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Preparation of Australia's southern bluefin tuna catch and effort data submission for 2020

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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.

Relational databases, spreadsheets and query scripts 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, Water and the Environment (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 2021, the following reports were submitted to the data exchange:

- Aggregated Catch and Effort data 2019 and 2020
- Raised Catch 2019 and 2020
- Total Catch by Fleet 2019 and 2020 (quota and calendar year)
- Catch at Size data 2019 and 2020
- Non-retained Catches 2019 and 2020
- CPUE series (GAMM)

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 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 2021 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. 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, CDR_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

Oracle export files from 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 into an Oracle relational database server. In 2021 these databases were then synced to a SQL MI database in the Azure Cloud to enable analysis using Structured Query Language (SQL) via Microsoft Access software on client workstations. 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. New queries and procedures were established in 2016 to produce the data reports that ABARES submits each year. These queries may require minor modification each year as changes, if any, are made to the source data collection process or CCSBT requirements.

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 2019 and 2020 commercial fishery catch and effort data supplied to the CCSBT. ABARES can provide more details of data collection and data processing methods upon request.

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

Australian Fisheries Management Authority, Commonwealth of Australia

Log Book No: 001	Page No: 01	Boat Name: SARDINE	Dist. Symbol: LFB123	Fishing Method Used? (tick appropriate box) Purse Seining <input checked="" type="checkbox"/> Poling <input type="checkbox"/>												
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?	Fishing Details			Total Weight and Type of Bait Caught (if applicable)			Estimated Catch Details				Towing Details				
		Search Hours	Spotter Plane Used? (Y/N)	Start Time (24hr) (local time)	Latitude	Longitude	No. Poles Used (if applicable)	Species Name	Kgs Caught	SBT Weight (kg)	Tole 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	790	
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	786	
19 / 1 / 16			N	1630	33°54'	131°17'			6,000		80	0	0	6,000	790	
20 / 1 / 16	4															
/ /																
Comments:																

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

Purse Seine Daily Fishing Log – PS01A

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

Australian Fisheries Management Authority
PO Box 7051
Canberra BC ACT 2610

Original Copy – Send to AFMA

Boat Name WATERCRESS		Dist. Symbol LFB 60		Distinguishing Nos. of assisting Pole vessels LFB 8071		Log No. ####	Page No. ##	
I did not work in this fishery between 7 / 1 / 10 and 15 / 1 / 10		TICK APPROPRIATE NON-FISHING (NF) CODE BOX AT RIGHT		<input type="checkbox"/> 1 Bad Weather <input checked="" type="checkbox"/> 2 In Port <input type="checkbox"/> 3 Broken Down <input type="checkbox"/> 4 Steaming <input type="checkbox"/> 6 Searching		Other Fishery 5 (specify)		
Fishing Date	NF Code	Fishing Details		CATCH DETAILS – Estimated Weights per Shot (kg) – tick box below fish name to indicate target species				BAIT/CHUM DETAILS
		Time Zone used for log entries	Record Positions for Target Species and Bait Shots	Estimated % of school caught	Other Spec. (list above)	List species of bait caught each day	Bait caught (kg)	
		Latitude (dd mm)	Longitude (odd mm)	Estimated % of school caught	Other Spec. (list above)	List species of bait caught each day	Bait caught (kg)	
16 / 1 / 10	4							
17 / 1 / 10	6							
18 / 1 / 10	2	3 7 3 0	1 5 0 2 0	70	600			
18 / 1 / 10	1	3 7 4 2	1 5 0 0 5	95				
19 / 1 / 10	3	3 8 1 5	1 5 2 1 2	60				
20 / 1 / 10	4			300				
/ /								
/ /								
/ /								
/ /								

DRAFT

Comments Approx. 300 kg Damaged Skipjack	Complete at End of Trip	
	Trip Start Date 16.1.10	Port of Departure WALKER COVE
	Trip End Date 21.1.10	Port of Landing WALKER COVE
	First Receiver(s) of Fish BASILS 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
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

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 **Truck** Trailer Vehicle Reg **YLT-091** Date/Time of Departure of Consignment from point of Unloading **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					
Permit Holder	A B CUTTER					
Tow Cage ID Number	T800					
Fish Received From	<input checked="" type="checkbox"/> Purse Seine Boat – Complete Sections 1, 2, 4 and 7, then Section 5 or 6					
Fish Received From	<input type="checkbox"/> Carrier Boat – Complete Sections 1, 3, 4 and 7, then Section 5 or 6					
Dist. Symbol	DE 123					
Carrier Boat Permit Number	400100					
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	Record a Date + Number of Mortalities for Each 24 hr Period.					
20 / 12 / 09 09:30						
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					
SBT03B Book No	333					
SBT03B Page No	2					
Dist. Symbol	FJ308					
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					
/ / :						
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	Signature					
JASON MANNING	<i>J. Manning</i>					
Date	25 / 12 / 09					

