Estimation of Catch-at-Size, Catch-at-Age and Total Catches per Area

IOTC Secretariat

Summary

This document…will have a summary

Rationale

The estimation of Catch-At-Size (CAS) and Catch-at-Age (CAA) has three main objectives:

- Input for stock assessment models (CASAL, ASPM or other)
- Build stock status indicators (e.g. trends in average weight per fishery)
- Create tables of total catches per fleet, species, gear, year, month and five degrees square areas (Tuna Atlas).

The construction of catch-at-size tables requires that length frequency distributions are assigned to all the nominal catches recorded for the species involved. Thus, the total weight estimated for all specimens recorded under the length classes making up each stratum (i.e. the weight resulting from summing up the weights estimated for the specimens within each length class) shall be equal to the nominal catches recorded for that stratum.

Species involved

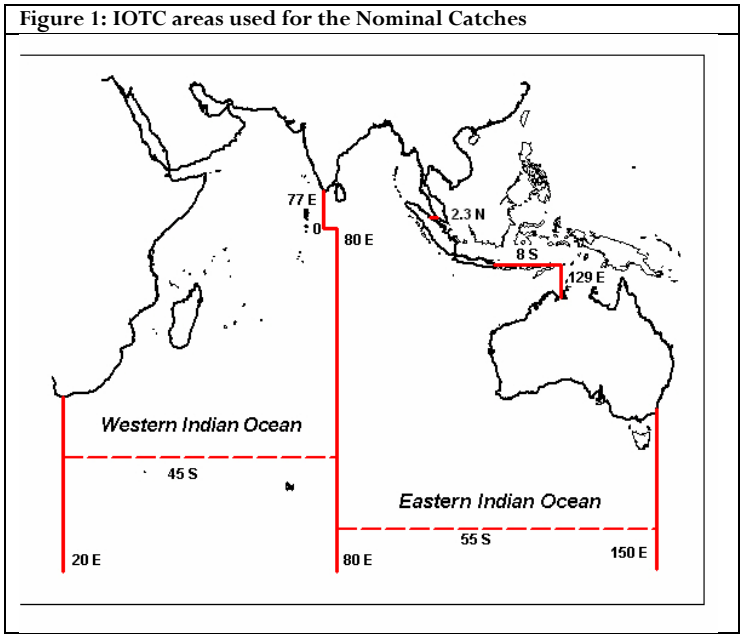
CAS tables are estimated for yellowfin tuna, bigeye tuna, skipjack tuna, albacore and swordfish. The estimation of CAS for species other than the above is not recommended due to the paucity of size data that are available.

Input Data

Three datasets are used for the estimation of CAS:

- *Nominal catches*: Total catch estimates per Species, Fleet, Year, Gear and IOTC Area (Figure 1). The data in this dataset issues from two different sources:
  a. Reports from the flag countries or reports from other countries on the catches of foreign vessels operating within its Economic Exclusive Zone or based in ports within its territory.
  b. Estimates carried out by the IOTC Secretariat: this may involve changes in the catches reported by the above or the estimation of catches for non-reporting fleets (e.g. catches recorded under the NEI[1] category).

Figure 1: IOTC areas used for the Nominal Catches



- *Catches per area* (from catch and effort): Catches (in tonnes or/and in number) are recorded per Species, Fleet, Year, Gear, Type of School, Time Interval (month or quarter usually) and area (usually 1 degree square areas

[1] Not elsewhere identified

for industrial purse seine fisheries, 5 degrees square areas for industrial longline fisheries and various regular or irregular areas for artisanal fisheries). Catches per area are not available for all Nominal catches strata. When recorded, the catches in these datasets might represent the total catches of the species in the year for the fleet and gear concerned or represent simply a sample of those.

- *Size data*: Size frequency data (standard or processed length or standard or processed weight) are recorded per Species, Fleet, Year, Gear, Type of School, Time Interval (month or quarter or year usually) and area (usually 5 degrees square areas for purse seine fisheries, 10 degrees latitude by 20 degrees longitude for longline fisheries and various regular or irregular areas for artisanal fisheries). Size data are not available for all Nominal catches strata. When recorded, the size data might represent the total catches of the species in the strata concerned or simply a sample of those.

The type of information recorded in each case is summarized in **Table 1** below:

Dataset	*Fishery Strata*	*Time Strata*	*Area Strata*	*Status*
Nominal Catches	Fleet-Gear (or gear aggregate)-Species (or species aggregate)	Year	IOTC Area	Complete record
Catches per area	Fleet-Gear (or gear aggregate)-Type of School (purse seine only)-Species	Month (quarter or year)	1°square area (purse seine) 5°square area (longline) Other regular or irregular areas	Sample
Size data	Species- Fleet-Gear (or gear aggregate)-Type of School (purse seine only)-Type of measurement (length or weight, standard or processed)-Size interval (between size classes)	Quarter (year or month)	5°square area (purse seine) 10°Lat.*20°Lon. area (longline) Other regular or irregular areas	Sample

Data Processing

Estimating total catches per species and gear

The catches in the IOTC nominal catches database are not recorded per species and/or per gear in all cases. The Secretariat conducted a review aiming at estimating catches when data were not available by species or gear in the IOTC database. This process is documented in a document presented to the WPTT in 2004 (IOTC-2004-WPTT-06).

Standardizing the data in the catch and effort table

The catches in the catch and effort table are recorded under different levels of aggregation. All the catches from this record were assigned per Species-Fleet-Gear-Type of School-Year-Month-5° square grid-Catch in number of fish-(and/or)-Catch in metric tons.

i. Area allocation: All the catches not recorded per 5° square areas were assigned to 5° square areas as follows:
   a. Allocation of catches recorded under irregular areas to regular grids: The catches recorded under irregular areas (e.g. port of unloading, fishing district, etc.) were assigned to regular grids. The areas assigned are shown in Appendix I.
   b. Aggregation of catches recorded under lower resolution areas: all catches recorded under areas smaller than the standard were accumulated under the corresponding 5° square areas.
   c. Disaggregation of catches recorded under higher resolution areas: all catches recorded under areas larger than the standard were evenly assigned per 5° square area.

ii. Time allocation: The catches not recorded per month were evenly assigned per month.

Standardizing the available size frequency data

The samples in the size frequency table are recorded under different levels of aggregation. The samples from this record were aggregated depending on the species and type of fishery. The level of aggregation chosen in each case is indicated below:

- Industrial purse seine fisheries: Species-Fleet-Gear-Type of School-Year-Quarter-Purse Seine Statistical Area-Fork length class (in centimetres)-Number of fish.
- Other fisheries (industrial longline plus all artisanal fisheries): Species-Fleet-Gear-Type of School-Year-Quarter-10o latitude by 20o longitude areas-Fork length class (in centimetres)-Number of fish.

The areas referred to above are shown in Figures 2 and 3.

Figure 2: Areas used for industrial purse seiners

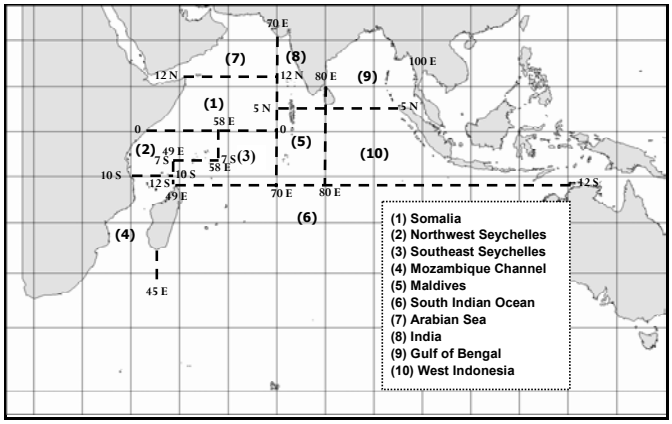
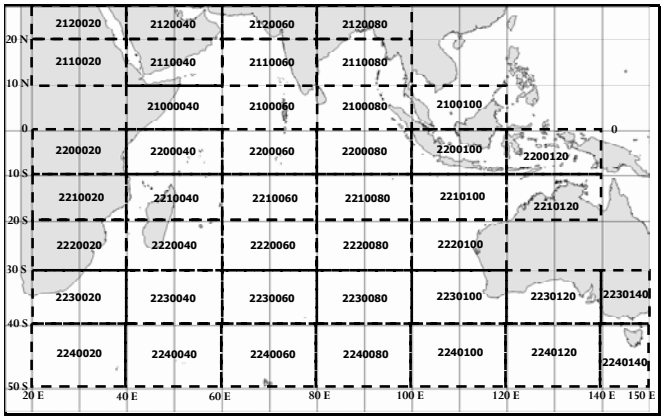


Figure 3: Areas used for other fisheries



Most of the size data recorded in the IOTC database for industrial longline fisheries (Japan, Taiwan,China) and industrial purse seine fisheries (EC, Seychelles and related vessels) refers to the areas shown above.
The intervals used between consecutive size classes were assigned depending on the species (Table 2).

Table 2: Standard length, first length, interval and total number of size classes used for tropical tuna species

Species	*Standard Length*	*First length (cm)*	*Interval between length classes (cm)*	*Total number of size classes*	*Maximum interval allowed (cm)*
Yellowfin tuna	Fork length	10	2	150	4
Bigeye tuna	Fork length	10	2	150	4
Skipjack tuna	Fork length	10	1	150	2

NOTE: All samples in the IOTC database were assigned according to the specifications above; the samples recorded under length intervals higher than the maximum interval specified above were deleted

The steps given to put the samples available for each species into standard form are indicated below:

i. Converting from non-standard measurement types into standard length (Table 3):
   a. Converting from weight into standard-length: The process used to estimate fork length from the gilled and gutted weights recorded for yellowfin tuna and bigeye tuna is documented in a separate document (insert reference to technical report).
   b. Converting from non-standard length into standard length: The regression equations indicated in Table 3 are used to estimate fork length from the lengths to the first dorsal fin recorded for yellowfin tuna and bigeye tuna, respectively (slicing).

Table 3: Regression equations used to convert from non-standard measurements into standard lengths, per species

Species: Yellowfin tuna

Type Measurement	*Equation*	*Parameters*	*Sample size*	*Size*	*Variance*	*Covariance ab*	*Mean Residual*	*Gradient*
Weight gilled and gutted[A]	$a*W^{b}$	a= 44.28699 b= 0.3008591	2,361	Min:14 Max:71	a=0.00752476509 b=2.86244E-07	-4.626246E-05	4.095958	a=3.033852 b=495.6385
Length to the base of the 1st dorsal fin[B]	$a*L^{b}$	a=1.9011 b=1.177	3,139	Min:10 Max:50				

Species: Bigeye tuna

Type Measurement	*Equation*	*Parameters*	*Sample size*	*Size*	*Variance*	*Covariance ab*	*Mean Residual*	*Gradient*
Weight gilled and gutted[A]	$a*W^{b}$	a= 42.2186 b= 0.3012349	316	Min:12 Max:107	a=0.0321755341 b=1.299934E-06	-0.0002034041	3.98137	a=3.03806 b=473.1455
Length to the base of the 1st dorsal fin[C]	$\frac{(L+a)^2}{(b)^2}$	a=21.45108 b=5.28756	2,858	Min:13 Max:48				

A: Data from Penang Sampling Programme (1992-93)
B: Data from the Atlantic Ocean, Caverivière (1976) (Fonteneau, A. et J. Marcille (eds), 1988: Ressources, pêche et biologie des thonidés tropicaux de l'Atlantique Centre-Est. FAO Doc.Tech.Pêches, (292), page 261)
C: Data from the Atlantic Ocean, Champagnat et Pianet (1974) (ibid. B)

ii. Assigning the existing fork lengths per standard length class interval:
   a. Aggregation of lengths recorded under classes lower than the standard class: all lengths recorded under classes lower than the standard were aggregated to the closest lower class (e.g. YFT specimens recorded under the classes 10-11 cm and 11-12 cm were accumulated under the length class 10).
   b. Disaggregation of lengths recorded under classes higher than the standard class: all the specimens recorded under length classes below the standard classes defined in table 2 above were evenly assigned per length class (e.g. 2/3 of the YFT specimens recorded under the length class 10-13 were assigned to the class 10-12 and 1/3 to the class 12-14). The samples recorded under length intervals over the maximum interval recorded in table 2 were deleted.

iii. Area allocation: All the samples not recorded per standard areas (see figure 2 and figure 3 above) were assigned to the corresponding areas as follows:
   a. Allocation of samples recorded under irregular areas to regular grids: The samples recorded under irregular areas (e.g. port of unloading, fishing district, etc.) were assigned to regular areas. The areas assigned are shown in Appendix I.
   b. Aggregation of samples recorded under lower resolution areas: all samples recorded under smaller areas were accumulated per area.
   c. Disaggregation of samples recorded under higher resolution areas: all samples recorded under larger areas were evenly assigned per area.

iv. Time allocation: The catches not recorded per quarter were aggregated or evenly disaggregated per quarter.

v. Estimation of sampled weight: The weight for each sample was calculated by adding the weights estimated for all the specimens making it. The equations used to estimate weight from the available lengths are shown in Table 4.

Table 4: Equations used to convert from standard (fork) length into round weight, per species

Species	*Gear Type/s*	*From type measurement – To type measurement*	*Equation*	*Parameters*	*Sample size*	*Length*
Yellowfin tuna	Purse seine Pole and Line Gillnet	<64cm Fork length – Round Weight(kg)[A]	RND=a*L^b	a= 0.0000531300 b= 2.75366	n/a	n/a
		>=64 cm Fork length – Round Weight(kg)[A]	RND=a*L^b	a= 0.0000158490 b= 3.04600		
	Longline Line Other Gears	Fork length(cm) – Gilled and gutted weight(kg)[B] Gilled and gutted weight(kg) - Round Weight(kg)[C]	GGT=a*L^b RND=GGT*1.13	a= 0.0000159207 b= 3.0415414023	15,133	Min:72 Max:177
Bigeye tuna	Purse seine Pole and Line Gillnet	Fork length(cm) – Round Weight(kg)[D]	RND=a*L^b	a= 0.000027000 b= 2.95100	n/a	n/a
	Longline Line Other Gears	Fork length(cm) – Gilled and gutted weight(kg)[B] Gilled and gutted weight(kg) - Round Weight(kg)[C]	GGT=a*L^b RND=GGT*1.13	a= 0.0000094007 b= 3.126843987	12,047	Min:70 Max:187
Skipjack tuna	All gears	Fork length(cm) – Round Weight(kg)[E]	RND=a*L^b	a= 0.0000074800 b= 3.25260	14,140	Min:32 Max:78

A: ***Montaudoin, Hallier and Hassani, IPTP TWS/90/48 (vol.4)***
B: Multilateral catch monitoring Benoa (2002-04)
C: ICCAT Field Manual (Appendix 4: Population parameters for key ICCAT species. Product Conversion Factors)
D: Cort (1986)
E: ***Data from the Atlantic Ocean,*** *Cayré et Laloë* ***(Fonteneau, A. et J. Marcille (eds), 1988: Ressources, pêche et biologie des thonidés tropicaux de l'Atlantique Centre-Est. FAO Doc.Tech.Pêches, (292)****, page262)*

Examples of the standard tables referred to above can be found in Appendix II.

Breaking the nominal catches per time and area (CTA)

The aim of this process is to break the catches recorded in the nominal catches table per time and area. This information is used:

- For the estimation of catch-at-size tables: The length distributions of tuna species may change depending on the area and/or time fished and therefore the estimation of catches-at-size is likely to be improved if this information is used.
- For the estimation of total catches per time and area for the Tuna Atlas.

The steps given to assign the catches available for each NC stratum per month and 5° square areas are indicated below:

i. Nominal catches strata for which catches per time and area (CTA) exist:
   a. Deleting strata from the catches per time and area table: The catches per time and area for NEI-(deep)-freezing longliners and NEI-fresh tuna longliners were not used because they refer to very specific areas and times and are not considered to cover all the areas of operation of these fleets. The catches for industrial purse seiners operating under the flag of the Soviet Union and other flags in recent times (NEI-ex-Soviet) were deleted for some years for the same reason.
   b. Breaking the nominal catches per time and area: The nominal catches were broken per time and area in years for which spatio-temporal catches are available for the fleet concerned.

ii. Nominal catches strata for which catches per time and area do not exist:
   a. Catches per area are available for the same fleet in years before or after the year concerned: The catches recorded in the five years closest to the year of reference were accumulated and the average values obtained used to break the catches per area in the year concerned. Data extending to up to 15 years above or below the year concerned are used.
   b. Catches per area are not available for the same fleet in years before or after the year concerned or they are available but very far in time (more than 15 years before or after the year concerned):
      i. Fleets that are presumed to operate as other fleets for which catches per area exist: This refers mainly to industrial fleets. The catches per area available for other fleets (and years) are used to break the nominal catches per month and 5 degrees square area/s.
         a. Catches per area for the alternative fleet are available for the same year: This information is used to break the nominal catches per time and area.
         b. Catches per area for the alternative fleet are not available for the same year: The same substitution scheme as the one defined in ii.a. above is used.

      The fisheries for which the above substitution scheme was used and the alternate fleets and gears selected for substitution in each case can be found in Appendix III.
      ii. Fleets that are presumed to operate in specific areas: This refers mainly to artisanal and semi-industrial fleets. One or more 5° square areas were assigned to each fleet. The areas assigned are shown in Appendix IV.
         a. Time-area catches exist for other fleets in the areas concerned: The nominal catches are broken per month and area according to the proportion that the catches available from other fleets make in the area/s concerned.
         b. Time-area catches do not exist for other fleets in the areas concerned: The catches for the fleet concerned are equally broken per month and area.

Estimating catches-at-size (CAS)

The aim of this process is to estimate length frequency distributions for each species, year and gear type. Thus, the accumulated weight estimated from the specimens making up the length frequency shall be the same than the total weight recorded in the stratum concerned and the weight issuing from all the strata shall be equal to the total catches recorded for the species in the year concerned. These data are used to estimate catches-at-age and other information used as input for stock assessment models.

The time-area resolution used for the estimation of catches-at-size depends on the gear type (see 'Standardizing the available size frequency data' above for details). The minimum sample size was set to 30 specimens. The samples made up by less than 30 fish were completed with specimens from other stratum/a till 30 or more specimens were attained.

The amount of length frequency data available is scarce for some fisheries and/or periods. The use of length frequency information from fleets and/or gears other than the one for which nominal catches are recorded is required in many cases. The substitution scheme used to assign length frequency data per time and area is explained below:

i. Length frequency data are available for the stratum concerned:
   a. Deleting samples from the length frequency table: The samples recorded for South Korea were not used because they are presumed very incomplete.
   b. Assigning the available length frequency distributions per strata: The remaining length frequency distributions were assigned per strata.

ii. Length frequency data are not available for the stratum concerned:
   a. Length frequency data are available within the year before or after the quarter concerned:
      i. Length frequency data are available for the same fleet and gear. Two substitution schemes are used depending on the gear type:

a. Industrial purse seiners: The areas defined in Figure 2 (page 3) are used. The following latitude and longitude are assigned to each area[2]:

PS Area	*Q-Lat-Lon*
(1) Somalia	1 00 040
(2) NW Seychelles	2 00 020
(3) SE Seychelles	2 00 060
(4) Moz. Channel	2 10 020
(5) Maldives	2 00 080

PS Area	*Q-Lat-Lon*
(6) S Indian Ocean	2 20 060
(7) Arabian Sea	1 20 040
(8) India	1 00 080
(9) Gulf of Bengal	1 00 100
(10) W Indonesia	2 00 100

b. Other gears: The areas defined in Figure 3 (page 3) are used. Two regions are identified:
   i. Areas below 10°S
   ii. Areas above 10°S

   The sizes of the specimens of yellowfin tuna and bigeye tuna seem to vary significantly depending on the latitude. The substitution scheme is therefore applied independently to each area (i.e. Length frequency data from areas below 10°S are not used for strata in the North and *vice versa*).

The substitution process is based on changes in time (quarter) and/or space (latitude and/or longitude). Below is an example of the first substitution steps. All steps are defined in the table presented in Appendix V.

Step	*Lat*	*Long*	*Qtr*	*Description*
1	0	0	-0.25	Length frequency data from the same area and previous quarter are used for substitution, if any
2	0	0	0.25	Length frequency data from the same area and following quarter are used for substitution, if any
3	0	-20	0	Length frequency data from the first area to the West and same quarter are used for substitution, if any
4	0	20	0	Length frequency data from the first area to the East and same quarter are used for substitution, if any
5	0	-20	-0.25	Length frequency data from the first area to the West and previous quarter are used for substitution, if any
!	!	!	!	!
764	0	120	1.00	Length frequency data from the area 120 degrees to the East and following year are used for substitution, if any
Note that the latitude and longitude defined above for industrial PS and those from the 10*20 grids for other fisheries are used				

ii. No length frequency data are available for the same fleet and gear: Information from other fleet/s is used. The length frequency data available from other fleets that are presumed to operate the same areas and/or use the same fishing techniques are used for substitution. The same substitution scheme in time and area is applied in each case. Three levels of aggregation are established. The complete substitution tables for each species are shown in Appendix VI. Below is an example of the substitution scheme:

CTA Strata			*Level Aggregation 1*		*Level Aggregation 2*		*Level Aggregation 3*	
Species	*Gear*	*Fleet*	*Gear Ag1*	*Fleet Ag1*	*Gear Ag2*	*Fleet Ag2*	*Gear Ag3*	*Fleet Ag3*
BET	LL	IND	LL	AG3	LL	AG2	LL	AG1
BET	LL	IRN	LL	AG2	LL	AG2	LL	AG1
BET	LL	JPN	LL	AG1	LL	AG1	LL	AG1
BET	LL	KOR	LL	AG1	LL	AG1	LL	AG1
BET	LL	NEI-DFRZ	LL	AG3	LL	AG2	LL	AG1
BET	LL	PHL	LL	AG3	LL	AG2	LL	AG1
BET	LL	SUN	LL	AG2	LL	AG2	LL	AG1
BET	LL	SYC	LL	AG3	LL	AG2	LL	AG1
BET	LL	THA	LL	AG1	LL	AG1	LL	AG1
BET	LL	TWN	LL	AG3	LL	AG2	LL	AG1

[2] Note that the substitution scheme is based on changes in time and/or space (latitude and/or longitude). The areas assigned are used for the substitution.

