NOTE ON THE PREPARATION OF CATCH-AT-SIZE DATASETS

IOTC Secretariat

ABSTRACT

The present document summarizes the assumptions and procedures applied to generate catch-at-size matrices for yellowfin (Appendix A) and bigeye (Appendix B) tunas by the WPTT at its 2002 meeting. This documentation will be updated at the next meeting of the WPTT with further detail in the description of the procedures and, especially, on the software used. Most of the calculations for yellowfin tuna were carried out during the meeting and, therefore, the scheme utilized could be subject to improvements in the future. The calculations for bigeye tuna were carried out by the Secretariat prior to the meeting.

OUTSTANDING PROBLEMS FOR CATCH-AT-SIZE OF TROPICAL TUNAS

There are still major areas of uncertainty that can be summarized as follows:

For both yellowfin and bigeye tunas :

1.- The small number of fish measured in recent years in the Japanese LL fishery, compounded by the lack of reporting from Taiwan and the Republic of Korea, means that only a 0.3% of the catch of yellowfin tuna and 0.3% of the total catch of LL have been measured in recent years. This raises concern as to what extent the size-frequency distribution of the longline catch is well represented by those data.

Recommendation: Efforts should continue to increase the sample sizes of fish measured. At least, it will be necessary to specify a minimum sample size for a stratum to be used. If the number of fish measured in the stratum is below that number, then the data would be combined with data from a stratum likely to be similar.

2.- There has been no report of size-frequency data since 1989 for the Taiwanese LL fleet. The lack of these data means that the missing size-frequency data had to be substituted by the Japanese LL SF data. This assumption is clearly questionable as, for those years for which both data sets have been reported, the average size of the fish caught by Taiwanese vessels has been consistently smaller than in the Japanese catch.

Recommendation: Efforts should continue to obtain the original SF data from Taiwan, China. If this is not possible, a method should be developed to adjust for expected differences between the Taiwanese and Japanese LL SF.

3.- The substitutions for the missing Japanese SF in certain strata were only done on area basis. It is possible that it would be more appropriate to use combined time-area strata. The definition of the large areas used could be better defined.

Recommendation: The Secretariat will explore different methods next year.

Affecting yellowfin tuna:

4.- For the baitboat fishery in Maldives, the estimation was done on an yearly basis.

Recommendation: It is possible to work with quarter (possibly month) and atoll as the basic time and area strata. The Secretariat will explore these possibilities for next year.

5.- For catches from Sri Lankan vessels using gillnet/longline gear combination, it was assumed that the size-frequency distribution was the same as that of the gillnet fisheries of Iran, Oman and Pakistan. This is a strong assumption that might be incorrect, either because of the very different areas of operation or because part of the yellowfin tuna is actually caught using a longline gear.

Recommendation: The Secretariat, in association with Sri Lankan scientists, will collect additional information regarding the operation of this fleet.

A WORKPLAN FOR 2003

Tropical tunas

The Secretariat recognizes the importance of completing the preparation of these datasets as early as possible to allow for the various national groups to conduct sufficient analyses.

Most of the software necessary has been completed. Therefore, conditional on the completion of a pending review of the purse seine data for the period 1984-1990, it is likely that catch-at-size datasets could be made available as early as March 31st 2003. These datasets would include the implementation of the relevant portions of the recommendations listed above.

For dissemination of the data, the Secretariat will post the data using standard data formats in the IOTC website and it will send a notification (via e-mail) to those scientists who have participated in the 2002 meeting or those who request to be on

the list of distribution for the WPTT.

Billfish

In anticipation of a meeting of the WPB in 2003, the Secretariat will assess the situation of the available SF data for swordfish, and attempt to produce estimates of catch-at-size for this species. Other species are likely to present very serious difficulties and very small sample sizes. Collaboration with Taiwanese scientists will be of particular important for this species as in recent years the Taiwanese longline fleet has been increasingly targeting swordfish. Known spatial patterns in the SF distribution of swordfish might play a role in the final design of a scheme for substitutions when necessary.

APPENDIX A. PROCESSING OF YFT CATCH BY SIZE DATA

Data available:

- Nominal catches, file NCDB&cde.xls, as of 16/04/2001
- C/E data, file CELL.txt and CEPSBB.txt (CEOTHR.txt not used), as of 06/05/2002
- Size frequency data, file Sfyft.csv as of 07/05/2002

Processing:

Data for LL, PS, BB, GILL and others have been processed - and all raised to the total catch.

