

ESTIMATE OF GLOBAL SALES VALUES FROM TUNA FISHERIES

STUDY FOR PEW CHARITABLE TRUSTS



Photo: bluefin tuna Sakaiminato port, Japan. Courtesy of Yasuhiro Sanada

PHASE 2 REPORT

FEBRUARY 2016

BY



WINDRUSH, WARBORNE LANE
PORTMORE, LYMINGTON
HAMPSHIRE SO41 5RJ
UNITED KINGDOM

TELEPHONE: +44 1590 610168
FAX: +44 1590 636 585
graeme@consult-poseidon.com
<http://www.consult-poseidon.com>

Estimate of the global sales values from tuna fisheries - Phase 2 report

TABLE OF CONTENTS

1	BACKGROUND	6
2	METHODOLOGY AND APPROACH USED DURING PHASE 2	7
2.1	INTRODUCTION - FOUR MAIN PRODUCT CATEGORIES TO BE VALUED.....	7
2.2	APPROACH USED TO GENERATE PRICES FOR EACH OF THE FOUR PRODUCT CATEGORIES.....	7
2.2.1	<i>Canned tuna</i>	7
2.2.2	<i>Sashimi grade tuna i.e. high value non-canned tuna</i>	12
2.2.3	<i>'Domestic' consumption of tuna</i>	14
2.2.4	<i>By-products of canning</i>	15
3	PHASE 2 RESULTS AND DISCUSSION.....	18
	REFERENCES	20

	APPENDIX 1: ADDITIONAL DATA TABLES	21
--	------------------------------------------	----

Tables

TABLE 1:	SUMMARY OF EX-VESSEL VALUES OF PRODUCT BY SPECIES, END MARKET SEGMENT, AND OCEAN AREA (US\$).....	6
TABLE 2:	AVERAGE PRICES OF TUNA CANS COLLECTED DURING THE STUDY (US\$/KG, JUNE/JULY 2015)	10
TABLE 3:	VALUE/PRICES OF TUNA IN CANS (DRAINED WEIGHT) IN US\$/TONNE OF WHOLE LANDED WEIGHT EQUIVALENT USED IN THE ESTIMATION OF CONSUMED VALUES OF CANNED TUNA	11
TABLE 4:	PRICES OF SASHIMI GRADE TUNA IN US\$/TONNE OF WHOLE LANDED WEIGHT EQUIVALENT, USED IN THE ESTIMATION OF CONSUMED VALUES OF SASHIMI GRADE TUNA	13
TABLE 5:	'DOMESTIC' RETAIL SALES PRICES (WHOLE FISH EQUIVALENT) ASSUMED IN PHASE 2 ANALYSIS	15
TABLE 6:	VOLUMES (IN TONNES), WHOLE ROUND EQUIVALENT PRICES (US\$/TONNE) FOR SALES OF BY-PRODUCTS FROM TUNA CANNING AS FISH MEAL AND PET FOOD, AND RESULTING SALES VALUES OF BY-PRODUCTS (US\$)	17
TABLE 7:	GLOBAL SALES VALUE OF TUNA IN 2012 BY SPECIES, MARKET SEGMENT, OCEAN AREA, AND FISHING GEAR (US\$)	18
TABLE 8:	INDEXED AVERAGE MONTHLY SELLING PRICES IN FRENCH METROPOLIS – CANNED TUNA IN WATER (160 G)	21
TABLE 9:	2012 – 2014 VARIATIONS IN FRENCH CANNED TUNA PRICES	22
TABLE 10:	AVERAGE FOB CANNED TUNA PRICES FROM THAILAND, JUNE 2012 AND JUNE 2014	22
TABLE 11:	RETAIL PRICES OF YELLOWFIN TUNA FOR SASHIMI IN OSAKA, 2010-2014 (US\$/TONNE)	23
TABLE 12:	RETAIL PRICES OF BIGEYE TUNA FOR SASHIMI IN TOKYO, 2010-2014 (US\$/TONNE)	23
TABLE 13:	AVERAGE RETAIL PRICE IN TOKYO, SAPPORO AND OSAKA OF BLUEFIN TUNA FOR SASHIMI, 2014.....	24
TABLE 14:	FROZEN TUNA ON TSUKIJI MARKET, 2012-2014 (US\$).....	24
TABLE 15:	FRESH TUNA ON TSUKIJI MARKET, 2012-2014 (US\$).....	25
TABLE 16:	US\$/TONNE WHOLE ROUND WEIGHT EQUIVALENT FOR FRESH TUNA ON TSUKIJI MARKET, 2012-2014 (US\$)	25
TABLE 17:	ANALYSIS OF DIFFERENCES BETWEEN RETAIL PRICES AND WHOLESALE TSUKIJI PRICES	26
TABLE 18:	WHOLESALE AND RETAIL MARKET PRICES FOR TUNA, SRI LANKA, 2012-2013(US\$)	26
TABLE 19:	SALES PRICES OF TRADERS AT INDONESIAN PORTS, 2014	27
TABLE 20:	FISH MEAL PRICES IN THAI BAHT/KG, 1998 TO 2015	27
TABLE 21:	FINAL SALES PRICES (US\$/TONNE) USED IN THE PHASE 2 ANALYSIS	28
TABLE 22:	FINAL SALES REVENUES (US\$) ESTIMATED DURING THE PHASE 2 ANALYSIS FOR 2012	29
TABLE 23:	GLOBAL SALES VALUE OF TUNA IN 2012 BY SPECIES, MARKET DESTINATION, OCEAN AREA, AND FISHING GEAR (US\$), USING TOTAL PRICE FOR THE RETAIL SALES VALUES OF CANNED TUNA NOT JUST THE VALUE OF TUNA IN CANS	31

