DISAGGREGATION OF CATCHES RECORDED UNDER AGGREGATES OF GEAR AND SPECIES IN THE IOTC NOMINAL CATCHES DATABASE

IOTC Secretariat

1-. Rationale and main constraints

Nominal catches data in the IOTC IOTDB database are not always recorded under individual gears or species. This is due to catches not always reported per species and/or gear by the responsible institution/s in each country.

The decomposition of catches recorded under species and/or gear aggregates is in some cases possible, especially when the Secretariat has access to alternate sources of information as publications, fishery bulletins or other where these data are available.

Species and gear aggregates are kept when no alternative sources are found or the information available is not enough to allow the decomposition of these catches. Data recorded in the IOTC Nominal Catches database follows the above rule.

The main role of this database is to further decompose the catches in IOTDB so as that all fall under individual gears and species. The catches series obtained are used by scientists participating to IOTC Working Parties their use not being recommended for other purposes due to the high level of uncertainty of the estimates.

2-. Allocation of catches aggregates to individual Gear and Species

The decomposition of the catches is done automatically by following pre-established criteria. More details about this process can be found further in the Help. The process runs by simply clicking on the command Run Process in the main Switchboard. Several forms will open on the fly in the case that information needs to be completed or data checked upon. If this occurs simply complete the information missing in the forms in the way explained closing them afterwards

When the process ends several tables or queries are open:

i **FINAL_TABLE_NC**: Table recording the new catches estimated, assigned to individual gears and species.

ii **085/GetNewTotalsPerGear**: Total catches of IOTC species (tuna and tuna like species) estimated per gear after decomposition of catches recorded under gear aggregates.

iii **086/GetDBTotalsPerGear**: Total catches of IOTC species (tuna and tuna like species) per gear as recorded in the IOTC database.

iv **085/GetNewTotalsPerSpecies**: Total catches of IOTC species (tuna and tuna like species) estimated after decomposition of catches recorded under species aggregates.

v **086/GetDBTotalsPerSpecies**: Total catches of IOTC species (tuna and tuna like species) as recorded in the IOTC database.

Data in **FINAL_TABLE_NC** is fully decomposed being all catches assigned to individual species, gears and fleets. Fleet and gear information recorded are more detailed than that currently disseminated or used during Working Party Meetings. Country Strata information (Country-Reporting Country in the IOTDB) are usually not disseminated as such being the catches assigned to single fleet codes and aggregated for fleets operating in the same way (or whose catches were estimated by following the same criteria). Furthermore, catches recorded under different codes all referring to a single gear are all aggregated under the corresponding gear for dissemination.

This final step occurs in a separate database. You can open it by clicking on the command YES when you are prompted to do so in the form that is open along with the tables referred to above. Once that you press YES this database will close and **NCRepFor.mdb** will open (***W:\Databases\Requests For IOTC Data\Nominal catch***). Click on the button ***Create NC Tables (Individual Gear and Species)*** if you whish to obtain standard tables including the nominal catches series decomposed. The excel template ***NCDB&cdeDiss.xlt***, located in the same folder, will open once that the process finishes and the data in the final tables will be imported to its several worksheets. Save this file as an excel worksheet and send it to the requesting scientist or transfer it to your web master to be uploaded in the IOTC web site.

A. Step 1: Inputs needed

Not all information used during the process comes from the IOTC database being in several tables gathered in this database. These are:

i **GearDisagg:** Contains all gear codes, both gear groups (column GearGroup) and detailed gear codes (column Gear), used in the Nominal Catches database (as recorded in the *sql* table **IOTDB.dbo.cdeGears**) with an indication (column **IsAgg**) of whether codes refer to aggregates or not (check box) and the gears making up each aggregate (column **GearDiss**). The gear Unclassified (**UNCL**) does not need decomposition for it refers, by default, to all other gears in the table.

Figure 1: User Table **GearDisagg**

IsAgg	GearGroup	Gear	GearDiss	TimeStamp
☐	BB	BB	BB	08/06/2004 16:26:25
☐	BB	BBM	BBM	08/06/2004 16:26:25
☐	BB	BBN	BBN	08/06/2004 16:26:25
☐	BB	BBPS	BBPS	08/06/2004 16:26:25
☑	GILL	G/L	GILL	08/06/2004 16:26:25
☑	GILL	G/L	LL	08/06/2004 16:26:25
☑	GILL	GIHA	GILL	08/06/2004 16:26:25
☑	GILL	GIHA	HAND	08/06/2004 16:26:25
☐	GILL	GILL	GILL	08/06/2004 16:26:25
☐	GILL	GIOF	GIOF	08/06/2004 16:26:25
☐	HAND	HAND	HAND	08/06/2004 16:26:25
☑	LINE	HATR	HAND	08/06/2004 16:26:25
☑	LINE	HATR	TROL	08/06/2004 16:26:25
☑	LINE	HOOK	HAND	08/06/2004 16:26:25
▶ ☑	LINE	HOOK	TROL	08/06/2004 16:26:25
☐	LL	ELL	ELL	08/06/2004 16:26:25

Columns completed by default:

Gear: Gear code as it is recorded in the IOTC Nominal Catches Table (the *sql* table **IOTDB.dbo.cdeGears** contains the description of all gear codes used; this table can be accessed from this database through the linked table ***dbo_cdeGears***)

GearGroup: Gear or gear group as it is recorded in the IOTDB database table **IOTDB.dbo.cdeGears** (referred to as **AggCode**)

TimeStamp: Date and hour in which each record was input to the table

Columns completed/to complete by the user:

IsAgg: Check box to indicate if the Gear code in **Gear** refers to an individual gear (not checked) or to more than one gear (checked)

GearDiss: Column to record the gear/s in which each gear in the column **Gear** is decomposed (one to one relationship for individual gears and one to many for gear aggregates)

Figure 2: User Table **SpeciesDisagg**

IsIOTC	SpsGroup	Species	DisSps	IsAgg	TimeStamp
☑	BILLFISH	BIL	BLM	☑	08/06/2004 16:26:47
☑	BILLFISH	BIL	BUM	☑	08/06/2004 16:26:47
☑	BILLFISH	BIL	MLS	☑	08/06/2004 16:26:47
☑	BILLFISH	BIL	SFA	☑	08/06/2004 16:26:47
▶ ☑	BILLFISH	BIL	SSP	☑	08/06/2004 16:26:47
☑	BILLFISH	BILL	BLM	☑	08/06/2004 16:26:47
☑	BILLFISH	BILL	BUM	☑	08/06/2004 16:26:47
☑	BILLFISH	BILL	MLS	☑	08/06/2004 16:26:47
☑	BILLFISH	BILL	SFA	☑	08/06/2004 16:26:47
☑	BILLFISH	BILL	SSP	☑	08/06/2004 16:26:47
☑	BILLFISH	BILL	SWO	☑	08/06/2004 16:26:47
☑	BILLFISH	BLM	BLM	☐	08/06/2004 16:26:47
☑	BILLFISH	BUM	BUM	☐	08/06/2004 16:26:47
☑	BILLFISH	MARL	BLM	☑	08/06/2004 16:26:47
☑	BILLFISH	MARL	BUM	☑	08/06/2004 16:26:47
☑	BILLFISH	MARL	MLS	☑	08/06/2004 16:26:47
☑	BILLFISH	MLS	MLS	☐	08/06/2004 16:26:47