The years covered were 1950-2000

YFT LL:

Reformatting

1. Reformatting of C/E data.

The C/E LL data were reformatted to only include stratum header, effort and catch data for YFT, BET and SKJ (the latter for uniform format purpose only, since almost no SKJ are recorded for LL) in number of fish and weight. Certain yearly data were also recoded as month 17.

Calculation of mean weights and Japanese size profiles

2. Japan.

Calculation of mean weights and cumulated size frequency data for the Japanese LL fleet. First the Japanese CE data (all in number of fish) for YFT were cumulated by quarter and 10x20 time -area strata.

The Japanese size frequency data were then cumulated by quarter and 10x20 time-area strata, and they were then raised according to the number of fish reported in the corresponding C/E data.

Since some time -area strata (10x20, quarter and year) were not covered, substitution strata were also prepared. These were: NE, NW, SE, SW, N, S, E, W and total, with the limit East West at 80 degrees.

The formula used for length weight conversions was a=.000018640 and b= 2.97400 (IOTC Secretariat, data from IPTP Penang sampling program)

Mean weights were calculated for all the detailed strata, and then the data for missing strata were completed using mean weights from larger strata. The substitutions were only carried out between area strata and not between time strata.

The mean weights were then output to a file, since they were to be used for conversion to weight of all C/E data reported in number of fish.

The size frequencies were equally completed and output to an intermediate file for all strata.

3. Taiwan, China

The Taiwanese data were recoded into 5x5 degree square and the weight of the data for each stratum was added to the records

4. NEI-ICE

Data were cumulated by quarter and year and output to an intermediate file

Raising of CE

5. First C/E data were cumulated by year. Raising factors were calculated using the corresponding nominal catches and then all available C/E data were raised to the total reported nominal catch. When necessary the data were first converted from number of fish to weight using the mean weights calculated previously for the Japanese size frequency data.

Raising of size data to C/E

6. The raised C/E file was then used to obtain raised size frequency data

All available C/E data were assigned a size 'profile' and the size data were raised to the corresponding catch. The size profiles used were from the Japanese data, except for Taiwan,China where two methods were used:

a) The Japanese data were used , except for the years 85-88, where Taiwanese size frequency data were available.

b) The Japanese size profiles were used for all catch data.

Raising of data to NC for data without C/E

7. Some fleets only reported nominal catches. For these yearly catches (without size nor C/E data), the Japanese size profiles for large strata were used according to the operating areas of

the fleets concerned. First the totals by year of the weights of the size profiles were calculated, thus permitting to obtain raising factors and to raise the size data to the total catch. Quarterly data were then obtained using proportional weights.

Cumulating into quarterly catch by size

8. Finally, all data were cumulated into 2 types of raised files:

a) Country, year and quarter

b) Year and quarter

Table 1 shows the options used for each fleet.

YFT PS:

Reformatting

1. Reformatting of C/E data.

The C/E PS data were reformatted to only include stratum header, effort and catch data for YFT, BET and SKJ (free schools, log schools and unclassified type of gear) in weight (MT). Certain yearly data were also recoded as month 17.

Calculation of mean weights and PS-European fleets size profiles

2. PS-EUR

Calculation of mean weights and cumulated size frequency data for the PS-EUR fleet.

The PS-EUR size frequency data are reported in raised monthly 5x5 format with separation of log and free schools. They were cumulated by quarter and 10 large time-area strata used in general for the PS-EUR fleet processing, see Figure 1.

Since some time-area strata (school, 10areas, quarter and year) were not covered, substitution strata were also prepared. These were: NE, NW, SE, SW, N, S, E, W and total, with the limit East West at 80 degrees.

All size frequencies being expressed in length, the weights of these strata were calculated using the length weight formula with a= 0.000015849 and b= 3.04600 for fish >=64 cm, and a= 0. 000053130 and b= 2.75366 for fish <64 cm (Montaudoin, Hallier and Hassani, IPTP TWS/90/48 (vol. 4)).

Mean weights were calculated for all the detailed and cumulated strata, and then the data for missing strata were completed using mean weights from larger strata. The substitutions were only carried out between area strata and not between time strata. The mean weights were then output to a file, although only for comparison purpose.

The size frequencies were equally completed and output to an intermediate file for all strata.

