



Australian Government

**Australian Bureau of Agricultural and
Resource Economics and Sciences**

Preparation of Australia's southern bluefin tuna catch and effort data submission for 2011

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The Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES), was formed following the merger of the Australian Bureau of Agricultural and Resource Economics (ABARE) and the Bureau of Rural Sciences (BRS) in 2010-11.

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Summary

The aggregated catch and effort, catch by fleet, raised catch, catch at size, and non-retained catch data sets submitted to the Commission for the Conservation of Southern Bluefin Tuna (CCSBT) by the Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES), on behalf of the Australian Government, are compiled from a number of databases. The daily fishing logbooks, catch disposal records and fisheries observer reports, collected and managed by the Australian Fisheries Management Authority (AFMA), are the main data sources. The Australian catch of southern bluefin tuna (SBT) from the surface (purse seine) fishery is also sampled by contracted field staff prior to release into farm cages. The sample data includes 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 facsimiles of data collection forms, as well as flow charts illustrating the data integration procedures.

1 Introduction

The Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES), within the Australian Government Department of Agriculture, Fisheries and Forestry (DAFF), provides data reports each year to the Commission for the Conservation of Southern Bluefin Tuna (CCSBT) as part of the annual data exchange. In April 2011, the following reports were submitted to the data exchange:

- Aggregated Catch and Effort data 2009 and 2010
- Raised Catch 2009 and 2010
- Total Catch by Fleet 2009 and 2010 (quota and calendar year)
- Catch at Size data 2009 and 2010
- Non-retained Catches 2009 and 2010.

The following reports are also provided directly to the data exchange by the CSIRO:

- Tag Releases/Recoveries and Reporting Rates
- Direct Ageing data
- Catch at Age data
- Indonesian Longline Fishery Age and Size Composition
- Raised Catch-at-age for the Australian Surface Fishery
- CPUE series
- Aerial Survey Index
- Commercial Spotting Index.

Preparation of the CSIRO data sets are described in separate papers.

2 Data sources

For the 2011 data submission, there were four sources of data used to produce the data reports. These were: the Australian Fisheries Management Authority (AFMA) Daily Fishing Logs Database; Catch Disposal Database; Tow Cage Size Monitoring Database; and Fisheries Observer Database.

Daily Fishing Logs Database

The Daily Fishing Logs Database is maintained by the 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 2011 data submission were the AL06 (pelagic longline), TPB03 (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. **Fishing Effort** – contains fishing method used and fishing effort information (e.g. number of hooks for longline operations; search hours for purse seine operations).

4. **Operation_Longline** – contains other information on longlining operations (e.g. length of mainline).
5. **Operation_Pole** – contains other information on poling operations (e.g. number of poles used).
6. **Vessel** – contains information on each licensed vessel; vessel name is used to identify individual vessels when determining the number of vessels that fished.
7. **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.

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 SBT04A (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.

Tow Cage Size Monitoring Database

Tow cage size monitoring data are collected by Protec Marine 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 Bureau of Rural Sciences (BRS) developed a database for Protec Marine to record this information, the Tow Cage Size Monitoring Database, replacing a series of spreadsheet forms. 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 2010. A sample of one of the reports produced by the database is given in Appendix C.

For each tow cage, fish were sampled until 40 fish 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.

Fisheries Observer Database

AFMA employs fisheries observers to collect data on board fishing vessels in a number of domestic fisheries and opportunistically on the high seas. Observer coverage of pelagic longline vessels has been variable between 2001 and 2010, mainly concentrated in the eastern Exclusive Economic Zone (EEZ). There has been limited coverage of longline fisheries in the southern and western EEZ and minimal purse seine coverage. 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 New South Wales purse seine components of the Catch at Size reports for 2009 and 2010. The AFMA observer data were also used to produce the “Non-retained Catches” reports for 2009 and 2010. 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 five 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 2010 and 2011 data submissions. 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.

3 Data Preparation

Raw data files of database tables from the AFMA Daily Fishing Logs, Catch Disposal Records and Observer databases are acquired late in the first quarter of each calendar year. The data are loaded into an Oracle relational database server 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 Protec Pty Ltd. Standard queries and procedures have been established to produce the data reports that ABARES submits each year. These queries may require minor modification each year as changes 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.

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.

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.

Assumptions Used in 2009 Length Frequency Data

As no length data were available for the pole-and-line operations off South Australia, length frequencies were determined from the purse seine operations in the same grid cell and the same month.

