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WESTERN CENTRAL ATLANTIC FISHERY COMMISSION (WECAFC)

TENTH SESSION OF THE SCIENTIFIC ADVISORY GROUP (SAG)

Electronic SAG, 4 June 2019

**Draft Report of the Scientific, Statistical and Technical Advisory Group of the
CFMC/OSPESCA/WECAFC/CRFM/CITES Queen Conch Working Group (QCWG)**

1. This document presents the Draft Report of the Scientific, Statistical and Technical Advisory Group of the CFMC/OSPESCA/WECAFC/CRFM/CITES Queen Conch Working Group (QCWG) held in Miami, 23-26 April, 2019.
2. SAG is invited to discuss the outcomes and review, amend as appropriate the suggested **recommendations** as follows:

The Commission is particularly invited to:

- ask countries to: a) submit clear definition of their processing degrees in trade or degree of cleaning and calculate the proper conversion factor; b) report all landings indicating the processing degree (i.e. x kg of 85% clean meat), c) develop a scale of the conversion factor from % tissue loss for each processing grade they trade; d) Determine the numbers of conch by unit of weight for each processing grade (weight frequencies can also be used), d) convert production (100% dirty meat) to nominal weight for FAO statistics and/or provide the conversion factor used or to be used in case of reporting at meat level.
- communicate to countries the need to identify long-term research strategies for conducting conch density surveys needed to determine population status, following regional scientific agreements. They are invited to develop further collaboration allowing for sustainable funding mechanisms, and sharing of human and technical resources.
- request the CITES Secretariat to inform Parties to discuss the need for a resolution on queen conch, that could include guidance e.g. on NDFs and data collection. It is further recommended to seek the CITES Animals Committee's view at its 31st meeting, scheduled for 2020, on possible elements of such a draft resolution.

Commented [A1]: These will be addressed together with WECAFC/SAG/X/2019/5 (Draft Recommendations and Resolution)

1. Introduction

This queen conch expert workshop was held in Miami as result of one of the recommendations of the CFMC/OSPESCA/WECAFC/CRFM/CITES Working Group on Queen Conch (QC), in its third Meeting held in Panama City, from 30 October -1 November, 2018 to improve the implementation of the regional queen conch management and conservation plan (<http://www.fao.org/3/ca4467b/ca4467b.pdf>). This regional plan envisioned the establishment of three subgroups, within the main queen conch working group: a) the technical advisory, b) the outreach and education, and c) the governance sub-group. The third meeting of the working group established the operationalization of the former two sub-groups. The document also outlined the activities each sub-group could address.

In particular, the technical advisory group, coordinated by Ms. Martha Prada, initiated its communications using online tools, but in-depth discussions took place in the first face-to-face meeting which is the subject of this report. The CFMC/OSPESCA/WECAFC/CRFM/CITES Working Group on QC recommended several experts names for the potential composition of this advisory group but the sub-group will eventually determine its own composition and other rules and protocols. The recommendations from this technical advisory group will then be shared with the CFMC/OSPESCA/WECAFC/CRFM/CITES Working Group for final approval.

Funding for the coordination and for this workshop have been provided by the Caribbean Fisheries Management Council (CFMC) and FAO/WECAFC (respectively 80% under NOAA funding and 20% under the EU-funded FAO implemented project “Support to the implementation of the Regional Plan for the Management and Conservation of Queen Conch (*Strombus gigas*) in the WECAFC area”). Nevertheless, it is recognized that there is a need for securing additional funding to keep the sub-group actively working, in effectively addressing the recommended actions in the regional fisheries management and conservation plan.

2. Objectives of the meeting

The technical advisory sub-group was asked to discuss and provide recommendations on four main topics, as follows:

- a) Improve scientific guidance on regional conversion factors,
- b) Provide initial considerations about the basic information for generation of queen conch NDF determination,
- c) Identify priority research at the regional level,
- d) Define its internal protocols on how it will operate and agree on future steps, at least for its first year of work.

3. Methodology

The meeting took place at the Aloft hotel, Brickell, Miami, from April 23-25, 2019. It was attended by 11 experts, three observers, and three representatives from regional organizations, as presented in Table 1 and Figure 1. The meeting was conducted in English.

Based on the objectives of the meeting, the agenda in Annex 1 was agreed. The Workshop documentation, presentations, pictures are available at <https://www.dropbox.com/sh/qfyrrdzlz3rpg4p/AADVDDVVNMoD8gcFYstejHazqa?dl=0>

4. Meeting development

3.1. Background

Ms. Martha Prada, the group coordinator, welcomed participants and facilitated their short introductions. She recalled in her presentation that there have been previous encounters of QC experts aimed to improve collaboration and fisheries management during the last decade, which proved relevant in implementing the species regional fisheries management and conservation plan recently adopted. Among them were:

- The collaborative management of the queen conch workshop in the southwestern Caribbean in San Andres Island, Colombia (Jul 2008),
- The technical recommendations gathered from the QC expert meeting in Miami (May 2012),
- The establishment of the CFMC/OSPESCA/WECAFC/CRFM/CITES Working Group on Queen Conch at the 14th session of WECAFC, Panama (Feb 2012),
- The revision of the QC regional plan during the second meeting of the CFMC/OSPESCA/WECAFC/CRFM/CITES QC Working Group in Panama (Nov 2014),
- The expert's regional recommendations for better QC management in San Andres Island, Colombia (Mar 2015),
- The establishment of the technical advisory and education and outreach subgroups during the third meeting of the CFMC/OSPESCA/WECAFC/CRFM/CITES QC Working Group in Panama (Oct 2018).

The regional fisheries and conservation management of the QC in the Caribbean was built over scientific recommendations. However, technical advice needs to go further and develop mechanisms for the progressive implementation of the plan. In this respect, QC experts recommended to work in the development of one or several proposals aimed to respond to priority recommended actions.

3.2. Updates from WECAFC

Ms. Yvette Diei Ouadi, from WECAFC Secretariat, mentioned the importance of this meeting and the establishment of the sub-group supported by FAO/WECAFC as recommended during the third meeting of the CFMC/OSPESCA/WECAFC/CRFM/CITES QC Working Group, to get technical advice to support countries to respond to FAO and CITES reporting requirements and QC stock assessments. Also, technical advice is important to evaluate the progress of the QC working group in the implementation of the regional management plan.

Ms. Ouadi mentioned that the recommendations from this workshop will be presented at the next on-line 10th WECAFC Scientific Advisory Group meeting that will take place in June 2019 and the 17th Session of WECAFC. She also recommended to have experts frequent interactions, such as one or two face-to-face meetings per year and even more frequent online communications, the group needs to keep a manageable size.

3.3. Updates from CITES

Mr. Daniel Kachelriess from the CITES Secretariat expressed the Secretariat's thanks for the close collaboration that has developed in the Caribbean region with regard to the QC, since the species was listed in CITES Appendix II in 1992. In fact, he highlighted, it was one of the first commercial marine species to be listed under this convention.