Estimate of the global sales values from tuna fisheries - Phase 2 report

Disclaimer and Report Information

Support for this project was provided by The Pew Charitable Trusts.

The views expressed herein are those of the author(s) and do not necessarily reflect the views of The Pew Charitable Trusts.

The content of this report may not be reproduced, or even part thereof, without explicit reference to the source.

Macfadyen G., and Defaux V. (2016). **Estimate of the global sales values from tuna fisheries – Phase 2 Report**. Poseidon Aquatic Resource Management Ltd, Windrush, Warborne Lane, Portmore, Lymington, Hampshire SO41 5RJ, UK

Tel/Fax: +44 (0)1590 610168

Email: graeme@consult-poseidon.com

URL: <http://www.consult-poseidon.com>

Acknowledgements

The authors wish to thank Marie-Christine Monfort and Yasuhiro Sanada, who contributed towards data collection aspects for canned tuna and Japanese sashimi prices respectively, and Benoit Caillart and Richard Banks who provided peer review comments on a draft version of this report.

Thanks also go to two anonymous peer reviewers contracted by Pew Charitable Trusts who reviewed a draft of this report and provided comments and suggestions which have been incorporated into this final version.

Version: FINAL Phase 2 Report

Report ref: 1059-GBR/R/02/E

Date issued: 29 February 2016
(update of Phase 1 report
previously issued in 2015,
following peer review
comments)

Estimate of the global sales values from tuna fisheries - Phase 2 report

Table of Acronyms

ALB	Albacore
AZOR	Azores Islands Area
BB	Pole and line
BET	Bigeye
BFT	Atlantic bluefin
CANA	Canary Islands area
CCSBT	Commission for the Conservation of Southern Bluefin Tuna
CIF	Carriage Insurance and Freight
C&F	Carriage and Freight
CVER	Cape Verde area
EAO	East Atlantic Ocean
EEZ	Economic Exclusion Zone
e.g.	<i>Exempli gratia</i> in Latin meaning 'for instance'/'for example'
EIO	East Indian Ocean
EPO	Eastern Pacific Ocean
ETRO	East Tropical Atlantic
FAO	Food and Agriculture Organisation (of the United Nations)
FOB	Free On Board
GN	Gillnet
GOFM	Gulf of Mexico
HL	Handline
IATTC	Inter-American Tropical Tuna Commission
ICCAT	International Commission for the Conservation of Atlantic Tunas
i.e	<i>Id est</i> in Latin meaning 'that is'
IOTC	Indian Ocean Tuna Commission
LL	Longline
MDRA	Madeira Islands area
NE	North East
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmosphere Administration
NW	North West
NWC	North West Central
OTH	Other
PBF	Pacific bluefin
PFMC	Pacific Fishery Management Council
PS	Purse seine
RFMO	Regional Fisheries Management Organisation
SBT	Southern Bluefin tuna
SKJ	Skipjack
SW	South West
T	tonnes
TR	Troll
TROP	Tropical Atlantic
ULT	Ultra Low Temperature

