REPORT ON THE STATUS OF THE DATABASES HELD AT THE IOTC SECRETARIAT

NOMINAL CATCHES

The total catches of tropical tunas per country and fishing period are shown in Table 1. The large increase in the number of flags involved in the fishery in the lasts two decades in relation with those operated from 1950 to 1980 should be noted.

The three main reasons for this increase are:

- The arrival of industrial purse seine boats from the Atlantic and the Pacific Oceans in the early and mid-eighties, mainly EU, JPN and URSS-owned.
- The re-flagging of both longline and purse seine boats belonging to DWFN to "Flags of Convenience[1]" (FoC).
- The improvement in data collection and statistics that occurred in several riparian countries in recent years referring mainly to:
- Countries which only started reporting statistics on these three species to IOTC in recent years.
- Countries that improved their sampling systems in order to obtain more detailed information on the species breakdown of the catches.

These changes have had an impact of in the completeness and quality of the data for yellowfin, bigeye and skipjack tunas. Catches from 1950 to 1980 are still likely to be underestimated due to lack of reporting or to catches reported aggregated under an NEI category and those after 1980 are uncertain for some FoC fleets.

A thorough review of the IOTC NC database was conducted in the past year, which resulted in a general increase in the catches and countries involved in the fishery since 1950. The main sources consulted for this review were the FAO FishStat dataset and other data held by the Secretariat, mostly from IPTP. Although the review affected data mainly for seerfish and billfish, there was a slight increase in the catches of tunas (by about 6%). There was also an increase of 30% in the 1963 catches as the Japanese longline catches in the western Indian Ocean had not been added to the nominal catch database.

This revision process is still under way and more information will be possibly input to the IOTC databases in coming months.

It should also be noted that all new data reviews will have a quality code allocated which will permit to put aside series of data which the completeness and/or accuracy are not thought good, especially when the data is to be used for analysis. This revision will also be conducted with all records in the IOTC databases whenever there is enough information to flag the records which the quality is thought bad or uncertain.

TROPICAL TUNA CATCHES BY COUNTRY AND GEAR

The Tables 2 to 6 show the countries for which catches of tropical tunas have been reported or estimated, as well as the 1970-99 catch series for each species. The countries are sorted on the cumulated catches over the last ten years.

The quality of the data has varied over time because of several factors:

- **Unreported catches:** Several countries have no reported tropical tuna catches, especially in years prior to the late seventies or early eighties. This may have been due either to lack of data collection systems, small catches aggregated under an NEI category or statistics not made available to IPTP, IOTC or FAO.
- The catches of **NEI** deep-freezing tuna longliners and fresh tuna longliners fall also partially into this category, especially for years prior to 1998 in the first case (due to incompleteness of vessel records) and for ports other than those monitored by the Secretariat in the second.
- **Underestimated catches**: Tropical tunas are likely to be included in catches of tuna and tuna-like species which have been reported aggregated (Tables 5 and 6). India, Indonesia and Sri Lanka are the countries having reported the highest aggregated catches since 1970. As the two latter countries have important catches of tropical tunas, significant amounts of YFT, SKJ and BET are thought to be lost due to aggregation. In recent years, Sri Lanka has improved reporting by species.
- **Uncertain catches**: This category refers to unreported or aggregated catches which the Secretariat has estimated or assigned to tropical tuna species (sub-tables below Tables 2 (YFT) and 3 (BET)). Sources such as statistical bulletins, scientific papers and publications, reports from previous years, data collected from port sampling, vessel records, etc. are used to conduct such estimates. The accuracy of these estimates decreases for older source data. The Indonesian (1994-99) catches had to be assigned to species and gear from highly aggregated data

and NEI catches (1985-99) were fully estimated on the basis of the number of boats operating per year. Most of the uncertainty comes from longline fleets either operating under FoC flags or not monitored by the responsible flag authorities (as fresh tuna longliners flying different flags, mainly Taiwan, China). The IOTC sampling programs, already operating in Thailand, Malaysia and soon in Sri Lanka will probably fill the gaps regarding the small fresh tuna longliners. An improvement in the catch estimates of deep-freezing LL and industrial PS is also expected in the future as more information becomes available to the Secretariat regarding the vessel records and directly from PS owners.

The catches of tropical tunas by gear and year, from 1970 to 1999, aggregated into catches of coastal and long-distance fisheries, are displayed in tables 7 to 9. Aggregated catches (TUN and TUX) are shown in the Tables 10 and 11.

The gears are sorted on the catches cumulated during the last decade. Purse seines (YFT, BET and SKJ) and longlines (BET and YFT) are the most important gears as regards industrial fleets, while pole and lines (SKJ) and gill nets (SKJ and YFT) are the main artisanal gears.

Sources of inaccuracy in longline and purse seine records are due to the following:

Longline:

Indonesia: in the absence of reporting, catches from FAO have been used. The species are aggregated and catches not assigned to gears. The last year that reliable data are available to IOTC was 1994 and all estimates since then have been conducted on the basis of that year to break down the aggregated to species and gear. Although the Secretariat is aware of a rapid development in the Indonesian longline fishery in recent years, the share of the catch allocated to longlines is thought to be underestimated. In consequence, the species breakdown is also probably incorrect. BPPL, with CSIRO assistance, is sampling SBF landings and IOTC is envisaging a three-way cooperative sampling scheme to extend the species coverage and number of ports sampled.

NEI: A better estimate of the catches of NEI fresh and deep-freezing longliners have become possible since the IOTC sampling programmes and the Vessel Registry were implemented.

