

**MEMORANDUM OF UNDERSTANDING
ON THE CONSERVATION OF
MIGRATORY SHARKS**

CMS/Sharks/AC2/Rec.2.1
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**RECOMMENDATIONS OF THE ADVISORY COMMITTEE TO THE
3RD MEETING OF THE SIGNATORIES OF THE SHARKS MOU
ON
THE AMENDMENT OF ANNEX 1 AND CRITERIA FOR LISTING SPECIES**

Background

1. CMS COP12 (October 2017) agreed to list five further shark species on Appendices I and/or II:

- Blue Shark *Prionace glauca* (App. II)
- Dusky Shark *Carcharhinus obscurus* (App. II)
- Angelshark *Squatina squatina* (Apps. I and II)
- Common Guitarfish *Rhinobatos rhinobatos* (Apps. I¹ and II)
- Bottlenose Wedgefish / White-spotted Wedgefish *Rhynchobatus australiae* (App. II)

2. The Advisory Committee (AC) was requested to (a) review the proposals for amendments to Annex 1; (b) provide comments and make recommendations regarding the inclusion of the proposed species in Annex 1 of the MOU for the consideration of Signatories at MOS3 based on the criteria of CMS; (c) consider whether it is necessary to prioritize potential species that qualify for listing on the MOU in order to ensure the MOU remains manageable; (d) provide recommendations for additional listing criteria to MOS3; and (e) make suggestions for the inclusion of further species in Annex 1 as appropriate.

3. The five species proposed for listing were considered by the AC in relation to their conservation status and their migratory nature, which are the criteria under CMS for the inclusion of species in the CMS Appendices. In accordance with the Convention text,

- a. “Appendix I shall list migratory species which are endangered” (Article III, 1) and
- b. “Appendix II shall list migratory species which:
 - have an unfavourable conservation status and which require international agreements for their conservation and management,

¹ Mediterranean Sea only

- as well as those which have a conservation status which would significantly benefit from the international cooperation that could be achieved by an international agreement.” (Article IV, 1)

4. The CMS Convention text defines migratory species in Article II as “the entire population or any geographically separate part of the population of any species or lower taxon of wild animals, a significant proportion of whose members cyclically and predictably cross one or more national jurisdictional boundaries”. The supplementary notes to the national reporting format provides further guidance on how understand the definition.

5. In accordance with CMS Article I c , “the conservation status of a species will be taken as "favourable" when: (1) population dynamics data indicate that the migratory species is maintaining itself on a long-term basis as a viable component of its ecosystems; (2) the range of the migratory species is neither currently being reduced, nor is likely to be reduced, on a long-term basis; (3) there is, and will be in the foreseeable future sufficient habitat to maintain the population of the migratory species on a long-term basis; and (4) the distribution and abundance of the migratory species approach historic coverage and levels to the extent that potentially suitable ecosystems exist and to the extent consistent with wise wildlife management;”

6. CMS Article I (d) further defines, that the conservation status will be taken as "unfavourable" if any of the conditions set out in sub-paragraph (c) of this paragraph is not met;

7. CMS Article I (e) states that "Endangered" in relation to a particular migratory species means that the migratory species is in danger of extinction throughout all or a significant portion of its range;

Recommendations on Amendments to Annex 1 of the MOU:

Blue shark (*Prionace glauca*)

8. The AC considers that the Blue Shark does not meet the criteria for inclusion in Annex I.

- meets the criteria for “migratory”
- does not meet the criteria for “unfavourable”
- there are currently management measures in place for its conservation throughout most of its range through RFMOs (e.g. ICCAT), and as such, this species would not significantly benefit from additional international cooperation through the Sharks MOU.

9. The Blue Shark is a highly migratory, pelagic shark species with evidence of migrations between international and national waters of many countries, thus across national jurisdictional boundaries.

10. Blue Shark stocks are currently assessed by the major tuna-RFMOs in the Atlantic, Pacific and Indian Oceans. While declines have been observed, these stock assessments have not found Blue Shark stocks to be overfished or with overfishing occurring and thus the conservation status does not currently appear to be unfavourable. Blue shark stocks are being managed through tuna-RFMOs with a catch limit established for the North Atlantic, implying that international cooperation is already in place and catches are being monitored. The current IUCN global status lists Blue Sharks as Near Threatened.

