1. Introduction

One of the primary roles of the Indian Ocean Tuna Commission (IOTC) is to maintain an information centre for tuna and tuna-like species in the Indian Ocean (Figure 1). Historical and current fisheries statistics are collected, processed and disseminated for use in the development and the management of tuna fisheries. The Secretariats current data programme builds on the data collection activities initiated by the Indo-Pacific Tuna Development and Management Programme (IPTP) between 1982 and 1997.

The agreement defining the statutes of IOTC was approved by the FAO Council at its Twenty Sixth Session at the end of 1994, opening the Commission to accession by parties qualified to join. Accession is open to coastal states and to non coastal states or regional economic integration organisations to which these states have transferred competence over matters within the purview of this Agreement and whose vessels engage in fishing stocks covered by the Agreement within its area of competence. The Agreement entered into force on the accession of the tenth Member on 27 March, 1996. IOTC has twenty-three Contracting Parties which are Australia, China, Comoros, Eritrea, France, India, Iran, Japan, Kenya, the Republic of Korea, Oman, Madagascar, Malaysia, Mauritius, Pakistan, Philippines, Seychelles, Sri Lanka, Sudan, Thailand, Vnuatu the United Kingdom and the European Community.

The First Session of the IOTC was held at the FAO Headquarters in Rome, from 3 to 6 December, 1996, and the Secretariat was established in Seychelles in 1998.

IOTC collates data supplied by contracting and collaborating parties, including:

- Annual nominal catch by country, species, gear and IOTC statistical area;
- Estimates of incidental catch and discards from tuna fishing operations;
- Catch and effort statistics by species, gear, fishing ground (by 1°x1° or 5°x5° square) and month;
- Size-frequency data by species, gear, fishing ground and month;
- Annual tuna fishing craft statistics aggregated by gear and vessel size class;

1. Introduction

Un des rôles majeurs de la Commission des Thons de l'océan Indien (CTOI) est de maintenir un centre d'information pour les thonidés dans l'océan Indien (Figure 1). La CTOI a aussi la responsabilité de la gestion des ressources. Les statistiques historiques et actuelles des pêches thonières sont collectées, traitées et diffusées à des fins de développement et de gestion. Le programme de données du Secrétariat s'est développé à partir des activités de collecte de données mises en place par l'«*Indo-Pacific Tuna Development and Management Programme*» (IPTP) entre 1982 et 1997.

L'accord qui détermine les statuts de la CTOI et qui permet l'accession des parties qualifiés fut approuvé par le Conseil de l'OAA à sa Vingt Sixième Session à la fin de 1994. Peuvent être membres les états côtiers ou non côtiers ainsi que les organismes d'intégration économique régionales auxquels ces états ont transféré leur compétence en matière des éléments régis par cet Accord et dont les bateaux exploitent les ressources couvertes par l'Accord dans son aire de compétence. L'Accord est entré en vigueur au moment de l'accession du dixième Membre, le 27 mars, 1996. Actuellement, les pays et organisations membres (au nombre de 23) sont: l'Australie, la Chine, les Comores, la République de Corée, l'Érythrée, la France, l'Inde, l'Iran, le Japon, le Kenya, Madagascar, la Malaisie, l'île Maurice, l'Oman, le Pakistan, les Philippines, les Seychelles, le Sri Lanka, le Soudan, la Thaïlande, le Royaume Uni, le Vanuatu et l'Union Européenne.

La Première Session de la CTOI a eu lieu au siège de l'OAA à Rome, du 3 au 6 décembre 1996 et le Secrétariat en a été établi aux Seychelles en 1998.

La CTOI continue la compilation des données suivantes:

- Captures nominales annuelles par espèce, engin, pays et zone statistique OAA;
- Statistiques de captures accessoires et de rejets par les pêcheries thonières;
- Statistiques mensuelles de captures et effort par espèce, engin et zone de pêche (par carré de 1° x1° ou 5°x5°);
- Statistiques de fréquences de tailles par espèce, engin, zone de pêche et mois;
- Statistiques annuelles des flottes de pêche thonière par engin et classes de tailles des navires;
- Registre des bateaux de pêche thonière actifs dans l'océan Indien, comprenant les spécifications du bateau et l'identité des propriétaires et opérateurs;

- A record of the tuna fishing vessels active in the Indian Ocean with details on the vessel, and the owners and operators;

- An activity record (port call) of foreign fishing vessels.

This Data Summary, No. 24, was compiled from cross-tabulations of the annual nominal catch and fishery fleet statistics from 1993 to 2002. Nominal catch, catch and effort and size frequency statistics at the Secretariat for the period 1953-2002 are also presented graphically. Nominal catch data are also distributed together with a programme for data query and analysis. This programme, FISHSTAT PLUS, is available through the IOTC Web site [http://www.IOTC.org] or on magnetic media or CD-ROM (by request).

2. General Notes

2.1. Data source

The statistics compiled in this report were mostly obtained from liaison officers nominated by the governments of countries fishing for tuna and tuna-like species in the Indian Ocean. In some cases, statistics were estimated by IOTC using best available information obtained from reliable sources or obtained

- Un registre des activités des bateaux de pêche thonière étrangers (sur la base de visites au port).

