

ANNEX 1. The Honduras conch research and management program in support of the
CITES requirements for species in Appendix II

By

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The overall frame of the conch research and management program in Honduras is in response to the CITES terms of reference concerning conservation and sustainable use of species in Appendix II. Therefore, CITES aim and concept to ensure that international trade in specimens of wild animals and plants does not threaten their survival has been introduced as a protocol in the conch, *Strombus gigas*, research and management program in Honduras.

The CITES Scientific Authority in Honduras has been challenged to determine whether a particular conch export will be detrimental to the survival of the species and to define which information and parameters are relevant to determine this. The conch is the largest of the commercial marine gastropods exhibiting a complex and highly sophisticated but at the same time plastic population dynamics. This is due to a distinct geographic identity of the species, which frames growth, reproduction and recruitment according to local habitat and environmental conditions. The CITES has used the criteria of population density levels and export quantities to judge for the status of exploitation and conservation of the species in the different countries in the Caribbean region. However, it is not clear if the effects of landings are detrimental to the sustainability of the conch populations under this population density paradigm. In other words, density may or may not be related to population abundance.

Furthermore, conch cannot be aged and shell siphonal length stops at the attainment of maturity. At this time conch shells start to thicken and a wide lip is developed. That is, the direction of growth changes at the onset of maturity. The previous condition mars the possibility of estimating fishing mortality and abundance from traditional fisheries methodologies based on the age or size structure of the landings. The internal reproductive system of the conch also prevents the use of fishing mortality bench marks traditionally used in fisheries to frame the status of exploitation of fish stocks. Copulation success in *S. gigas* is related to population density levels and no fishing mortality reference points are known for this management framework. That is, it is not known what level of fishing mortality generates what level of population density that can secure reproductive success. The basic criteria for conch stock assessment methodologies and management are the first step in the efforts of Honduras to properly and responsively answer to the CITES requirements in order to formulate Non-Detriment Findings.

In 2005 the CITES authorized the Government of Honduras the use of a 210 metric ton scientific quota with the purpose of developing appropriate protocols to assess annual population densities and abundance in each of the 13 fishing banks previously reported by Honduras to the CITES as the prime localities where the species has been exploited. A systematic random sampling design with 40 replicated samples per sampling sites was adopted in each fishing ground (Figure 1). The fishing grounds were identified by knowledgeable fishers that contributed their experience and knowledge on the seasonal distribution of the conch on the Honduras Continental Shelf. The statistical sampling design is effective to map the conch resources and it generates unbiased estimates of population density as well as abundance. Given the large area of the conch distribution on the Shelf, a total of 4 vessels with 40 divers each are used in the experimental sampling. Sampling stations are set 3 nautical miles equidistant from each other. Each vessel covers 3 stations per day and each fishing bank is explored in its entirety in about 6 to 9 days. These operations are repeated every year in each season such that an entire biological cycle is attained in the database. The option to use commercial conch divers is an important consideration given their ability to detect and count conchs under extreme diving conditions. Biological samples are collected in two forms: 1) clean meat samples from which a meat weight frequency distribution is generated (Figure 2 upper panel), and 3) whole animals including the conch shell that are used to obtain morphometric data as well as data on sex, maturity and size. Protocols have been developed to statistically reconstruct the population characteristics from the samples thus generated.

So far complete assessments of the conch fishing grounds have been accomplished. An example of the density results is provided in figure 3. The population densities estimated by the experimental sampling design are well above the average reported to the CITES by all countries exporting conch in the Caribbean. Furthermore, the minimum population density of 56 individuals per hectare adopted by the CITES as the limit for acceptable exploitation is well below most densities estimated for the Honduran conch banks.

Also, Honduras is in a unique position to generate annual estimates of fishing mortality – a parameter that is rarely estimated for conch fisheries. This was possible through the development of the appropriate database and models pertinent to the species and fisheries. These estimates are presented in figure 2 (Bottom panel) for the three main fishing grounds in Honduras. These mortalities compare well with the levels of natural mortality also estimated for the species in Honduras, which resulted in 0.72 per year.