If no samples of bigeye tuna are recorded for the longline fishery of South Korea in the stratum concerned (or the sample is made up of less than 30 specimens) the samples available for South Korea and/or Japan and/or Thailand are aggregated. The substitution scheme defined in Appendix V applies also in this case. If no samples are available for the above fleets the second level of aggregation is used and the third level is used in the case that no samples are found.

b. No length frequency data are available within the year before or after the quarter concerned:
   i. Length frequency data are available for the same fleet in other years: The samples for the three years that are closest to the year concerned are used. Only the samples from the 25 years before or after the year concerned are used.
   ii. No length frequency data are available for the same fleet in other years or they are very far in time (more than 25 years ahead or behind the year concerned). The available length data for other fleets are used. The information from the fleets and gears specified in Appendix VI and the above substitution scheme (b.i.) apply in this case.
c. No Length frequency data are available for the gear concerned in the 25 years before or after the year concerned:
   i. Length frequency data are available for the same fleet and gear anytime at all: all available samples are used (i.e. the accumulated length frequency for the whole period is used).
   ii. No length frequency data are available for the same fleet and gear anytime at all: The available length data for other fleets are used. The information from the fleets and gears specified in Appendix VI and the above substitution scheme (c.i.) apply in this case.

The average weights estimated from the samples (by using the equations in Table 4) are used to estimate the number of specimens or the weight for each stratum in the CAS table:

- Longline fisheries: The catches are usually recorded in numbers. The average weights estimated from the sample are multiplied by the numbers of fish recorded (from the CTA table) to obtain the weights per stratum. This method is also used for fisheries for which only numbers of fish are recorded.
- Other fisheries: The catches are usually recorded in weight. The average weights estimated from the sample are divided by the weight recorded (from the CTA table) to obtain the numbers per stratum. This method is also used for longline fisheries for which only the weights are recorded.

The resulting weights are accumulated per fleet, gear, year, species and IOTC Area. The factor resulting from dividing the total catches estimated for the species (nominal catches) and those issuing from the CAS table is used to estimate total weight, total number of fish and number of fish per length class for each stratum in the CAS table.

Estimating total catches per area

The catches and numbers of fish in the CTA table are weighed by following the same approach (as explained in the last part of the previous section).

Estimation of catch-at-age tables

The catches-at-age for each species are estimated from the available catches-at-size. The estimation procedure is presented in a separate document (insert reference to technical report)

Results

Total catches per species

The total catches per species, gear type and year estimated from the process are shown in Appendix VII. **The catches estimates for 2005 are very preliminary** due to the paucity of the data available.

- Bigeye tuna: This species is caught by longliners, purse seiners and, to a lesser extent, bait boats and other artisanal fleets. The catches are likely to be of good quality. The total catches recorded in the IOTC database versus those estimated (disaggregation) are shown in Figures 4 and 5.

Figure 4: Total catches of bigeye tuna (BET) in the IOTC database (NCDB) *versus* those estimated for the WPTT (Disaggregation), per year (1950-2005).

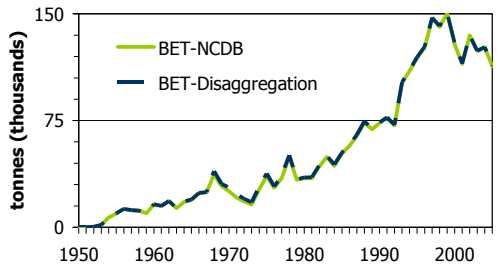
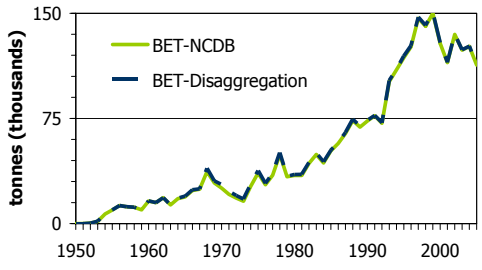


Figure 5: Catches of bigeye tuna (BET) recorded per gear in the IOTC database (NCDB) *versus* the total catches estimated for the WPTT (Disaggregation), per year (1950-2005).



- Yellowfin tuna: This species is caught by several industrial (PS, LL) and artisanal (GILL, BB, LINE) fleets. The total catches recorded in the IOTC database versus those estimated (disaggregation) are shown in Figures 6 and 7. The amount of catches of yellowfin tuna that is not reported per gear is of concern, mainly since the early 90's. The majority of these catches is presumed to refer to artisanal gears, mainly gillnets, hand lines and troll lines. The catches recorded under those gears are thought, for this reason, less accurate.

Figure 6: Total catches of yellowfin tuna (YFT) in the IOTC database (NCDB) *versus* those estimated for the WPTT (Disaggregation), per year (1950-2005).

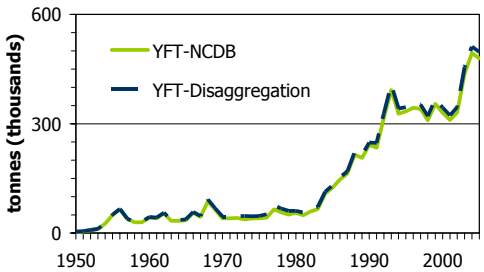
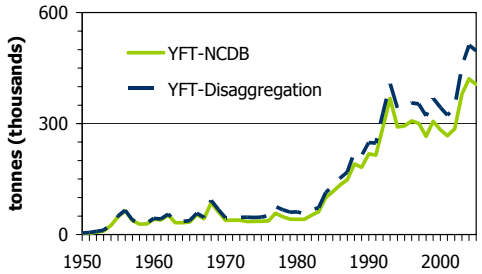


Figure 7: Catches of yellowfin tuna (YFT) recorded per gear in the IOTC database (NCDB) *versus* the total catches estimated for the WPTT (Disaggregation), per year (1950-2005).



- Skipjack tuna: This species is caught by industrial purse seiners and several artisanal fleets (GILL, BB, LINE and other). The total catches recorded in the IOTC database versus those estimated (disaggregation) are shown in Figures 8 and 9. The amount of catches of skipjack tuna that is not reported per species and/or gear is of concern. The total catches estimated for the species are thought less precise than those estimated for other tropical tunas. The majority of these catches is presumed to refer to artisanal gears, mainly gillnets, hand lines and troll lines. The catches recorded under those gears are thought, for this reason, less accurate.

Figure 8: Total catches of skipjack tuna (SKJ) in the IOTC database (NCDB) *versus* those estimated for the WPTT (Disaggregation), per year (1950-2005).

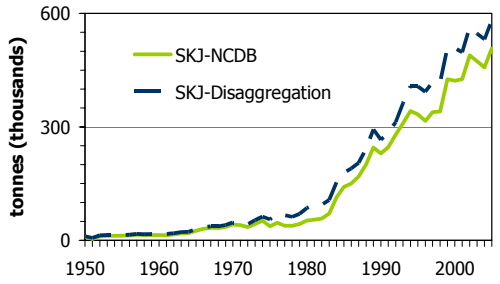
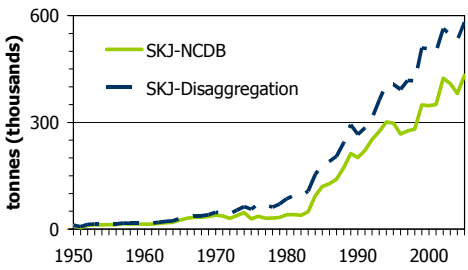


Figure 9: Catches of skipjack tuna (SKJ) recorded per gear in the IOTC database (NCDB) *versus* the total catches estimated for the WPTT (Disaggregation), per year (1950-2005).



Catch-at-size tables

CAS tables are estimated for yellowfin tuna, bigeye tuna and skipjack tuna. The precision of the estimates is likely to vary depending on the quality of the catches (see the above section), the availability of catches in time and space and the amount (coverage) and representativeness of the samples available.

- Bigeye tuna:

Completeness of time-area catches: The amount of catches that are available in time and space *versus* the total catches of bigeye tuna estimated are shown in the figures 10 to13 below. The amount of catches not available in time and space for longline fisheries is of concern making up between the 30-50% in recent years. This refers mainly to fleets operating under the flags of various non-reporting countries (NEI fleets). Almost no catches are available for 2005.

Figure 10: Total catches of bigeye tuna (BET) available in time and space *versus* the total catches recorded for the species (all gears combined).

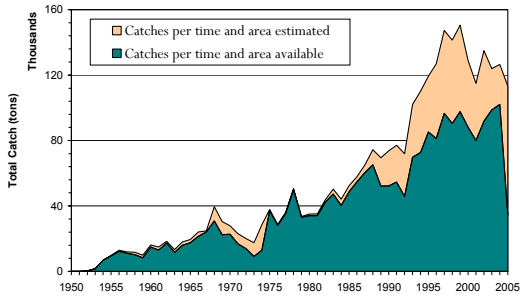


Figure 11: Total catches of bigeye tuna (BET) available in time and space *versus* the total catches recorded for the species (purse seine).

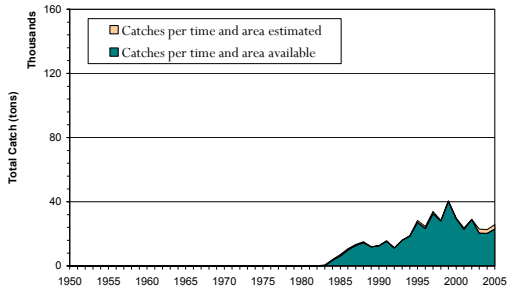


Figure 12: Total catches of bigeye tuna (BET) available in time and space *versus* the total catches recorded for the species (longline).

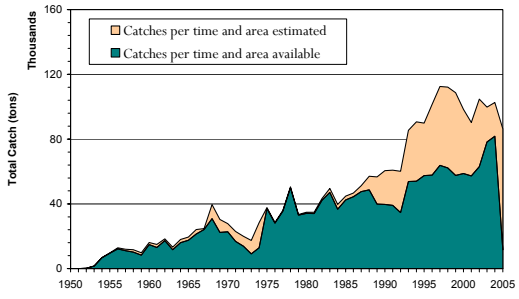
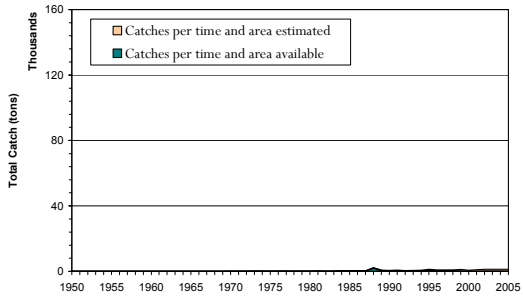


Figure 13: Total catches of bigeye tuna (BET) available in time and space *versus* the total catches recorded for the species (artisanal gears).



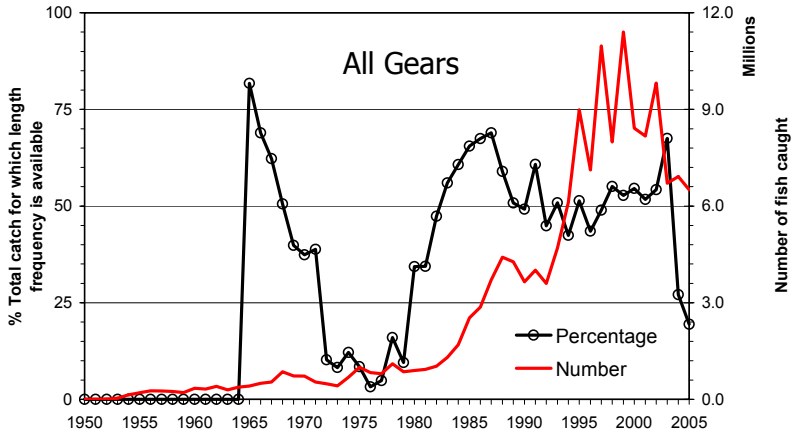
Completeness of length data: The catches estimated for strata having samples available *versus* the total catches estimated for the species per year is shown in Figure 14. The same information per gear is shown in Appendix VIII. The estimation of catches-at-size is thought less accurate:

- 1950-1964: No size data are available for the species.
- 1969-1981 and 2004-05: The amount of samples available is very low.

The lack of data is likely to affect in the estimation of CAS for longline fisheries during the referred periods.

The numbers of fish measured per strata in relation with the total numbers caught by several longline fisheries, mainly Japan, has been declining in recent years. The representativeness of the samples might be also compromised for this reason.

Figure 14: Total numbers of bigeye tuna (BET) estimated and proportion (in weight) estimated for strata having length frequency data (all gears combined).



- Yellowfin tuna:

Completeness of time-area catches: The amount of catches that are available in time and space *versus* the total catches of yellowfin tuna estimated are shown in the figures 15 to18 below. The amount of catches not available in time and space since the mid 80's for longline fisheries is of concern making up between 30-60% of the total catches estimated. Almost no catches are available for 2005. The coverage in time and space is also very low for most artisanal fisheries, notably gillnet, hand line and troll line. The lack of spatial coverage is likely to be important for fleets operating in island countries or in countries having a large coastline, notably Indonesia and Sri Lanka. The lack of coverage in time is likely to be important for fleets operating in regions with a marked seasonality, notably the countries in the Arabian Peninsula (Yemen, Oman, Iran, and Pakistan) and Indonesia.

Figure 15: Total catches of yellowfin tuna (YFT) available in time and space *versus* the total catches recorded for the species (all gears combined).

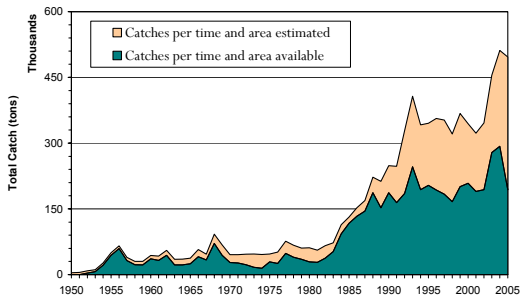


Figure 16: Total catches of yellowfin tuna (YFT) available in time and space *versus* the total catches recorded for the species (purse seine).

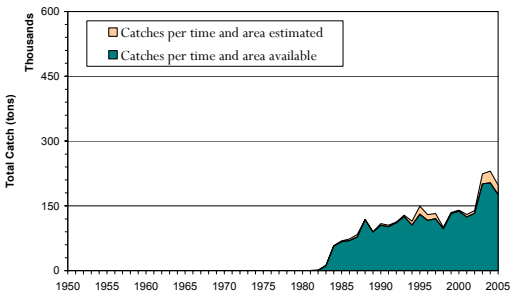


Figure 17: Total catches of yellowfin tuna (YFT) available in time and space *versus* the total catches recorded for the species (longline).

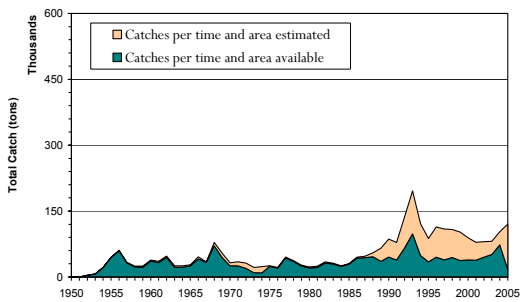
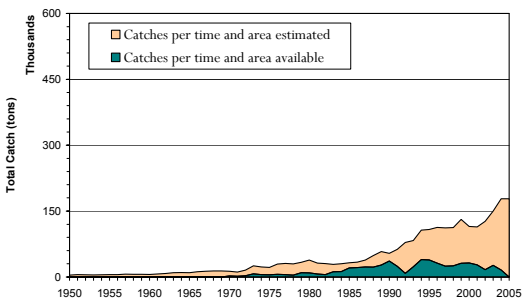


Figure 18: Total catches of yellowfin tuna (YFT) available in time and space *versus* the total catches recorded for the species (artisanal gears).



Completeness of length data: The catches estimated for strata having samples available *versus* the total catches estimated for the species per year is shown in Figure 19. The same information per gear is shown in Appendix VIII. The estimation of catches-at-size is thought less accurate for 1970-1982 and 2004-05 due to the paucity of the samples available.

This lack of data is likely to affect in the estimation of CAS for longline fisheries during the referred periods.

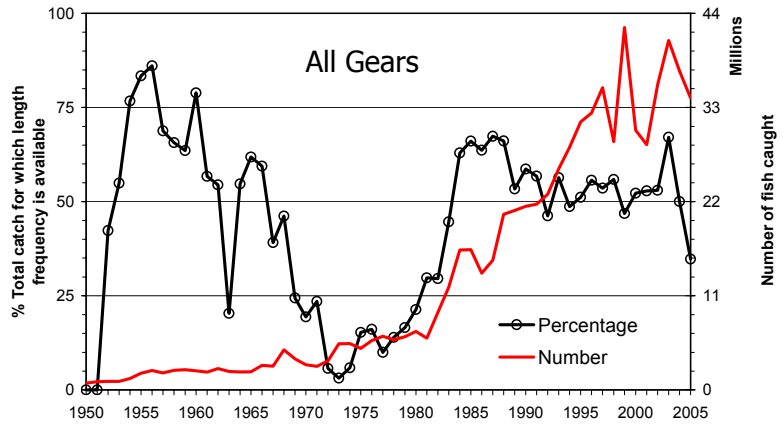
The numbers of fish measured per strata in relation with the total numbers caught by several longline fisheries, mainly Japan, has been declining in recent years. The representativeness of the samples might be also compromised for this reason.

The lack of length data for artisanal fisheries is of concern:

- Gillnet: No size data are available for 1950-1975. The amount of samples available is very low for other years or periods (1976-82, 1994-95, 2000-01).
- Pole and line: No size data are available for 1950-1980, 2000-02 and 2005.
- Hand lines and troll lines: there is an almost complete lack of samples for both gears.

The quality of the CAS estimated for the artisanal gears is likely to be highly compromised due to the above.

Figure 19: Total numbers of yellowfin tuna (YFT) estimated and proportion (in weight) estimated for strata having length frequency data (all gears combined).



- Skipjack tuna

Completeness of time-area catches: The amount of catches that are available in time and space *versus* the total catches of skipjack tuna estimated are shown in the figures 20 to 23 below. The amount of catches not available in time and space up to the early 80's (artisanal fisheries) and since the early 90's (notably gillnets) is of concern. The coverage in time and space is also very low for most artisanal fisheries, notably the gillnet.

Figure 20: Total catches of skipjack tuna (SKJ) available in time and space *versus* the total catches recorded for the species (all gears combined).

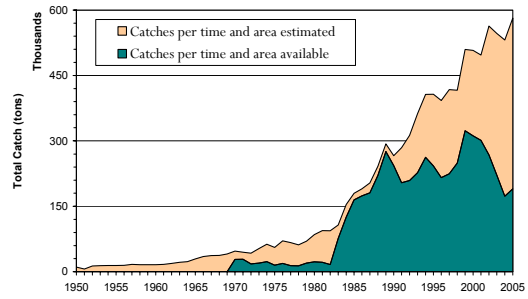


Figure 21: Total catches of skipjack tuna (SKJ) available in time and space *versus* the total catches recorded for the species (purse seine).

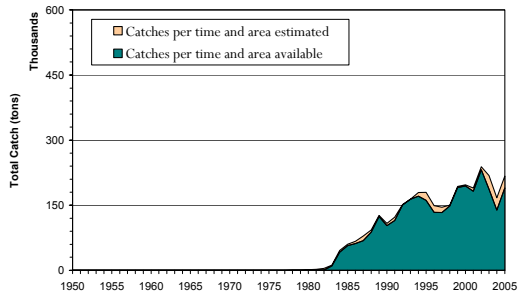


Figure 22: Total catches of skipjack tuna (SKJ) available in time and space *versus* the total catches recorded for the species (gillnet).

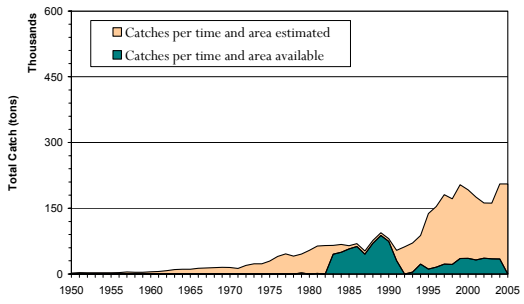
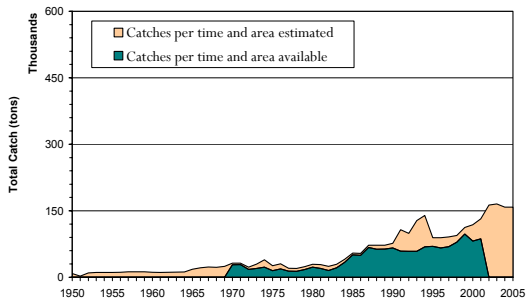
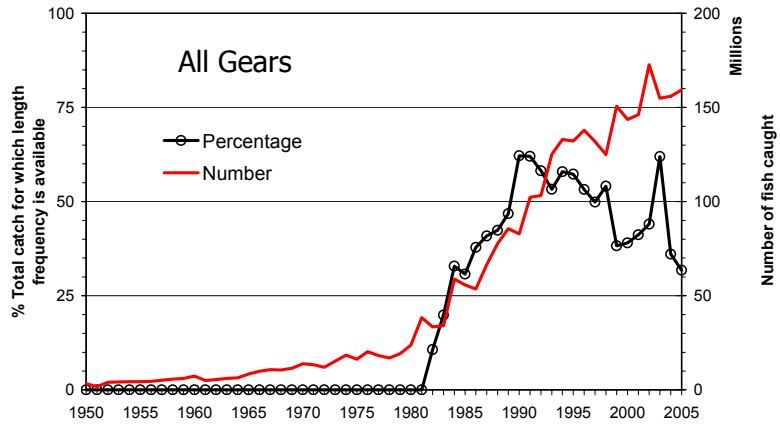


Figure 23: Total catches of skipjack tuna (SKJ) available in time and space *versus* the total catches recorded for the species (other artisanal gears).