Ce recueil de données n°24 comprend les données de captures nominales et de flottes thonières pour les dix années entre 1993 et 2002. Les données de captures nominales, de prise et effort, ainsi que de fréquences de tailles disponibles au Secrétariat pour la période 1953-2002 sont également présentées sous forme graphique. Les statistiques de captures nominales sont disponibles, à la demande, sur support informatique ou peuvent être téléchargées sur le site Web de la CTOI [http://www.iotc.org], avec un programme pour la sélection et l'analyse des données, FISHSTAT PLUS.

2. Notes Générales

2.1. Source des données

Les statistiques ont dans l'ensemble été obtenues auprès des agents des gouvernements des pays pêchant les thonidés dans l'océan Indien responsables de la liaison avec la CTOI. Dans certains cas, les statistiques ont été estimées par la CTOI, en utilisant la meilleure source disponible d'information, ou fournies par le Service de l'Information, des Données et des Statistiques des Pêches de l'OAA à Rome (FIDI). Une brève annotation sur la source des données est fournie au tableau des statistiques par pays (Tableau 7.5).

Figure 7. Catches of non-tuna species *versus* catches of tuna species in the IOTC nominal catches database

Figure 7. Captures de thons et thonidés contre autres espèces dans la base de données de captures nominales de la CTOI

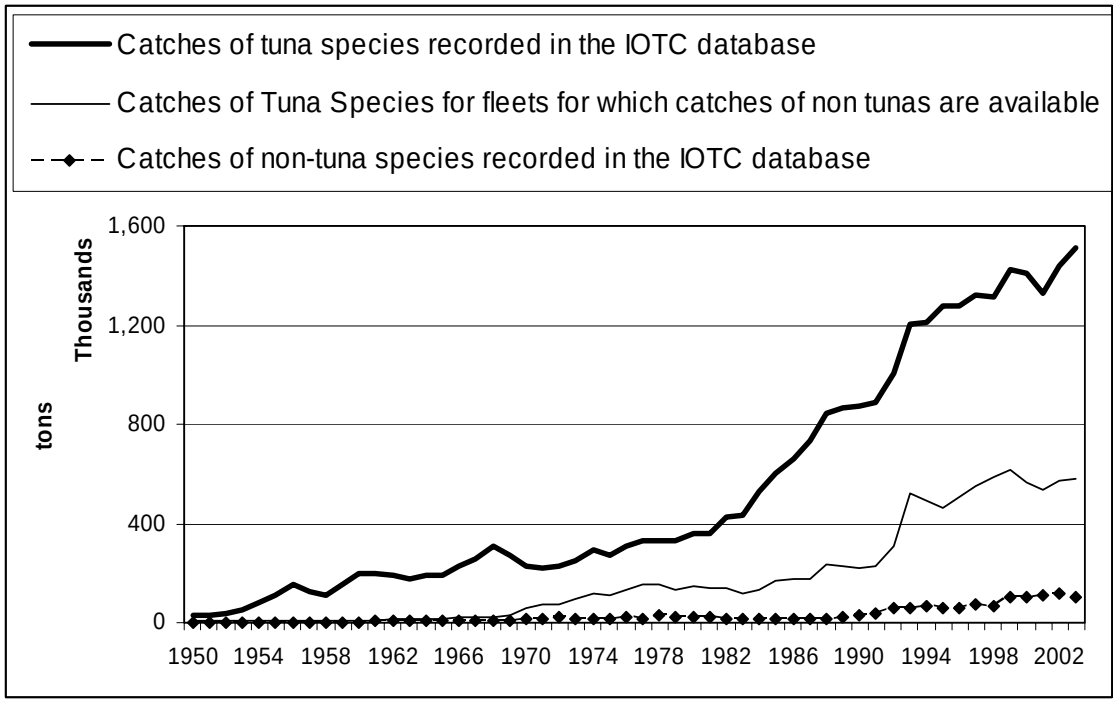


Table 4. Non-tuna species having catches recorded in the IOTC Database and proportion that the catches of each group make up of the total catches of non-tunas

Tableau 4. Espèces autres que thons et thonidés ayant des captures enregistrées dans la base de données de la CTOI, et proportions de chaque groupe par rapport aux captures totales de ces espèces.