There were data entry errors found in the lengths for longline operations off New South Wales, where two lengths entered were smaller than the expected range for SBT off eastern Australia and one length was larger than the known maximum length for SBT. The latter was disregarded as it was assumed this must have been a northern bluefin tuna. For the lengths that were too small, original records were obtained and the correct lengths were determined.

4 Closing Remarks

The description of data preparation and submission in this report applies to the 2009 and 2010 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

Scientific Logbook Forms (AL06, TPB03, PS01A)

Australian Purse Seine and Pole Daily Fishing Log - For Farmed Southern Bluefin Tuna Only TPB03

Australian Fisheries Management Authority
Commonwealth of Australia

Log Book No: **0026** Page No: **02** Boat Name: *Sea Spray* Dist. Symbol: *LFB 12345* Master's Name: *C. Gavin*

TICK APPROPRIATE NON-FISHING (NF) CODE BOX AT RIGHT: 1 Bad Weather 2 In Port 3 Broken Down 7 Cage Towing Poling Purse Seining

I did not work between *28/05/98* and *28/11/98*. 4 Steaming 10 Reft Distinguishing No. of assisting vessels NE: State whether pole or seine boats *LFB023 (pole boat)*

Date of Fishing (day/month)	NF Codes listed above	Search Details				Fishing Details				Total Weight and Type of Batt			Estimated Catch Weights per Strut (kg)				Towing				
		Hours Searched	Spotter Plane Used? (Y/N)	Sea Surface Temp. (C)	Start Time (24hr local time)	Latitude	Longitude	No. Poles Used?	Pole Boat Assisted Y/N	Seine Boat Assisted Y/N	Type	Kgs	SBT Weight	Other Species	Other Weight	Estimated % of school caught	Carrier Boat Name	Weight Transferred	Transfer Date	SBT 03 Book No.	Page No.
29/11	6	4		20	1300	32°40'	132°30'		4				8,000	-	-	90	Star	8,000	29/11	036	09
30/11	4								4				15,000	-	-	95	June S.	15,000	1/12	024	36
1/12		4		21	1200	34°05'	131°08'		4				25,000	-	-	70	"	25,000	2/12	024	36
2/12		5		19	1100	33°50'	131°20'		4				12,000	-	-	80	"	12,000	2/12	024	36
2/12		2		19	1600	33°54'	131°17'		4												

Comments:

Wildlife Interactions:
List any wildlife interacting with you during your fishing activities, including netted animals. If possible, list Species name, Interaction Date, No. of Animals and Life Status of any animals released after capture. Life Status Codes are listed on the writing template. Please record any extra details in the Comments section.

Species: _____ Date/s: _____ Qty: _____ Life Status: _____

Concession Holder or Authorised Person:
I certify that the information I have provided on this form is a complete and accurate record.
Dated: 3/12/98
Name: C. GAVIN
Signature: C. Gavin

WHITE COPY - send to AFMA BLUE COPY - retain for your records Note: There are tagged fish/wildlife recapture forms at the rear of this book.

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 WATERCRESS		Dist. Symbol LFB 60		Distinguishing Nos. of assisting Pole vessels LFB 8071		Log No. ###	Page No. ##												
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 type="checkbox"/> 2 In Port <input type="checkbox"/> 3 Broken Down <input type="checkbox"/> 4 Steaming <input type="checkbox"/> 5 Searching <input type="checkbox"/> 6 Searching		Other Fishery # (specify)													
Fishing Date	NF Code above listed	Search Details (see instructions)	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		Latitude (dd mm)	Longitude (ddd mm)	Assisted by	Skipped Tuna	Yellowfin Tuna	Jack Mackerel	Blue Mackerel	Yellowtail Snapper	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)
6 / 1 / 10	4																		
7 / 1 / 10	6	5 N																	
8 / 1 / 10		2 N																	
8 / 1 / 10		1 N																	
9 / 1 / 10		3 N																	
0 / 1 / 10	4																		
/ /																			
/ /																			
/ /																			
/ /																			

DUPLICATE PAGE

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 Receivers 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**

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.

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

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

Catch Disposal Forms (CR4A, SBT03A, SBT04A)

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	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.

