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DATA PREPARATION CARRIED OUT BY THE SECRETARIAT FOR THE
1996 SWORDFISH STOCK ASSESSMENTS

BY THE ICCAT SECRETARIAT

1. Task I landing and discards data

The Task I data base was updated and prepared and in table and figure form for use by the SCRS Stock Assessment Group. The problem relating to the possible double counting of the Taiwanese vessels fishing under the bi-lateral arrangement with Brazil was solved, as it has been clarified that those catches made under the contract were only reported by Brazil and not included in Taiwanese catch estimates.

2. Catch at size data base

The historical catch-at-size data base was sent to all the major fishing country for their revision. The U.S. carried out a major review and hence submitted new data to replace past historical data. However, the frequencies for landings were given only in dressed weight (pounds) and these have been converted by the Secretariat into lower-jaw fork length. The frequencies for discards were reported in lower-jaw fork length.

All the historical data were reviewed using the routine check program. As in the past, the estimated weight from the Spanish and Japanese catch at size do not match the Task I catch. There are a few particularly extreme cases, where the discrepancies are well over 10% for the Japanese data. These cases have been noted in Tables 1 and 2. Neither Task I nor catch-at-size have been modified, despite these discrepancies.

All the changes in the historical catch data (mostly Brazilian and Venezuelan) were updated by re-raising the catch-at-size table according to the new data.

For 1994 and 1995, the entire catch-at-size was newly created. Canada, Japan, Spain and U.S. provided the Secretariat with raised size data for both years, and Taiwan with 1994 data.

Of the rest of the countries, partial Portuguese size data are available for 1995 and Brazil submitted new historical size data. However, the Brazilian data were in pectoral fin to anal length. The Secretariat was unsuccessful in its attempts to find conversions from these measurements to other more generally used standards, and therefore, these data could not be used, with the exception of those data for the gear LLMB for 1995 from the port of Natal. These were submitted in pectoral fork length for which Mr. Meneses de Lima provided a conversion equation to lower-jaw fork length.

The procedures used by the Secretariat for data substitutions and raising are listed in Tables 1 and 2 for north and south, respectively. These tables show the data by ICCAT swordfish area, country, gears and month or quarter periods.

3. Sex ratio information by area-time-size strata

The SCRS recommended that available information should be sent to the Secretariat early enough to allow trials of separating the catch-at-size base into two sexes to be made, based on the area-time-size strata. Up to the time of writing this report, Spain (SCRS/96/136) and U.S. submitted this information to the Secretariat. The information was immediately transmitted to scientists from the major fishing countries for their use.

Spanish data are by smaller area units than ICCAT sampling areas, and by biannual periods. However, there are no annual variables.

U.S. sex-ratio data since 1974 were submitted, but are actually based on sampling since 1985 and in three areas (temperate, sub-tropic and tropic). The ratio is for the entire year and annually variable.

4. Catch-at-size by sex

The SCRS recommended that national scientists provide historical catch-at-size data by sex, using information obtained by correspondence (see above section). The following countries met this obligation:

Spain - catch at size for the entire Atlantic by area for 1988-1995.

Canada - 1986-95 using their own sex-ratio information.

Japan - 1978-95 only for north Atlantic, using the sex ratio provided by Spain.

U.S. - 1985-95 (while the Secretariat was informed that these data were being sent through e-mail, as of September 30, they have not been received at the Secretariat)

The Secretariat has been asked to sex the rest of the catch at age using the sex ratio information received. However, it has been difficult to carry out this task due to the following reasons.

- Sex-ratio information did not become available until very close to the meeting date.
- Time-area strata in which sex ratio information became available did not match with the catch at size data. In other words, to apply them correctly, it is necessary to go back to the original Task I and catch and effort data and size data to recreate the catch-at-size in smaller strata to match with the sex ratio information. This represents a major task and could not be achieved in the limited time available.
- Sex-ratio information itself includes much substitution. Until the data are thoroughly examined, it would not be appropriate to apply them in such a small time-area strata.
- The catch at size for those other than the four countries mentioned above are almost all created by data substitution from these four countries.

Considering all these factors, the Secretariat developed a program to achieve the following procedures (for the north Atlantic only):

1. Create catch at size (without sex) and another independent file of catch at size by sex. In this second file, only those catch-at-size provided by national scientists are combined.
2. Data on both files are combined into year, quarter, ICCAT area, disregarding country and gears (in 5 cm classes).
3. Catch-at-size by sex frequencies are raised to the total catch-at-size by number of fish for each strata (year-quarter, area and by 5 cm intervals).

At the time of writing this report, the U.S. catch-at-size by sex data have not been received, and therefore this process is not completed. However, as soon as the U.S. data are received, they will be processed and sex-based catch at size will be provided to the Stock Assessment Group.

5. Geographical distribution of catch and discards

Using the new software and data base developed by the Secretariat in 1996, a geographical distribution map of reported catches and discards of Atlantic swordfish is provided for the analysis. All the catches (Task I) are assigned to one of the 5 x 5 areas and are available for 1950 to 1994. The recent update of Task I is not included. Most of the catches are further assigned to quarters using Task II data.

The figures of such distribution maps were made for the entire period by surface and longline gears, by decade, and by quarters, respectively.

Figures and tables are included in the Report of the SCRS Swordfish Stock Assessment Session and are therefore not included here.