Gear	Group	Species	Especе	%93-02
PS	Other / Autres	Non targeted, associated and dependent species	Espèces non ciblées, associées et dépendantes	0.01
LL	Sharks / Requins	Blue shark	Peau bleue	9.01
		Broadnose sevengill shark	Platnez	
		Copper shark	Requin cuivre	
		Dogfishes nei	Aiguillats nca	
		Hammerhead sharks nei	Requins marteau nca	
		Longfin mako	Petite taupe	
		Oceanic whitetip shark	Requin océanique	
		Porbeagle	Requin-taupe commun	
		Requiem sharks nei	Requins nca	
		Sharks nei other than oceanic whitetip shark and blue shark	Requins nca hors requin océanique et peau bleue	
		Sharks various nei	Requins divers nca	
		Shortfin mako	Taupe bleue	
		Silky shark	Requin soyeux	
		Smooth hammerhead	Requin marteau commun	
		Smooth-hound	Emissole lisse	
		Thresher sharks nei	Renards de mer nca	
		Tiger shark	Requin tigre commun	
		Tope shark	Requin-hâ	
	Other / Autres	Butterfly kingfish	Thon papillon	0.71
		Common dolphinfish	Coryphène commune	
		Dogtooth tuna	Bonite à gros yeux	
		Mackerels Indian, nei	Maquereaux (Indo-pacif.) nca	
		Non targeted, associated and dependent species	Espèces non ciblées, associées et dépendantes	
		Other non tuna-like fishes nei	Poissons non du type thon nca	
		Rays, stingrays, mantas nei	Raies, pastenagues, mantes nca	
BB	Other / Autres	Blue mackerel	Maquereau tacheté	8.04
		Dogtooth tuna	Bonite à gros yeux	
		Mackerels Indian, nei	Maquereaux (Indo-pacif.) nca	
		Other non tuna-like fishes nei	Poissons non du type thon nca	
		Striped bonito	Bonite oriental	
GILL	Sharks / Requins	Blue shark	Peau bleue	65.44
		Hammerhead sharks nei	Requins marteau nca	
		Oceanic whitetip shark	Requin océanique	
		Requiem sharks nei	Requins nca	
		Sharks mackerel, porbeagles nei	Requins taupe nca	
		Sharks various nei	Requins divers nca	
		Shortfin mako	Taupe bleue	
		Silky shark	Requin soyeux	
		Thresher sharks nei	Renards de mer nca	
	Other / Autres	Dogtooth tuna	Bonite à gros yeux	1.44
		Indian mackerel	Maquereau des Indes	
		Mackerels Indian, nei	Maquereaux (Indo-pacif.) nca	
		Non targeted, associated and dependent species	Espèces non ciblées, associées et dépendantes	
		Other non tuna-like fishes nei	Poissons non du type thon nca	
		Striped bonito	Bonite oriental	
LINE	Sharks / Requins	Blacktip reef shark	Requin pointes noires	0.82
		Blue shark	Peau bleue	
		Broadnose sevengill shark	Platnez	
		Copper shark	Requin cuivre	
		Dusky shark	Requin de sable	
		Hammerhead sharks nei	Requins marteau nca	
		Sharks mackerel, porbeagles nei	Requins taupe nca	
		Sharks various nei	Requins divers nca	
		Shortfin mako	Taupe bleue	
		Smooth-hound	Emissole lisse	
		Thresher sharks nei	Renards de mer nca	
		Tope shark	Requin-hâ	
	Other / Autres	Common dolphinfish	Coryphène commune	4.24
		Dogtooth tuna	Bonite à gros yeux	
		Mackerels Indian, nei	Maquereaux (Indo-pacif.) nca	
		Other non tuna-like fishes nei	Poissons non du type thon nca	
		Striped bonito	Bonite oriental	
OTHER	Sharks / Requins	Sharks various nei	Requins divers nca	8.96
	Other / Autres	Blue mackerel	Maquereau tacheté	1.34
		Dogtooth tuna	Bonite à gros yeux	
		Indian mackerel	Maquereau des Indes	
		Mackerels Indian, nei	Maquereaux (Indo-pacif.) nca	
		Non targeted, associated and dependent species	Espèces non ciblées, associées et dépendantes	
		Other non tuna-like fishes nei	Poissons non du type thon nca	
		Striped bonito	Bonite oriental	

Data available on By-Catch species

IOTC Secretariat

Which species?

All non-IOTC species caught by fleets targeting IOTC species:

- Sharks, rays (and skates)

- Finfish, including various species (e.g. dolphinfish, rainbow runner, oilfish, escolar, triggerfish, barracuda, etc.)

- **Mammals: e.g. several species of dolphins**
- **Seabirds: e.g. several species of Albatrosses**
- **Sea turtles: e.g. leatherback turtle, etc.**

Was/Is there a mandate?

Not until now

New Requirements to be implemented:

- **Resolution on Sharks (binding):**
  - **Reporting on historical and recent data**
  - **SC(WPB) Preliminary advice + Research plan**
  - **Limitation on amounts of sharks harvested**
  - **Limit amount Shark fins and obtain biological info**
- **Recommendation on seabirds (voluntary):**
  - **Reduce incidental catches**
  - **Study interactions and assess impact**
- **Recommendation on sea turtles (voluntary):**
  - **Implement measures to Minimize bycatch and improve release techniques on PS and LL fisheries**

What has the IOTC Secretariat been requesting? (i)

Nominal Catch Data:

- **Retained catches: IOTC Form 1: total catches per fleet (flag country-type of vessel-gear used) year, IOTC Area (East or West) and species (both IOTC and other)**
- **Discards: IOTC Form 1b: total amounts discarded per year per fleet and species (both)**

Both forms are intended for the reporting of both IOTC and non-IOTC species

What is the IOTC Secretariat requesting? (ii)