He made clear that pursuant to the provisions of CITES for species listed in its Appendix II every QC export would require a NDF (Non-Detriment Finding) by a designated Scientific Authority and a legal acquisition finding by a designated Management Authority. For these however, each country can develop their own criteria on which to base these decisions, with no binding guidance specified in CITES. In this sense, clear guidelines need to be implemented looking at improved harmonization. Guidance developed by expert groups such as this one, can be helpful tool to assist CITES parties in these processes. As a safety net, to ensure that no Appendix II species are traded at levels detrimental to the survival of the species in the wild, CITES conducts significant trade reviews, based on its trade database, where Parties with significant levels of export are requested to provide the scientific justification for their offtake levels. Queen Conch range states have already undergone this process twice (1996-1997 & 2001-2003).

He also provided an update on recent developments and discussions in CITES fora. Among others CoP17 (Johannesburg, 2016) had adopted Decisions for the CITES Animals Committee to review the use of scientific quotas for queen conch, which at its 30th meeting (Geneva, 2018) decided that "scientific quotas" were not defined under the convention and that every export would require an NDF. Other instructions by CoP17, largely focusing on supporting queen conch range states in implementing the regional queen conch management plan, have not advanced significantly, due to lack of external funding, and the CITES Secretariat will propose to CoP18 to extend their duration with some small updates.

With regards to the upcoming CoP18, the Secretariat informed the participants that they will be proposing another NDF workshop for plants and animals, similar to the one that took place a decade ago in Cancun. There may also be a smaller workshop, focusing in particular on marine species late in 2019. QC would be an interesting example case for both workshops. In addition, he informed participants that FAO is preparing a report on CITES and the sea, which looks at historical trade in marine species under CITES.

After the presentation there was some discussion about the role of the CITES Secretariat, the governing bodies of the Convention (CoP, Animals Committee, Standing Committee) and the Parties. The presenter explained that the implementation of CITES decisions and resolutions lies with the designated management and scientific authorities of the Parties that need to make sure the rules set by the Convention are followed. For more specific questions and topics, the Conference of the Parties adopts decisions, which are time-bound and usually cover the time between two CoPs (3 years) and resolutions, which are more long-term. Another source of instructions are compliance processes, e.g. the Review of Significant Trade (RST). While for QC there is currently no resolution and no ongoing RST, there is nevertheless a set of decisions designed to support the range states in the regional management of QC.

However, it is recommended in the long term, to have more independent reviews, thus assuring that countries do not have under the same agency the scientific and the management CITES authorities.

Noting that only the general provisions, e.g. the requirement to make an NDF are binding under CITES, but not any specific guidelines or format, the group discussed that these could be agreed on a regional basis. However regional organizations such as the WECAFC usually also adopt only non-binding regulations. and given the fact that this organization is currently going through a transformation process, it is unlikely that they will adopt a binding measure. If a party is exporting, it remains its responsibility to comply with CITES requirements.

The group also discussed the need for conducting surveys and be able to estimate proper levels of extraction (including domestic use and estimates of IUU fishing), in particular in the context of making NDFs. However, surveys are usually costly and funding mechanisms need to be in place. Several countries already have allocated budgets for this research, other has created an industry fund, while other exclusively rely on direct participation of the industry. The group recognized that it is important that management authorities require independence and establishing protocols and funding mechanisms is a task that should be addressed in the short term.

The group noted that the queen conch fishery in the region has been usually working based on CITES decisions, which are short term, time-bound actions in between CoPS, that will usually expire after ca. three years. A more permanent alternative would be a CITES resolution on queen conch, that could include guidance e.g. on NDFs and data collection. At present, there is no time to consider a CITES Resolution for the upcoming CoP18 as the document deadline was already 24 December 2018, but experts may wish to recommend to the QCWG to start the development of such a resolution for submission to CoP19 (2022). Experts recalled that in fact, there is a big problem in data collection not just for exports, but also for production which need to include national consumption and IUU fishing.

3.4. Updates from FAO/Fisheries and Aquaculture Statistics

Ms. Stefania Vannuccini, FAO, delivered a presentation on “*Queen conch: conversion factors and impact on FAO Statistics*”. She explained that FAO fisheries and aquaculture statistics are disseminated in terms of live weight equivalent (i.e. entire animal). Therefore, in the case of Stromboid conchs this is equivalent to the weight of the entire conch including the shell. She indicated that live-weight equivalent is essential to allow comparison among data by countries as well within countries and obtain consistent studies on national and regional trends. She provided a detailed overview of conversion factors being utilized by the countries in the region when reporting data on Stromboid conchs in live weight equivalent as well as the ones applied by FAO when data were reported in different meat forms (from dirty to 100 percent clean).

In general, in case of no indication of the conversion factor by the country, FAO has been applying the regionally agreed conversion factors for various meat processing grades. These were obtained since the last few years through the conversion factor project led by Manuel Perez, agreed at the 2nd Queen conch Working Group in Panama (November 2014), and adopted by the XVI Session of WECAFC in 2016. In examining the conversion factors of the nine countries¹ utilized to obtain the regional conversion factors, the experts noted that three of the nine countries (Barbados, Belize and Mexico), presented clearly different trends on the conversion factors (processed weight to live weight) compared to the others. S. Vannuccini indicated that the conversion factors being utilized by FAO, or directly applied by the countries, are regularly reported in the country notes metadata published by FAO when disseminating the capture fisheries data.

¹ Antigua and Barbuda, Bahamas, Barbados, Belize, Dominican Republic, Honduras, Martinique, Mexico and Nicaragua.

Furthermore, she indicated, that a new version of the Harmonized Commodity Description and Coding System, commonly referred to as HS, entered into force on 1 January 2017 for all Contracting Parties to the Harmonized System Convention. The HS 2017 contains three specific codes for Stromboid conchs in different product forms² as a result of the work carried out by FAO with the World Customs Organization (WCO), responsible for HS. This represents a major improvement for monitoring trade of these species as HS is used as a basis for the collection of customs duties and international trade statistics by more than 200 countries.

The most recent data on trade, as well on capture fisheries were presented. These statistics highlighted that several countries report data on QC not as a separate species, but as *Strombus* spp. Overall, the data indicated that in 2017 Nicaragua was the country with the highest production, followed by Mexico, Jamaica, Bahamas and Belize. For trade, preliminary data indicate that in 2017 Nicaragua was also the key exporter in both quantity and value terms, while other relevant exporters in the region were Bahamas, Haiti and Turks and Caicos. Key importers were China, Spain and the United States of America in quantity (in product weight), while in value terms they were the United States of America, China and France. In examining catch data, experts noted some anomalous trends, which reflect limitations on the quality of the reported data. This was considered due to non-comprehensive and effective collection of data, often more based on trade or processing plants data, or partial surveys not fully covering the production destined for local consumption. For instance, in Jamaica the Queen conch local consumption significantly increased, so they will close the fishery for one year in order to get better estimations. In other case, Bahamas reports are likely to represent only 30% of the total amount since it is believed that around 70% of the production is consumed locally.

