



Memorandum of Understanding on the
Conservation and Management of Marine Turtles and
their Habitats of the Indian Ocean and South-East Asia

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INSIGHTS INTO INDIAN OCEAN FISHERIES-TURTLE INTERACTIONS

1. In April 2013, the IOSEA Secretariat prepared a systematic analysis¹ of national reports submitted by member States of the Indian Ocean Tuna Commission to the 15th meeting of the IOTC Scientific Committee, held in Seychelles in December 2012 (Annex 1). The review sought to assess the reports' potential contribution to the understanding of marine turtle bycatch in the Indian Ocean and the efficacy of by-catch mitigation measures undertaken by IOTC members.

2. The national reports provided to the IOTC Scientific Committee generally include much information of interest and relevance to marine turtle conservation. The information on fleet size and distribution could be used as starting point for more in-depth investigation of overlaps and interactions with marine turtle populations. The usefulness of these reports will be further enhanced as more IOTC members make a concerted effort to include up-to-date and comprehensive information, in enough detail to allow impartial observers to assess the extent to which the provisions of IOTC Resolution 12/04 (largely focussing on mitigation of marine turtle bycatch) are being met. The national reports submitted by many of the same countries under their reporting commitments to IOSEA often provide complementary information on their fisheries as well as bycatch mitigation measures.

3. The attached paper responds in part to the request of the Sixth Meeting of the Signatory States to begin an investigation of indirect take of marine turtles in legal fisheries occurring in the IOSEA region. A parallel request addressed to the Advisory Committee to provide guidance on minimum data requirements in relation to turtle by-catch is worth revisiting, in the light of a recently expressed wish of IOTC to collaborate with IOSEA in this area.

4. Annex 2 contains a separate article² prepared by the IOSEA Secretariat summarising the marine turtle-related discussions which took place at the 16th IOTC Scientific Committee meeting (Busan, December 2013). In particular, the Scientific Committee recommended (*in para. 53 of its report*) collaboration with IOSEA to improve data collection and to offer specialised training to increase post-release survival rates of marine turtles:

- “The development of standards using the IOTC guidelines for the implementation of the Regional Observer Scheme should be undertaken, as it is considered the best way to collect reliable data related to marine turtle bycatch in the IOTC area of competence.

¹ IOSEA Profile of the Month for April 2013: http://ioseaturtles.org/pom_detail.php?id=127. The three annexes to that report are not reproduced here, but are available online. Namely, Annex 1: Spreadsheet summarising information relevant to marine turtle bycatch mitigation contained in IOTC national reports (2012); Annex 2: Summary of relevant information extracted from the IOSEA Online Reporting Facility (<http://ioseaturtles.org/report.php>), pertaining to countries that are members of both IOSEA and IOTC; and Annex 3: List of acronyms and abbreviations.

² Marine turtle discussions at the 16th IOTC Scientific Committee meeting. (Reproduction of article prepared by the IOSEA Secretariat and featured on the IOSEA website on 28 March 2014).

- The Chair of the WPDCS [Working Party on Data Collection and Statistics] [should] work with the IOSEA MoU Secretariat, which has already developed regional standards for data collection (*sic*), and revise the observer data collection forms and observer reporting template as appropriate, as well as current recording and reporting requirements through IOTC Resolutions, to ensure that the IOTC has the means to collect quantitative and qualitative data on marine turtle bycatch.
- [IOTC member States are encouraged] to use IOSEA expertise and facilities to train observers and crew to increase post-release survival rates of marine turtles.”

5. The attached analysis and summary of IOTC deliberations are thought to provide useful guidance to Signatory States with a view to taking IOSEA’s involvement in by-catch mitigation efforts to a new level. Discussions at the Meeting should strive to focus on new initiatives that are realistically achievable in the inter-sessional period.

Action requested:

Signatory States are invited to review the attached analysis of IOTC national reports and the summary of relevant IOTC Scientific Committee discussions, with a view to formulating specific follow-up actions to be directed to the Signatory States, Advisory Committee, and Secretariat. In particular, the Advisory Committee might again be tasked with providing advice on minimum data collection requirements and, to the extent possible (i.e. subject to available finance and in-house expertise), to participate in planned IOTC training programmes on bycatch mitigation.



IOTC / IOSEA reports give insights into Indian Ocean fisheries-turtle interactions

Introduction

The Indian Ocean Tuna Commission (IOTC) is the main regional fisheries management organisation mandated to manage tuna and tuna-like species in the Indian Ocean and adjacent seas. While its primary objective is to assure the conservation and optimum utilisation of fish stocks, the IOTC has paid increasing attention in recent years to the impacts of its fisheries on other marine species, such as marine turtles, seabirds and sharks. IOSEA and IOTC have developed a good working relationship, which has included collaboration in the production of regular status reports on marine turtles, the development of turtle ID cards for fishermen and, most recently, co-funding of the production of a region-wide Ecological Risk Assessment (ERA) for marine turtles.

Membership of IOTC is open to coastal countries and to countries or regional economic integration organisations that are fishing for tuna in the Indian Ocean. There is a substantial overlap in the respective memberships of IOTC and IOSEA. Indeed, twenty-three of the 31 IOTC Contracting Parties and two Cooperating Non-Contracting Parties (collectively known as CPCs) are also signatories to IOSEA. Many are also members of the Convention on Migratory Species, the parent organisation of IOSEA. This might help to explain, in part, why IOTC has been receptive to substantive discussions about fisheries interactions with non-target migratory species.

