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Department of Agriculture, Fisheries and Forestry

ABARES

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(ESC Agenda item 4.1)

Preparation of Australia's southern bluefin tuna catch and effort data submission for 2022

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Research by the Australian Bureau of Agricultural and Resource Economics and Sciences

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Summary

On behalf of the Australian Government, the Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES) has compiled aggregated catch and effort, catch by fleet, raised catch, catch at size, and non-retained catch for submission to the Commission for the Conservation of Southern Bluefin Tuna (CCSBT). This has been compiled from a number of databases including daily fishing logbooks, catch disposal records and fisheries observer reports, collected and managed by the Australian Fisheries Management Authority. The Australian catch of southern bluefin tuna from the surface (purse seine) fishery is also sampled by contracted field staff prior to release into farm cages. The sample data include size and weight measurements that are used to calculate representative size distributions and average weights.

PARQUET files in the Azure Data Lake, spreadsheets and Synapse workflows are used to integrate and process the source data sets and create the data files required for the CCSBT data exchange. This report provides copies of data collection forms, as well as flow charts illustrating the data integration procedures. The paper also describes the data validation procedures.

Introduction

The Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES), within the Australian Government Department of Agriculture, Fisheries and Forestry (the department), provides data reports each year to the Commission for the Conservation of Southern Bluefin Tuna (CCSBT) as part of the annual data exchange (CCSBT 2012). In April 2023, the following reports were submitted to the data exchange:

- Aggregated Catch and Effort data 2021 and 2022
- Raised Catch 2021 and 2022
- Total Catch by Fleet 2021 and 2022 (quota and calendar year)
- Catch at Size data 2021 and 2022
- Non-retained Catch 2021 and 2022

The following reports are also provided directly to the data exchange by the Commonwealth Scientific and Industrial Research Organisation (CSIRO):

- Tag Releases/Recoveries and Reporting Rates
- Direct Ageing data
- Catch at Age data
- Raised Catch-at-Age for the Australian Surface Fishery
- CPUE series (nominal)

Preparation of the CSIRO data sets is described in separate papers (e.g. Preece et al. 2004; Eveson 2011).

1 Data Sources

In recent years, the Australian Fisheries Management Authority (AFMA) have developed a Data Warehouse that draws together data from various tables within the original databases (Daily Fishing Logs, Catch Disposal, PISCES and Observer databases). These original databases have evolved over time, with changes to logbooks, the introduction of electronic logbooks (e-logs) and transfer of catch disposal data to the licencing database (PISCES). Not all data are drawn into the data warehouse, however, it is still possible link back to necessary tables in the original databases for most purposes when required.

Also, the introduction of electronic-monitoring (e-monitoring) has meant that from 1 July 2015 observers are no longer deployed on longline vessels and length measurements are now obtained solely from port sampling rather than at time of catch.

There were four sources of data used to produce the data reports. These were: Daily Fishing Logs Database; Catch Disposal Database; Tow Cage Size Monitoring Database; and Fisheries Observer Database.

1.1 Daily Fishing Logs Database

The Daily Fishing Logs Database is maintained by AFMA and contains data collected from logbooks that fishers are required to complete. The logbooks of relevance to southern bluefin tuna (SBT) catch for the 2022 data submission were the AL06 (pelagic longline), TPB03A (purse seine and pole log for farmed SBT), and PS01A (purse seine log for non-farm SBT). See Appendix A for samples of these logbooks. Electronic logs are also used by AFMA, collecting the same information as the paper logbooks. Each fishing operation is given a unique identifier in the Daily Fishing Logs Database and tables are linked using this identifier. The following tables are required from this database:

1) **Operations** – contains information on each operation, including start latitude, start longitude and vessel identifier.

2) **Catch** – contains a separate record for each species caught, together with the number of fish caught and estimated weight of the catch.

3) **Elect_Shot_Detail** – contains depth and position information for e-logs.

4) **Fishing_Effort** – contains fishing method used and fishing effort information (e.g. number of hooks for longline operations; search hours for purse seine operations).

5) **Operation_Longline** – contains other information on longlining operations (e.g. length of mainline).

6) **Operation_Pole** – contains other information on poling operations (e.g. number of poles used).

7) **Vessel** – contains information on each licensed vessel; vessel name is used to identify individual vessels when determining the number of vessels that fished.

8) **Tow_Cage_Transfer** – contains information on each transfer of fish from the capture vessel to the tow cage in each purse seine operation. Provides the link between the Daily Logs Database and the OtherInfo table produced from the Tow Cage Size Monitoring Reports.

1.2 Catch Disposal Database

The Catch Disposal Database is used by AFMA for quota monitoring and contains data collected from the CR4A (SBT Catch Disposal Record; all methods except purse seining for farms), SBT02 (SBT Farm Catch Disposal Record – Purse Seine Boat) and SBT04B (SBT Farm Catch Disposal Record; purse seining for farms). See Appendix B for samples of these forms. The following tables are required from this database:

1) **Catch Disposal** – contains information on trip start and end dates.
2) **Landing** – contains information on species caught, numbers of fish caught and weight of catch.
3) **Fishing_Method** – provides the fishing method information.
4) **Tow_Catch_Transfer** – contains identification of capture vessel for purse seine operations.

1.3 PISCES Database

PISCES is the licencing database. Landings data and quota monitoring has been moved into this database. The relevant tables for this database are now:

1) **CDR_Catch_Disposal** – contains general information about the landing, such as trip end date and fishing trip id.
2) **CDR_Operator_Landing** – where there is no receiver information, operator reported catches are used.
3) **CDR_Receiver Landing** – contains information about the catch, as reported by the receiver.
4) **CDR_SBT**, **CDR_SBT03**, C**DR_SBT03_Mortality, CDR_SBT04, CDR_SBT04_Transfer** – SBT information is kept in these separate table which store information about the SBT farm sector, such as tow cage information and transfers to farm cages.