Columns completed by default:

Species: Species code as it is recorded in the IOTC Nominal Catches Table (the *sql* table **IOTDB.dbo.cdeSpecies** contains the description of all species codes used; this table can be accessed from this database through the linked table ***dbo_cdeSpecies***)

SpeciesGroup: Species group as it is recorded in the IOTDB database table **IOTDB.dbo.cdeSpecies** (referred to as **LargeGroup**)

IsIOTC: Indicates whether the Species code in **Species** refers to an IOTC species (checked) or not (not checked)

TimeStamp: Date and hour in which each record was input to the table

Columns completed/to complete by the user:

IsAgg: Check box to indicate if the Species code in **Species** refers to an individual species (not checked) or to more than one (checked)

DisSps: Column to record the species in which each species in the column **Species** is decomposed (one to one relationship for individual species and one to many for species aggregates)

ii **SpeciesDisagg:** Contains all species codes, both species groups (column **SpsGroup**) and detailed species codes (column **Species**), used in the Nominal Catches database (as recorded in the *sql* table **IOTDB.dbo.cdeGears**) recording whether codes refer to IOTC species (column **IsIOTC**) or not (check box), an indication (column **IsAgg**) of whether codes refer to aggregates or not (check box) and the species making up each aggregate (column **DisSps**). Only IOTC species are considered for the decomposition. The catches of all non-IOTC species are ignored and therefore decomposition of aggregates is not done at this level.

iii **CountryStratRegions:** This table (**Figure 3**) contains all strata in the sql table **IOTDB.dbo.NCStrat,** defined as Country-Reporting Country-Gear-IOTC Area with an indication on the period for which catches data are available in each case. A presumed region of operation is assigned to each stratum (fleet or fishery) as well as a presumed type of operation in two additional columns (Region and TypeOperation, respectively). **Figure 4**

shows the regions used, that are also represented in **Map 1**. These regions were created on the assumption that fisheries in the area are likely to be similar and are more precise for small scale/short range than to large scale/long range fisheries. Long range fisheries are normally bound to large areas, all the IOTC Area in some cases. **Figure 5** shows the types of operation recorded: presumed small scale/short range fisheries are defined as Artisanal and large scale/long range fisheries as Industrial.

Figure 3: User Table **CountryStratRegions**

CountryStratRegions : Table

Country	ReportingCo	Gear	GearA	Area	FromYear	ToYear	Region	TypeOperation	TimeStamp
ANT	ESP	PS	PS	F51	1997	2002	WESIO	IND	08/06/2004 21:02:27
ANT	ESP	PS	PS	F57	1997	1998	WESIO	IND	08/06/2004 21:02:27
ARE	ARE	TROL	TROL	F51	1988	2002	PERSG	ART	08/06/2004 21:02:27
ARE	ARE	UNCL	OTHER	F51	1950	2002	PERSG	ART	08/06/2004 21:02:27
ARE	ARE	GILL	GILL	F51	1988	2002	PERSG	ART	08/06/2004 21:02:27
AUS	AUS	UNCL	OTHER	F57	1950	2002	SEAIO	ART	08/06/2004 21:02:27
AUS	AUS	TROL	TROL	F57	1981	2002	SEAIO	ART	08/06/2004 21:02:27
AUS	AUS	TRAW	OTHER	F57	1996	2001	SEAIO	IND	08/06/2004 21:02:27
AUS	AUS	SEN	OTHER	F57	1996	1998	SEAIO	ART	08/06/2004 21:02:27
AUS	AUS	TRAP	OTHER	F57	1998	1998	SEAIO	ART	08/06/2004 21:02:27
AUS	AUS	SPOR	OTHER	F57	1996	2000	SEAIO	ART	08/06/2004 21:02:27
AUS	AUS	BBPS	BB	F57	1996	2000	SEAIO	IND	08/06/2004 21:02:27

Columns completed by default:

Country-ReportingCo: Country and Reporting Country codes as they are recorded in the IOTC Nominal Catches Table (**IOTDB.dbo.NCStrat**; the *sql* table **IOTDB.dbo.CountryStrat** contains all Country-Reporting Country strata recorded in IOTDB; these codes can be read by using the table **IOTDB.dbo.cdeCountries**, also in IOTDB.

Gear: Gear code as it is recorded in the IOTC Nominal Catches Table (**IOTDB.dbo.NCStrat;** the *sql* table **IOTDB.dbo.cdeGears** contains the description of all gear codes used; this table can be accessed from this database through the linked table ***dbo_cdeGears***)

GearA: Gear or gear group as it is recorded in the IOTDB database table **IOTDB.dbo.cdeGears** (referred to as **AggCode**)

Area: Code referring to the Area of operation as it is recorded in the IOTC Nominal Catches Table (**IOTDB.dbo.NCStrat;** the *sql* table **IOTDB.dbo.cdeGeoFeatures** contains all Area strata recorded in IOTDB; only West (F51) and East (F57) are used in the Nominal Catches Table)

FromYear: First year for which catches are recorded in the Nominal Catches Table (**IOTDB.dbo.NCStrat**)

ToYear: Last year for which catches are recorded in the Nominal Catches Table (**IOTDB.dbo.NCStrat**)

TimeStamp: Date and hour in which each record was input to the table

Columns completed/to complete by the user:

Region: Column to record the presumed region or area of operation of each fleet (defined as Country-Reporting Country-Gear-Area-YearFrom-YearTo); the table **CodeRegions,** in this database, shows all region codes used and its description (see also **Figure 4**)

TypeOperation: Column to record the presumed type of operation of each fleet (defined as Country-Reporting Country-Gear-Area-YearFrom-YearTo); the table **CodeTypesOperation,** in this database, shows all types of operation codes used and its description (see also **Figure 5**)