The annual meeting of the IOTC Scientific Committee includes on its agenda a presentation and review of national reports submitted by CPCs.¹ These reports cover such topics as: background/general fishery information, fleet structure, catch and effort by species and gear, recreational fishery, ecosystem and bycatch issues, national data collection and processing systems, national research programmes, and implementation of IOTC recommendations and resolutions relevant to the Scientific Committee.

These reports are a rich source of information on fisheries potentially interacting with marine turtles in the Indian Ocean, as well as on monitoring programmes and bycatch mitigation measures that may have been implemented by IOTC members. They include, for example, data on the size and coverage of longline and purse seine fleets, as well as trends in fishing effort and shifts in the geographic distribution of fishing fleets. Such information could eventually be useful in helping to identify areas where marine turtles may be more or less prone to interactions with fisheries. The reports also contain information that may be used to assess the extent of compliance with various IOTC resolutions and recommendations pertaining to mitigation of marine turtle bycatch.

Incidentally, the reports also contain some data on the incidence of turtle bycatch, however this aspect is generally incomplete and based on very limited observation and reporting. Indeed, the IOTC Scientific Committee has expressed concern in the past “that the lack of data from Contracting Parties and cooperating non-contracting Parties (CPCs) on the interactions and mortality of marine turtles from fisheries under the mandate of the IOTC undermines the ability to estimate levels of turtle bycatch and consequently IOTC’s capacity to respond and manage adverse effects of fishing on marine turtles”.

Until now, the IOTC national reports have never been analysed systematically from the standpoint of assessing their potential contribution to the understanding of marine turtle bycatch in the Indian Ocean and of the efficacy of bycatch mitigation measures undertaken by IOTC members. The following analysis does just that, by compiling and summarising information from all of the national reports submitted to the 15th Scientific Committee meeting held in Seychelles in December 2012.

¹ Available at: http://www.iotc.org/English/meetings/sc/doc_meeting_SC15.php. The designation of geographical entities in this report does not imply the expression of any opinion concerning the legal status of any country, territory or area, or of its authorities, or concerning the delimitation of its frontiers or boundaries.

IOTC frame of reference for mitigation of marine turtle bycatch

IOTC Resolution 12/04 (adopted in April 2012) requires IOTC Contracting Parties and Co-operating non-Contracting Parties to take various measures in order to mitigate the impact of their fisheries on the six species of marine turtles that are present in the Indian Ocean. The requirements of CPCs with regard to fishing vessels registered on the IOTC Record of Fishing Vessels can be summarised as follows:

- To require fishermen to bring aboard, if practicable, any captured marine turtle that is comatose or inactive, and foster its recovery before safely returning it to the water; and to release marine turtles observed entangled in fishing gear;
- To ensure that fishermen are aware of and use proper mitigation, identification, handling and de-hooking techniques and keep on board all necessary equipment for the release of marine turtles. More specifically, CPCs are to ensure that longline vessel operators carry line-cutters and de-hookers; that purse seine vessel operators avoid encirclement of marine turtles and use dip nets to handle them; and they are encouraged to adopt designs for Fish Aggregating Devices (FADs) that reduce the incidence of entanglement of marine turtles; and
- To collect, and provide to the IOTC Secretariat, all data on their vessels' interactions with marine turtles, through the use of a logbook system and an observer programme.

CPCs are also requested to undertake research trials with a view to improving mitigation methods in several areas that have shown potential (e.g. use of circle hooks and whole finfish bait, alternative gear design and handling techniques) and to report the results of these trials to the Scientific Committee. Furthermore, CPCs are encouraged to collaborate with IOSEA, to apply the *FAO Guidelines to Reduce Sea Turtle Mortality in Fishing Operations*, and to support developing countries in their implementation of these guidelines.

In fact, the provisions of Resolution 12/04 are broadly shared by its predecessor from 2009, Resolution 09/06, with the introduction of some additional elements. For instance, the new resolution clarifies that it applies to all fishing vessels on the IOTC Record of Fishing Vessels, and reinforces the need for CPCs to report annually to the IOTC Secretariat all interactions and mortality of marine turtles in fisheries under the IOTC mandate. As noted above, the latest resolution also calls for the development of improved FAD designs to reduce the incidence of entanglement of marine turtles; and its provisions on safe handling of accidentally captured marine turtles now apply to all species, not only hard shelled turtles. Similarly, IOTC Recommendation 05/08, dating back to 2005, also included specific guidelines in relation to safe handling, purse seine and longline operations, and data collection.

Thus, while it might seem reasonable to excuse IOTC CPCs for any incompleteness in their reports submitted in December 2012 – given that much of their content relates to a resolution adopted earlier that same year – CPCs have in fact been encouraged to improve and report on their implementation of marine turtle bycatch mitigation measures as long ago as 2005.