With the new recommendation of WECAFC/17/2019/8 of using a conversion factor to back calculate the whole animal weight as extracted from the shell (100% meat weight or dirty weight), without the conch shell, she remarked that there would be the need of having proper conversion factor(s) to convert data into live-weight equivalent for inclusion in the FAO database. However, experts discussed that one approach would be to use just one global conversion value from the dirty weight to live-weight. This is due to the fact that proper conversion factors are difficult to estimate, particularly when the shell weight is included. The shell accounts for a very large proportion of the weight and exhibits a very large variation through its distribution range, and it can be also associated to the conch age targeted in the fishery. Furthermore, the shell weight is a measure that only few countries can conduct, because extraction of the meat from the shell is mainly done directly at sea and mostly QC meat fillets are being landed. In addition, conch meat might be landed according to many different processing grades and several existing conversion factors are utilizing outdated parameters. Work needs to be done to calculate regional conversion factors from the different processing levels and various conch ages (adults, semi-adults, juveniles) into dirty weight. A first approximation of an updated regional conversion factor may result from re-analyzing existing data, and a proposal should be presented by some of the experts to the WECAFC Secretariat and the CFMC.

3.5. Processing grades

Mr. Manuel Perez presented on processing grades in queen conch. As background information he mentioned that the level of processing varies and depends on the marketing system and destination (export versus domestic market) or cultural preferences. Also, in some cases the animal is landed whole in the shell but usually the conch meat is extracted at sea (some

² The three codes are: 0307.82 Live, fresh or chilled Stromboid conchs (*Strombus* spp.); 0307.74 Frozen Stromboid conchs (*Strombus* spp.); and 0307.88 Other stromboid conchs (*Strombus* spp)

processing at sea). Within the commercial sector specific terms are used to describe different processing grades. Each country has its own standardized processing grades, but usually varying from dirty (meat without shell) to 50, 65, 75, 85, 90 to 100 percent cleaned. The terminology used is not yet standardized throughout the region and within the seafood industry. Nominal weight, dirty and 100% clean are comparable in OSPESCA countries.

The expert presented a table showing the different processing grades and how the conch is reported in landings in many Caribbean countries. The table confirmed and showed there are different processing grades with different meaning in some cases, e.g. in Antigua and Barbuda what is reported as “dirty” meat is equivalent to 50% clean meat in other countries. The description of processing grades, therefore should be clearly indicated.

As recommendations, Mr. Perez indicated the need to report/update on how the queen conch is landed and the current processing grades in the industry clearly described. At least, the most important grades and descriptions should be for nominal, dirty (without shell) and marketing grade (export or local). Also, all landings/export/local market units should be clearly defined as in many cases landings or exports are reported in meat weight but without any description of the processing grade. As final questions for discussion, he asked whether the standardization of processing grades terminology throughout the region is possible and whether is it worth considering that standard levels of processing could be defined in regulations and enforced.

3.6. Conversion factors

Mr. Nelson Ehrhardt talked about the conversion factors, yield estimations based on population densities, and from landings. He highlighted that conversion factors should be comparable among countries for more accurate and precise information, but also mentioned that it is important to consider the species differences in morphometry.

He recognized the importance of determining exploitation reference points for annual quotas, and adopt simultaneous conservation programs. Considering that meat processing grades can be defined as chaotic, and that conch size varies in a non-linear relationship, it would be difficult to estimate mean values for conversion factors, and so available statistics are uncertain. With the shell inclusion, the uncertainty will increase, because the shell volume can be added with growth (non-linear) but not necessarily to the cavity. In addition, shell weight can be affected due to several factors, including the following:

- a) higher predator density could affect growth of conch due to energy expenditure
- b) shell may be thickened due to predator exposure
- c) shell may become brittle due to boring sponges and thus decrease survival from crushing predators.
- d) shells may also be reduced in mass due to boring sponges

Mr. Ehrhardt noted that the issue for stock assessment is to have good estimates of size frequency or maturity from pieces of meat landed, and that there is the need to assess population densities by fishing grounds. The transformation of dirty weight to number of individuals is also needed. Stock assessment based on conch population density will be also informative of the mating success, and allow for determination of reproduction success and recruitment to the fishing production. The inclusion of low and high densities areas need to be integrated into the survey design, thus counteracting for the low data situation.

The elaboration of proper NDF (Non-Detriment Findings) relies on the countries possibilities to conduct their fishery independent analysis, accounting for those cases when fishing effort is targeting conch aggregations. In addition, they need to improve their landings reports. Thus, definition and improvement in conversion factors is crucial.

Shell weight estimations is difficult to be properly calculated, so it is good to have an overall conversion factor for the shell estimate, but this factor should integrate conch variations in size.

3.7. The case of the QC conversion factors and fisheries in Belize

Mr. Mauro Gongora presented the evolution of the QC fisheries management in Belize. He mentioned that landings are at 85% clean and there are specific regulations on unprocessed (dirty), 85% and 100% clean conch meat. He noted that the 85% clean is a processing level not included in the regional assessment of conversion factors. Belize has accepted the conversion factors as detailed in FAO Fisheries Circular No. 1042, which is the result of a field survey that was carried out in 2014 and in which 400 conch samples were collected in Belize. Belize has collected new field data that will be used to determine a conversion factor (85% to dirty weight) in the next few months.

In response to the CITES recommendation to include the conversion factors on the CITES certificates, Belize would demand the impression of new certificates in 2019, using new serial numbers. They will not include the shell weight as agreed in the last Panama meeting.

However, it is important to remember that the dirty meat recommendation is not in the documentation to be presented at the upcoming CITES COP, and maybe it won't be ready either for the 17th WECAFC CoP. To move forward and fast, a consultancy from this group can be developed to attend the issue of additional conversion factors. In this work, the situation of having three countries deviating from the mean can be also analyzed. Thus, a proposal for further work based on re-analysis of existing data was agreed.

3.8. The case of the QC conversion factors and fisheries in Jamaica

Mr. Stephen Smikle from Jamaica, presented that their national QC fishery management plan stipulates the development of surveys every three years to estimate the size of the conch population on the Pedro Bank, and from this the standing exploitable biomass, and the National Total Allowable Catch (NTAC), based on a decision rule.

These surveys have been conducted since 1995, when five processing grades were stipulated. They sampled in three depth zones and a total of 81 stations. Areas up to 40 ft are mostly fished by artisanal fishers, while from 60 ft and beyond 100 ft are preferred by industrial ones.

From the 2018 survey it was found that the mean exploitable biomass was on average 9,276.787 mt, a drastic decline from the 28,020.007 mt estimated in 2015 (the highest density in 20 years). It was also found that there were many more areas on the Pedro Bank where no conch was found or that density was lower than the minimum limit of 100 ind/ha established by the international scientific community as required for conch to reproduce sustainably.

Given these observations it is highly likely that the true mean exploitable biomass is closer to the lower confidence level of 3,561.079 MT. As such the risk is extremely high that any continued commercial fishing for conch on the Pedro Bank will result in the collapse of the fishery. This Division has explored three policy options, and recommended closing the fishery for 1-2 years as the best option available. Several recommendations were also made, including undertaking partial surveys to determine the soonest possible time for reopening of the QC fishery.

