Commission for the Conservation of
Southern Bluefin Tuna

みなみまぐろ保存委員会

CCSBT-ERS/1203/06

Finalisation of updated CCSBT ERS Pamphlets

Purpose

To finalise the CCSBT ERS pamphlets that were updated intersessionally.

Background

At the Eighth Meeting of the ERS Working Group (September 2009) and with further direction from CCSBT16 (October 2009), the Secretariat was tasked with conducting the following items in conjunction with Members.

(1) Update of pamphlets for Seabirds and Sharks

- Update the identification guides and if possible publish these to the CCSBT web site at no additional cost.
- Scope and cost printing the identification pamphlets and producing revised sea bird and shark education pamphlets in all Member languages for consideration at the October 2010 Extended Commission meeting.

(2) Developing of possible pamphlet for Sea turtles

- Scope and cost producing pamphlet on sea turtles in all Member languages for consideration at the October 2010 Extended Commission meeting.

At CCSBT 18 (October 2011), it was agreed that Members will be provided with electronic copies of the updated ERS pamphlets for Seabirds and Sharks, and that Members will organise printed copies at their own expense, instead of the Secretariat printing copies.

CCSBT does not have its own pamphlet on sea turtles and no decision has been reached to develop such a pamphlet. Instead, links to existing sea turtle guides (WCPFC and FAO) have been placed on the CCSBT web site. See the bottom of the ByCatch Mitigation page at: http://www.ccsbt.org/site/bycatch_mitigation.php

Updated Pamphlets

In accordance with these decisions, intersessional work has been conducted on the Seabird and Shark pamphlets. Changes (**Attachment A**) to the pamphlets proposed by Members and ACAP have been agreed, and an English version of the updated pamphlets (**Attachment B & C**) were uploaded to the CCSBT web site in November 2011.

Outstanding issues

The Secretariat was unable to resolve all changes suggested by Members intersessionally. Suggestions by Members that have not yet been included in the modified pamphlets are below. These should be discussed by the ERSWG to determine which of these suggestions should be included in the pamphlets;

(1) Seabird Pamphlet

- Page 5: Q6 How deep do birds dive?
  Shearwaters have been tracked diving to "70m" (currently mentions a max of "30m").
- Page 5-7:
  A Member suggested that "Bird scaring line" would be more easily understood than just "bird line". Other Member suggested that "bird line" or "seabird line" should be replaced with "tori line".
- Page 6-7: How to reduce bait loss (and seabird deaths)
  In general, night-setting, line weighting and bird scaring lines are usually considered the three most effective or primary measures; the order of measures could be changed to reflect this.
- Page 7: Colouring bait
  Modify the colouring bait entry - e.g. "Blue dyed bait... shows some promise as another way to reduce incidental captures..."
- Page 7: Using bait casting machines
  It is very important these are set so that the bait is cast within the area protected by the tori line; if so they can be useful but they are not really a mitigation measure per se, perhaps this could be reflected by changing this entire section to become:
  "Bait casting machines, if used carefully, can aid placement of hooks within the protection afforded by bird scaring lines and away from propeller turbulence to help increase sink rates"
- Page 7: Using hydraulic line hauler
  Consideration could be given to haul mitigation more generally instead of just hydraulic line haulers, which are not particularly recognised as a mitigation measure – e.g. bird curtains, hoses or cannons.
- Page 7: Request to fishers
  "night setting" should be removed as an example of a mitigation measure which is under development.
- Page 8-9: Care for live seabirds on hooks
  In the section marked "Important", insert a second bullet point with the text: "If removing an internally embedded hook will cause further damage to the bird, just cut the line as close as possible to the hook, and leave it in place".

(2) Shark Pamphlet

- The pamphlet is quite long and would likely be more user friendly for fishers if it were shorter. Most (or all) of the introductory text could be removed, along with some other information that also seems less useful for fishers (e.g. the section on shark resources and the behaviour section).

Future Plan

Once these pamphlets are finalised, the Secretariat will commence the work on the other four language versions in conjunction with relevant Members, and publish on the CCSBT web site.

Prepared by the Secretariat

Attachment A

Major changes to the ERS pamphlets

Following changes have been made and agreed to the pamphlets intersessionally.

(1) Seabird Pamphlet (**Attachment B**)

- Page 6: How to reduce bait loss (and seabird deaths)
  - Added practical information on mitigation measures such as "In most cases, it is necessary to use multiple mitigation measures in combination to successfully minimise seabird bycatch." on the top of this page /just bellow under its title.
- Page 10-11: A comparative Table in Five Languages on Names of Main Seabird Species caught incidentally in SBT Fisheries
  - Added the following 13 species. For the albatrosses, taxonomic changes which were under discussion at the time the original pamphlet was put together, have now been widely adopted by the international ornithological community, including ACAP. The 4 additional petrel species are known to come into contact with SBT fisheries.
    Diomedea antipodensis (Antipodean Albatross)
    Diomedea amsterdamensis (Amsterdam Albatross)
    Diomedea dabbenena (Tristan Albatross)
    Diomedea sanfordi (Northern Royal Albatross)
    Thalassarche impavida (Campbell Albatross)
    Thalassarche steadi (White-capped Albatross)
    Thalassarche eremite (Chatham Albatross)
    Thalassarche salvini (Salvin's Albatross)
    Thalassarche carteri (Indian Yellow-nosed Albatross)
    Puffinus tenuirostris (Sooty shearwater)
    Pterodroma macroptera (Great-winged petrel)
    Procellaria parkinsoni (Black Petrel)
    Procellaria westlandica (Westland Petrel)
  - Updated some scientific names
    Genus name *"Diomedea" has been replaced with "Thalassarche"*
  - Created a column for Indonesian (Bahasa).
  - Added a note under the table which is "Note: Due to difficulties in distinguishing species within some seabirds complexes (ID No. 1,2,5,6 and 9) by illustrations, only typical species' illustrations are placed in this guide."
  - Removed the country specific reporting and contact list section from the bottom of the page. This section is not appropriate for the CCSBT Web version of the pamphlet, but could be added to country specific versions that Members print and distribute.
- ID sheet:
  - Added following 4 petrel illustrations
    (14) Sooty shearwater
    (15) Great-winged petrel
    (17) Black petrel
    (18) Westland petrel
  - In relation to "2) Royal albatross", previously there was no illustration of adult Northern royal albatross. This would probably be identified as a Wondering albatross. So, an illustration of the back side of a juvenile Southern royal

albatross has been replaced with that of the back side of an adult Northern royal albatross.

(2) Shark Pamphlet (**Attachment C**)