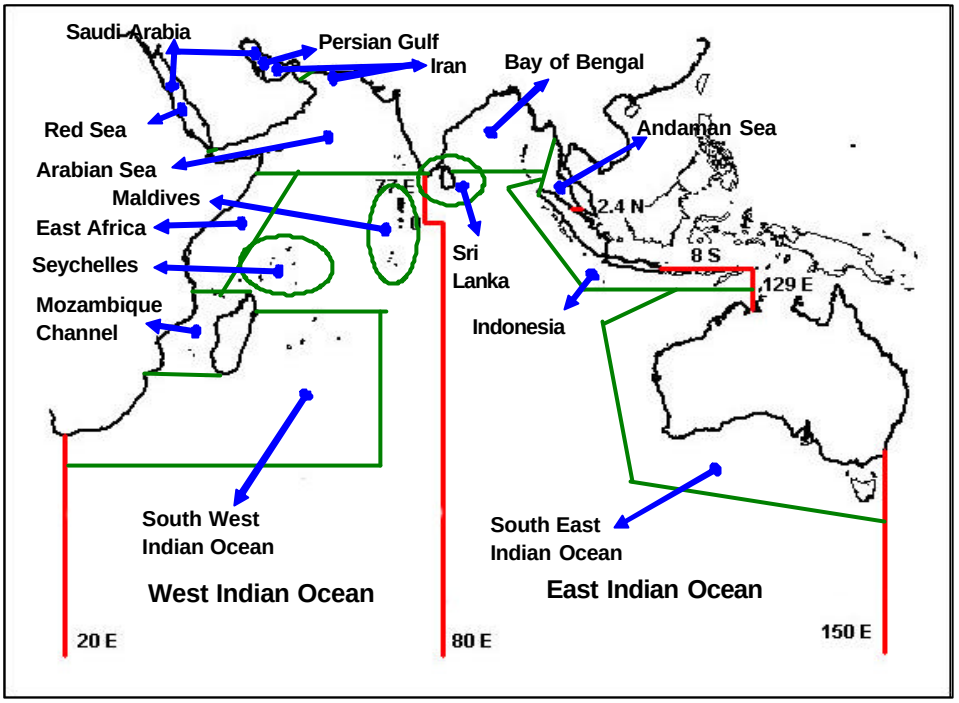
Figure 4: User Table **Regions**

RegionCode	Region
ALLIO	All Indian Ocean
ANDAS	Andaman Sea
ARABS	Arabian Sea
BAYBE	Bay of Bengal
EAFRI	East Africa
EASIO	East Indian Ocean
INDON	Indonesia
IRAN	Iran
MALDI	Maldives
MOZCH	MozambiqueChannel
NEAIO	Northeast Indian Ocean
NWEIO	NorthWest Indian Ocean
PERSG	Persian Gulf
REDSE	Red Sea
SAUAR	Saudi Arabia
SEAIO	Southeast Indian Ocean
SEYCH	Seychelles
SRILA	Sri Lanka
SWEIO	SouthWest Indian Ocean
UNCL	Unclassified or Unknown
WESIO	West Indian Ocean

Figure 5: User Table **Types of Operation**

TypeOperationCode	Description
ART	Artisanal Fishing
IND	Industrial Fishing
UNCL	Unknown or Unclassified

Map 1: Regions used for the disaggregation of catches



The information in these tables is completed on the fly and they are automatically opened in the case of new strata recorded in the IOTC Nominal Catches Table. All fields from the IOTC Database are automatically appended to the corresponding table being other fields left blank (check boxes) or completed as "UNCL" (text fields). The process will check if "UNCL" values are recorded in any of the columns to complete by the user being the table opened if it is the case. The process will not continue until all fields are completed for new strata (all "UNCL" have been changed to the corresponding code).

Following is an example this:

BOX 1: New Stratum recorded in the IOTC Nominal Catches Table:

Country: United Arab Emirates (**ARE**)

Reporting Country: United Arab Emirates (**ARE**)

Gear: Catches under gillnets, hand lines and troll lines recorded aggregated (Code **GIHT**)

IOTC Area: West Indian Ocean (code **F51**)

Year: 2003

Species: Narrow-barred Spanish mackerel (**COM**) and catches of longtail tuna (**LOT**) and yellowfin tuna (**YFT**) recorded aggregated (code **LOYF**)

TABLE **GearDisagg**

Checking and adding new strata to the table **GearDisagg**: The gear **GIHT**, not recorded in **GearDisagg**, will be added to the table as shown in **Figure 6** on the right: The values in **GearGroup** and **Gear** will be added automatically from the table **IOTDB.dbo.cdeGears** while "UNCL" will be added to the field **GearDiss**.

Figure 6:

IsAgg	GearGroup	Gear	GearDiss	TimeStamp
☐	TROL	TROLM	TROLM	08/06/2004 16:26:25
☐	TROL	TROLN	TROLN	08/06/2004 16:26:25
☐	GILL	GIHT	UNCL	08/07/2004 09:48:33

The table will be opened subsequently so as the user can complete it (**Figure 7**): The gear **GIHT** is an aggregate of three gears and therefore two more rows need to be added to the table by the user. The data in **GearGroup** and **Gear** are the same than that in **Figure 6** being other fields completed by the user. The column **IsAgg** needs to be checked because the code **GIHT** refers to an aggregate; codes referring to individual gears are used to complete the values in **GearDiss**.

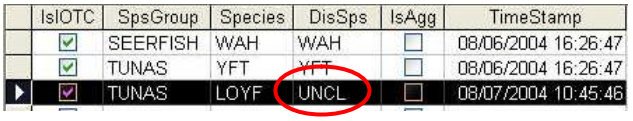
Figure 7:

IsAgg	GearGroup	Gear	GearDiss	TimeStamp
☐	TROL	TROLN	TROLN	08/06/2004 16:26:25
☑	GILL	GIHT	HAND	08/07/2004 09:48:33
☑	GILL	GIHT	TROL	08/07/2004 09:48:33
☑	GILL	GIHT	GILL	08/07/2004 09:48:33

TABLE **SpeciesDisagg**

Checking and adding new strata to the table **SpeciesDisagg**: The species **LOYF**, not recorded in **SpeciesDisagg**, will be added to the table as shown in **Figure 8** on the right: The values in **IsIOTC** , **SpsGroup** and **Species** will be added automatically from the table **IOTDB.dbo.cdeSpecies** while "UNCL" will be added to the field **DisSps**.

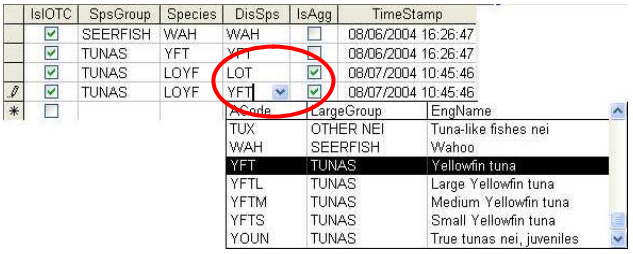
Figure 8:



IsIOTC	SpsGroup	Species	DisSps	IsAgg	TimeStamp
☑	SEERFISH	WAH	WAH	☐	08/06/2004 16:26:47
☑	TUNAS	YFT	YFT	☐	08/06/2004 16:26:47
☑	TUNAS	LOYF	UNCL	☐	08/07/2004 10:45:46

The table will be opened subsequently so as the user can complete it (**Figure 9**): The species **LOYF** is an aggregate of two species and therefore one more row needs to be added to the table by the user. The data in **IsIOTC**, **SpsGroup** and **Species** are the same than that in **Figure 8** being other fields completed by the user. The column **IsAgg** needs to be checked because the code **LOYF** refers to an aggregate; codes referring to individual species are used to complete the values in **DisSps** (the species can be chosen from the drop down list that is displayed by pushing on the down arrow on the right of each **DisSps** field).