The distribution of the density was the reason for recommending the closure of the fishery; few sites with extremely high density (spawning aggregation) and low values in most places were found. There were concerns about recruitment failure because fishers usually prefer discrete conch aggregation areas, which can reduce searching time and consequently reduce fishing operation costs.

The Pedro Bank 2018 survey, also showed reductions in conch size, due to thicker conch shells, with reduced internal cavity and so less space for conch meat. The adult conch and late juveniles in addition exhibited porous shells, thus, recommended additional monitoring to determine the extent this situation may affect the conch population. For instance, surveyors are looking if the conch density recovered over the 150 ind/ha, the stability on conch spawning aggregation, and if necessary establish closed areas to fishing on a permanent basis, especially those with high juvenile density.

Currently, QC from Jamaica is exported at the 50% clean, but little variations are seen in domestic consumption. The 50% grade is the reference in the legislation for establishing QC quotas, thus maybe difficult to change. The values for conversion factors have not been updated since 1996, however there is a plan to review these data and develop new CF. Since 2011, 500 mt of conch fillets are set for export (99% to EU), but the local consumption is on the rising, for which the data are unfortunately not known as this is not recorded. In response, they are considering to increase the current 20 mt allocated for national consumption, perhaps up to 100 mt.

Additional research is needed to determine the impacts from hurricanes on juvenile, believed to be a serious problem; indeed, four hurricanes crossed Pedro bank from 2004 to 2006. The group mentioned the example in Florida where the post Hurricane recovery may take up to two years.

3.9. The case of the QC conversion factors and fisheries in Nicaragua

Mr. Reinaldi Barnutty presented the information on Nicaragua QC conversion factors. He mentioned that there are four processing grades (100% dirty, 50% clean, 98% clean and 100% clean). There is also a trade of trimmings and operculum resulting from QC processing, and some shells.

There are 7 conversion factors in use in the country, obtained from data collected in 2005 and 2006. In addition, in 2007, Nicaragua participated in the FAO regional project "Conversion Factors for Processed Queen Conch to Nominal Weight"³.

³ FAO, Circular de Pesca y Acuicultura No 1042. 2009.
<file:///D:/Data/CFMC/FAO/FAO%20conversion%20factor.pdf>

Conch fishery began to increase since 2006, from 2.15 million ton to a maximum of 9.86 million ton (nominal weight) in 2017. High production values have been stable in the past five years, probably resulting from the expansion of fishing areas granted to Nicaragua by the International Court of Justice. QC surveys are also conducted to estimate the resource abundance.

It is estimated that around 20% of landed QC is not registered in the total catch, with another 5% for family consumption, and 12% in local trade. The new law 489/ 2005 clearly defined that the Instituto Nicaragüense de Pesca y la Acuicultura (INPESCA) is the fishing authority, it will be developing some conch specific regulations. Each year a four months closed season (June 1 to September 30) is declared, with a minimum size of 200 mm total shell length, and 9.5 mm of lip thickness as requirements. Conch export quota has been set since 2012 at 1,500,000 pounds as 100 % clean meat.

3.10. The case of the QC conversion factors and fisheries in Bahamas

Mr. Paul Medley informed about the big concern in the QC fishery there. Consequently, The Bahamas, is currently undergoing a harvest strategy review. There is concern with the population due to severe declines in catch-per-unit-effort and reduced densities most likely caused by exploitation recorded over 20 years of visual survey data. Declines have also occurred in a “no-take” area, which appears to be getting insufficient recruitment.

QC populations in The Bahamas have undergone serial depletion, and so a wide range of recommendations are being proposed that aimed at stock recovery including a broader network of no-take reserves, which have been put out for consultation with stakeholders. These include:

1. Landing conch in the shell
2. Ending the use of compressors for catching conch
3. Implementing a minimum lip thickness of 13mm.
4. Disallowing harvesting by foreign recreational fishers. There is currently a bag limit of 6 conch per vessel.
5. Ending commercial exports by 2021. There was a minor reduction this year and already a commitment to reduce exports significantly next year.

No decision has been made on any action yet.

From 20 years of visual surveys (Stoner et al. 2018), it is clear that:

- mature density negatively correlated with fishing pressure index (FP),
- mean shell length no correlates with FP,
- mean lip-thickness negatively correlated with FP,
- densities declined significantly over 22 years in a large no-take fishery reserve,
- juveniles rather than mature conch declined in no-take area, with little or no recruitment,
- in main fishing grounds, densities of adult conch are now below that needed for successful mating and reproduction.

3.11. The case of the QC conversion factors and fisheries in Turks and Caicos Islands (TCI)

Mr. Paul Medley also presented the case for TCI, which are geographically part of the Bahamas, but cover a much smaller area (Caicos Bank fishery 6,500 km² vs Bahamas 136,000 km² (<10m deep). Unlike the Bahamas, use of compressed air in fishing is not allowed (Bahamas allows “hookah”) and Turks and Caicos also has a conch closed season, which Bahamas does not. Despite the differences in areas, the reported landings are comparable being around 2,500 ton for TCI and 2,696 ton for the Bahamas.

TCI has good records of landings data based on exports, but local consumption has not been recorded. There have been two Caicos bank-wide surveys in 2000 and 2015, and biological sampling of landings has been conducted at least from the early 1990s.

In general, fishery dependent information is good, but fishery independent information poor.

Historically, there have been two depletion and recoveries:

- 1985: a depletion occurred probably due to improvements in gear, followed by recovery due to fishers going to Freeport, Bahamas for construction work resulting in an effort reduction.
- 2012: an increase in CPUE, followed by rapid decline. In this case the export quota was reduced by 50% and CPUE has now recovered to “normal” levels again.

The reasons for the 2009-2012 decline in CPUE is unknown, but a depletion due to fishing is not reflected in landings data. Hurricanes Hanna/Ike in 2008, IUU fishing, and an increase local consumption are alternative hypotheses for the cause.

A new stock assessment is under development in attempt to account for all depletions and help develop a robust harvest strategy. The analysis will be based on a biomass dynamics state space model that can account for and potentially estimate unrecorded mortality and changes in catchability. However, despite their similarities, the Caicos Bank has demonstrated an ability to recover which is not evident in The Bahamas. Understanding why this is the case would be useful to develop robust harvest strategies for queen conch across the region.

The group commented about the role in reduction of conch predators can be playing in the conch recovery, that can influence why the model is lacking ability to predict abundance trends. They recall the need to be careful when using models, and so considered that catch should be dirty meat, that conch sizes are needed to determine better production data, and that reproduction needs to be successful.

3.12. Summary of Glover’s Reef conch fishery

Mr. Alexander Tewfik (coauthors Elizabeth Babcock, Janet Gibson and Richard Appeldoorn) presented the general conclusion of long-term analysis, and mentioned how shell length (SL), currently used to limit individual harvest in Belize is not a good proxy for determining maturity, as SL growth ceases before an individual conch is mature. This research and others have found that lip thickness is the best proxy for maturity. Thus, there is a need to refine the size limits (i.e. size at first capture) for conch in Belize.