Completeness of length data: The catches estimated for strata having samples available *versus* the total catches estimated for the species per year is shown in Figure 24. The same information per gear is shown in Appendix VIII. The estimation of catches-at-size is thought less accurate for 1950-1980 due to the paucity of the samples available. This lack of data is likely to affect in the estimation of CAS for all artisanal fisheries during the referred periods. The representativeness of the samples is unknown for most artisanal fisheries.
The quality of the CAS estimated for the artisanal gears is likely to be highly compromised due to the above.

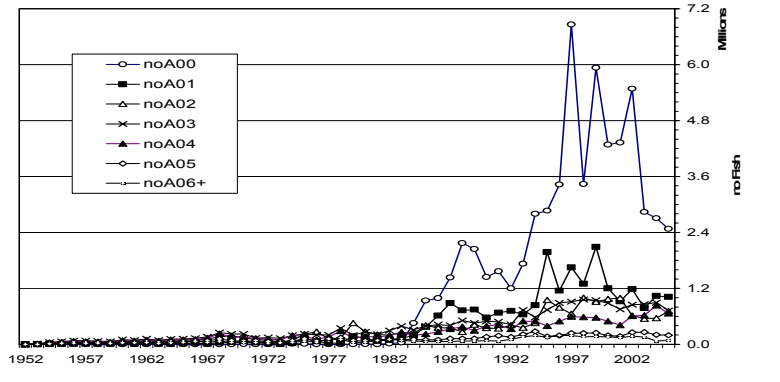
Figure 24: Total numbers of skipjack tuna (SKJ) estimated and proportion (in weight) estimated for strata having length frequency data (all gears combined).



Catch-at-age tables

Catches-at-age were only created for the bigeye tuna. The numbers of fish estimated per age class for industrial fisheries (longline and purse seine) are shown in Figure 25 (and Appendix IX). The estimation of catches-at-age is likely to be compromised for some fisheries and periods (see the previous section), notably for artisanal fisheries.

Figure 25: Total numbers of bigeye tuna (BET) estimated per age class (classes 6-18 are represented as 6+).



APPENDIX I
Areas allocated to catches and/or size frequency data not recorded under regular grids

CodeArea	Description	Grid Assigned
Custom grid for BIOT fishing areas (Chagos EEZ)		
BIOT	British Indian Ocean Territory EEZ	6205070
Custom grid for Indonesia landing places		
BACEH	Indonesia - Banda Aceh	6105095
BALI	Indonesia - Bali	6205115
PADANG	Indonesia - Padang	6200095
PELRATU	Indonesia - Pelabuhan Ratu	6205105
PRIGI	Indonesia - Prigi	6205110
Custom grid for Iran fishing areas		
ABADAN	Port of Abadan - Khouzestan	6125045
BANDAR	Port of Bandar - Abbas-Hormozgan	6125055
BERIS	Port of Beris - Sistan and Baluchistan	6125060
BUSHEHR	Port of Bushehr - Bushehr	6125050
BUSHRCOAST	Bushehr Area	6125050
DAYER	Port of Dayer - Bushehr	6125050
DEYLAM	Port of Deylam - Bushehr	6125050
GENAVEH	Port of Genaveh - Bushehr	6125050
HENDIJAN	Port of Hendijan - Khouzestan	6125045
HORMOZGAN	Hormozgan Area	6125050
IRAN	Iran Economic Exclusive Zone	2120040
JASK	Port of Jask - Hormozgan	6125055
KHOUZESTAN	Khouzestan Area	6125045
KOLAHI	Port of Kolahi - Hormozgan	6125055
LENGEH	Port of Lengeh - Hormozgan	6125050
MAHSHAHR	Port of Mahshahr - Khouzestan	6125045
NAKHLE	Port of Nakhle Taghi - Bushehr	6125050
OMANSEA	Oman Sea	1100030
POZM	Port of Pozm - Sistan and Baluchistan	6125060
QUISHM	Quishm Island- Hormozgan	6125055
RAMIN	Port of Ramin - Sistan and Baluchistan	6125060
SISTAN	Sistan Area	6125060
Custom grid for Malaysia Fishing Districts		
KEDAH	Malaysia-Kedah District	6100100
PENANG	Malaysia-Penang District	6100100
PERAK	Malaysia-Perak District	6100100
PERLIS	Malaysia-Perlis District	6105100
SELANGOR	Malaysia-Selangor District	6100100
Custom grid for Maldives Atolls		
ADDU	Addu - Seenu	5200073
ADDUHI	Addu - South hithadhoo - Seenu	5200073
ADDUMA	Addu - South maradhoo - Seenu	5200073
BAA	South Maalhosmadulu - Baa	5105072
DHKUDA	South Nilandhe - Dhaalu	5102072
FAADHI	Faadhippolhu - Lhaviyani	5105073
FELID	Felidhu Atholhu - Vaavu	5103073
FUVAHM	Fuvahmulah - Gnaviyani	5200073
GAVILI	North Huvadhu - Gaafu alifu	5100073
GAVILIKO	North Huvadhu - Kolamafushi - Gaafu Alifu	5100073
GAVILIVI	North Huvadhu -Gadhoo Villingili - Gaafu Alifu	5100073
GDHTHI	South Huvadhu - Gaafu Dhaalu	5100073
HDHKUL	South Thiladhunmathi - Haa Dhaalu	5106072
KMALE	Male Atholhu - Kaafu	5104073
KOLHUM	Kolhumadulu - Thaa	5102073
LMAAM	Hadhdhunmathi - Laamu	5101073
MALE	Male - Male	5104073
MMADU	Mulaku Atholhu - Meemu	5103073
NNILAN	North Nilandhe - Faafu	5103072
NRALIF	North Ari Atholhu - Alifu Alifu	5103072
NTHILA	North Thiladhunmathi - Haa Alifu	5106073
RALIF	Ari Atholhu - Alifu	5103072
RKAN	North Maalhosmadulu - Raa	5105072
SHAV	North Miladhunmathi - Shaviyani	5106073
SMILAD	South Miladhunmathi - Noonu	5105073
SRALIF	South Ari Atholhu - Alifu Dhaalu	5103072

CodeArea	Description	Grid Assigned
Custom grid for Omani landing places		
ALWUS	Al-Wusta	5120058
AWADU	Al-Wusta - Willayat A'Duqum	5120058
AWALJ	Al-Wusta - Willayat Al'Jazer	5120058
AWMAH	Al-Wusta - Willayat Mahut	5120058
BAKHA	Batinah - Willayat A'Khaburah	5125057
BAMUS	Batinah - Willayat A'Musanaa	5125057
BASUW	Batinah - Willayat A'Suwaiq	5125057
BATIN	Batinah	6120055
BBARK	Batinah - Willayat Barka	5125057
BLIWA	Batinah - Willayat Liwa	5125057
BSAHA	Batinah - Willayat Saham	5125057
BSHIN	Batinah - Willayat Shinas	5125057
BSOHA	Batinah - Willayat Sohar	5125057
DDHAL	Dhofar - Willayat Dhalkuit	5117056
DHOFA	Dhofar	6115050
DMIRB	Dhofar - Willayat Mirbat	5117056
DRHKU	Dhofar - Willayat Rhkuit	6115050
DSADA	Dhofar - Willayat Sadah	5117056
DSALA	Dhofar - Willayat Salalah	5117056
DSHHA	Dhofar - Willayat Shaleem&Halaniyat	5117056
DTAQA	Dhofar - Willayat Taqah	5117056
MMUSC	Muscat - Willayat Muscat	5124058
MMUTR	Muscat - Willayat Mutrah	5124058
MQURA	Muscat - Willayat Qurayat	5124058
MSEEB	Muscat - Willayat Seeb	5124058
MUBUK	Musadan - Willayat Bukha	5126057
MUDAB	Musadan - Willayat Dabba	5126057
MUKHA	Musadan - Willayat Khasab	5126057
MUSAD	Musandam	5126057
MUSCA	Muscat	5124058
OMAN	Omani EEZ	1100030
SHARQ	Sharqiyah	6120055
SJALA	Sharqiyah - Willayat Ja'laan	5121059
SMASI	Sharqiyah - Willayat Masirah	5121059
SSUR	Sharqiyah - Willayat Sur	5121059
Custom grid for Pakistan fishing areas		
PAKISTAN	Pakistan	3120060
Custom grid for Saudi Arabia fishing areas		
PERSIANGLF	Persian Gulf	2120040
REDSEA	Red Sea	1100030
SAUEEZ	Saudi Arabia Economic Exclusive Zone	1100030
Custom grid for Seychelles fishing areas		
SYCZEE	Seychelles Economic Exclusive Zone	3200050
Custom grid for Sri Lanka fishing areas		
BERU-TR5	Beruwala (SW) - Mechanised traditional orru	6105075
BERU-UN1	Beruwala (SW) - 5.5 - 7.2 m FRP dinghy	6105075
BERU-UN2	Beruwala (SW) - 8.8 - 9.8 m	6105075
BERU-UN2A	Beruwala (SW) - 8.8 - 9.8 m Single day boats	6105075
BERU-UN2B	Beruwala (SW) - 8.8 - 9.8 m Multi-day boats	6105075
BERU-UN3	Beruwala (SW) - 9.8 - 12.2 m	6105075
BERU-UN3A	Beruwala (SW) - 9.8 - 12.2 m	6105075
BERU-UN3B	Beruwala (SW) - Above 12.2m	6105075
CODB-UN2B	Codbay (NE) - 8.8 - 9.8 m Multi-day boats	6105080
DOND-UN1	Dondra (S) - 5.5 - 7.2 m FRP dinghy	6105080
DOND-UN2	Dondra (S) - 8.8 - 9.8 m	6105080
DOND-UN2A	Dondra (S) - 8.8 - 9.8 m Single day boats	6105080
DOND-UN2B	Dondra (S) - 8.8 - 9.8 m Multi-day boats	6105080
DOND-UN3	Dondra (S) - 9.8 - 12.2 m	6105080
DOND-UN3A	Dondra (S) - 9.8 - 12.2 m	6105080
DOND-UN3B	Dondra (S) - Above 12.2m	6105080
DOND-UN4	Dondra (S) - 15.2 - 18.3 m	6105080
GALL-UN1	Galle (SW) - 5.5 - 7.2 m FRP dinghy	6105075
GALL-UN2	Galle (SW) - 8.8 - 9.8 m	6105075

CodeArea	Description	Grid Assigned
Custom grid for Sri Lanka fishing areas (cont.)		
GALL-UN2A	Galle (SW) - 8.8 - 9.8 m Single day boats	6105075
GALL-UN2B	Galle (SW) - 8.8 - 9.8 m Multi-day boats	6105075
GALL-UN3	Galle (SW) - 9.8 - 12.2 m	6105075
GALL-UN3A	Galle (SW) - 9.8 - 12.2 m	6105075
GALL-UN3B	Galle (SW) - Above 12.2m	6105075
HAMB-UN1	Hambantota (SE) - 5.5 - 7.2 m FRP dinghy	6105080
HAMB-UN2A	Hambantota (SE) - 8.8 - 9.8 m Single day boats	6105080
HAMB-UN2B	Hambantota (SE) - 8.8 - 9.8 m Multi-day boats	6105080
KALM-UN1	Kalmunai (E) - 5.5 - 7.2 m FRP dinghy	6105080
KALM-UN2	Kalmunai (E) - 8.8 - 9.8 m	6105080
KALM-UN2A	Kalmunai (E) - 8.8 - 9.8 m Single day boats	6105080
KALM-UN2B	Kalmunai (E) - 8.8 - 9.8 m Multi-day boats	6105080
KALT-UN1	Kalmetiya SE) - 5.5 - 7.2 m FRP dinghy	6105080
KALT-UN2A	Kalmetiya SE) - 8.8 - 9.8 m Single day boats	6105080
KALT-UN2B	Kalmetiya SE) - 8.8 - 9.8 m Multi-day boats	6105080
KALT-UN3A	Kalmetiya SE) - 9.8 - 12.2 m	6105080
KAND-UN1	Kandakuliya (NW) - 5.5 - 7.2 m FRP dinghy	6105075
KAND-UN2	Kandakuliya (NW) - 8.8 - 9.8 m	6105075
KIRI-UN1	Kirinda (SE) - 5.5 - 7.2 m FRP dinghy	6105080
KIRI-UN2A	Kirinda (SE) - 8.8 - 9.8 m Single day boats	6105080
KIRI-UN2B	Kirinda (SE) - 8.8 - 9.8 m Multi-day boats	6105080
KIRI-UN3A	Kirinda (SE) - 9.8 - 12.2 m	6105080
KOTT-UN1	Kottegoda (S) - 5.5 - 7.2 m FRP dinghy	6105080
KOTT-UN2	Kottegoda (S) - 8.8 - 9.8 m	6105080
KOTT-UN2A	Kottegoda (S) - 8.8 - 9.8 m Single day boats	6105080
KOTT-UN3	Kottegoda (S) - 9.8 - 12.2 m	6105080
KUDA-TR5	Kudawela (SE) - Mechanised traditional orru	6105080
KUDA-UN1	Kudawela (SE) - 5.5 - 7.2 m FRP dinghy	6105080
KUDA-UN2	Kudawela (SE) - 8.8 - 9.8 m	6105080
KUDA-UN2A	Kudawela (SE) - 8.8 - 9.8 m Single day boats	6105080
KUDA-UN2B	Kudawela (SE) - 8.8 - 9.8 m Multi-day boats	6105080
KUDA-UN3	Kudawela (SE) - 9.8 - 12.2 m	6105080
KUDA-UN3A	Kudawela (SE) - 9.8 - 12.2 m	6105080
KUDA-UN3B	Kudawela (SE) - Above 12.2m	6105080
KUDA-UN4	Kudawela (SE) - 15.2 - 18.3 m	6105080
LKAE	East Area Sri lanka (E)	6105080
LKANE	Northeast Area Sri Lanka (NE)	6105080
LKANW	Northwest Area Sri Lanka (NW)	6105075
LKAS	South Area Sri Lanka (S)	6105080
LKASE	Southeast Area Sri Lanka (SE)	6105080
LKASW	Southwest Area Sri Lanka (SW)	6105075
LKAW	West Area Sri Lanka (W)	6105075
MALI-UN2A	Malikadu (E) - 8.8 - 9.8 m Single day boats	6105080
MALI-UN2B	Malikadu (E) - 8.8 - 9.8 m Multi-day boats	6105080

CodeArea	Description	Grid Assigned
Custom grid for Sri Lanka fishing areas (cont.)		
MIRI-TR5	Mirissa (S) - Mechanised traditional orru	6105080
MIRI-UN1	Mirissa (S) - 5.5 - 7.2 m FRP dinghy	6105080
MIRI-UN2	Mirissa (S) - 8.8 - 9.8 m	6105080
MIRI-UN2A	Mirissa (S) - 8.8 - 9.8 m Single day boats	6105080
MIRI-UN2B	Mirissa (S) - 8.8 - 9.8 m Multi-day boats	6105080
MIRI-UN3	Mirissa (S) - Above 9.8 m	6105080
MIRI-UN3A	Mirissa (S) - 9.8 - 12.2 m	6105080
MIRI-UN3B	Mirissa (S) - Above 12.2m	6105080
MIRI-UN4	Mirissa (S) - 15.2 - 18.3 m	6105080
MUTH-UN1	Muththur (NE) - 5.5 - 7.2 m FRP dinghy	6105080
NEGO-UN1	Negombo (W) - 5.5 - 7.2 m FRP dinghy	6105075
NEGO-UN2	Negombo (W) - 8.8 - 9.8 m	6105075
NEGO-UN2A	Negombo (W) - 8.8 - 9.8 m Single day boats	6105075
NEGO-UN2B	Negombo (W) - 8.8 - 9.8 m Multi-day boats	6105075
NEGO-UN3	Negombo (W) - Above 9.8 m	6105075
NEGO-UN3A	Negombo (W) - 9.8 - 12.2 m	6105075
NEGO-UN3B	Negombo (W) - Above 12.2m	6105075
NEGO-UN4	Negombo (W) - 15.2 - 18.3 m	6105075
SRIL	All Areas Sri Lanka (CA)	1100060
TANG-UN1	Tangalle (SE) - 5.5 - 7.2 m FRP dinghy	6105080
TANG-UN2	Tangalle (SE) - 8.8 - 9.8 m	6105080
TANG-UN2A	Tangalle (SE) - 8.8 - 9.8 m Single day boats	6105080
TANG-UN2B	Tangalle (SE) - 8.8 - 9.8 m Multi-day boats	6105080
TANG-UN3	Tangalle (SE) - 9.8 - 12.2 m	6105080
TANG-UN3A	Tangalle (SE) - 9.8 - 12.2 m	6105080
TANG-UN3B	Tangalle (SE) - Above 12.2m	6105080
TRIN-UN1	Trincomalee (NE) - 5.5 - 7.2 m FRP dinghy	6105080
TRIN-UN2	Trincomalee (NE) - 8.8 - 9.8 m	6105080
TRIN-UN2A	Trincomalee (NE) - 8.8 - 9.8 m Single day boats	6105080
TRIN-UN2B	Trincomalee (NE) - 8.8 - 9.8 m Multi-day boats	6105080
TRIN-UN3	Trincomalee (NE) - Above 9.8 m	6105080
TRIN-UN3A	Trincomalee (NE) - 9.8 - 12.2 m	6105080
TRIN-UN3B	Trincomalee (NE) - Above 12.2m	6105080
WELI-TR5	Weligama (S) - Mechanised traditional orru	6105080
WELI-UN1	Weligama (S) - 5.5 - 7.2 m FRP dinghy	6105080
WELI-UN2	Weligama (S) - 8.8 - 9.8 m	6105080
WELI-UN2A	Weligama (S) - 8.8 - 9.8 m Single day boats	6105080
WELI-UN2B	Weligama (S) - 8.8 - 9.8 m Multi-day boats	6105080
WELI-UN3A	Weligama (S) - 9.8 - 12.2 m	6105080
WELI-UN4	Weligama (S) - 15.2 - 18.3 m	6105080
Custom grid for Thai fishing areas		
ANDAM	Andaman Sea (Thai)	6105095
INOCE	Indian Ocean (Thai)	6105095

APPENDIX II
Examples of Standard Tables

a/ Nominal catches (NC)

ID	Fleet	EName	Area	Year	Gear	Species	CatchNC	CdeSubs
7461	AUS	Australia	IO_Eastern	1972	TROL	SKJ	100	1

Where:

Field	Description
ID	Unique identifier NC strata
Fleet	Fleet code
EName	Fleet description
Area	IOTC Area
Year	Year
Gear	Gear type code
Species	Species code
CatchNC	Total catch in tons
CdeSubs	Substitution code: original catches (0) or catches estimated (1)

b/ Catches per time-area stratum (CTA)

id	NCid	Species	Gear	School Type	Fleet	Year	Month Start	Month End	Grid	SF Area	IOTC Area	NO	MT	CE estimated
16287920	5360	YFT	PS	LS	FRA	2004	7	7	6210040	9210020	IO_Western		560	0

Where:

Field	Description
id	Unique identifier CTA strata
NCid	NC identifier (NC stratum to which each CTA stratum refers to)
Species	Species code
Gear	Gear type code
SchoolType	Type of school (used for industrial purse seine fisheries)
Fleet	Fleet code
Year	Year
Month	Month
Grid	5º square grid
SFArea	Length frequency data area (see figures 2 and 3) to which each CTA grid refers to
IOTC_Area	NC Area to which each CTA grid refers to
NO	Catch in number of fish (if available; required if MT is not available)
MT	Catch in metric tons (if available required if NO is not available)
CEestimated	Substitution code: original stratum (0) or stratum estimated (>0)

c/ Samples per time-area stratum (STA)

id	Species	Year	Quarter	Gear	Fleet	Grid	School type	SF no.Fish	SF mt.Fish	First Class Low	Size Interval	T001	…	T150
833327	YFT	2003	4	ELL	MUS	2210020	UNCL	128	5.753	10	2	0	…	0

Where:

Field	Description
id	Unique identifier STA strata
Species	Species code
Year	Year
Quarter	Quarter
Gear	Gear type code
Fleet	Fleet code
Grid	STA Areas (see figures 2 and 3)
Schooltype	Type of school (used for industrial purse seine fisheries)
SFnoFish	Number of fish in the sample
SFmtFish	Sampled weight (in tons)
FirstClassLow	First length class
SizeInterval	Interval between length classes
T001	Number of fish measured (1st length class)
……	Number of fish measured (2nd length class to 149th length class)
T150	Number of fish measured (150th length class)
SFestimated	Substitution code: original time-area-length class stratum (0) or time-area-length class stratum estimated (>0)