Purse Seine:

EU-owned: the 1997 to 1999 YFT, BET and SKJ catches are likely to be less accurate than those of previous years due to inadequate sampling on those fleets.

Singaporean-owned PS (ex-Russian) (1996-99): The catches of the ex-Russian boats have been estimated on the basis of several factors, including the catch composition of EU purse seiners. The accuracy of these estimates is therefore thought far from good.

TUN and TUX catches have been systematically reported under unclassified gears, although some tropical tunas might be caught by coastal purse seiners together with the neritic tunas that normally fall in these categories.

The situation regarding the reporting of nominal catches to IOTC is shown in Table 12. The partially and fully estimated catches in the tables would fall into the category Uncertain catches referred above.

YFT and **BET** catches were fully reported until the mid-eighties. The situation started worsening subsequently, especially due to the arrival of FoC fleets to the Indian Ocean. The figures falling after each table show that most of the uncertainty in catches come from longliners. Some 20% and 30% of the catches of YFT and BET, respectively have been estimated in recent years.

Between the 10% and 20% of the SKJ catches are somewhat uncertain in recent years, the gears concerned being especially bait boat, purse seine or unclassified gears.

CATCH AND EFFORT

The newly designed IOTC database accepts heterogeneous spatio-temporal aggregates. This has allowed the entry of CE and SF data which were not reported following IPTP standard formats. Several examples are the Maldivian, Pakistani, Malaysian and Iranian catch and effort and size frequency statistics which were reported on the basis of the places where the fish were landed. On the assumption that the fleets involved are mainly using artisanal gears fishing in proximity to the landing place, the catches can now be allocated to the often irregular areas exploited.

Catch and Effort Catalogues for YFT, BET and SKJ can be found in Charts 13 to 15. Dark bars have been used to indicate the presence of catch records in the IOTC Nominal Catch Database while light bars are used when catches are available from both the Nominal Catches and the Catch and Effort Databases.

The catch series are presented by the main gears (BB, GILL, LINE, LL, PS and OTHER) and flag. Cumulative catches for the period 1950-99 (from NCDB) are also shown in order to show the relative importance of the fleets involved in each fishery.

The catalogues only show the availability of NC and/or CE records but not the quality of the information concerned. More information about the quality of these records can be found in the charts 13b to 15b as well as in Table 22.

Bait boat: Maldives is the only country with important pole and line catches. Catch and effort records by month and atoll are available from 1970 to 1992, but only for the whole fishing area since then. CE records of BET are not available as the catches of this species are reported along with YFT catches (C. Anderson). Nevertheless, the amounts of BET caught by BB are thought negligible. Apart from this, the quality of the data is thought to be very good.

Gillnet: YFT and SKJ tunas are the species most caught by gillnets, particularly in Sri Lanka (SKJ and YFT), Iran

(YFT) and Pakistan (SKJ and YFT). Few catch and effort records are available for these countries in the IOTC database, especially in recent years, although CE data are probably collected, at least in Iran and Sri Lanka.

The main gear reported to catch tropical tunas in Sri Lanka is a combination of GILL and LL, although the LL are thought to catch mainly shark. CE statistics are collected in this country since the mid-eighties and are thought to be good.

It is recommended that these countries provide the statistics available to the IOTC, especially for recent years.

Line (hook, hand and troll lines): Catches of tropical tunas by lines are negligible if compared with other gears. Comoros and Maldives (SKJ and YFT) are the countries reporting most of the catches under these gears. Catch and effort records are available for Maldives since 1970, either by atoll (1970-92) or all aggregated (1993-99).

Longline: Most of the YFT and BET caught by longline have been historically reported under four flags, namely TWN, JPN, KOR and IDN. The catches of NEI boats (mainly TWN, BLZ, HND and EQG) are also worthy of mention, especially taking into account the sustained increase in the catches over the time since these fleets started operating in the mid-eighties.

CE statistics from TWN and JPN are available since the beginning of the fishery and the KOR CE records are available from 1975 to 1998 (the 1998 CE data are aggregated over the year, rather than by month)

Although the JPN and TWN CE statistics are thought reliable, those for 1980 (JPN) and from 1990 to 1992 (TWN) need to be reviewed as some inconsistencies were found during analysis of the data.

The KOR CE data, on the contrary, are considered somewhat unreliable as a lot of inconsistencies were found when comparing the catches in this dataset with those reported as NC. The KOR LO has not replied to any of the messages sent to him asking for clarification on this issue. The use of this dataset is therefore not recommended.

CE records are not available from IDN and NEI boats, although some general information is being retrieved in the scope of the IOTC sampling programmes. It is also thought that logbook data have been recorded in IDN in recent years, although IOTC has no information on the extent of these activities. The IDN authorities have so far failed to provide information to IOTC despite agreeing to do so.

Purse seine: PS statistics regarding EU, EU-NEI, JPN, LBR (ex-RUS), MUS and SYC fleets are almost fully available. Catches reported by other countries are either negligible (coastal PS mainly targeting neritic tunas) or highly incomplete (SUN CE records which only YFT catches were reported in short periods).

JPN SF statistics are available since 1952 for the YFT and since 1965 for BET. SF data have traditionally been reported by large areas (10x20) and quarter. The data reported are not raised and samples sizes can therefore be assessed for the period. It is important to note the serious decrease in the number of YFT and BET sampled on JPN LL. Sample sizes would be still lower if the data were reported following IOTC standards (5 degree square areas).

From 1997 to 1999, problems with sampling on EU, EU-NEI and SYC PS are likely to add uncertainty to the species composition of the catches during these years as the logbook records are raised to landing and the species breakdown obtained from sampling.