Ongoing efforts at regional harmonization of conch management have considered switching to a shell lip thickness minimum, because a lip thickness-based limit would be more likely to protect juveniles and allow all conch at least some opportunity to spawners before harvest, and the team's research supports this concept. Currently, most conch harvested in Belize are juveniles with no lip. It should be noted that minimum conch meat mass does not constitute a reliable indicator of individual maturity, and the use of lip-based regulations will remain problematic where shells are not landed, like Belize. Landing conch in the shell will mean that fewer conch can be transported from fishing grounds and fishers will need a higher price to offset decreased yields. Nevertheless, such measures should be considered. Therefore, a reasonable meat mass associated with adult conch will likely also protect juvenile conch where shells are not landed.

The protection of juvenile conch would allow increased recruitment of mature animals (i.e. higher age at first capture) to the fishery and spawning stock, supporting the reproductive success of the population, if combined with sustainable levels of fishing effort. The continued use of a shell length minimum may lead to recruitment and growth overfishing over time, diminish the economic yield from the fishery and negatively impact thousands of Belizeans dependent on conch resources.

A significant decrease in SL of adults and sub-adults ($LT \geq 1mm$) in two habitats (PR – patch reefs, SF – sand flats) and both management zones (RZ - replenishment, GUZ – general use) was observed over a 15-year period. These observations were made using the full range of fisheries-independent data collected within SF and PR habitats (2004 – 2018), where conch in PR were consistently larger than those in SF (Figure 8). In addition to natural habitat quality induced differences in growth (e.g. PR vs. SF), may also affect reproduction, the conch fishery at Glover's Atoll may have selectively removed larger SL animals due to the SL based size limit, thus truncating the SL size distribution of non-juveniles.

The predominance of small phenotype adults in populations, which also display low mating frequencies, has previously been associated to selective fishing pressure compounding the density effect on reproduction. Future research in Belize should include movement dynamics of conch in relation to replenishment zone size and spillover as well as the importance of deep-water conch to shallow water recruitment, which is thought to be limited.

The group highlighted the importance of having independent data and discussed the potential reasons for this declining, recommending further studies on conch fecundity, in fishing and un-fishing zones, and additional information on the deep water population with poor data. In other areas, such as Florida, researches have concluded that local recruitment prevails over long-distance connections; and in Jamaica, highly variable conch recruitment despite fairly stable fishing patterns. Therefore, reproduction success patterns and connectivity of larval dispersal effects across the region needs better attention.

3.13. Group discussion on minimum data collection

The group of experts, led by Mr. Paul Medley, analyzed the minimum requirements for fisheries managers to meet their obligations, with the following recommendations:

- Fishery-dependent reporting is for scientific and statistics purposes; thus it is of the highest relevance to have conversion factors allowing for population trends analysis.
- All countries should know what the conch catch and efforts are the minimum required estimations. If local consumption is significant, surveys need to be conducted regularly to

improve the catch information, and if possible, its changes with time. Countries should have their own conversion factors in place as recommended in the third meeting of the QC working group. When not feasibly, countries are invited to use proposed (and soon to be revised) regional conversion factors.

- A system for registry and licensing fishers should be in place for submission of the data.
- At least one index of abundance needed to determine the sustainability of the fishery or alternative to demonstrate mechanisms in place to promote it. The production performance indicators are dynamic.
- Improvement of the traceability system for QC fishery. Traceability is relevant for food safety and to counteract IUU fishing. For instance, Jamaica has one in place for several years now for the EU markets, and in Belize one shall soon be implemented. Other examples can be seen in Nicaragua in the spiny lobster fishery or the one in Costa Rica for shark and other fin fish fisheries. OSPESCA is developing one for spiny lobster, but still needs additional funds and coordination for its implementation. The problem with traceability based on soft money is that the system collapses once project ended.
- A lack of Traceability standardization can heavily increase the cost, thus in the next CITES COP aspects for adaptation of basic definition for standardization will be considered, including lessons from case studies. The use of VMS systems information would help to improve traceability. Additional data can be obtained from processing plants, or vessel registries, but data from artisanal fishing become challenging.
- Reporting from restaurants in Belize proved not as successful as expected for traceability, but probably effective to estimate local consumption. Data on artisanal fisheries demand commitments, and what countries lack.
- Industrial vessels should have a mandatory catch certificates, based on log books and fisheries estimations. Digital reporting is not easy to manage, sophisticate and lots of data to analyze.
- A subregional training workshop looking at harmonized protocols for surveys and further data analysis for determination of catch quotas should be pursued. This kind of event may overcome political limitations, and facilitate identification of potential resources that can be shared.
- Surveys can provide a lot more additional information for fisheries management, supporting data environmental data, including the support for genetic and reproduction movements.
- Pearls trade is difficult to trace and understand, thus poor data is available.
- Experts recognized the need to address other aspects different than the biological aspects, but for now are attending the QC working group recommendations.

*3.14. Phenotypic and Genomic variation of the Queen Conch (*Lobatus gigas*) in Puerto Rico*

Ms. Diana Beltran presented the research that quantified genetic variability in populations of the QC throughout Puerto Rico and evaluated if the presence of the four morpho-types identified by commercial fishermen represented differences in populations, and so deserve independent resource management. A total of 757 specimens were collected across 11 sampling sites. For each specimen, morphometric measurement and tissue samples for genomic analysis were gathered. The genomic data analyzed DNA fragments (over 10k SNPs) from 279 individuals.

The data indicated that at least one of the morphs (“flin”) is substantially different from the others, differences were found in lip thickness and shell length and in its genetic composition. At small scale (only Puerto Rico), the mixture of the populations was seen across the geography range.

This is the first study in reporting genetic differentiation among QC morphotypes. The “flin” phenotype seems to be not only found in Puerto Rico, but also related to the Samba morph in the Bahamas, Mexico and Cuba. A follow up study across the wider Caribbean region is

recommended for proper extrapolation and better understanding of the genetic differentiation across the region. In addition, the degree of differentiation between the “flin” morph and the so-called samba conch needs to be addressed. To achieve these objectives, a strong collaboration from scientists and resources managers is required in contributing to conch samples. The support of the University of Rhode Island for the genetic analysis is available, and so emerging enthusiastic networks can be built.

The group discussed how larval dispersal appears to be not that large as previously thought, and that connectivity among areas can be determined by new genetic technologies. In high connectivity sites proportion of genetic diversity is low and the plot of genetic distance vs geographic distance is a constant line, while on low connectivity situation this plot is a line, with the slope meaning the rate of lack of connectivity. In Jamaica, observations in Pedro, suggest that some conch has different potential to become stoned (large), perhaps a function of sponges abundances (predation). However, the impact is not uniform across the local populations. Conch appears to have a great genetic plasticity.