AFMA create a single landings table in their Data Warehouse, which combines the Catch Disposal Database with the PISCES Database. However, this does not include the fishing method. ABARES has developed queries to append PISCES data to the Catch Disposal Database in such a way that fishing method is included and code changes have been accounted for.

1.4 Tow Cage Size Monitoring Database

Tow cage size monitoring data are collected by Seatec Pty Ltd, a company contracted to AFMA, and its primary purpose is for estimation of total weight of SBT in tow cages prior to transfer of fish to farm cages. In 2006, the then Bureau of Rural Sciences (now the Australian Bureau of Agricultural and Resource Economics and Sciences; ABARES) developed a database for Protec Marine to record this information, the Tow Cage Size Monitoring Database, replacing a series of spreadsheet forms. From the 2016–17 season, Seatec have been using a version of this database for this purpose. Data for the 2006–07 and previous fishing seasons were then entered into this database from the original spreadsheets. From December 2007, data were entered directly into the database rather than using spreadsheets as an intermediate step. The database has been used as the source of SBT length samples for the purse seine component of the Catch at Size reports for 2008 to 2017 submissions. A sample of one of the reports produced by the database is given in Appendix C.

For each tow cage, fish were sampled until 100 fish (40-fish prior to 2012) weighing 10 kg or more were measured and weighed. The length and weight of all fish sampled were entered into the database, including fish smaller than 10 kg, as were the total number of fish transferred to farm cages. Data were then collated to produce a table of statistics for each tow cage, named Analysis – OtherInfo, which was used in preparation of Raised Catch and Total Catch by Fleet reports (see Appendix D). The raw lengths and weights of all sampled fish for the year were combined and used in conjunction with the Daily Fishing Logs data to prepare the Catch at Size report.

In the 2010–11 fishing season, stereo video was used to measure fish lengths and determine the average weight for some of the tow cages. These data were initially recorded in another database. However, for the purposes of the data preparation, all necessary data were migrated to the Tow Cage Size Monitoring Database.

1.5 Fisheries Observer Database

AFMA employs fisheries observers to collect data on board fishing vessels in a number of fisheries. Observer coverage of pelagic longline vessels has been variable between 2001 and 2015, mainly concentrated in the Eastern Tuna and Billfish Fishery. A database of observed fishing operations is maintained by AFMA, including records of retained and discarded catch and biological data collection including length measurements. Length data collected by observers were used to compile the longline and trolling components of the Catch at Size reports for 2013 and 2014. The AFMA observer data were also used to produce the "Non-retained Catches" reports for 2013 and 2014. These reports provided numbers of non-retained fish observed in the longline fishery and were not raised or imputed from logbook data. The total longline fishing effort for each 5-degree cell is provided from the Aggregated Catch and Effort report with the corresponding observed effort and non-retained catch.

AFMA implemented a new Observer Database in September 2008, so this new database was used for the 2014 data submission. The following observer database tables contributed data to the Non-retained Catches report:

1) **Activity** – describes vessel activity (e.g. setting, hauling, searching and time, location, environmental conditions).

2) **Opn_Biological** – describes biological attributes of animals caught including life status of retained and discarded fish.

3) **Opn_Biological_Length** – gives the length type and length measurement of each sampled fish.

4) **Vyg_Project** – provides the name of the project under which the observer was operating.

Port sampled lengths were provided by AFMA in a spreadsheet for use in the longline length frequency submission for 2015.

1.6 Data Warehouse

Single tables have been created to bring data from the disparate areas together for easier access. The key tables in the warehouse are:

1) **Fact_CDR_Boat_Landing_Spcs** – draws together the Catch Disposal Database and the PISCES Database to create a single table with a complete time series of landings data.

2) **Fact_Fishery_Boat_Operation** – draws together data from the various tables in the Daily Fishing Logs Database to produce a single table with shot date, position and effort information. It retains the original record number so that it can link back to the Daily Fishing Logs Database at any time, when required.

3) **Fact_Fishery_Boat_Optn_Species** – draw together data from the various tables in the Daily Fishing Logs Database and shows logbook recorded catches of each species in each operation.

2 Data Preparation

JSON-formatted files of the tables in the AFMA Daily Fishing Logs, Catch Disposal Records, Observer databases and Data Warehouse are acquired late in the first quarter of each calendar year. The data are imported to the Azure Data Lake, first converted to AVRO files and then to PARQUET files for final use. Data from the Tow Cage Size Monitoring Database was imported to the Azure Data Lake as CSV files. Synapse workflows have been created to extract the required data for the data submission. The length data for the Catch at Size reports are processed at least partly in MS Excel to enable estimation of size distributions for month-location strata that have not been sampled by observers or Seatec Pty Ltd.

See Appendix D for flow diagrams of data sources and tables used to produce the various reports. Note that with the introduction of e-monitoring in July 2015, Australia is still investigating how to prepare the Non-retained Catch component of the data submission. The flow diagram included here is how the 2014 data was prepared, using the observer data.

2.1 Definition of Seasons

All data reports use date of capture to sort catch records by time period, except the catch by fleet – quota year statistics. The quota year statistics use tow end date (farm purse seining) or trip end date (other methods) to define whether a catch falls within a particular season/fishing period.

2.2 Spatial Definitions

Since the 2003 data exchange, raised catch or catch at size data have been provided by latitude/longitude grid cells (1x1 degrees for purse seine and 5x5 degrees for longline). This was made possible for the farm sector by the introduction of the SBT03 forms. The forms enable the linking of the Tow Cage Size Monitoring Database to the Daily Fishing Logs Database, thus providing capture location information for SBT transferred from tow cages. The Aggregated Catch and Effort Report also provides spatial information; all data for this report coming from the Daily Fishing Logs Database.