The CE records for JPN and LBR are also incomplete and the species breakdown not corrected as no sampling systems are implemented on those fleets.

Other gears (TRAW, UNCL, etc.): IDN and LKA (SKJ & YFT), and OMN (YFT) are the countries having reported the highest catches of tropical tunas not assigned to any gear. While the LKA and OMN catches are thought to come mostly from GILL, the IDN catches are most likely from trolling and pole and lining.

SIZE FREQUENCY

Size Frequency Catalogues for YFT, BET and SKJ can be found in Charts 13 to 15. As in the CE catalogues, dark bars indicate the presence of catch records in the NC DB and light bars the presence of SF statistics. SF data are missing, incomplete and often inaccurate for most countries.

Baitboat: Maldives recently reported a completely new size frequency series extending from 1983 to 1998. Size frequencies are usually reported by month and atoll. The quality of this dataset is thought very good.

Gillnet: Size frequency statistics are available for almost the same countries (IRN, IDN, PAK) and years reporting this gear. The lack of reporting in recent years needs to be assessed. Size frequencies have usually been reported by landing place and year. SF statistics are also thought to exist in other countries such as OMN and LKA. The LKA SF statistics reported under OTHER gears probably come from gillnets.

Line: No statistics are available regarding line fisheries at the Secretariat.

Longline: Only JPN, TWN and recently KOR have submitted SF statistics to the IOTC for LL fisheries.

TWN SF statistics are only available from 1985 to 1989. No statistics have been collected since then according to the TWN Liaison Officer.

KOR reported this year SF statistics for BET and YFT from 1990 to 1999. Nevertheless, the data have not been input yet to the IOTC DB due to the many inconsistencies found during the validation process. Many of the records reported include anomalous grids and/or periods. As was the case with the CE data, no response has yet been given to the many communications sent to KOR asking for clarification on this issue. The data will be on hold until these problems are solved.

Purse seine: SF statistics are only available for EU-owned and SYC fleets. No statistics have been collected in other fleets such as JPN and SUN/SGP.

Samples have traditionally been reported by 5 degree square area and quarter, raised to the total catches. It is important to remind at this stage the lower quality of the EU dataset since 1997 due to problems with sampling on those boats.

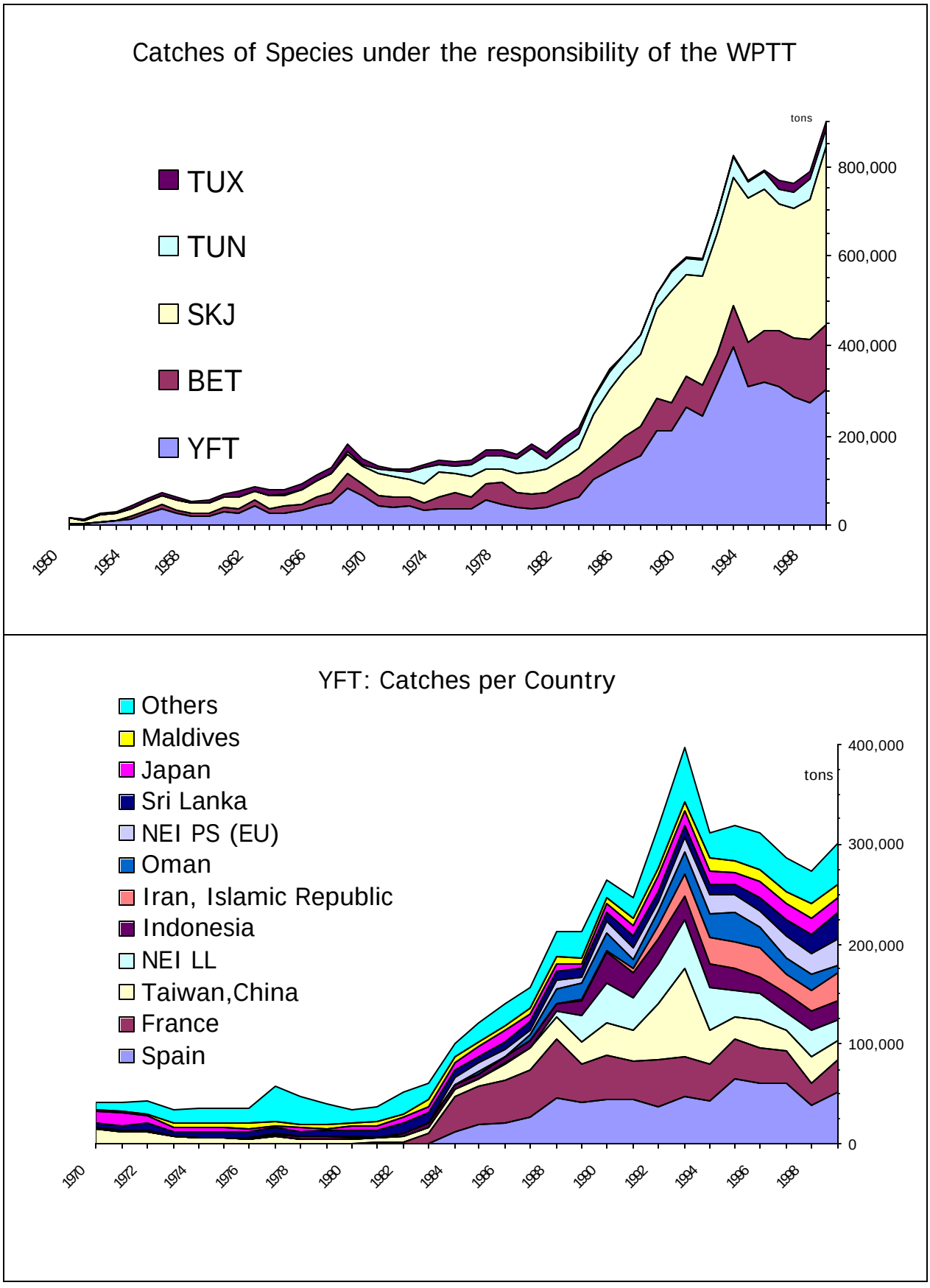
Other: No SF statistics are available, apart from the LKA YFT series from 1974 to 1981, probably from GILL. Statistics for this country are thought to exist for later years.

