queen Conch by-products. Too much of the Queen Conch is wasted when the meat alone is harvested. If this practice does not change the harvesting of the Queen Conch as we know it will not be sustainable. The restrictions of the CITES legislations following the Appendix II listing is for the sustainability of a species for commercial trade. SGA supports trade; not waste.

a) Encourage all meat processing to be conducted locally (on shore) and develop uses for the conch meat tissue waste. Tissue waste or dirty conch is essentially protein. It can be used as bait in other fishing endeavours, food for domestic animals and perhaps garden fertilizers. Even the operculum can be used in shell craft, jewelry, mosaics and the like.

b) Revitalize artisanal uses for conch shells. Currently, pristine shells are sold as cleaned, natural shells, decorative art pieces, I.e.: lamps, bowls, folk instruments, shell art and hand carved jewelry. Research now proves a reliable means to expand this market.

c) Support alternative shell uses for the wasted derivatives. In construction they can be used for landfill, landscaping, road way development, breakwaters. Venezuela and parts of Asia are already introducing ground conch shells as building materials and interior materials for floor tiles and Formica-type counter tops. Spa products such as exfoliant treatments and skin creams are also made from the shells of the Queen Conch. Even the health food market has found shell uses as whole food supplement capsules and include conch nutrients such as amino-acids and antioxidants (Eichler, 2007).

d) Encourage the international trade of conch pearls. The rarity of this semi-precious gem

(1 in 10 000) has created a market anxious for the exposure it had in Edwardian Era. The host conch now has a 100% survival rate and prospects to re-seed for future pearls. The advancements of research for conch pearl development proves the species is no longer threatened if pearl trading is recognized and removed from the governing legislation of the CITES Appendix II listing.

SGA Recommendation for Sustainability – Total usage

The above examples are some of the ways to include total usage as the key factor of sustainability. Commercially, it is termed „value-added' (products). SGA supports value-added products and is ready to assist new ventures in the commercial marketplace with the derivatives of the meat harvest.

7. Commercial and Trade Development

As discussed in previous goal points, new markets for commercial development are primed and ready to be serviced. SGA is willing to be a part of that and assist new ventures to grow. Value-added products from the „by-products' of the wasted conch has the marketability that can provide sustainability for the species in an entirely new way. SGA wants to assist the Caribbean nations to develop local businesses from the by-product of the *Strombus gigas* and direct the profits back into the Caribbean communities.

SGA Recommendation for Sustainability – Commercial trade and development

Future education and research for sustainability are all part of the process for new markets in commercial trade and development. SGA would like to see the Queen Conch surpass the status of artisanal uses only and be elevated to the regal opportunities of history, but those days are gone. Our efforts are better served with educating others for changing laws and developing a commercial trade market. We would like to augment the conch meat marketplace while enhancing the authentic sustainability of the species by creating employment and business opportunities in the communities where the Queen Conch is harvested. We aim to share research and education in a functional way and encouraging the adoption of zero waste. This means adopting an attitude of zero waste for a species that has waited many millennia for us adopt it completely. We wish to assist in the development of business ideas that may change the face of fisheries but are reliable in sustainability and proven by research.

8. Update regulations for improved sustainability

It remains unfortunate that the country which promoted the *Strombus gigas*, Queen Conch, to the Appendix II CITES listing, is the same country known for the majority of conch meat imports, closely followed in recent years by the European Community. SGA promotes sustainability and is attempting to prove the sustainability of new developments for the trade of the by-products of this species, currently hindered by CITES regulations. We do not promote the notion of take the fins and discard the carcass (I.e.: Shark). Unfortunately the carcass is already abandoned during the harvest of the conch meat. SGA believes that some of the regulations are now in need of change; proof is found with ongoing research, technological advances and newly recognized fishing practices for sustainability of the species. We believe that the Appendix II listing was only meant for the trade in meat yet as an Appendix II listing, the Queen Conch derivatives have been unintentionally caught in the CITES regulations.

a) SGA is seeking endorsement for the refinement of conch fishing regulations to require onshore shell landings. We can assist in transforming local fisheries into sustainable fisheries.