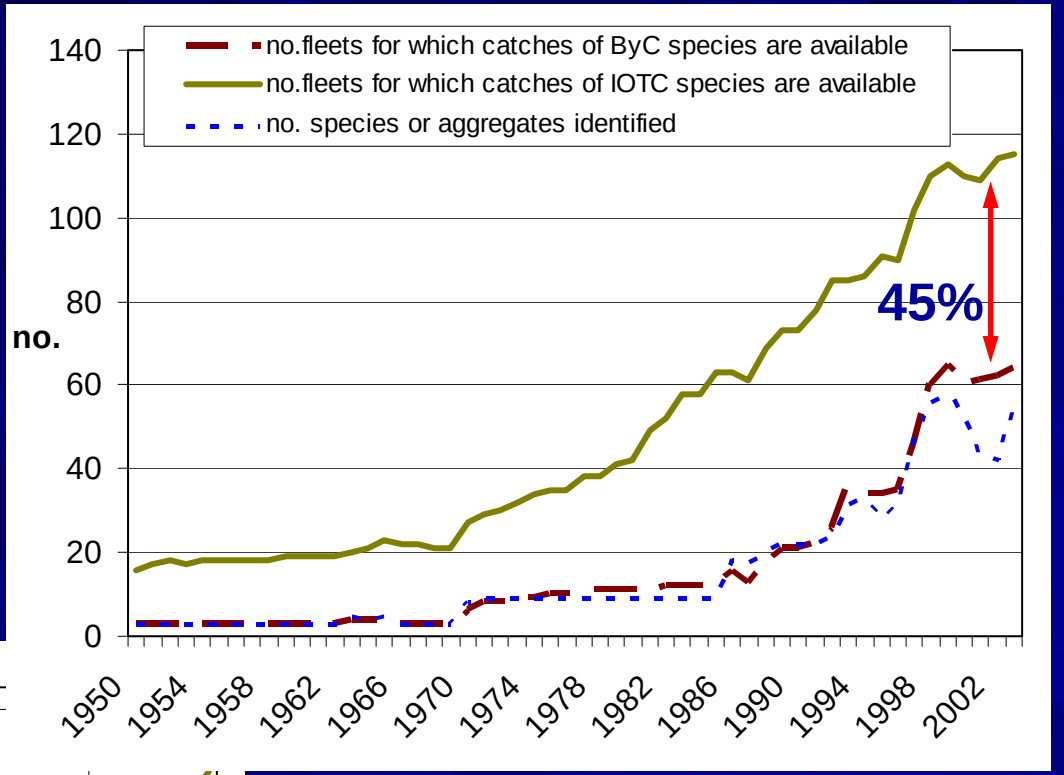
Catch-and-Effort and size data:

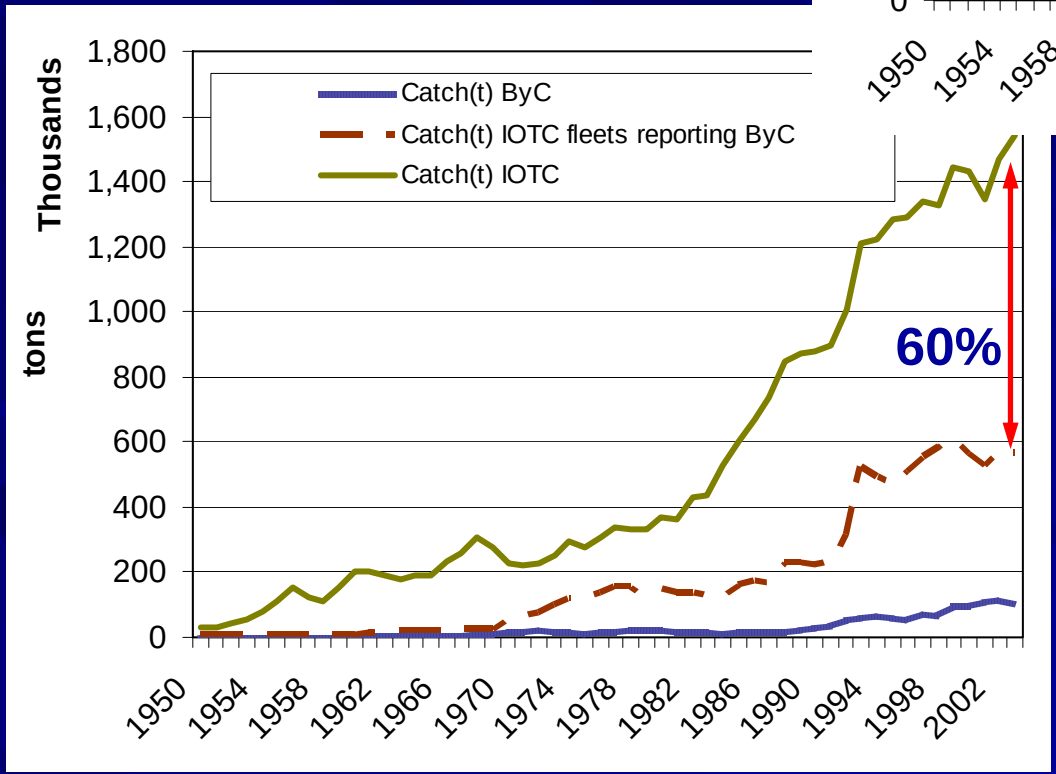
- **Surface fisheries (industrial purse seine and pole and line vessels): catches and effort per month, one degree square area and species (IOTC or not)**
- **Longline fisheries (industrial): catches and effort per month, 5 degrees square area and species (IOTC or not)**
- **Other fleets (gillnet, hand line, troll line and other small scale fisheries): same degree of resolution as surface fisheries if possible.**

