THOUGHTS FOR DEVELOPING A POTENTIAL INDICATOR FOR NON-RETAINED SHARKS IN SUPPORT OF AN ECOSYSTEM REPORT CARD

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SUMMARY

Some preliminary thoughts on the feasibility of developing indicators for non-retained sharks for incorporation in an ecosystem report card are described in this document.

RÉSUMÉ

Le présent document décrit quelques réflexions préliminaires sur la faisabilité de l'élaboration d'indicateurs pour les requins non retenus en vue de leur incorporation dans une fiche informative sur les écosystèmes.

RESUMEN

En este documento se exponen algunas reflexiones preliminares sobre la viabilidad de desarrollar indicadores para tiburones no retenidos con miras a su incorporación en la ficha informativa sobre ecosistemas.

KEYWORDS

Sharks, mortality, North Atlantic

1. Introduction

Following a request by the ICCAT Sub-committee on Ecosystems to develop an indicator for the non-retained sharks ecosystem component to be incorporated into an ecosystem report card, we discuss some preliminary thoughts on potential indicators to be used. The Shark Working Group will discuss this matter further at its July 2018 intersessional meeting.

The overall objective is to identify an indicator of non-retained sharks (caught as bycatch) based on total mortality in or total interactions with, ICCAT fisheries, or other alternatives.

2. Methods

2.1 List of species

The first step should be defining the list of no-retention sharks. The following species are non-retained sharks due to specific ICCAT recommendations: oceanic whitetip, silky shark, bigeye thresher shark, and hammerhead sharks (except *S. tiburo*).

Additionally, several pelagic sharks, rays and manta may also be captured and mostly discarded due to low or no commercial value, such as the tiger shark or pelagic stingray.

Finally, some species are no retention in some fleets, either due to specific national regulations or fishing practices from the fleets. For example, porbeagle is a no-retention species in EU and Uruguayan fleets due to specific legislation. In other cases, some species (e.g., blue shark) may be usually retained by some fleets and discarded by others due to their fishing practices and preferences.

2.2 Indicators

There are task I data for non-retained sharks, but the catches reported are very incomplete and underestimate true catches. Additionally, very few CPCs report dead discard estimates for non-retained sharks.

Quantifying total mortality for non-retained sharks thus does not seem achievable in the near future without a concerted effort by all CPCs to report all catches in ICCAT fisheries. Some CPCs (e.g., the USA) already report dead discard estimates, but others could potentially estimate total dead discards based on information collected in scientific observer programs of their fleets and effort information from logbooks. Also, estimates of the total number of sharks released alive that die as a result of the gear interaction could be developed based on observer information in conjunction with post-release mortality estimates inferred from electronic tagging.

Examples of other potential indicators that could be more readily obtained are:

1. A data-limited method based on life history information and an index of relative abundance, which allows one to determine overfished status (Brooks *et al*. 2010). The difficulty in using this method lies in identifying a reliable index of relative abundance. Once a reliable index of relative abundance is identified, overfished status could be updated on an annual basis based on the updated value of the index.

2. Trends in size by sex (length, weight) over time. Like indices of relative abundance, these trends are also subject to changes due to targeting, other fishery operations, or management measures, which must be taken into account in the standardization process.

2.3 Data

As stated above, there are some Task I data for catches (**Figures 1 and 2**). These data, as presently reported and available, are not informative. It would have to be augmented with dead discard estimates as well as estimates of sharks released alive that are likely to die. This will require the use of data from national scientific observer programs.

For potential indicators based on life history, indices of abundance, or size trends, published biological information is available and indices of abundance and trends in size also exist or could be developed for several non-retained shark species by some CPCs.

2.4 Regions

Of the two proposed alternatives for partitioning the ICCAT Convention area into subareas for reporting (existing ICCAT stock boundaries consisting of 5 regions and the established ecological provinces with ICCAT species occurrence divided into 6 regions), the first (ICCAT stock boundaries) seems more feasible. However, these regions have been conceived for other species and it would be problematic to disaggregate catches or catch rates into the 5 regions for non-retained sharks.

2.5 Goals and Objectives

Goal: Minimizing the interactions and mortality as practically as possible.

Objective: Determine whether mortality or the number of interactions is being reduced.

3. Discussion

At this point, the limited interpretation of the data available is that, for the reasons stated above, ICCAT task 1 and task 2 are not usable to provide informative time series indicators for non-retained sharks.

Potential future indicators will require the use of detailed fishery observer data. Some options to explore in the future for feasibility are 1) estimate species-specific total mortality, taking into account dead discards and any known post-release mortality; 2) calculate species-specific relative indices of abundance and trends in size by sex from observer data; and 3) incorporation of life history data.

References

Brooks, E.N., J.E. Powers, and E. Cortés. 2010. Analytic reference points for age-structured models: application to data-poor fisheries. ICES Journal of Marine Science 67:165-175.