SBT03A
Southern Bluefin Tuna Fishery
Farm Transit Log

Log No:	Page No:
---------	----------

Carrier Boat Name	MARY LOU	Dist. Symbol	DE 123
Permit Holder	A B CUTTER	Carrier Boat Permit Number	400100
Tow Cage ID Number	T600		
Fish Received From	<input checked="" type="checkbox"/> Purse Seine Boat – Complete Sections 1 and 3 then 4 or 5		
Fish Received From	<input type="checkbox"/> Carrier Boat – Complete Sections 2 and 3 then 4 or 5		

Section 1		Transfer Details			
Name of Purse Seine Boat	Dist. Symbol	Date & Time Last Transfer Finished	Estimate of Weight (Tonnes)	SBT02 Book No.	SBT02 Page No.
BLUE OCEAN	333	20/ 12 / 04 9:30	50	111	05

Section 2		Previous Carrier Boat Name	<input type="text"/>	Dist. Symbol	<input type="text"/>
SBT03A	Log No:	Page No:	A Record of Mortalities Recorded in Box "G" of Previous SBT03A		E

Section 3		Record of Mortalities During This Tow						
Date/Time Tow Started	22/ 12 / 04 8:30	Record a Date + Number of Mortalities for Each 24 hr Period.						
Date	22/12	24/12	25/12	28/12				
Number	10	5	1	1				
Date								
Number								
Date								
Number								
Total Mortalities During This Tow		F 17		Progressive Total of Mortalities (E & F = G)				G 17

Section 4		Tow Cage Transferred To Another Carrier Boat		
Carrier Boat Name	<input type="text"/>	Dist. Symbol	<input type="text"/>	
SBT03A Book No	<input type="text"/>	SBT03A Page No	Date/Time Tow Cage Transferred <input type="text"/> / <input type="text"/> / <input type="text"/> :	

Section 5		Tow Cage Transferred To Fish Receiver			
Date/Time Tow Ended	29/ 12 / 04 11:30	Name of Fish Receiver Permit Holder	McNALLY FRESH FISH	Fish Receiver Permit Number	9999

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

Carrier Boat Permit Holder or Person Acting on their Behalf

Print Name	B. BOXALL	Signature	<i>B. Boxall</i>	Date	29 / 12 / 04
------------	------------------	-----------	------------------	------	---------------------

SBT04A
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 Vessel SBT03A Log and Page No
 Log No: **198** Page No: **15**

Progressive Total of mortalities during tow (G = SBT03A) **A 17**

Number of mortalities recorded from date of receipt of tow cage **B 8**

Transfer from Tow Cage to Farm

Transfer Date	Farm Number Cage No.	Live Fish Count
29/1/05	A93	4,802
30/1/05	A85	1,098

Count Total **C 5,900**

Total Number of mortalities $F = A + B + J$ **F 35**

Weight Total **D 107675**
 $D = C \times E$
 (E: Average Weight in Kg)

Total Weight of mortalities $H = F \times E$
 (E: Average Weight in Kg) **H 638.75**

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 **2930404**

FRP Holder **E. Watson**

Video Reference Date **1 / 2 / 05**

FRP Signature **E. Watson**

Date **1 / 2 / 05**

Part 2

Purse Seine Boat Name **TUNA 1**

Dist. Symbol **0253**

SBT02 Log No: **12** Page No: **4**

J 10 Number of mortalities during pursing and transfer to tow cage

Average Weight sample from Tow Cage

Sample Date **29 / 1 / 05**

Name of Person Sampling **T. Smith**

Signature of Person Sampling **T. Smith**

Average Weight in Kg **E 18.25**

No. of Fish taken from tow cage **42**

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

AFMA Agent's Name **B. Brown**

AFMA Agent's Signature **B. Brown** Date: **29 / 1 / 05**

Appendix C
Tow Cage Size Monitoring Report

Southern Bluefin Tuna Fishery
Farm Catch per Tow Cage

2005/06

Tow Identification

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

Catch Information

Catcher/Vessel _____	AFMA Form # _____
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	Tow Cage ID	Tow Cage Owner

Total number of live fish counted: _____

2005/06					
Tow Identification					
Tow Cage ID	_____	Catch Disposal Form	_____	Book No.	Page No.
Tow Number for Season	_____	Fish Receiver Number:	_____		
Average Weight Data					
40 Fish Sample			Number of Under 10kg Fish	<input type="text" value="0"/>	
Weight	Length	Tag	Under 10kg Fish	Weight	Length

Appendix D

Flow Charts Showing Flow of Data from Data Sources to Reports