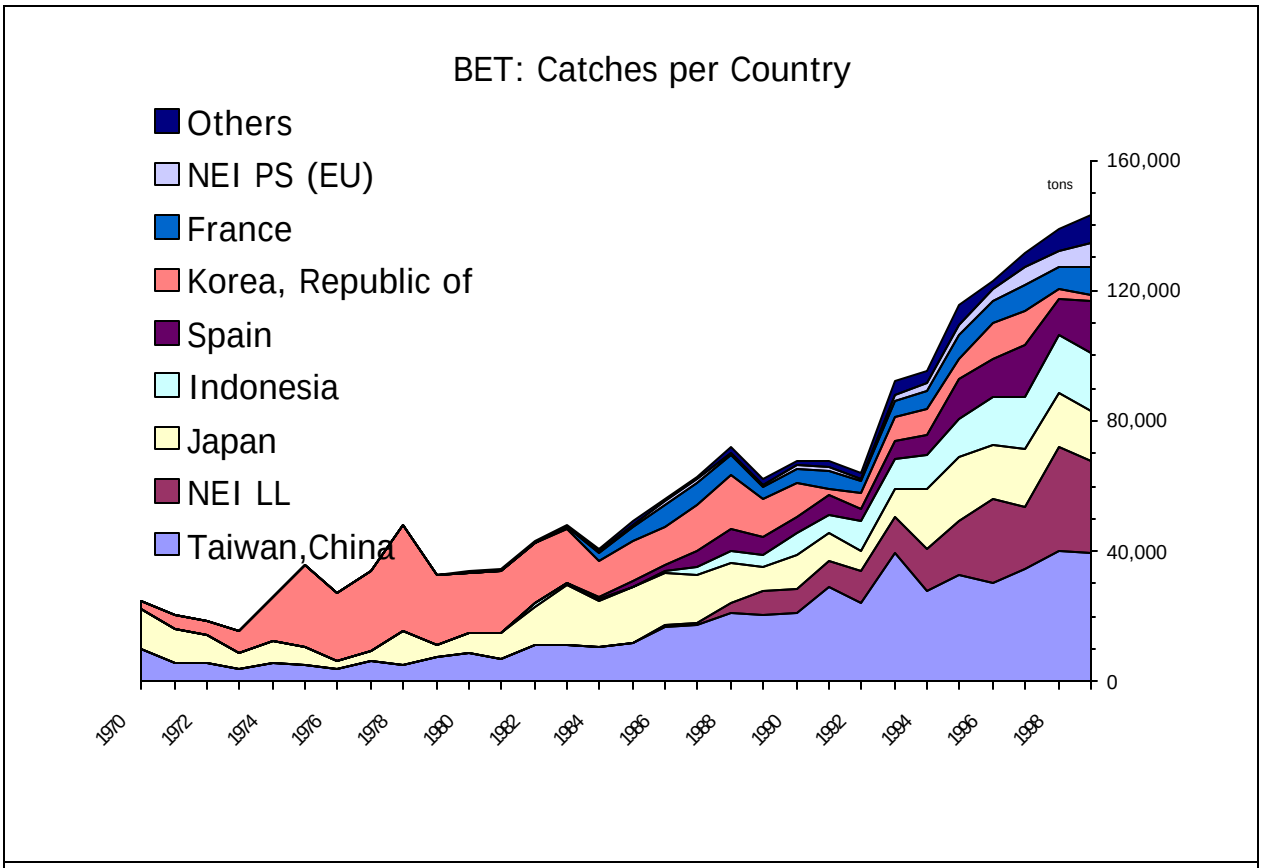
FISHING CRAFT STATISTICS

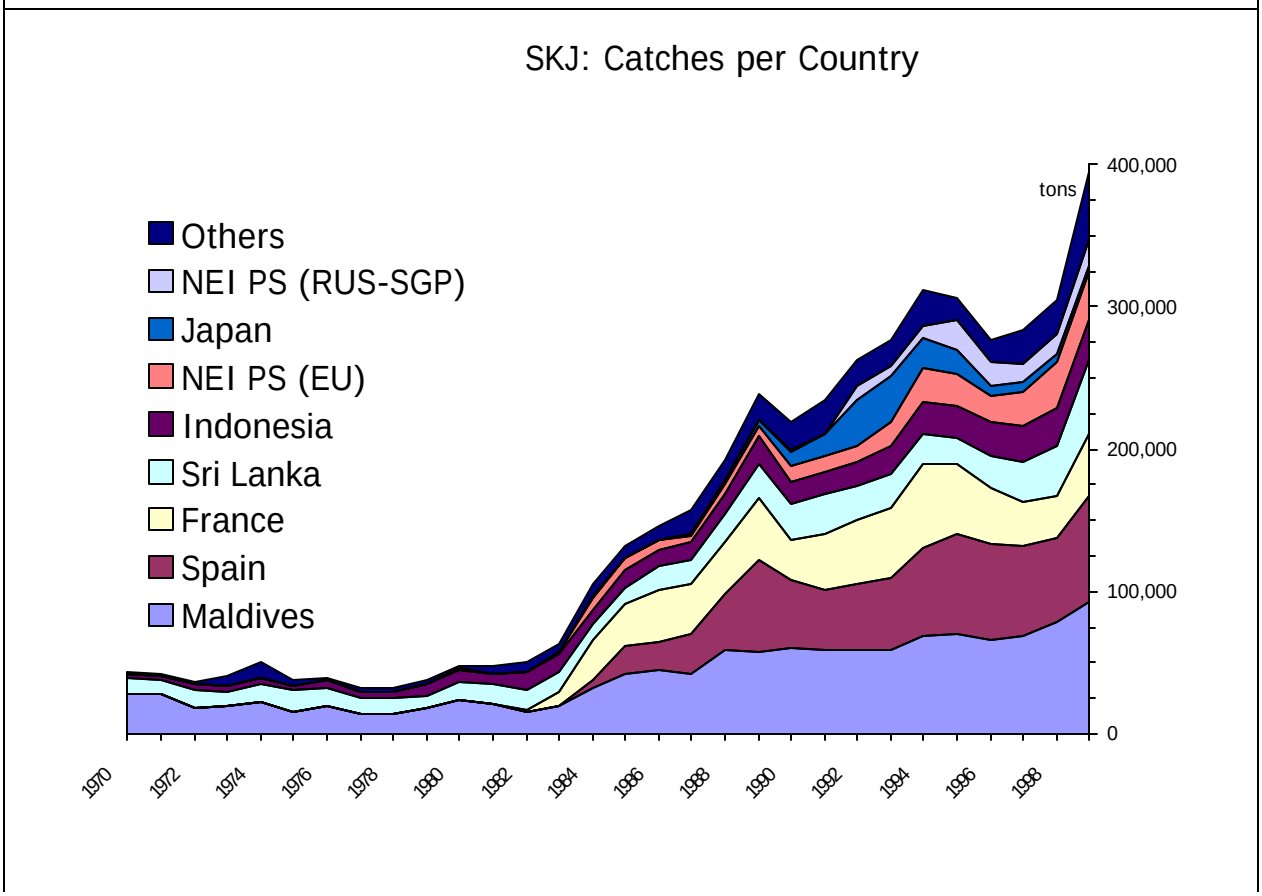
The number of vessels by Gear, Country, Size Category and Year reported to have operated in the Indian Ocean targeting tropical tunas can be seen in the Tables 19 and 20. Only BB, LL and PS fleets have been included