Table 1. Procedures used for creating north Atlantic swordfish catch at size (without sex), for 1996 stock assessments.

| CATCH DATA | | | | | | MATCHED SIZE DATA | | | | | | REMARKS | Est'd Wght mt |
|------------------|---------------------------------|------------------|---|---|----------|---|-----------------------|---|-------------------|---------|-------------------|---------|---------------------|
| A R E A | C O U N T R Y | G E A R | G Y E E I A A M R R E | C A T C H I M P E | R. F. | A R C O U N T R Y | C G E A R | G Y E E I A A M R R E | T W N O. | N O. | | | |
| 3 | VENEZUELA | 29 LL | 1 88 | 2 | 0.01852 | | | | | | Task I changed | 108 | |
| 3 | VENEZUEL | 29 LL | 1 89 | 2 | 0.03361 | | | | | | Task I changed | 60 | |
| 3 | VENEZUEL | 29 GILL | 24 89 | 2 | 0.03361 | 3 | VENEZUEL | 29 LL | 1 89 | | Task I/est'd wght | 60 | |
| 3 | VENEZUEL | 29 LL | 1 90 | 4 | 0.02413 | | | | | | Task I changed | 166 | |
| 3 | VENEZUEL | 29 GILL | 24 90 | 5 | 0.03165 | 3 | VENEZUEL | 29 LL | 1 90 | | Task I/est'd wght | 158 | |
| 24 | NEI | 73 LL | 1 90 | 529 | 0.55702 | | | | | | Task I changed | 950 | |
| 2 | CUBA | 6 UNCL | 13 91 | 23 | 0.10009 | | | | | | Task I changed | 230 | |
| 3 | VENEZUEL | 29 GILL | 24 91 | 5 | 0.05574 | 3 | VENEZUEL | 29 LL | 1 91 | | Task I/est'd wght | 89.7 | |
| 3 | VENEZUEL | 29 LL | 1 91 | 73 | 0.81382 | | | | | | | 89.7 | |
| 24 | SENEGAL | 53 HAND | 19 91 | 6 | 5.45455 | | | | | | | 1 | |
| 2 | CUBA | 6 UNCL | 13 92 | 27 | 0.09901 | | | | | | | 273 | |
| 3 | VENEZUEL | 29 LL | 1 92 | 101 | 0.24634 | | | | | | | 410 | |
| 3 | VENEZUEL | 29 GILL | 24 92 | 2 | 0.00488 | 3 | VENEZUEL | 29 LL | 1 92 | | Task I/est'd wght | 410 | |
| 24 | SENEGAL | 53 HAND | 19 92 | 6 | 0.00115 | 24 | ESPANA | 21 LLH | 4 92 | | Task I/est'd wght | 5229 | |
| 14 | CHI.TAIW | 5 LL | 1 93 | 28 | 0.40902 | | | | | | | 68 | |
| 2 | CHI.TAIW | 5 LL | 1 93 | 3 | 0.40902 | | | | | | | 8 | |
| 24 | CHI.TAIW | 5 LL | 1 93 | 67 | 0.40902 | | | | | | | 164 | |
| 24 | KOREA | 13 LLFB | 3 93 | 12.76 | 0.01787 | 24 | JAPAN | 12 LL | 1 93 | | Task I/est'd wght | 714 | |
| 2 | KOREA | 13 LLFB | 3 93 | 0.5486 | 0.01787 | 2 | JAPAN | 12 LL | 1 93 | | Task I/est'd wght | 30.7 | |
| 14 | KOREA | 13 LLFB | 3 93 | 5.8955 | 0.01787 | 14 | JAPAN | 12 LL | 1 93 | | Task I/est'd wght | 329.9 | |
| 24 | PORTUGAL | 19 LL | 1 93 | 0 | 0.00000 | | | | | | Delete c/size | 19 | |
| 24 | PORT-AZ | 19 LL | 1 93 | 664 | 1.64519 | | | | | | | 404 | |
| 24 | PORTUGAL | 19 LLHB | 4 93 | 1286 | 1.30519 | | | | | | | 985 | |
| 3 | VENEZUEL | 29 LL | 1 93 | 68 | 0.61706 | | | | | | | 110 | |
| 3 | VENEZUEL | 29 GILL | 24 93 | 5 | 0.04537 | 3 | VENEZUEL | 29 LL | 1 93 | | Task I/est'd wght | 110 | |
| 3 | TRINIDAD | 41 LL | 1 93 | 125 | 1.13430 | 3 | VENEZUEL | 29 LL | 1 93 | | Task I/est'd wght | 110 | |
| 24 | LIBERIA | 51 UNCL | 13 93 | 14 | 0.00296 | 24 | ESPANA | 21 LLH | 4 93 | | Task I/est'd wght | 4734 | |
| 3 | ST.VINC. | 111 UNCL | 13 93 | 23 | 0.02692 | 3 | USA | 25 LL | 1 93 | | Task I/est'd wght | 854.3 | |