11. Several inaccuracies were noted in the listing proposal (including an incorrect scientific authority, inaccurate and outdated information on population declines, and incorrect information relating to management measures applicable (see Annex 1 for further details).

Dusky shark (*Carcharhinus obscurus*)

12. The AC considers that the Dusky Shark meets the criteria for inclusion in Annex 1.

- meets the criteria for “migratory”
- meets the criteria for “unfavourable”

13. The Dusky Shark is a coastal pelagic shark that undergoes regional migrations, with sufficient evidence of migrations across national jurisdictional boundaries.

14. Dusky Shark stocks are currently assessed by the United States and Australia. These stock assessments have found Dusky Shark stocks to have declined by 73% and 75%, respectively and thus conservation status is currently unfavourable. The current IUCN global status lists dusky sharks as Vulnerable.

Angel shark (*Squatina squatina*)

15. Members of the AC and Conservation Working Group (CWG) highlighted that Angelsharks (Squatinae) are of major conservation concern due to their high vulnerability to overexploitation, habitat degradation, and the unfavourable status of many species in this family.

16. However, the AC considers that the Angelshark does not meet the criteria for inclusion in Annex I:

- does not meet the criteria for “migratory”
- meets the criteria for “unfavourable” and “endangered”

17. The population of the European Angelshark (*Squatina squatina*) has both declined severely and is fragmented, as this species has been lost from several parts of its former range. The available evidence clearly indicates the species has an unfavourable conservation status. The IUCN lists this species of angel shark as Critically Endangered.

18. The data and information available for the Angelshark (and as inferred from related species) indicate that seasonal, inshore-offshore migrations probably occur, but the depth range would not result in Angelsharks moving from national to international waters. Whilst there is also the capacity for north-south seasonal migrations, there is no indication that this is to an extent that results in “a significant proportion of whose members cyclically and predictably cross one or more national jurisdictional boundaries”.

19. The AC considered available evidence for *Squatina squatina* (and published studies on other species of angel sharks, and noted the following points:

- Whilst the proposal noted that “*about 80% of tagged sharks were recaptured close to the tagging sites*”, Quigley (2006), using data from the same study, reported that “*Nearly 96% ... of the recaptures were taken in Irish coastal waters and only 4% ... from abroad*” and

concluded “it seems that most fish remain in Irish waters and indeed, relatively close to their initial tagging location”.

- Whilst based on very limited data, tagging studies in the Mediterranean Sea inferred distances travelled as 10-44 km (Capapé et al., 1990).
- Whilst seasonal migrations likely occur, these include inshore-offshore migrations, as reported for other species of Angelshark (Colonello et al., 2007; Vögler et al., 2008), though there is also the possibility of some latitudinal migrations. Whilst there is evidence of some longer-distance movements, the frequency of such events appears low.
- Genetic studies on the related Pacific Angelshark (*Squatina californica*) reported significant genetic differences from samples from different parts of the California Channel Islands (Gaida, 1997), an archipelago that extends for <300 km. A subsequent study observed different haplotypes in specimens of this species from the Sea of Cortez and Californian coast (Stelbrink et al., 2010). Cases of significant genetic differences suggests there can be limited mixing within the wider species range.

Common Guitarfish (*Rhinobatos rhinobatos*)

20. The AC considers that the Common Guitarfish meets the criteria for inclusion in Annex 1.

- meets the criteria for “migratory”
- meets the criteria for “unfavourable” and “endangered”

21. The Common Guitarfish is a coastal batoid species. Information from the Mediterranean Sea clearly indicates seasonal inshore-offshore migrations, although it was unclear as to whether these migrations crossed one or more national jurisdictional boundaries. Such seasonal migrations were also noted off West Africa (Mauritania, Senegal, Guinea, Guinea-Bissau, and Sierra Leone), based on coastal fishers switching their fishing activities, and there was some evidence that these migrations crossed national jurisdictional boundaries (Diop and Menna, 2000). The AC considered these migrations to be a significant portion of the population (as it is unlikely that fishers would shift their activities based on a few individuals because this would not be profitable). Given the known importance of West Africa to the species, international cooperation is required.