3. JPN

Data were recoded as area 97(East) and the weight of the data for each stratum was calculated and added.

Raising of C/E

5. First C/E data were cumulated by year. Raising factors were calculated using the corresponding nominal catches and all available C/E data were then raised to the total reported nominal catch.

Raising of size data to C/E

6. The raised C/E file was then used to obtain raised size frequency data

All available C/E data were assigned a size 'profile' according to the time area strata (year, quarter, 10areas and type of school) and the size data selected were raised to the corresponding catch. The size profiles used were from the PS-EUR data, except for Japan East. If the exact school type was detailed in the C/E data, size profiles with the exact school type was used, if not, cumulated profiles for log and free schools (and unclassified) were used.

For Japan, data were available for 1995-2000 with only one record per year, unclassified schools (1998 log and free schools were cumulated). These data were used for the Eastern JPN PS catches, all years (years prior to 1995 were assigned the 1995 profile) and were raised to the total catch.

Raising of data to NC for data without C/E

7. Some fleets only reported nominal catches. For these yearly catches (without size nor C/E data), the PS-EUR size profiles for large strata by quarter (cumulated school type) were used according to the operating areas of the fleets concerned.

First the totals by year of the weights of the size profiles were calculated, thus permitting to obtain raising factors and to raise the size data to the total catch. Quarterly data were then obtained using proportional weights.

Years prior to the first year with available size data have been assigned a profile corresponding to the first year.

Cumulating into quarterly catch by size

8. Finally, all data were cumulated into 2 types of raised files:

a) Country, year and quarter

b) Year and quarter

Table 2 shows the options used for each fleet.

YFT other gears (BB, GILL and OTHERS):

1.BB

For all BB fisheries, yearly BB size frequency data from the Maldivian fishery were used.. These size data are available from 1983 to 2000, but only data from 1985-1998 were considered for the calculations. For the years 1999 and 2000, data for 1998 were used

All size frequencies being expressed in length, the weights of these data were calculated using the the same length weight formula as for the PS data with a= 0.000015849 and b= 3.04600 for fish >=64 cm, and a= 0. 000053130 and b= 2.75366 for fish <64 cm (?v).

The nominal yearly catches by country were then assigned a size profile, and the weight of the size profile was calculated, thus permitting to obtain raising factors and to raise the size data to the total catch.

Years prior to 1985 have been assigned a size data profile corresponding to an average of 1983-1985.

2.GILLNET

For the GILL fisheries, data from several countries were available. (see table 3). These data were cumulated by year and country. A yearly profile with combined data from Iran, Oman and Pakistan was also created. For each year , the data for each of these three countries were first raised to the total nominal catch.For the year 2000, data from 1999 were used.

The size profiles assig ned by country were the following:

- Sri Lanka, for years with size data, the sri lankan size profiles were used; for the other years, the combined profiles from Iran, Oman and Pakistan.
- Indonesia, for years with size data, the indonesian size profiles were used; for the other years, a mean profile using all years of Indonesian data was used.
- For all the others, the combined profile from Iran, Oman and Pakistan were used, except for Pakistan previous to 1987, for which a mean 1987-1989 profile with Pakistan data only was used

Then, the weight of each size profile thus assigned was calculated, thus permitting to obtain raising factors and to raise the size data to the total catch by country and year.

3. OTHER SURFACE GEARS

For the other gears (handline, lines, trolling and others), no size data were available. In order to obtain catch at size data for these fisheries, combined BB+GILL annual size profiles were used.

Then, the weight of each size profile thus assigned was calculated, thus permitting to obtain raising factors and to raise the size data to the total catch by country and year.