Estimate of the global sales values from tuna fisheries - Phase 2 report

WAO	West Atlantic Ocean
WCP(O)	Western Central Pacific (Ocean)
WCPFC	Western and Central Pacific Fisheries Commission
WIO	West Indian Ocean
WTRO	West Tropical Atlantic
YFT	Yellowfin

1 BACKGROUND

This document provides the outputs from **Phase 2** of a three-phase project, to complete a study to provide an *estimate of the global sales values from tuna fisheries*. The study was completed by **Poseidon Aquatic Resource Management Ltd** (Poseidon) of the UK, for **Pew Charitable Trusts** ('Pew').

The study phases were as follows:

Phase 1 focused on: collecting and analysing tuna landings data by ocean, vessel flag, gear, and species; mapping product flows; and assessing the first sale value of landed catch in 2012 by multiplying landed volumes with ex-vessel/first sale prices.

Phase 2 focused on: generation of 2012 data on final consumer sales values, based on the volumes of sales and final sale prices.

Phase 3 focused on: updating the Phase 1 and Phase 2 outputs to arrive at estimates for 2014.

The Phase 1 report made a global estimation of landed volumes and values at the first point of sale for tuna fisheries globally, by multiplying tuna catches for different species and fishing methods from Regional Fisheries Management Organisation (RFMO) catch databases, with ex-vessel prices. A global estimate for 2012 of first sale ex vessel values was calculated at US\$12.2 billion (see Table 1).

Table 1: Summary of ex-vessel values of product by species, end market segment, and ocean area (US\$)

Species	\$	% of species total	Market segment	\$	% by market segment	Ocean Area	\$	% by ocean
ALB	924,700,704	7.6%	Canning	6,563,934,810	53.8%	WCPO	6,496,898,718	53.2%
BET	2,653,810,223	21.7%	Domestic	792,873,338	6.5%	EPO	1,538,621,840	12.6%
BFT	172,841,426	1.4%	Fresh sashimi	1,407,843,366	11.5%	WIO	1,822,570,002	14.9%
PBF	359,265,530	2.9%	Frozen sashimi	3,272,763,107	26.8%	EIO	855,705,787	7.0%
SBF	128,536,170	1.1%	Ranching	168,653,480	1.4%	EAO	962,510,252	7.9%
SKJ	4,036,805,178	33.1%		12,206,068,100		WAO	401,225,331	3.3%
YFT	3,930,108,869	32.2%				Antartic	128,536,170	1.1%
Total	12,206,068,100						12,206,068,100	

Source: Poseidon analysis

Phase 2, and the purpose of this report, is to provide an estimate of the final consumed global sales values of tuna for 2012.

2 METHODOLOGY AND APPROACH USED DURING PHASE 2

2.1 INTRODUCTION - FOUR MAIN PRODUCT CATEGORIES TO BE VALUED

Building on the work completed during Phase 1, global sales values have been estimated separately for four main market segments or product categories (which combined should account for all final tuna trade) as follows: (figures below extracted from the Phase 1 analysis)