APPENDIX III

Industrial fleets for which no catches per time and area are available and alternate fleets whose data were used for substitution

Fleet Code	Fleet Name	Gear Code	IOTC Area	Year From	Year To	Alternate Fleet Code	Alternate Gear Code
FRAT	France-Territories	ELL	IO_Western	1998	2005	FRA-REU	ELL
FRAT	France-Territories	PS	IO_Western	2001	2002	FRA	PS
GIN	Guinea	ELL	IO_Western	2005	2005	JPN	LL
IND	India	LL	IO_Western	1983	1984	TWN	LL
IRN	Iran, Islamic Republic	LL	IO_Western	1976	2005	TWN	LL
IRN	Iran, Islamic Republic	PS	IO_Eastern	1996	1998	ESP	PS
IRN	Iran, Islamic Republic	PS	IO_Western	1992	2005	ESP	PS
JPN	Japan	PS	IO_Eastern	1977	1988	NEI-OTH	PS
JPN	Japan	PS	IO_Western	1983	1988	NEI-OTH	PS
KEN	Kenya	ELL	IO_Western	1980	1983	TWN	LL
MDV	Maldives	FLL	IO_Western	2002	2004	TWN	LL
MUS	Mauritius	ELL	IO_Western	2005	2005	JPN	LL
MUS	Mauritius	LL	IO_Western	1978	2000	TWN	LL
MUS	Mauritius	PS	IO_Western	1979	1979	NEI-OTH	PS
MYS	Malaysia	FLL	IO_Eastern	2002	2005	TWN	LL
NEI-DFRZ	NEI-Deep-freezing	ELL	IO_Eastern	2002	2005	ESP	ELL
NEI-DFRZ	NEI-Deep-freezing	ELL	IO_Western	2001	2005	ESP	ELL
NEI-DFRZ	NEI-Deep-freezing	LL	IO_Eastern	1985	2005	TWN	LL
NEI-DFRZ	NEI-Deep-freezing	LL	IO_Western	1985	2005	TWN	LL
NEI-DFRZ	NEI-Deep-freezing	TLL	IO_Western	2004	2005	TWN	LL
NEI-ICE	NEI-Fresh Tuna	FLL	IO_Eastern	1989	2005	TWN	LL
NEI-ICE	NEI-Fresh Tuna	FLL	IO_Western	1998	2000	TWN	LL
PAK	Pakistan	LL	IO_Western	1991	2000	TWN	LL
PHL	Philippines	LL	IO_Eastern	2005	2005	JPN	LL
PHL	Philippines	LL	IO_Western	2005	2005	JPN	LL
PRT	Portugal	LL	IO_Western	1998	2004	ESP	ELL
PRT	Portugal	LLD	IO_Eastern	2004	2004	ESP	ELL
PRT	Portugal	LLD	IO_Western	2004	2004	ESP	ELL
PRT	Portugal	SLL	IO_Western	2004	2004	ESP	ELL
SEN	Senegal	ELL	IO_Western	2003	2005	ESP	ELL
SUN	Soviet Union	LL	IO_Eastern	1977	1985	TWN	LL
SUN	Soviet Union	LL	IO_Western	1964	1990	TWN	LL
SUN	Soviet Union	PS	IO_Eastern	1985	1985	NEI-OTH	PS
SUN	Soviet Union	PS	IO_Western	1983	1984	NEI-OTH	PS
SYC	Seychelles	LL	IO_Eastern	1999	2005	TWN	LL
SYC	Seychelles	LL	IO_Western	1999	2005	TWN	LL
SYC	Seychelles	PS	IO_Western	1991	1992	NEI-OTH	PS
THA	Thailand	LL	IO_Eastern	2000	2005	JPN	LL
THA	Thailand	LL	IO_Western	2001	2005	JPN	LL
THA	Thailand	PS	IO_Eastern	2000	2005	JPN	PS
THA	Thailand	PS	IO_Western	2005	2005	NEI-OTH	PS
TWN	Taiwan,China	FLL	IO_Eastern	2001	2005	TWN	LL
TWN	Taiwan,China	FLL	IO_Western	2001	2005	TWN	LL
ZAF	South Africa	SLL	IO_Western	1997	2000	TWN	LL
ZAF	South Africa	TLL	IO_Western	2005	2005	JPN	LL

APPENDIX IV

Areas of operation assigned to fleets for which no catches per time and area are available

NC strata with no CE				
Fleet	Gear	Area	YearFirst	YearLast
Australia	BB	IO_Eastern	1982	1990
	GILL	IO_Eastern	1992	2004
	HAND	IO_Eastern	1989	2004
	PS	IO_Eastern	1981	1988
	TROL	IO_Eastern	1972	1999

NC assigned to Areas			
Area	Area	Area	Area
108 - {6210120}	161 - {6225110}	204 - {6235110}	211 - {6235145}
109 - {6210125}	180 - {6230110}	205 - {6235115}	236 - {6240140}
125 - {6215110}	181 - {6230115}	206 - {6235120}	237 - {6240145}
126 - {6215115}	182 - {6230120}	207 - {6235125}	262 - {6245140}
127 - {6215120}	183 - {6230125}	208 - {6235130}	263 - {6245145}
143 - {6220110}	184 - {6230130}	209 - {6235135}	
144 - {6220115}	185 - {6230135}	210 - {6235140}	

NC strata with no CE				
Fleet	Gear	Area	YearFirst	YearLast
Bahrain	GILL	IO_Western	1976	1980

NC assigned to Areas			
Area	Area	Area	Area
59 - {6125050}	60 - {6125055}		

NC strata with no CE				
Fleet	Gear	Area	YearFirst	YearLast
Bangladesh	HAND	IO_Eastern	1985	1985

NC assigned to Areas			
Area	Area	Area	Area
54 - {6120085}	55 - {6120090}		

NC strata with no CE				
Fleet	Gear	Area	YearFirst	YearLast
Comoros	HAND	IO_Western	1950	2004
	TROL	IO_Western	1979	2004

NC assigned to Areas			
Area	Area	Area	Area
92 - {6210040}	93 - {6210045}		

NC strata with no CE				
Fleet	Gear	Area	YearFirst	YearLast
Djibouti	GILL	IO_Western	1983	2004

NC assigned to Areas			
Area	Area	Area	Area
25 - {6110040}			

NC strata with no CE				
Fleet	Gear	Area	YearFirst	YearLast
East Timor	GILL	IO_Eastern	1999	2004
	HAND	IO_Eastern	1999	2004
	TROL	IO_Eastern	2000	2004

NC assigned to Areas			
Area	Area	Area	Area
108 - {6210120}	109 - {6210125}		

NC strata with no CE				
Fleet	Gear	Area	YearFirst	YearLast
France-Reunion	HAND	IO_Western	1998	2004
	TROL	IO_Western	1950	2004

NC assigned to Areas			
Area	Area	Area	Area
113 - {6215050}	114 - {6215055}	131 - {6220050}	132 - {6220055}

NC strata with no CE				
Fleet	Gear	Area	YearFirst	YearLast
France-Territories	HAND	IO_Western	1995	2004
	TROL	IO_Western	1995	2004

NC assigned to Areas			
Area	Area	Area	Area
92 - {6210040}	93 - {6210045}		

NC strata with no CE				
Fleet	Gear	Area	YearFirst	YearLast
India	BB	IO_Western	1992	2004

NC assigned to Areas			
Area	Area	Area	Area
19 - {6105070}	31 - {6110070}	32 - {6110075}	

NC strata with no CE				
Fleet	Gear	Area	YearFirst	YearLast
India	GILL	IO_Eastern	1950	2004
	HAND	IO_Eastern	1985	2004
	PSS	IO_Eastern	1950	1990
	TROL	IO_Eastern	1991	2004

NC assigned to Areas			
Area	Area	Area	Area
20 - {6105075}	33 - {6110080}	44 - {6115080}	54 - {6120085}
23 - {6105090}	35 - {6110090}	45 - {6115085}	

NC strata with no CE				
Fleet	Gear	Area	YearFirst	YearLast
India	GILL	IO_Western	1950	2004
	HAND	IO_Western	1991	2003
	TROL	IO_Western	1992	2003

NC assigned to Areas			
Area	Area	Area	Area
31 - {6110070}	32 - {6110075}	43 - {6115070}	53 - {6120070}

NC strata with no CE				
Fleet	Gear	Area	YearFirst	YearLast
Indonesia	LL	IO_Eastern	1973	2004

NC assigned to Areas			
Area	Area	Area	Area
71 - {6200085}	90 - {6205110}	108 - {6210120}	140 - {6220095}
72 - {6200090}	91 - {6205115}	109 - {6210125}	141 - {6220100}
73 - {6200095}	103 - {6210095}	122 - {6215095}	142 - {6220105}
86 - {6205090}	104 - {6210100}	123 - {6215100}	158 - {6225095}
87 - {6205095}	105 - {6210105}	124 - {6215105}	159 - {6225100}
88 - {6205100}	106 - {6210110}	125 - {6215110}	160 - {6225105}
89 - {6205105}	107 - {6210115}	126 - {6215115}	

NC strata with no CE				
Fleet	Gear	Area	YearFirst	YearLast
Indonesia	BB	IO_Eastern	1950	1993
	GILL	IO_Eastern	1950	1967
	HAND	IO_Eastern	1950	2004
	TROL	IO_Eastern	1950	1969

NC assigned to Areas			
Area	Area	Area	Area
12 - {6100095}	24 - {6105095}	88 - {6205100}	91 - {6205115}
13 - {6100100}	73 - {6200095}	89 - {6205105}	108 - {6210120}
23 - {6105090}	74 - {6200100}	90 - {6205110}	109 - {6210125}

NC strata with no CE				
Fleet	Gear	Area	YearFirst	YearLast
Iran, Islamic Republic	GILL	IO_Western	2002	2004
	HAND	IO_Western	1994	1994

NC assigned to Areas			
Area	Area	Area	Area
49 - {6120050}	51 - {6120060}	59 - {6125050}	
50 - {6120055}	58 - {6125045}	60 - {6125055}	

NC strata with no CE				
Fleet	Gear	Area	YearFirst	YearLast
Jordan	GILL	IO_Western	1998	2004
	TROL	IO_Western	1998	2004

NC assigned to Areas			
Area	Area	Area	Area
58 - {6125045}			

NC strata with no CE				
Fleet	Gear	Area	YearFirst	YearLast
Kenya	GILL	IO_Western	1981	2004
	HAND	IO_Western	1981	2004
	TROL	IO_Western	1984	2004

NC assigned to Areas			
Area	Area	Area	Area
62 - {6200040}	63 - {6200045}		

NC strata with no CE				
Fleet	Gear	Area	YearFirst	YearLast
Korea, Republic of	BB	IO_Eastern	1975	1981

NC assigned to Areas			
Area	Area	Area	Area
9 - {6100080}	24 - {6105095}	45 - {6115085}	84 - {6205080}
10 - {6100085}	33 - {6110080}	70 - {6200080}	85 - {6205085}
11 - {6100090}	34 - {6110085}	71 - {6200085}	86 - {6205090}
22 - {6105085}	35 - {6110090}	72 - {6200090}	87 - {6205095}
23 - {6105090}	36 - {6110095}	73 - {6200095}	88 - {6205100}

NC strata with no CE				
Fleet	Gear	Area	YearFirst	YearLast
Korea, Republic of	BB	IO_Western	1971	1983

NC assigned to Areas			
Area	Area	Area	Area
1 - {6100040}	18 - {6105065}	63 - {6200045}	81 - {6205065}
2 - {6100045}	27 - {6110050}	64 - {6200050}	92 - {6210040}
3 - {6100050}	28 - {6110055}	65 - {6200055}	93 - {6210045}
4 - {6100055}	29 - {6110060}	66 - {6200060}	94 - {6210050}
5 - {6100060}	30 - {6110065}	67 - {6200065}	95 - {6210055}
6 - {6100065}	39 - {6115050}	76 - {6205040}	110 - {6215035}
14 - {6105045}	40 - {6115055}	77 - {6205045}	111 - {6215040}
15 - {6105050}	41 - {6115060}	78 - {6205050}	128 - {6220035}
16 - {6105055}	42 - {6115065}	79 - {6205055}	129 - {6220040}
17 - {6105060}	62 - {6200040}	80 - {6205060}	

NC strata with no CE				
Fleet	Gear	Area	YearFirst	YearLast
Madagascar	BB	IO_Western	1973	1975

NC assigned to Areas			
Area	Area	Area	Area
93 - {6210045}	112 - {6215045}	130 - {6220045}	148 - {6225045}
94 - {6210050}	113 - {6215050}	131 - {6220050}	
111 - {6215040}	129 - {6220040}	147 - {6225040}	

NC strata with no CE				
Fleet	Gear	Area	YearFirst	YearLast
Malaysia	LL	IO_Eastern	2002	2003

NC assigned to Areas			
Area	Area	Area	Area
9 - {6100080}	23 - {6105090}	45 - {6115085}	84 - {6205080}
10 - {6100085}	24 - {6105095}	46 - {6115090}	85 - {6205085}
11 - {6100090}	33 - {6110080}	70 - {6200080}	86 - {6205090}
12 - {6100095}	34 - {6110085}	71 - {6200085}	87 - {6205095}
21 - {6105080}	35 - {6110090}	72 - {6200090}	88 - {6205100}
22 - {6105085}	36 - {6110095}	73 - {6200095}	

NC strata with no CE				
Fleet	Gear	Area	YearFirst	YearLast
Maldives	BB	IO_Western	1950	1969
	FN	IO_Western	1994	2004
	HAND	IO_Western	1994	2004
	LLCO	IO_Western	2000	2004
	TROL	IO_Western	1994	2004

NC assigned to Areas			
Area	Area	Area	Area
7 - {6100070}	19 - {6105070}	68 - {6200070}	
8 - {6100075}	20 - {6105075}		

NC strata with no CE				
Fleet	Gear	Area	YearFirst	YearLast
Maldives	LL	IO_Western	2002	2004

NC assigned to Areas			
Area	Area	Area	Area
6 - {6100065}	18 - {6105065}	30 - {6110065}	69 - {6200075}
7 - {6100070}	19 - {6105070}	31 - {6110070}	70 - {6200080}
8 - {6100075}	20 - {6105075}	67 - {6200065}	
9 - {6100080}	21 - {6105080}	68 - {6200070}	

NC strata with no CE				
Fleet	Gear	Area	YearFirst	YearLast
Mauritius	TROL	IO_Western	1977	2004

NC assigned to Areas			
Area	Area	Area	Area
114 - {6215055}	115 - {6215060}	132 - {6220055}	133 - {6220060}

NC strata with no CE				
Fleet	Gear	Area	YearFirst	YearLast
NEI-Fresh Tuna	LL	IO_Eastern	1989	2004

NC assigned to Areas			
Area	Area	Area	Area
9 - {6100080}	23 - {6105090}	45 - {6115085}	84 - {6205080}
10 - {6100085}	24 - {6105095}	46 - {6115090}	85 - {6205085}
11 - {6100090}	33 - {6110080}	70 - {6200080}	86 - {6205090}
12 - {6100095}	34 - {6110085}	71 - {6200085}	87 - {6205095}
21 - {6105080}	35 - {6110090}	72 - {6200090}	88 - {6205100}
22 - {6105085}	36 - {6110095}	73 - {6200095}	

NC strata with no CE				
Fleet	Gear	Area	YearFirst	YearLast
NEI-IDN Fresh Tuna	LL	IO_Eastern	1986	1999

NC assigned to Areas			
Area	Area	Area	Area
71 - {6200085}	90 - {6205110}	108 - {6210120}	140 - {6220095}
72 - {6200090}	91 - {6205115}	109 - {6210125}	141 - {6220100}
73 - {6200095}	103 - {6210095}	122 - {6215095}	142 - {6220105}
86 - {6205090}	104 - {6210100}	123 - {6215100}	158 - {6225095}
87 - {6205095}	105 - {6210105}	124 - {6215105}	159 - {6225100}
88 - {6205100}	106 - {6210110}	125 - {6215110}	160 - {6225105}
89 - {6205105}	107 - {6210115}	126 - {6215115}	

NC strata with no CE				
Fleet	Gear	Area	YearFirst	YearLast
Oman	GILL	IO_Western	1950	2004

NC assigned to Areas			
Area	Area	Area	Area
40 - {6115055}	50 - {6120055}	51 - {6120060}	60 - {6125055}

NC strata with no CE				
Fleet	Gear	Area	YearFirst	YearLast
Pakistan	GILL	IO_Western	1950	1971

NC assigned to Areas			
Area	Area	Area	Area
41 - {6115060}	42 - {6115065}	51 - {6120060}	52 - {6120065}

NC strata with no CE				
Fleet	Gear	Area	YearFirst	YearLast
Qatar	GILL	IO_Western	1982	2004

NC assigned to Areas			
Area	Area	Area	Area
59 - {6125050}			

NC strata with no CE				
Fleet	Gear	Area	YearFirst	YearLast
Seychelles	GILL	IO_Western	1973	1979
	HAND	IO_Western	1970	1999
	TROL	IO_Western	1970	1991

NC assigned to Areas			
Area	Area	Area	Area
64 - {6200050}	65 - {6200055}	78 - {6205050}	79 - {6205055}

NC strata with no CE				
Fleet	Gear	Area	YearFirst	YearLast
Spain	BB	IO_Western	1981	1982

NC assigned to Areas			
Area	Area	Area	Area
1 - {6100040}	18 - {6105065}	63 - {6200045}	81 - {6205065}
2 - {6100045}	27 - {6110050}	64 - {6200050}	92 - {6210040}
3 - {6100050}	28 - {6110055}	65 - {6200055}	93 - {6210045}
4 - {6100055}	29 - {6110060}	66 - {6200060}	94 - {6210050}
5 - {6100060}	30 - {6110065}	67 - {6200065}	95 - {6210055}
6 - {6100065}	39 - {6115050}	76 - {6205040}	110 - {6215035}
14 - {6105045}	40 - {6115055}	77 - {6205045}	111 - {6215040}
15 - {6105050}	41 - {6115060}	78 - {6205050}	128 - {6220035}
16 - {6105055}	42 - {6115065}	79 - {6205055}	129 - {6220040}
17 - {6105060}	62 - {6200040}	80 - {6205060}	

NC strata with no CE				
Fleet	Gear	Area	YearFirst	YearLast
UK-Territories	HAND	IO_Western	2003	2004

NC assigned to Areas			
Area	Area	Area	Area
68 - {6200070}	82 - {6205070}		

NC strata with no CE				
Fleet	Gear	Area	YearFirst	YearLast
Yemen	GILL	IO_Western	1950	2004
	HAND	IO_Western	1953	2004
	TROL	IO_Western	1950	2004

NC assigned to Areas			
Area	Area	Area	Area
25 - {6110040}	26 - {6110045}	27 - {6110050}	39 - {6115050}

APPENDIX V

Substitution scheme used for the estimation of Catches-at-Size (time-area)

