Update on Porbeagle Shark Stock Status Assessment

New Zealand

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for ERSWG 10 Agenda Item 4.2.4

Executive Summary
An initial analysis of porbeagle shark stock status has been completed for some components of the Southern hemisphere stock. To develop this work further, and make it more comprehensive, a revised approach to joint assessment of porbeagle shark stock status is proposed. Support for the proposed approach to assessment, and sharing of data is sought from Extended Commission for the Conservation of Southern Bluefin Tuna (CCSBT) members. It would be particularly useful if CCSBT members were able to agree on a future approach at the 2015 Ecologically Related Species Working Group (ERSWG) meeting.

Porbeagle sharks
Porbeagles live mainly in the latitudinal bands 30–50oS and 30–70oN. They occur in the North Atlantic Ocean, and in a circumglobal band in the Southern Hemisphere. Porbeagles are absent from the North Pacific Ocean, where the closely related salmon shark*, Lamna ditropis*, fills their niche. In the South Pacific Ocean, porbeagles are caught north of 30oS in winter–spring only; in summer they are not found north of about 35oS. They appear to penetrate further south during summer and autumn, and are found near many of the sub-Antarctic islands in the Indian and South-west Pacific Oceans. Porbeagle sharks are not found in the equatorial tropics.

Porbeagles are live-bearers (aplacental viviparous), and the length at birth is 58–67 cm fork length (FL) in the South-West Pacific. Females mature at around 170–180 cm FL and males at about 140–150 cm FL. The gestation period is about 8–9 months. In the North-West Atlantic, all females sampled in winter were pregnant, suggesting that there is no extended resting period between pregnancies, and that the female reproductive cycle lasts for one year. Litter size is usually four embryos, with a mean litter size in the South-West Pacific of 3.75. If the reproductive cycle lasts one year, annual fecundity would be about 3.75 pups per female.

A study of the age and growth of New Zealand porbeagles produced growth curves and estimates of the natural mortality rate. However, attempts to validate ages using bomb radiocarbon analysis were unsuccessful, but suggested that the ages of porbeagles older than about 20 years were progressively under-estimated; for the oldest sharks the age under-estimation may have been as much as 50%. Consequently, the growth parameters derived are probably only accurate for ages up to about 20 years. Males mature at 8–11 years, and females mature at 15–18 years. Longevity is unknown but may be about 65 years.

In New Zealand, porbeagle sharks recruit to commercial fisheries during their first year at about 70 cm FL, and much of the commercial catch is immature. Most sharks caught by tuna longliners are 70 170 cm FL. The size and sex distribution of both sexes is similar up to about 150 cm, but larger individuals are predominantly male; few mature females are caught. Regional differences in length composition suggest segregation by size. The size and sex composition of sharks caught by trawlers are unknown.

Porbeagles are active pelagic predators of fish and cephalopods. Pelagic fish dominate the diet but squid are also commonly eaten; especially by the small sharks.

Stock status assessment to date

At the Ninth Meeting of the Ecologically Related Species Working Group (ERSWG09) of the Commission for the Conservation of Southern Bluefin Tuna (CCSBT)[1] it was noted that the stock status of porbeagle shark in the Southern Hemisphere was unknown. Porbeagle was identified as a priority candidate for ecological risk assessment by the ERSWG for the following reasons: it has widespread capture in southern bluefin tuna (SBT) fisheries, a likely stock distribution across the boundaries of several regional fisheries management organisations (RFMOs), and the Southern Hemisphere population is subject to relatively limited attention in other RFMOs. The meeting discussed undertaking a stock assessment for porbeagle shark and agreed that data would be required from all Members and cooperating non-members (CNMs), and that such an assessment should be part of the future ERSWG work program. The meeting recommended that Japan, New Zealand and Australia work together to progress a stock assessment for porbeagle shark in advance of the next ERSWG meeting.

At the Tenth Meeting of the Ecologically Related Species Working Group (ERSWG10, the data available and potential sources of information on porbeagle required for a stock assessment were discussed. As catches from some fleets were not likely to be available for the assessment, it was identified as necessary to approximate the catch history for some fisheries using observer data on bycatch rates combined with the effort data from the fisheries of each country fishing in the area of porbeagle distribution. A collaborative approach was suggested and New Zealand agreed to fund some of the work required to collate information for ERSWG.