| 24 | U.K. | 112 GILL | 24 93 | 2 | 0.03155 | 24 | FRANCE | 8 UNC | 13 93 | | Task I/est'd wght | 63.4 | |
| 2 | CHI.TAIW | 5 LLFB | 3 94 | 372 | 1.22208 | | | | | | Task I/est'd wght | 304 | |
| 2 | CANADA | 4 HARP | 18 94 | 22 | 1.00000 | | | | | | Nation. sci | 22.1 | |
| 2 | CANADA | 4 LL | 1 94 | 1017.9 | 1.00000 | | | | | | Nation. sci | 1017 | |
| 14 | CANADA | 4 LL | 1 94 | 636.14 | 1.00000 | | | | | | Nation. sci | 635.6 | |
| 24 | FRANCE | 8 MWT | 23 94 | 13 | 0.00289 | 24 | ESPANA | 21 LLH | 4 94 | | Task I/est'd wght | 4501 | |
| 24 | FRANCE | 8 GILL | 24 94 | 33 | 0.00733 | 24 | ESPANA | 21 LLH | 4 94 | | Task I/est'd wght | 4501 | |
| 24 | JAPAN | 12 LLHB | 4 94 | 776 | 1.00000 | | | | | | Nation. sci | 821 | |
| 2 | JAPAN | 12 LLHB | 4 94 | 33 | 1.00000 | | | | | | Nation. sci | 35 | |
| 14 | JAPAN | 12 LLHB | 4 94 | 169 | 1.00000 | | | | | | Nation. sci | 188 | |
| 24 | KOREA | 13 LLFB | 3 94 | 12.582 | 0.01532 | 24 | JAPAN | 12 LLH | 4 94 | | Task I/est'd wght | 821 | |
| 14 | KOREA | 13 LLFB | 3 94 | 0.5331 | 0.01532 | 2 | JAPAN | 12 LLH | 4 94 | | Task I/est'd wght | 35 | |
| 24 | KOREA | 13 LLFB | 3 94 | 2.8844 | 0.01532 | 14 | JAPAN | 12 LLH | 4 94 | | Task I/est'd wght | 188 | |
| 24 | MAROC | 16 LL | 1 94 | 39 | 0.00867 | 24 | ESPANA | 21 LLH | 4 94 | | Task I/est'd wght | 4501 | |
| 24 | MAROC | 16 TRAP | 10 94 | 8 | 0.00178 | 24 | ESPANA | 21 LLH | 4 94 | | Task I/est'd wght | 4501 | |
| 24 | MAROC | 16 GILL | 24 94 | 288 | 0.06399 | 24 | ESPANA | 21 LLH | 4 94 | | Task I/est'd wght | 4501 | |
| 24 | PORT-AZO | 19 LL | 1 94 | 576 | 0.12799 | 24 | ESPANA | 21 LLH | 4 94 | | Task I/est'd wght | 4501 | |
| 24 | PORT-MD | 19 LL | 1 94 | 37 | 0.00822 | 24 | ESPANA | 21 LLH | 4 94 | | Task I/est'd wght | 4501 | |
| 24 | PORTUGAL | 19 LL | 1 94 | 0 | 0.00000 | 24 | ESPANA | 21 LLH | 4 94 | | Task I/est'd wght | 4501 | |
| 24 | PORTUGAL | 19 LLHB | 4 94 | 960 | 0.21331 | 24 | ESPANA | 21 LLH | 4 94 | | Task I/est'd wght | 4501 | |
| 24 | PORTUGAL | 19 UNCL | 13 94 | 6 | 0.00133 | 24 | ESPANA | 21 LLH | 4 94 | | Task I/est'd wght | 4501 | |
| 24 | PORT-MDR | 19 HAND | 19 94 | 20 | 0.00444 | 24 | ESPANA | 21 LLH | 4 94 | | Task I/est'd wght | 4501 | |
| 24 | ESP-CANR | 21 BB | 17 94 | 5 | 0.00111 | 24 | ESPANA | 21 LLH | 4 94 | | Task I/est'd wght | 4501 | |
| 24 | ESPANA | 21 LLHB | 4 94 | 4408 | 1.00000 | | | | | | Nation. sci | 4501 | |
| 14 | ESPANA | 21 LLHB | 4 94 | 1619 | 1.00000 | | | | | | Nation. sci | 1553 | |
| 24 | ESPANA | 21 TRAP | 10 94 | 3 | 0.00067 | 24 | ESPANA | 21 LLH | 4 94 | | Task I/est'd wght | 4501 | |
| 24 | ESPANA | 21 UNCL | 13 94 | 150 | 0.03333 | 24 | ESPANA | 21 LLH | 4 94 | | Task I/est'd wght | 4501 | |
| 14 | USA | 25 LL | 1 94 | 816 | 1.00000 | | | | | | Nation. sci | 850 | |
| 3 | USA | 25 LL | 1 94 | 1034 | 1.00000 | | | | | | Nation. sci | 1060 | |
| 1 | USA | 25 LL | 1 94 | 285 | 1.00000 | | | | | | Nation. sci | 296 | |
| 2 | USA | 25 LL | 1 94 | 1117 | 1.00000 | | | | | | Nation. sci | 1144 | |