Carrying out these explorations over wide areas of the Continental Shelf requires a large number of participants as well as equipment all of which is translated in funding needs that the Government of Honduras arranged as shared investment with the stakeholders. Only through such arrangement this research work has been possible.

The project has a finite time span of four years and then it is expected that monitoring surveys will replace the ongoing massive population surveys. Those monitoring surveys in conjunction with appropriate statistics from the fisheries will be used to elucidate the status of exploitation of the conch stocks in each fishing ground. These stock assessment activities will always have to have the support and participation of the stakeholders if a successful species conservation program is desired. At this time there is a limited entry into the system

(4 vessels) based on the scientific quota assigned by the CITES; however, once the fishery is open to exports a limited entry system is being planned such that conch fishing capacities are regulated from the earliest stages after the reopening of this important fishery. With this in mind the Government of Honduras is hoping for maintaining a biologically sustainable conch resource while the fishery is economically viable. In sum, the Government of Honduras is fully aware that the conch, *Strombus gigas*, needs permanent stock assessment requirements as the only way to respond to the CITES requirement of reporting Non-Detriment Findings with the conch exports declared by the country.

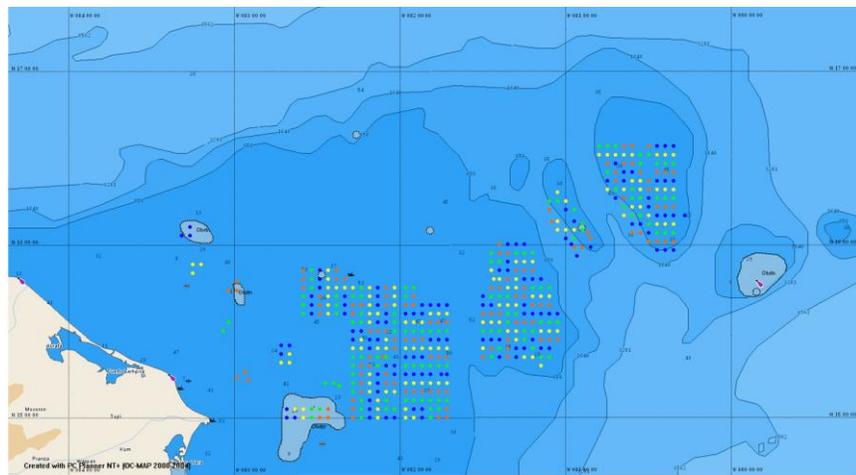


Figure 1. Distribution of the sampling stations thought the Continental Shelf where 13 conch fishing grounds are reported by Honduras to the CITES. Colors are indicative of stations allocated to the four vessels that implement the work at sea.