Table 1 : Longline

Country	Years	C/E	Size	Use for missing	Comments NC: mean (min-max)
AUS	1989-2000	Yes (w)	No	JPN SE	NC: 235 (14-642)
CHN	1985-1998 1999-2000	No Yes (w)	No No	JPN IO JPN 10x20	NC: 1080 (137-2361)
ESP	1993-2000	No	No	JPN W	NC: 35 (8-108)
FRA-MAY	1998	No	No	JPN W	NC: 194
FRA-RUN	1991-2000	Yes (n)	No	JPN 10x20	NC: 175 (18-360)
IDN	1973-2000	No	No	JPN IO	NC: 9175 (114-40445)
IND	1983-1990 1991 1992-1993 1994-1997 1998-2000	No Yes (w) No Yes (w) No	No No No No No	JPN N JPN N JPN N JPN N JPN N	NC: 140 (5-645)
IRN	1976-2000	No	No	JPN NW	NC: 1057 (25-4980)
JPN	1952-2000	Yes (n)	Yes		NC: 12201 (2023-38100)
KEN	1980-1983	No	No	JPN IO	NC: 220 (77-370)
KOR	1966-1974 1975-1990 1991-1993 1994-2000	No Yes (n) Yes (n) Yes (w)	No No Yes Yes	JPN IO JPN 10x20 JPN 10x20 JPN 10x20	Few size data, not used NC: 9107 (100-31383)
LKA	1982-2000	No	No	JPN IO	NC: 588 (204-1138)
MDV	1988-1998	No	No	JPN IO	NC: 5 (1-19)
MUS	1978-1998	No	No	JPN IO	NC: 50 (1-219)
NEI-DFRZ	1985-1989 1990-1991 1992-2000	No Yes (w) No	No No No	JPN IO JPN IO JPN IO	NC: 7936 (56-22272)
NEI-ICE	1989-1997 1998-2000	No No	No Yes	JPN SE	NC: 18975 (10615-27614) used
NEI-IDN	1986-1999	No	No	JPN IO	NC: 7564 (42-16099)
OMN	1991	Yes (w)	No	JPN 10x20	NC: 1069
PAK	1991-2000	No	No	JPN NW	NC: 5769 (133-28188)
PHL	1998-2000	No	No	JPN SE	NC: 514 (299-623)
PRT	1998-2000	No	No	JPN W	NC: 8 (4-10)
SUN	1988-1989	No	No	JPN IO	NC: 5 (2-8)
SYC	1983-1985 1995-2000	Yes (w) Yes (w)	No No	JPN 10x20 JPN 10x20	NC: 73 (5-170)
THA	2000	No	No	JPN IO	NC: 227
TWN	1966-1984 1985-1988 1989-2000	Yes (n & w) Yes (n & w) Yes (n & w)	No Yes No	JPN 10x20 JPN 10x20	NC: 17406 (3355-88026) TWN used

Table 2 : Purse seine

Country	Years	C/E	Size	Use for missing	Comments NC: mean (min-max)
AUS	1981-1988	No	No	PS-EUR	NC: 28 (8-43)
ESP	1983-2001	Yes (w)	Yes	PS-EUR	NC: 41903 (11453-65143)
FRA	1981-2001	Yes (w)	Yes	PS-EUR	NC: 33900 (199-59913)
IDN	1974-2000	No	Some	PS-EUR	1986-1988 NC: 325 (21-814)
IND	1998	No	No	PS-EUR	NC: 14
IRN	1992-1995 1996-2000	No Yes (w)	No Yes	PS-EUR West	NC: 2676 (1607-4300) except 1996
JPN	1977-1988 1989-1994 1995-2000	No Yes (w) Yes (w)	No No Yes	 PS-EUR West JPN East	NC: 2180 (32-11882) Eastern IO
LKA	1993	No	No	PS-EUR	NC: 1
MUS	1983-1987 1988-2000	No Yes (w)	No Some	PS-EUR West	NC: 1319 (109-2621) 1989-1990
NEI-EUR	1983-2000	Yes (w)	Yes	PS-EUR	NC: 13732 (661-27049)
NEI-SUN	1990-2000	Some	No	PS-EUR West	1992-1993 NC: 9494 (804-17002)
SUN	1963-1965 1983-1984 1985-1991	No No Yes (w)	No No No	PS-EUR	NC: 1693 (5-4153)
SYC	1991-2001	Yes (w)	Yes	PS-EUR West	NC: 6306 (221-12007)
THA	2000	No	No	PS-EUR	NC: 250