Table 1. Procedures used for creating north Atlantic swordfish catch at size (without sex), for 1996 stock assessments.

| CATCH DATA | | | | | | | MATCHED SIZE DATA | | | | | | | Est'd | | | | |
|------------|----------|-----|------|----|----|--------|-------------------|----|----------|----|------|----|----|-------|---|-----|-------------------|------|
| A | COUNTRY | C | GEAR | G | Y | CATC | R.F. | AR | COUNTRY | C | GEAR | G | Y | T | W | NO. | REMARKS | Wght |
| E | | O | | E | E | I | Y | | | O | | E | E | I | | | | mt |
| A | | N | | R | R | E | E | | | T | | R | R | E | | | | |
| 2 | USA | 25 | TRAW | 14 | 94 | 14 | 1.00000 | | | | | | | | | | Nation. sci | 14 |
| 2 | USA | 25 | HARP | 18 | 94 | 2 | 1.00000 | | | | | | | | | | Nation. sci | 2 |
| 2 | USA | 25 | MWT | 23 | 94 | 10 | 0.00000 | | | | | | | | | | | |
| 2 | USA | 25 | GILL | 24 | 94 | 88 | 1.00000 | | | | | | | | | | Nation. sci | 86 |
| 3 | USA | 25 | LLD | 33 | 94 | 53 | 1.00000 | | | | | | | | | | Nation. sci | 53 |
| 14 | USA | 25 | LLD | 33 | 94 | 52 | 1.00000 | | | | | | | | | | Nation. sci | 58 |
| 1 | USA | 25 | LLD | 33 | 94 | 69 | 1.00000 | | | | | | | | | | Nation. sci | 69 |
| 2 | USA | 25 | LLD | 33 | 94 | 335 | 1.00000 | | | | | | | | | | Nation. sci | 336 |
| 2 | USA | 25 | MWTD | 34 | 94 | 0 | 1.00000 | | | | | | | | | | Nation. sci | 9 |
| 3 | VENEZUEL | 29 | LL | 1 | 94 | 60 | 0.05661 | 3 | USA | 25 | LL | 1 | 94 | | | | Task I/est'd wght | 1060 |
| 3 | VENEZUEL | 29 | GILL | 24 | 94 | 9 | 0.10465 | 2 | USA | 25 | GILL | 24 | 94 | | | | Task I/est'd wght | 86 |
| 1 | MEXICO | 31 | LL | 1 | 94 | 14 | 0.04727 | 1 | USA | 25 | LL | 1 | 94 | | | | Task I/est'd wght | 296 |
| 24 | LIBERIA | 51 | UNCL | 13 | 94 | 26 | 0.00578 | 24 | ESPANA | 21 | LLH | 4 | 94 | | | | Task I/est'd wght | 4501 |
| 3 | ST.LUCIA | 77 | HAND | 19 | 94 | 1 | 0.00094 | 3 | USA | 25 | LL | 1 | 94 | | | | Task I/est'd wght | 1060 |
| 24 | U.K. | 112 | GILL | 24 | 94 | 3 | 0.00067 | 24 | ESPANA | 21 | LLH | 4 | 94 | | | | Task I/est'd wght | 4501 |
| 14 | BRASIL | 3 | LL | 1 | 95 | 0 | 0.00000 | 14 | JAPAN | 12 | LL | 1 | 95 | | | | Task I/est'd wght | 234 |
| 2 | CANADA | 4 | LL | 1 | 95 | 1421 | 1.00000 | | | | | | | | | | Nation. sci | 1043 |
| 14 | CANADA | 4 | LL | 1 | 95 | 0 | 1.00000 | | | | | | | | | | Nation. sci | 104 |
| 14 | CANADA | 4 | HARP | 18 | 95 | 0 | 1.00000 | | | | | | | | | | Nation. sci | 2 |
| 2 | CANADA | 4 | HARP | 18 | 95 | 189 | 1.00000 | | | | | | | | | | Nation. sci | 174 |
| 2 | CHITAIW | 5 | LLFB | 3 | 95 | 429 | 1.40933 | 2 | CHITAIW | 5 | LLF | 3 | 94 | | | | Task I/est'd wght | 304 |
| 24 | FRANCE | 8 | MWT | 23 | 95 | 13 | 0.00253 | 24 | ESPANA | 21 | LLH | 4 | 95 | | | | Task I/est'd wght | 5143 |
| 24 | FRANCE | 8 | GILL | 24 | 95 | 33 | 0.00642 | 24 | ESPANA | 21 | LLH | 4 | 95 | | | | Task I/est'd wght | 5143 |
| 14 | JAPAN | 12 | LLHB | 4 | 95 | 234 | 1.00000 | | | | | | | | | | Nation. sci | 234 |
| 24 | JAPAN | 12 | LLHB | 4 | 95 | 931 | 1.00000 | | | | | | | | | | Nation. sci | 931 |
| 2 | JAPAN | 12 | LLHB | 4 | 95 | 38 | 1.00000 | | | | | | | | | | Nation. sci | 38 |
| 14 | KOREA | 13 | LLFB | 3 | 95 | 3.1076 | 0.01331 | 14 | JAPAN | 12 | LLH | 4 | 95 | | | | Task I/est'd wght | 234 |