22. Documented declines over parts of their range, particularly in the Mediterranean Sea, support the view that the conservation status is currently “unfavourable”. The global population was assessed by IUCN in 2007 and the Mediterranean Sea population was evaluated again in 2016; in both cases the species was listed as Endangered.

23. The AC noted that four similar proposals for this species had been submitted, and these were considered as one proposal with information reviewed from all proposals.

Bottlenose Wedgefish / White-spotted Wedgefish (*Rhynchobatus australiae*)

24. The AC considers that the Bottlenose Wedgefish / White-spotted Wedgefish meets the criteria for inclusion in Annex 1:

- meets the criteria for “migratory”
- meets the criteria for “unfavourable”

25. Data on the biology and ecology of this species remain limited, with little information on the extent of seasonal and predictable migratory patterns across international boundaries. However, there is some indirect evidence suggesting populations undertake transboundary migrations in some regions. The AC noted the following points:

- In Oman, landing site surveys (across the wider area and thus encompassing multiple fisheries and fishing grounds) revealed only large individuals (>150 cm total length, TL), comprised mostly males (R.W. Jabado, unpubl. data). This is despite the wide range of gear used by local fishermen, including gillnets, longlines, and beach seines. In contrast, fishermen using the same gear in the UAE frequently land individuals ranging from 59-290 cm TL. This suggests that Omani populations are likely to be using waters of neighbouring countries at other life-history stages and events, which suggests this species is crossing national jurisdictional boundaries on a regular basis.
- A recent study investigating genetic differentiation in *R. australiae* in Australia, South-East Asia, and the Andaman Sea did not provide evidence for substantial demographic connectivity among regions (Giles et al., 2016). However, the authors recommend separate conservation assessments and management of the species in each of the sampled sub-regions as separate stocks, suggesting individuals potentially range over several countries, particularly in southeast Asia. Furthermore, the genetic results indicated episodic migration between Australia and Indonesia.
- Research in northern Australia, examining the spatial ecology, and particularly residency of *R. australiae*, provides evidence of individuals leaving specific areas for periods varying from days to weeks (White et al., 2014). Furthermore, individuals were not observed to return to the study area once they had been absent for more than 200 days, possibly suggesting movement beyond the study region.
- As shark-like batoids, *Rhynchobatus* spp. are morphologically similar to species such as sawfish (Pristidae), and share many of the same characteristics (i.e. large size). Adult sawfish are known to have large activity spaces and undertake migratory movements across international boundaries (Simpfendorfer 2005; Carlson et al. 2014; Harrison and Dulvy 2014). It is possible that the behaviour of *Rhynchobatus* sp. is similar to that of sawfish.

26. The Bottlenose Wedgefish / White-spotted Wedgefish is heavily exploited throughout its range with evidence of significant population declines in some regions (e.g. southeast Asia, Arabian Seas region; White and McAuley, 2003; Jabado et al., 2017). At a global level, this species is listed by the IUCN as Vulnerable (noting this assessment dates back to 2003 and requires updating). A more recent IUCN regional assessment from the Arabian Seas Region categorised this species as Endangered, with a suspected population decline of between 50-80% over the past 39 years (three generations). This species is particularly susceptible to fishing because of its coastal habitat, vulnerability to incidental catch in multiple gear types (e.g. gillnets, trawls, and longlines) and large size. It also has extremely valuable fins. The AC therefore considers that the conservation status of the Bottlenose Wedgefish / White-spotted Wedgefish is “unfavourable”.

27. The AC also noted that there are currently no management measures in place for its conservation and so this species would significantly benefit from international cooperation through the Sharks MOU.

28. Given the morphological similarities among the three species, Bottlenose Wedgefish / White-spotted Wedgefish (*R. australiae*), Smoothnose Wedgefish (*R. laevis*) and Giant Guitarfish

/White-spotted Wedgefish (*R. djiddensis*) and their geographical overlap, there could usefully be consideration of including all three taxa on the Annex (see Annex 2).

Comments on listing criteria

29. In terms of listing criteria and prioritisation of species, the AC and CWG considered that ‘population status’ and ‘migratory nature’ should continue to be the main criteria. Species listed on the Appendices of CMS COP12 included two extremes in these criteria: the Blue Shark (highly migratory, but not considered in an ‘unfavourable conservation status’) and the Angelshark (‘unfavourable conservation status’, but not meeting the defined criteria for ‘migratory’).