Methodology

Available 2012 IOTC national reports were reviewed in order to identify actions taken so far by CPCs in accordance with IOTC Resolution 12/04, regarding marine turtle interactions with tuna fisheries operating in the IOTC convention area. In total, 24 reports were reviewed, corresponding to all IOTC CPCs, except: Eritrea, Guinea, Pakistan, Sierra Leone, United Republic of Tanzania, Vanuatu and Yemen, which did not submit a report to the IOTC Secretariat; Belize and Sudan, whose submitted reports were not available on the IOTC website; and Senegal, which has not conducted any fishing activities in the IOTC area of competence since 2007. Incidentally, the reports of Comoros and Philippines were found to provide very little information regarding their implementation of the provisions of IOTC Resolution 12/04.

All of the relevant information gleaned from the IOTC national reports is summarised in a large Excel spreadsheet (Annex 1: available online at http://ioseaturtles.org/pom_detail.php?id=127). In due course, consideration may be given to transforming the contents of the spreadsheet into an online database, to make it easier to search for particular topics of interest.

Supplementary information from IOSEA national reports submitted to the IOSEA Secretariat by countries that are members of both IOSEA and the IOTC has allowed for further enrichment of the analysis. For instance, IOSEA reports often provide complementary information concerning small-scale fisheries operating in the IOTC convention area but not targeting tuna, such as shrimp trawling and pole-and-line fisheries; occurrence of illegal fishing; subjective assessments of the degree of interaction of each fishery with marine turtles; details of results of ongoing research trials; eventual use, monitoring and recovery of FADs; details of existing net retention and recycling schemes; and national regulations on spatial and temporal control of fishing etc. This complementary information is mentioned in various places in the text, and is summarised for each country in Annex 2.

I. Fleet structure and trends in fishing effort

Out of the 24 reports reviewed, 21 CPCs reported having a longline fishery operating in the IOTC area. It is not possible, from the limited information currently available, to draw any conclusion about the overall impact of this fishery on marine turtles in the Indian Ocean. However, a report by Varghese et al (2010) submitted to the IOTC Working Party on Ecosystems and Bycatch in 2010 is particularly informative in its description of the impact on marine turtles of the longline fishery in Indian waters.

As far as purse seine is concerned, this gear type is reportedly used in nine CPCs. This fishing technique could have a direct as well as an indirect impact on marine turtles, since it is often used in combination with FADs. These can entangle turtles if they are not designed with “turtle-friendly” configuration and materials. A recent study based on a long-term dataset indicates that the rate of turtle mortality in the EU Indian Ocean purse seine fishery is actually rather low. However, that study did not consider FADs that are not observed, lost or abandoned, and which may go on to become “ghost nets” that trap turtles and other marine species indefinitely.

Other fishing techniques – trawling, gillnets, ringnets, troll lines (with or without FAD), hand lines or harpoons – are used in the majority of the IOTC member countries, often as secondary / artisanal fisheries. The degree of their so-far-unquantified interaction with marine turtles should not be underestimated. For instance, shrimp trawl and gill net fisheries are often cited in IOSEA reports for having a relatively high impact on marine turtles.

Many of the IOTC reports provide interesting information on national trends in fishing effort, in terms of current fleet size and recent growth/contraction trends. Longline fishing effort, measured in terms of vessel numbers, has reportedly declined in recent years in 11 countries – substantially so in some cases (e.g. Australia, EU-Portugal, Japan, Republic of Korea) – while effort has apparently undergone a moderate increase in six countries (EU-Spain, Indonesia, Kenya, South Africa and Sri Lanka). For all of the CPCs involved in purse seining, effort in this fishery is reported to have declined in recent years. Reasons provided by CPCs to account for these declining trends include increased piracy in parts of the IOTC area, as well as higher operational costs associated with a general decrease in the target fish stock. Fishing effort of six CPCs was reported to have shifted geographically in recent years (mostly in 2011), suggesting a possible adaptation of the fisheries to those negative conditions.

It would be interesting to investigate more thoroughly the implications of these trends for marine turtle conservation. For instance, are smaller fleet sizes necessarily resulting in less turtle bycatch? Are the reported shifts in the geographic distribution of fishing effort positive, negative or inconsequential for marine turtle populations, in terms of the frequency of fisheries interactions with turtles? These and other questions could be explored more thoroughly if access to more detailed information on fishing effort and turtle distribution (including migration patterns) were made available.

II. Monitoring activities

Observer programme

Seventeen CPCs declared the existence of an observer programme designed for their fisheries. Although, unsurprisingly, none was reported to be specific to turtles, all of them include marine

turtles in their scope. However, eight of the 17 concerned CPCs – namely China, Comoros, Kenya, Mauritius, Philippines, Republic of Korea, Sri Lanka and Thailand – reportedly did not implement their programme in the year 2011, either due to piracy issues, lack of resources or decline in fishing effort; and the Islamic Republic of Iran also mentioned having some issues regarding the implementation of its observer programme.

Furthermore, one general reservation that may be stated regarding the implementation of existing national observer programmes is that data, sometimes still in the process of analysis, are currently unavailable for some key countries (e.g. China's data for the years 2007, 2008 and 2009 are still to be recovered; and Japanese data for 2010 are under analysis). Moreover, it is important to note that observer coverage of the national programmes is very uneven across countries (e.g. 1.3% for Spain, 1.7% for Australia, 5% for Japan, between 9 and 13% for France, 16% for EU-Portugal, and a "target" of 30% for Madagascar). This lack of uniformity and relatively low coverage rate for some national fisheries makes it difficult to draw meaningful conclusions from the available observer data.