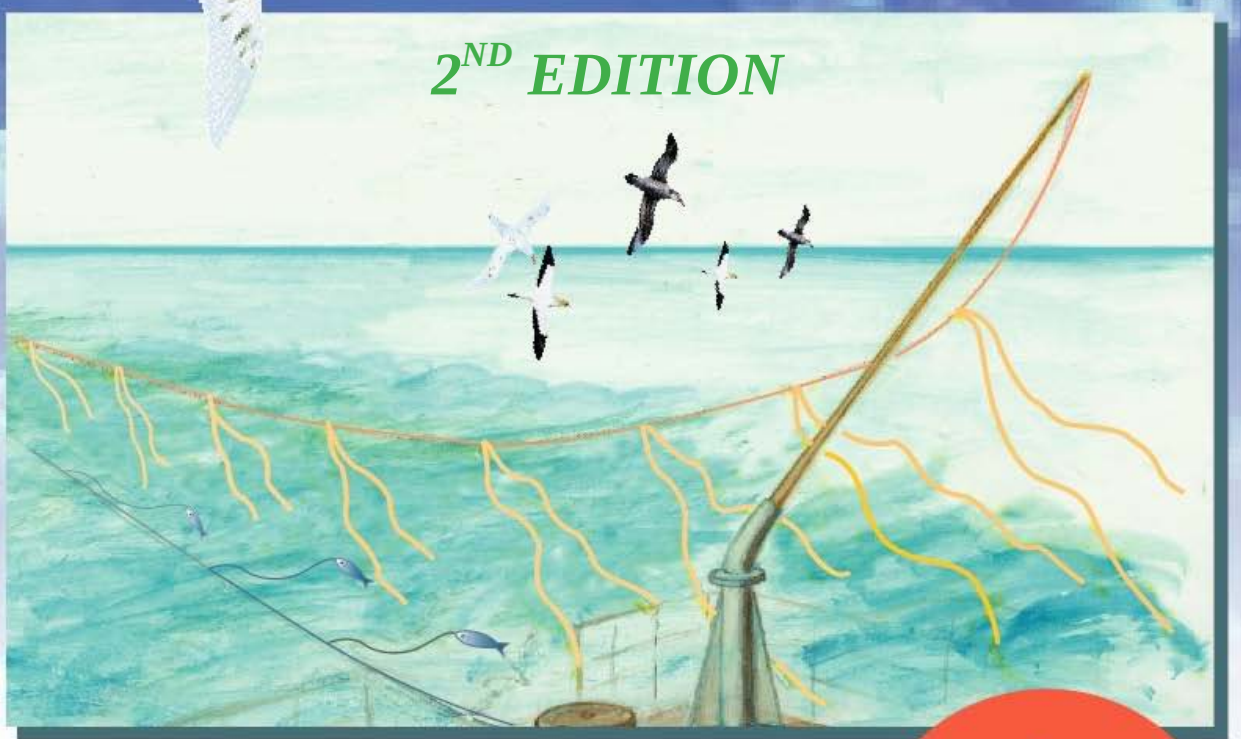
- Page 5: "Growth and reproduction"
  - Replaced the last sentence of the first paragraph with "Shortfin mako sharks are mature at 7-9 years for males and 18-21 years for females and may live to at least 29 years." in order to reflect the latest scientific knowledge.
- Page 5: "When Sharks Are Caught…"
  - Added this item to provide advice on how to handle and release sharks once they are caught.
- Page 6-7: A comparative Table in Five Languages on Names of Sharks Caught in SBT Fishing Ground
  - Added Bronze whaler which is likely to be encountered.
  - Deleted Whitetail dog fish due to a low level of appearance.
  - Listing order has been completely changed to put congeneric species together.
  - Removed the country specific reporting and contact list section from the bottom of the page. This section is not appropriate for the CCSBT Web version of the pamphlet, but could be added to country specific versions that Members print and distribute.
- ID sheet
  - All illustrations and descriptions have been completely changed and some detailed diagnostic features have been added in order to make it more useful as a species identification guide.

Attachment B

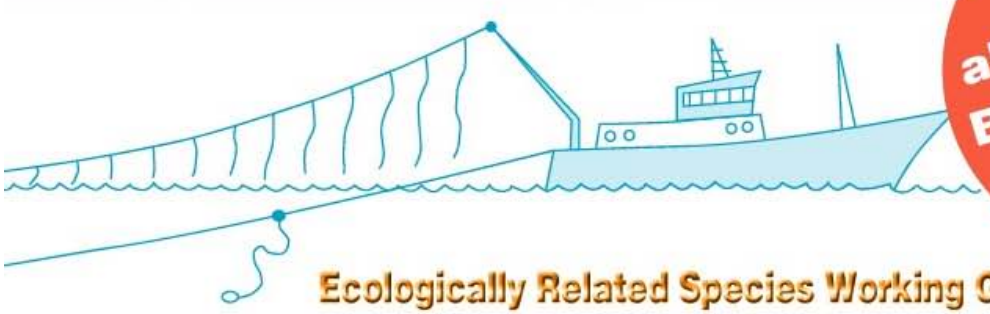
Building a Seabird Friendly SBT Fishery

A Guide to Reducing the Incidental Catch of Seabirds in Longline Fisheries

2ND EDITION



For all Southern Bluefin Tuna Fishers



Ecologically Related Species Working Group

Commission for the Conservation of Southern Bluefin Tuna

みなみまぐろ保存委員会

Compiled by:

Ecologically Related Species Working Group,

Commission for the Conservation of Southern Bluefin Tuna

A Guide to Reduce the Incidental Catch of Seabirds in Longline Fisheries

CONTENTS

Q1

How long can some seabirds live?

A Some seabirds such as Wandering Albatross and Royal Albatross categorised as Large Albatrosses can live over 60 years.

Q2

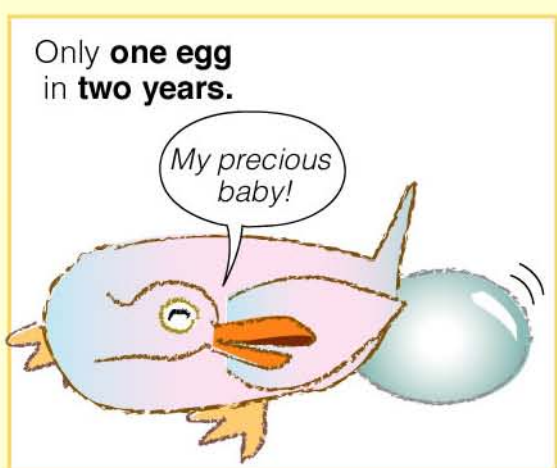
How long does an albatross egg take to hatch?

A About 70 days.

Q3

How many eggs does an albatross, a petrel or a shearwater lay?

A One each year and for some species, like the Wandering albatross, only one every two years.



Introduction

Seabirds are being incidentally caught in various commercial longline fisheries in the world, and concerns are arising about the impact of this incidental catch. The specific concern is that longline fishing is a known significant source of mortality for some species of seabirds and that the level of mortality may be the primary cause of the observed decline in some seabird populations. Whilst efforts have been made all over the world to conserve seabird populations by taking various measures such as protection of nesting areas and control of alien species which are harmful to seabirds, more action is required. Fisheries, catching seabirds incidentally, need to address the issue with a view to conserving the seabird populations by reducing the incidental catch of seabirds. Unless fishing practices are changed to minimise seabird captures, the survival of some seabird populations is doubtful.

When baits are removed from hooks by seabirds, those hooks will not catch fish. Operators can make changes to their fishing

gear and its use, which will allow fewer or no birds to be caught and improve fish catch rates to maximise profits.

Practices shown to be effective include:

- using a correctly made and set bird line,
- setting gear at night,
- reducing lighting,
- thawing bait,
- colouring bait,
- weighting branch lines,
- using bait casting machines,
- using hydraulic branch line haulers,
- paying close attention to wind and setting course,
- retaining offal, and
- an aware crew.

Brief explanations of these mitigation measures are given in the "How to reduce bait loss (and seabird deaths)" section of this pamphlet.

Q4

At what age does an albatross chick fly for the first time?

A Between four and nine months.

Q6

How deep do birds dive?

A Most albatross can dive up to about five meters, however other birds like shearwaters can generally dive up to 30 meters and can bring bait to the surface.

Q5

How long can an albatross stay at sea without once visiting land?

A After leaving the nest, five years may go by before the bird will return to land again.

Q&A on Seabirds

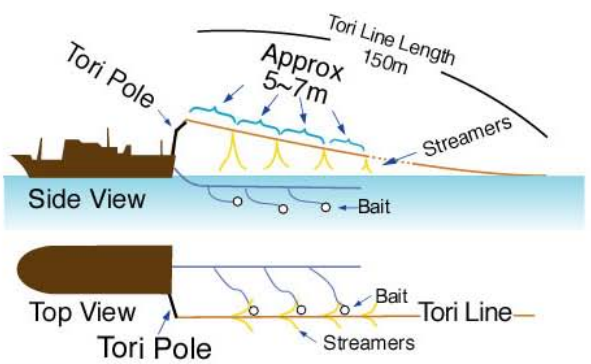
How to reduce bait loss (and seabird deaths)

In most cases, it is necessary to use multiple mitigation measures in combination to successfully minimise seabird bycatch.