ERSWG 10 identified that the first substantive step was a characterisation across all data sources identified in the data inventory. The characterisation would provide the basis for a stock status assessment for porbeagle shark. New Zealand offered to contract an independent research organisation to coordinate and contribute to the characterisation. Australia and Japan agreed to provide scientific contacts who could contribute data and input to the analyses required.

This brief note identifies progress subsequent to ERSWG 10 and makes recommendations on how this work should be continued in future. It seeks input from Commission members to refine the proposed approach, share data and support the proposed continuation of the research.

Progress since ERSWG 10

Previously a comprehensive summary of Southern Hemisphere distribution information has been provided in Semba et al. (2013).

In preparation for the implementation of the CITES Appendix II shark listings in mid-September, WCPFC has launched a simple “shark portal” on its home page (or go to https://www.wcpfc.int/sharks). On the shark portal they have linked their Shark Research Plan, stock assessments and other science products, and it provides easy access to the shark Conservation and Management Measures and the most recent compliance and data provision summaries for sharks.

[1] Note that all references to the Commission can be read as references to the Extended Commission.

Since ERSWG 10, New Zealand has completed a characterisation across all data sources available to it (Francis et al. 2014). The analysis was limited to data from New Zealand. The Francis et al. (2014) report performs indicator analyses for New Zealand blue, porbeagle and mako sharks. There was no evidence that the stocks of these sharks in New Zealand waters have been adversely affected by fishing at the levels experienced since 2005, and there are good signs that they are increasing.

The intersessional group on porbeagle shark stock status assessment has had some correspondence. As a result of the correspondence, Australia has agreed to provide all relevant data holdings to a future stock-wide assessment. However an initial review of those data suggests they are very limited (as might be expected given the methods used and the range of the Australian fisheries). Additional attempts to expand the data coverage have been made but have been unsuccessful to date.

Continuing porbeagle stock status assessment research

To complete a comprehensive full stock range analysis, we need to progress such work across the other potential data sets. Essentially the remaining gaps are the Indian Ocean and South Atlantic, and then a synthesis across the areas.

As a result of the indicator analyses, and the other work done to date, we consider that it is unlikely that a robust complete stock assessment can be conducted for porbeagle shark. However, it should be possible to advance the indicator analysis approach to a whole stock level. To achieve that, will require access to the relevant data. Accordingly, as a next step, we would like to explore requesting that the GEF ABNJ Tuna Project Technical Coordinator-Sharks and Bycatch progress this work with the ERS group, and across the joint tuna RFMOs.

Data contributions from all ERS participants would be an important part of that work. Data contributions from New Zealand and Australia have already been confirmed for such an approach. Uruguay have identified that they are also likely to be able to participate in such a GEF ABNJ approach. Chile has recently been contacted to explore whether it has relevant data holdings, and if so, whether they would be willing to participate.

Recommendation for discussion at ERSWG11

Porbeagle remains a high priority for stock status assessment in the Pacific Ocean and southern hemisphere generally. Doing this work through the ABNJ tuna project should allow a first global assessment for this stock of porbeagle. Working as ERS alone, we are unlikely to obtain access to all the required data sets.

Accordingly, to support a whole of stock status assessment for porbeagle sharks, we recommend that ERSWG 11 discuss and support a recommendation as follows.

To achieve a whole of porbeagle shark stock status assessment, we:

1) request that the GEF ABNJ Tuna Project Technical Coordinator-Sharks and Bycatch progress this work with the ERS group, and across the joint tuna RFMOs; and

2) ERS members provide all relevant data holdings to such a project.

References

Francis, M.P.; Clarke, S.C.; Griggs, L.H.; Hoyle, S.D. (2014). Indicator based analysis of the status of New Zealand blue, mako and porbeagle sharks. Ne*w Zealand Fisheries Assessment Report* 2014/69. 109 p.

Semba, Y., Yokawa, K., Matsunaga, H., and Shono, H. 2013. Distribution and trend in abundance of the porbeagle (*Lamna nasus*) in the southern hemisphere. *Marine and Freshwater Research*, 64: 518–529