1. Tuna catches which are destined for canneries (3.5 million tonnes in 2012, 75% of global landed volumes).
2. Tuna catches destined for the sashimi market i.e. non-canned tuna sold in whole, loined, steak of fresh form, either fresh or frozen at the point of catching prior to transport to end markets (<700,000 tonnes in 2012, 14% of global landed volumes).
3. Tuna catches made by vessels from particular countries which are not destined for global trade, but which are either consumed fresh in the domestic markets in which catches are landed (generally at low value i.e. not for sashimi/canning) or which are the subject of domestic/small-scale traditional processing (e.g. smoking, drying, etc) for domestic consumption (450,000 tonnes in 2012, 10% of global landed volumes).
4. By-products of canning destined for fish meal or pet food. The ex-vessel value of this product category was not considered separately during the Phase 1 analysis as at that stage of the value chain values were attributed to the catches destined for the 'canning' market segment. Given an estimated processing yield conversion factor from whole tuna to tuna in cans of an average of 40-45% depending on the species processed (IATTC, 2007)¹, from the 3.5 million tonnes destined for canneries in 2012, an estimate of around 2.1 million tonnes of processing waste (i.e. product not used in cans of tuna) can be made. A small proportion of this material may be discarded, but most is sold for use in fish meal or pet food².

The following text provides an explanation of how price data have been generated and applied to the volumes caught globally as recorded in catch database established during Phase 1.

2.2 APPROACH USED TO GENERATE PRICES FOR EACH OF THE FOUR PRODUCT CATEGORIES

Two main issues impact on the approach taken to each of the four market segments/product categories: i) the point in the value chain which should/can be valued, and ii) the need for selective sampling of data in each product category to be applied globally (and where possible supported by triangulation of data) to catches estimated during Phase 1 as destined for sale through the different market segments/product categories.

2.2.1 Canned tuna

Retailed canned prices collected and interviews completed

For canned tuna prices, there are no problems in accessing 'final' consumer values, as canned prices can be obtained from retail stores. However, given the inability during the study to collect canned tuna prices in all global markets, a sample-based approach has been necessary. While the sample frame was far from being 'stratified' in a statistical sense, the following text provides some rationale for the approach used. It is acknowledged that given the 'opportunistic' approach to the sampling,

¹ Exact yields vary by species and size of fish

² It is noted that in the Pacific there are small domestic markets for the red meat product coming from PNG and Solomon Island canning plants, and this may be the case in other geographical areas, but this separate marketing channel is not estimated/analysed in this study.

Estimate of the global sales values from tuna fisheries - Phase 2 report

some sampling bias may be involved in the final numbers generated and used, although the 'commodity' nature of canned tuna (as discussed below) should serve to reduce the impact of any such bias.

Hamilton et al, 2011³ suggests that the contributions of the EU, the USA and Asia to total global consumption of canned tuna are around 30%, 19%, and 15% respectively, and combined represent 64% of global consumption of canned tuna. Given these data and the importance of the EU and USA markets in global terms, canned tuna price data were collected from a number of EU markets, namely the UK, France, Italy, Spain and Germany as these are the largest country markets in the EU⁴, and the USA. Due to expected difficulties in obtaining detailed historical time series for price data from supermarket buyers, data were instead collected during June and July 2015 based on visits to stores and by accessing online sales of canned tuna products. A total of 365 individual price records for cans of tuna were entered into a database, and converted into US\$ using June/July 2015 exchange rates (from www.oanda.com). Each individual entry/record in the database captured information on: the price and weight of the can, the tuna species, the tuna preparation (e.g. in oil, water, flakes, crumbs, etc), whether the can was own brand or not, where possible the canning location, and in most cases the drained weight of tuna as a % of the total canned weight. The breakdown of the number of individual records entered by country is shown below, along with the retailers from which price data were obtained.

- France: 64 records, from Carrefour, Leclerc, and Intermarche;
- Germany: 12 records from REWE;
- Italy: 78 records from Coop and Conad;
- Spain: 33 records from Hyercor and Alcampo;
- UK: 141 records from Asda, Sainsburys, Tesco, and Morrisons;
- USA: 37 records from Walmart, Safeway/Albertsons, Trader Joe's, and Costco.

Interviews with supermarket buyers in the UK (Asda) and Italy (Conad) confirmed that online sales and in-store sales prices are identical with retailers utilising a 'single price' list, validating the approach of accessing price data in some cases through the sales websites of the retailers. Promotional sales prices for canned tuna may represent an important share of total sales, and while this study has not been able to account specifically for reduced promotional prices and while it was not noted when collecting price data whether prices were promotional prices or not, it is likely that the price records collected included some product on promotion.