3 Data Validation

3.1 Data Management Systems

AFMA maintains two systems for tracking catches of SBT in Australian waters. One system is on MS Excel spreadsheets and the other is AFMA's main Oracle database that stores all logbook and catch disposal records. These two systems are cross-referenced to ensure that data entry is correct in both systems. This process ensures validity and plausibility of data during the data entry process.

ABARES obtains copies of the AFMA Daily Fishing Logs Database and Catch Disposal Database and stores it in an SQL MI system on the Azure Cloud. It is these copies that are used for the preparation of the annual data submission.

3.2 Cross-Verification of Datasets

All Commonwealth authorised receivers of SBT are required to complete reconciliation sheets at the end of each season that are then cross-checked against catch disposal records and catch documentation scheme records. This is called the Audit Level 1.

There are a number of triggers (such as discrepancies in the Audit Level 1) that can trigger the Audit Level 2, which involves AFMA officers examining the books and invoices of the company involved.

During the preparation of the annual data submission, data from the Tow Cage Monitoring Database are cross-referenced with data from the Daily Fishing Logs Database and Catch Disposal Database to ensure accuracy of results. Any discrepancies are tracked down to original forms, if required.

Lengths and weights in the Tow Cage Monitoring Database are graphed to identify any outliers.

4 Closing Remarks

The description of data preparation and submission in this report applies to the 2021 and 2022 commercial fishery catch and effort data supplied to the CCSBT. ABARES can provide more details of data collection and data processing methods upon request.

Appendix A: Example Scientific Logbook Forms (AL06, TPB03A, PS01A)

Australian Fisheries Management Authority, Box 7051, Canberra Mail Centre ACT 2610

Australian Pelagic Longline Daily Fishing Log – AL06

NOTE: DO NOT USE A SINGLE PAGE FOR MORE THAN ONE TRIP — Original Copy – Send to AFMA

Boat Name	Dist. Symbol	Log No.	Page No.
Cormorant	LFB963		

Port Departed: SYDNEY — Date Departed: 25 / 6 / 07

Port Returned: ULLADALLA — Date Returned: 27 / 6 / 07

NON-FISHING PERIOD (I did not work between): 19 / 6 / 07 and 24 / 6 / 07

Non-Fishing Codes (PLEASE CIRCLE): (1) Bad Weather, 2 – In Port, 3 – Broken Down, 4 – Steaming, 6 – Searching, 5 – Other Fishery (SPECIFY), 10 – Refit

SHOT INFORMATION		Shot 1 Date 26/6/07	Shot 2 Date 27/6/07	Shot 3 Date
Target species		Yellowfin, Bigeye	Yellowfin, Bigeye	
Start set time (24h)		0300	0230	
Start set	Lat. (dd mm)	33 35	36 31	
Position	Long. (ddd mm)	151 42	151 55	
End set time (24h)		0610	0515	
End set	Lat. (dd mm)	35 19	36 25	
Position	Long. (ddd mm)	151 40	151 40	
Start Haul time (24h)		1500	1300	
Start Haul	Lat. (dd mm)	35 20	36 20	
Position	Long. (ddd mm)	151 41	151 42	
End Haul time (24h)		2200	1900	
End Haul	Lat. (dd mm)	33 36	36 30	
Position	Long. (ddd mm)	151 40	151 56	
Vessel shooting speed (kn)		7	7	
Mainline length/Hooks		30 (nm/km) 1000 hooks	25 (nm/km) 700 hooks	nm/km hooks
Line shooter used (CIRCLE)		(Yes) No	(Yes) No	Yes No
Seabird mitigation measures used (CIRCLE) (see template)		(TORI CHUTE) (THAW CAPS) PSBL DYED (NSET OTHER) (LWEI NAPP)	(TORI CHUTE) (THAW CAPS) PSBL DYED (NSET OTHER) (LWEI NAPP)	TORI CHUTE THAW CAPS PSBL DYED NSET OTHER LWEI NAPP
Gear Information	Targeted depth (in metres)	30 min 100 max	30 min 100 max	min max
	No. hooks between bubbles	6	6	
	No. of lightsticks used	500	300	
	Bait type(s)/ source(s)/life status/weight(s) used for shot	SQO (B) S L (D) 50 Kg MAY B (S) L D 50 Kg	SQO (B) S L (D) 35 Kg PIL (B) S L (D) 45 Kg	B S L D Kg B S L D Kg

CATCH DETAILS	Shot 1 No. Fish Kept	Shot 1 Est. Processed Wt Kept (kg)	Shot 1 Form Code	Shot 1 No. Fish Discarded	Shot 1 DISCARD/ RETAINED CODE	Shot 2 No. Fish Kept	Shot 2 Est. Processed Wt Kept (kg)	Shot 2 Form Code	Shot 2 No. Fish Discarded	Shot 2 DISCARD/ RETAINED CODE	Shot 3 No. Fish Kept	Shot 3 Est. Processed Wt Kept (kg)	Shot 3 Form Code	Shot 3 No. Fish Discarded	Shot 3 DISCARD/ RETAINED CODE
Yellowfin Tuna	11	350	GG	3	US	14	480	GG	1	DM					
Bigeye Tuna	4	150	GG			6	160	GG	4	TL					
Albacore Tuna	7	50	W			4	40	W							
Southern Bluefin Tuna															
Broadbill Swordfish						2	90	TR							
Striped Marlin	1	35	TR												
Shortbilled Spearfish															
Ray's Bream						3	10	GG							
Moonfish															
Rudderfish															
Oilfish/Escolar															
Dolphinfish															
Wahoo															
Lancetfish				4	UM										
Short Finned Mako Shark	1	80	TR						1	US					
Bronze Whaler Shark															
Dusky Whaler Shark															
Blue Shark									4	UM					
Oceanic Whitetip Shark															
Other Species: Thresher shark									1	UM					
Other Species: Yellowfin	4	60	GG		SD										
Other Species: Bigeye	1	20	GG		SD										
Other Species: Bigeye	3	25	W												