30. One option for better clarifying and prioritizing species in the remit of CMS were suggested as outlined below (figure 1), where the red cells indicate species (or stocks) of greater relevance to the CMS Sharks MOU, orange cells indicate species (or stocks) of moderate importance (though potentially greater importance regionally) and blank cells indicating species (or stocks) that could be considered of lower priority to the MOU.

Extent of migratory nature	Highly migratory	<i>Blue shark</i>			
	Regional migratory			<i>Dusky shark</i>	
	Sub-regional migratory				<i>Wedgefish</i> <i>Guitarfish</i>
	Smaller scale coastal migrations or non-migratory				<i>Angelshark</i>
		Moderate ^[1]	Moderate ^[2]	High	Very high
Scale of depletion					

Figure 1. Priority species (red and orange) in relation to the extent of their migratory nature and scale of depletion of Species ([1] Moderate decline, but the stock is either assessed routinely and/or the main fishery taking the species is under routine management; [2] Moderate decline, but the stock is unassessed and/or the fishery is not under routine management)

31. The term “migratory species” is defined by CMS in Article I (1), II (1) and IV (1) and further specified in the explanatory notes to the format for proposals to amend CMS Appendices. To better differentiate between the geographical extent of migrations, the following categories were suggested:

- Highly migratory: Those species whose migrations extend over the scale of oceanic basins, so encompassing national waters and high seas. An example of this is blue shark.

- Regional migratory: Those species whose migrations extend over the scale of regional (often shelf) seas, although a small proportion of the population may make longer-distance movements, including excursions into oceanic basins. An example of this is dusky shark.
- Sub-regional migratory: Those species that migrate over smaller spatial scales, but with clear evidence of cyclical and predictable migrations across jurisdictional boundaries. Examples of this are guitarfish and wedgefish.
- Smaller scale coastal migrations or non-migratory: Those species that are generally site specific, or make only shorter distance movements (e.g. seasonal inshore-offshore or north-south migrations). An example of this is Angelshark.

32. The AC recommends that the CMS Scientific Council (ScC) consults the Sharks MOU AC on listing proposals for species of sharks and rays.

Other Species recommended for Inclusion in Annex 1

33. The AC and CWG were requested to make suggestions for the inclusion of further species in Annex 1 as appropriate. The following species were proposed:

- **Oceanic Whitetip Shark** *Carcharhinus longimanus*
- **Smooth Hammerhead** *Sphyrna zygaena*
- **Winghead Shark** *Eusphyra blochii*
- **Wedgefish:** “look-alike” species of the Bottlenose Wedgefish / White-spotted Wedgefish *Rhynchobatus australiae*
 - **Smoothnose wedgefish** *Rhynchobatus laevis*
 - **Whitespotted Wedgefish / Giant Guitarfish** *Rhynchobatus djiddensis*

34. The AC and CWG recognize that there is an increasing number of larger-bodied coastal elasmobranchs that have high conservation interest, including some species of skate (Family Rajidae), angelsharks (Family Squatinidae), guitarfish and sawfish (Order Rhinopristiformes) as well as various members of the Order Myliobatiformes. Many of the more threatened species within these groups will be data-limited, and determining which of these are ‘migratory’ will likely be problematic. Approaches that could be used to inform or infer migratory extent may include:

- Conventional and electronic tagging studies;
- Genetic studies;
- Considering the home range/scale of movements in relation to the sizes of the various jurisdictional areas within the geographic range;
- Information from similar species;
- Habitat modelling, that may indicate likely habitat in relation to temperature, depth, sediment (but noting that these should be robust studies, as such approaches can often exaggerate species distributions).

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ANNEX I: FURTHER NOTES ON THE PROPOSAL FOR THE INCLUSION OF THE BLUE SHARK IN ANNEX 1 OF THE MOU (*original proposals for CMS Appendix I*)

Section 4.2 (*population estimates and trends*)

The proposal listed several indices of relative abundance showing different degrees of decline. It is important to highlight that relative abundance indices are only stock status indicators and not full stock assessments providing a formal determination of the status of a stock. Additionally, the choice of some particular catch rate series seemed biased, since other indices of abundance showing different trends were not mentioned. One example is the analysis shown in Baum et al. (2003) that has been rebutted several times by the scientific literature, but was still listed in the proposal. As another example, of the eight standardized catch rate series used in the 2015 ICCAT stock assessment for the North Atlantic stock, four displayed a positive trend, one no overall trend, and three had a negative trend, while the six catch rate series used for the South Atlantic stock all showed a positive trend. None of those catch rate based indicators were listed in the proposal. The same is true for all the standardized catch series indexes used for the Indian Ocean and Pacific assessments.