Figure 9:



IsIOTC	SpsGroup	Species	DisSps	IsAgg	TimeStamp
☑	SEERFISH	WAH	WAH	☐	08/06/2004 16:26:47
☑	TUNAS	YFT	YFT	☐	08/06/2004 16:26:47
☑	TUNAS	LOYF	LOT	☑	08/07/2004 10:45:46
☑	TUNAS	LOYF	YFT	☑	08/07/2004 10:45:46

ASCode	LargeGroup	EngName
TUX	OTHER NEI	Tuna-like fishes nei
WAH	SEERFISH	Wahoo
YFT	TUNAS	Yellowfin tuna
YFTL	TUNAS	Large Yellowfin tuna
YFTM	TUNAS	Medium Yellowfin tuna
YFTS	TUNAS	Small Yellowfin tuna
YOUN	TUNAS	True tunas nei, juveniles

TABLE **CountryStratRegions**

Checking and adding new strata to the table **CountryStratRegions**: The new stratum referred to above will be automatically added to the table **CountryStratRegions** as in **Figure 10** below. The code "**UNCL**" is added to Region and Type of Operation.

Figure 10:

Country	ReportingCo	Gear	GearA	Area	FromYear	ToYear	Region	TypeOperation	TimeStamp
ZAF	ZAF	SLL	LL	F51	1997	2001	SWEIO	IND	08/06/2004 21:02:27
ZAF	ZAF	HAND	HAND	F51	1979	2002	SWEIO	ART	08/06/2004 21:02:27
ARE	ARE	GIHT	GILL	F51	2003	2003	UNCL	UNCL	08/07/2004 14:42:59

The table will be opened subsequently so as it can be completed (**Figure 11**): A region and a type of operation need to be chosen from the drop down lists that are displayed by clicking on the down arrow on the right of the corresponding cells (see **Figures 4** and **5** and **Map 1** for reference).

Figure 11:

Country	ReportingCo	Gear	GearA	Area	FromYear	ToYear	Region	TypeOperation
ZAF	ZAF	SLL	LL	F51	1997	2001	SWEIO	IND
ZAF	ZAF	HAND	HAND	F51	1979	2002	SWEIO	ART
ARE	ARE	GIHT	GILL	F51	2003	2003	PERSG	ART

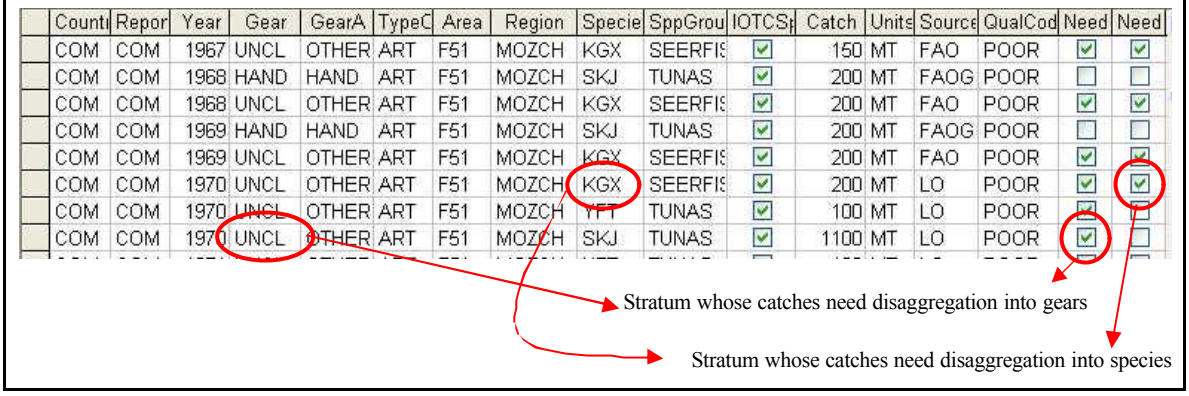
ALLIO	All Indian Ocean
ANDAS	Andaman Sea
ARABS	Arabian Sea
BAYBE	Bay of Bengal
EAFRI	East Africa
EASIO	East Indian Ocean
INDON	Indonesia
IRAN	Iran
MALDI	Maldives
MOZCH	MozambiqueChannel
NEAIO	Northeast Indian Ocean
NWEIO	NorthWest Indian Ocean
PERSG	Persian Gulf
REDSE	Red Sea

Once all tables completed and closed press the Run Process button again.

B. Step 2: Disaggregation of catches recorded under gear aggregates

The process starts by appending all nominal catches data in the IOTC database (from tables **IOTDB.dbo.NCStrat** and **IOTDB.dbo.NCEstimates**) to a flat table in this database (**NewNCData, Figure 12**).

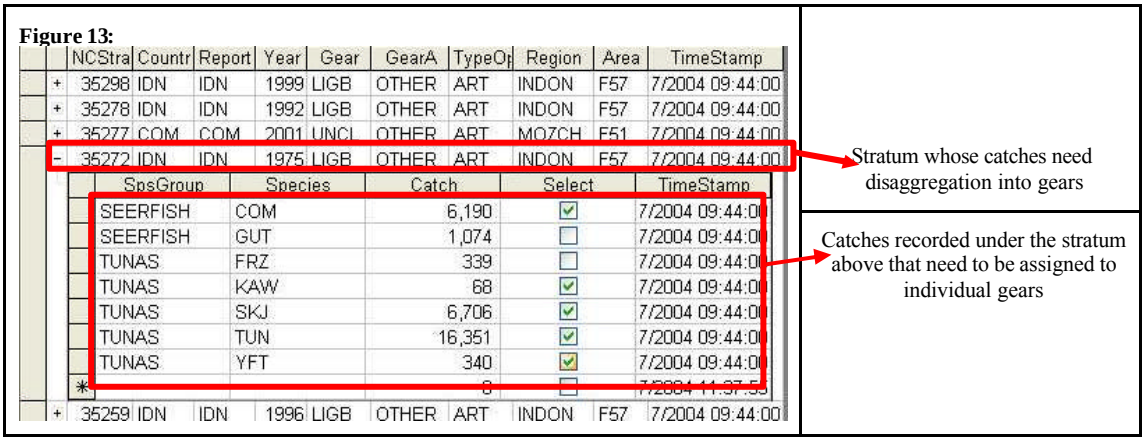
Figure 12:



The last two columns of the table are used to mark the strata that need disaggregation regarding gear and/or species. The boxes are checked according to whether the gear and/or species for each stratum are defined as aggregates in the tables **GearDisagg** and **SpeciesDisagg**, respectively. Region and type of operation are also assigned to each stratum according to those recorded in the table **CountryStratRegions.**

All strata containing catches recorded under gear aggregates are transferred to the tables **NewNC_GeartoDis** and **NewNC_GeartoDisEstimates** (**Figure 13**), the former containing the strata and the later the catches reported for each strata.