More positively, many of the countries that have yet to implement an observer programme have stated their intention to do so, or are in the process of developing one (namely India, Malaysia, Maldives, and Oman). Moreover, South Africa is developing a new phase of its observer programme and Seychelles has just started to administer its newly designed programme in early 2013.

The IOTC national reports offer some insights into the integrity of the programmes that are already operational. Only 9 countries (Australia, Comoros, Islamic Republic of Iran, Kenya, Madagascar, Mauritius, EU-Portugal, Republic of Korea, Seychelles) mention training of their observers – while Sri Lanka, whose programme is under development, has requested assistance from the IOTC Secretariat. Of these countries, only three (Australia, China and Republic of Korea) provide additional information that might allow for a cursory indication of observer competence. For the latter, observers are reportedly recruited from among graduates of science colleges/universities. In the case of the Islamic Republic of Iran, the observers are crew members trained for the purpose of its programme. In general, the available information is insufficient to give confidence about the ability of observers, trained or otherwise, to correctly identify and handle incidentally caught turtles. Kenya's national report to IOSEA mentions the incapacity of its observers to deal with faulty TEDs.

Logbook system and port sampling programme

All CPCs had implemented a national logbook system in the year 2011, except for Comoros, Philippines, United Kingdom (which no longer issues commercial licences) and Thailand (under development). In some cases, the onboard filling of logsheets by vessel operators is a licensing or unloading requirement, in China and Mauritius, respectively.

However, available data seem to be scarce even for several of those countries that have been implementing their logbook system in recent years. In most cases this situation is due to insufficient raw data, either because coverage of the programme was very limited (Indonesia, Japan), because of implementation delays (Malaysia) or, more commonly, because data were not correctly reported by cooperating vessels: Islamic Republic of Iran, Madagascar, Seychelles (for its recreational fishery), and Sri Lanka. But the limitation of available data is also, in the case of France, due to incomplete processing of recovered data because of unexpected technical and administrative problems.

CPCs seem aware of this issue and, to address it, several of them have recently reviewed their logsheets in accordance with IOTC requirements (India, Madagascar, Mozambique, Seychelles, and Republic of Korea). Additionally, Australia and France have implemented an electronic logbook system in 2013 and the Maldives and Korea are on the path to doing it.

With the exceptions of Japan, Madagascar, Maldives, Mozambique, Philippines, EU-Portugal, Republic of Korea, Seychelles and United Kingdom/BIOT, all CPCs implemented a port sampling programme in 2011, involving the collection of data such as catch, number of trips, days per trip, and operations by fishing ground. However, very little information was provided in CPC 2012 reports on the level of coverage of the programmes, and Oman declared having sometimes recorded some inaccurate data. In general, it is unclear whether any of these port sampling programmes might provide an opportunity to glean more information about the extent of marine turtle bycatch.

Reporting of turtle bycatch

According to the IOTC 2012 national reports, 14 CPCs currently apply a system of turtle bycatch monitoring to a portion of their fisheries. Such activities are organised either as part of their main observer programme (Australia), logbook system (China), other research projects carried out by specialized institutes (EU countries), or by NGOs (Seychelles). On the other hand, seven countries (Comoros, Kenya, Madagascar, Mauritius, Oman, Philippines, and Thailand) did not provide any data in their IOTC reports, suggesting no existing monitoring activities. The United Kingdom (BIOT) and Maldives declared no turtle bycatch in their waters due to the nature of their fisheries in 2011, without specifying whether monitoring had been implemented for that year or not.

Among the CPCs reporting on levels of turtle bycatch, Australia, China, Mozambique and Spain reported no interaction of their national fisheries with marine turtles in 2011, in the IOTC area. The number of incidentally caught turtles averaged about 12 in countries reporting incidental catch events in their territorial waters for that year (10 for Portugal, 14 for Japan, and 12 for South Africa).

Additional information is available from a study (Clermont et al 2012) that analysed European Union purse seine fishery interactions with marine turtles in the Indian Ocean over a 15 year period. Based on available observer data, the average annual bycatch of marine turtles in fishing sets of EU purse seines operating in the Indian Ocean was estimated to be in the order of 250 animals. About 3/4 of these by-caught turtles were released alive, suggesting that the number of marine turtles killed in the EU purse seine fishery is in the order of 60 individuals per year. This finding is consistent with studies in other ocean basins showing very low rates of turtle mortality in purse seine operations. However, it is worthwhile noting that observations on sets do not take into account the phenomenon of “ghost fishing” occurring on floating devices (some of them being lost by owners) that do not end up in a fishing set.

In general, the levels of marine turtle bycatch recorded in CPC reports should be considered with great caution. The extent of monitoring and/or reporting of turtle bycatch in the IOTC area appears to be uneven among CPCs. Firstly, reporting of bycatch is not necessarily a requirement for all fisheries of a given CPC (for example, Japan clarifies that its observers are limited to longliners) and, in general, smaller vessels that cannot accommodate observers are usually excluded on practical grounds. India reports a sizeable longline fleet of some 294 vessels, but bycatch monitoring is undertaken on only four governmental tuna longline survey vessels. Under these circumstances, meaningful extrapolations are problematic.