Methodological issues

The results from the data collected have been examined to determine if at first sight they appear sensible, and intuitively they do indeed provide for some confidence in the data collected given that the data show as would be expected that: (i) prices for tuna in oil are higher than for tuna in water; (ii) prices are lower for skipjack tuna than for other species; and (iii) retailer own brand cans of tuna are lower priced than branded cans. The average price of tuna cans collected during the study (in June/July 2015) was US\$ 18.15/kg.

Important methodological issues then relate to: (i) the extent to which it is valid to use the retail canned price data collected June/July 2015 for the different species of tuna to apply to volumes of different tuna species landed/sold in 2012 from the Phase 1 analysis (and in 2014 for the Phase 3 analysis); (ii) the extent to which data for the EU and USA could be applied more globally; (iii) whether to use the sales prices of canned tuna in the global estimate, or just the value of the tuna

³ Hamilton et al., 2011. Market and industry dynamics in the global tuna supply chain.

⁴ FAO tuna commodity update, 2012

Estimate of the global sales values from tuna fisheries - Phase 2 report

contained within the can; (iv) processing conversion rates i.e. the proportion of whole round fish that is canned, as opposed to discarded or sold as by-product; and (v) the issue of branding and non-canned products.

Validity of using 2015 price data and applying it to 2012 catch volumes (and to 2014 catch volumes for the Phase 3 analysis)

For the first issue, some historical data on tuna prices of canned tuna in France (see Table 8 and Table 9 in Appendix 1) demonstrate only small year-on-year changes in canned tuna prices, suggesting that given the overall margins of error inherent in the final global estimated value of tuna sales and given the many assumptions in the study, 2015 canned tuna prices could be applied to 2012 and 2014 catch data. Applying the 2015 data collected would if anything result in a conservative estimate of 2012 values given that canned prices may have fallen very slightly since 2012. However, canned tuna prices in retail stores vary little between years in the short term because of: (i) retailers viewing it as desirable where possible to maintain fairly constant prices (which may in some cases be the reason for tuna being sold as a 'loss leader'); and (ii) inventories/stores of canned tuna. Both factors mean that variations in ex-vessel prices do not necessarily feed through the supply chain immediately into similar levels of change in canned tuna prices on supermarket shelves.

2015 prices collected were however reduced by 1.75%⁵ to account for average monthly European inflation of processed food over the period mid-2012 to mid-2015.

Validity of using EU and USA sales price data as applicable for sales prices in other markets

With respect to canned tuna prices in other markets globally for which price data were not obtained, two approaches were taken to assessing how applicable canned tuna price data in EU and the USA might be to prices in other countries.

Firstly, Thai export data for canned tuna for 2012 and 2014 was accessed to consider any such price differentials. This analysis (shown in Table 10 in Appendix 1) suggests that prices in some markets for which retail canned prices were not obtained from retail stores during the study (e.g. Brazil, South Africa) were lower than in EU and USA markets, but that prices in other markets (e.g. Australia, Nigeria) may be higher than in EU and USA markets⁶. While the reliability of the data cannot be accurately determined and it is surprising that data show canned prices higher in Nigeria than in the EU/USA, it has been assumed in this study that the price data collected for canned tuna in EU and USA markets is representative of prices globally; given that canned tuna is a global commodity product. This assumption may be supported by the fact that concentration of processors and traders (see Phase 1 report) at the global level means that information is rapidly transmitted from one location to another. Tuna markets for canned products have been found to be well integrated at the world-wide level, forming a single global and interdependent market (Jiménez-Toribio et al. 2010). Although our collection of data did demonstrate some differences in average prices of canned tuna in different markets (with average prices in Germany, Italy and Spain higher than the average of US\$18.15/kg shown below, prices in France, the US and the UK slightly lower).

Secondly, a small number of tuna canneries (MW Brands with canneries in Ghana, Seychelles and Portugal, PT. Samudera Santosa in Indonesia, and Thai Union in Thailand) were interviewed for their views about price differentials between markets. These interviews confirmed that differences in canned tuna prices are more strongly determined by branding (e.g. multiple retailer own brands vs tuna canning brands) and type of canned tuna product (e.g. particularly whether tuna is in oil or water, but also tuna species, flakes vs crumbs, etc.) than by the country of final sales.