| 24 | KOREA | 13 | LLFB | 3 | 95 | 12.393 | 0.01331 | 24 | JAPAN | 12 | LLH | 4 | 95 | | | | Task I/est'd wght | 931 |
| 2 | KOREA | 13 | LLFB | 3 | 95 | 0.4991 | 0.01331 | 2 | JAPAN | 12 | LLH | 4 | 95 | | | | Task I/est'd wght | 38 |
| 24 | MAROC | 16 | LL | 1 | 95 | 39 | 0.00758 | 24 | ESPANA | 21 | LLH | 4 | 95 | | | | Task I/est'd wght | 5143 |
| 24 | MAROC | 16 | TRAP | 10 | 95 | 12 | 0.00233 | 24 | ESPANA | 21 | LLH | 4 | 95 | | | | Task I/est'd wght | 5143 |
| 24 | MAROC | 16 | GILL | 24 | 95 | 285 | 0.05541 | 24 | ESPANA | 21 | LLH | 4 | 95 | | | | Task I/est'd wght | 5143 |
| 24 | PORTUGAL | 19 | LL | 1 | 95 | 0 | 0.00000 | | | | | | | | | | Task I/est'd wght | 4 |
| 24 | PORT-AZ | 19 | LL | 1 | 95 | 576 | 0.11199 | 24 | ESPANA | 21 | LLH | 4 | 95 | | | | Task I/est'd wght | 5143 |
| 24 | PORT-MDR | 19 | LL | 1 | 95 | 18 | 4.61538 | | | | | | | | | | Task I/est'd wght | 4 |
| 24 | PORTUGAL | 19 | LLHB | 4 | 95 | 1115 | 0.21680 | 24 | ESPANA | 21 | LLH | 4 | 95 | | | | Task I/est'd wght | 5143 |
| 24 | PORTUGAL | 19 | PS | 6 | 95 | 1 | 0.00019 | 24 | ESPANA | 21 | LLH | 4 | 95 | | | | Task I/est'd wght | 5143 |
| 24 | PORT-MD | 19 | HAND | 19 | 95 | 23 | 5.89744 | | | | | | | | | | Task I/est'd wght | 4 |
| 14 | ESPANA | 21 | LLHB | 4 | 95 | 1948 | 1.00000 | | | | | | | | | | Nation. sci | 1900 |
| 24 | ESPANA | 21 | LLHB | 4 | 95 | 5000 | 1.00000 | | | | | | | | | | Nation. sci | 5143 |
| 24 | ESP-CAN | 21 | BB | 17 | 95 | 4 | 0.00078 | 24 | ESPANA | 21 | LLH | 4 | 95 | | | | Task I/est'd wght | 5143 |
| 1 | USA | 25 | LL | 1 | 95 | 598 | 1.00000 | | | | | | | | | | Nation. sci | 617 |
| 14 | USA | 25 | LL | 1 | 95 | 764 | 1.00000 | | | | | | | | | | Nation. sci | 799 |
| 2 | USA | 25 | LL | 1 | 95 | 988 | 1.00000 | | | | | | | | | | Nation. sci | 1017 |
| 3 | USA | 25 | LL | 1 | 95 | 1576 | 1.00000 | | | | | | | | | | Nation. sci | 1673 |
| 2 | USA | 25 | TRAW | 14 | 95 | 10 | 1.00000 | | | | | | | | | | Nation. sci | 10 |
| 2 | USA | 25 | HARP | 18 | 95 | 1 | 1.00000 | | | | | | | | | | Nation. sci | 1 |
| 2 | USA | 25 | MWT | 23 | 95 | 15 | 0.00000 | | | | | | | | | | | |
| 2 | USA | 25 | GILL | 24 | 95 | 74 | 1.00000 | | | | | | | | | | Nation. sci | 74 |
| 2 | USA | 25 | LLD | 33 | 95 | 292 | 1.00000 | | | | | | | | | | Nation. sci | 307 |
| 1 | USA | 25 | LLD | 33 | 95 | 44 | 1.00000 | | | | | | | | | | Nation. sci | 45 |
| 3 | USA | 25 | LLD | 33 | 95 | 66 | 1.00000 | | | | | | | | | | Nation. sci | 66 |
| 14 | USA | 25 | LLD | 33 | 95 | 124 | 1.00000 | | | | | | | | | | Nation. sci | 172 |
| 2 | USA | 25 | MWTD | 34 | 95 | 0 | 1.00000 | | | | | | | | | | Nation. sci | 14 |
| 3 | VENEZUEL | 29 | LL | 1 | 95 | 45 | 3.00000 | | | | | | | | | | Task I/est'd wght | 15 |
| 2 | VENEZUEL | 29 | GILL | 24 | 95 | 9 | 0.60000 | 3 | VENEZUEL | 29 | LL | 1 | 95 | | | | Task I/est'd wght | 15 |
| 2 | GRENADA | 30 | LL | 1 | 95 | 1 | 0.00098 | 2 | USA | 25 | LL | 1 | 95 | | | | Task I/est'd wght | 1017 |
| 2 | BERMUDA | 83 | LL | 1 | 95 | 1 | 0.00098 | 2 | USA | 25 | LL | 1 | 95 | | | | Task I/est'd wght | 1017 |
| 24 | U.K. | 112 | GILL | 24 | 95 | 1 | 0.00019 | 24 | ESPANA | 21 | LLH | 4 | 95 | | | | Task I/est'd wght | 5143 |