No Take Species	Shot 1 Number Released Alive	Shot 1 Number Released Dead	Shot 2 Number Released Alive	Shot 2 Number Released Dead	Shot 3 Number Released Alive	Shot 3 Number Released Dead
Blue Marlin		1	1			
Black Marlin						

Did you have an Observer on Board (circle) (No) / Yes — Observer Trip ID

Please provide an estimate of the time taken to complete this form: 10 mins

Did you have an interaction with a Listed Marine or Threatened Species? (circle) Yes / (No)

Further details of all Listed Marine and Threatened Species interactions must be recorded on the Listed Marine and Threatened Species Form at the back of the logbook.

Concession holder or authorised agent - *I certify that the information provided on this form is a true and accurate record.*

Printed Name: Tim Gardener

Comments: 5 fish damaged by sharks in first shot but fish still retained

Signature: T Gardener — Date 27 / 6 / 07

NOTE • If tagged fish / animals or banded birds are captured, please complete tag form at back of book and return to AFMA.

Australian Fisheries Management Authority, Commonwealth of Australia

Australian Purse Seine and Pole Daily Fishing Log - For Southern Bluefin Tuna Only TPB03A

Log Book No:	Page No:	Boat Name:	Dist. Symbol:	Fishing Method Used? (tick appropriate box)
001	01	SARDINE	LFB123	Purse Seining ☑ Poling ☐

NON-FISHING CODES (NF) 1 Bad Weather 16 Sheltering 3 Broken Down 6 Searching 7 Cage Towing 4 Steaming 11 Other (Specify)

Trip Details Date Departed 15 / 1 / 16 Date Returned 20 / 1 / 16

Date of Fishing	NF Code?	Search Details		Fishing Details				Total Weight and Type of Bait Caught (if applicable)		Estimated Catch Details					Towing Details	
Date	Codes listed above	Hours Searched	Spotter Plane Used ? (Y/N)	Start Time (24hr) (local time)	Latitude	Longitude	No. Poles Used? (if applicable)	Species Name	Kgs Caught	SBT Weight (kg)	Pole only No. of Fish	Estimated % of school caught	Mortalities Number	Fish Released Estimated Weight	Estimated Weight Transferred	Tow Cage Number
15/ 1/16	4															
16/ 1/16		5	N	1010	32°70'	-132°30'				10,000		90	1	0	10,000	T90
17/ 1/16	16															
18/ 1/16	16															
19/ 1/16		2	N	1100	33°50'	131°20'				15,000		95	2	2000	13,000	T86
19/ 1/16			N	1630	33°54'	131°17'				6,000		80	0	0	6,000	T90
20/ 1/16	4															
/ /																

Comments:

Did you have an interaction with a listed marine or threatened species?

Please tick Yes ☐ No ☑

If yes, please enter details on a "Marine and Threatened Species" Form at the back of this book.

NOTE: • If tagged fish / animals or banded birds are captured, please complete tag form at back of book and return form and tag to AFMA's agent.

Master of the Boat (Skipper) - *I certify that the information provided on this form is a true and accurate record.*

Printed Name: D. MATTHEW

Signature: D. Matthew Date 20/ 1 /2016

Australian Fisheries Management Authority
PO Box 7051
Canberra BC ACT 2610

Purse Seine Daily Fishing Log – PS01A

NOTE: IF POLING PLEASE USE THE TUNA MINOR LINE LOGBOOK TO RECORD YOUR CATCH

Original Copy – Send to AFMA

Boat Name	Dist. Symbol	Distinguishing Nos. of assisting Pole vessels	Log No.	Page No.
WATERCRESS	LFB 60	LFB 8071	###	##

I did not work in this fishery between 7 / 1 / 10 and 15 / 1 / 10

TICK APPROPRIATE NON-FISHING (NF) CODE BOX AT RIGHT: ☐ 1 Bad Weather ☑ 2 In Port ☐ 3 Broken Down ☐ 4 Steaming ☐ 6 Searching ☐ 5 Other Fishery (specify)

Fishing Details — Time Zone used for log entries: EST

CATCH DETAILS – Estimated Weights per Shot (kg) – tick box below fish name to indicate target species: KINGFISH

Fishing Date	NF Code	Search Details (see instructions)		Fishing Details					CATCH DETAILS – Estimated Weights per Shot (kg) – tick box below fish name to indicate target species: KINGFISH									BAIT/CHUM DETAILS	
Date	Codes listed above	Hours Searched	Spotter Plane Used (Y/N)	Sea Surface Temp. (C)	Start Time (24 hr local time)	Record Positions for Target Species and Bait Shots: Latitude (dd mm)	Longitude (ddd mm)	Assisted by Pole Boat Y/N	Skipjack Tuna ☑	Yellowfin Tuna ☐	Jack Mackerel ☐	Blue Mackerel ☑	Yellowtail Scad ☐	Southern Bluefin Tuna ☐	Other Spec. (list above) ☐	Estimated % of school caught	Estimated Wt (kg) Non-retained catch	List species of bait caught each day	Bait caught (kg)
16 / 1 / 10	4																		
17 / 1 / 10	6	5	N																
18 / 1 / 10		2	N	21	1015	37 30	150 20	Y	9,000							70	–		
18 / 1 / 10		1	N	22	1410	37 42	150 05	N				21,000			600	95	–		
19 / 1 / 10		3	N	20	1120	38 15	151 12	Y	7,500							60	300		
20 / 1 / 10	4																		
/ /																			
/ /																			
/ /																			
/ /																			

EXAMPLE PAGE

Comments

Approx. 300 kg

Damaged Skipjack

Complete at End of Trip

Trip Start Date	16.1.10
Port of Depature	WALKER COVE
Trip End Date	21.1.10
Port of Landing	WALKER COVE
First Receiver/s of Fish	BASIL'S FRESH FISH

I certify the information which I have provided on this form to be a complete and accurate record.