Step	Lat	Lon	Qtr	Step	Lat	Lon	Qtr	Step	Lat	Lon	Qtr	Step	Lat	Lon	Qtr	Step	Lat	Lon	Qtr
1	0	0	-0.25	53	20	-20	0.00	105	30	-20	-0.25	157	40	0	-0.25	209	10	-80	0.00
2	0	0	0.25	54	20	20	0.00	106	30	20	-0.25	158	40	0	0.25	210	10	80	0.00
3	0	-20	0.00	55	-20	-20	-0.25	107	-30	-20	0.25	159	-40	-80	0.00	211	-10	-80	-0.25
4	0	20	0.00	56	-20	20	-0.25	108	-30	20	0.25	160	-40	80	0.00	212	-10	80	-0.25
5	0	-20	-0.25	57	20	-20	-0.25	109	30	-20	0.25	161	40	-80	0.00	213	10	-80	-0.25
6	0	-20	0.25	58	20	20	-0.25	110	30	20	0.25	162	40	80	0.00	214	10	80	-0.25
7	0	20	-0.25	59	-20	-20	0.25	111	-30	-40	0.00	163	-40	-80	-0.25	215	-10	-80	0.25
8	0	20	0.25	60	-20	20	0.25	112	-30	40	0.00	164	-40	80	-0.25	216	-10	80	0.25
9	-10	0	0.00	61	20	-20	0.25	113	30	-40	0.00	165	40	-80	-0.25	217	10	-80	0.25
10	10	0	0.00	62	20	20	0.25	114	30	40	0.00	166	40	80	-0.25	218	10	80	0.25
11	-10	0	-0.25	63	-10	-40	0.00	115	-30	-40	-0.25	167	-40	-80	0.25	219	-20	-80	0.00
12	-10	0	0.25	64	-10	40	0.00	116	-30	40	-0.25	168	-40	80	0.25	220	-20	80	0.00
13	10	0	-0.25	65	10	-40	0.00	117	30	-40	-0.25	169	40	-80	0.25	221	20	-80	0.00
14	10	0	0.25	66	10	40	0.00	118	30	40	-0.25	170	40	80	0.25	222	20	80	0.00
15	-10	-20	0.00	67	-10	-40	-0.25	119	-30	-40	0.25	171	-40	-20	0.00	223	-20	-80	-0.25
16	-10	20	0.00	68	-10	40	-0.25	120	-30	40	0.25	172	-40	20	0.00	224	-20	80	-0.25
17	10	-20	0.00	69	10	-40	-0.25	121	30	-40	0.25	173	40	-20	0.00	225	20	-80	-0.25
18	10	20	0.00	70	10	40	-0.25	122	30	40	0.25	174	40	20	0.00	226	20	80	-0.25
19	-10	-20	-0.25	71	-10	-40	0.25	123	-10	-60	0.00	175	-40	-20	-0.25	227	-20	-80	0.25
20	-10	20	-0.25	72	-10	40	0.25	124	-10	60	0.00	176	-40	20	-0.25	228	-20	80	0.25
21	10	-20	-0.25	73	10	-40	0.25	125	10	-60	0.00	177	40	-20	-0.25	229	20	-80	0.25
22	10	20	-0.25	74	10	40	0.25	126	10	60	0.00	178	40	20	-0.25	230	20	80	0.25
23	-10	-20	0.25	75	0	-60	0.00	127	-10	-60	-0.25	179	-40	-20	0.25	231	-30	-80	0.00
24	-10	20	0.25	76	0	60	0.00	128	-10	60	-0.25	180	-40	20	0.25	232	-30	80	0.00
25	10	-20	0.25	77	0	-60	-0.25	129	10	-60	-0.25	181	40	-20	0.25	233	30	-80	0.00
26	10	20	0.25	78	0	-60	0.25	130	10	60	-0.25	182	40	20	0.25	234	30	80	0.00
27	0	-40	0.00	79	0	60	-0.25	131	-10	-60	0.25	183	-40	-40	0.00	235	-30	-80	-0.25
28	0	40	0.00	80	0	60	0.25	132	-10	60	0.25	184	-40	40	0.00	236	-30	80	-0.25
29	0	-40	-0.25	81	-30	0	0.00	133	10	-60	0.25	185	40	-40	0.00	237	30	-80	-0.25
30	0	-40	0.25	82	30	0	0.00	134	10	60	0.25	186	40	40	0.00	238	30	80	-0.25
31	0	40	-0.25	83	-30	0	-0.25	135	-20	-60	0.00	187	-40	-40	-0.25	239	-30	-80	0.25
32	0	40	0.25	84	-30	0	0.25	136	-20	60	0.00	188	-40	40	-0.25	240	-30	80	0.25
33	-20	0	0.00	85	30	0	-0.25	137	20	-60	0.00	189	40	-40	-0.25	241	30	-80	0.25
34	20	0	0.00	86	30	0	0.25	138	20	60	0.00	190	40	40	-0.25	242	30	80	0.25
35	-20	0	-0.25	87	-30	-60	0.00	139	-20	-60	-0.25	191	-40	-40	0.25	243	0	-100	0.00
36	-20	0	0.25	88	-30	60	0.00	140	-20	60	-0.25	192	-40	40	0.25	244	0	100	0.00
37	20	0	-0.25	89	30	-60	0.00	141	20	-60	-0.25	193	40	-40	0.25	245	0	-100	-0.25
38	20	0	0.25	90	30	60	0.00	142	20	60	-0.25	194	40	40	0.25	246	0	-100	0.25
39	-20	-40	0.00	91	-30	-60	-0.25	143	-20	-60	0.25	195	-40	-60	0.00	247	0	100	-0.25
40	-20	40	0.00	92	-30	60	-0.25	144	-20	60	0.25	196	-40	60	0.00	248	0	100	0.25
41	20	-40	0.00	93	30	-60	-0.25	145	20	-60	0.25	197	40	-60	0.00	249	0	-120	0.00
42	20	40	0.00	94	30	60	-0.25	146	20	60	0.25	198	40	60	0.00	250	0	120	0.00
43	-20	-40	-0.25	95	-30	-60	0.25	147	0	-80	0.00	199	-40	-60	-0.25	251	0	-120	-0.25
44	-20	40	-0.25	96	-30	60	0.25	148	0	80	0.00	200	-40	60	-0.25	252	0	-120	0.25
45	20	-40	-0.25	97	30	-60	0.25	149	0	-80	-0.25	201	40	-60	-0.25	253	0	120	-0.25
46	20	40	-0.25	98	30	60	0.25	150	0	-80	0.25	202	40	60	-0.25	254	0	120	0.25
47	-20	-40	0.25	99	-30	-20	0.00	151	0	80	-0.25	203	-40	-60	0.25	255	0	0	-0.50
48	-20	40	0.25	100	-30	20	0.00	152	0	80	0.25	204	-40	60	0.25	256	0	0	0.50
49	20	-40	0.25	101	30	-20	0.00	153	-40	0	0.00	205	40	-60	0.25	257	0	-20	-0.50
50	20	40	0.25	102	30	20	0.00	154	40	0	0.00	206	40	60	0.25	258	0	-20	0.50
51	-20	-20	0.00	103	-30	-20	-0.25	155	-40	0	-0.25	207	-10	-80	0.00	259	0	20	-0.50
52	-20	20	0.00	104	-30	20	-0.25	156	-40	0	0.25	208	-10	80	0.00	260	0	20	0.50

Step	Lat	Lon	Qtr
261	-10	0	-0.50
262	-10	0	0.50
263	10	0	-0.50
264	10	0	0.50
265	-10	-20	-0.50
266	-10	20	-0.50
267	10	-20	-0.50
268	10	20	-0.50
269	-10	-20	0.50
270	-10	20	0.50
271	10	-20	0.50
272	10	20	0.50
273	0	-40	-0.50
274	0	-40	0.50
275	0	40	-0.50
276	0	40	0.50
277	-20	0	-0.50
278	-20	0	0.50
279	20	0	-0.50
280	20	0	0.50
281	-20	-40	-0.50
282	-20	40	-0.50
283	20	-40	-0.50
284	20	40	-0.50
285	-20	-40	0.50
286	-20	40	0.50
287	20	-40	0.50
288	20	40	0.50
289	-20	-20	-0.50
290	-20	20	-0.50
291	20	-20	-0.50
292	20	20	-0.50
293	-20	-20	0.50
294	-20	20	0.50
295	20	-20	0.50
296	20	20	0.50
297	-10	-40	-0.50
298	-10	40	-0.50
299	10	-40	-0.50
300	10	40	-0.50
301	-10	-40	0.50
302	-10	40	0.50
303	10	-40	0.50
304	10	40	0.50
305	0	-60	-0.50
306	0	-60	0.50
307	0	60	-0.50
308	0	60	0.50
309	-30	0	-0.50
310	-30	0	0.50
311	30	0	-0.50
312	30	0	0.50
313	-30	-60	-0.50
314	-30	60	-0.50
315	30	-60	-0.50
316	30	60	-0.50
317	-30	-60	0.50
318	-30	60	0.50
319	30	-60	0.50
320	30	60	0.50
321	-30	-20	-0.50
322	-30	20	-0.50
323	30	-20	-0.50
324	30	20	-0.50
325	-30	-20	0.50
326	-30	20	0.50
327	30	-20	0.50
328	30	20	0.50
329	-30	-40	-0.50
330	-30	40	-0.50
331	30	-40	-0.50
332	30	40	-0.50
333	-30	-40	0.50
334	-30	40	0.50
335	30	-40	0.50
336	30	40	0.50
337	-10	-60	-0.50
338	-10	60	-0.50
339	10	-60	-0.50
340	10	60	-0.50
341	-10	-60	0.50
342	-10	60	0.50
343	10	-60	0.50
344	10	60	0.50
345	-20	-60	-0.50
346	-20	60	-0.50
347	20	-60	-0.50
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349	-20	-60	0.50
350	-20	60	0.50
351	20	-60	0.50
352	20	60	0.50
353	0	-80	-0.50
354	0	-80	0.50
355	0	80	-0.50
356	0	80	0.50
357	-40	0	-0.50
358	-40	0	0.50
359	40	0	-0.50
360	40	0	0.50
361	-40	-80	-0.50
362	-40	80	-0.50
363	40	-80	-0.50
364	40	80	-0.50
365	-40	-80	0.50
366	-40	80	0.50
367	40	-80	0.50
368	40	80	0.50
369	-40	-20	-0.50
370	-40	20	-0.50
371	40	-20	-0.50
372	40	20	-0.50
373	-40	-20	0.50
374	-40	20	0.50
375	40	-20	0.50
376	40	20	0.50
377	-40	-40	-0.50
378	-40	40	-0.50
379	40	-40	-0.50
380	40	40	-0.50
381	-40	-40	0.50
382	-40	40	0.50
383	40	-40	0.50
384	40	40	0.50
385	-40	-60	-0.50
386	-40	60	-0.50
387	40	-60	-0.50
388	40	60	-0.50
389	-40	-60	0.50
390	-40	60	0.50
391	40	-60	0.50
392	40	60	0.50
393	-10	-80	-0.50
394	-10	80	-0.50
395	10	-80	-0.50
396	10	80	-0.50
397	-10	-80	0.50
398	-10	80	0.50
399	10	-80	0.50
400	10	80	0.50
401	-20	-80	-0.50
402	-20	80	-0.50
403	20	-80	-0.50
404	20	80	-0.50
405	-20	-80	0.50
406	-20	80	0.50
407	20	-80	0.50
408	20	80	0.50
409	-30	-80	-0.50
410	-30	80	-0.50
411	30	-80	-0.50
412	30	80	-0.50
413	-30	-80	0.50
414	-30	80	0.50
415	30	-80	0.50
416	30	80	0.50
417	0	-100	-0.50
418	0	-100	0.50
419	0	100	-0.50
420	0	100	0.50
421	0	-120	-0.50
422	0	-120	0.50
423	0	120	-0.50
424	0	120	0.50
425	0	0	-0.75
426	0	0	0.75
427	0	-20	-0.75
428	0	-20	0.75
429	0	20	-0.75
430	0	20	0.75
431	-10	0	-0.75
432	-10	0	0.75
433	10	0	-0.75
434	10	0	0.75
435	-10	-20	-0.75
436	-10	20	-0.75
437	10	-20	-0.75
438	10	20	-0.75
439	-10	-20	0.75
440	-10	20	0.75
441	10	-20	0.75
442	10	20	0.75
443	0	-40	-0.75
444	0	-40	0.75
445	0	40	-0.75
446	0	40	0.75
447	-20	0	-0.75
448	-20	0	0.75
449	20	0	-0.75
450	20	0	0.75
451	-20	-40	-0.75
452	-20	40	-0.75
453	20	-40	-0.75
454	20	40	-0.75
455	-20	-40	0.75
456	-20	40	0.75
457	20	-40	0.75
458	20	40	0.75
459	-20	-20	-0.75
460	-20	20	-0.75
461	20	-20	-0.75
462	20	20	-0.75
463	-20	-20	0.75
464	-20	20	0.75
465	20	-20	0.75
466	20	20	0.75
467	-10	-40	-0.75
468	-10	40	-0.75
469	10	-40	-0.75
470	10	40	-0.75
471	-10	-40	0.75
472	-10	40	0.75
473	10	-40	0.75
474	10	40	0.75
475	0	-60	-0.75
476	0	-60	0.75
477	0	60	-0.75
478	0	60	0.75
479	-30	0	-0.75
480	-30	0	0.75
481	30	0	-0.75
482	30	0	0.75
483	-30	-60	-0.75
484	-30	60	-0.75
485	30	-60	-0.75
486	30	60	-0.75
487	-30	-60	0.75
488	-30	60	0.75
489	30	-60	0.75
490	30	60	0.75
491	-30	-20	-0.75
492	-30	20	-0.75
493	30	-20	-0.75
494	30	20	-0.75
495	-30	-20	0.75
496	-30	20	0.75
497	30	-20	0.75
498	30	20	0.75
499	-30	-40	-0.75
500	-30	40	-0.75
501	30	-40	-0.75
502	30	40	-0.75
503	-30	-40	0.75
504	-30	40	0.75
505	30	-40	0.75
506	30	40	0.75
507	-10	-60	-0.75
508	-10	60	-0.75
509	10	-60	-0.75
510	10	60	-0.75
511	-10	-60	0.75
512	-10	60	0.75
513	10	-60	0.75
514	10	60	0.75
515	-20	-60	-0.75
516	-20	60	-0.75
517	20	-60	-0.75
518	20	60	-0.75
519	-20	-60	0.75
520	-20	60	0.75

Step	Lat	Lon	Qtr
521	20	-60	0.75
522	20	60	0.75
523	0	-80	-0.75
524	0	-80	0.75
525	0	80	-0.75
526	0	80	0.75
527	-40	0	-0.75
528	-40	0	0.75
529	40	0	-0.75
530	40	0	0.75
531	-40	-80	-0.75
532	-40	80	-0.75
533	40	-80	-0.75
534	40	80	-0.75
535	-40	-80	0.75
536	-40	80	0.75
537	40	-80	0.75
538	40	80	0.75
539	-40	-20	-0.75
540	-40	20	-0.75
541	40	-20	-0.75
542	40	20	-0.75
543	-40	-20	0.75
544	-40	20	0.75
545	40	-20	0.75
546	40	20	0.75
547	-40	-40	-0.75
548	-40	40	-0.75
549	40	-40	-0.75
550	40	40	-0.75
551	-40	-40	0.75
552	-40	40	0.75
553	40	-40	0.75
554	40	40	0.75
555	-40	-60	-0.75
556	-40	60	-0.75
557	40	-60	-0.75
558	40	60	-0.75
559	-40	-60	0.75
560	-40	60	0.75
561	40	-60	0.75
562	40	60	0.75
563	-10	-80	-0.75
564	-10	80	-0.75
565	10	-80	-0.75
566	10	80	-0.75
567	-10	-80	0.75
568	-10	80	0.75
569	10	-80	0.75
570	10	80	0.75
571	-20	-80	-0.75
572	-20	80	-0.75
573	20	-80	-0.75
574	20	80	-0.75
575	-20	-80	0.75
576	-20	80	0.75
577	20	-80	0.75
578	20	80	0.75
579	-30	-80	-0.75
580	-30	80	-0.75
581	30	-80	-0.75
582	30	80	-0.75
583	-30	-80	0.75
584	-30	80	0.75
585	30	-80	0.75
586	30	80	0.75
587	0	-100	-0.75
588	0	-100	0.75
589	0	100	-0.75
590	0	100	0.75
591	0	-120	-0.75
592	0	-120	0.75
593	0	120	-0.75
594	0	120	0.75
595	0	0	-1.00
596	0	0	1.00
597	0	-20	-1.00
598	0	-20	1.00
599	0	20	-1.00
600	0	20	1.00
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606	-10	20	-1.00
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609	-10	-20	1.00
610	-10	20	1.00
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613	0	-40	-1.00
614	0	-40	1.00
615	0	40	-1.00
616	0	40	1.00
617	-20	0	-1.00
618	-20	0	1.00
619	20	0	-1.00
620	20	0	1.00
621	-20	-40	-1.00
622	-20	40	-1.00
623	20	-40	-1.00
624	20	40	-1.00
625	-20	-40	1.00
626	-20	40	1.00
627	20	-40	1.00
628	20	40	1.00
629	-20	-20	-1.00
630	-20	20	-1.00
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632	20	20	-1.00
633	-20	-20	1.00
634	-20	20	1.00
635	20	-20	1.00
636	20	20	1.00
637	-10	-40	-1.00
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684	10	60	1.00
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686	-20	60	-1.00
687	20	-60	-1.00
688	20	60	-1.00
689	-20	-60	1.00
690	-20	60	1.00
691	20	-60	1.00
692	20	60	1.00
693	0	-80	-1.00
694	0	-80	1.00
695	0	80	-1.00
696	0	80	1.00
697	-40	0	-1.00
698	-40	0	1.00
699	40	0	-1.00
700	40	0	1.00
701	-40	-80	-1.00
702	-40	80	-1.00
703	40	-80	-1.00
704	40	80	-1.00
705	-40	-80	1.00
706	-40	80	1.00
707	40	-80	1.00
708	40	80	1.00
709	-40	-20	-1.00
710	-40	20	-1.00
711	40	-20	-1.00
712	40	20	-1.00
713	-40	-20	1.00
714	-40	20	1.00
715	40	-20	1.00
716	40	20	1.00
717	-40	-40	-1.00
718	-40	40	-1.00
719	40	-40	-1.00
720	40	40	-1.00
721	-40	-40	1.00
722	-40	40	1.00
723	40	-40	1.00
724	40	40	1.00
725	-40	-60	-1.00
726	-40	60	-1.00
727	40	-60	-1.00
728	40	60	-1.00
729	-40	-60	1.00
730	-40	60	1.00
731	40	-60	1.00
732	40	60	1.00
733	-10	-80	-1.00
734	-10	80	-1.00
735	10	-80	-1.00
736	10	80	-1.00
737	-10	-80	1.00
738	-10	80	1.00
739	10	-80	1.00
740	10	80	1.00
741	-20	-80	-1.00
742	-20	80	-1.00
743	20	-80	-1.00
744	20	80	-1.00
745	-20	-80	1.00
746	-20	80	1.00
747	20	-80	1.00
748	20	80	1.00
749	-30	-80	-1.00
750	-30	80	-1.00
751	30	-80	-1.00
752	30	80	-1.00
753	-30	-80	1.00
754	-30	80	1.00
755	30	-80	1.00
756	30	80	1.00
757	0	-100	-1.00
758	0	-100	1.00
759	0	100	-1.00
760	0	100	1.00
761	0	-120	-1.00
762	0	-120	1.00
763	0	120	-1.00
764	0	120	1.00

APPENDIX VI

Substitution scheme used for the estimation of Catches-at-Size (Fleet-Gear)

a/Bigeye tuna

Species	Gear	Fleet	GearA	FleetA	GearA2	FleetA2	GearA3	FleetA3	UseStrata
BET	BB	AUS	BB	AG1	BB	AG1	PS	AG1	FALSE
BET	BB	MDV	BB	AG2	BB	AG1	PS	AG1	FALSE
BET	BB	TZA	BB	AG3	BB	AG1	PS	AG1	FALSE
BET	BBM	MDV	BB	AG2	BB	AG1	PS	AG1	FALSE
BET	BBN	MDV	BB	AG2	BB	AG1	PS	AG1	FALSE
BET	G/L	LKA	GILL	AG5	GILL	AG1	ART	AG1	TRUE
BET	GILL	AUS	GILL	AG2	GILL	AG1	ART	AG1	TRUE
BET	GILL	LKA	GILL	AG2	GILL	AG1	ART	AG1	TRUE
BET	GILL	TMP	GILL	AG2	GILL	AG1	ART	AG1	TRUE
BET	GILL	TWN	GILL	AG5	GILL	AG1	ART	AG1	TRUE
BET	HAND	AUS	HAND	AG1	LINE	AG1	ART	AG1	TRUE
BET	HAND	COM	HAND	AG2	LINE	AG1	ART	AG1	TRUE
BET	HAND	FRA-REU	HAND	AG3	LINE	AG1	ART	AG1	TRUE
BET	HAND	FRAT	HAND	AG2	LINE	AG1	ART	AG1	TRUE
BET	HAND	KEN	HAND	AG2	LINE	AG1	ART	AG1	TRUE
BET	HAND	LKA	HAND	AG5	LINE	AG1	ART	AG1	TRUE
BET	HAND	SYC	HAND	AG5	LINE	AG1	ART	AG1	TRUE
BET	HAND	TZA	HAND	AG2	LINE	AG1	ART	AG1	TRUE
BET	HAND	ZAF	HAND	AG3	LINE	AG1	ART	AG1	TRUE
BET	LL	LKA	HAND	AG5	LINE	AG1	ART	AG1	FALSE
BET	TROL	AUS	TROL	AG1	LINE	AG1	ART	AG1	TRUE
BET	TROL	COM	TROL	AG2	LINE	AG1	ART	AG1	TRUE
BET	TROL	FRA-REU	TROL	AG3	LINE	AG1	ART	AG1	TRUE
BET	TROL	FRAT	TROL	AG2	LINE	AG1	ART	AG1	TRUE
BET	TROL	IDN	TROL	AG1	LINE	AG1	ART	AG1	TRUE
BET	TROL	LKA	TROL	AG5	LINE	AG1	ART	AG1	TRUE
BET	TROL	MUS	TROL	AG3	LINE	AG1	ART	AG1	TRUE
BET	ELL	AUS	ELL	AG1	ELL	AG1	LL	AG1	FALSE
BET	ELL	ESP	ELL	AG2	ELL	AG1	LL	AG1	FALSE
BET	ELL	FRA-REU	ELL	AG3	ELL	AG1	LL	AG1	FALSE
BET	ELL	FRAT	ELL	AG3	ELL	AG1	LL	AG1	FALSE
BET	ELL	GIN	ELL	AG2	ELL	AG1	LL	AG1	FALSE
BET	ELL	KEN	ELL	AG2	ELL	AG1	LL	AG1	FALSE
BET	ELL	MUS	ELL	AG3	ELL	AG1	LL	AG1	FALSE
BET	ELL	NEI-DFRZ	ELL	AG2	ELL	AG1	LL	AG1	FALSE
BET	ELL	SYC	ELL	AG3	ELL	AG1	LL	AG1	FALSE
BET	LL	MUS	ELL	AG2	ELL	AG1	LL	AG1	FALSE
BET	LL	PRT	ELL	AG2	ELL	AG1	LL	AG1	FALSE
BET	LL	ZAF	ELL	AG2	ELL	AG1	LL	AG1	FALSE
BET	LLD	PRT	ELL	AG2	ELL	AG1	LL	AG1	FALSE
BET	LLEX	ESP	ELL	AG2	ELL	AG1	LL	AG1	FALSE
BET	SLL	PRT	ELL	AG2	ELL	AG1	LL	AG1	FALSE
BET	SLL	ZAF	ELL	AG2	ELL	AG1	LL	AG1	FALSE
BET	TLL	NEI-DFRZ	ELL	AG2	ELL	AG1	LL	AG1	FALSE
BET	TLL	ZAF	ELL	AG2	ELL	AG1	LL	AG1	FALSE
BET	FLL	CHN	FLL	AG1	FLL	AG1	LL	AG1	FALSE
BET	FLL	IDN	FLL	AG2	FLL	AG1	LL	AG1	FALSE
BET	FLL	MDV	FLL	AG1	FLL	AG1	LL	AG1	FALSE
BET	FLL	MYS	FLL	AG1	FLL	AG1	LL	AG1	FALSE
BET	FLL	NEI-ICE	FLL	AG1	FLL	AG1	LL	AG1	FALSE
BET	FLL	NEI-IDN	FLL	AG2	FLL	AG1	LL	AG1	FALSE
BET	FLL	OMN	FLL	AG1	FLL	AG1	LL	AG1	FALSE
BET	FLL	TWN	FLL	AG1	FLL	AG1	LL	AG1	FALSE
BET	LL	CHN	FLL	AG1	FLL	AG1	LL	AG1	FALSE
BET	LL	IND	LL	AG3	LL	AG2	LL	AG1	FALSE
BET	LL	IRN	LL	AG2	LL	AG2	LL	AG1	FALSE
BET	LL	JPN	LL	AG1	LL	AG1	LL	AG1	TRUE
BET	LL	KOR	LL	AG1	LL	AG1	LL	AG1	FALSE
BET	LL	NEI-DFRZ	LL	AG3	LL	AG2	LL	AG1	FALSE
BET	LL	PHL	LL	AG3	LL	AG2	LL	AG1	FALSE
BET	LL	SUN	LL	AG2	LL	AG2	LL	AG1	FALSE
BET	LL	SYC	LL	AG3	LL	AG2	LL	AG1	FALSE
BET	LL	THA	LL	AG1	LL	AG1	LL	AG1	FALSE
BET	LL	TWN	LL	AG3	LL	AG2	LL	AG1	TRUE
BET	PS	ESP	PS	AG2	PS	AG2	PS	AG1	TRUE
BET	PS	FRA	PS	AG3	PS	AG2	PS	AG1	TRUE
BET	PS	FRAT	PS	AG3	PS	AG2	PS	AG1	TRUE
BET	PS	IRN	PS	AG5	PS	AG2	PS	AG1	TRUE
BET	PS	JPN	PS	AG4	PS	AG3	PS	AG1	FALSE
BET	PS	MUS	PS	AG4	PS	AG3	PS	AG1	FALSE
BET	PS	NEI-OTH	PS	AG5	PS	AG2	PS	AG1	TRUE
BET	PS	NEI-SUN	PS	AG6	PS	AG4	PS	AG1	FALSE
BET	PS	SUN	PS	AG6	PS	AG4	PS	AG1	FALSE
BET	PS	SYC	PS	AG5	PS	AG2	PS	AG1	TRUE
BET	PS	THA	PS	AG6	PS	AG4	PS	AG1	FALSE
BET	PSS	IDN	PSS	AG1	PSS	AG1	PS	AG1	FALSE
BET	RIN	LKA	PSS	AG1	PSS	AG1	PS	AG1	FALSE