SBT04B
Southern Bluefin Tuna Fishery
Farm Catch Disposal Record

Log No: Page No:

Part 1		Tow Cage ID Number T600	
Fish Receiver Permit Holder Name	McNally Fresh Fish	Carrier Boat's SBT03B Log and Page No's	Log No: 198 Page No: 15
Fish Receiver Permit Holder Number	9999		
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 $H = F \times E$ (E: Average Weight in Kg)	H 638.75	Weight Total $D = C \times E$ (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	FRP Holder	E. Watson
No. of Videos viewed (2)	4		
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			
Purse Seine Boat Name	TUNA 1	Dist. Symbol	0253
SBT02	Boat 1 Log No: 12 Page No: 4	Boat 2 Log No: Page No:	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	No. of Fish taken from tow cage	Farm Stocking Form No.	Boat 1 FSAU 10 00101 Boat 2
E 18.25	42		
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	_____	Catch Disposal Form	_____
Tow Number for Season	_____	Fish Receiver Number:	_____

Book No. Page No.

Catch Information

Catcher Vessel	_____	AFMA Forms	_____
Capture location	_____		
Date of First Transfer to Tow Cage	_____		
Date of Last Transfer to Tow Cage	_____		
Tow Vessel	_____		
Date Tow Ended	_____	Total Weight of Fish Captured in this Tow Cage:	_____
Number of Mortalities during Catching	_____	Estimated Weight (kg):	_____
Number of Mortalities during Tow	_____	Total Number of Mortalities:	_____
Number of Mortalities between end of Tow and Release to Farm	_____	Total Number of Fish:	_____

Average Weight Sample Information

Sample Date	Witnesses	Average Length	Average Weight
-------------	-----------	----------------	----------------

Fish Count Information

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

Total number of live fish counted:	0	0
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Data preparation