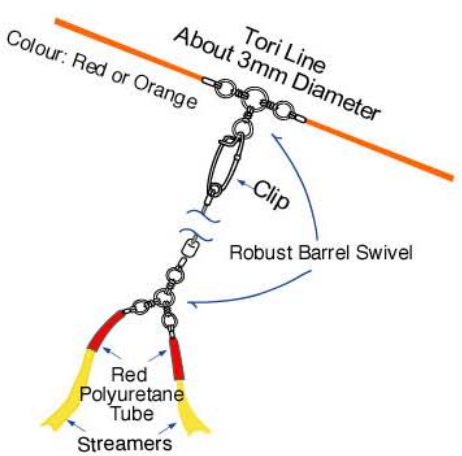
Using a correctly made and set seabird line

A bird line (also called a tori line) is simply used to scare seabirds from the bait. It consists of a line with attached streamers towed astern directly above the area in which baits enter the water. Baits can be taken by a bird immediately after they are thrown from the vessel and before they have had time to sink. All Southern Bluefin Tuna vessels should be using a bird line as standard practice. They are inexpensive, easy to construct and set and if they are used correctly, they will serve to not only reduce seabird deaths, but will also help fishermen avoid considerable bait loss.

CCSBT has adopted "A Guideline for the Deployment of Tori Lines" as follows.



Note: Streamers should flap over baited hooks in the water.



Setting gear at night

Line setting at night can minimise bait loss and seabird deaths during longline fishing, since albatrosses feed mostly during day time. But during a full moon, albatrosses will sometimes take baited hooks set at night. Also, some smaller species of seabirds such as Grey petrels, White-chinned petrels and shearwaters search for baits behind vessels at any time, day or night. As a result certain birds may continue to be caught regardless of night setting. However, lines set at night are still far less likely to catch birds than lines which are set partly or wholly in the daylight. Night setting should be combined with the use of a good bird line, particularly on moonlit nights, and with appropriate combinations of other methods.

Reducing lighting

Birds rely on their eyes to see baits in order to take them, so floodlights which brightly illuminate a large area astern assist them to do this. Where it does not compromise safety on board, operators can reduce seabird catches by reducing lighting.

Bait quality

Baits that are frozen or bait which have air in their swim bladders are likely to be taken by birds. Both are more likely to float, or to sink more slowly, making them easy pickings for birds. Use fully thawed baits and avoid bait types that have a high incidence of air retained in the swim bladder.

Colouring bait

Blue dyed bait is less visible in the water and shows promise as another way to reduce incidental capture of seabirds without reducing target fish catch.

Weighting branch lines

Obviously with more weight on branch lines, baits will sink faster and out of reach of seabirds. The amount and position of weights on the branch-line is particularly important to increase the sink rate of the bait. Less weight is required if placed close to the hook. If not weighted correctly, particular ocean currents may also cause branch lines to rise to the water surface. If this happens, your line will not be set at a depth to target fish and bait can be taken by birds at the surface. Birds still alive on hooks, which haven't been caught during hauling, can indicate that the set line has been lying close to the surface. When using weighted lines however, crew members must be careful about their safety when handling the line.

Using bait casting machines

Bait casting machines throw baited hooks so that these hooks will not be influenced by propeller turbulence, and, by ensuring the baits are placed under the bird line, can maximise the protection from the bird line.

Using hydraulic line haulers

Seabirds can also be caught during hauling, especially if branch lines are recovered too slowly. Vessel speed and the main line hauling rate must be synchronised with branch line recovery rate so that baited hooks never trail on the sea surface astern.

Paying close attention to wind and setting course

It is important that the mainline is set such that it is never pulled taut by the motion of the vessel. This requires careful attention to line shooter or drum speed, especially when setting gear in downwind conditions. If the line does pull tight astern, bait immediately becomes more available to birds.

Retaining offal

Discarding any edible materials from your vessel during line setting or line hauling only increases the number of birds following the vessel and encourages them to search intensively for baits. Retaining offal and used baits during fishing operations and discharging them once each night will reduce the number of birds feeding behind your vessel.

An aware crew

It is important that crew members understand the actions needed to reduce capture of seabirds.

Request to fishers

Some of the above-mentioned mitigation measures (such as night setting, coloring bait) are under development or are in the improvement stages. We would therfore appreciate any feedback from fishers on the measures including their effectiveness and any effects on fishing activities observed as a result of using the measures.

Care for live seabirds on hooks

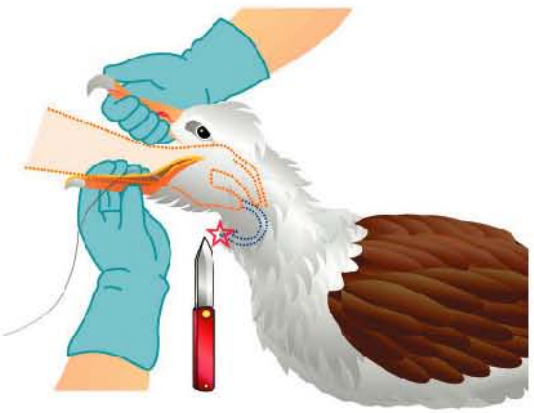
Often hooks can be easily removed from wings, legs or bill tips but if the hook has been swallowed the bird may not survive long unless the hook is removed. The following procedure is recommended when the position of the hook can be found.

1

Get the bird aboard as gently as possible and hold it by the bill immediately. Albatrosses are powerful and have very sharp bill edges.

2

Restrain the bird as in the illustration (two hands for this). A second person can now find the hook position externally by feeling along the neck or internally by following the line to the hook.



3

Reach down the birds throat and hold the hook. Gently force the tip of the hook so that it bulges under the skin of the bird then make a small cut to allow the hook to pass through the skin and be removed. Never try and extract a hook backwards as considerably more damage will be caused.

Images; Global Guardian Trust (GGT), Japan

Important

- Never try and extract a hook backwards as considerably more damage will be caused.
- For further advice, if you have an injured or dead bird or if you come across a banded bird, contact your local authorities.

A Comparative Table in Four Languages on Names of Main Seabird Species Caught Incidentally in SBT