b/Yellowfin tuna

Species	Gear	Fleet	GearA	FleetA	GearA2	FleetA2	GearA3	FleetA3	UseStrata
YFT	BB	AUS	BB	AG1	BB	AG1	PS	AG1	FALSE
YFT	BB	ESP	BB	AG3	BB	AG1	PS	AG1	FALSE
YFT	BB	IDN	BB	AG2	BB	AG1	PS	AG1	FALSE
YFT	BB	IND	BB	AG2	BB	AG1	PS	AG1	FALSE
YFT	BB	LKA	BB	AG2	BB	AG1	PS	AG1	FALSE
YFT	BB	MDG	BB	AG3	BB	AG1	PS	AG1	FALSE
YFT	BB	MDV	BB	AG2	BB	AG1	PS	AG1	FALSE
YFT	BB	TZA	BB	AG3	BB	AG1	PS	AG1	FALSE
YFT	BBM	MDV	BB	AG2	BB	AG1	PS	AG1	FALSE
YFT	BBN	MDV	BB	AG2	BB	AG1	PS	AG1	FALSE
YFT	BBPS	AUS	BB	AG1	BB	AG1	PS	AG1	FALSE
YFT	ELL	AUS	ELL	AG1	ELL	AG1	LL	AG1	FALSE
YFT	ELL	ESP	ELL	AG2	ELL	AG1	LL	AG1	FALSE
YFT	ELL	FRA-REU	ELL	AG3	ELL	AG1	LL	AG1	FALSE
YFT	ELL	FRAT	ELL	AG3	ELL	AG1	LL	AG1	FALSE
YFT	ELL	GIN	ELL	AG2	ELL	AG1	LL	AG1	FALSE
YFT	ELL	KEN	ELL	AG2	ELL	AG1	LL	AG1	FALSE
YFT	ELL	MUS	ELL	AG3	ELL	AG1	LL	AG1	FALSE
YFT	ELL	NEI-DFRZ	ELL	AG2	ELL	AG1	LL	AG1	FALSE
YFT	ELL	SEN	ELL	AG2	ELL	AG1	LL	AG1	FALSE
YFT	ELL	SYC	ELL	AG3	ELL	AG1	LL	AG1	FALSE
YFT	LL	ZAF	ELL	AG2	ELL	AG1	LL	AG1	FALSE
YFT	LLD	PRT	ELL	AG2	ELL	AG1	LL	AG1	FALSE
YFT	SLL	PRT	ELL	AG2	ELL	AG1	LL	AG1	FALSE
YFT	SLL	ZAF	ELL	AG2	ELL	AG1	LL	AG1	FALSE
YFT	TLL	NEI-DFRZ	ELL	AG2	ELL	AG1	LL	AG1	FALSE
YFT	TLL	ZAF	ELL	AG2	ELL	AG1	LL	AG1	FALSE
YFT	LL	MUS	ELL	AG2	ELL	AG1	LL	AG1	FALSE
YFT	LL	PRT	ELL	AG2	ELL	AG1	LL	AG1	FALSE
YFT	FLL	CHN	FLL	AG1	FLL	AG1	LL	AG1	FALSE
YFT	FLL	IDN	FLL	AG2	FLL	AG1	LL	AG1	FALSE
YFT	FLL	MDV	FLL	AG1	FLL	AG1	LL	AG1	FALSE
YFT	FLL	MYS	FLL	AG1	FLL	AG1	LL	AG1	FALSE
YFT	FLL	NEI-ICE	FLL	AG1	FLL	AG1	LL	AG1	FALSE
YFT	FLL	NEI-IDN	FLL	AG2	FLL	AG1	LL	AG1	FALSE
YFT	FLL	OMN	FLL	AG1	FLL	AG1	LL	AG1	FALSE
YFT	FLL	TWN	FLL	AG1	FLL	AG1	LL	AG1	FALSE
YFT	LL	CHN	FLL	AG1	FLL	AG1	LL	AG1	FALSE
YFT	LL	IND	LL	AG3	LL	AG2	LL	AG1	FALSE
YFT	LL	IRN	LL	AG2	LL	AG2	LL	AG1	FALSE
YFT	LL	JPN	LL	AG1	LL	AG1	LL	AG1	TRUE
YFT	LL	KOR	LL	AG1	LL	AG1	LL	AG1	FALSE
YFT	LL	NEI-DFRZ	LL	AG3	LL	AG2	LL	AG1	FALSE
YFT	LL	PAK	LL	AG3	LL	AG2	LL	AG1	FALSE
YFT	LL	PHL	LL	AG3	LL	AG2	LL	AG1	FALSE
YFT	LL	SUN	LL	AG2	LL	AG2	LL	AG1	FALSE
YFT	LL	SYC	LL	AG3	LL	AG2	LL	AG1	FALSE
YFT	LL	THA	LL	AG1	LL	AG1	LL	AG1	FALSE
YFT	LL	TWN	LL	AG3	LL	AG2	LL	AG1	TRUE
YFT	FN	MDV	GILL	AG4	GILL	AG1	GILL	AG1	TRUE
YFT	G/L	LKA	GILL	AG5	GILL	AG2	GILL	AG1	TRUE
YFT	GILL	AUS	GILL	AG1	GILL	AG1	GILL	AG1	TRUE
YFT	GILL	BHR	GILL	AG2	GILL	AG1	GILL	AG1	TRUE
YFT	GILL	DJI	GILL	AG3	GILL	AG1	GILL	AG1	TRUE
YFT	GILL	IDN	GILL	AG1	GILL	AG1	GILL	AG1	TRUE
YFT	GILL	IND	GILL	AG2	GILL	AG1	GILL	AG1	TRUE
YFT	GILL	IRN	GILL	AG2	GILL	AG1	GILL	AG1	TRUE
YFT	GILL	JOR	GILL	AG2	GILL	AG1	GILL	AG1	TRUE
YFT	GILL	KEN	GILL	AG3	GILL	AG1	GILL	AG1	TRUE
YFT	GILL	LKA	GILL	AG2	GILL	AG1	GILL	AG1	TRUE
YFT	GILL	OMN	GILL	AG2	GILL	AG1	GILL	AG1	TRUE
YFT	GILL	PAK	GILL	AG2	GILL	AG1	GILL	AG1	TRUE
YFT	GILL	QAT	GILL	AG2	GILL	AG1	GILL	AG1	TRUE
YFT	GILL	TMP	GILL	AG1	GILL	AG1	GILL	AG1	TRUE
YFT	GILL	TWN	GILL	AG5	GILL	AG2	GILL	AG1	TRUE
YFT	GILL	TZA	GILL	AG3	GILL	AG1	GILL	AG1	TRUE
YFT	GILL	YEM	GILL	AG2	GILL	AG1	GILL	AG1	TRUE
YFT	GIOF	LKA	GILL	AG5	GILL	AG2	GILL	AG1	TRUE

Species	Gear	Fleet	GearA	FleetA	GearA2	FleetA2	GearA3	FleetA3	UseStrata
YFT	HAND	AUS	HAND	AG1	LINE	AG1	ART	AG1	TRUE
YFT	HAND	BGD	HAND	AG4	LINE	AG1	ART	AG1	TRUE
YFT	HAND	COM	HAND	AG2	LINE	AG1	ART	AG1	TRUE
YFT	HAND	FRA-REU	HAND	AG3	LINE	AG1	ART	AG1	TRUE
YFT	HAND	FRAT	HAND	AG2	LINE	AG1	ART	AG1	TRUE
YFT	HAND	GBRT	HAND	AG5	LINE	AG1	ART	AG1	TRUE
YFT	HAND	IDN	HAND	AG1	LINE	AG1	ART	AG1	TRUE
YFT	HAND	IND	HAND	AG4	LINE	AG1	ART	AG1	TRUE
YFT	HAND	KEN	HAND	AG2	LINE	AG1	ART	AG1	TRUE
YFT	HAND	LKA	HAND	AG5	LINE	AG1	ART	AG1	TRUE
YFT	HAND	MDV	HAND	AG5	LINE	AG1	ART	AG1	TRUE
YFT	HAND	OMN	HAND	AG4	LINE	AG1	ART	AG1	TRUE
YFT	HAND	SYC	HAND	AG5	LINE	AG1	ART	AG1	TRUE
YFT	HAND	TMP	HAND	AG1	LINE	AG1	ART	AG1	TRUE
YFT	HAND	TZA	HAND	AG2	LINE	AG1	ART	AG1	TRUE
YFT	HAND	YEM	HAND	AG4	LINE	AG1	ART	AG1	TRUE
YFT	HAND	ZAF	HAND	AG3	LINE	AG1	ART	AG1	TRUE
YFT	LL	LKA	HAND	AG5	LINE	AG1	ART	AG1	FALSE
YFT	LLCO	MDV	HAND	AG6	LINE	AG1	ART	AG1	TRUE
YFT	TROL	AUS	TROL	AG1	LINE	AG1	ART	AG1	TRUE
YFT	TROL	COM	TROL	AG2	LINE	AG1	ART	AG1	TRUE
YFT	TROL	FRA-REU	TROL	AG3	LINE	AG1	ART	AG1	TRUE
YFT	TROL	FRAT	TROL	AG2	LINE	AG1	ART	AG1	TRUE
YFT	TROL	IDN	TROL	AG1	LINE	AG1	ART	AG1	TRUE
YFT	TROL	IND	TROL	AG4	LINE	AG1	ART	AG1	TRUE
YFT	TROL	JOR	TROL	AG4	LINE	AG1	ART	AG1	TRUE
YFT	TROL	KEN	TROL	AG2	LINE	AG1	ART	AG1	TRUE
YFT	TROL	LKA	TROL	AG5	LINE	AG1	ART	AG1	TRUE
YFT	TROL	MDV	TROL	AG5	LINE	AG1	ART	AG1	TRUE
YFT	TROL	MUS	TROL	AG3	LINE	AG1	ART	AG1	TRUE
YFT	TROL	SYC	TROL	AG3	LINE	AG1	ART	AG1	TRUE
YFT	TROL	TMP	TROL	AG1	LINE	AG1	ART	AG1	TRUE
YFT	TROL	TZA	TROL	AG2	LINE	AG1	ART	AG1	TRUE
YFT	TROL	YEM	TROL	AG4	LINE	AG1	ART	AG1	TRUE
YFT	TROLM	MDV	TROL	AG5	LINE	AG1	ART	AG1	TRUE
YFT	TROLN	MDV	TROL	AG5	LINE	AG1	ART	AG1	TRUE
YFT	PS	AUS	PS	AG1	PS	AG1	PS	AG1	FALSE
YFT	PS	ESP	PS	AG2	PS	AG2	PS	AG1	TRUE
YFT	PS	FRA	PS	AG3	PS	AG2	PS	AG1	TRUE
YFT	PS	FRAT	PS	AG3	PS	AG2	PS	AG1	TRUE
YFT	PS	IRN	PS	AG5	PS	AG2	PS	AG1	TRUE
YFT	PS	JPN	PS	AG4	PS	AG3	PS	AG1	FALSE
YFT	PS	MUS	PS	AG4	PS	AG3	PS	AG1	FALSE
YFT	PS	NEI-OTH	PS	AG5	PS	AG2	PS	AG1	TRUE
YFT	PS	NEI-SUN	PS	AG6	PS	AG4	PS	AG1	FALSE
YFT	PS	SUN	PS	AG6	PS	AG4	PS	AG1	FALSE
YFT	PS	SYC	PS	AG5	PS	AG2	PS	AG1	TRUE
YFT	PS	THA	PS	AG6	PS	AG4	PS	AG1	FALSE
YFT	PSS	IDN	PSS	AG1	PSS	AG1	PS	AG1	FALSE
YFT	PSS	SUN	PSS	AG2	PSS	AG1	PS	AG1	FALSE
YFT	RIN	LKA	PSS	AG1	PSS	AG1	PS	AG1	FALSE
YFT	BS	IDN	PSS	AG1	PSS	AG1	ART	AG1	TRUE
YFT	HARP	LKA	HARP	AG1	ART	AG1	ART	AG1	TRUE

c/Skipjack tuna

Species	Gear	Fleet	GearA	FleetA	GearA2	FleetA2	GearA3	FleetA3	UseStrata
SKJ	BB	AUS	BB	AG1	BB	AG1	PS	AG1	FALSE
SKJ	BB	ESP	BB	AG3	BB	AG1	PS	AG1	FALSE
SKJ	BB	IDN	BB	AG2	BB	AG1	PS	AG1	FALSE
SKJ	BB	IND	BB	AG2	BB	AG1	PS	AG1	FALSE
SKJ	BB	KOR	BB	AG3	BB	AG1	PS	AG1	FALSE
SKJ	BB	LKA	BB	AG2	BB	AG1	PS	AG1	FALSE
SKJ	BB	MDG	BB	AG3	BB	AG1	PS	AG1	FALSE
SKJ	BB	MDV	BB	AG2	BB	AG1	PS	AG1	FALSE
SKJ	BB	TZA	BB	AG3	BB	AG1	PS	AG1	FALSE
SKJ	BBM	MDV	BB	AG2	BB	AG1	PS	AG1	FALSE
SKJ	BBN	MDV	BB	AG2	BB	AG1	PS	AG1	FALSE
SKJ	BBPS	AUS	BB	AG1	BB	AG1	PS	AG1	FALSE
SKJ	ELL	AUS	ELL	AG1	ELL	AG1	LL	AG1	FALSE
SKJ	ELL	ESP	ELL	AG2	ELL	AG1	LL	AG1	FALSE
SKJ	ELL	FRA-REU	ELL	AG3	ELL	AG1	LL	AG1	FALSE
SKJ	ELL	GIN	ELL	AG2	ELL	AG1	LL	AG1	FALSE
SKJ	ELL	KEN	ELL	AG2	ELL	AG1	LL	AG1	FALSE
SKJ	ELL	NEI-DFRZ	ELL	AG2	ELL	AG1	LL	AG1	FALSE
SKJ	LL	MUS	ELL	AG2	ELL	AG1	LL	AG1	FALSE
SKJ	LL	PRT	ELL	AG2	ELL	AG1	LL	AG1	FALSE
SKJ	LLD	PRT	ELL	AG2	ELL	AG1	LL	AG1	FALSE
SKJ	LLEX	ESP	ELL	AG2	ELL	AG1	LL	AG1	FALSE
SKJ	FLL	IDN	FLL	AG2	FLL	AG1	LL	AG1	FALSE
SKJ	FLL	MDV	FLL	AG1	FLL	AG1	LL	AG1	FALSE
SKJ	FLL	MYS	FLL	AG1	FLL	AG1	LL	AG1	FALSE
SKJ	FLL	NEI-ICE	FLL	AG1	FLL	AG1	LL	AG1	FALSE
SKJ	FLL	OMN	FLL	AG1	FLL	AG1	LL	AG1	FALSE
SKJ	FLL	TWN	FLL	AG1	FLL	AG1	LL	AG1	FALSE
SKJ	LL	CHN	FLL	AG1	FLL	AG1	LL	AG1	FALSE
SKJ	LL	IND	LL	AG3	LL	AG2	LL	AG1	FALSE
SKJ	LL	JPN	LL	AG1	LL	AG1	LL	AG1	TRUE
SKJ	LL	KOR	LL	AG1	LL	AG1	LL	AG1	FALSE
SKJ	LL	NEI-DFRZ	LL	AG3	LL	AG2	LL	AG1	FALSE
SKJ	LL	SUN	LL	AG2	LL	AG2	LL	AG1	FALSE
SKJ	LL	THA	LL	AG1	LL	AG1	LL	AG1	FALSE
SKJ	LL	TWN	LL	AG3	LL	AG2	LL	AG1	TRUE
SKJ	FN	MDV	GILL	AG4	GILL	AG1	GILL	AG1	TRUE
SKJ	G/L	LKA	GILL	AG5	GILL	AG2	GILL	AG1	TRUE
SKJ	GILL	AUS	GILL	AG1	GILL	AG1	GILL	AG1	TRUE
SKJ	GILL	BHR	GILL	AG2	GILL	AG1	GILL	AG1	TRUE
SKJ	GILL	DJI	GILL	AG3	GILL	AG1	GILL	AG1	TRUE
SKJ	GILL	IDN	GILL	AG1	GILL	AG1	GILL	AG1	TRUE
SKJ	GILL	IND	GILL	AG2	GILL	AG1	GILL	AG1	TRUE
SKJ	GILL	IRN	GILL	AG2	GILL	AG1	GILL	AG1	TRUE
SKJ	GILL	JOR	GILL	AG2	GILL	AG1	GILL	AG1	TRUE
SKJ	GILL	KEN	GILL	AG3	GILL	AG1	GILL	AG1	TRUE
SKJ	GILL	LKA	GILL	AG2	GILL	AG1	GILL	AG1	TRUE
SKJ	GILL	OMN	GILL	AG2	GILL	AG1	GILL	AG1	TRUE
SKJ	GILL	PAK	GILL	AG2	GILL	AG1	GILL	AG1	TRUE
SKJ	GILL	QAT	GILL	AG2	GILL	AG1	GILL	AG1	TRUE
SKJ	GILL	SYC	GILL	AG3	GILL	AG1	GILL	AG1	TRUE
SKJ	GILL	TMP	GILL	AG1	GILL	AG1	GILL	AG1	TRUE
SKJ	GILL	TWN	GILL	AG5	GILL	AG2	GILL	AG1	TRUE
SKJ	GILL	TZA	GILL	AG3	GILL	AG1	GILL	AG1	TRUE
SKJ	GILL	YEM	GILL	AG2	GILL	AG1	GILL	AG1	TRUE
SKJ	GIOF	LKA	GILL	AG5	GILL	AG2	GILL	AG1	TRUE