Concession Holder or Authorised Agent

Printed Name: L Waller

Signature: L Waller

Date: 21 / 1 / 10

Please provide an estimate of the time taken to complete this form 8 **mins**

NB Did you have an interaction with any wildlife or other protected species? Please tick Yes ☐ No ☑

If yes, please enter details on a "Wildlife and Other Protected Species" Form at the back of this book.

NOTE • If tagged fish / animals or banded birds are captured, please complete tag form at back of book and return form and tag to AFMA.

Appendix B: Example Catch Disposal Forms (CR4A. SBT03B, SBT04B)

CR4A Form
Southern Bluefin Tuna Fishery
Catch Disposal Record

Book No.		Page No.	

Part A: SFR Holder or Authorised Representative to Complete

SFR Holder: Tuna International P/L
Boat Name: Hunter IV
Dist. Symbol: 0999

Area Fished: ☐ Tas ☐ Vic ☑ NSW ☐ SA ☐ WA ☐ QLD

Fishing Method: ☐ Pole ☐ Purse Seine ☑ Longline ☐ Trolling

Please provide an estimate of the time taken to complete this form.
Hrs. 5 mins

Trip Start Date: 8 / 7 / 04
Trip End Date: 14 / 7 / 04
Port Unloaded: Tuncurry
Date Unloaded: 14 / 7 / 04

☑ Whole Catch Consigned ☐ Part Catch Consigned
Book No. | Page No. | Other CR4A details

Name of Receiver: Tuna Exporters P/L

Name of Transporter: Bradley Transport

Type of Vehicle	Trailer Vehicle Reg	Date/Time of Departure of Consignment from point of Unloading
Truck	YLT-091	14 / 7 /04 15:30

SOUTHERN BLUEFIN TUNA

Number of Fish	Total Accurate Weight Kg	Form Code
3	300	B

NORTHERN BLUEFIN TUNA

Number of Fish	Total Accurate Weight Kg	Form Code

Form Codes

W means Whole Weight – No Processing

A means SBT that has been gilled and gutted so that:
a. the gill plates are removed; and
b. the tail is wholly removed.

B means SBT that has been gilled and gutted so that:
a. the gill plates are not removed; and
b. the tail is not wholly removed.

I declare that the information I have provided in Part A to be a complete and accurate record.

SFR Holder or Authorised Representative
Printed Name: JOHN WELSH
Signature & Date: J. Welsh 14/7/04

Part B
I acknowledge that I have received for transportation the amount of fish referred to in Part A.

Printed Name of Driver: PETER BRADLEY
Signature & Date: Peter Bradley 14/7/04

Forward White copy to AFMA within 24 hours of unloading.

Leave Green copy in book.

Send the Blue and Yellow copies with the fish to the receiver of your fish.

SBT03B
Southern Bluefin Tuna Fishery
Farm Transit Log

Log No:	Page No:

Section 1

Carrier Boat Name: MARY LOU
Dist. Symbol: DE 123
Permit Holder: A B CUTTER
Carrier Boat Permit Number: 400100
Tow Cage ID Number: T800

Fish Received From: ☑ Purse Seine Boat – Complete Sections 1, 2, 4 and 7, then Section 5 or 6

Fish Received From: ☐ Carrier Boat – Complete Sections 1, 3, 4 and 7, then Section 5 or 6

Section 2

Transfer Details

Name of Purse Seine Boat	Dist. Symbol	Date & Time First Transfer Started	Date & Time Last Transfer Finished	Estimate of Weight (Tonnes)	SBT02 Book No.	SBT02 Page No.
BLUE OCEAN	333	20 /12 /09 9:30	22 / 12 /09 11:30	50	111	05

Section 3

Previous Carrier Boat Name:
Dist. Symbol:

SBT03A — Log No: | Page No:

A Record of Retained to Land Mortalities Recorded in Box "G3" of Previous SBT03B: G1

A Record of Mortalities Recorded in Box "G" of Previous SBT03B: E

Section 4

Record of Mortalities During This Tow

Date/Time: 20/ 12 / 09 09:30

Record a Date + Number of Mortalities for Each 24 hr Period.

Date	20/12	21/12	22/12	23/12	24/12				
Number	5	1	3	4	2				
Date									
Number									
Date									
Number									

Total Mortalities During This Tow: F 15
Progressive Total of Mortalities (E & F = G): G 15

Total Mortalities Retained to Land During This Tow: G2 4
Progressive Total of Mortalities Retained to Land (G1 & G2 = G3): G3 4

Section 5

Tow Cage Transferred To Another Carrier Boat

Carrier Boat Name: MISTY MOON
Dist. Symbol: FJ308

SBT03B Book No: 333
SBT03B Page No: 2

Date/Time Tow Cage Transferred: 25/ 12 / 09 06:30

Section 6

Fish Transferred To Fish Receiver

Date/Time Transfer Ended: / / :
Name of Fish Receiver Permit Holder:
Fish Receiver Permit Number:

Section 7

I declare that the information which I have provided on this form to be a complete and accurate record.