Classification	ID No.	Scientific Name	English	Japanese	Korean	Mandarin	Indonesian
Albarosses Diomedididae							
Large Albatrosses	**1**	*Diomedea exulans*	Wandering albatross	ワタリアホウドリ	큰신천옹	漂泊信天翁	Elang laut penjelajah
		Diomedea antipodensis	Antipodean albatross	アンティポデスワタリアホウドリ	앤티퍼디신천옹	安提波地信天翁	Elang laut Antipodean
		Diomedea amsterdamensis	Amsterdam albatross	アムステルダムアホウドリ	암스테르담신천옹	阿姆斯特丹島信天翁	-
		Diomedea dabbenena	Tristan albatross	ゴウワタリアホウドリ	트리스턴신천옹	崔斯坦信天翁	-
	2	*Diomedea epomophora*	Southern Royal albatross	ミナミシロアホウドリ	남부흰신천옹	南方皇家信天翁	Elang laut royal selatan
		Diomedea sanfordi	Northern Royal albatross	キタシロアホウドリ	북부흰신천옹	北方皇家信天翁	Elang laut royal utara
Dark-colored Albatrosses	**3**	*Phoebetria fusca*	Sooty albatross	ススイロアホウドリ	검은머리신천옹	烏信天翁	-
	4	*Phoebetria palpebrata*	Light-mantled sooty albatross	ハイイロアホウドリ	회색등검은머리신천옹	灰背烏信天翁	Elang laut kelabu tua
Other Albatrosses	**5**	*Thalassarche melanophrys*	Black-browed albatross	マユグロアホウドリ	검은눈섭신천옹	黑眉信天翁	Elang laut beralis hitam
		Thalassarche impavida	Campbell albatross	キャンベルアホウドリ	캠벨검은눈섭신천옹	坎培爾信天翁	Elang laut Campbell
	6	*Thalassarche cauta*	Shy albatross	タスマニアアホウドリ	노랑부리검은눈섭신천옹	羞怯信天翁	-
		Thalassarche steadi	White-capped albatross	オークランドハジロアホウドリ	흰머리검은눈섭신천옹	白頭信天翁	Elang laut berkepala putih
		Thalassarche eremita	Chatham albatross	チャタムアホウドリ	채텀신천옹	查島信天翁	Elang laut Chatham
		Thalassarche salvini	Salvin's albatross	サルビンアホウドリ	샐빈신천옹	薩氏信天翁	Elang laut Salvin
	7	*Thalassarche bulleri*	Buller's albatross	ミナミニュージーランドアホウドリ	불러신천옹	布氏信天翁	Elang laut buller
	8	*Thalassarche chrysostoma*	Grey-headed albatross	ハイガシラアホウドリ	회색머리신천옹	灰頭信天翁	Elang laut berkepala kelabu
	9	*Thalassarche chlororhynchos*	Atlantic yellow-nosed albatross	ニシキバナアホウドリ	대서양노랑코신천옹	大西洋黃鼻信天翁	-
		Thalassarche carteri	Indian Yellow-nosed albatross	ヒガシキバナアホウドリ	인도양노랑코신천옹	印度洋黃鼻信天翁	-
Petrels Procellaridae							
Giant Petrels	**10**	*Macronectes giganteus*	Southern giant petrel	オオフルマカモメ	남방큰바다제비	南方巨鰾	Burung petrel raksasa selatan
	11	*Macronectes halli*	Northern giant petrel	キタオオフルマカモメ	북방큰바다제비	北方巨鰾	Burung petrel raksasa utara
Fulmars	**12**	*Daption capense*	Cape petrel	マダラフルマカモメ	바다비둘기	海角鰾	Burung petrel tanjung
Petrels	**13**	*Puffinus carneipes*	Flesh-footed shearwater	アカアシミズナギドリ	붉은발슴새	肉足水薙鳥	Burung penciduk berkaki merah-daging
	14	*Puffinus griseus*	Sooty shearwater	ハイイロミズナギドリ	검정슴새	烏水薙鳥	Burung penciduk hitam
	15	*Pterodroma macroptera*	Great-winged petrel	ハネナガミズナギドリ	큰날개슴새	大翅鰾	Burung petrel muka kelabu
	16	*Procellaria aequinoctialis*	White-chinned petrel	ノドジロクロミズナギドリ	흰턱바다제비	白頦鰾	Burung petrel paruh putih
	17	*Procellaria parkinsoni*	Black petrel	クロミズナギドリ	흑바다제비	黑風鰾	Burung petrel hitam
	18	*Procellaria westlandica*	Westland petrel	ウエストランドクロミズナギドリ	습지바다제비	西地鰾	Burung petrel Westland
	19	*Procellaria cinerea*	Grey petrel	オオハイイロミズナギドリ	회색바다제비	灰風鰾	Burung petrel kelabu

Note: Due to difficulties in distinguishing species within some seabirds complexes (ID No. 1,2,5,6 and 9) by illustrations, only typical species' illustrations are placed in this guide.

Commission for the Conservation of Southern Bluefin Tuna

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IDENTIFICATION SHEET OF SEABIRD SPECIES INCIDENTALLY CAUGHT IN SBT LONGLINE FISHERIES

Large Albatrosses

Large albatrosses have big pinkish bills. Under-wing mostly white with white leading edge (wing span 3 m).

1) **Wandering albatross:** Bill with pink cutting edges. Juveniles have dark brown plumage on body and head. Tail dark tipped.

Juvenile
Back Side

Adult
Back Side

Adult
Abdomen Side

Adult
Head

2) **Royal albatross:** Distinctive black cutting edges to bill. Body and head whitish in adults and juveniles. Tail all white.

Juvenile
Back Side

Adult
Back Side

Adult
Back Side

Adult
Head

Dark-coloured Albatrosses

Dark coloured albatross with black slender bill and long tail (wing span 1.9 - 2.1 m).

3) **Sooty albatross:** Whole body is blackish-brown. Adults have orange stripe on bill.

Adult
Back Side

Adult
Abdomen Side

Adult
Head

Juvenile
Head

4) Light-mantled sooty albatross: Light-grey body with dark head. Adults have bluish stripe on bill.


Adult
Back Side


Adult
Abdomen Side


Juvenile
Head


Adult
Head

Other Albatrosses

Small or medium sized albatrosses (wing span: 1.9 - 2.5m)

5) Black-browed albatross:
Adult's bill is bright yellow. Juvenile's bill is dusky grey with blackish tip.


Juvenile
Back Side


Juvenile
Abdomen Side


Adult
Abdomen Side

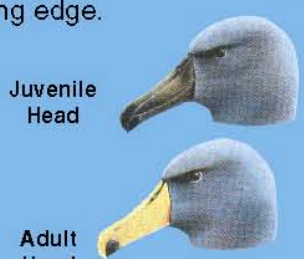

Juvenile
Head

Adult
Head

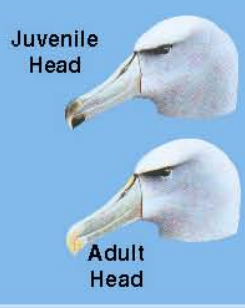
6) Shy albatross: White underwing with very narrow black margins and with distinctive 'thumbmark' at the base of leading edge.


Adult
Back Side


Adult
Abdomen Side


Juvenile
Head

Adult
Head


Juvenile
Head

Adult
Head

7) Buller's albatross: Resembles grey-headed albatross, but differs by having whitish forehead and broader yellow margins of bill.


Adult
Back Side


Juvenile
Abdomen Side

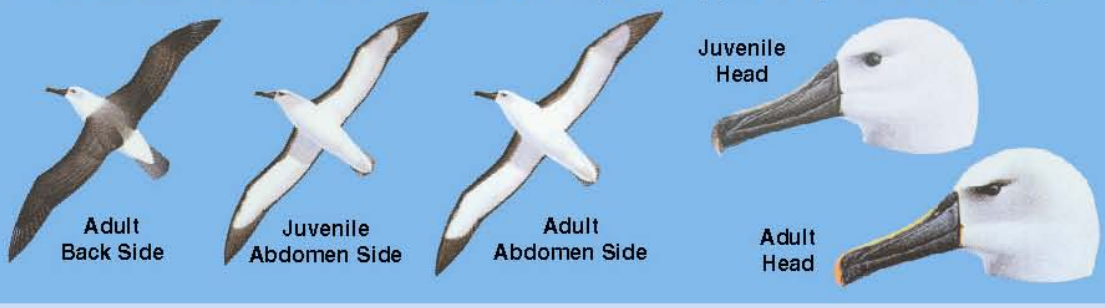

Adult
Abdomen Side


Juvenile
Head

Adult
Head

8) Grey-headed albatross: Upper and lower margins of adult's bill are yellow with reddish bill tip. Juvenile's bill is glossy black with lighter-coloured lower margins.

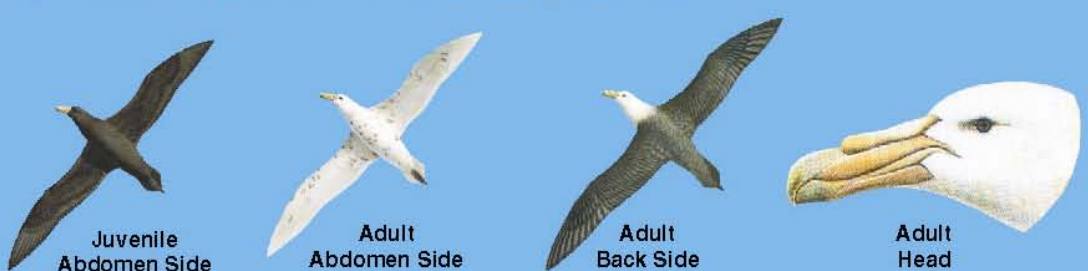
9) Yellow-nosed albatross:
Small albatross with slender bill. Adult's bill has yellow upper margin with reddish tip.