Species	Gear	Fleet	GearA	FleetA	GearA2	FleetA2	GearA3	FleetA3	UseStrata
SKJ	HAND	AUS	HAND	AG1	LINE	AG1	ART	AG1	TRUE
SKJ	HAND	BGD	HAND	AG4	LINE	AG1	ART	AG1	TRUE
SKJ	HAND	COM	HAND	AG2	LINE	AG1	ART	AG1	TRUE
SKJ	HAND	FRA-REU	HAND	AG3	LINE	AG1	ART	AG1	TRUE
SKJ	HAND	FRAT	HAND	AG2	LINE	AG1	ART	AG1	TRUE
SKJ	HAND	GBRT	HAND	AG5	LINE	AG1	ART	AG1	TRUE
SKJ	HAND	IDN	HAND	AG1	LINE	AG1	ART	AG1	TRUE
SKJ	HAND	IND	HAND	AG4	LINE	AG1	ART	AG1	TRUE
SKJ	HAND	IRN	HAND	AG4	LINE	AG1	ART	AG1	TRUE
SKJ	HAND	KEN	HAND	AG2	LINE	AG1	ART	AG1	TRUE
SKJ	HAND	LKA	HAND	AG5	LINE	AG1	ART	AG1	TRUE
SKJ	HAND	MDV	HAND	AG5	LINE	AG1	ART	AG1	TRUE
SKJ	HAND	SYC	HAND	AG5	LINE	AG1	ART	AG1	TRUE
SKJ	HAND	TZA	HAND	AG2	LINE	AG1	ART	AG1	TRUE
SKJ	HAND	ZAF	HAND	AG3	LINE	AG1	ART	AG1	TRUE
SKJ	LL	LKA	HAND	AG5	LINE	AG1	ART	AG1	FALSE
SKJ	LLCO	MDV	HAND	AG6	LINE	AG1	ART	AG1	TRUE
SKJ	TROL	AUS	TROL	AG1	LINE	AG1	ART	AG1	TRUE
SKJ	TROL	COM	TROL	AG2	LINE	AG1	ART	AG1	TRUE
SKJ	TROL	FRA-REU	TROL	AG3	LINE	AG1	ART	AG1	TRUE
SKJ	TROL	FRAT	TROL	AG2	LINE	AG1	ART	AG1	TRUE
SKJ	TROL	IDN	TROL	AG1	LINE	AG1	ART	AG1	TRUE
SKJ	TROL	IND	TROL	AG4	LINE	AG1	ART	AG1	TRUE
SKJ	TROL	JOR	TROL	AG4	LINE	AG1	ART	AG1	TRUE
SKJ	TROL	LKA	TROL	AG5	LINE	AG1	ART	AG1	TRUE
SKJ	TROL	MDV	TROL	AG5	LINE	AG1	ART	AG1	TRUE
SKJ	TROL	MUS	TROL	AG3	LINE	AG1	ART	AG1	TRUE
SKJ	TROL	MYS	TROL	AG1	LINE	AG1	ART	AG1	TRUE
SKJ	TROL	SYC	TROL	AG3	LINE	AG1	ART	AG1	TRUE
SKJ	TROLM	MDV	TROL	AG5	LINE	AG1	ART	AG1	TRUE
SKJ	TROLN	MDV	TROL	AG5	LINE	AG1	ART	AG1	TRUE
SKJ	PS	AUS	PS	AG1	PS	AG1	PS	AG1	FALSE
SKJ	PS	ESP	PS	AG2	PS	AG2	PS	AG1	TRUE
SKJ	PS	FRA	PS	AG3	PS	AG2	PS	AG1	TRUE
SKJ	PS	FRAT	PS	AG3	PS	AG2	PS	AG1	TRUE
SKJ	PS	IRN	PS	AG5	PS	AG2	PS	AG1	TRUE
SKJ	PS	JPN	PS	AG4	PS	AG3	PS	AG1	FALSE
SKJ	PS	MUS	PS	AG4	PS	AG3	PS	AG1	FALSE
SKJ	PS	NEI-OTH	PS	AG5	PS	AG2	PS	AG1	TRUE
SKJ	PS	NEI-SUN	PS	AG6	PS	AG4	PS	AG1	FALSE
SKJ	PS	SUN	PS	AG6	PS	AG4	PS	AG1	FALSE
SKJ	PS	SYC	PS	AG5	PS	AG2	PS	AG1	TRUE
SKJ	PS	THA	PS	AG6	PS	AG4	PS	AG1	FALSE
SKJ	PSS	IDN	PSS	AG1	PSS	AG1	PS	AG1	FALSE
SKJ	PSS	IND	PSS	AG1	PSS	AG1	PS	AG1	FALSE
SKJ	PSS	SUN	PSS	AG2	PSS	AG1	PS	AG1	FALSE
SKJ	BS	IDN	PSS	AG1	PSS	AG1	ART	AG1	TRUE
SKJ	RIN	LKA	PSS	AG1	PSS	AG1	PS	AG1	FALSE
SKJ	HARP	LKA	HARP	AG1	ART	AG1	ART	AG1	TRUE

APPENDIX VII
Total catches and total number of fish estimated per species, gear and year

a/Bigeye tuna

Bigeye tuna Catches in number of fish

Year	PS	BB	GILL	LL	ELL	FLL	HAND	TROL	ART	Total
1950							14	0		14
1951							25	1		25
1952				6,459			18	0		6,477
1953				36,802			11	0		36,813
1954				144,913			9	0		144,923
1955				205,207			8	0		205,215
1956				267,800			9	0		267,809
1957				259,227			10	0		259,238
1958				247,456			11	0		247,467
1959				211,750			11	0		211,761
1960				343,785			13	0		343,799
1961				319,820			16	0		319,836
1962				398,990			23	1		399,013
1963				293,922			28	1		293,951
1964				377,402			25	1		377,427
1965				414,746			24	1		414,770
1966				501,233			26	1		501,259
1967				539,447			30	1		539,478
1968				855,542			36	1		855,579
1969				728,514			39	1		728,555
1970		41,693		678,377			31	1		720,101
1971		24,542		514,916			22	1		539,480
1972		29,133		451,314			29	1		480,477
1973		62,797		357,748		635	35	1		421,216
1974		61,109		617,572		5,428	38	1		684,148
1975		55,032		929,812		9,725	25	1		994,595
1976		75,764		750,704		8,029	53	3		834,553
1977		86,006		705,644		7,071	73	5		798,798
1978	690	63,432		1,029,312		10,011	81	7		1,103,533
1979	138	64,448		782,360		9,590	104	7		856,649
1980	3,583	50,742		822,401	4,843	14,165	87	10		895,830
1981	2,415	110,856		803,748	4,022	12,469	115	12		933,638
1982	19,796	50,085	113	934,155	3,986	20,194	44	46		1,028,420
1983	81,328	91,814	124	1,070,053	7,202	51,084	20	71		1,301,696
1984	650,520	175,068		816,850	2,195	54,828	105	64		1,699,629
1985	1,325,821	151,860	690	983,609	1,689	64,886	21	67		2,528,643
1986	1,686,100	102,812	11,946	1,039,088	4,907	18,884	21	71		2,863,830
1987	2,437,883	156,724	4,972	1,048,563	1,183	57,242	20	119		3,706,706
1988	2,964,223	149,724	83,405	1,085,639	1,967	127,599	20	76		4,412,653
1989	2,718,517	145,980	21,326	1,001,493	620	379,071	779	178		4,267,966
1990	2,115,653	156,938	9,587	984,600	267	380,416	784	250		3,648,496
1991	2,399,189	261,300	7,079	937,220	805	400,365	1,253	203		4,007,414
1992	1,982,544	209,472	1,006	968,667	6,898	426,250	547	709		3,596,094
1993	2,591,144	272,462	6,527	1,359,572	15,753	454,560	498	1,033		4,701,549
1994	3,644,335	439,183	50,351	1,360,134	5,651	613,383	585	723	1,043	6,115,389
1995	4,806,652	361,426	1,350,350	1,775,160	2,329	689,596	615	806	434	8,987,369
1996	4,679,771	231,211	12,963	1,648,990	4,376	539,897	1,177	752	52	7,119,190
1997	8,512,815	190,272	6,822	1,663,828	5,491	588,392	913	1,381	27	10,969,941
1998	4,876,879	262,660	10,552	2,039,856	11,279	784,590	741	354	30	7,986,941
1999	8,156,686	548,239	2,916	1,896,594	23,123	772,800	598	1,354		11,402,310
2000	5,632,385	304,880	413	1,866,853	17,415	590,460	576	1,407		8,414,389
2001	5,350,809	502,507	2,162	1,573,119	26,237	718,863	566	707		8,174,971
2002	6,820,961	625,003	4,141	1,538,114	27,910	797,236	583	695		9,814,644
2003	3,868,591	614,850	27,554	1,730,591	34,613	430,248	773	608		6,707,828
2004	3,999,772	552,429	31,477	1,741,673	26,711	559,407	3,930	771		6,916,170
2005	3,737,760	552,832	31,275	1,642,255	37,435	496,654	4,299	710		6,503,221

Bigeye tuna Catches in weight (tons)

Year	PS	BB	GILL	LL	ELL	FLL	HAND	TROL	ART	Total
1950							1	0		1
1951							1	0		1
1952				280			1	0		281
1953				1,653			0	0		1,653
1954				6,850			0	0		6,851
1955				9,739			0	0		9,740
1956				12,846			0	0		12,846
1957				11,991			0	0		11,992
1958				11,655			0	0		11,655
1959				9,868			0	0		9,869
1960				16,115			1	0		16,115
1961				14,950			1	0		14,951
1962				18,481			1	0		18,482
1963				13,303			1	0		13,304
1964				18,026			1	0		18,027
1965				19,538			1	0		19,539
1966				24,130			1	0		24,131
1967				24,762			1	0		24,763
1968				39,501			1	0		39,502
1969				30,427			2	0		30,428
1970		83		27,753			1	0		27,837
1971		51		22,959			1	0		23,011
1972		61		19,994			1	0		20,056
1973		130		17,389		29	1	0		17,550
1974		127		28,112		239	1	0		28,479
1975		103		37,242		428	1	0		37,774
1976		142		28,233		310	2	0		28,687
1977		160		35,589		319	3	0		36,071
1978	5	119		50,105		438	3	0		50,670
1979	1	132		33,057		420	4	0		33,614
1980	21	105		34,150	183	528	3	0		34,991
1981	13	230		34,206	170	459	4	0		35,083
1982	116	105	3	42,389	176	815	2	2		43,608
1983	587	193	3	47,258	314	1,939	1	3		50,297
1984	4,020	369		37,211	115	2,359	4	2		44,080
1985	7,158	319	16	42,391	74	2,403	1	3		52,364
1986	10,626	216	278	45,774	206	725	1	3		57,828
1987	13,400	332	109	48,754	53	2,417	1	3		65,069
1988	15,058	317	1,935	51,836	90	5,128	1	3		74,368
1989	11,980	307	495	42,742	24	13,890	28	7		69,474
1990	12,667	294	218	44,144	12	16,318	29	7		73,689
1991	15,624	484	164	44,603	39	16,192	46	7		77,159
1992	11,259	388	24	38,295	261	21,609	20	25		71,880
1993	16,013	505	6	64,964	520	19,960	18	27		102,014
1994	18,881	510	104	63,042	252	27,348	21	26	3	110,188
1995	28,381	473	706	67,100	107	22,597	22	29	3	119,418
1996	24,529	630	204	70,536	186	30,740	42	28	2	126,897
1997	33,964	540	297	74,374	219	37,836	40	51	2	147,323
1998	28,333	606	291	78,378	418	33,307	27	13	1	141,374
1999	40,659	1,007	84	70,028	963	37,646	22	50		150,458
2000	29,858	560	9	69,214	783	28,374	21	51		128,870
2001	23,718	923	37	59,910	895	29,482	21	26		115,011
2002	29,043	1,148	41	67,899	1,038	35,707	21	25		134,923
2003	22,946	1,129	93	77,944	1,145	20,680	28	22		123,989
2004	22,585	1,015	93	75,787	1,048	25,797	164	28		126,517
2005	25,735	1,015	93	61,388	1,530	23,386	164	26		113,337

b/Yellowfin tuna

Yellowfin tuna Catches in number of fish

Year	PS	BB	GILL	LL	ELL	FLL	HAND	TROL	PSS	Total
1950		527,236	202,686				26,631	40,748		797,300
1951		527,236	330,047				55,255	41,946		954,484
1952		527,236	312,481	62,801			52,424	49,430		1,004,373
1953		527,236	274,146	120,707			51,368	24,580		998,037
1954		527,236	282,714	429,025			43,372	49,250		1,331,598
1955		702,981	284,859	870,828			41,571	49,215		1,949,454
1956		702,981	300,788	1,180,321			45,592	42,075		2,271,757
1957		702,981	556,556	636,562			48,530	42,154		1,986,784
1958		1,108,082	551,709	520,744			51,090	42,138		2,273,764
1959		1,172,002	498,912	572,586			52,107	49,418		2,345,025
1960		620,470	612,412	900,372			58,680	42,320		2,234,253
1961		509,832	681,877	779,024			74,533	42,839		2,088,106
1962		500,165	672,488	1,174,782			107,380	43,718		2,498,533
1963		499,051	859,788	614,077			126,543	44,231	720	2,144,410
1964		499,051	857,109	577,721			124,588	44,129	3,168	2,105,767
1965		326,598	880,239	750,635			129,121	48,075	1,728	2,136,397
1966		489,897	998,652	1,199,007			139,493	48,342		2,875,391
1967		534,157	1,082,432	952,606			146,234	63,179		2,778,608
1968		534,157	1,157,672	2,752,099			157,131	74,478		4,675,537
1969		565,578	1,218,392	1,615,997			167,932	74,570		3,642,469
1970		831,301	1,032,530	859,013			137,893	89,692		2,950,430
1971		455,638	953,380	1,105,442			116,050	135,242		2,765,752
1972		955,771	1,247,793	873,078			154,965	159,772		3,391,380
1973		2,615,255	1,955,611	468,845		2,748	191,252	161,482		5,395,193
1974		2,111,533	2,331,229	531,439		7,717	160,438	258,764	15,041	5,416,161
1975		1,760,834	1,857,629	724,101		18,850	107,431	355,137	27,726	4,851,708
1976		1,849,838	2,668,419	567,917		27,190	196,710	412,300	38,919	5,761,291
1977	2,688	1,785,017	2,576,833	951,218		31,262	278,488	601,138	50,734	6,277,378
1978	16,996	1,330,302	2,786,505	861,828	388	33,656	361,493	415,415	50,454	5,857,037
1979	8,142	1,587,842	3,122,261	693,974		35,270	428,543	292,557	54,479	6,223,068
1980	11,513	2,188,378	3,007,842	547,362	2,367	56,129	564,803	396,343	57,496	6,832,234
1981	30,275	2,157,614	2,536,999	599,858	5,911	73,492	245,992	337,539	58,941	6,046,621
1982	92,626	2,654,915	3,789,677	873,991	6,138	67,296	964,481	493,058	106,682	9,048,864
1983	1,043,746	5,528,013	3,155,434	777,668	11,100	23,010	709,465	622,194	146,129	12,016,760
1984	4,785,839	6,398,621	2,707,532	592,231	3,049	19,790	721,870	981,658	152,066	16,362,656
1985	7,655,705	2,274,074	2,751,179	761,292	4,149	20,379	1,401,148	1,369,769	147,508	16,385,205
1986	4,667,382	1,375,991	3,049,016	1,180,954	6,178	20,720	1,210,747	1,990,952	136,616	13,638,556
1987	5,157,566	1,759,540	1,813,211	1,157,744	2,142	34,602	1,488,916	3,589,615	154,925	15,158,263
1988	9,985,662	1,482,074	2,750,493	1,287,014	2,992	135,060	1,683,031	3,029,995	162,242	20,518,563
1989	8,793,703	1,787,630	3,755,901	1,171,184	9,672	822,317	2,732,292	1,714,906	183,265	20,970,870
1990	9,948,676	1,168,109	3,179,470	1,549,425	2,617	865,266	2,960,856	1,579,210	196,972	21,450,603
1991	7,147,157	2,166,841	3,091,488	1,110,030	2,603	856,562	5,634,172	1,543,439	148,819	21,701,111
1992	7,684,672	2,171,396	4,070,900	2,560,942	3,811	1,046,730	3,552,430	1,551,818	213,157	22,855,858
1993	8,424,872	2,886,127	4,597,657	6,280,265	6,353	1,153,517	1,134,100	895,773	462,405	25,841,070
1994	9,215,147	5,927,958	6,084,500	2,102,491	24,943	2,205,066	1,047,393	1,185,958	558,686	28,352,141
1995	11,943,695	5,480,025	8,332,715	1,272,642	9,314	1,800,437	675,379	1,249,166	548,747	31,312,121
1996	14,969,544	4,276,225	6,988,575	1,588,565	9,442	1,806,045	787,701	1,380,843	542,702	32,349,643
1997	20,083,448	3,833,522	6,401,831	1,140,109	15,989	1,325,061	614,839	1,354,185	554,832	35,323,817
1998	10,993,491	5,310,786	6,594,250	1,600,806	24,017	1,131,052	887,341	2,133,563	331,946	29,007,252
1999	22,756,957	4,778,744	8,600,010	1,330,737	39,083	1,264,875	842,276	2,388,144	344,846	42,345,671
2000	15,350,271	3,078,243	6,334,120	1,242,647	34,707	1,039,504	647,040	2,057,178	545,204	30,328,915
2001	13,482,680	3,333,935	5,681,423	1,073,464	41,690	878,919	793,274	2,806,366	574,519	28,666,271
2002	19,193,880	2,458,266	5,900,464	1,276,029	26,058	739,463	2,514,609	2,549,020	1,003,192	35,660,981
2003	19,932,959	3,644,871	8,616,188	1,305,785	26,549	616,313	2,907,752	3,268,360	514,145	40,832,922
2004	17,783,638	4,373,121	7,324,788	2,547,340	25,790	665,348	1,341,634	2,956,684	250,752	37,269,096
2005	15,986,813	685,739	7,358,129	2,912,685	43,211	658,401	2,083,739	4,192,740	197,257	34,118,715

Yellowfin tuna Catches in weight (tons)

Year	PS	BB	GILL	LL	ELL	FLL	HAND	TROL	PSS	Total
1950		1,500	2,131				247	295		4,172
1951		1,500	2,960				450	301		5,212
1952		1,500	2,789	3,683			386	351		8,709
1953		1,500	2,588	6,757			396	171		11,412
1954		1,500	2,673	21,876			283	348		26,680
1955		2,000	2,709	44,853			264	347		50,173
1956		2,000	2,742	60,575			303	297		65,917
1957		2,000	3,697	33,117			338	298		39,450
1958		2,000	3,107	24,471			357	299		30,234
1959		2,000	3,295	24,564			371	352		30,582
1960		1,000	3,884	38,298			435	302		43,919
1961		1,500	4,434	35,610			532	306		42,382
1962		1,500	5,317	47,662			741	315		55,533
1963		1,500	7,031	25,386			932	322	5	35,177
1964		1,500	7,461	25,290			903	321	22	35,497
1965		1,000	7,669	27,690			894	347	12	37,612
1966		1,500	8,946	45,745			988	351		57,529
1967		1,700	9,536	34,037			1,070	459		46,802
1968		1,700	10,037	78,615			1,174	542		92,068
1969		1,800	10,199	53,948			1,300	548		67,795
1970		2,323	8,897	32,383			1,115	674		45,392
1971		1,381	7,983	34,376			882	919		45,541
1972		2,573	10,522	31,519			1,143	1,031		46,787
1973		7,401	15,386	21,611		114	1,340	1,117		46,969
1974		6,217	13,529	23,196		300	1,230	1,698	82	46,251
1975		4,786	13,950	24,666		686	876	1,989	151	47,104
1976		5,218	20,003	20,919		967	1,593	2,337	216	51,254
1977	34	4,897	19,175	44,125		1,301	1,717	4,587	281	76,117
1978	215	3,822	20,790	35,630	17	1,345	1,903	3,159	286	67,166
1979	103	4,396	24,125	25,433		1,441	2,304	2,424	324	60,551
1980	130	6,128	22,471	20,623	78	2,126	5,435	4,015	341	61,347
1981	264	6,124	19,281	21,650	198	2,591	2,553	2,897	350	55,907
1982	1,166	4,858	19,590	31,544	238	2,741	3,661	1,969	435	66,201
1983	12,626	7,797	14,862	29,886	417	829	2,856	2,547	608	72,428
1984	58,241	8,401	15,572	24,525	131	815	2,352	3,222	643	113,903
1985	68,760	7,329	16,010	29,496	170	787	4,359	3,807	765	131,483
1986	73,427	6,367	18,880	44,338	219	743	3,135	4,470	861	152,439
1987	83,795	7,693	19,358	45,608	81	1,300	3,044	7,351	879	169,109
1988	118,566	6,101	31,803	49,936	113	4,926	3,478	6,390	922	222,236
1989	89,656	5,756	37,994	38,998	328	26,004	7,997	5,038	998	212,768
1990	108,697	5,248	32,773	52,162	92	33,809	9,582	5,234	1,038	248,636
1991	105,402	7,459	30,596	45,939	111	32,745	18,548	5,619	828	247,247
1992	112,838	8,527	45,348	94,968	158	41,581	12,598	11,135	1,164	328,317
1993	128,400	9,784	45,841	155,559	192	39,917	12,879	11,991	2,556	407,120
1994	114,370	12,817	64,824	65,099	771	54,830	11,601	14,243	3,097	341,653
1995	149,420	12,192	70,863	44,374	383	42,864	7,322	14,898	3,042	345,358
1996	129,673	11,960	73,173	59,574	383	53,787	8,063	16,312	3,226	356,150
1997	132,153	12,688	69,897	44,480	654	64,122	7,680	17,924	3,307	352,904
1998	100,380	13,440	68,647	53,718	975	53,129	7,903	19,478	3,180	320,849
1999	134,765	13,102	84,937	41,898	983	59,041	7,707	21,857	3,452	367,743
2000	140,255	10,637	65,430	42,505	1,125	45,391	7,973	27,260	3,649	344,224
2001	129,967	11,643	60,264	38,587	1,694	38,796	8,230	30,527	3,002	322,711
2002	138,992	16,880	61,779	47,500	1,186	31,787	20,047	24,722	3,219	346,113
2003	224,076	16,669	80,546	50,883	1,297	28,828	22,419	26,951	3,322	454,991
2004	230,511	14,867	105,469	71,764	974	30,260	14,025	40,315	3,323	511,508
2005	198,171	14,867	105,469	88,141	1,163	31,288	14,025	40,298	3,323	496,746