Carrier Boat Permit Holder or their Agent

Print Name: JASON MANNING
Signature: J. Manning
Date: 25 / 12 / 09

SBT04B

Southern Bluefin Tuna Fishery
Farm Catch Disposal Record

Log No:	Page No:

Part 1

Fish Receiver Permit Holder Name: McNally Fresh Fish

Tow Cage ID Number: T600

Fish Receiver Permit Holder Number: 9999

Carrier Boat's SBT03B Log and Page No's

Log No:	Page No:
198	15

Progressive total of all mortalities during tow (G = SBT03B) [A]: 17

Total number of mortalities recorded from date of receipt of tow cage [B]: 2

Record the number of retained to land mortalities from the date of receipt of the tow cage. [B1]: 2

Transfer from Tow Cage to Farm

Transfer Date	Farm Number Cage No.	Live Fish Count
29/01/10	C01	4,802
30/01/10	C02	1,098

Total Number of mortalities F = A + B + J [F]: 35

Count Total [C]: 5,900

Total Weight of mortalities H = F x E (E: Average Weight in Kg) [H]: 638.75

Weight Total D = C x E (E: Average Weight in Kg) [D]: 107675

Total Weight of Fish in Kg I = D + H [I]: 108313.75

I have had the opportunity to witness the verified count conducted by AFMA's Agent and I agree with and verify the count taken.
I declare that the information which I provide on the form to be a complete and accurate record.

Video Reference Number (1): T600-1

No. of Videos viewed (2): 4

FRP Holder: E. Watson

Video Reference Date: 2 / 2 / 10

FRP Signature: E. Watson Date: 2 / 2 / 10

Part 2 I authorise AFMA to deduct the SBT kilos of quota recorded in box I above from my/our quota holdings:

SFR Holder: A. Brazil

SFR Signature: A. Brazil Date: 2 / 2 / 10

Part 3

	Boat 1	Boat 2
Purse Seine Boat Name	TUNA 1	
Dist. Symbol	0253	

SBT02	Boat 1 Log No:	Boat 1 Page No:	Boat 2 Log No:	Boat 2 Page No:
	12	4		

J: 16 Number of mortalities during pursing and transfer to tow cage

Progressive total of retained to land mortalities during tow (G3=SBT03B) [A1]: 3

J1: 1 Number of mortalities retained to land during pursing and transfer to tow cage

Average Weight sample from Tow Cage

Sample Date	Name of Person Sampling	Signature of Person Sampling
28 / 1 / 10	T. Smith	T. Smith

Average Weight in Kg [E]	No. of Fish taken from tow cage	Farm Stocking Form No. Boat 1	Boat 2
18.25	42	FSAU 10 00101	

I declare that the information which I provide on the form to be a complete and accurate record.

AFMA Agent's Name: T. Poppy

AFMA Agent's Signature: T. Poppy Date: 3 / 2 / 10

Appendix C: Tow Cage Size Monitoring Report

Southern Bluefin Tuna Fishery

Farm Catch per Tow Cage

Tow Identification

Tow Cage ID _____

Tow Number for Season _____

Catch Disposal Form Book No. Page No. _____

Fish Receiver Number: _____

Catch Information

Catcher Vessel

Capture location

Date of First Transfer to Tow Cage

Date of Last Transfer to Tow Cage

Tow Vessel _____

DateTow Ended _____

Number of Mortalities during Catching

Number of Mortalities during Tow

Number of Mortalities between end of Tow and Release to Farm

AFMA Forms

Total Weight of Fish Captured in this Tow Cage: #Type!

Estimated Weight (kg):

Total Number of Mortalities: _____

Total Number of Fish: _____

Average Weight Sample Information

Sample Date	Witnesses	Average Length	Average Weight

Fish Count Information

Transfer Date	Video Count	Tonnage	Static Cage ID	Static Cage Owner
		#Type!		

Total number of live fish counted: 0 0

Tow Identification

Book No. Page No.