Table 2. Procedures used for creating south Atlantic swordfish catch at size (without sex), for 1996 stock assessments.

| CATCH DATA | | | | | | | MATCHED SIZE DATA | | | | | | | Estimt'd | | | |
|------------|----------|-----|------|----|----|------|-------------------|---|---------|------|------|----|----|----------|--------------------|---------|--------|
| A | COUNTRY | C | GEA | G | Y | CATC | R.F. | A | COUNTR | C | GEA | G | Y | WG | NO. | REMARKS | Wght |
| E | | O | | E | E | I | | | | O | | E | E | I | | | MT |
| A | | U | | A | A | M | | | | N | | A | A | M | | | |
| | | N | | R | R | E | | | | T | | R | R | E | | | |
| 7 | BENIN | 67 | GILL | 24 | 84 | 85 | 0.93612 | 7 | GHANA | B 44 | SURF | 11 | 83 | | | | 90.8 |
| 7 | BENIN | 67 | HS | 29 | 84 | 1 | 0.01101 | 7 | GHANA | B 44 | SURF | 11 | 83 | | Task I/Est'd wght | | 90.8 |
| 7 | ANGOLA | 34 | SURF | 11 | 86 | 815 | 0.84605 | | | | | | | | Change in Task I | | 963.3 |
| 7 | BENIN | 67 | GILL | 24 | 86 | 39 | 0.84783 | | | | | | | | Change in Task I | | 46.0 |
| 6 | BRASIL | 3 | LLHB | 4 | 86 | 339 | 0.97414 | | | | | | | | Change in Task I | | 348.0 |
| 7 | TOGO | 72 | UNCL | 13 | 86 | 32 | 0.84656 | | | | | | | | Change in Task I | | 37.8 |
| 6 | BRASIL | 3 | LLHB | 4 | 87 | 341 | 1.15593 | | | | | | | | Change in Task I | | 295.0 |
| 7 | CHI.TAIW | 5 | LLFB | 3 | 87 | 192 | 0.48671 | | | | | | | | Change in Task I | | 393.9 |
| 6 | CHI.TAIW | 5 | LLFB | 3 | 87 | 68 | 0.48671 | | | | | | | | Change in Task I | | 140.3 |
| 6 | JAPAN | 12 | LL | 1 | 87 | 586 | 1.00000 | | | | | | | | Task I < Est. wght | | 818.2 |
| 7 | JAPAN | 12 | LL | 1 | 87 | 1291 | 1.00000 | | | | | | | | Task I < Est. wght | | 1802.0 |
| 6 | BRASIL | 3 | LL | 1 | 88 | 34 | 0.05123 | 6 | BRASIL | 3 | LLHB | 4 | 88 | | Task I/Est'd wght | | 663.7 |
| 6 | BRASIL | 3 | LLHB | 4 | 88 | 633 | 0.95374 | | | | | | | | Change in Task I | | 663.7 |
| 7 | JAPAN | 12 | LL | 1 | 88 | 2678 | 1.00000 | | | | | | | | Task I < Est. wght | | 3481.1 |
| 6 | JAPAN | 12 | LL | 1 | 88 | 748 | 1.00000 | | | | | | | | Task I < Est. wght | | 972.1 |
| 6 | BRASIL | 3 | LL | 1 | 89 | 192 | 0.27862 | 6 | BRASIL | 3 | LLHB | 4 | 89 | | Task I/Est'd wght | | 689.1 |
| 6 | BRASIL | 3 | LLMB | 2 | 89 | 37 | 1.23333 | | | | | | | | Task I/Est'd wght | | 30.0 |
| 7 | NEI | 73 | LL | 1 | 89 | 856 | 1.11256 | | | | | | | | Change in Task I | | 769.4 |
| 6 | BRASIL | 3 | LL | 1 | 90 | 37 | 0.74000 | | | | | | | | Change in Task I | | 50.0 |
| 6 | BRASIL | 3 | LLHB | 4 | 90 | 930 | 1.20748 | | | | | | | | Change in Task I | | 770.2 |
| 6 | BRASIL | 3 | LLMB | 2 | 90 | 50 | 0.06492 | 6 | BRASIL | 3 | LLHB | 4 | 90 | | Task I/Est'd wght | | 770.2 |
| 6 | JAPAN | 12 | LLHB | 4 | 90 | 2564 | 1.00000 | | | | | | | | Task I > st'd wght | | 1954.1 |
| 7 | JAPAN | 12 | LLHB | 4 | 90 | 3690 | 1.00000 | | | | | | | | Task I < Est. wght | | 4754.1 |
| 7 | NEI | 73 | LL | 1 | 90 | 439 | 0.11434 | 7 | ESPANA | 21 | LLHB | 4 | 90 | | Task I/Est'd wght | | 3839.3 |
| 6 | BRASIL | 3 | LL | 1 | 91 | 25 | 0.03672 | 6 | BRASIL | 3 | LLHB | 4 | 91 | | Task I/Est'd wght | | 680.9 |
| 7 | C.IVOIRE | 50 | SURF | 11 | 91 | 21 | 2.23404 | | | | | | | | Task I/Est'd wght | | 9.4 |