3.15. Priority research agenda

Ms. Yvette Diei Ouadi led a group identification of a research agenda the conch experts considered relevant. As assigned by the QC working group in the third regional meeting held in November 2018, this advisory group is for now attending issues related to the biology of conch populations and the effect of exploitation on the sustainability of the resource given data limitations and availability. Nevertheless, it is understood that other social and economic issues also need to be addressed. For this reason, the experts group considers appropriate to invite additional experts to contribute in this area as the scope of discussions expands to data needs and methods required to address social and economic impacts and associated factors related to queen conch governance at larger scale.

The following were the research considered relevant to improve the QC sustainable fishery:

- Improve understanding of conversion factors by re-analyzing existing data.
- Develop guidelines for conch density survey protocols that could then be standardized across the region (with priority given to those countries already conducting surveys).
- Review available landings data (including landings for both export and local consumption) and determine minimum data needs for stock assessment using fishery-dependent data.
- Survey design(s) that could be used to estimate domestic conch consumption in the countries where it is important and worth to assess.
- Update and summarize information on conch population dynamics, including growth, mortality, habitat quality, and develop a conch population dynamics simulation model suitable for use in management strategy evaluations.
- Conduct specific research aimed to increase understanding of spawning aggregations and reproduction success, including the effects of climate change,
- Determine the degree of conch population connectivity by using proper genetic techniques in connection with hydrogeographic models at an appropriate scale. Genetic analysis can also be utilized for identification of eco-toxicology and their effects on meta-populations, and the growing concerns of increase in plastics in the marine environment.
- Identify mechanisms (social, cultural, behavioral) that can be used to increase stakeholder buy-in and support for the 3 pillars embedded in the regional plan (Technical & Statistics, Education & Outreach and Governance).
- Strengthen the preparation of queen conch NDFs. Selected countries may need help in term of making a NDF and in understanding questions being asked in proposed regional

formats. Very often different national CITES authorities. Useful tide to CITES animal committee with the issues of NDF and the working group.

- Identification of potential mechanisms for improvement of the regulations enforcement strategies and assessment of countries capabilities needed for conch stock recovery.
- Enforcement need to be in place and find mechanisms to assess effective ways to access funds, at national and international level. Need to discuss opportunities.
- Increase knowledge and understanding of the queen conch value chain, in particular on value-added conch products (e.g. byproducts of conch meat processing and the use of the shells), to be able to track its trade.
- Psychological research link to compliance of regulation, the increase of stakeholders participation in management are both an innovative topic to determine. Some countries are successfully implementing such techniques.
- Studies on economic and fair trade topics are also needed. Increase in a perceived value of the conch products, and value-added products would complement this kind of research.
- Linkages with other WECAFC working groups that share common challenges.

3.16. NDF tables revision

Experts found that the 2014 proposed tables to provide guidelines on a simplified version to generate NDF were complex, and not much practical, and recommended the review for general use of a flow diagram developed by Mexico instead. If so, it would probably demand a different overall approach, and further work in revising the guidelines intersessionally. In any case, it would be important to promote harmonized population reference points (i.e.: density or MSY among others).

Additional comments were received regarding the following aspects:

A. General Considerations

- It is important to evaluate data quality and availability for the jurisdiction, thus facilitating the scientific authority assessment.
- Degree on dependence on spawning stocks and larval recruitment either to or from the fishery being examined, thus the source of recruitment to a fishery is better understood avoiding seriously undermining a fishery. Dependence on undocumented spawning stocks (i.e. deep stocks) locally or elsewhere is extremely detrimental.
- Total export levels must only be set after documented local consumption levels and reasonable estimates of IUU fishing are removed from total quotas based on local standing stocks.

B. Biological Characteristics

- Implement recommendations on minimum population density made by experts in the region, to reduce risks of resource overfishing. Estimations should be done in a proper manner.

C. National Status

- Distribution, size/age structure needs to be considered across all viable habitats, which may include current fishing grounds, former fishing grounds, nursery grounds, and spawning grounds. This is critical to correctly evaluate the density threshold, areas that require protection from fishing, correct closed season and the portion of the population under protection in MPA no-take areas.

- The socio-economic impacts need to be considered in a way that protects the needs of local household consumption and tourism and the potential for export and foreign earnings.

D. Queen Conch Management Plans

- Evaluation of measures focused on protection of juvenile conch, secure spawning individuals, and establishment of no-take zones to enhance larval recruitment and promote the conch movement across MPA boundaries to fished areas due to density dependence effects.
- Robust mechanisms to counteract IUU fishing and compliance with management regulations.
- Application of an adaptive approach to set indicators for determining population status.

E. Queen Conch Fishing

- Total catches must be detailed by processing grade and harvest areas and reasonable estimates of domestic consumption and illegal harvest must be available. Total export quotas must not exceed the total sustainable catch minus both domestic consumption and illegal harvest.
- Harvest control rules are important for population stability, and so needs to be clearly identified.

F. Monitoring

- Underwater stratified surveys need to be in place, and should include nursery and spawning areas.
- Monitoring of proper fishing-dependent parameters are also needed.

G. Trade Data

- Transshipments and reprocessing of QC products must be carefully accounted for. The fully standardized and transparent nature of conversion factors is a critical component. A robust traceability system will also support the elimination of illegal trade or exceeding of documented sustainable extractions.

H. Aquaculture

- A robust traceability system in place is needed in case of farmed conch, eliminating the potential for illegal or unregulated trade.

3.17. Advisory group protocol

The group of experts agreed to set the name as the **Scientific, Statistical and Technical Advisory Group**. It was also agreed to expand its composition and participation depending on issues and subjects to be addressed. A probable participation of up to 20 people (including permanent and temporary or observers) to mainstream a diversity of expertise to better advice on additional biological, social and economic issues was discussed.

Recognizing the restricted funds available, it was also agreed that most communication will continue with the same participants in this Miami meeting using online communication tools, but that a second face-to-face meeting, of up to ten people, would be necessary.

The expert participation in this group is based in the recognition of individual scientific knowledge and experience; they participate on a personal and voluntary basis, and do not represent any country or institution interests.

The official language will mostly be English, but other languages can be used as required. FAO/WECAFC was asked to provide examples of other groups rules of procedure in the region which can guide further development of this group.