as almost all tropical tuna catches fall into these three years.

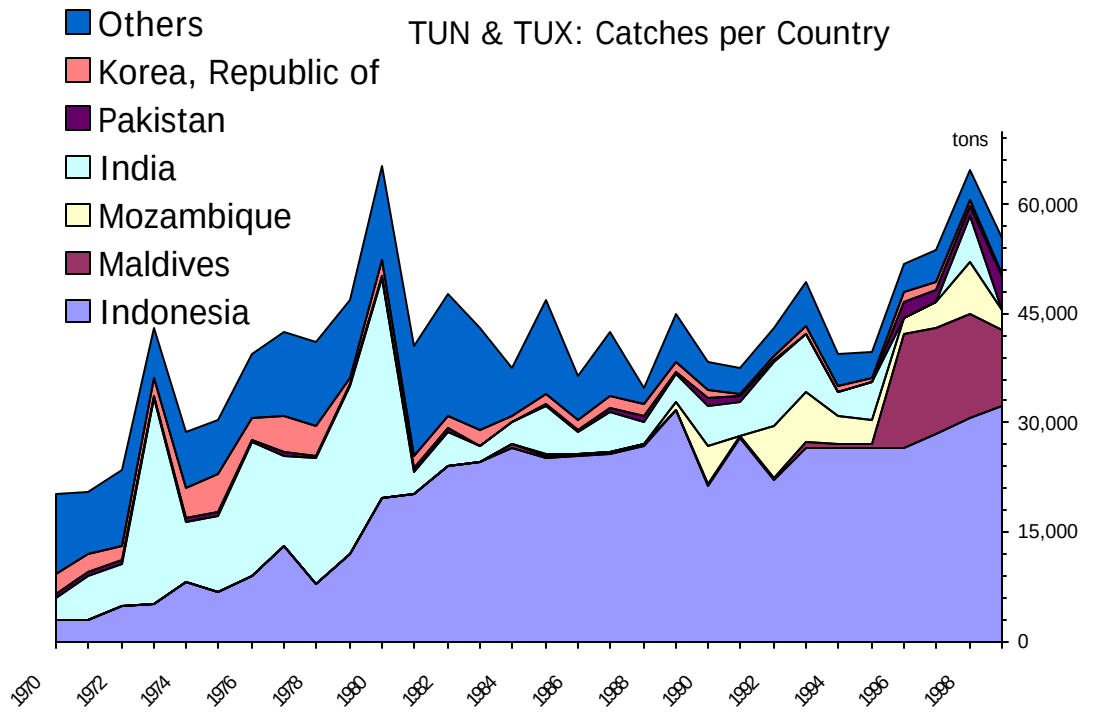
It is important to point out the high lack of records relying this database. The estimation on the number of boats become possible only in some cases which partial information exist on the fisheries concerned.