The same applies to size frequency data (fish)

And… What is available? (i)

- **Nominal Catches: Almost no data or very poor quality data are available due to:**

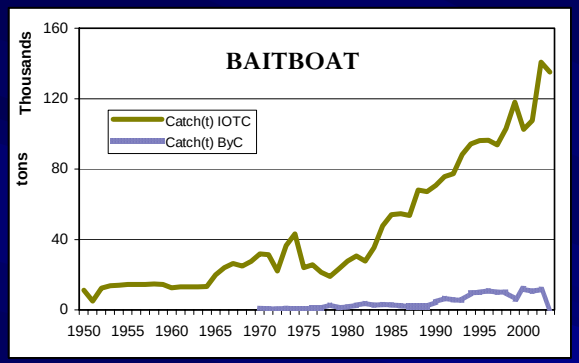


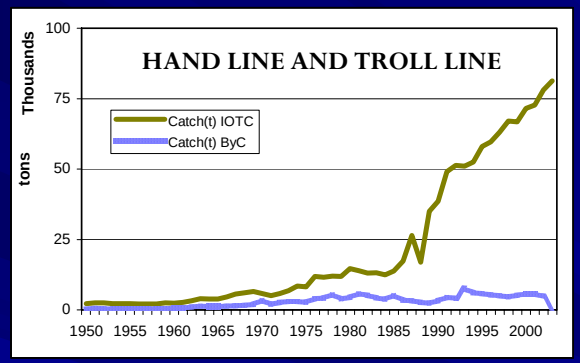


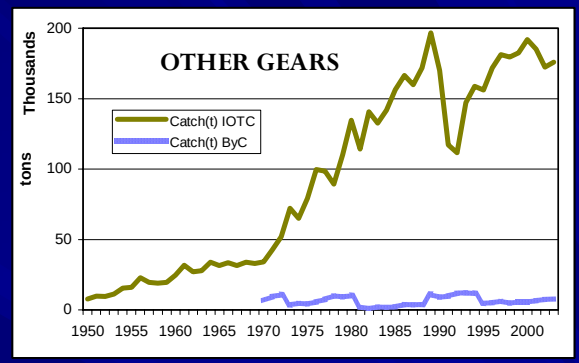
- Data incomplete, not representing total catches: information not complete for most fisheries (e.g. most industrial purse seine and longline fisheries)

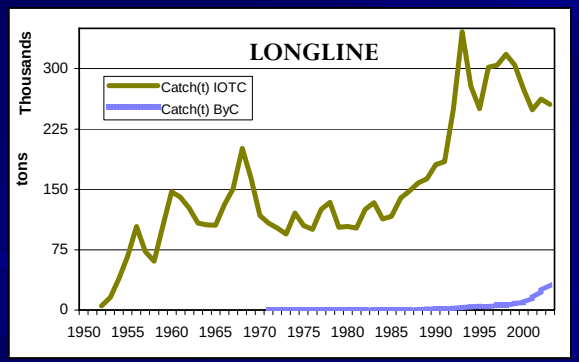
Reporting rates per gear

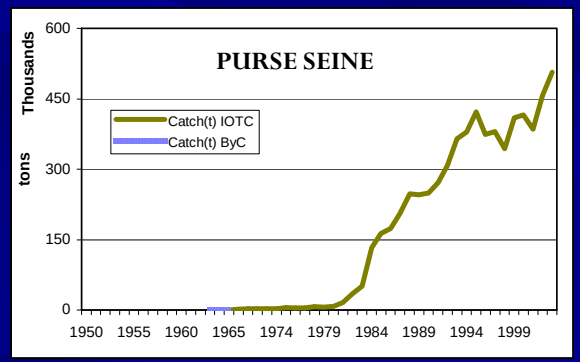
- The amounts of bycatch caught by baitboat, hand line and troll line fisheries (artisanal) are thought small (IOTC tuna species are not the target in some cases)