Secondly, it is often difficult to differentiate between *effectiveness of bycatch monitoring/reporting* and *actual levels of bycatch* where the quality of bycatch monitoring and reporting appears to vary greatly among CPCs. It is impossible to discern from the available reports whether the lack of mention of any bycatch (or a very low value) is a reflection of little or no “actual” turtle bycatch, poor reporting by vessel operators, and/or inadequate monitoring/reporting by authorities. For example, in Malaysia, although longline operators “were informed to record any interaction with turtles”, very few reports of bycatch appear to have been recorded. In contrast, some countries have submitted extensive documentation to various IOTC working groups which gives confidence that their estimates of low bycatch, in some fisheries, are scientifically justified.

Very few CPCs provide information on the fate of by-caught turtles in their IOTC, IOSEA or other reports. Some reports suggest that a high percentage of turtles may be released alive. For example, the study by Clermont et al (2012) indicates that 86% of the nearly 600 turtles caught in the EU purse seine fishery between 2003 and 2010 were released alive. A similarly high value, 88%, was reported for one of Australia’s eastern longline fisheries, based on a much smaller sample size (22 animals). The basis of Sri Lanka’s estimation that “over 95% of the turtles incidentally caught are returned safe to the sea” is not clear from its report submitted to IOTC. Other research conducted in Sri Lanka in late 1999/2000 suggests otherwise, at least in some localities (Marine Turtle By-Catch in Sri Lanka, 2002. Turtle Conservation Project.)

III. Turtle mitigation measures

Generally speaking, most CPCs have a general legal instrument in place that deals with protection of marine turtles from fishing activities, such as a ban on catching of turtles, spatial and temporal control of fishing, or marine protected areas that complement marine turtle conservation efforts.

Regulation of legal fisheries

Training of fishermen

IOTC Resolution 12/04 requires that all CPCs “ensure that fishermen are aware of” turtle mitigation methods. Regarding that provision, 13 countries so far (Australia, Comoros, France, India, Indonesia, Islamic Republic of Iran, Kenya, Mozambique, EU-Portugal, Republic of Korea, South Africa, Sri Lanka and Thailand) have developed programmes, in one form or another, intended to educate vessel operators about fishing techniques to avoid marine turtle bycatch and appropriate handling of by-caught turtles. However, there is little information available to judge the scope and effectiveness of these programmes, which seem to greatly vary from one CPC to another. Genuine training (e.g. through workshops, that go beyond simply handing out reading material) appears to have been provided in very few countries. Indonesia’s mention of training of crews in collaboration with WWF is noteworthy. China, France and the Republic of Korea report having produced and distributed identification cards intended to help fishermen accurately record turtle bycatch.

Use of mitigation techniques

Eleven CPCs reported having a legal framework requiring fishermen to help recover captured marine turtles and to release them at sea (Australia, China, Portugal, Indonesia, Madagascar, Maldives, Mauritius, Mozambique, Seychelles, South Africa, and Thailand). In addition, nine CPCs have adopted regulations that require fishermen to carry onboard line cutters and de-hookers (Australia, China, India, Maldives, Mauritius, Mozambique, EU-Portugal, Republic of Korea, and South Africa). Furthermore, monitoring and recovery of FADs is reportedly carried out in four countries (Comoros, Indonesia, Madagascar and Malaysia).

However, while most of the CPCs have provided information on their legal framework for mitigation of turtle bycatch (either to IOTC or to IOSEA), the extent to which these national regulations are effectively monitored and enforced is ambiguous. Although most of the CPCs have adopted regulations requiring fishermen to “*keep on board* all necessary equipment for the release of marine turtles” (IOTC resolution 12/04, para. 6), it is less clear whether vessel operators effectively “*use proper mitigation, identification, handling and de-hooking techniques*”. Similarly, no information is provided on whether fisheries have effectively adapted their fishing practices in accordance with IOTC Resolution 12/04, which encourages the use of whole finfish bait for longliners and avoidance of marine turtle encirclement by purse seiners.

While it is beyond the intended scope of IOTC reporting, some CPCs mention there – or in their reports to IOSEA – their programmes requiring the use of Turtle Excluder Devices (e.g. Australia, India, Kenya, Madagascar, Malaysia, Mozambique, Philippines). However, in most cases, little or no information is provided on their effective use by fishing fleets.

National Plans of Action

Only three countries (Australia, Kenya and Malaysia) report having a national plan for marine turtle conservation in place, and those plans are, in some cases, overdue for review. It is known from other sources that a number of countries – including France, Indonesia and India – are in the process of developing their national plans. Although not directly related to bycatch mitigation, a few CPCs (e.g. France, Malaysia, and Oman) report having opened turtle conservation centres for educational purposes, and many other countries are known to have similar centres.

Illegal fishing

The national reports submitted to IOSEA provide supplementary information about the perceived impact of illegal fishing on marine turtles in the IOTC convention area. Indeed, 13 IOSEA members have reported such activities in their territories, potentially affecting marine turtle populations. Apart from poaching directly targeted at marine turtles (e.g. harpooning in Kenya and Seychelles, and illegal inshore fishing in the United Kingdom/BIOT), accidental harming of turtles commonly occurs in some CPCs (e.g. through the illegal use of explosive for fishing in Indonesia).