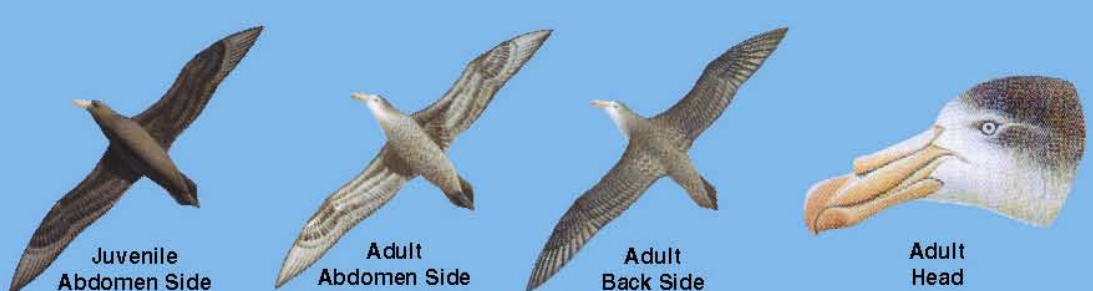
Giant Petrels

Juvenile resembles dark coloured albatrosses,
but has robust yellowish bill with distinct nostril.

10) Southern giant petrel: Bill has pale greenish tip.



11) Northern giant petrel: Bill has reddish tip.



Fulmars

12) **Cape petrel:**

Whitish fulmar with distinct chequered black and white pulmage on the back.

Adult
Abdomen Side

Adult
Back Side

Petrels

13) **Flesh-footed shearwater:**

Blackish-brown shearwater with dark tipped pale pinkish-white bill and pink legs.

Adult
Abdomen Side

Adult
Back Side

14) **Sooty shearwater:**

Completely dark brown or black shearwater with silvery white on underwings and dark/longer bill.

Adult
Abdomen Side

Adult
Back Side

15) **Great-winged petrel:**

Completely dark with some pale feathers around base of bill & throat. Endemic to NZ(often called Gray-faced petrel) has wider white area arround base of bill & throat.

Adult Abdomen Side

Adult Abdomen Side
(NZ Endemic)

Adult Back Side
(NZ Endemic)

Adult Head
(NZ Endemic)

Petrels (cont.)

16) **White-chinned petrel:**

Dark blackish-brown petrel with white chin and yellowish bill.

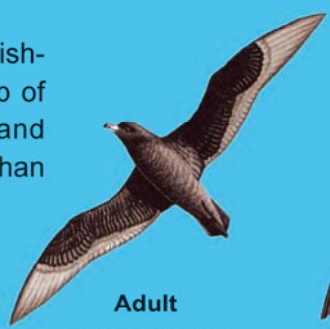
Adult
Abdomen Side

Adult
Back Side

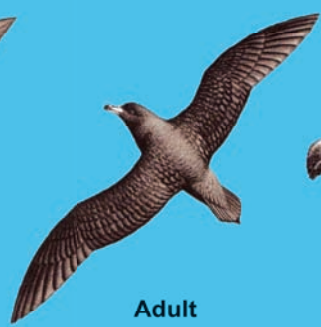
Adult
Head

17) **Black petrel:**

Completely sooty or brownish-dark petrel with a darker tip of bill. Very similar to Westland petrel but its bill is shorter than 45mm.



Adult
Abdomen Side



Adult
Back Side

Adult
Head

18) **Westland petrel:**

Completely sooty or brownish-dark petrel with a blackish tip of bill. Very similar to Black petrel but its bill is longer than 44mm.

Adult
Abdomen Side

Adult
Head

19) **Grey petrel:**

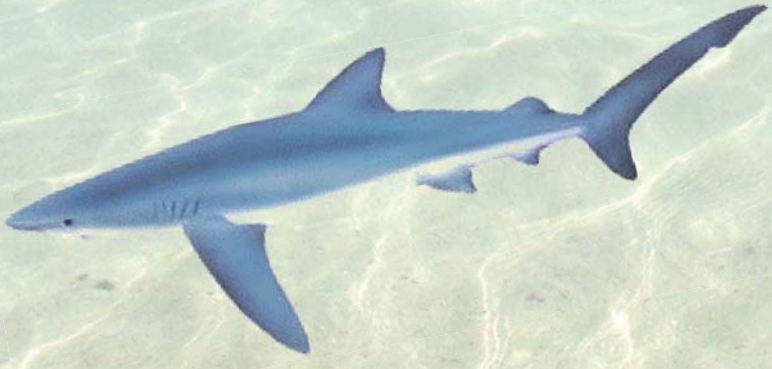
Large petrel with grey back and white ventral plumage.

Adult
Abdomen Side

Adult
Back Side

A handbook on Sharks Caught in SBT Fishing Grounds

2nd Edition



Ecologically Related Species Working Groupe

Commission for the Coservation of
Southern Bluefin Tuna

みなみまぐろ保存委員会

Introduction

The Ecologically Related Species Working Group (ERS WG) has been established under the Commission for the Conservation of Southern Bluefin Tuna (CCSBT) to investigate the nature and extent of the interaction of species that are ecologically linked to southern bluefin tuna (SBT) in the fishery. The ERS WG also provides information and advice on issues relating to species associated with southern bluefin tuna (SBT). This work will assist the CCSBT to achieve its objectives of the conservation and optimum utilization of SBT.

The ERS WG is carefully monitoring the trends in shark resources caught as by-catch, or secondary products in SBT fisheries. There is concern over the increase of shark catches and the consequences that this has for the populations of some shark species in several areas of the world's oceans.

The purpose of this pamphlet is to raise awareness of the issues associated with shark conservation, management and sustainable use and to encourage SBT fishers to collect and submit accurate data and information on their shark catch. Accordingly, sections on reporting/data collection, shark biology, shark resources, and shark identification have been included.

In 1998, the Food and Agriculture Organization developed an "International Plan of Action for the Conservation and Management of Sharks (IPOA-Sharks)". The objective of the IPOA-Sharks is to ensure the conservation and management of sharks and their long-term sustainable use. All members of CCSBT, who contribute to fishing mortality of shark resources, should participate in the management of shark resources consistent with the IPOA-Sharks. For the plan's objectives to be realized, the collection of relevant and consistent data, including commercial data and data leading to improved species identification and ultimately, the establishment of abundance indices is necessary. This information can then be used as the basis for the conservation, management and sustainable use of shark resources.

SBT fishermen are therefore requested to collect and submit data / information on shark resources according to their respective competent authority's instructions.

Sharks and Fisheries

Shark Resources

Historically, humans have used sharks as a food resource and, over time, entire industries have evolved from this enterprise.

Shark meat is widely used and distributed in both dried and fresh forms in many parts of the world. Other shark parts are also utilised for medicinal, decorative and cultural purposes. For example, gelatin found between vertebral joints is used as a food source, teeth are used for jewelry and skin has been used as sandpaper to work timber. Shark liver oil is known for its pharmaceutical benefits. Recently, chondroitin sulfuric acid extracted from shark cartilage has been utilised for treating ailments such as arthritis. Sharks have also become important to some diving and sport fishing operations and some species, such as the spiny dogfish are used extensively for medical dissection and scientific experiments.

Sustainable Management of Sharks in Fisheries

According to statistics released by the United Nations Food and Agriculture Organization (FAO), about one million tons of cartilaginous fishes (the group of fishes to which sharks belong) are used as fishery resources throughout the world. Sharks are often caught by longline fishers targeting species such as tuna, but they are often reported as unidentified shark catch (Walker 2000).

The FAO IPOA on Sharks notes concern over the increase of shark catches and the consequence which this has for the populations of some shark species in several areas of the world's oceans. This is because sharks often have low levels of productivity, long recovery times in response to over-fishing and complex spatial structures. Consequently, the intensive harvesting of sharks has the potential to cause the depletion of stocks and to result in a slow stock recovery.