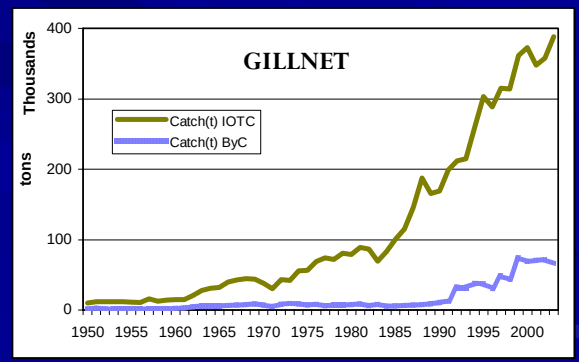








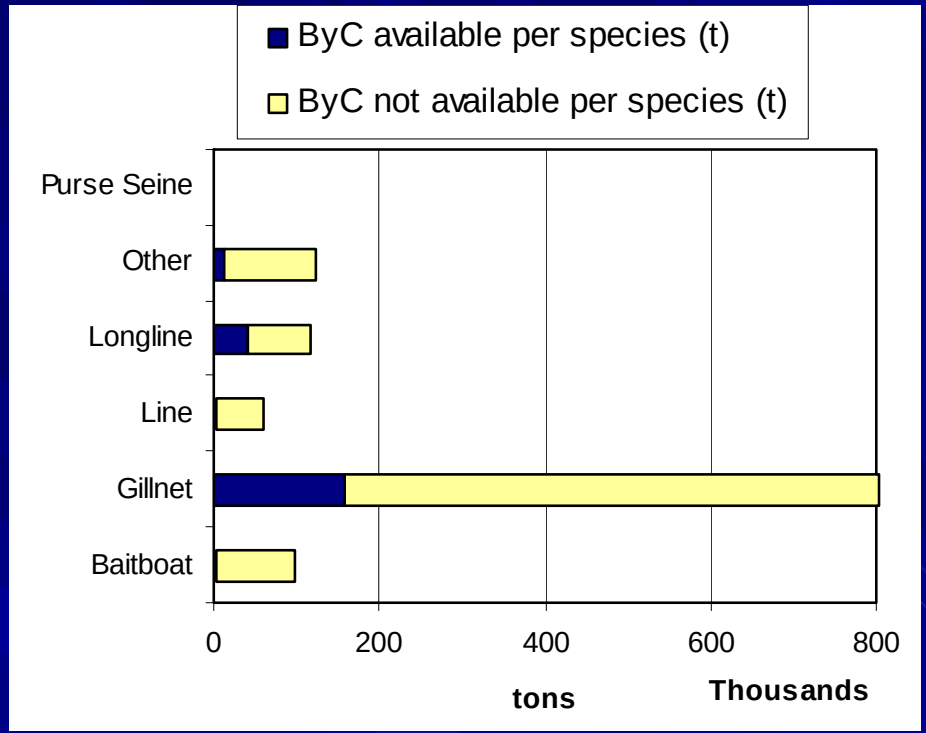


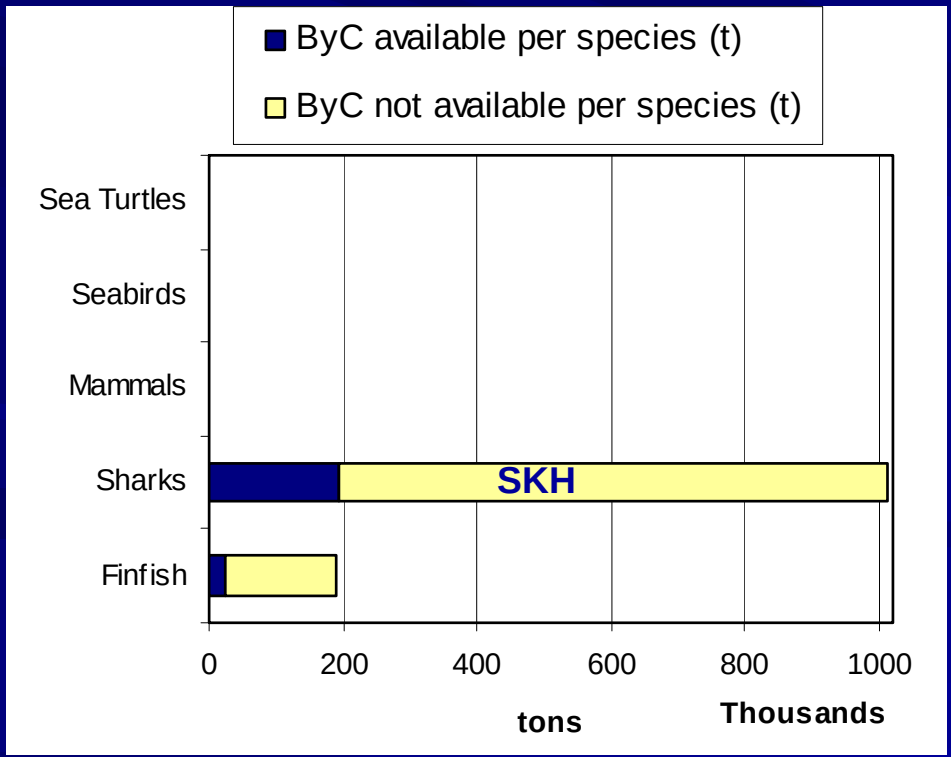


- The amounts of bycatch caught by longline, purse seine (industrial) and gillnet fisheries are thought large. The amounts of bycatch reported are, however, very low.