| 7 | JAPAN | 12 | LLHB | 4 | 91 | 2214 | 1.00000 | | | | | | | | Task I < Est. wght | | 2501.9 |
| 6 | JAPAN | 12 | LLHB | 4 | 91 | 1482 | 1.00000 | | | | | | | | Task I < Est. wght | | 1956.7 |
| 6 | BRA-HON. | 102 | LLFB | 3 | 92 | 48 | 0.03198 | 6 | BRA.TAI | 100 | LLFB | 3 | 92 | | Task I/Est'd wght | | 1501.0 |
| 6 | BRA.TAIW | 100 | LLFB | 3 | 92 | 1200 | 0.79947 | | | | | | | | Change in Task I | | 1501.0 |
| 6 | BRASIL | 3 | LL | 1 | 92 | 19 | 0.02810 | 6 | BRASIL | 3 | LLHB | 4 | 92 | | Task I/Est'd wght | | 676.1 |
| 6 | BRASIL | 3 | LLHB | 4 | 92 | 587 | 0.86821 | | | | | | | | Change in Task I | | 676.1 |
| 6 | BRASIL | 3 | LLMB | 2 | 92 | 23 | 0.03402 | 6 | BRASIL | 3 | LLHB | 4 | 92 | | Task I/Est'd wght | | 676.1 |
| 7 | C.IVOIRE | 50 | SURF | 11 | 92 | 15 | 3.94737 | | | | | | | | Change in Task I | | 3.8 |
| 6 | CUBA | 6 | UNCL | 13 | 92 | 147 | 0.13162 | 6 | JAPAN | 12 | LL | 1 | 92 | | Task I/Est'd wght | | 1119.5 |
| 7 | CUBA | 6 | UNCL | 13 | 92 | 230 | 0.13162 | 7 | JAPAN | 12 | LL | 1 | 92 | | Task I/Est'd wght | | 1749.5 |
| 6 | JAPAN | 12 | LLHB | 4 | 92 | 1008 | 1.00000 | | | | | | | | Task I < Est. wght | | 1119.5 |
| 7 | JAPAN | 12 | LLHB | 4 | 92 | 1467 | 1.00000 | | | | | | | | Task I < Est. wght | | 1749.5 |
| 7 | NIGERIA | 88 | SURF | 11 | 92 | 3 | 4.28571 | | | | | | | | Change in Task I | | 0.7 |
| 7 | TOGO | 72 | UNCL | 13 | 92 | 5 | 2.63158 | | | | | | | | Change in Task I | | 1.9 |
| 6 | BRA-HON. | 102 | LLFB | 3 | 93 | 77 | 1.10157 | | | | | | | | Change in Task I | | 69.9 |
| 6 | BRAS.JPN | 57 | LLFB | 3 | 93 | 85 | 1.36876 | | | | | | | | Change in Task I | | 62.1 |
| 6 | BRASIL | 3 | LLHB | 4 | 93 | 637 | 1.09450 | | | | | | | | Change in Task I | | 582.0 |
| 6 | BRASIL | 3 | LLMB | 2 | 93 | 37 | 1.19355 | | | | | | | | Change in Task I | | 31.0 |
| 7 | C.IVOIRE | 50 | SURF | 11 | 93 | 19 | 0.00729 | 7 | ESPANA | 21 | LLHB | 4 | 93 | | Task I/Est'd wght | | 2604.9 |
| 6 | CUBA | 6 | UNCL | 13 | 93 | 23 | 0.03092 | 6 | JAPAN | 12 | LL | 1 | 94 | | Task I/Est'd wght | | 751.2 |
| 7 | CUBA | 6 | UNCL | 13 | 93 | 136 | 0.03092 | 7 | JAPAN | 12 | LL | 1 | 94 | | Task I/Est'd wght | | 4391.4 |
| 7 | GHANA | 27 | UNCL | 13 | 93 | 0 | 0.00000 | | | | | | | | Task I = 0 deleted | | 233.0 |
| 7 | TOGO | 72 | UNCL | 13 | 93 | 8 | 0.03433 | 7 | GHANA | 27 | UNCL | 13 | 93 | | Task I/Est'd wght | | 233.0 |
| 6 | URUGUA | 42 | LLHB | 4 | 93 | 260 | 1.29353 | 6 | URUGUA | 42 | LL | 1 | 93 | | Change in Task I | | 201.0 |
| 6 | ARGENTI | 2 | UNCL | 13 | 94 | 24 | 0.03195 | 6 | JAPAN | 12 | LLHB | 4 | 94 | | Task I/Est'd wght | | 751.2 |
| 6 | BRA-HON. | 102 | LLFB | 3 | 94 | 257 | 0.34212 | 6 | JAPAN | 12 | LLHB | 4 | 94 | | Task I/Est'd wght | | 751.2 |
| 6 | BRA.TAIW | 100 | LLFB | 3 | 94 | 217 | 0.28887 | 6 | JAPAN | 12 | LLHB | 4 | 94 | | Task I/Est'd wght | | 751.2 |
| 6 | BRAS.JPN | 57 | LLFB | 3 | 94 | 109 | 0.14510 | 6 | JAPAN | 12 | LLHB | 4 | 94 | | Task I/Est'd wght | | 751.2 |
| 6 | BRAS.KOR | 56 | LLFB | 3 | 94 | 19 | 0.02529 | 6 | JAPAN | 12 | LLHB | 4 | 94 | | Task I/Est'd wght | | 751.2 |
| 6 | BRASIL | 3 | LLHB | 4 | 94 | 950 | 1.26464 | 6 | JAPAN | 12 | LLHB | 4 | 94 | | Task I/Est'd wght | | 751.2 |