Careful and accurate monitoring of shark catch data is vital to ensure the conservation and management of sharks and their long-term sustainable use. This monitoring cannot be achieved without the assistance of the SBT fishing industry.

The guide attached to this pamphlet contains a list of shark species commonly caught in SBT fisheries to assist fishers to identify and accurately record shark catch.

Shark Tagging and Recording

A number of tagging programmes are being carried out on shark species to increase our knowledge including aspects of movements, age structure, reproduction and longevity. It is vitally important to ensure that information is recorded about the catch of any tagged sharks.

In particular, please record the species and length of any tagged sharks that you catch. Also record the tag number and when and where the shark was caught. Recording additional information, such as weight, is certainly appreciated. Please provide this information to the address on the tag or to your national fisheries organization.

Biology of Sharks

Taxonomy, distribution and migration

Sharks, rays, skates and chimaeras belong to the cartilaginous fishes (Chondrichthyes) rather than the bony fishes. There are approximately 400 species of sharks and about 500 species of rays. Of these, approximately 20 species of shark and one ray are caught in tuna longline fisheries, with blue shark, shortfin mako shark, porbeagle and thresher sharks caught most frequently.

Sharks have evolved and adapted to live in a diverse range of environments including the deep sea, open oceans and coastal zones. Sharks may also occupy various depths of the water column between surface and deep water. Some species are known to migrate between coastal and oceanic environments at night and may move between the surface and depths of several hundred metres during the day. Sharks usually segregate by sex and age and some studies have shown that pelagic species, such as blue and shortfin mako sharks undertake large-scale migrations throughout their life history.

Behavior

Sharks are predatory animals and are an integral part of the marine ecosystem. For example, salmon sharks hunt salmon and spiny dogfish hunt herring. Sharks can also be drawn to certain fisheries and preferred prey species. For example tunas caught on hooks can be attacked by some shark species.

Sharks are known to occasionally damage human-made installations such as underwater cables, oceanographic observation equipment and fishing gear. This damage often occurs when equipment emits electromagnetic fields that attract or aggravate sharks.

Growth and reproduction

It is difficult to generalize about how fast shark species grow, as there are wide differences between species. Although many sharks are not fast growing (unlike most bony fishes) some species of pelagic sharks exhibit fast annual growth rate much like tuna and billfish. Blue sharks mature at 4-6 years for males and 5-7 years for females and are thought to live for about 20 years. Shortfin mako sharks are mature at 7-9 years for males and 18-21 years for females and may live to at least 29 years.

Unlike the reproduction strategy of bony fishes, many shark species give birth to a few large-sized offspring. The number of viable embryos per shark differs widely. For example, blue sharks may produce 30 embryos whereas shortfin mako, grey nurse and thresher sharks produce between 2-4 embryos. For many species, the gestation period is about one year and the reproductive cycles last 1-3 years.

In summary, shark species are often characterized as long-lived, slow growing, and produce few offspring. These features make them particularly vulnerable to the effects of overfishing as their recovery from fishing pressure will also be slow. Therefore, careful monitoring, such as the collection of catch data, is needed for the management and conservation of shark resources.

When Sharks Are Caught...

Guidelines for handling sharks

Sharks caught on longlines are often alive and have a good chance of survival if handled correctly and returned to the sea. General guidelines to handling sharks caught on or entangled in longlines are:

- If possible leave the shark in the water. Hauling them on deck causes stress which reduces the chances of the shark surviving.
- Using a linecutter, cut the line as close to the hook as possible when freeing the shark. This will reduce the amount of line the shark will trail behind it.
- If the shark must be brought on deck, minimise the time it is out of the water.

A Comparative Table in Five Languages on Names of Sharks Caught in SBT Fishing Ground

ID	Scientific Name	English	Japanese	Korean	Mandarin	Indonesian
1	Pseudocarcharias kamoharai	Crocodile shark	ミズワニ	강남상어	蒲原氏擬錐齒鯊	Cucut buaya
2	Alopias vulpinus	Thresher shark	マオナガ	진환도상어	狐鮫 , 狐形長尾鯊	Cucut tikus
3	Alopias superciliosus	Bigeye thresher	ハチワレ	큰눈환도상어	深海狐鮫 , 深海長尾鯊	hiu monyet, hiu lancur (Bali), hiu tikus (Lombok), paitan (Central Java)
4	Alopias pelagicus	Pelagic thresher	ニタリ	환도상어	淺海狐鮫 , 淺海長尾鯊	hiu monyet, hiu lancur (Bali), hiu tikus (Lombok), cucut pedang (Jakarta), Tikusan (Central Java)
5	Carcharodon carcharias	Great white shark	ホホジロザメ	백상아리	食人鮫 , 噬人鯊	Cucut koboi
6	Isurus oxyrinchus	Shortfin mako	アオザメ	청상아리	灰鯖鮫 , 尖吻鯖鯊	hiu tenggiri, hiu anjing, hiu mako, hiu kakap
7	Isurus paucus	Longfin mako	バケアオザメ	단순청상아리	長臂灰鯖鮫 , 波卡鯖鯊	hiu tenggiri, hiu mako bersirip panjang, hiu anjing
8	Lamna nasus	Porbeagle	ニシネズミザメ	비악상어	鼠鯊（中國）	Mako
9	Prionace glauca	Blue shark	ヨシキリザメ	청새리상어	鋸峰齒鮫 , 大青鯊	Cucut lalaek, cucut selendang, cucut karet
10	Galeocerdo cuvier	Tiger shark	イタチザメ	뱀상어	鼬鮫 , 居氏鼬鯊	Cucut omas, cucut macan
11	Carcharhinus galapagensis	Galapagos shark	ガラパゴスザメ	갈라파고스상어	直翅真鯊	-
12	Carcharhinus plumbeus	Sandbar shark	ヤジブカ	흉상어	高鰭白眼鮫	Cucut lanjaman(Central Java), hiu teteri (Lombok)
13	Carcharhinus obscurus	Dusky shark	ドタブカ	흑상어	灰色白眼鮫	merak bulu (Lombok), cucut lanjaman, hiu lanyam (Central Java)
14	Carcharhinus longimanus	Oceanic whitetip shark	ヨゴレ	장완흉상어	污斑白眼鮫	Cucut koboi
15	Carcharhinus falciformis	Silky shark	クロトガリザメ	미흑점상어	平滑白眼鮫	mungsing (Bali), hiu lonjor (Lombok), cucut lanjaman, hiu lanyam (Central Java)
16	Carcharhinus brachyurus	Bronze whaler	クロヘリメジロザメ	무태상어	短尾白眼鮫	
17	Sphyrna lewini	Scalloped hammerhead	アカシュモクザメ	홍살귀상어	紅肉丫髻鮫 , 路氏雙髻鯊	Cucut martil, cucut capingan
18	Sphyrna zygaena	Smooth hammerhead	シロシュモクザメ	귀상어	丫髻鮫 , 槌頭雙髻鯊	Cucut martil
19	Galeorhinus galeus	School shark	イコクエイラクブカ	행락상어	翅鯊	-
20	Zameus squamulosus	Velvet dogfish	ビロウドザメ	우단상어	鱗鎧鯊 (中國)	Cucut botol
21	Dasyatis violacea	Pelagic stingray	カラスエイ	보라색가오리	紫魟 (中國)	Pari kembang, pari macan