b) Removing the terms mariculture and ranched (aquaculture) from the Appendix II legislation would provide the opportunity to continue research towards future sustainability of this species. Research has already proven technological advances in hatchery (egg strand to larvae) and grow-out stages for re-seeding of habitats.

c) Developing new commercial markets with the detritus or by-product from the conch harvest is more than difficult. SGA is hindered on this as the CITES Appendix II listing does not allow the development of new commercial markets for waste products unless exemptions are granted and amendments approved. It is for this reason that we propose the Convention of Parties (CoP16) for CITES in March 2013 consider providing an annotation to amend the use of derivatives of the *Strombus gigas*.

d) Research findings also prove that it is possible to cultivate the Queen Conch. Does the market want meat, shells and pearls? Research has made the improbable very much possible. Yet all of the trade of by-products remains under the restrictions of CITES legislation that endorses meat harvest for trade which maintains an 85-92% loss of the individual animal.

SGA Recommendation for Sustainability – Update or amend regulations

Change the fisheries regulations for the catching and harvesting of conch. CITES regulations were adopted when gear restrictions were applied; onshore shell landings can become a requirement too, and SGA can help. Data collection for size, age and mature catches could all be documented as well as catch quotas match with specific habitat areas and possible needs for reseeded. Onshore and barge shell landings would increase the conch industry with artisanal uses, alternate uses, and the development of new local businesses. Removing or amending the regulations and terms governing ranching (farming) and mariculture from the 1992 regulations specified in the CITES Appendix II controls would enhance mariculture and aquaculture as have been documented above with proven research records towards better sustainability than the current regulations require.

9. Ethical business practices

The *Strombus gigas* is found in nature in localized areas protected by the Mesoamerican Reef. In the past 20 years the Caribbean nation states have learned the needed lessons and have worked towards sustainability of this species. Now, as trade in this commodity is governed by CITES, unfortunately, the majority of the associated profits from the Queen Conch go towards export, shipping, imports to foreign nations and end suppliers. Very little financial gain remains in the Caribbean communities. SGA proposes that adopting a habit of total usage, more local business and jobs can be created in local communities; hence more profits remaining in the communities working with the Queen Conch.

SGA Recommendation for Sustainability – Ethical business practices

SGA wants to ensure an equitable share of benefits, prosperity, and financial trade remains within these Caribbean communities. If SGA recommendations are implemented, then changes will take place. We will be available to assist.

SUMMARY

The 1992 Appendix II listing was a necessary wake-up call for *Strombus gigas* fisheries. Today, we have research proving the suggestions we have forwarded can provide more sustainability for the product, the by-product and the species as a whole animal than is currently being enforced by regulations. We propose a change in the methods of commercial meat harvesting



**MINSITRY OF AGRICULTURE AND FISHERIES
BELIZE FISHERIES DEPARTMENT**



**BELIZE FISHERIES EDUCATIONAL PROGRAMME
STANDARDIZED CONCH MEAT WEIGHTS**

All fishermen are advised of the following conch terms and their definitions.

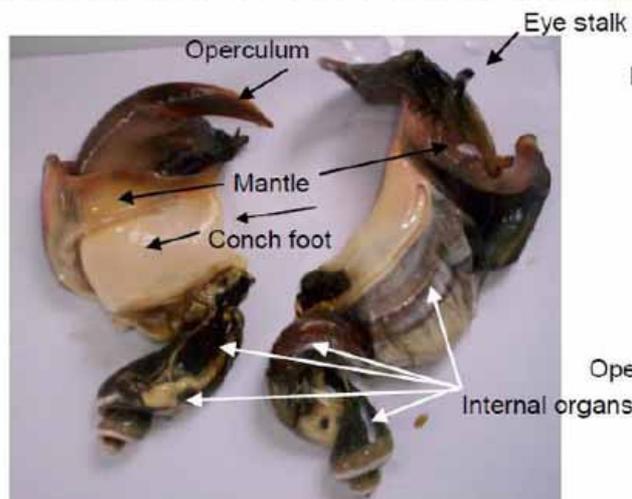


Figure 1. Unprocessed conch - 7 ½ oz.