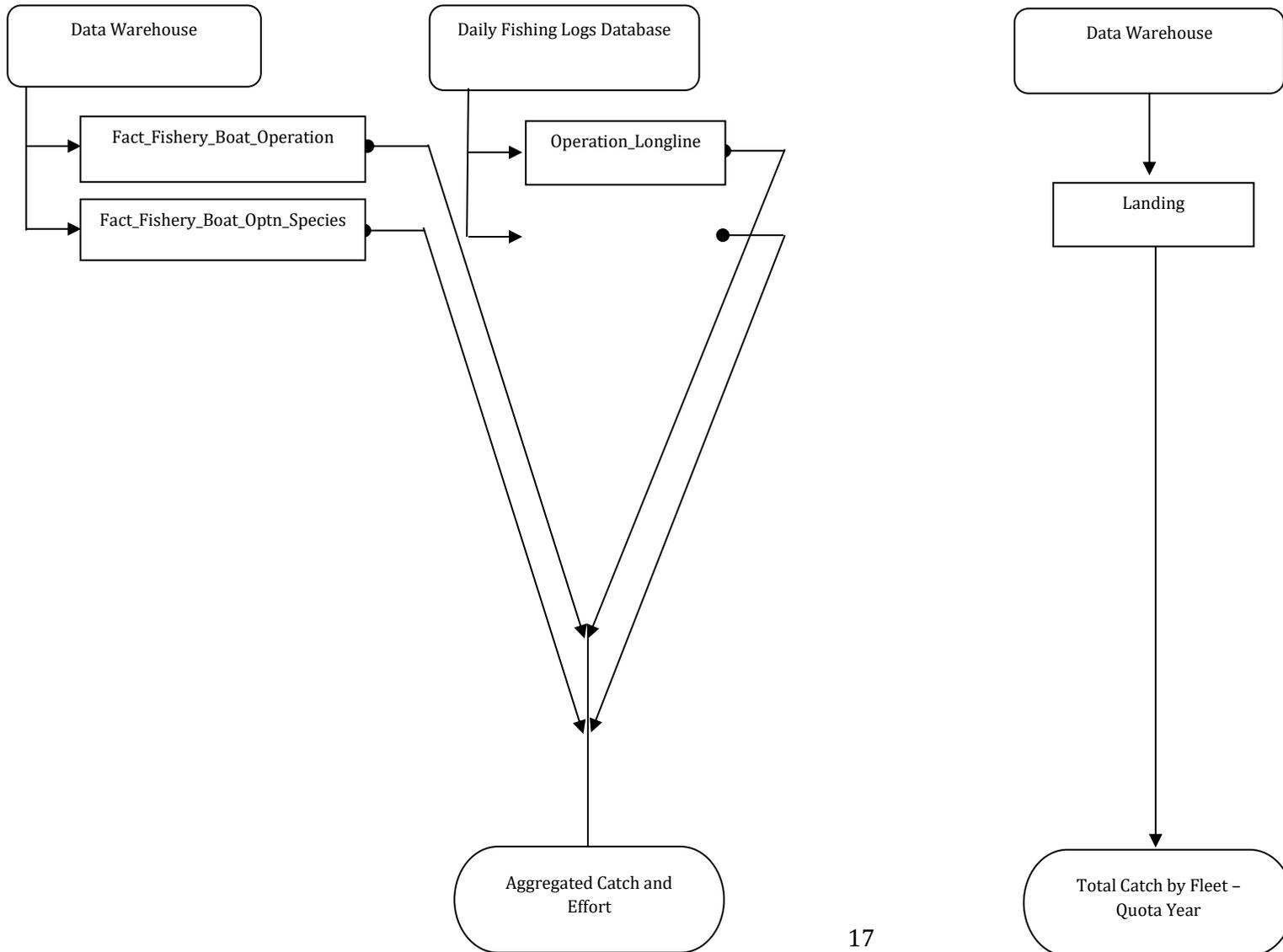
Tow Identification

Tow Cage ID	_____	Catch Disposal Form	_____	Book No. Page No.
Tow Number for Season	_____	Fish Receiver Number:	_____	