Commission for the Coservation of
Southern Bluefin Tuna

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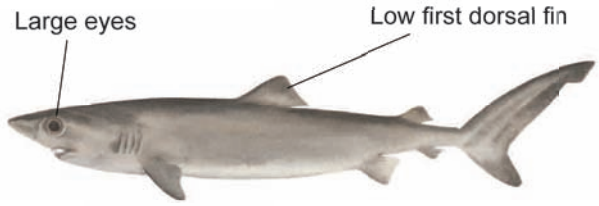
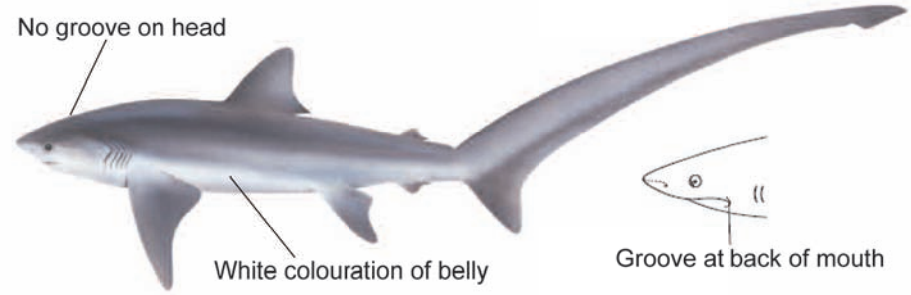
Image on the front cover(Blue shark) by Les Hata, ©Hawaii Division of Aqutic Resources

IDENTIFICATION SHEET ON SHARK SPECIES CAUGHT IN SBT FISHING GROUNDS



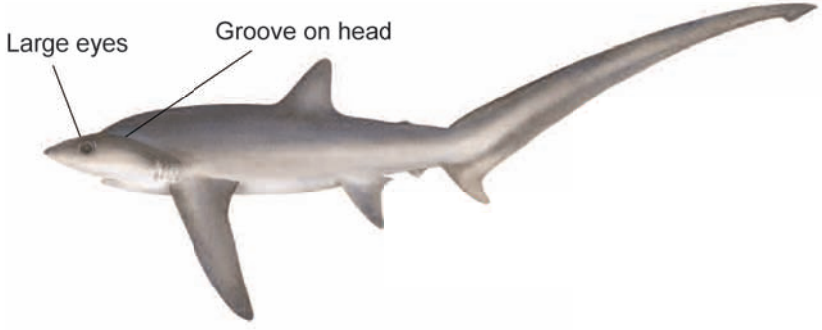
1 Crocodile shark

Oceanic (590 m) and in tropical and subtropical waters. The body is slender and spindle-shaped with large eyes without a nictitating membrane and long gill slits, which extend onto the top of the head. Grows to ~1.1 m.



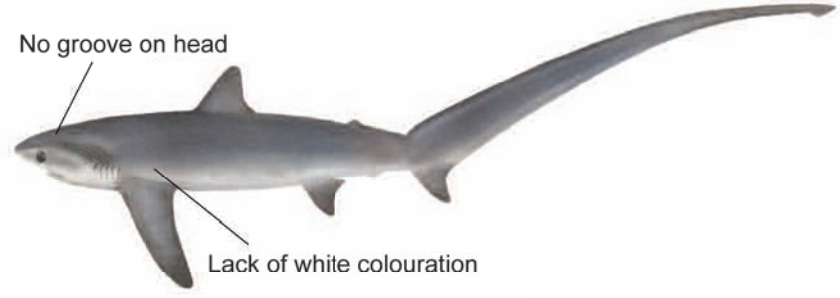
2 Thresher shark

All the thresher sharks have an extremely long upper lobe of the caudal fin. Cosmopolitan in tropical and warm temperate seas (to 650 m). This species can be recognised by its pointed, pectoral fins and the white colouration above the pectoral and pelvic fins. Grows to 5.7 m.



3 Bigeye thresher

Similar distribution to thresher shark but oceanic (to 700 m). Can be recognised by the long upper lobe of the caudal fin and the very large eyes that extend onto the top of the head. Grows to about 4.8 m.

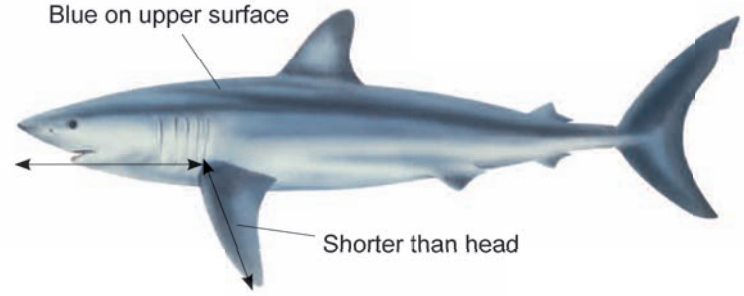


4 Pelagic thresher

Restricted to the Indo-Pacific (to 150 m). Can be distinguished by the extremely long upper lobe of the caudal fin (longer than other threshers) and the lack of white colouration above the pectoral and pelvic fins. The eyes do not extend on top of the head. Smaller than the other threshers, it grows to 3.9 m.

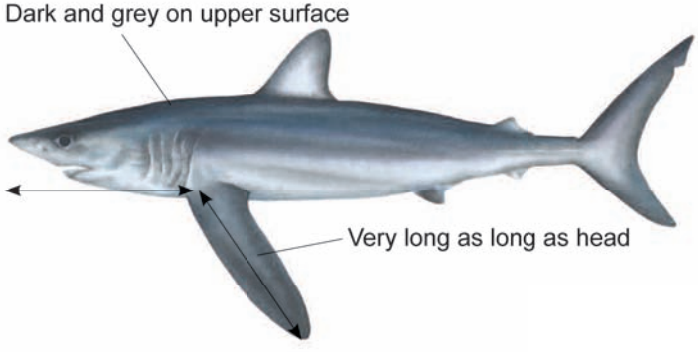
5 Great white shark

Widely distributed throughout temperate and sub-tropical regions in the northern and southern hemispheres (to 1280 m). Large shark with serrated, triangular teeth and very small second dorsal and anal fins. Grows up to 6 m.



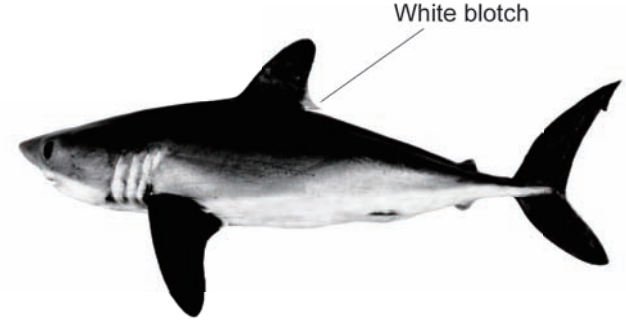
6 Shortfin mako

Widely distributed in temperate and tropical seas (to 650 m). Has slender, pointed teeth that protrude from the mouth and very small second dorsal and anal fins. Blue in colour on upper surface of the body. Can grow to ~ 4 m.



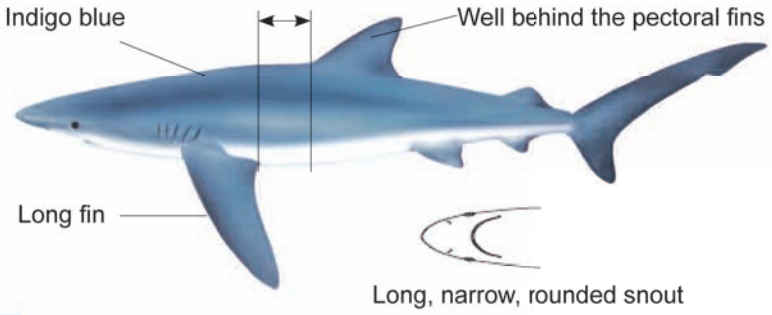
7 Longfin mako

Similar distribution to the shortfin mako and similar in appearance but with longer pectoral fins. Darker and more grey in colour than the shortfin. Grows to ~4 m.



8 Porbeagle

Widely distributed in cold and temperate seas of the North Atrantic and Southern Hemisphere (to 1,360 m). The most dstinctive feature is the white blotch on the back of its first dorsalfin. Grows to ~ 2.5 m.