Table 3 : Artisanal

Country	Years	C/E	Size	Use for missing	Comments NC: mean (min-max)
Baitboat					
AUS	1989-1996	No	No	MDV 1983-2000	NC: 4 (1-11)
ESP	1981-1982	No	No	MDV 1983-1985	NC: 209 (55-363)
IDN	1985-1987	No	No	MDV 1983-2000	NC: 122 (4-256)
IND	1976-1991 1999-2000	Yes (w) No	No No	MDV 1983-1985 MDV 1983-2000	NC: 366 (25-1214)
LKA	1982-1988	No	No	MDV 1983-2000	NC: 167 (4-452)
MDG	1973-1975	No	No	MDV 1983-2000	NC: 630 (180-1160)
MDV	1950-1969 1970-1982 1983-1998	No Yes (w) Yes (w)	No No Yes	MDV 1983-1985 MDV 1983-1985 MDV 1983-2000	NC: 4874 (1000-12994) Size 1983-84 not used
Gillnet					
AUS	1995-2000	No	No	IDN 1986	NC: 1 (1-1)
IDN	1982-1983 1984-1986 1987-2000	No Yes (w) No	No Yes No	IDN 1984 IDN 1984-1986 IDN 1986	NC: 251 (29-526)
IND	1979-1981 1998-2000	Yes (w) No	No No	Combined (IRN+OMN+PAK)	NC: 630 (4-1969)
IRN	1989-1992 1993-1995 1996-2000	No Yes (w) No	No Yes Yes	Combined (IRN+OMN+PAK)	NC: 13634 (980-28465)
LKA-GILL&LL LKA-GILL	1992-1998 1982-2000	Yes (w) No	Yes No	 Combined (IRN+OMN+PAK	NC: 11048 (5151-27139)
OMN	1985-1986 1987-1994	No No	No Yes	Combined (IRN+OMN+PAK)	NC: 11076 (2237-21276) Some C/E 1996 & 2000

	1995-2000	No	No		
PAK	1950-1986 1987-1991 1992-1994 1995-2000	No Yes (w) No No	No Yes Yes No	Combined (IRN+OMN+PAK)	NC: 2436 (351-8747)
TWN	1986-1991	Yes (n & w)	No	Combined (IRN+OMN+PAK)	NC: 36 (1-88)

Table 3 : Artisanal (continued)

Country **Others**	Years	C/E	Size	Use for missing	Comments NC: mean (min-max)
AUS-Hand AUS-Troll AUS-Others	1990-2000 1989-2000 1977-1980	No	No	Combined BB+Gillnet	NC: 9 (1-34)
COM-Hand COM-Troll COM-Others	1989-2000 1989-2000 1970-2000	No	No	Combined BB+Gillnet	NC: 1927 (100-5609)
F/RUN-Hand F/RUN-Troll	1993-2000 1950-1992	No	No	Combined BB+Gillnet	NC: 207 (79-416)
IDN-Troll IDN-Others	1985-1987 1950-2000	No	No	Combined BB+Gillnet	Some information (troll) NC: 639 (44-2915)
IND-Hand IND-Line IND-Troll IND-Others	1979 1998-2000 1976-1991 1996-1998	No	No	Combined BB+Gillnet	NC: 655 (2-7155)
JPN-Others	1981	No	No	Combined BB+Gillnet	NC: 2
KEN-Troll	1984-2000	No	No	Combined BB+Gillnet	NC: 59 (19-80)
LKA-Hand LKA-Troll LKA-Others	1986-2000 1982-2000 1956-2000	No	No	Combined BB+Gillnet	NC: 3216 (2-9000)
MDV-Hand MDV-Troll MDV-Others	1985-2000 1970-2000 1990-2000	No	No	Combined BB+Gillnet	NC: 389 (150-1591)
MOZ-Others	1983-1985	No	No	Combined BB+Gillnet	NC: 73 (15-188)
MUS-Troll	1984-2000	No	No	Combined BB+Gillnet	NC: 78 (8-249)
SYC-Hand SYC-Troll SYC-Others	1986-2000 1985-1991 1970-1983	No	No	Combined BB+Gillnet	NC: 122 (1-949)
TMP-Line	1999-2000	No	No	Combined BB+Gillnet	NC: 2 (1-3)
TZA-Others	1999-2000	No	No	Combined BB+Gillnet	NC: 525 (300-700)
YEM-Others	1980-2000	No	No	Combined BB+Gillnet	NC: 716 (5-2367)
ZAF-Hand	1983-1995	No	No	Combined BB+Gillnet	NC: 35 (1-166)

APPENDIX B. PROCESSING OF BET CATCH BY SIZE DATA

Data available:

- Nominal catches, file NCDB&cde.xls, as of 16/04/2001
- C/E data, file CELL.txt and CEPSBB.txt (CEOTHR.txt not used), as of 06/05/2002
- Size frequency data, file Sfbet.csv as of 07/05/2002

Processing:

Only data for LL and PS have been processed - and all raised to the total catch - since almost no size frequency data are available for the other gears. The years covered were 1970-2000

BET LL data processing:

Reformatting

1. Reformatting of C/E data.

The C/E LL data were reformatted to only include stratum header, effort and catch data for YFT, BET and SKJ (the latter for uniform format purpose only, since almost no SKJ are recorded for LL) in number of fish and weight. Certain yearly data were also recoded as month 17.