Section 5.2 (*equivalent information relevant to conservation status assessment*)

The proposal stated that "*fisheries stock assessments have been undertaken (or attempted) for some Blue Shark stocks*". In fact, the blue shark is the most ubiquitously assessed pelagic shark species in the world given its naturally high abundance, with assessments now available for Atlantic, Pacific, and Indian Oceans. There are also several management measures in place which have allowed for better data collection in recent years.

Section 5.3 (*threats to the population*)

It is unclear where the landings used for Figure 5 in the proposal come from. Using the catches reported in the 2015 Blue Shark stock assessment combined for North and South Atlantic stocks, catches increased by about 50% from 2005 (51,602 t) to 2011 (76,692 t).

Section 6.2 (*International protection status*)

The proposal states that "*none of the major oceanic RFMOs have yet adopted catch limits for this species...*". This is incorrect as ICCAT has in 2016 established a catch limit for the North Atlantic stock, specifically 39,102 t (ICCAT Rec. 2016-12).

The proposal also mentions that "*no RFMO has put in place management measures that would bind fishing countries to work together to ensure that *P. glauca* is managed sustainably*". This is also not entirely correct, as the same ICCAT Rec (2016-12) mentions that "*the SCRS shall provide, if possible, options of Harvest Control Rules with the associated limit, target and threshold reference points for the management of this species in the ICCAT Convention area*". While this is not a binding measure, it implies that scientific work has now to be carried out to provide options for *Harvest Control Rules*, with the respective reference points, for future management of the stock.

Section 6.5 (*population monitoring*)

The proposal states that the "*there are no formal programmes dedicated specifically to monitoring of Blue Shark...*". The indices of relative abundance (commented in section 4.2) and that are used the stock assessments are a form of population monitoring at least on a relative basis, if they properly account for all variables that can affect abundance.

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- ICCAT Rec. 2016-12: Recommendation by ICCAT on Management Measures for the Conservation of Atlantic Blue shark caught in association with ICCAT Fisheries.

ANNEX 2: ADDENDUM TO THE PROPOSAL FOR THE INCLUSION OF *Rhynchobatus australiae* (Whitley, 1939) IN ANNEX 1 OF THE SHARKS MOU (original proposals for CMS App II)

Recognizing that the Bottlenose Wedgefish / White-spotted Wedgefish *Rhynchobatus australiae* (Whitley, 1939) is previously considered as part of a species complex to which taxonomic confirmation has only been recently done, the potential for “look-alike species” overlapping in the regions needs to be addressed. “Look-alike species” are those species whose specimens closely resemble or resemble those of species listed for conservation reasons. Globally, there are at least eight distinct species confirmed present, two of which are of considerable overlap in geographic distribution and have often been confused or mistaken with *R. australiae* or each other (L.J.V. Compagno pers. comm. in: Cavanagh et al. 2003; Compagno et al. 2005; Giles et al. 2016). These two species are the **Giant Guitarfish / Whitespotted Wedgefish *R. djiddensis* (Forsskål, 1775)** and the **Smoothnose Wedgefish *R. laevis* (Bloch & Schneider, 1801)**. Both species have been assessed as Vulnerable on the IUCN Red List, with declining populations from interactions with various fisheries and increasing demand and high value of their fins.