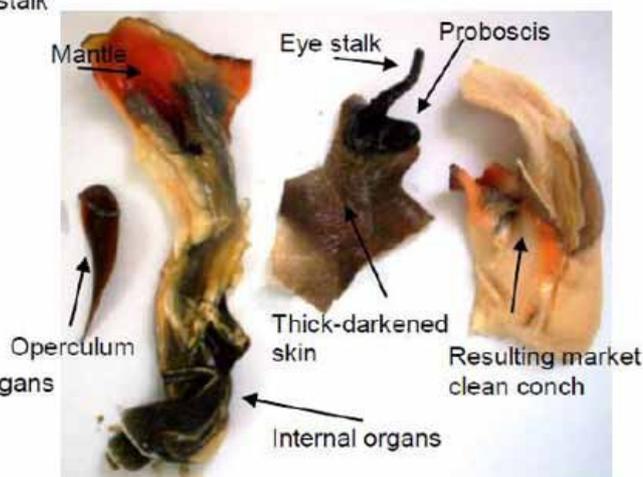


Figure 2a. Organs removed to produce a partially processed conch (market clean).



Figure 2b. Partially processed conch (market clean) - 3.0 oz. (Dorsal view).



Figure 2c. Partially processed conch - (market clean) - 3.0 oz. (Ventral view).

Figure 3.
Fully processed conch
(conch fillet) – 2 ¾
oz.



Definitions:

1. **Unprocessed conch** means conch that has been removed from the shell with all organs attached and has a **minimum weight** of **7 ½ ounces** or **213 grams**.

Appendix C

San Pedro Sun Newspaper, Stable Conch Population, Sept. 06, 2012

September 6, 2012

Conch Survey conducted nationwide

The Fisheries Department is working within the various marine reserves nationwide in conducting their bi-annual national conch survey. The survey, which should be completed next week, is conducted in compliance with Appendix Two of the Convention on International Trade in Endangered Species (CITES) and is intended to make stock assessment of the Queen Conch scientifically known as *strombus gigas*. The two marine reserves on Ambergris Caye, Hol Chan and Bacalar Chico have been working in various areas inside and outside of the reef to inventory all queen conchs regardless of their size.



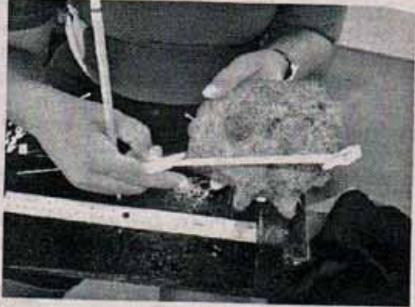
Hol Chan Marine Reserve Biologist Kirah Forman explained that because the flesh of the queen conch is one of the biggest fishery products exported from Belize, it is important for the country to provide critical information to CITES to show that the conch population is still sustainable. Because the queen conch is listed by CITES as endangered, Forman said that it is essential that Belize reports to CITES that Belize is monitoring the conch abundance and sustainability.

Forman explained that the methodology used to conduct the conch survey is similar to that used at Hol Chan Marine Reserve when doing their conch abundance survey before and after the official conch season

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Conch Survey Continued from Page 3



in Belize each year. "We run transect lines inside and outside of the reef... inside the reef we run 200 meter transect lines and two meters wide on each side of the line in a grid pattern, we measure every single conch (queen conch) within the transect," explained Forman. Two measurements are taken from the conch, the first measurement is the length of the conch from tip to base and the second is the thickest part of the flair lip of the conch. The survey off Ambergris Caye is held from the Belize/Mexico border where Bacalar Chico Marine Reserve starts and every two miles southward thereafter until they eventually pass the Hol Chan Marine Reserve. Forman said that they emphasize on holding a stock count in the fore reef (front part of the reef) is because, "Belize claims to have a deep stock of conch so we want to also be able to show that the deep stock is replenishing the back reef where most of the conch fishing is done."

While Forman could not give preliminary findings so far on the national conch survey around Ambergris Caye, she said that around the Hol Chan Marine Reserve the population can be described as "stable." The national conch survey is done every two years from the northern coastal tip of the country to the southern coastal end. Hol Chan conducts their own conch abundance survey inside and outside the protected areas at the beginning and the end of the conch season. The national survey off Ambergris Caye is conducted over a span of two weeks, just ahead of the opening of the official conch season which is scheduled to open on October 1st.

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