5. Conclusions

1. FAO has been working in standardizing the conch production reported data by countries with the use of national and regional conversion factors, to achieve an estimation of a comparable historical data and be able to determine indices of abundances. However, proper conversion factors are difficult to estimate, particularly when the shell weight is included, accounting for a very large proportion of the weight and exhibiting a very large variation through its distribution range. With the new working group recommendation of using a conversion factor to the total weight removed from the shell (i.e. dirty meat) new challenges emerged, not only because the shell weight is a measure that only few countries can conduct, given the fact that mostly QC meat fillets are being landed; but also because countries may use outdated parameters when their conversion factors to the so different meat processing degrees.
2. As a management priority, countries also need fishery-dependent data to be analyzed to get information to develop a harvest strategy and closely monitor data quality (good estimations of total production) and fishery trends. Processing grades and conversion factors are critical for proper catch production estimations.
3. There is a need to identify the reason (cause) why in the regional analysis of the conversion factors (dirty weight to live weight) three countries (Mexico, Belize, Barbados), out of the nine countries analyzed, were clearly separated of the general trend identified for the other six. In addition, it is necessary to have a complete and clear definition of the various processing grades of the conch meat currently employed by countries and utilized to generate the conversion factors. This will help better understanding of the harmonization process of conversion factors. Ideally, conversion factors should be developed for different processing grades and taking into consideration several criteria such as size, sex, season, and habitat among others. Countries that do not have national conversion factors should give priority to develop their own.
4. Countries should have a mandatory report of their conch production (harvest) and exports, where applicable. This can improve country data quality and introduce estimations of conch local consumption and IUU fishing levels, which appears to be changing with time. It is useful to note that harvest reports are different from exports reports.
5. There is need to develop multiple mechanisms to overcome country limitations in conducting conch density surveys in the region. Technical advice on survey design and potential to improve fieldwork collaboration can be provided by the experts sub-group, allowing for harmonization and better understanding of the conch abundances trends.
6. Experts noted that guidance on the management of Queen Conch in the context of CITES has been provided either in the form of recommendations by the Animals Committee in the

Review of Significant Trade Process or Decisions adopted by the Conference of the Parties, both of which are time-bound and expire once implemented. The Experts are of the view that a Resolution on Queen Conch under CITES would be helpful to ensure consistency of guidance over time and to make it easier for Parties to find such guidance.

7. To reduce risks and the impacts associated to uncertainty, fisheries managers often rely on surveys that allow the estimation of population densities as reference points (fishery-independent data), among other factors. Despite the relative slow movement of conch, spatial and temporal variations of the conch distribution and densities by depth or habitat strata are observed in long term monitoring.
8. Two recent and long-term studies (Belize and Jamaica) presented in the meeting are providing indications of a decline in shell size which is still poorly understood, thus offering an opportunity to develop further research addressing the potential causes, including for instance uncertainty in the reproduction success, impacts associated to intense and more frequent hurricanes, changes in water temperature, pollution, or fishing pressure among other topics.
9. Experts recognized that participation in international scientific and management meetings contribute to developing further collaborative efforts in training and research among countries given the transboundary nature of the queen conch stocks, shared larval pools and connections in environmental characteristics. Additional collaboration is also needed, to promote that countries comply with international agreements signed, in particular those addressing IUU fishing.
10. On data needs, experts agreed that, at minimum, more reliable data and information should be available, *inter alia*, total catch, an index of abundance (CPUE, densities), size/sex composition of the landings and fishing fleet composition. Vessel Monitoring Systems in place, transparency and traceability were considered useful to assess reliability of the data generated.
11. A recent genetic study has indicated the determination of connectivity patterns in queen conch using microsatellite-based techniques may still overestimate the degree of connectivity and that more accurate determinations will require the use of newer genetic techniques, such as use of Single Nucleotide Polymorphisms (SNPs). Unfortunately, such studies are relatively new and to date have been conducted only within Puerto Rico.

6. Recommendations

As a result of these three days of deliberation, the experts recommended the following actions:

1. Based on countries need to report their conch production allowing for back calculating to the so called “dirty weight” and from there to the nominal (also indicated as live-weigh) weight (with the shell weight), it was recommended: a) the shell weight can be set as a global factor, and b) Re-analyzed existing data, according to statistically tested equality of conversion factors by country groupings, generating an updated estimation (averaged with standard deviations). For this, some of the participants will develop a proposal in the next couple of weeks, and submitted to WECAFC and CFMC for further support.
2. WECAFC should ask countries to: a) submit clear definition of their processing degrees in trade or degree of cleaning and calculate the proper conversion factor; b) report all landings

indicating the processing degree (i.e. x kg of 85% clean meat), c) develop a scale of the conversion factor from % tissue loss for each processing grade they trade; d) Determine the numbers of conch by unit of weight for each processing grade (weight frequencies can also be used), d) convert production (100% dirty meat) to nominal weight for FAO statistics and/or provide the conversion factor used or to be used in case of reporting at meat level. Note that processing grade and conversion factors should be reported to CITES and FAO.

3. WECAFC need to communicate to countries the need to identify long-term research strategies for conducting density surveys. In the short term, the WECAFC can contribute with the development of a training workshop looking at harmonized field protocols, identifying alternatives for more collaboration, and develop guidelines for countries interested in develop one. Thus, a proposal for conducting such training workshop will be prepared by some of the participants, and other relevant stakeholders and submitted to WECAFC and CFMC for further support.
4. Noting that the document deadline for CITES CoP18 has passed, it is recommended that WECAFC and the QC working group start drafting the contents of such a resolution to CITES CoP19 scheduled for 2022. In addition, WECAFC should request the CITES Secretariat to inform Parties about this recommendation through an oral update at the CITES CoP18. It was further recommended to seek the CITES Animals Committee's view at its 31st meeting, scheduled for 2020, on possible elements of such a draft resolution.
5. WECAFC will coordinate the structure of a research proposal to attend some of the priority actions identified as relevant in the sustainability of the QC fishery. Experts will also look at various funding and collaboration opportunities to attend this need. One potential collaboration between the University of Rhode Island, and scientists and fishery offices in the Caribbean region was identified as a viable option to develop a more comprehensive genetic study for determination con QC connectivity.

(a) ANNEX 1. Workshop Agenda

**(QCWG) CFMC/OSPESCA/WECAFC/CRFM/CITES Queen Conch Working Group
Scientific, Statistical and Technical Advisory Group**

Miami, 23-26 April, 2019

Background

Moving towards progressively implementing the queen conch regional management and conservation plan, during the third meeting of the CFMC/OSPESCA/WECAFC/CRFM/CITES Working Group on Queen Conch (QCWG), held in Panama City, from 30 October -1 November, 2018, it was agreed to begin activities with two of the three working sub-groups stated in the plan. One will be dealing with the scientific and technical advice, and the other will work on education/outreach activities. The third sub-group is the governance, which would be organized later in the implementation phase, considering that currently there are other regional initiatives, such as the CMLE+ project, that specifically focus on improving the governance in the Caribbean fisheries, among other aspects.

The FAO/Western Central Atlantic Fishery Commission (WECAFC) along with the Caribbean Fisheries Management Council (CFMC) are collaboratively supporting the operation of these two sub-groups. In particular, in this opportunity, reference will only be made to activities related to the scientific and technical advisory sub-group. The expert sub-group recommendations (see list of participants) and its coordinator (Martha Prada), were also agreed in the Panama meeting.

The sub-group has initiated its preliminary conversations by providing written comments to an initial communication, several of them integrated in the presented agenda for the face-to-face workshop. Recommendations from this workshop, will be presented to the 10th Session of the Scientific Advisory Group scheduled for June, before being presented together with connected scientific guidance compiled in a technical report at the seventeen session of WECAFC to be held in July 2019. It is expected the sub-group will continue to working online and in face-to-face communications to pursue its objectives and goals.