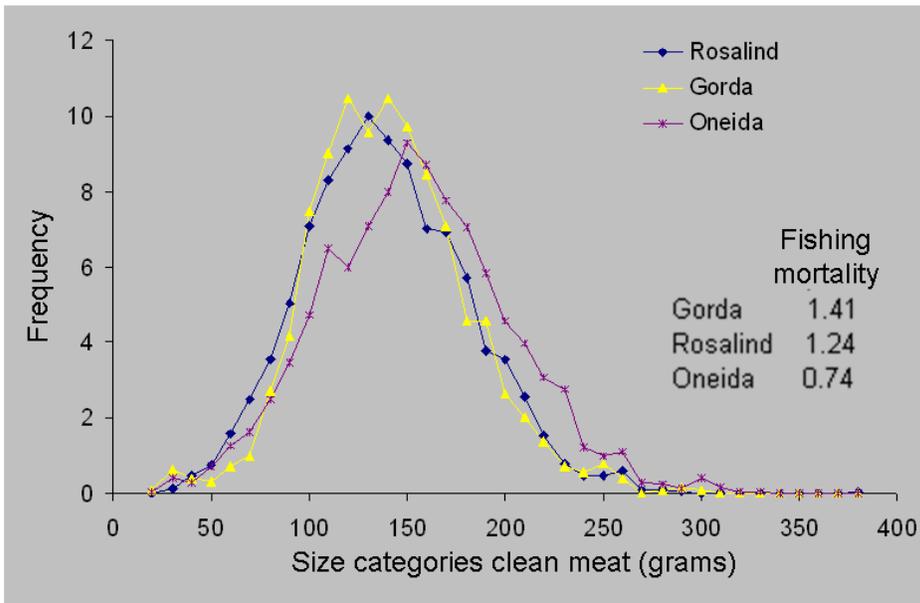
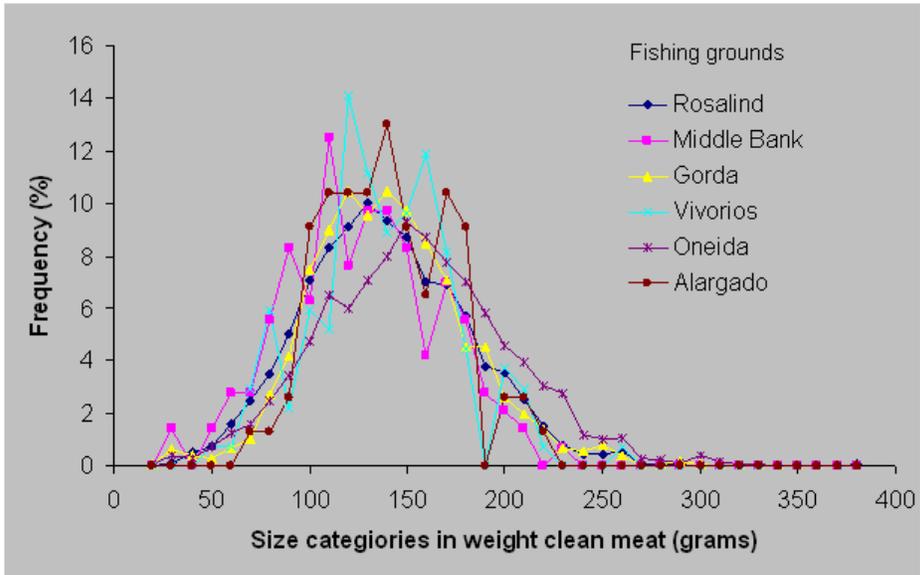


Figure 2. Upper panel. Conch size frequency distributions estimated for 6 of the largest fishing grounds in Honduras. Bottom panel. Size frequency distributions for 3 fishing grounds with estimates of fishing mortality rates.

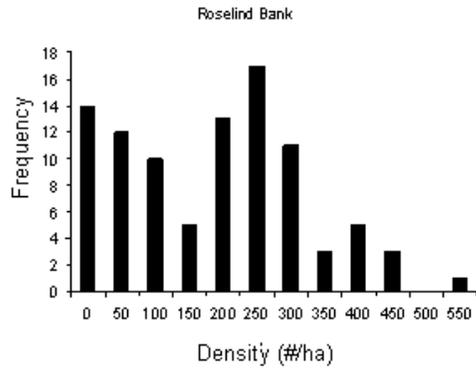
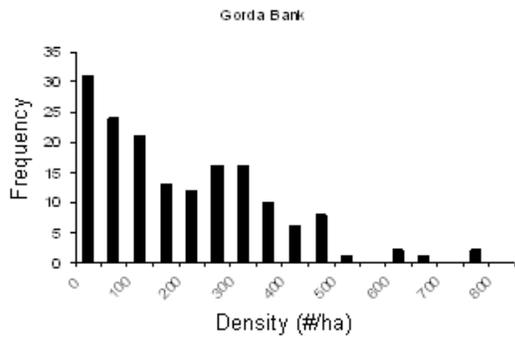
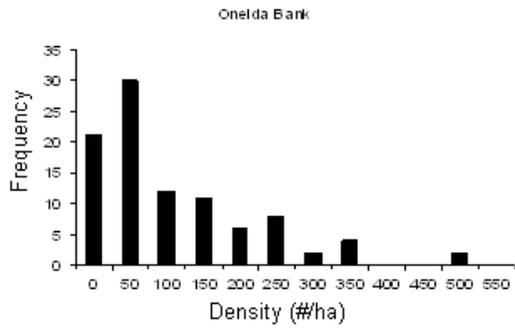


Figure 3. Frequency distribution of conch population densities in each of the three most important fishing grounds in Honduras.