Table 2. Procedures used for creating south Atlantic swordfish catch at size (without sex), for 1996 stock assessments.

| CATCH DATA | | | | | | | MATCHED SIZE DATA | | | | | | | Estim'd Wght MT | | | | |
|------------|----------|-----|------|----|----|------|-------------------|---|---------|----|------|---|----|-----------------------|----|-------------------|-------------------|--------|
| A | COUNTRY | C | GEA | G | Y | CATC | R.F. | A | COUNTR | C | GEA | G | Y | | WG | NO. | REMARKS | |
| R | | O | | E | E | I | Y | E | | U | | A | A | M | P | | | |
| A | | N | | R | R | E | E | A | | N | | A | A | M | | | | |
| | | | | | | | | | | T | | R | R | E | | | | |
| 6 | BRASIL | 3 | LLMB | 2 | 94 | 19 | 0.02529 | 6 | JAPAN | 12 | LLHB | 4 | 94 | | | Task I/Est'd wght | 751.2 | |
| 7 | C.IVOIRE | 50 | SURF | 11 | 94 | 24 | 0.00808 | 7 | ESPANA | 21 | LLHB | 4 | 94 | | | Task I/Est'd wght | 2972.1 | |
| 7 | CHI.TAIW | 5 | LLFB | 3 | 94 | 1887 | 12.62325 | | | | | | | | | Task I/Est'd wght | 149.5 | |
| 6 | CHI.TAIW | 5 | LLFB | 3 | 94 | 323 | 3.08332 | | | | | | | | | | Task I/Est'd wght | 104.7 |
| 7 | ESPANA | 21 | LLHB | 4 | 94 | 2751 | 1.00000 | | | | | | | | | | National sci. | 2972.1 |
| 6 | ESPANA | 21 | LLHB | 4 | 94 | 5186 | 1.00000 | | | | | | | | | | National sci. | 5253.2 |
| 7 | JAPAN | 12 | LLHB | 4 | 94 | 4133 | 1.00000 | | | | | | | | | | National sci. | 4391.4 |
| 6 | JAPAN | 12 | LLHB | 4 | 94 | 657 | 1.00000 | | | | | | | | | | National sci. | 751.2 |
| 7 | JP-SH-OB | 97 | LL | 1 | 94 | 56 | 0.01275 | 7 | JAPAN | 12 | LLHB | 4 | 94 | | | | Task I/Est'd wght | 4391.4 |
| 7 | KOREA | 13 | LLFB | 3 | 94 | 140 | 0.03189 | 7 | JAPAN | 12 | LLHB | 4 | 94 | | | | Task I/Est'd wght | 4391.4 |
| 6 | KOREA | 13 | LLFB | 3 | 94 | 24 | 0.03189 | 6 | JAPAN | 12 | LLHB | 4 | 94 | | | | Task I/Est'd wght | 751.2 |
| 7 | S.AFRICA | 20 | SPOR | 12 | 94 | 1 | 0.00034 | 7 | ESPANA | 21 | LLHB | 4 | 94 | | | | Task I/Est'd wght | 2972.1 |
| 7 | TOGO | 72 | UNCL | 13 | 94 | 14 | 0.00471 | 7 | ESPANA | 21 | LLHB | 4 | 94 | | | | Task I/Est'd wght | 2972.1 |
| 6 | URUGUA | 42 | LLHB | 4 | 94 | 165 | 0.21965 | 6 | JAPAN | 12 | LLHB | 4 | 94 | | | | Task I/Est'd wght | 751.2 |
| 6 | ARGENTI | 2 | UNCL | 13 | 95 | 24 | 1.33333 | 6 | BRASIL | 3 | LLMB | 2 | 95 | | | | Task I/Est'd wght | 18.0 |
| 7 | BE.SH.OB | 137 | LL | 1 | 95 | 1 | 0.05556 | 6 | BRASIL | 3 | LLMB | 2 | 95 | | | | Task I/Est'd wght | 18.0 |
| 6 | BRA.TAIW | 100 | LLFB | 3 | 95 | 311 | 17.27778 | 6 | BRASIL | 3 | LLMB | 2 | 95 | | | | Task I/Est'd wght | 18.0 |
| 6 | BRAS-BAR | 117 | LLFB | 3 | 95 | 45 | 2.50000 | 6 | BRASIL | 3 | LLMB | 2 | 95 | | | | Task I/Est'd wght | 18.0 |
| 6 | BRAS.JPN | 57 | LLFB | 3 | 95 | 53 | 2.94444 | 6 | BRASIL | 3 | LLMB | 2 | 95 | | | | Task I/Est'd wght | 18.0 |
| 6 | BRAS.KOR | 56 | LLFB | 3 | 95 | 33 | 1.83333 | 6 | BRASIL | 3 | LLMB | 2 | 95 | | | | Task I/Est'd wght | 18.0 |
| 6 | BRASIL | 3 | GILL | 24 | 95 | 5 | 0.27778 | 6 | BRASIL | 3 | LLMB | 2 | 95 | | | | Task I/Est'd wght | 18.0 |
| 6 | BRASIL | 3 | LLHB | 4 | 95 | 1019 | 56.61111 | 6 | BRASIL | 3 | LLMB | 2 | 95 | | | | Task I/Est'd wght | 18.0 |
| 6 | BRASIL | 3 | LLMB | 2 | 95 | 35 | 1.94444 | 6 | BRASIL | 3 | LLMB | 2 | 95 | | | | Task I/Est'd wght | 18.0 |
| 7 | C.IVOIRE | 50 | SURF | 11 | 95 | 24 | 0.00546 | 7 | ESPANA | 21 | LLHB | 4 | 95 | | | | Task I/Est'd wght | 4395.1 |
| 7 | CHI.TAIW | 5 | LLFB | 3 | 95 | 668 | 4.46823 | 7 | CHI.TAI | 5 | LLFB | 3 | 94 | | | | Task I/Est'd wght | 149.5 |
| 6 | CHI.TAIW | 5 | LLFB | 3 | 95 | 1483 | 14.16428 | 6 | CHI.TAI | 5 | LLFB | 3 | 94 | | | | Task I/Est'd wght | 104.7 |
| 7 | ESPANA | 21 | LLHB | 4 | 95 | 3951 | 1.00000 | | | | | | | | | | National sci. | 4395.1 |
| 6 | ESPANA | 21 | LLHB | 4 | 95 | 7339 | 1.00000 | | | | | | | | | | National sci. | 7353.5 |
| 7 | HO-SH-OB | 108 | LL | 1 | 95 | 6 | 0.00166 | 7 | JAPAN | 12 | LLHB | 4 | 95 | | | | Task I/Est'd wght | 3624.7 |
| 6 | JAPAN | 12 | LLHB | 4 | 95 | 522 | 1.00000 | | | | | | | | | | National sci. | 459.3 |
| 7 | JAPAN | 12 | LLHB | 4 | 95 | 3203 | 1.00000 | | | | | | | | | | National sci. | 3624.7 |
| 7 | KOREA | 13 | LLFB | 3 | 95 | 146 | 0.04016 | 7 | JAPAN | 12 | LLHB | 4 | 95 | | | | Task I/Est'd wght | 3624.7 |
| 6 | KOREA | 13 | LLFB | 3 | 95 | 18 | 0.04016 | 6 | JAPAN | 12 | LLHB | 4 | 95 | | | | Task I/Est'd wght | 459.3 |
| 7 | PORTUGA | 19 | LLHB | 4 | 95 | 227 | 0.05165 | 7 | ESPANA | 21 | LLHB | 4 | 95 | | | | Task I/Est'd wght | 4395.1 |
| 6 | URUGUA | 42 | LLHB | 4 | 95 | 428 | 0.93185 | 6 | JAPAN | 12 | LLHB | 4 | 95 | | | | Task I/Est'd wght | 459.3 |