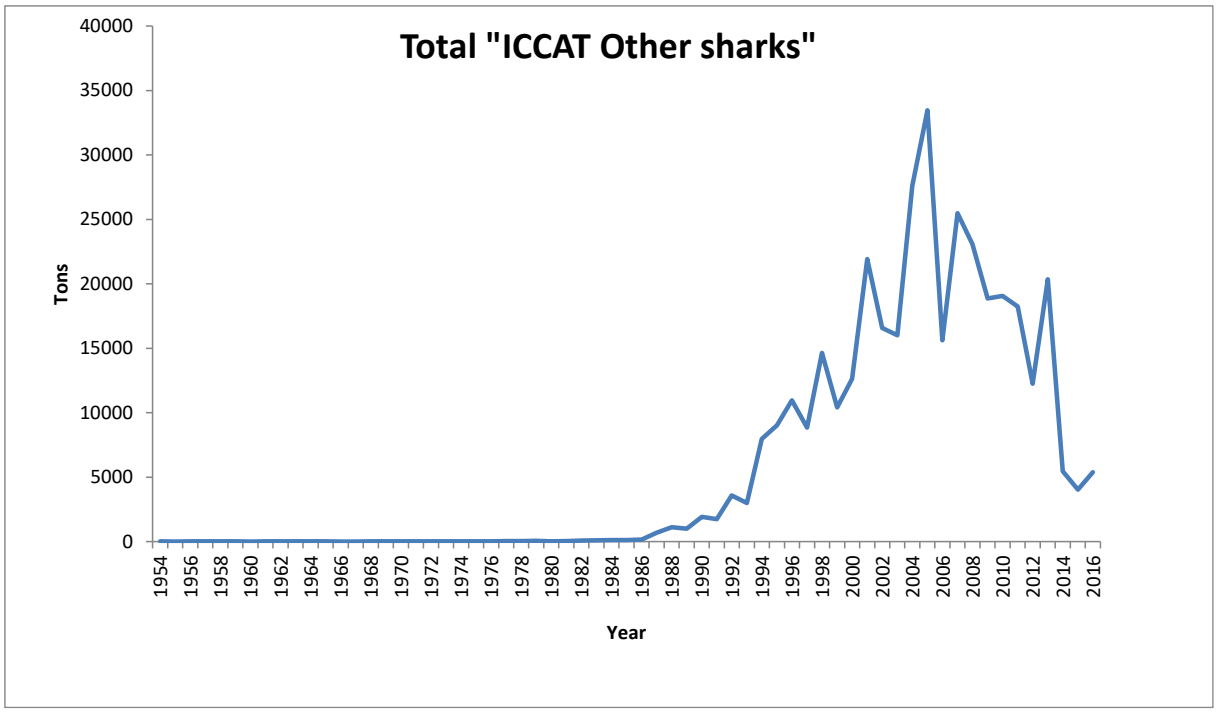

Figure 1. Total "other sharks" reported in ICCAT Task 1 database.

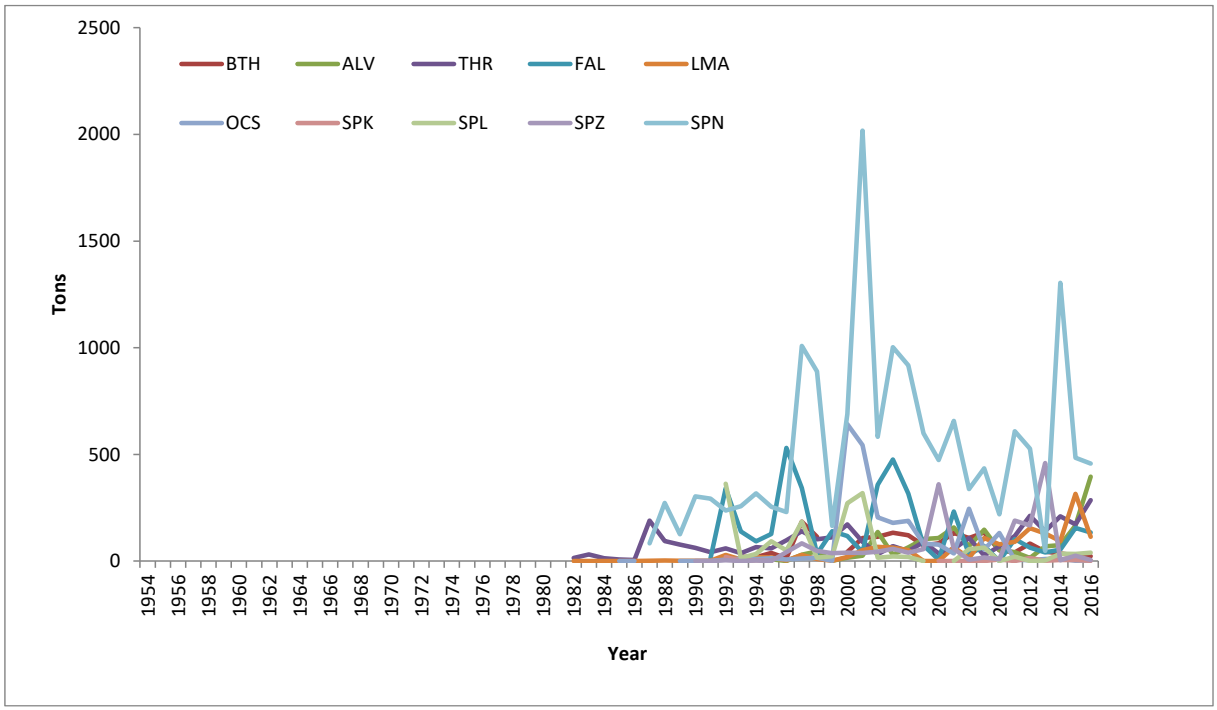

Figure 2. Shark species or complexes reported in ICCAT Task 1 database.