IOSEA national reports also document the fact that non-reported bycatch of turtles in illegal fisheries occurs in many CPCs, significant examples of which are the large-meshed bottom gill-net fishery intended to catch stingrays in Malaysia, illegal purse seine fishery in Mozambique, set gill net fishery in Philippines, as well as the use of FADs in commercial ski-boat line-fishery to attract pelagic fish in South Africa. Aside from IOTC, it is urgent that countries take necessary measures to address these issues by enforcing their domestic regulations more effectively in order to improve the scope and impact of their legislation.

Incidentally, no mention is made in the reports of IOTC CPCs of the ramifications of IUU fishing, in terms of the potential extent of bycatch of non-target species, including marine turtles.

IV. Research initiated by governments

IOTC Resolution 12/04 calls on CPCs to undertake research on a variety of mitigation techniques and to report the results of trials to the Scientific Committee. Until now, only a small number of countries have reported activities undertaken in this regard. However, it is known from IOSEA reports that Australia is currently quantifying the ecological and economic value of short soak time for gillnets, developing and trialling set mesh nets with break-away panels, and has reported a reduction of marine turtle interactions with its longline fishery as a result of the use of circle hooks. The impact of such hooks is also being investigated by Malaysia, Philippines, and Republic of Korea. Similarly, EU-Portugal has undertaken research trials on the use of whole finfish bait; and alternative FADs are being designed in France and Madagascar, and trialled in Mozambique. South Africa reportedly introduced on an experimental basis grids that exclude turtles.

It is likely that more research is being conducted than is being reported, either through IOTC or IOSEA channels. Given the value and cost-effectiveness of sharing the results of successful – and even unsuccessful – research trials, more attention should be paid to documenting the work that has been undertaken.

V. Quality of data provided

Overall, the IOTC national reports reveal considerable variability, in terms of the regulation, practical application and enforcement of turtle mitigation measures. Some countries, such as Australia, India, Indonesia, Malaysia and Sri Lanka, are apparently more active in this area, whereas data relative to turtle mitigation efforts were found to be scarce or sometimes inexistent in the IOTC reports of Comoros, Indonesia, Japan, Oman, Philippines, and EU-Spain. Yet, most if not all of these countries are thought to be confronted with turtle-bycatch issues.

Generally speaking, the level of detail in the national reports is often insufficient to distinguish between the mere existence of a regulation (for instance, a requirement for vessels to carry line cutters and de-hookers on board, for appropriate handling of turtles) and effective implementation of that regulation. The latter implies a certain degree of training of crews (repeated occasionally, as crews can change), periodic feedback, and monitoring of compliance. Going forward, logbooks should include information on the interventions made in sufficient detail to provide feedback on their efficacy (i.e. on the animal's fate: dead/alive; released with/without hook; released with/without obvious injury etc.). Ideally observer data would be even more specific, giving an indication of species and possibly include basic morphometric measurements.

It is sometimes unclear whether the primary fishing gears described in reports relate only to *national* fleets, or to all fleets (including foreign vessels) operating within a county's EEZ. Similarly, licensing information provided by a member country sometimes does not specify whether it concerns only tuna fishing operators or any fishing gear operating in the IOTC convention area.

Conclusion

Despite these shortcomings, the national reports provided to the IOTC Scientific Committee include much information of interest and relevance to marine turtle conservation. The information on fleet size and distribution could be used as starting point for more in-depth investigation of overlaps and interactions with marine turtle populations. The usefulness of these reports will be further enhanced as more IOTC members make a concerted effort to include up-to-date and comprehensive information, in enough detail to allow impartial observers to assess the extent to which the provisions of IOTC Resolution 12/04 are being met.

As mentioned in the introduction, the national reports submitted by many of the same countries, as part of their reporting commitments to IOSEA, often provide complementary information on their fisheries and bycatch mitigation measures. In the interest of presenting a fuller picture of these efforts, Annex 2 to this report summarises the highlights of this additional information source.

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April 2013



Marine turtle discussions at the 16th IOTC Scientific Committee meeting (28 March 2014)

The IOSEA Secretariat has reported on several occasions in the past on the work of the Indian Ocean Tuna Commission (IOTC) which, apart from being responsible for the management of tuna and tuna-like species in the Indian Ocean, takes an active interest in bycatch of non-target species including marine turtles. The Commission receives advice from its Scientific Committee which meets annually to review the national reports of IOTC members (known as CPCs: Contracting Parties and Cooperating Non-Contracting Parties), assess the status of target and non-target species, review implementation of various measures, and make technical recommendations to the Commission. The Sixteenth Session of the IOTC Scientific Committee (SC) was held in Busan, Republic of Korea, from 2 to 6 December 2013. The full report of the meeting is available for downloading from the newly-revised IOTC website: www.iotc.org. As a service to IOSEA readers, we summarise here the main points of the lengthy (312-page) meeting report related to marine turtles. Where appropriate, specific paragraphs of the report are referenced in parentheses.

Executive Summary for Marine Turtles

Appendix XXX of the SC report provides a summary of the status of the six species of marine turtles found in the Indian Ocean, and includes rudimentary management advice:

Status. “No assessment has been undertaken by the IOTC WPEB for marine turtles due to the lack of data being submitted by CPCs. However, the current International Union for Conservation of Nature (IUCN) threat status for each of the marine turtle species reported as caught in IOTC fisheries to date is provided in Table 1. It is important to note that a number of international global environmental accords (e.g. Convention on Migratory Species (CMS), Convention on Biological Diversity (CBD)), as well as numerous fisheries agreements obligate States to provide protection for these species. While the status of marine turtles is affected by a range of factors such as degradation of nesting beaches and targeted harvesting of eggs and turtles, the level of mortality of marine turtles due to capture by gillnets is likely to be substantial as shown by the Ecological Risk Assessment undertaken in 2012/13, and an order of magnitude higher than longline and purse seine gears for which mitigation measures are in place.”