Catches per species

- **Data are seldom available per species (e.g. all catches of shark species reported aggregated as SKH)**

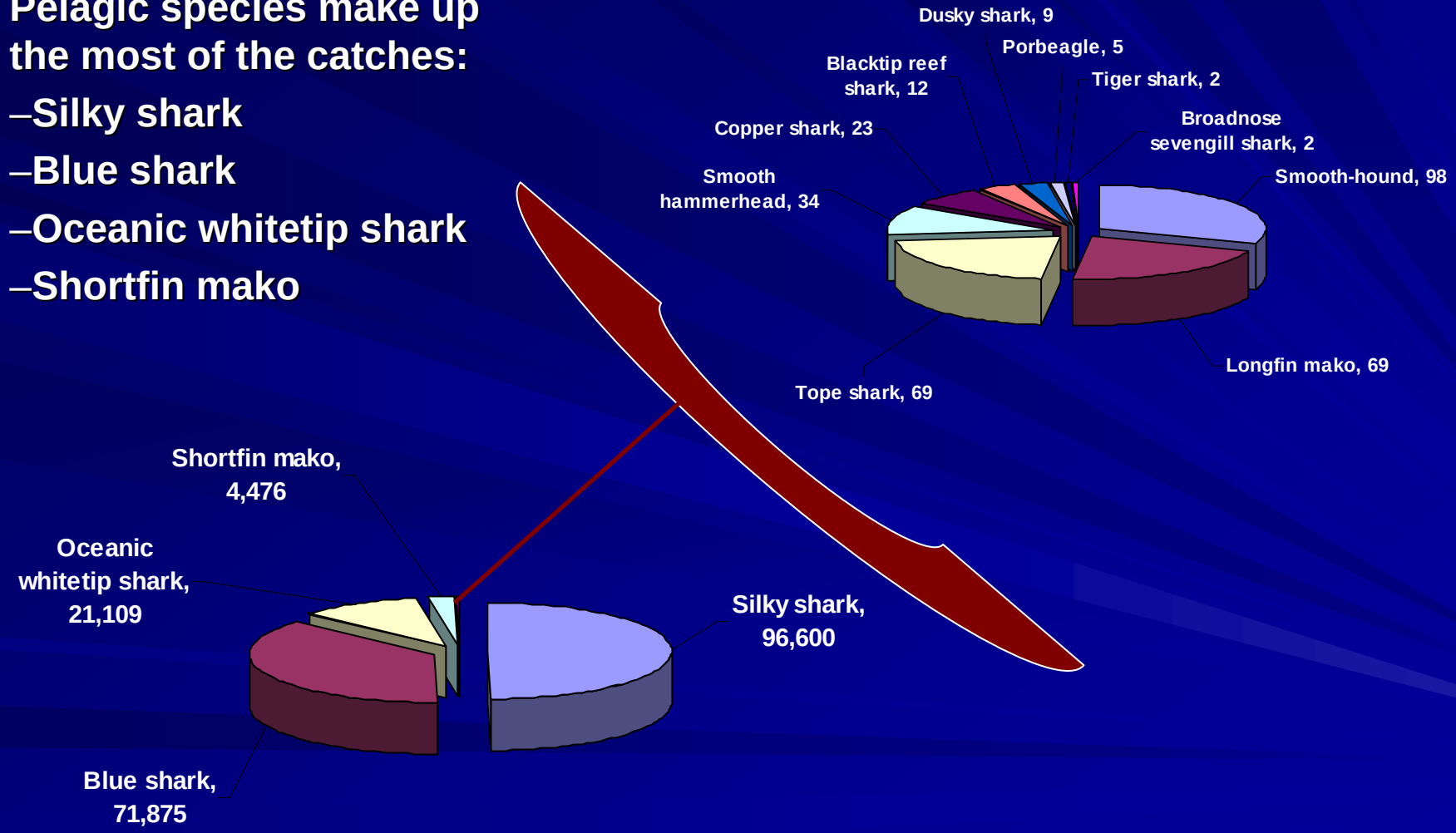




Which shark species

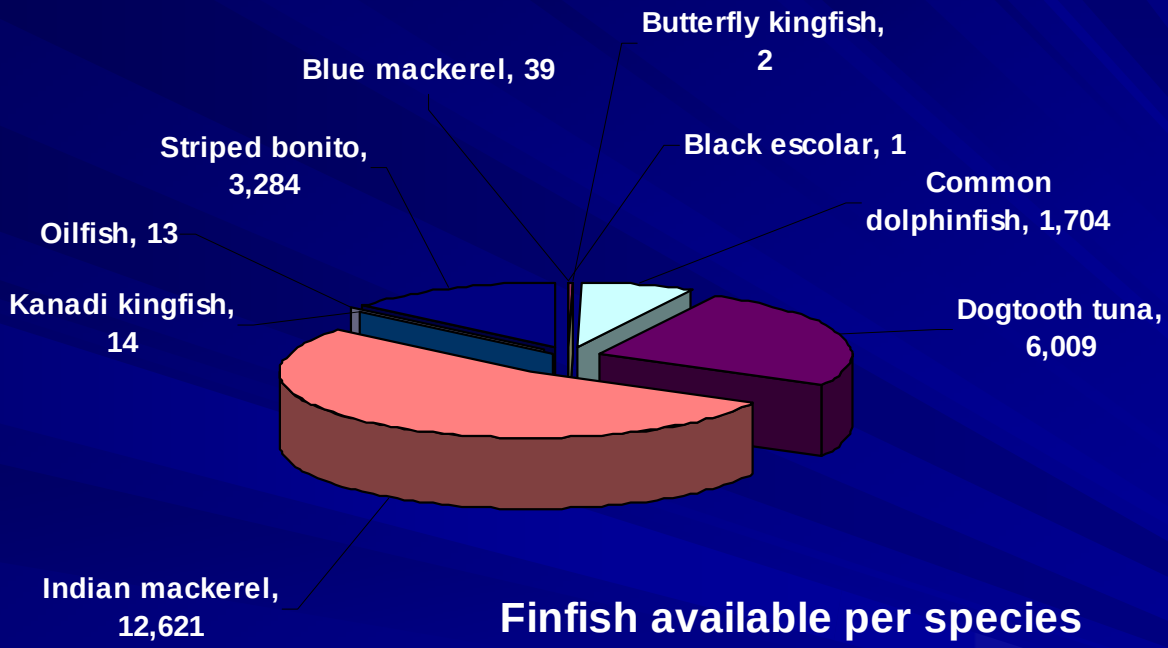
Pelagic species make up the most of the catches:

- **–Silky shark**
- **–Blue shark**
- **–Oceanic whitetip shark**
- **–Shortfin mako**



Sharks available per species

Finfish



Finfish available per species

Small pelagic species dominate

Which species might be incidentally caught

- **Longline: mainly shark species (oilfish, black escolar and other species are also caught). Incidental catches of seabirds may also occur in the southern latitudes and catches of sea turtles mainly in tropical areas. Bycatch levels are presumed high, mainly for sharks (shark fins or carcasses)**
- **Purse seine: shark species are caught in association with FAD or in coastal areas. Several species of finfish are also caught (dolphinfish, triggerfish, Lobotes spp., etc.). Sea turtles may also be caught on FAD sets. Bycatch levels are presumed moderate on FAD schools, very small on free-schools.**
- **Gillnet: shark species, rays (manta ray), and several other fish species are caught. Incidental catches of sea turtles and mammals may also occur**
- **Other (sport fishing): some species of sharks and other fish are caught.**

Fleets

- Longline:

Only fish species in all cases; no bycatch of seabirds or turtles available

  - Targeting swordfish:
    - Spanish LL operating in the Southwest IO; scientific estimates from observer data indicate that high amounts of sharks are caught
    - Australian LL operating in the Southeast IO; estimates are based on logbook data; data on discards is not verified and not raised
    - Several Taiwanese longliners are also targeting SWO; catch estimates come from logbooks being all shark species aggregated as SKH
  - Targeting sharks:
    - Several South African longliners target shark species, their catches available through logbooks
    - Several fresh-tuna longliners target sharks; the only data available come from port sampling and most species are aggregated as SKH
    - Several Taiwanese LL target sharks: Information is not available per species

Fleets (ii)

- Longline:
  - Targeting tropical tunas:
    - Fresh-tuna IDN, TWN: the amounts of bycatch estimated from port sampling are moderate; the estimates do not account for amounts discarded (only shark fins are kept for many shark species)
    - Deep-freeze (JPN, TWN, KOR, PHL, SYC): the amounts of bycatch are estimated from logbook data; data is incomplete and highly aggregated
    - Targeting temperate tunas (TWN, KOR, JPN): same as above deep-freeze; bycatch
- Gillnet:
  - Targeting tropical tunas and/or sharks:
    - Sri Lanka gillnet and longline fishery: shark species are targeted by using LL. Manta rays and other species are also caught. Depletion of shark species in waters around LKA has been noted (vessels operate on the high seas)

    The catches of species other than sharks or rays are not known.

Fleets (iii)

- Purse seine:

Only fish species when available; no bycatch of sharks or turtles available

  - EC, SYC and related, IRN and ex-SUN:
    - Catches of sharks on fishing on FAD are known to occur. No data is available so far. Sharks are not retained on board. Catches of other pelagic fish (dolphinfish, rainbow runner, etc) are also high on logs

- Other: Hand and troll lines, sport fishing and other artisanal gears; almost no catches of species other than tunas are available. Some fisheries target non-IOTC species (bycatch is IOTC species)

Availability of CE and SF data

- **CE Data are only available for some longline and gillnet fisheries, only for shark species. When available, the catches are usually incomplete and not per species**
- **SF data are seldom available**

Is it possible to estimate current levels of by-catch?

- **The existing data make it very difficult any attempt to raise estimates of the amount of bycatch species caught by the different fisheries because:**
  - **It is highly incomplete**
  - **There is scarce information per species**

Is there a way ahead?

- IOTC Observer programmes: 10% coverage expected. This is probably the most effective way to collect information on this species (a considerable portion of the catch might be discarded and this would only be available to observers)

- Port sampling/inspection: less effective but may help to identify fleets catching significant amounts of bycatch (i.e. vessels carrying shark carcasses or fins)

- Create specific forms for the reporting of incidental catches: this shall be done (IOTC Secretariat) although I would not be very optimistic about it. Many questionnaires on other subjects have already been sent with no much response