c/Skipjack tuna

Skipjack tuna Catches in number of fish

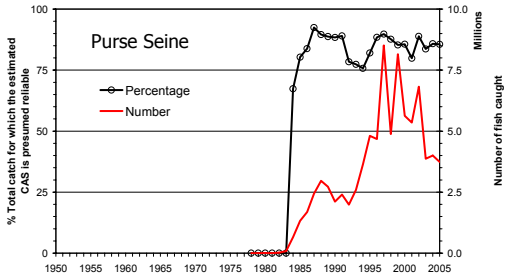
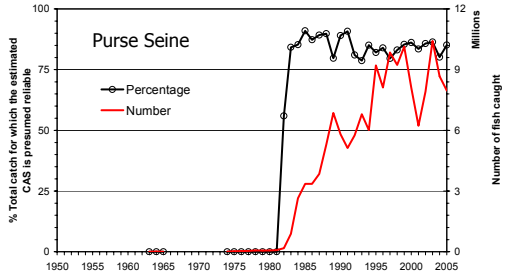
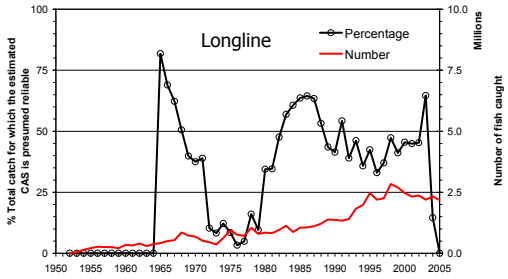
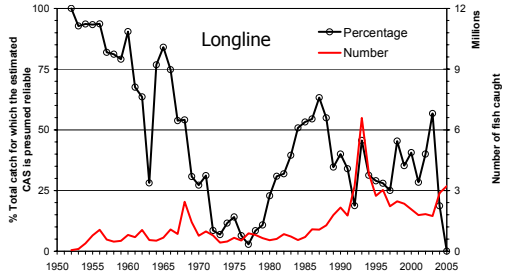
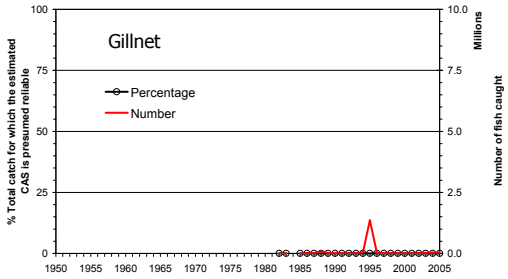
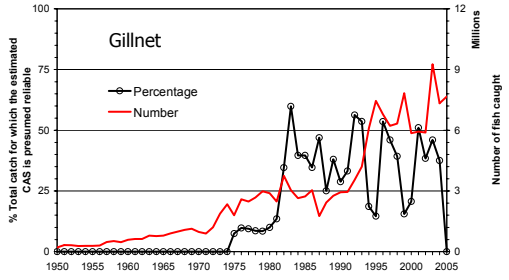
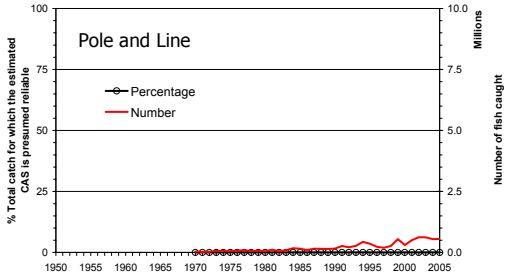
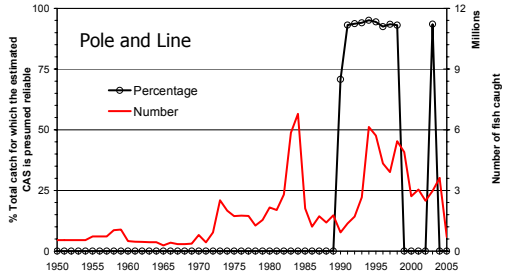
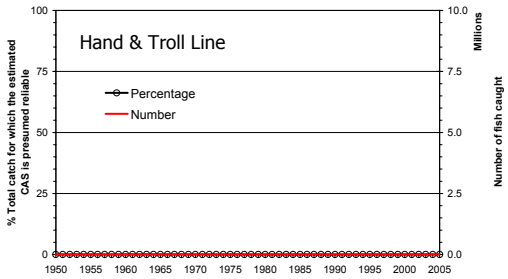
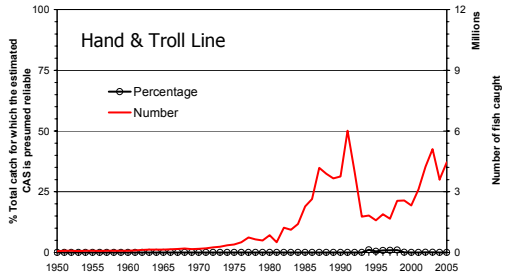
Year	PS	BB	GILL	LL	ELL	FLL	HAND	TROL	PSS	Total
1950		2,660,269	460,843				126,133	7,284		3,254,529
1951		726,010	802,925				175,962	10,244		1,715,142
1952		3,091,503	738,610				134,084	10,163		3,974,360
1953		3,450,989	685,897				118,408	4,931		4,260,224
1954		3,486,925	711,603	0			119,021	9,848		4,327,397
1955		3,486,925	707,437	0			147,580	9,759		4,351,700
1956		3,522,861	780,528	0			163,370	10,457		4,477,216
1957		3,810,475	1,129,145	0			144,238	10,864		5,094,722
1958		4,568,086	999,434	0			156,287	10,985		5,734,792
1959		4,872,164	1,019,668	0			162,226	11,162		6,065,220
1960		5,857,712	1,243,944	0			188,884	11,595		7,302,136
1961		3,315,026	1,426,718	0			226,672	13,293		4,981,710
1962		3,384,028	1,768,023	0			302,603	16,324		5,470,978
1963		3,427,677	2,263,675	0			380,789	19,443	14,481	6,106,065
1964		3,463,575	2,411,514	30			375,034	19,301	66,071	6,335,525
1965		5,562,737	2,459,015	63			373,044	19,366	3,319	8,417,545
1966		6,553,845	2,889,785	58			431,761	21,174		9,896,622
1967		7,107,893	3,093,489	33			465,024	27,157		10,693,596
1968		6,724,974	3,329,595	336			527,907	33,818		10,616,630
1969		7,491,481	3,487,360	200			512,812	35,318		11,527,170
1970		9,148,681	3,495,153	24,543			740,573	467,422		13,876,371
1971		9,123,286	3,038,412	19,938			691,865	486,166		13,359,667
1972		5,893,160	4,637,633	28,184			806,374	686,101		12,051,452
1973		8,001,367	5,573,964	4,016			960,447	719,750		15,259,543
1974		10,847,177	5,576,710	4,489			916,134	1,099,696	95,327	18,539,534
1975		5,605,633	7,283,208	3,506			943,884	2,200,306	175,449	16,211,986
1976		6,027,433	10,029,655	1,975			1,296,043	2,676,278	251,949	20,283,333
1977	50,486	4,680,738	11,729,500	803			1,203,553	233,001	329,132	18,227,213
1978	351,104	4,556,283	10,373,242	2,668			1,143,658	229,975	338,890	16,995,820
1979	230,448	5,702,309	11,506,446	2,354			863,572	557,349	387,936	19,250,414
1980	507,146	7,199,654	13,963,192	2,619			1,041,762	653,378	395,094	23,762,845
1981	700,402	6,484,828	28,520,169	4,999	362		1,120,889	1,051,393	438,583	38,321,625
1982	1,371,135	8,164,985	21,177,420	2,742	124		929,410	1,228,015	535,375	33,409,205
1983	3,944,513	9,625,128	17,999,477	2,026	251		797,355	1,185,338	613,160	34,167,249
1984	15,789,701	23,128,311	17,660,412	3,068			697,220	1,157,277	392,732	58,828,722
1985	19,611,137	13,911,485	19,242,223	6,650			1,683,777	712,418	693,279	55,860,968
1986	20,433,282	12,932,752	17,468,727	4,398			701,628	796,150	1,311,532	53,648,469
1987	22,367,460	15,378,541	14,642,237	2,588			1,116,061	11,874,974	757,787	66,139,649
1988	31,747,647	22,016,138	18,383,743	9,701	268		2,786,424	1,720,294	1,090,905	77,755,121
1989	39,511,915	16,543,463	24,699,267	15,745	154		1,338,657	2,362,633	1,203,442	85,675,276
1990	37,599,009	21,491,687	18,414,270	16,596			2,187,843	2,058,655	1,000,949	82,769,008
1991	43,457,650	27,967,520	12,521,311	5,706			16,329,060	1,511,384	540,115	102,332,746
1992	47,920,570	30,584,420	15,807,432	12,683			5,811,736	1,747,276	1,363,170	103,247,287
1993	56,214,685	32,240,917	18,509,070	36,185	0	75	8,711,068	7,129,880	2,309,345	125,151,225
1994	65,185,997	29,822,357	20,169,659	14,702	510	57	5,519,787	9,576,155	2,648,498	132,937,724
1995	67,568,955	24,205,123	36,224,036	17,659	174	68	564,067	1,033,641	2,583,978	132,197,703
1996	58,767,949	29,186,027	44,707,578	12,557	3	300	894,268	1,212,984	3,029,400	137,811,065
1997	58,329,009	25,673,149	43,004,654	10,452	174	1,613	407,759	1,082,348	3,277,682	131,786,839
1998	55,275,031	20,705,786	44,322,674	13,326	180	1,796	358,352	1,067,260	2,944,991	124,689,395
1999	75,143,743	20,561,858	50,879,715	10,905	123	1,034	177,316	857,788	3,134,491	150,766,973
2000	64,604,634	26,521,118	44,156,504	8,007	7	235	139,844	4,800,490	3,308,213	143,539,053
2001	67,658,642	27,466,806	40,950,363	1,700	109	1,099	112,905	6,432,126	3,524,206	146,147,956
2002	95,744,880	27,363,376	36,231,106	2,455	46	24	2,290,349	7,454,818	3,547,206	172,634,260
2003	69,190,746	32,879,346	37,087,667	3,659	626	188,362	6,339,861	5,788,980	3,380,125	154,859,371
2004	61,063,427	34,518,863	46,118,817	4,704	894	150,878	6,006,664	4,708,197	3,321,866	155,894,308
2005	70,830,409	33,398,792	40,864,954	13,125	922	144,240	5,792,942	4,930,126	3,257,711	159,233,222

Skipjack tuna Catches in weight (tons)

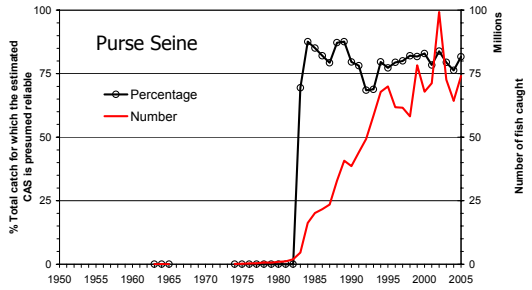
Year	PS	BB	GILL	LL	ELL	FLL	HAND	TROL	PSS	Total
1950		8,200	2,081				444	26		10,751
1951		2,100	3,456				655	34		6,244
1952		9,400	3,146				519	33		13,098
1953		10,500	2,954				460	15		13,929
1954		10,600	3,054	0			465	31		14,149
1955		10,600	3,039	0			554	30		14,223
1956		10,700	3,345	0			615	33		14,693
1957		11,600	4,708	0			561	35		16,903
1958		11,700	3,980	0			598	37		16,315
1959		11,600	4,078	0			620	38		16,336
1960		10,600	4,943	0			717	42		16,302
1961		10,100	5,789	0			869	49		16,808
1962		10,100	7,701	0			1,158	63		19,022
1963		10,200	10,186	0			1,447	76	48	21,956
1964		10,300	10,928	0			1,426	75	219	22,948
1965		16,700	11,166	0			1,421	75	11	29,373
1966		19,700	13,246	0			1,636	83		34,665
1967		21,600	13,847	0			1,761	104		37,312
1968		20,400	14,836	2			1,991	127		37,357
1969		22,700	15,399	1			2,187	136		40,424
1970		27,870	15,032	162			2,761	1,441		47,266
1971		28,030	12,885	136			2,528	1,356		44,935
1972		17,895	19,656	193			2,959	1,763		42,464
1973		24,553	23,328	28			3,448	1,914		53,270
1974		33,394	23,362	31			3,271	2,738	258	63,054
1975		17,095	29,475	25			3,432	5,087	475	55,589
1976		18,650	40,281	14			4,799	6,334	682	70,760
1977	132	14,259	46,212	6			4,446	827	891	66,773
1978	918	13,964	40,999	18			4,211	826	918	61,853
1979	607	17,648	45,521	16			3,370	1,837	1,051	70,049
1980	1,420	22,214	54,018	17			4,092	2,217	1,066	85,043
1981	2,003	19,874	63,826	32	3		4,387	3,135	1,186	94,445
1982	4,185	16,587	64,995	20	1		2,924	3,872	1,546	94,131
1983	11,848	20,516	65,504	12	2		2,802	4,046	2,163	106,894
1984	45,710	33,286	67,582	28			2,398	3,453	1,455	153,911
1985	60,361	43,161	64,430	52			6,280	2,023	3,388	179,695
1986	66,627	46,114	69,439	37			2,387	2,160	3,287	190,050
1987	78,990	43,870	52,511	16			2,547	23,661	2,293	203,887
1988	92,825	59,896	76,492	75	2		5,403	3,863	3,389	241,946
1989	126,719	59,028	94,214	99	1		3,491	6,167	3,548	293,268
1990	108,241	62,235	80,905	107			5,469	5,537	3,529	266,023
1991	122,789	65,030	54,084	35			36,593	4,225	1,461	284,217
1992	151,392	64,648	62,208	76			25,396	5,224	3,723	312,668
1993	163,923	71,926	70,703	219	0	0	27,094	22,428	6,308	362,601
1994	179,174	75,753	87,778	95	3	0	21,453	35,164	7,285	406,706
1995	179,400	76,844	137,905	114	1	0	1,986	3,647	7,107	407,006
1996	149,161	73,422	154,030	78	0	2	3,510	4,264	8,195	392,663
1997	145,374	76,795	181,143	66	1	8	1,590	3,854	8,864	417,696
1998	150,040	81,235	171,495	90	1	10	1,274	3,618	8,384	416,148
1999	193,248	99,959	203,739	86	1	7	587	2,947	8,924	509,498
2000	196,890	86,263	192,083	61	0	2	495	22,601	9,221	507,616
2001	189,604	89,509	175,506	12	1	5	402	33,004	8,831	496,874
2002	238,583	117,025	161,987	11	0	0	9,281	28,647	7,816	563,351
2003	218,289	110,626	161,720	22	4	668	25,446	21,529	8,080	546,383
2004	167,084	108,542	205,517	31	6	485	23,157	17,573	9,079	531,474
2005	217,335	108,542	205,517	88	6	398	23,157	17,584	9,079	581,706

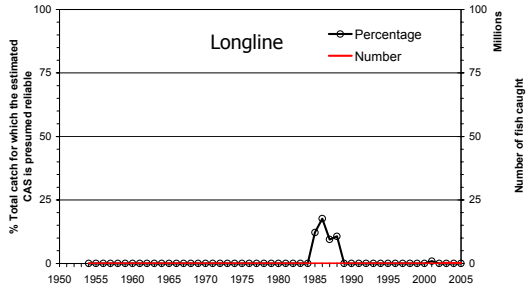
APPENDIX VIII

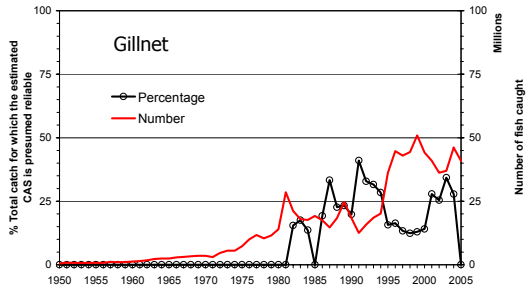
Total numbers of fish estimated (CAS) and amount of catches (number) for which length frequency data are available per species and gear type

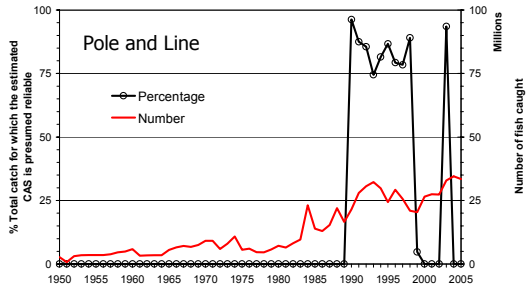
Bigeye tuna	Yellowfin tuna
	
	
	
	
	

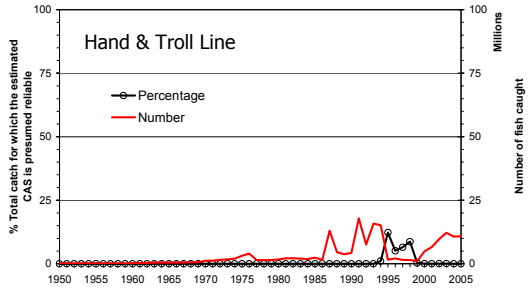
Skipjack tuna











APPENDIX IX

Total numbers of bigeye tuna estimated per age class and year (LL+PS)

Year	noA00	noA01	noA02	noA03	noA04	noA05	noA06+
1952	9	87	1,336	2,328	1,798	668	233
1953	23	929	6,417	12,462	10,592	4,674	1,701
1954	252	4,421	25,881	43,136	37,080	20,732	13,383
1955	414	7,065	36,217	60,393	52,112	29,091	19,865
1956	349	9,665	47,960	76,217	66,401	38,559	28,588
1957	411	12,234	49,395	75,586	62,622	34,770	24,149
1958	573	13,101	46,495	68,442	58,254	33,234	27,293
1959	388	10,629	40,393	59,870	50,470	28,414	21,522
1960	506	14,421	65,703	98,647	83,412	46,445	34,581
1961	794	13,859	59,861	91,483	78,720	43,917	31,120
1962	630	16,420	77,577	117,215	96,972	53,137	36,956
1963	370	13,475	59,580	88,695	70,210	36,739	24,779
1964	0	8,597	65,899	111,667	100,976	57,964	32,203
1965	45	18,906	80,661	115,890	98,146	57,447	43,535
1966	1,522	29,008	98,074	129,019	103,686	70,652	69,144
1967	127	10,754	116,631	161,980	134,681	73,068	42,129
1968	1,935	32,344	161,661	249,262	225,709	119,032	65,501
1969	1,373	41,820	184,964	222,687	155,577	75,317	46,679
1970	4,768	59,779	137,648	222,014	147,735	69,251	37,089
1971	1,411	39,181	103,581	131,175	126,344	72,902	40,234
1972	791	15,648	90,859	145,985	116,029	54,285	27,636
1973	571	5,235	48,641	125,957	93,539	50,963	33,401
1974	10,707	27,356	90,229	190,031	186,827	74,852	42,914
1975	12,078	133,145	214,256	221,537	174,266	115,687	68,495
1976	2,399	63,714	270,615	202,288	102,992	68,872	47,801
1977	1,419	27,872	119,247	198,728	158,781	90,652	115,952
1978	1,484	29,872	139,738	343,059	281,170	140,826	103,778
1979	520	173,500	453,118	192,653	128,473	75,520	36,487
1980	6,997	133,377	273,637	266,815	164,916	69,893	45,860
1981	2,630	72,888	209,307	210,257	154,408	82,261	82,663
1982	13,963	94,490	193,425	292,119	187,811	110,009	103,915
1983	41,450	132,594	260,263	389,009	250,564	105,162	85,213
1984	455,342	188,823	226,037	311,346	195,781	103,992	74,383
1985	941,436	374,853	402,970	389,965	221,229	95,460	56,734
1986	988,432	617,510	357,663	420,428	265,694	95,076	59,208
1987	1,435,077	885,497	350,130	403,691	330,094	123,716	58,616
1988	2,171,568	725,798	268,259	509,270	379,413	121,246	73,137
1989	2,043,333	746,983	424,017	454,341	295,519	124,999	73,367
1990	1,443,379	572,815	348,281	495,314	392,423	158,824	77,597
1991	1,564,393	680,161	337,610	481,763	416,129	183,302	74,898
1992	1,201,039	716,198	410,089	421,931	329,058	157,397	102,960
1993	1,725,529	636,852	358,026	735,429	494,347	212,327	161,217
1994	2,797,297	840,964	458,329	579,386	492,022	275,998	189,126
1995	2,869,080	1,977,885	950,471	739,501	394,767	167,638	151,893
1996	3,427,026	1,150,245	789,411	888,636	495,427	190,359	195,509
1997	6,863,730	1,648,513	653,907	914,471	595,665	239,865	190,731
1998	3,440,870	1,299,814	998,783	958,357	581,876	238,015	163,765
1999	5,930,760	2,087,773	908,654	945,518	571,217	245,370	164,288
2000	4,282,334	1,201,935	972,838	885,438	494,069	188,394	163,669
2001	4,329,065	920,204	992,986	752,423	412,522	173,928	142,500
2002	5,481,438	1,182,920	614,887	850,151	606,383	256,595	173,761
2003	2,841,098	779,979	549,753	862,770	622,979	258,774	157,661
2004	2,704,848	1,040,000	558,888	895,894	835,446	204,956	71,567
2005	2,476,887	1,017,433	709,761	721,116	659,421	194,459	82,994