Objectives

For the first face-to-face meeting, the queen conch scientific and technical advisory sub-group has been asked to discuss and provide recommendation on four main topics, as follow:

- a) Define its internal protocols on how it will operate
- b) Improve scientific guidance on regional conversion factors: what to measure? what data is needed? who should have this data? How to advance with the estimation of some countries?
- c) Provide initial considerations about the basic information for determining queen conch NDF analysis
- d) Identification of priority research at the regional level (useful for drafting a regional proposal to be presented to GEF either by FAO/WECAFC or CLME+)
- e) Other topics the group may identify, including aspects on how to tackle the sub-group long-term agenda, at least for its first year of work.

Program

Please see below preliminary workshop agenda for your comments.

Day 1: April 23, 2019			
Time	Topic	Leader	Detailed description
09:00-09:30	Welcome and introduction	Martha Prada	Participants short introduction, current projects related to queen conch. Countries of interest. (3 min per person)
09:30-10:30	Interactive conversation about activities CFMC/OSPESCA/WECAFC/CRFM/CITES Queen Conch working group and other regional initiatives.	Yvette Diei Ouadi Daniel Kachelriess	FAO program officer will introduce activities and process of this WG and expected results from the workshop. CITES representative will present latest initiatives and strategies to improve QC international trade, and relevant NDF criteria.
10:30-10:45	Break		
10:45-11:45	FAO reports and impacts of the conversion factors in available statistics (still not confirmed)	Stefania Vannuccini	Summary of FAO Statistical data and how the precautionary can be applied. Group discussion.
11:45-12:30	Group discussion about definition of conch meat processing levels	Manuel Perez	Background, definitions in the regional plan, integration of additional definitions on processing levels. Data needs and potential for study cases.
12:30-13:45	Lunch		
13:45-14:45	Introduction to conversion factors in the plan and considerations for adjusted factors / new factors	Nelson Ehrhardt	Group discussion to agree in adjusted / new conversion factors for conch meat. What about trade indicators for conch shells & conch pearls?
14:45-15:45	Existing conversion factors at national levels: case studies for Belize, Jamaica, Nicaragua, Bahamas	Mauro Gongora Stephen Smikle Renaldy Barnutti Paul Medley	Considerations about existing data, changes of the conversion factors through time, budget estimations to collect data, accessibility of data, constraints to collect data, opportunities for international collaboration, etc.
15:45-16:00	Break		
16:00-16:45	Identification of countries where technical assistance is required	Nelson Ehrhardt	Group analysis on what needs to be done, what kind of consultancy is envisioned, how to improve bi-national / sub-regional support? Agreements to share data?
16:45-17:00	Summary of the day analysis, agreements and recommendations	Martha Prada	

Day 2: April 24, 2019

09:00-09:30	Relevance of queen conch to management measures	Rich Appeldoorn	Impacts on increased fishing pressure on conch density & reproductive success
09:30-10:00	Other sustainability indicators, the case of Jamaica	Stephen Smikle	Understanding the complexity of the QC population status in Jamaica
10:00-10:45	Understanding the complexity of the QC population status in Turk & Caicos & the Bahamas	Paul Medley	Understanding the complexity of the QC population status in Turk & Caicos
10:45-11:00	Break		
11:00-12:00	The Glover's Reef conch population - 2004 - 2018	Alex Tewfik	Long term research on QC population variations at the Glover's reef MPA
12:00-13:30	Lunch		
13:30-14:00	Group discussion to set minimum data collection requirements for fisheries to meet their obligations	Paul Medley	Importance of data availability to determine the population status for NDF and how to advance at national / sub-regional level?
14:00-15:45	Revision and analysis of existing simplified NDF tables	Manuel Perez Mauro Gongora Renaldy Barnutti	Group discussion and recommendations for countries about the use of existing NDF simplified proposal versus the need for develop a new NDF template.
15:45-16:00	Break		
16:00-16:45	Strategies for getting existing data and for collecting new data	Martha Prada & Yvette Diei Ouadi	Analysis of what can be done to improve data access & data collection for the advisory sub-group
16:45-17:00	Summary of the day analysis, agreements and recommendations	Martha Prada	

Day 3: April 25, 2019			
09:00-09:30	Phenotypic and genotypic variations of the QC in Puerto Rico	Diana Beltran (invited researcher)	Single nucleotide polymorphisms (SNPs) in Puerto Rico queen con populations
09:30-10:00	The Glover's Reef conch population - 2004 - 2018	Alex Tewfik	Long term research on QC population variations at the Glover's reef MPA
10:00-10:45	Analysis of a prioritized research agenda	Yvette Diei-Ouadi	Guided group discussion aimed to identify priority research agenda to improve
10:45-11:00	Break		
11:00-12:00	Brain storming about a new QC proposal to be presented by FAO to GEF	Martha Prada	The CMLE+, other regional projects and the potential for prepare a regional management and research proposal

12:00-13:30	Lunch		
13:30-14:45	Sub-group name, protocol and Time table for future subgroup actions (1 year)	Martha Prada	Plenary discussion
14:45-15:45	FAO/WECAFC subgroup presentation and expected future support	Yvette Diei-Ouadi	Plenary discussion
15:45-16:00	Closing and adjourn		



Queen conch technical advisory group in the Miami 2019 expert workshop

List of Participants

No.	Category	Last name	Country	Organization	email
1	Expert	Paul Medley	UK	Consultant	paulahmedley@gmail.com
2	Expert	Nelson Ehrhardt	US	Consultant	nehhardt@rsmas.miami.edu
3	Expert	Alex Tewfik	Belize	Wildlife Conservation Society	atewfik@wcs.org
4	Expert	Mauro Gongora	Belize	Fisheries Department	megongora@hotmail.com
5	Expert	Richard Appeldoorn	Puerto Rico	Consultant	richard.appeldoorn@upr.edu
6	Expert	Renaldi Barnutty	Nicaragua	Fisheries Department (INPESCA)	rbarnutti@inpesca.gob.ni
7	Expert	Stephen Smikle	Jamaica	Fisheries Department	sgsmikle@micaf.gov.jm
8	Expert	Manuel Perez	Nicaragua	OSPESCA	maper59@hotmail.com
9	Expert/coordinator	Martha Prada	Puerto Rico	Under contract to CFMC	pradamc@gmail.com
10	Observer	Diana Beltran	US	Genetic researcher	dbeltran@uri.edu
11	Observer	Robert Glazer	US	Florida Wildlife Commission	bob.glazer@myfwc.com
12	Observer	Elizabeth Babcock	US	UM- RSMAS	ebabcock@rsmas.miami.edu
13	FAO/WECAFC	Yvette Diei Ouadi	Barbados	FAO -WECAFC	yvette.dieiouadi@fao.org
14	FAO/Fisheries Statistics	Stefania Vannuccini	Italy	FAO- FIAS	Stefania.Vannuccini@fao.org
15	CITES	Daniel Kachelriess	Switzerland	CITES	daniel.kachelriess@un.org