Figure 13:



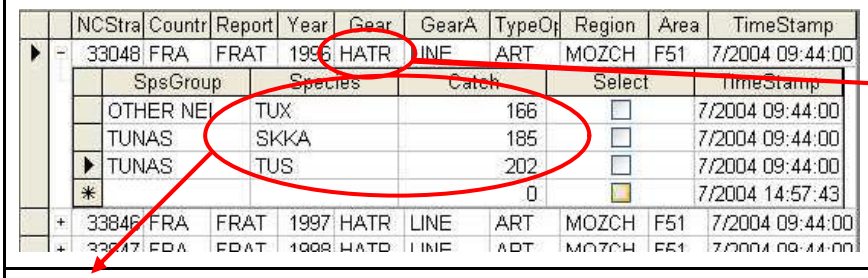
The table **NewNC_GeartoDis** is also connected to a table (**NewNC_GearForSubstitution**) where the information used for the disaggregation is appended. All gear aggregates are decomposed into individual gears according to the information in the table **GearDisagg** being the table **NewNC_GearForSubstitution** completed by using existing strata in the table **NewNCData. Table 1** below shows the criteria used for the selection of the strata to use for the substitution; an example of how this process works is shown in **Box 2** after the table.

Table 1: Criteria used for the disaggregation of catches recorded under gear aggregates in the IOTC Nominal Catches Table

Order	Criteria
	Catches recorded under individual gears for the:
1	Same Fleet / same type of operation / same region / same IOTC Area / same year
2	Same Fleet / same type of operation / same region / same IOTC Area / 5 years before or after
3	Different Fleet / same type of operation / same region / same IOTC Area / same year
4	Same Fleet / same type of operation / same region / same IOTC Area / 10 years before or after
5	Same Fleet / same type of operation / same region / same IOTC Area / more than 10 years before or after
6	Different Fleet / same type of operation / different region / same IOTC Area / same year
7	Different Fleet / same type of operation / different region / same IOTC Area / different year

BOX 2: Selecting the strata for the allocation of catches under gear aggregates to individual gears

Figure 14: Stratum whose catches need disaggregation



NCStra	Countr	Report	Year	Gear	GearA	TypeOp	Region	Area	TimeStamp
33048	FRA	FRAT	1996	HATR	LINE	ART	MOZCH	F51	7/2004 09:44:00

SpsGroup	Species	Catch	Select	TimeStamp
OTHER NEI	TUX	166	☐	7/2004 09:44:00
TUNAS	SKKA	185	☐	7/2004 09:44:00
TUNAS	TUS	202	☐	7/2004 09:44:00
*		0	☐	7/2004 14:57:43

NCStra	Countr	Report	Year	Gear	GearA	TypeOp	Region	Area	TimeStamp
33846	FRA	FRAT	1997	HATR	LINE	ART	MOZCH	F51	7/2004 09:44:00

The catches recorded under this gear come from hand lines (HAND) and troll lines (TROL), as recorded in the table **GearDisagg**

The catches of TUX, SKKA and TUS are assigned to HAND and/or TROL (all catches are assigned to HAND if no catches are found under TROL in the strata selected for substitution and *vice versa*)

Figure 15 below shows how the Table **NewNC_GearForSubstitution** is completed for this stratum :

Figure 15:

NCStra	Countr	Report	Year	Gear	GearA	TypeOp	Region	Area	TimeStamp
33048	FRA	FRAT	1996	HATR	LINE	ART	MOZCH	F51	7/2004 09:44:00

Priority	TypeOp	Region	Gear	SpsGroup	Species	Catch	TotCatchSps	Proportion	Select	Tim
31	ART	MOZCH	HAND	ALL	ALL	2,231.00	19,025.00	0.12	☑	7/200
31	ART	MOZCH	HAND	BILLFISH	BIL	63.00	130.00	0.48	☑	7/200
31	ART	MOZCH	HAND	BILLFISH	SFA	177.00	250.00	0.71	☑	7/200
31	ART	MOZCH	HAND	SEERFISH	KGX	132.00	269.00	0.49	☑	7/200
31	ART	MOZCH	HAND	TUNAS	BET	18.00	30.00	0.60	☑	7/200
31	ART	MOZCH	HAND	TUNAS	KAW	4.00	170.00	0.02	☑	7/200
31	ART	MOZCH	HAND	TUNAS	SKJ	46.00	2,150.00	0.02	☑	7/200
31	ART	MOZCH	HAND	TUNAS	TUN	245.00	508.00	0.48	☑	7/200
31	ART	MOZCH	HAND	TUNAS	YFT	1,546.00	5,518.00	0.28	☑	7/200
31	ART	MOZCH	TROL	ALL	ALL	16,794.00	19,025.00	0.88	☑	7/200
31	ART	MOZCH	TROL	BILLFISH	BIL	67.00	130.00	0.52	☑	7/200
31	ART	MOZCH	TROL	BILLFISH	SFA	73.00	250.00	0.29	☑	7/200
31	ART	MOZCH	TROL	SEERFISH	COM	10,000.00	10,000.00	1.00	☑	7/200
31	ART	MOZCH	TROL	SEERFISH	KGX	137.00	269.00	0.51	☑	7/200
31	ART	MOZCH	TROL	TUNAS	BET	12.00	30.00	0.40	☑	7/200
31	ART	MOZCH	TROL	TUNAS	KAW	166.00	170.00	0.98	☑	7/200
31	ART	MOZCH	TROL	TUNAS	SKJ	2,104.00	2,150.00	0.98	☑	7/200
31	ART	MOZCH	TROL	TUNAS	TUN	263.00	508.00	0.52	☑	7/200
31	ART	MOZCH	TROL	TUNAS	YFT	3,972.00	5,518.00	0.72	☑	7/200

The first column of the table **NewNC_GearForSubstitution** (**Priority**) is used to indicate where the data used for the substitution are from in the Nominal catches table; the catches recorded come in this case from fleet s other than FRA-FRAT (France Territories) that operated artisanal hand and/or troll lines (same type of operation) in the Mozambique Channel Region (same Region of Operation and same IOTC Area) during the year 1996 (same year) (refer to **Table 1** Order 3).

The column **Species** records all species and/or species aggregates for which catches are found plus total catches per gear (recorded as **ALL**). The columns **TotCatchSps** and **Proportion** are used to record the total catches of each species for all gears recorded and the proportion of catches of each species that fall under each gear.

The catches of TUX, SKKA and TUS will subsequently be assigned to HAND and TROL according to the proportions in **NewNC_GearForSubstitution.** The proportions used differ depending on whether the species whose catches need to be assigned are found in **NewNC_GearForSubstitution** or not: the proportions recorded for the same species/species aggregate are used in the case that it is recorded being the proportions under ALL (totals per gear) used if the species/species aggregate is not recorded as such in **NewNC_GearForSubstitution**. **Figure 16** below shows how the catches are assigned in this case (Table **G_NewCatchesPerGear**):

Figure 16:

Count	Reporti	Year	Gear	GearA	Type(	Area	Region	Specie	SppGroup	Catch	Units	Source	QualCo	GEsti	IsSpe
FRA	FRAT	1996	TROL	TROL	ART	F51	MOZCH	TUX	OTHER NEI	88.201	MT	IOTC	POOR	☑	☑
FRA	FRAT	1996	HAND	HAND	ART	F51	MOZCH	SKKA	TUNAS	21.694	MT	IOTC	POOR	☑	☑
FRA	FRAT	1996	HAND	HAND	ART	F51	MOZCH	TUS	TUNAS	23.688	MT	IOTC	POOR	☑	☑
FRA	FRAT	1996	HAND	HAND	ART	F51	MOZCH	TUX	OTHER NEI	19.466	MT	IOTC	POOR	☑	☑
FRA	FRAT	1996	TROL	TROL	ART	F51	MOZCH	SKKA	TUNAS	163.31	MT	IOTC	POOR	☑	☑
FRA	FRAT	1996	TROL	TROL	ART	F51	MOZCH	TUS	TUNAS	178.31	MT	IOTC	POOR	☑	☑
FRA	FRAT	1996	TROL	TROL	ART	F51	MOZCH	TUX	OTHER NEI	146.53	MT	IOTC	POOR	☑	☑
FRA	FRAT	1997	HAND	HAND	ART	F51	MOZCH	SKKA	TUNAS	23.054	MT	IOTC	POOR	☑	☑

The proportions used refer to the species ALL due to no catches of SKKA, TUS and TUX found in the substitution table.