- ***Rhynchobatus djiddensis* (Forsskål, 1775).** The Giant Guitarfish / White-spotted Wedgefish *R. djiddensis* was previously referred to as wide-ranging, and is now considered a complex of four species: *R. djiddensis* sensu stricto, *R. australiae*, *Rhynchobatus* sp. nov. B in Last & Stevens, 1994 and possibly *R. laevis* (L.J.V. Compagno pers. comm. in: Cavanagh et al. 2003). The Broadnose Wedgefish *Rhynchobatus* sp. nov. B in Last & Stevens, 1994, a synonym of the *Rhynchobatus* sp. 2 in the Western Central Pacific (Compagno & Last, 1999) and in the Philippines (Compagno et al. 2005), is recently described as a new species of wedgefish, *Rhynchobatus springeri* Compagno and Last, 2010 which is distinct from the other three species and found to occur in the Indo-Malay: from Java (Indonesia) to Thailand, including Borneo, Singapore and the Philippines. The current known range of *R. djiddensis* is in the Western Indian Ocean, from South Africa to Oman (Last et al. 2016; see Figure 2). Countries of occurrences include: Bahrain; Djibouti; Egypt; Eritrea; Kenya; Kuwait; Mozambique; Oman; Qatar, Iran; Saudi Arabia; Somalia; South Africa; Sudan; United Arab Emirates; United Republic of Tanzania, Yemen (Dudley and Cavanagh, 2006).
- ***Rhynchobatus laevis* (Bloch & Schneider, 1801).** The current known range of the Smoothnose Wedgefish *R. laevis* is in the Indo-West Pacific, from Oman to Japan, primarily in the Indian Ocean (Last et al. 2016; see Figure). Countries of occurrences include: Bahrain;

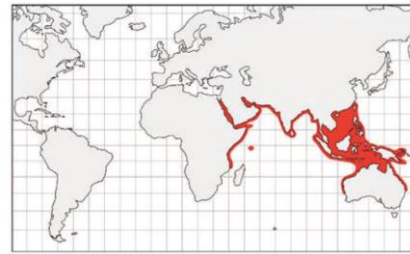


Figure 1. Distributional map of *Rhynchobatus australiae* (from Last et al. 2016).

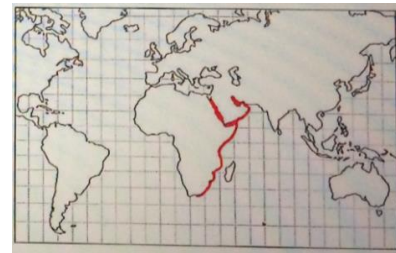


Figure 2. Distributional map of *Rhynchobatus djiddensis* (from Last et al. 2016).

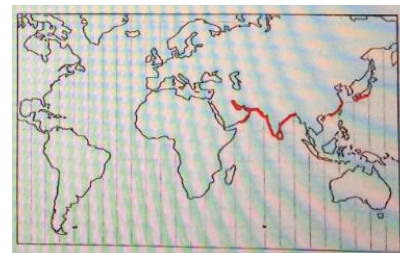


Figure 3. Distributional map of *Rhynchobatus laevis* (from Last et al. 2016).

Bangladesh; China; India; Iran; Japan; Kenya; Kuwait; Oman; Pakistan; Qatar; Saudi Arabia; Sri Lanka; Tanzania, United Arab Emirates (Compagno and McAuley, 2016). First described from India, the Smoothnose Wedgefish, was widely confused with the Western Indian Ocean *R. djiddensis* across its range from the Arabian Sea to the Western Pacific. Recent taxonomic study of *Rhynchobatus* species have resulted in improved understanding of the distribution of the Smoothnose Wedgefish and it is no longer considered to occur in East Africa and Australian waters (P. Last, CSIRO, pers. comm., 2015 in Compagno and McAuley, 2016).

As with the Bottlenose Wedgefish / White-spotted Wedgefish *Rhynchobatus australiae*, both *R. djiddensis* and *R. laevis* are taken by multiple artisanal and commercial fisheries throughout their ranges, both as a target and bycatch species. They are susceptible to capture by multiple fishing gear types, including trawl, gillnets and hooks, and have high-value fins. Their numbers have been inferred as locally reduced by generally unregulated fishing throughout their range. Management measures for these species are either limited or none existent across large parts of this range.

The AC thus recommends to the Signatories that they include the two-look-alike species of the Bottlenose Wedgefish / White-spotted Wedgefish *Rhynchobatus australiae* (Whitley, 1939) in Annex 1 to the Sharks MOU. Further investigations into the taxonomy, population and range, biology and ecology of *R. australiae* and the look-alike species are needed. Recent catch and trade data for the species throughout their ranges are required to assess to what extent the population decline is occurring. Improved species composition data from all fisheries that take these species is necessary.

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