Outlook. “Resolution 12/04 On the conservation of marine turtles includes an annual evaluation requirement by the Scientific Committee. However, given the lack of reporting of marine turtle interactions by CPCs to date, such an evaluation cannot not be undertaken. Unless IOTC CPCs become compliant with the data collection and reporting requirements for marine turtles, the WPEB and the SC will continue to be unable to address this issue.

Notwithstanding this, it is acknowledged that the impact on marine turtle populations from fishing for tuna and tuna-like species may increase if fishing pressure increases, or if the status of the marine turtle populations worsens due to other factors such as an increase in fishing pressure from other fisheries or anthropological or climatic impacts. The following should be noted:

- The available evidence indicates considerable risk to marine turtles in the Indian Ocean.
- The primary source of data that drive the ability of the WPEB to determination (*sic*) a status for the Indian Ocean, total interactions by fishing vessels, is highly uncertain and should be addressed as a matter of priority.
- Current reported interactions are known to be a severe underestimate: 39 interactions reported in 2010 by 3 CPCs.
- The Ecological Risk Assessment conducted by Nel et al. (2013) concluded that, from the limited data received on longlining and purse seining, the former posed the greater apparent risk to marine turtles. The ERA estimated that ~3,500 marine turtles are caught by longliners annually, followed by ~250 turtles p.a. in purse seine operations. Two separate approaches to estimate gillnet impacts on sea turtles, based on very limited data, calculated that ~ 52,425 turtles p.a. or 11,400 – 47,500 turtles p.a. are caught in gillnets (with a mean of the two methods being 29,488 turtles p.a.) Anecdotal/published studies reported values of >5000 - 16 000 turtles p.a. for each of just India, Sri Lanka and Madagascar. Of these reports, green turtles are under the greatest pressure from gillnet fishing, constituting 50-88% of catches. Loggerhead, hawksbill and olive ridley turtles are caught in varying proportions depending on the region.
- Maintaining or increasing fishing effort in the Indian Ocean without appropriate mitigation measures in place, will likely result in further declines in biomass.
- That appropriate mechanisms are developed by the Compliance Committee to ensure CPCs comply with their data collection and reporting requirements for marine turtles.”

Supporting information for the outlook includes reference to the Conservation and Management Measures adopted by the Commission (in the form of relevant resolutions), information on the biology and ecology of each marine turtle species of marine turtles (including range and stock structure, longevity, age of maturity, spawning season and size), a summary of information available on the interactions between marine turtles and selected fisheries for tuna and tuna-like species in the Indian Ocean, a list of available assessments of the status of certain marine turtle species, and a list of literature cited.

IOTC Conservation and Management Measures (pertaining to marine turtles)

IOTC Resolution 12/04 (on the Conservation of Marine Turtles), in effect since August 2012, is the primary instrument describing how IOTC CPCs are supposed to manage fisheries interactions with marine turtles. The Scientific Committee’s comments and recommendations with regard to implementation of this resolution – which tend to repeat previous exhortations – are indicative of a slow rate of uptake of its provisions:

“The SC noted that the lack of data from CPCs on interactions and mortalities of marine turtles in the Indian Ocean is a substantial concern, resulting in an inability of the WPEB to estimate levels of marine turtle bycatch. There is an urgent need to quantify the effects of fisheries for tuna and tuna-like species in the Indian Ocean on marine turtle species, and it is clear that little progress on obtaining and reporting data on interactions with marine turtles has been made. This data is necessary to allow the IOTC to respond and manage the adverse effects on marine turtles, and other bycatch species. (*para 49*)

The Committee agreed that an Ecological Risk Assessment (ERA) for marine turtles – jointly sponsored by IOTC and IOSEA, and carried out in 2012-2013 – “be kept under review, and that consideration be given to updating it periodically in light of newly received data and other information”. (*para 50*)

The SC also recommended that Resolution 12/04 be tweaked to require CPCs to report annually on the total estimated level of incidental catches of marine turtles, by species (which is not presently the case); and that Resolution 10/02 (Mandatory statistical [reporting] requirements) be revised in order to make the reporting requirements coherent with IOTC Resolutions 12/04 and 13/03. (*paras 51 & 52*)

Proposed management advice

Many of the Scientific Committee's recommendations to the Commission concern issues that have been discussed previously in that forum or by the subsidiary Working Party on Ecosystems and Bycatch (WPEB). The Committee repeated the following recommendations regarding the main fisheries interacting with marine turtles in the Indian Ocean (*para 53*):

“Gillnet: The absence of data for marine turtles, fishing effort, spatial deployment and bycatch in the IOTC area of competence makes it difficult to provide management advice for gillnets. However, possible mitigation measures to avoid marine turtle mortality in gillnets would be possible and, thus, the group suggested that research in gillnet mitigation measures (e.g. using lights on gillnets) will be considered as a research priority. Moreover, improvements in data collection and reporting of marine turtle interactions with gillnets, and research on the effect of gear types (i.e. net construction and colour, mesh size, soak times, light deterrents) are necessary.”