⁵ Source; Eurostat

⁶ Northern Africa and Middle East are also now important markets for canned tuna but Thailand customs data was not examined for these countries.

Estimate of the global sales values from tuna fisheries - Phase 2 report

The average retail canned tuna prices per kg in US\$ for whole cans of different tuna species presented in **Error! Reference source not found.** are therefore assumed representative of other markets.⁷

Table 2: Average prices of tuna cans collected during the study (US\$/kg, June/July 2015)

Tuna species	oil	other	water	Branded	Retail store own brand	Grand Total
albacore	23.47	23.72	16.95	21.46	17.61	20.35
bigeye tuna	19.91		8.35	17.98		17.98
skipjack	16.92	17.81	14.34	18.03	9.28	15.83
yellowfin	24.48		17.41	24.52	16.35	22.06
unspecified	15.18	13.53	17.16	17.97	9.85	15.13
Grand Total	20.58	16.30	15.93			18.15

Source: Poseidon survey and analysis. Notes: (1) blank cells mean no records contained in the database of prices established; (2) 'branded' = product branded by tuna producers/canners/wholesalers (e.g. Bumble Bee, Princes). 'Retail store own brand' = cans with retail brands/labels (e.g. Carrefour); (3) prices in grand totals are weighted averages; (4) 'unspecified' represent entries in the survey database for which the specific species was not recorded by the surveyor, but which are most likely to be skipjack tuna.

Canned vs drained weight

A further important methodological issue was whether it is valid to use the canned price recorded during the retail store data collection process, or just the part of the canned price comprised of tuna. Data collected on retail prices included data on the canned weight and the 'drained' weight of tuna i.e. the tuna without oil/water. On average across all 365 samples of canned tuna, the drained weight of tuna in cans was 68% of the canned product weight. Discussions with Indian Ocean Tuna cannery in the Seychelles (Pers. Comm., November 2015) also provided an indication that for canneries 'around 55% of the production cost of a can of tuna is the tuna product itself, with 25% being the can and non-tuna contents e.g. oil, and the remaining 20% being other costs (e.g. labour and operational costs)'. When considering these figures, and while recognising that cost structures may differ in different locations, tuna costs as a proportion of the combined tuna and can/filling costs (i.e. excluding operational costs) re 68.75%, which provides good triangulation with the 68% drained weight estimate from our retail survey. In order to provide final estimates that are conservative and cannot be criticized of trying to inflate global values by using the retail sales prices of the can (tuna, can, and liquid contents), it was decided therefore to apply 68% to the retail sales values of canned tuna⁸ rather than taking the final total canned price, so as to estimate the value of the tuna alone.

Processing yields

In applying the prices of canned tuna of different species to the volumes in the catch database from Phase 1 it is necessary to account for the fact that there is a processing yield conversion factor from whole tuna to tuna in cans of an average of 40-50% (IATTC, 2007) i.e. for every 1 tonne of tuna caught and processed, the weight of tuna available for canning is 400-500kg. Processing yields are lower for skipjack than for other species. In order to ensure global sales values are not over-estimated, a conversion factor of 40% is therefore used for skipjack with a factor of 45% applied as

⁷ It is known that pole and line caught canned tuna can fetch market premiums of around 5-10%, but: (i) data collected during the study on canned tuna prices did not include details of fishing method, and (ii) some pole and line caught tuna is likely to have been included in the 365 canned tuna samples for which price data were collected, meaning that any such price premiums will have been incorporated into the average prices.

⁸ It is noted that the USA Hydrolyzed fat represents an important component of canned tuna.

Estimate of the global sales values from tuna fisheries - Phase 2 report

the conversion factor for other species. Thus when canned tuna prices are applied to the catch volumes (of whole round fish) in the Phase 1 database, prices need to be multiplied by 40% in the case of skipjack tuna or 45% in the case of other species.

Final prices selected for use in the analysis of canned tuna

Given the above discussion, prices for individual species used in the Phase 2 analysis are thus those shown in Table 3⁹.