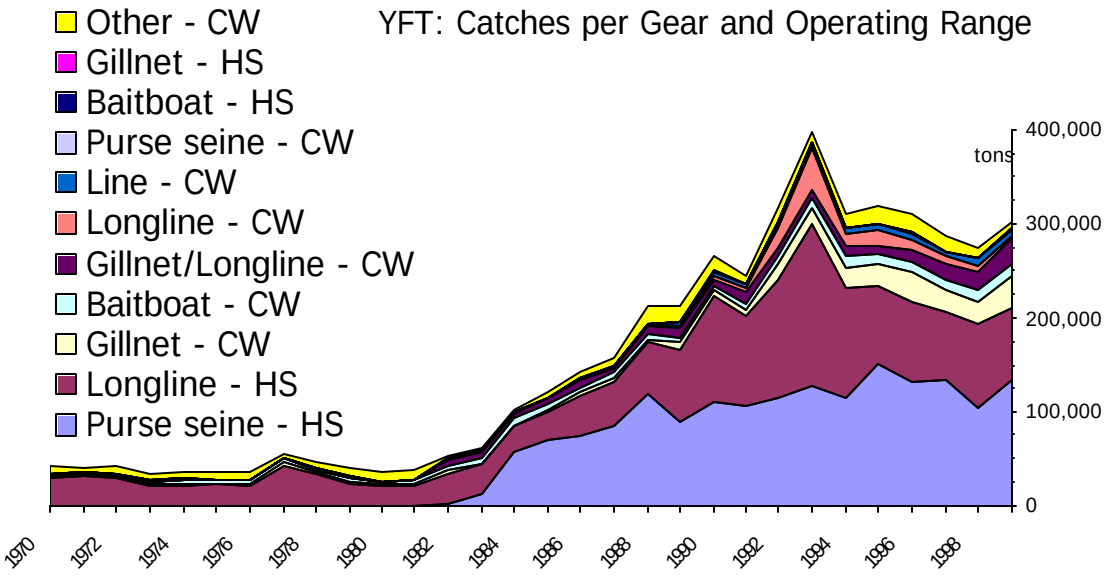
The Table 21 shows the comparative evolution of the most important fleets operating in the Indian Ocean, especially those which the target species are the WPTT species.


Catches of Species under the responsibility of the WPTT
tons
TUX
TUN
SKJ
BET
YFT
800,000
600,000
400,000
200,000
0
1950
1954
1958
1962
1966
1970
1974
1978
1982
1986
1990
1994
1998
YFT: Catches per Country
Others
Maldives
Japan
Sri Lanka
NEI PS (EU)
Oman
Iran, Islamic Republic
Indonesia
NEI LL
Taiwan,China
France
Spain
tons
400,000
300,000
200,000
100,000
0
1970
1972
1974
1976
1978
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998

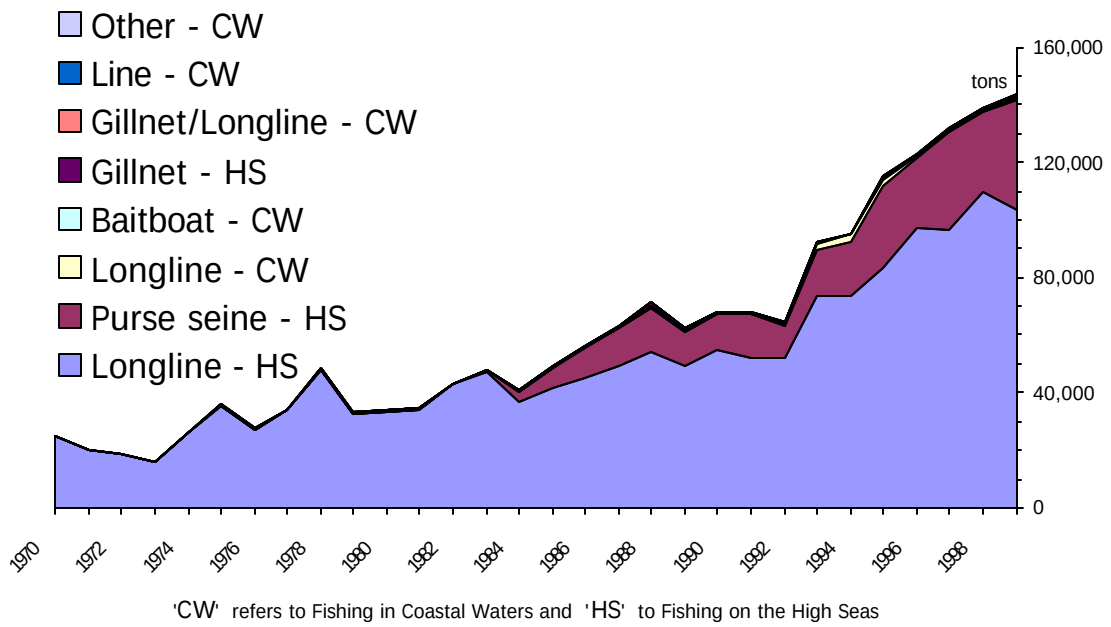

BET: Catches per Country
Others
NEI PS (EU)
France
Korea, Republic of
Spain
Indonesia
Japan
NEI LL
Taiwan,China
tons
160,000
120,000
80,000
40,000
0
1970
1972
1974
1976
1978
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998


SKJ: Catches per Country
Others
NEI PS (RUS-SGP)
Japan
NEI PS (EU)
Indonesia
Sri Lanka
France
Spain
Maldives
tons
400,000
300,000
200,000
100,000
0
1970
1972
1974
1976
1978
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998