The new catches estimated are appended to a new table, **G_NewCatchesPerGear**, along with the catches originally recorded under individual gears. This involve adding the catches for strata for which the new catches estimated fall under gear/s for which catches exist already in the database (e.g. catches recorded under UNCL for a country are decomposed as HAND and TROL where catches under one or the two gears already exist in the database).

The two columns on the right of table **G_NewCatchesPerGear** (check boxes) are used to indicate whether the catches recorded were estimated from a gear aggregate and if the species code recorded refers to a species aggregate (box checked) or to an individual species.

C. Step 3: Disaggregation of catches recorded under species aggregates

The disaggregation of catches recorded under species aggregates into individual species follows the same rationale than the former.

All strata containing catches recorded under species aggregates (box **IsSpsAgg** checked) in the table **G_NewCatchesPerGear** are transferred to the table **NewNC_SpeciestoDis** (**Figure 17**).

Figure 17:

SpsDID	Countr	Report	Year	Gear	GearA	TypeO	Area	Region	Specie	SppGroup	Catch	GEstimate	TimeStamp
220926	FRA	FRAT	1995	TROL	TROL	ART	F51	MOZCH	TUX	OTHER NEI	88.201	☑	/07/2004 09:46:30
220927	FRA	FRAT	1996	HAND	HAND	ART	F51	MOZCH	SKKA	TUNAS	21.694	☑	/07/2004 09:46:30
220928	FRA	FRAT	1996	HAND	HAND	ART	F51	MOZCH	TUS	TUNAS	23.688	☑	/07/2004 09:46:30
220929	FRA	FRAT	1996	HAND	HAND	ART	F51	MOZCH	TUX	OTHER NEI	19.466	☑	/07/2004 09:46:30
220930	FRA	FRAT	1996	TROL	TROL	ART	F51	MOZCH	SKKA	TUNAS	163.31	☑	/07/2004 09:46:30
220931	FRA	FRAT	1996	TROL	TROL	ART	F51	MOZCH	TUS	TUNAS	178.31	☑	/07/2004 09:46:30
220932	FRA	FRAT	1996	TROL	TROL	ART	F51	MOZCH	TUX	OTHER NEI	146.53	☑	/07/2004 09:46:30
220933	FRA	FRAT	1997	HAND	HAND	ART	F51	MOZCH	SKKA	TUNAS	23.054	☑	/07/2004 09:46:30

Strata whose catches need disaggregation per species

The strata in table **NewNC_SpeciestoDis** are aggregated according to the gear, type of operation, region of operation, species aggregate and period in which the catches of each species aggregate are recorded. ***This is done on the assumption that the proportion of catches of the species whose make up each species aggregate are likely to be the same for fisheries operating the same gear (and type of operation) within the same region (and/or IOTC Area).*** **CodeLikelySpeciesForAggregates (Figure 18**) shows the new strata from which the substitution process will proceed.

Figure 18:

	ID	Gear	GearA	TypeO	YearF	YearTo	Region	Area	SppGroup	Species	TimeStamp
+	5651	HAND	HAND	ART	1994	2002	SEYCH	F51	BILLFISH	BIL	7/2004 09:46:30
+	5645	HAND	HAND	ART	1995	1999	MOZCH	F51	OTHER NEI	TUX	7/2004 09:46:30
+	5647	HAND	HAND	ART	1995	2002	MOZCH	F51	TUNAS	SKKA	7/2004 09:46:30
+	5649	HAND	HAND	ART	1995	2002	MOZCH	F51	TUNAS	TUS	7/2004 09:46:30
+	5658	HAND	HAND	ART	1997	2002	SWEIO	F51	TUNAS	TUS	7/2004 09:46:30
+	5662	HAND	HAND	ART	1998	1998	SEAIO	F57	OTHER NEI	TUX	7/2004 09:46:30
+	5652	HAND	HAND	ART	1998	2002	SEYCH	F51	OTHER NEI	TUX	7/2004 09:46:30
+	5643	HAND	HAND	ART	2002	2002	MALDI	F51	TUNAS	TUN	7/2004 09:46:30
+	5666	HAND	HAND	IND	1950	1969	INDON	F57	OTHER NEI	TUX	7/2004 09:46:30

Aggregation of strata from **NewNC_SpeciestoDis** before the selection of strata for disaggregation of catches recorded under species aggregates

The table **CodeLikelySpeciesForAggregates** is connected to a table (**CodeLikelySpeciesForAggDetail**) where the information used for the disaggregation is appended. All species aggregates are decomposed into individual species according to the information in the table **SpeciesDisagg** being the table **CodeLikelySpeciesForAggDetail** completed by using existing strata in the table **NewNCData. Table 2** below shows the criteria used for the selection of the strata used for the substitution; an example of how this process works is shown in **Box 3** after the table.

Table 2: Criteria used for the disaggregation of catches recorded under species aggregates in the IOTC Nominal Catches Table

Order	Criteria
	Catches recorded under individual species for the:
10	Same Type of operation / Same Operating Region / Same IOTC Area / Same Gear
11	Same Type of operation / Same Operating Region / Same IOTC Area / Same Gear Aggregate
20	Same Type of operation / Different Operating Region / Same IOTC Area / Same Gear
21	Same Type of operation / Different Operating Region / Same IOTC Area / Same Gear Aggregate
30	Same Type of operation / Different Operating Region / Different IOTC Area / Same Gear
31	Same Type of operation / Different Operating Region / Different IOTC Area / Same Gear Aggregate
40	Different Type of operation / Different Operating Region / Different IOTC Area / Same Gear
41	Different Type of operation / Different Operating Region / Different IOTC Area / Same Gear Aggregate
50	Same Type of operation / Same Operating Region / Same IOTC Area / Different Gear

BOX 3: Selecting the strata for the allocation of catches under species aggregates to individual species

Figure 19:

	ID	Gear	GearA	TypeO	YearF	YearTo	Region	Area	SppGroup	Species	TimeStamp
+	5651	HAND	HAND	ART	1994	2002	SEYCH	F51	BILLFISH	BIL	7/2004 09:46:30
+	5645	HAND	HAND	ART	1995	1999	MOZCH	F51	OTHER NEI	TUX	7/2004 09:46:30
+	5647	HAND	HAND	ART	1995	2002	MOZCH	F51	TUNAS	SKKA	7/2004 09:46:30
+	5649	HAND	HAND	ART	1995	2002	MOZCH	F51	TUNAS	TUS	7/2004 09:46:30
+	5658	HAND	HAND	ART	1997	2002	SWEIO	F51	TUNAS	TUS	7/2004 09:46:30
+	5662	HAND	HAND	ART	1998	1998	SEAIO	F57	OTHER NEI	TUX	7/2004 09:46:30
+	5652	HAND	HAND	ART	1998	2002	SEYCH	F51	OTHER NEI	TUX	7/2004 09:46:30
+	5643	HAND	HAND	ART	2002	2002	MALDI	F51	TUNAS	TUN	7/2004 09:46:30
+	5666	HAND	HAND	IND	1950	1969	INDON	F57	OTHER NEI	TUX	7/2004 09:46:30

The catches recorded under SKKA come from Skipjack tuna (SKJ) and kawakawa (KAW), as recorded in the table **SpeciesDisagg**

Figure 20 below shows how the Table **CodeLikelySpeciesForAggDetail** is completed for this stratum:

Figure 20:

	ID	Gear	GearA	TypeOperation	YearFrom	YearTo	Region	Area	SppGroup	Species	TimeStar
+	5748	TROL	TROL	ART	1979	2002	MOZCH	F51	TUNAS	TUN	7/2004 09:
+	5747	TROL	TROL	ART	1995	2002	MOZCH	F51	TUNAS	SKKA	7/2004 09:
-	5647	HAND	HAND	ART	1995	2002	MOZCH	F51	TUNAS	SKKA	7/2004 09:

	Priority	SpsGroup	Species	Catch	TotSps	Proportion	TimeStamp
▶	10	TUNAS	KAW	177.80	21,517.016	0.01	7/2004 09:46:30
	10	TUNAS	SKJ	21,339.22	21,517.016	0.99	7/2004 09:46:30
*	0			0.00	0.000	0.00	7/2004 11:57:22

+	5643	HAND	HAND	ART	2002	2002	MALDI	F51	TUNAS	TUN	7/2004 09:

The first column of the table **CodeLikelySpeciesForAggDetail** (**Priority**) is used to indicate where the data used for the substitution are from in the Nominal catches table; the catches recorded come in this case from fleets that operated the same gear (artisanal) in the Mozambique Channel (same region of operation and same IOTC Area) (refer to **Table 2** Order 10).

The column **Species** records all species for which catches are found (out of those that make up the aggregate as recorded in table **SpeciesDisagg**). The columns **TotCatchSps** and **Proportion** are used to record the total catches in the stratum and the proportion that the catches of each species make according to the total catches.

The catches of SKKA will subsequently be assigned to KAW and SKJ according to the proportions in **CodeLikelySpeciesForAggDetail. Figure 21** below shows how the catches are assigned in this case (Table **S_CatchesAssignedtoindsps**):

Figure 21:

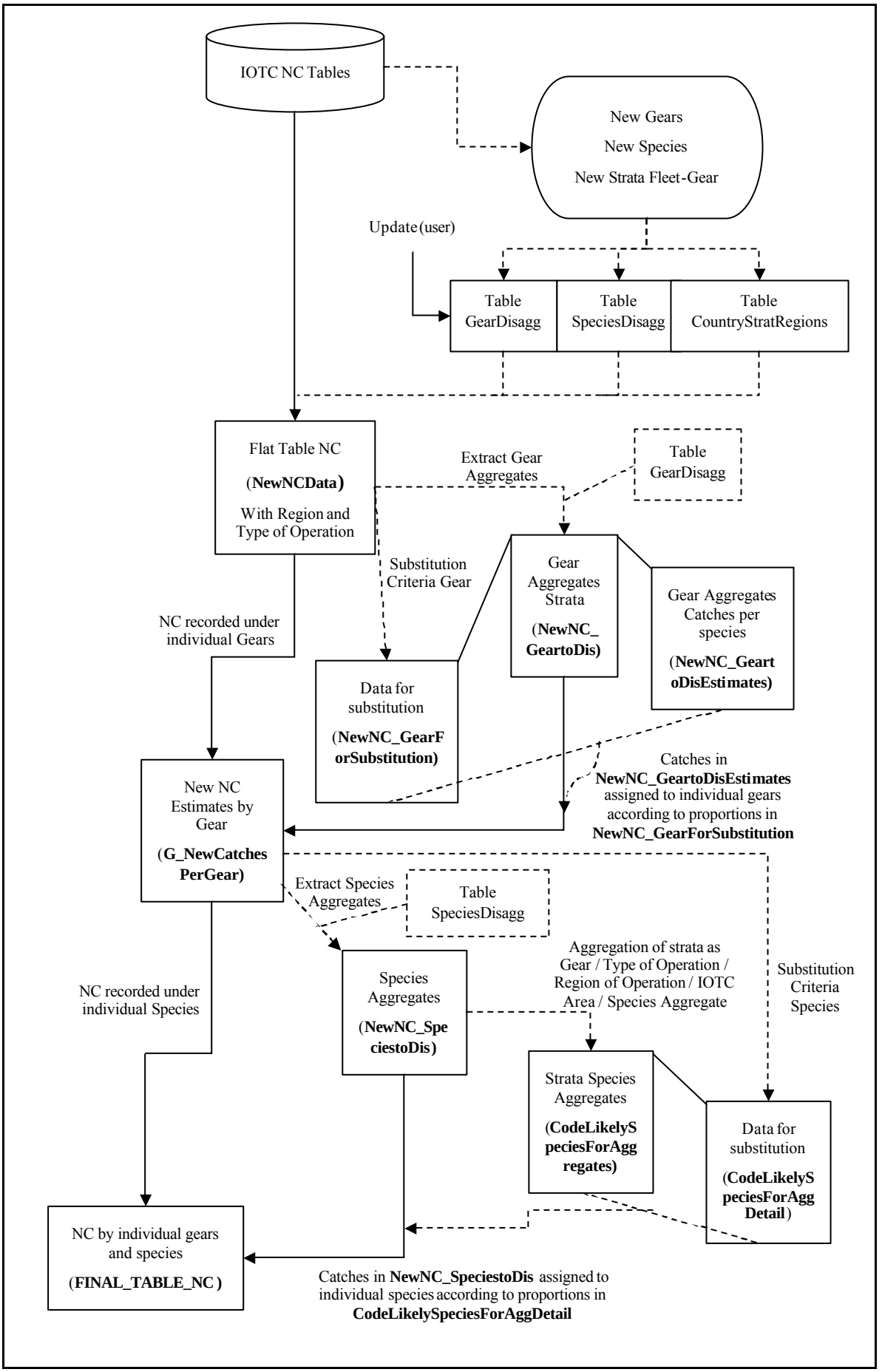
	Country	Reporting	Year	Gear	GearA	TypeO	Area	Region	Specie:	GEstimated	Catch
	FRA	FRAT	1995	TROL	TROL	ART	F51	MOZCH	YFT	☑	16.357
	FRA	FRAT	1996	HAND	HAND	ART	F51	MOZCH	KAW	☑	0.1793
	FRA	FRAT	1996	HAND	HAND	ART	F51	MOZCH	SKJ	☑	21.515
	FRA	FRAT	1996	HAND	HAND	ART	F51	MOZCH	YFT	☑	12.518
	FRA	FRAT	1996	HAND	HAND	ART	F51	MOZCH	BET	☑	0.1401
	FRA	FRAT	1996	HAND	HAND	ART	F51	MOZCH	SKJ	☑	11.03
	FRA	FRAT	1996	HAND	HAND	ART	F51	MOZCH	YFT	☑	9.6299

The new catches estimated are appended to a new table, **FINAL_TABLE_NC** (**Figure 22**), along with the catches originally recorded under individual species. This involve adding the catches for strata for which the new catches estimated fall under species for which catches exist already in the database (e.g. catches recorded under SKKA for a country are decomposed as SKJ and KAW where catches under one or the two species already exist in the database).