Tow Cage ID _____ **Catch Disposal Form** _____

Tow Number for Season _____ Fish Receiver Number: _____

Average Weight Data

40 Fish Sample

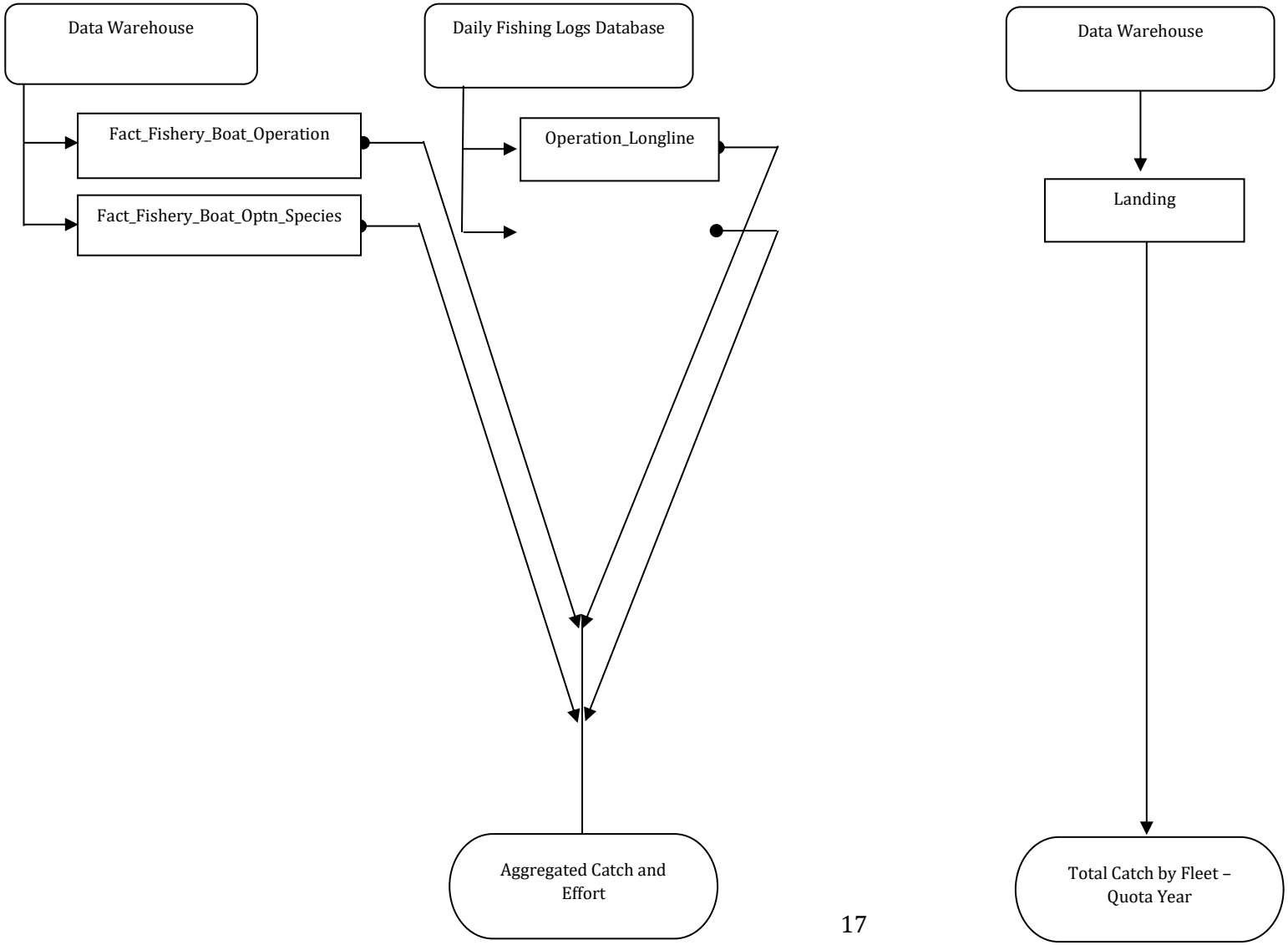
Weight Length Tag

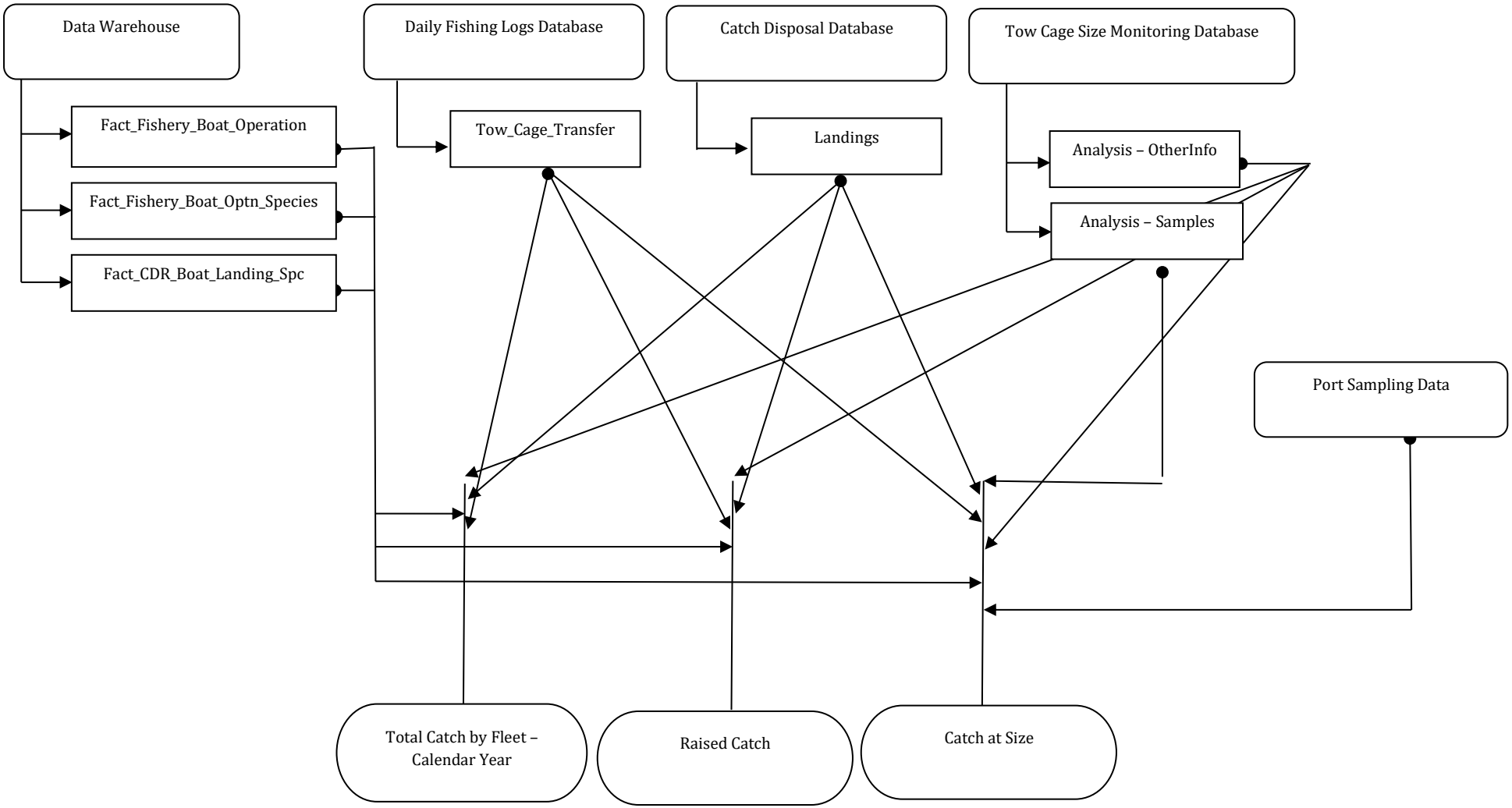
Number of Under 10kg Fish

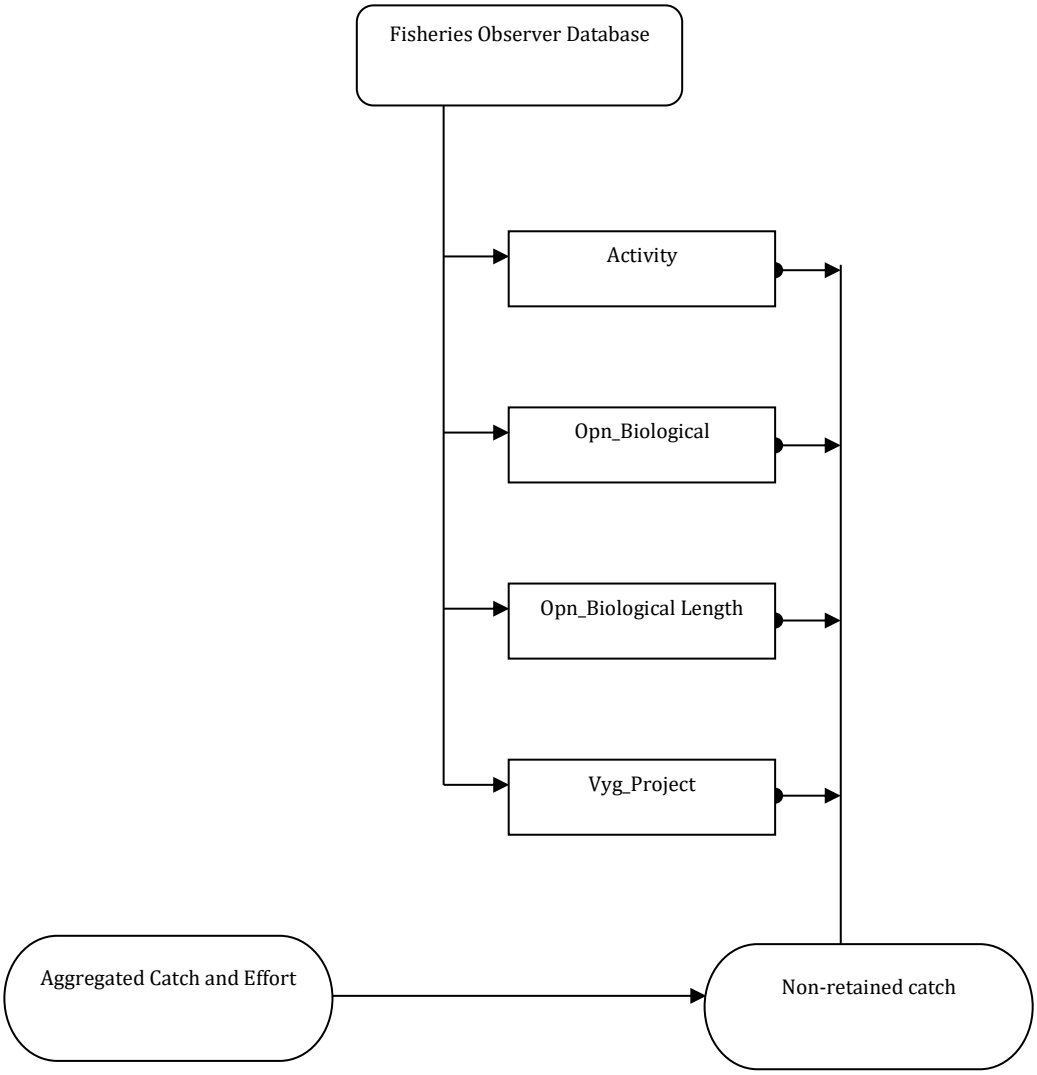
Under 10kg Fish

Weight Length

Appendix D: Flow of Data from Data Sources to Reports




Data Warehouse
Daily Fishing Logs Database
Catch Disposal Database
Tow Cage Size Monitoring Database
Fact_Fishery_Boat_Operation
Fact_Fishery_Boat_Optn_Species
Fact_CDR_Boat_Landing_Spc
Tow_Cage_Transfer
Landings
Analysis – OtherInfo
Analysis – Samples
Port Sampling Data
Total Catch by Fleet – Calendar Year
Raised Catch
Catch at Size


Fisheries Observer Database
Activity
Opn_Biological
Opn_Biological Length
Vyg_Project
Aggregated Catch and Effort
Non-retained catch

References

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Eveson, P 2011 *Updated growth estimates for the 1990s and 2000s, and new age-length cut points for the operating model and management procedures*, CCSBT-ESC16/1107/09, CCSBT 16th Meeting of the Scientific Committee, 19–28 July 2011, Bali, Indonesia.

Preece A, Cooper S & Hartog, J 2004, *Data post-processing for input to the 2004 stock assessments and comparisons of 2001 and 2004 assessment datasets*, CCSBT-ESC9/0409/27, CCSBT 9th Meeting of the Scientific Committee, 13–16 September 2004, Jeju, Korea.