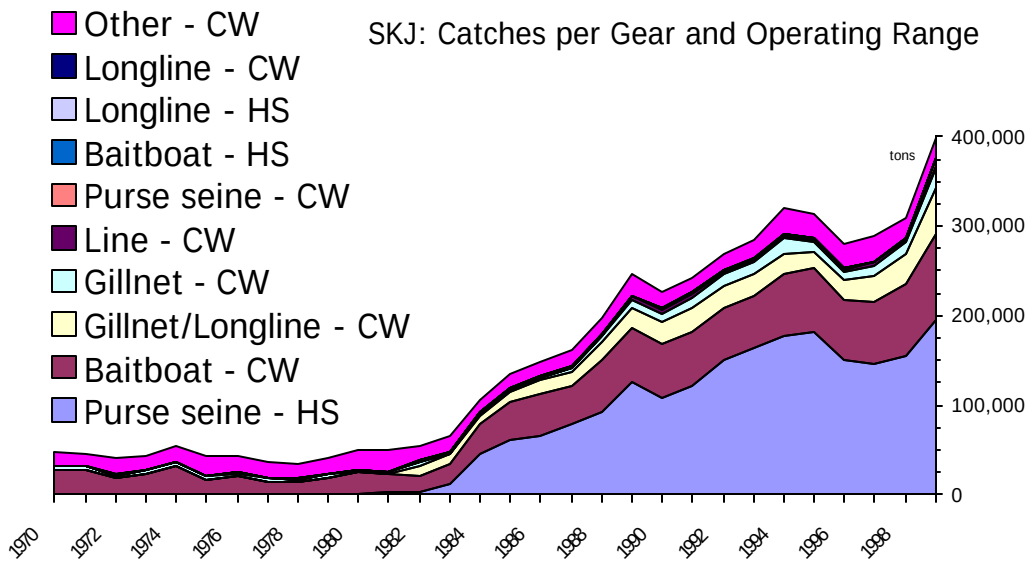




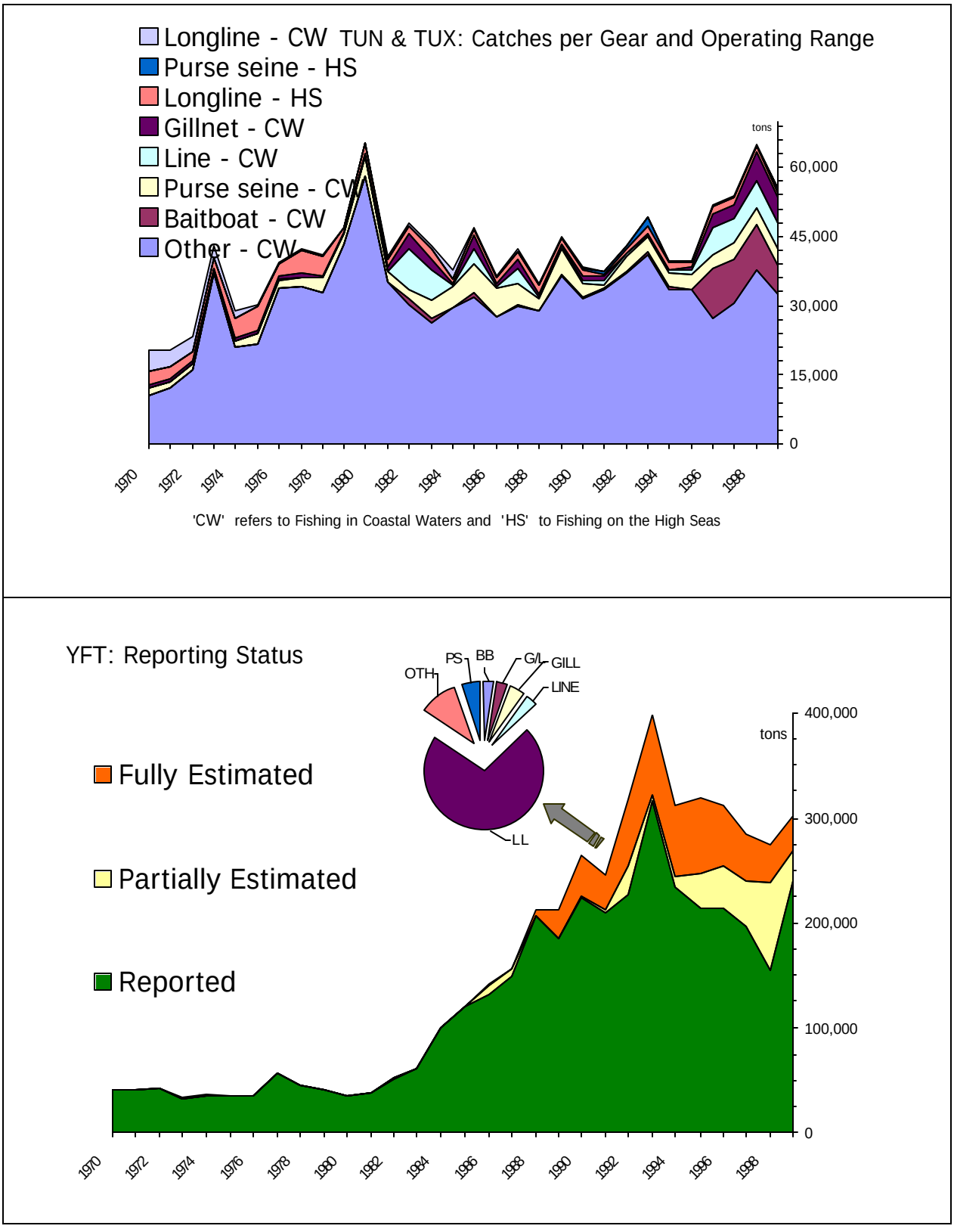
'CW' refers to Fishing in Coastal Waters and 'HS' to Fishing on the High Seas