With respect to gillnets, in particular, the SC reiterated its previous recommendation that “the Commission consider allocating funds to support a regional review of the current and historical data available for gillnet fleets operating in the Indian Ocean. As an essential contribution to this review, scientists from all CPCs having gillnet fleets in the Indian Ocean, in particular those from I.R. Iran, Oman, Pakistan and Sri Lanka, should collate the known information on bycatch in their gillnet fisheries, including sharks, marine turtles and marine mammals...” The SC recommended hiring a consultant for 30 days to assist CPCs with this task. (*para 38*)

At the same time, the SC recommended that “the Commission allocate funds in its 2014 and 2015 budgets for the IOTC Secretariat to facilitate training for CPCs having gillnet fleets on bycatch mitigation methods, species identification, and data collection methods”. The budget estimate for workshops in I.R. Iran/Oman and Sri Lanka amounted to USD 25,000. (*para 39*)

“Longline: Current information suggests inconsistent spatial catches (i.e. high catches in few sets) and by gear/fishery. The most important mitigation measures relevant for longline fisheries are to:

1. Encourage the use of circle hooks, whilst developing further research into their effectiveness using a multiple species approach.
2. Release live animals after careful dehooking/disentangling/line cutting ...”

Purse seine: All FAD-directed purse seine fisheries should rapidly change to only use ecological FADs [i.e. improved FAD designs to reduce the incidence of entanglement of bycatch species, using biodegradable material as much as possible] based on the principles outlined in Annex III of Resolution 13/08 (Procedures on a fish aggregating devices (FADs) management plan).

Review of national reports from CPCs

The national reports of IOTC CPCs generally contain interesting information on fishing fleets, including details of fleet size, trends in effort, and gear type; as well as occasional information on implementation of logbook and observer programmes, and data collection on bycatch species. However the only specific reference to marine turtles among the reports submitted in 2013 is contained in an abstract of the Seychelles report, which noted an absence of marine turtle interactions reported by the Seychelles longline fleets – evidently because the Seychelles industrial longline fleets target mainly bigeye tuna at depth, and the semi-industrial fleet targets swordfish at night.

Implementation of the IOTC regional observer scheme (ROS)

Since 2010, the IOTC has had in place a Regional Observer Scheme which is currently governed by the provisions of Resolution 11/04. That the scheme has yet to live up to expectations is reflected in the following statement of the SC, which makes reference to the potential usefulness of observer data in relation to marine turtles:

“The SC expressed its strong concern regarding the low level of reporting to the IOTC Secretariat of both the observer trip reports and the list of accredited observers since the start of the ROS in July 2010. Such a low level of implementation and reporting is detrimental to the work of the SC, in particular regarding the estimation of incidental catches of non-targeted species, as requested by the Commission. In particular, the SC noted that the IOTC Regional Observe Programme could be a significant source of potential data for marine turtles (e.g. sex and species composition, etc.) for some longline and gillnet fisheries.” (*para 175*)

The Committee recommended collaboration with IOSEA to improve data collection and offer specialised training to increase post-release survival rates of marine turtles (*para 53*):

“1. The development of standards using the IOTC guidelines for the implementation of the Regional Observer Scheme should be undertaken, as it is considered the best way to collect reliable data related to marine turtle bycatch in the IOTC area of competence.

2. The Chair of the WPDCS to work with the IOSEA MoU Secretariat, which has already developed regional standards for data collection (*sic*), and revise the observer data collection forms and observer reporting template as appropriate, as well as current recording and reporting requirements through IOTC Resolutions, to ensure that the IOTC has the means to collect quantitative and qualitative data on marine turtle bycatch.

3. Encourage CPCs to use IOSEA expertise and facilities to train observers and crew to increase post-release survival rates of marine turtles.”

Implementation of FAO Guidelines to reduce marine turtle mortality

The Scientific Committee meeting provides an opportunity to take stock of the state of implementation of the FAO guidelines to reduce marine turtle mortality in fishing operations. As noted in Appendix VI of the SC meeting report, only six CPCs (Australia, European Union, Maldives, Mauritius, Mozambique, and the United Kingdom) mention the measures in place – in most cases, regulations – aimed at mitigating marine turtle-fisheries interactions in the Indian Ocean. In most, if not all, cases it is not possible to discern from the short descriptions the degree of actual compliance with these domestic regulations or the extent of monitoring carried out to ensure compliance.

Arrangements for future meetings of the WPEB and Scientific Committee

Incidentally, the SC agreed that the Working Party on Ecosystems and Bycatch (WPEB) “should be maintained as a single working party for the next few years, to deal with sharks every year, as well as other issues, especially ecosystem related matters, and bycatch groups in alternate years or as required by the Commission.” (*para 58*) This was one of three options under consideration. In practical terms, the decision means that marine turtles are likely to receive less attention by the WPEB (and SC) than has been the case in recent years.

The 10th Working Party on Ecosystems and Bycatch (WPEB) will take place from 27-31 October 2014 (venue still to be confirmed); while the next (17th) meeting of the IOTC Scientific Committee will be held from 16-20 December 2014 in Victoria, Seychelles.

The full Report of the Sixteenth Session of the IOTC Scientific Committee (2013) can be accessed online from the [IOTC website](#).