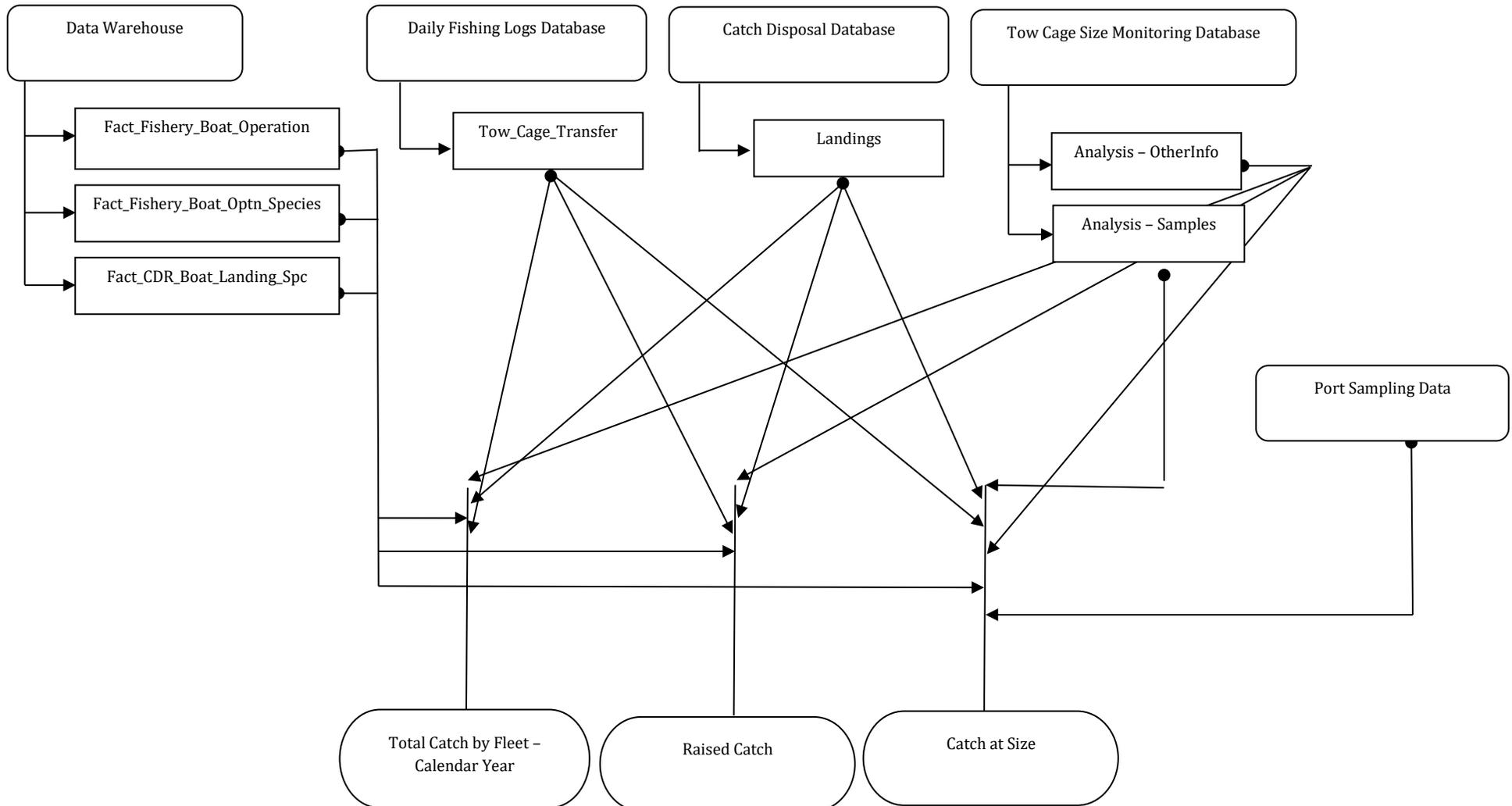
Average Weight Data

Weight	40 Fish Sample		Number of Under 10kg Fish	
	Length	Tag	Under 10kg Fish	
			Weight	Length

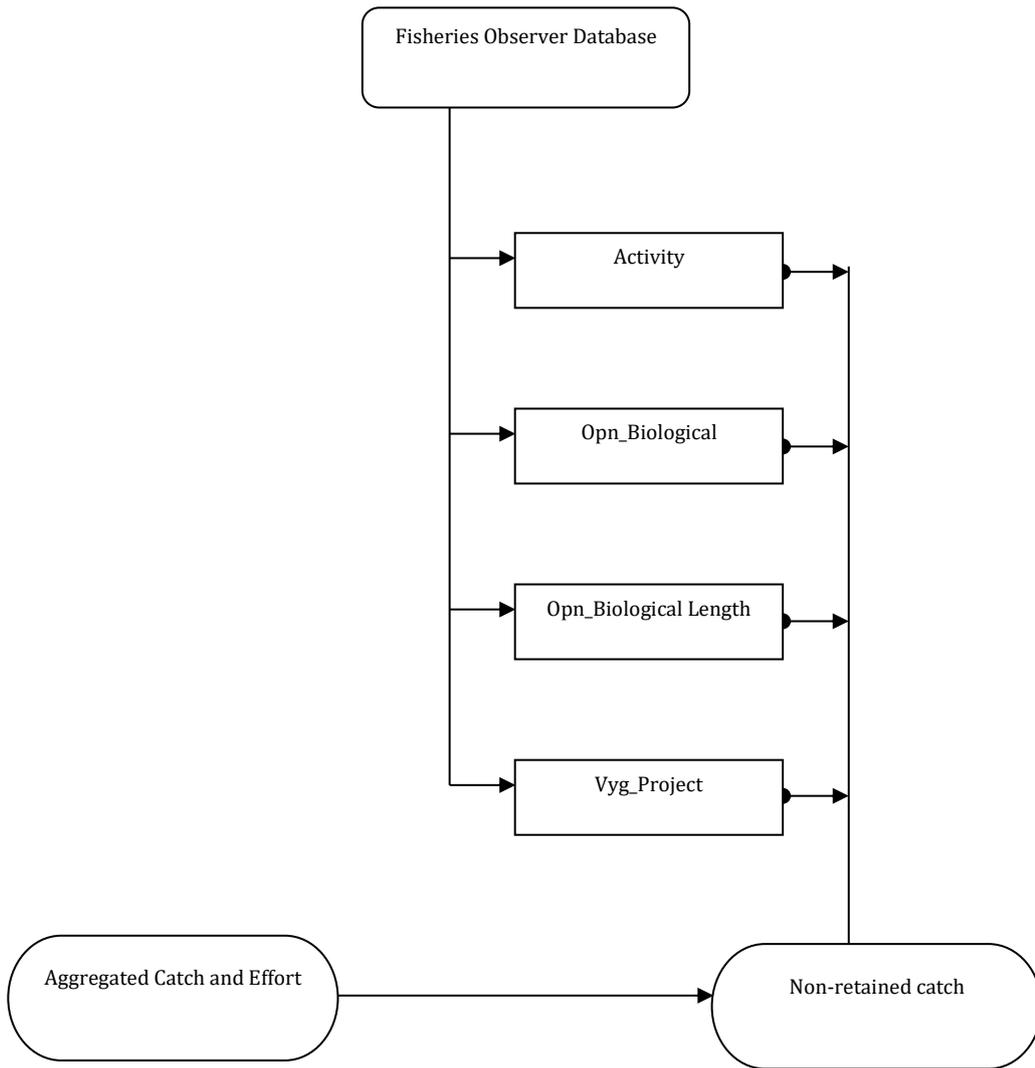
Appendix D: Flow of Data from Data Sources to Reports



Data preparation



Data preparation



References

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