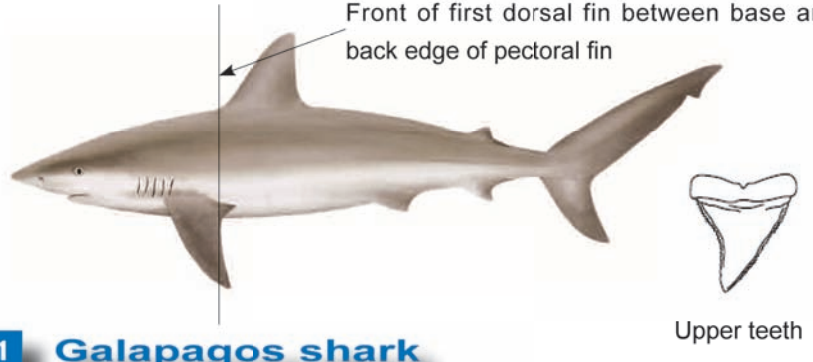


9 Blue shark

Found worldwide in temperate and tropical waters (to 1000 m). Has a slender, sleek-looking body with a long, narrow snout. The first dorsal fin originates well behind the pectoral fins. Indigo blue colour on the upper surface of the body. Grow to 3.8 m.

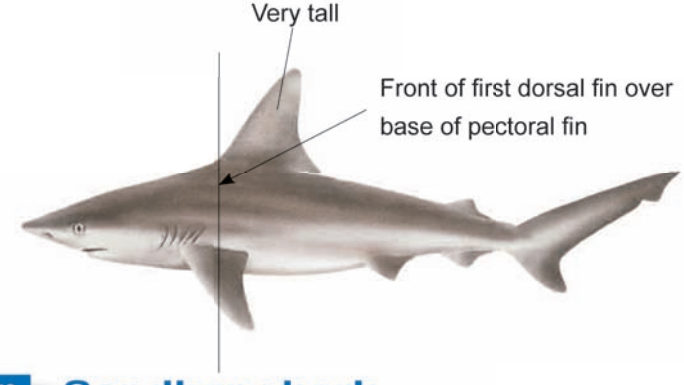
10 Tiger shark

Found in tropical waters but can migrate to warm temperate seas (to 150 m). A very large whaler with dark black spots and vertical bars which run the length of the body (may be absent in larger animals). Broad, blunt head with broad, serrated teeth. Grows to 6 m.



11 Galapagos shark

Generally found around oceanic islands in tropical and temperate waters (to 285 m). Large, grey whaler with dusky tips on fins (may be indistinct in larger animals). Can be distinguished from Bronze whalers by a ridge of thickened skin extending between the dorsal fin (interdorsal ridge) and broad triangular upper teeth. Found in large numbers where it occurs. Grows to 3 m.

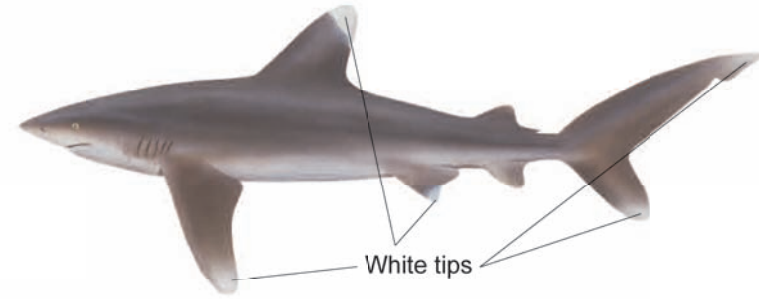


12 Sandbar shark

Patchy cosmopolitan species that inhabits warm temperate and tropical waters (to 280 m). Can be distinguished by the very tall first dorsal fin that originates over or just behind where the pectoral fins attach to the body. Grows to 2.4m.

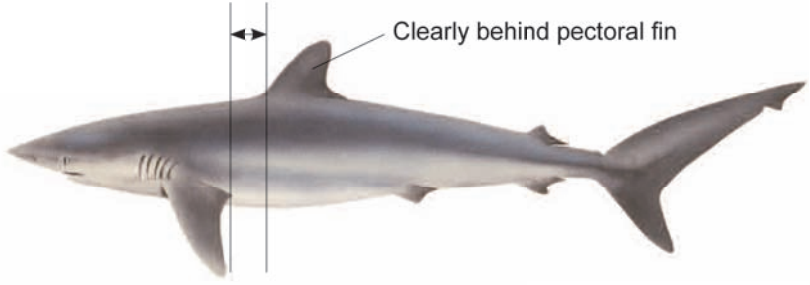
13 Dusky shark

Occurs along continental coastlines in tropical and temperate waters (to 400 m). Sometimes confused with the sandbar shark but can easily be distinguished by its smaller and more posterior first dorsal fin. Can be distinguished from Bronze whalers by a ridge of thickened skin extending between the dorsal fin (interdorsal ridge) and broad triangular upper teeth . Grows to 3.6 m.



14 Oceanic whitetip shark

Distributed worldwide in tropical and subtropical waters (to 150 m). Large whaler with very large, rounded first dorsal fin. White tips on the first dorsal, pectoral, pelvic, and caudal fins. Grow to 3 m.



15 Silky shark

Found in tropical waters and can migrate to warm temperate waters (to 500 m). Small silky sharks are commonly associated with schools of tuna. Large, darkly coloured whaler. First dorsal fin plain, but other fins may have dusky tips. Grow to 3.3 m.

16 Bronze whaler

Occurs from surf zone to slightly beyond the continental shelf(to 100m) in temperate waters. Plain bronze coloration. Front of first dorsal fin slightly behind pectoral fin. Has narrow curved upper teeth and lacks an interdorsal ridge. Grow to 3.3 m.

Front of head curved with middle dent and a distinct lobe at each end

17 Scalloped hammerhead

Cosmopolitan in tropical and warm temperate seas (to 275 m). Distinguished from other hammerheads by an indentation located centrally on the front margin of the broadly arched head. Two more indentations flank the main central indentation, giving this hammerhead a "scalloped" appearance. Grows to 1.6–2.2 m.

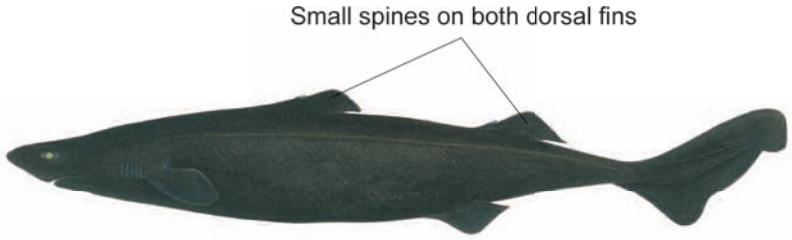
Front of head curved with no middle dent

18 Smooth hammerhead

Found in all tropical and warm temperate waters (to 80 m). The head is broad and flattened with a broadly rounded, unnotched anterior margin. Grows to 2.5 m.

19 School shark

Distributed world-wide in temperate waters, mainly demersal in coastal waters, but can be found offshore (to 600 m). Slender shark of a bronze/grey colour with a large lower lobe of the caudal fin, giving it a 'double-tailed' appearance. Often occurs in small schools. Attains up to 1.75 m.



20 Velvet dogfish

Widespread species that can be demersal or pelagic and can associate with seamounts (to 2000 m). This species is black or dark brown in colour with small dorsal fin spines, rounded pectoral fins and an asymmetrical caudal fin. Grows to ~80 cm.

21 Pelagic stingray

Widely distributed in tropical and temperate seas. Usually found in depths less than 100 m. A darkly coloured stingray with an evenly rounded anterior edge. Row of thorns along the back and a long whip-like tail. Grows to at least 1.3 cm in length and ~60 cm in disc width.

Images;

1,3,4,7 and 16(only teeth) by Les Hata, ©Secretariat of the Pacific Community(SPC)

8,13, 16 and 19 by CSIRO

20 and 21 by Rachel O'Shea, ©Secretariat of the Pacific Community(SPC)

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