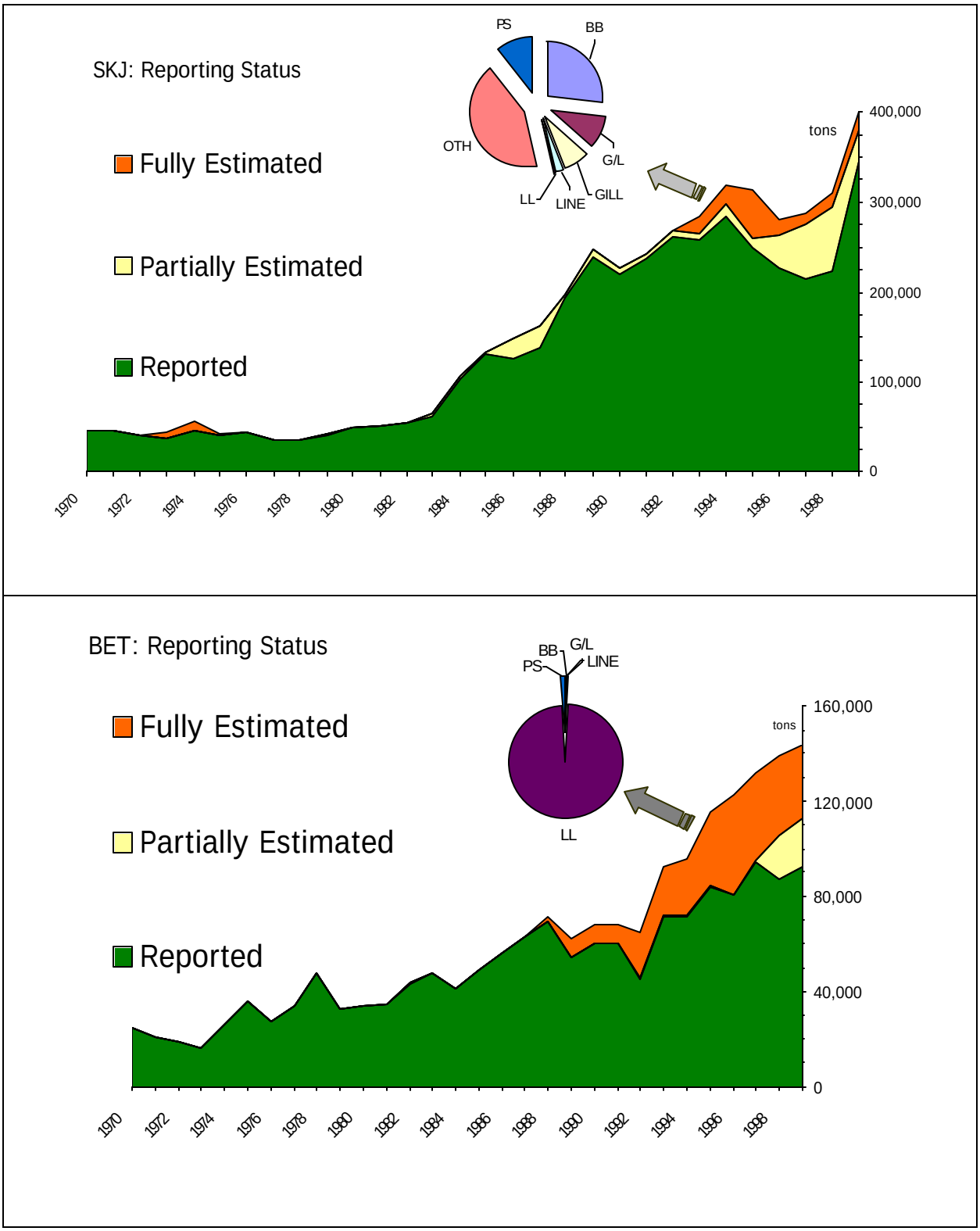


'CW' refers to Fishing in Coastal Waters and 'HS' to Fishing on the High Seas



'CW' refers to Fishing in Coastal Waters and 'HS' to Fishing on the High Seas


Longline - CW
Purse seine - HS
Longline - HS
Gillnet - CW
Line - CW
Purse seine - CW
Baitboat - CW
Other - CW
TUN & TUX: Catches per Gear and Operating Range
tons
60,000
45,000
30,000
15,000
0
1970
1972
1974
1976
1978
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
'CW' refers to Fishing in Coastal Waters and 'HS' to Fishing on the High Seas
YFT: Reporting Status
Fully Estimated
Partially Estimated
Reported
OTH
PS
BB
G/L
GILL
LINE
LL
tons
400,000
300,000
200,000
100,000
0
1970
1972
1974
1976
1978
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998


SKJ: Reporting Status
Fully Estimated
Partially Estimated
Reported
PS
BB
OTH
G/L
LL
LINE
GILL
tons
400,000
300,000
200,000
100,000
0
1970
1972
1974
1976
1978
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
BET: Reporting Status
Fully Estimated
Partially Estimated
Reported
BB
G/L
PS
LINE
LL
tons
160,000
120,000
80,000
40,000
0
1970
1972
1974
1976
1978
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998