Calculation of mean weights and Japanese size profiles

2. Japan.

Calculation of mean weights and cumulated size frequency data for the japanese LL fleet. First the japanese C/E data (all in number of fish) for BET were cumulated by quarter and 10x20 time -area strata.

The japanese size frequency data were then cumulated by quarter and 10x20 time-area strata, and they were then raised according to the number of fish reported in the corresponding C/E data.

Since some time -area strata (10x20, quarter and year) were not covered, substitution strata were also prepared. These were: NE, NW, SE, SW, N, S, E, W and total, with the limit East West at 80 degrees.

The formula used for length weight conversions was a=.000009430 and b= 3.14400 (IOTC Secretariat 1992, Penang sampling program)

Mean weights were calculated for all the detailed strata, and then the data for missing strata were completed using mean weights from larger strata. The substitutions were only carried out between area strata and not between time strata.

The mean weights were then output to a file, since they were to be used for conversion to weight of all C/E data reported in number of fish.

The size frequencies were equally completed and output to an intermediate file for all strata.

3. Taiwan

The Taiwanese data were recoded into 5x5 degree square and the weight of the data for each stratum was added to the records

4. NEI-ICE

Data were cumulated by quarter and year and output to an intermediate file

Raising of C/E

5. First C/E data were cumulated by year. Raising factors were calculated using the corresponding nominal catches and then all available C/E data were raised to the total reported nominal catch. When necessary the data were first converted from number of fish to weight using the mean weights calculated previously for the japanese size frequency data.

Raising of size data to C/E

6. The raised C/E file was then used to obtain raised size frequency data

All available C/E data were assigned a size 'profile' and the size data were raised to the corresponding catch. The size profiles used were from the Japanese data, except for Taiwan, where two methods were used:

a) The Japanese data were used , except for the years 85-88, where Taiwanese size frequency data were available.

b) The Japanese size profiles were used for all catch data.

Raising of data to NC for data without C/E

7. Some fleets only reported nominal catches. For these yearly catches (without size nor C/E data), the japanese size profiles for large strata were used according to the operating areas of the fleets concerned. First the totals by year of the weights of the size profiles were calculated, thus permitting to obtain raising factors and to raise the size data to the total catch. Quarterly data were then obtained using proportional weights.

Cumulating into quarterly catch by size

8. Finally, all data were cumulated into 2 types of raised files:

a) Country, year and quarter

b) Year and quarter

BET PS data processing:

Reformatting

1. Reformatting of C/E data.

The C/E PS data were reformatted to only include stratum

header, effort and catch data for YFT, BET and SKJ (free schools, log schools and unclassified type of gear) in weight (MT). Certain yearly data were also recoded as month 17.

Calculation of mean weights and Japanese size profiles

2. PS-EUR

Calculation of mean weights and cumulated size frequency data for the PS-EUR fleet.

The PS-EUR size frequency data are reported in raised monthly 5x5 format with separation of log and free schools. They were cumulated by quarter and 10 large time-area strata used in general for the PS-EUR fleet processing, see Figure 1.

Since some time-area strata (school, 10areas, quarter and year) were not covered, substitution strata were also prepared. These were: NE, NW, SE, SW, N, S, E, W and total, with the limit East West at 80 degrees.

All size frequencies being expressed in length, the weights of these strata were calculated using the length weight formula with a= 0.000027000 and b= 2.95100 (Cort, 1986).

Mean weights were calculated for all the detailed and cumulated strata, and then the data for missing strata were completed using mean weights from larger strata. The substitutions were only carried out between area strata and not between time strata. The mean weights were then output to a file, although only for comparison purpose.

The size frequencies were equally completed and output to an intermediate file for all strata.

3. JPN

Data were recoded as area 97(East) and the weight of the data for each stratum was calculated and added.