The two columns on the right of table **FINAL_TABLE_NC** (check boxes) are used to indicate whether the catches recorded were estimated from a gear and/or species aggregate, respectively. All quality code of strata whose catches have been disaggregated are set to POOR and the source changed to IOTC (catches estimated by the Secretariat).

Country	ReportingCo	Year	Gear	Area	Species	Catch	Units	Source	QualCode	GEstimated	IsSpeciesAgg
FRA	FRA	2002	PS	F51	FRI	45	MT	LO	FAIR	☐	☐
FRA	FRA	2002	PS	F51	SKJ	53971	MT	LO	GOOD	☐	☐
FRA	FRA	2002	PS	F51	YFT	35111	MT	LO	GOOD	☐	☐
FRA	FRAT	1995	HAND	F51	BET	0.150433	MT	IOTC	POOR	☑	☑
FRA	FRAT	1995	HAND	F51	KAW	0.151074	MT	IOTC	POOR	☑	☑
FRA	FRAT	1995	HAND	F51	SFA	0.711086	MT	IOTC	POOR	☑	☑
FRA	FRAT	1995	HAND	F51	SKJ	24.83419	MT	IOTC	POOR	☑	☑
FRA	FRAT	1995	HAND	F51	YFT	13.44413	MT	IOTC	POOR	☑	☑
FRA	FRAT	1995	TROL	F51	BET	0.227599	MT	IOTC	POOR	☑	☑

3-. Flow Chart


IOTC NC Tables
New Gears
New Species
New Strata Fleet-Gear
Update (user)
Table GearDisagg
Table SpeciesDisagg
Table CountryStratRegions
Flat Table NC
(NewNCData)
With Region and Type of Operation
Extract Gear Aggregates
Table GearDisagg
Substitution Criteria Gear
Gear Aggregates Strata
(NewNC_ GeartoDis)
Gear Aggregates Catches per species
(NewNC_GeartoDisEstimates)
NC recorded under individual Gears
Data for substitution
(NewNC_GearForSubstitution)
Catches in NewNC_GeartoDisEstimates assigned to individual gears according to proportions in NewNC_GearForSubstitution
New NC Estimates by Gear
(G_NewCatchesPerGear)
Extract Species Aggregates
Table SpeciesDisagg
Aggregation of strata as Gear / Type of Operation / Region of Operation / IOTC Area / Species Aggregate
Substitution Criteria Species
NC recorded under individual Species
Species Aggregates
(NewNC_SpeciestoDis)
Strata Species Aggregates
(CodeLikelySpeciesForAggregates)
Data for substitution
(CodeLikelySpeciesForAggDetail)
NC by individual gears and species
(FINAL_TABLE_NC)
Catches in NewNC_SpeciestoDis assigned to individual species according to proportions in CodeLikelySpeciesForAggDetail

Annex

Table 3: Difference between catch estimates of tropical tuna species carried out for the WPTT 2003 (Species code-2003) and WPTT 2004 (species code-2004). The amount of catch that comes from disaggregation of catches aggregates (species code-Disag) and that coming from new data series estimated by the IOTC Secretariat (species code-Estim) are also shown

Sps Estimates	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83
BET-2003	13	18	19	24	25	37	29	25	21	18	16	27	36	28	34	49	33	34	34	43	49
BET-Disag	0	0	0	0	0	2	1	2	2	2	2	2	2	1	2	1	0	1	1	1	1
BET-Estim	0	0	1	0	0	0	0	1	0	0	-1	-1	0	0	0	1	1	0	0	0	0
BET-2004	13	18	20	24	25	39	30	28	23	20	17	28	38	29	36	51	34	35	35	44	50
SKJ-2003	28	25	30	36	43	46	42	47	45	40	44	56	46	46	38	36	42	51	53	57	70
SKJ-Disag	4	4	4	4	4	5	5	5	5	7	10	11	18	24	28	24	27	35	40	37	36
SKJ-Estim	-10	-6	-5	-5	-10	-14	-7	-5	-5	-5	0	-4	-8	1	1	2	1	2	1	0	1
SKJ-2004	22	23	29	35	37	37	40	47	45	42	54	63	56	71	67	62	70	88	94	94	107
YFT-2003	37	35	38	57	48	91	65	41	41	43	36	38	39	38	60	51	45	39	42	53	63
YFT-Disag	2	2	2	2	2	5	4	5	5	5	9	6	6	9	11	10	10	11	8	8	6
YFT-Estim	-4	-2	-3	-2	-4	-4	-2	-1	-1	-2	2	1	1	3	4	5	4	5	5	4	2
YFT-2004	35	35	37	57	46	92	67	45	45	46	47	45	46	50	75	66	59	55	55	65	71

Sps Estimates	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00	01
BET-2003	43	52	57	64	74	69	73	77	72	106	112	124	130	149	144	150	129	111
BET-Disag	1	0	1	1	1	1	0	0	0	1	0	0	1	1	0	0	0	0
BET-Estim	0	0	0	0	-1	-1	1	0	0	-3	-2	-5	-5	-3	-1	2	-2	3
BET-2004	44	52	58	65	74	69	74	77	72	104	110	119	126	147	143	152	127	114
SKJ-2003	113	140	154	172	206	254	236	252	277	296	330	319	299	312	326	419	408	407
SKJ-Disag	40	38	39	37	41	48	36	38	33	54	66	66	69	75	70	74	86	71
SKJ-Estim	1	2	-3	-3	-5	-9	-6	-5	3	14	12	17	19	28	19	7	6	14
SKJ-2004	154	180	190	206	242	293	266	285	313	364	408	402	387	415	415	500	500	492
YFT-2003	101	122	143	156	211	201	232	226	306	386	314	324	336	320	295	331	304	281
YFT-Disag	6	8	6	7	7	8	8	12	10	14	14	19	19	14	17	21	14	12
YFT-Estim	5	0	0	1	0	-2	2	1	4	-1	4	-3	-7	5	-3	-2	13	8
YFT-2004	112	130	149	164	218	207	242	239	320	399	332	340	348	339	309	350	331	301

Figure 23: Difference between WPTT-2004 and WPTT-2003 nominal catches estimates as Catches WPTT-2004 / Catches WPTT-2003