Raising of C/E

5. First C/E data were cumulated by year. Raising factors were calculated using the corresponding nominal catches and all available C/E data were then raised to the total reported nominal catch.

Raising of size data to C/E

6. The raised C/E file was then used to obtain raised size frequency data

All available C/E data were assigned a size 'profile' according to the time area strata (year, quarter, 10areas and type of school) and the size data selected were raised to the corresponding catch. The size profiles used were from the PS-EUR data, except for Japan East. If the exact school type was detailed in the C/E data, size profiles with the exact school type was used, if not, cumulated profiles for log and free schools (and unclassified) were used.

For Japan, data were available for 1995-2000 with only one record per year, unclassified schools (1998 log and free schools were cumulated). These data were used for the Eastern JPN PS catches, all years (years prior to 1995 were assigned the 1995 profile) and were raised to the total catch.

Raising of data to NC for data without C/E

7. Some fleets only reported nominal catches. For these yearly catches (without size nor C/E data), the PS-EUR size profiles for large strata by quarter (cumulated school type) were used according to the operating areas of the fleets concerned.

First the totals by year of the weights of the size profiles were calculated, thus permitting to obtain raising factors and to raise the size data to the total catch. Quarterly data were then obtained using proportional weights.

Years prior to the first year with available size data have been assigned a profile corresponding to the first year.

Cumulating into quarterly catch by size

8. Finally, all data were cumulated into 2 types of raised files:

a) Country, year and quarter

b) Year and quarter

Table 3 shows the options used for each fleet.

Table 2: BET LL

Country	Years	C/E	Size data	Use for missing	Observations
JPN	1970-2000	Yes(n)	Yes		
TWN	1970-1984	Yes(n & w)	No	JPN 10x20	
	1985-1988	Yes(n & w)	Yes		
	1989-2000	Yes(n & w)	No	JPN 10x20	
KOR	1965-1974	No	No	JPN 10x20	
	1975-1993	Yes(n)	Only 1993	JPN 10x20	Size Korea not used
	1994-2000	Yes(w)	Yes	JPN 10x20	Size Korea not used
ESP	1993-2000	No	No	JPN W	
FRA-REU	1993-2000	Yes (n)	No	JPN 10x20	
FRA-MAY	1998-1999	No	No	JPN W	
SYC	1983-1985	Yes(w)	No	JPN 10x20	
	1995-2000	Yes(w)	No	JPN 10x20	
AUS	1989-2000	Yes(w)	No	JPN SE	
THA	2000	No	No	JPN IO	
NEI-ICE	1989-1997	No	No	JPN SE	
	1998-2000	No	Yes		
CHN	1995-1998	No	No	JPN IO	
	1999-2000	Yes (w)	No	JPN 10x20	
NEI-IDN	1986-1999	No	No	JPN IO	
IDN	1973-2000	No	No	JPN IO	
PHI	1998-2000	No	No	JPN SE	
NEI-DFRZ	1985-1989	No	No	JPN IO	
	1990-1991	Yes (w)	No	JPN IO	
	1992-2000	No	No	JPN IO	
IND	1983-1987	No	No	JPN N	
	1991	Yes(w)	No	JPN N	
	1993-1994	No	No	JPN N	
	1995-1997	Yes (w)	No	JPN N	
	1998	No	No	JPN N	
IRN	1996-2000	No	No	JPN NW	
KEN LKA	1980-1983 1986-2000	No No	No No	JPN IO JPN IO	
MUS	1986-1997	No	No	JPN IO	
SUN	1988	No	No	JPN IO	

Table 3 : BET Purse seine

Country	Years	C/E	Size	Use for missing
ESP	1984-2001	Yes (w)	Yes	PS-EUR
FRA	1981-2001	Yes (w)	Yes(from 1984)	PS-EUR
IRN	1996-2000	Yes (w)	No	PS-EUR
JPN	1977-1988 1989-1994 1995-2000	No Yes (w) Yes (w)	No No Yes	JPN West JPN East
MUS	1980-1987 1988-2000	No Yes (w)	No Some	PS-EUR
NEI-EUR	1983-2000	Yes (w)	Yes	PS-EUR
NEI-SUN	1990-2000	Some	No	PS-EUR
SUN	1986-1991	No	No	PS-EUR
SYC	1991-1992 1997-2001	No Yes (w)	No Yes	PS-EUR
THA	2000	No	No	PS-EUR