Table 3: Value/prices of tuna in cans (drained weight) in US\$/tonne of whole landed weight equivalent used in the estimation of consumed values of canned tuna

Species	\$/tonne landed weight
albacore	6,118
bigeye tuna	5,406
skipjack	4,230
yellowfin	6,632

Source: Poseidon analysis. Note: prices are the individual species prices taken from the survey of canned prices in retail stores, multiplied by 1,000 to arrive at a value figure per tonne, multiplied by 68% to account for the drained weight of tuna in cans, and multiplied by 40% (for skipjack) and 45% (for other species) to derive a price per tonne of whole landed weight. Prices also reduced by 1.75% to account for inflation of processed foods between 2012 and 2015.

Branding and non-canned products

The lack of detailed data for product on promotion is an acknowledged flaw in the method used in this study. Promotion of branded product is significant in the US and UK markets in particular. However, the price samples collected from retailers may be expected to have included some product on promotion, and the range of prices obtained for individual cans support this view. Also acknowledged as a weakness is the lack of consideration of other sub-segments in shelf-stable products such as tuna in jars, tuna in pouches, etc. These have not been examined, and their omission may result in the global estimate being an under/precautionary estimate of the true value of sales.

⁹ The analysis also assumes that all product estimated in Phase 1 as being destined for canning is sold in the retail sector rather than being used in the food service sector. It was agreed with Pew during the study that trying to value canned tuna as part of sandwiches or other food preparations used in the food service sector would be too problematic in terms of distinguishing what proportion of the final product/plate cost pertained to tuna.

2.2.2 Sashimi grade tuna i.e. high value non-canned tuna

Sashimi prices collected and interviews completed

Japan has historically dominated global sashimi consumption. However in recent years, other markets have grown rapidly especially for product such as tuna loins, steaks, etc., and data (in Hamilton et al., 2011) suggest that around 20% or more of global consumption is now in other markets; primarily the USA, other Asian markets of Korea, China and Taiwan (which are already greater than the EU market), the EU, and other growing markets in South America, Eastern Europe and Australia/New Zealand. Nevertheless Japan remains by far the largest market, and may still account for around 75-80% of the global market. As a result, Phase 2 has used Japanese sashimi prices to estimate the consumed values of the tuna destined for sashimi markets.

The first step in the analysis was to examine retail and wholesale data available from a number of different sources, so as to make a determination of their reliability and which data should be used in the global estimate.

Time series of retail sashimi grade tuna prices are available and have been accessed for yellowfin (Osaka, 2010-2014), bigeye (Tokyo, 2010-2014) and bluefin tuna (Tokyo, Osaka and Sapporo, 2014 only), and are presented in Table 11, Table 12, and Table 13 in Appendix 1, with prices in Japanese Yen converted to US\$ at mid-year values. The tables also provide the average round weight equivalent prices, based on our calculations and an assumption that the retail marketed weight is 45% of the whole weight (an average of information provided by prominent middlemen in Tsukiji fish market suggesting 50% of whole weight is edible, and Forum Fisheries Agency indicators of loined to whole weight of 40% used in Phase 1).¹⁰

Data on wholesale prices at the Tsukiji market in Tokyo for both fresh and frozen bluefin, bigeye, yellowfin, albacore, and southern Bluefin tuna are provided in Table 14 and Table 15 in Appendix 1 (2012 to 2014) with prices in Japanese Yen converted to US\$. Table 16 again provides the average round weight equivalent prices based on our calculations and assuming that landed weight is 1.15 of the wholesale marketed weight (based on estimations by both Tsukiji middlemen and FFA/Phase 1, and recognising that some product is sold gilled and gutted form and some as headed and gutted product).

Table 17 in Appendix 1 shows that retail prices were on average 1.75 times the wholesale prices on the Tsukiji market in both 2012 and 2014, for species where prices are comparable.

Methodological issues

Whether to use wholesale or retail prices from Japan and how applicable retail prices are to prices in the food service sector

This question relates to: (i) the balance of total sales which are retail and those which are in the food service sector i.e. restaurants; (ii) relative sashimi prices in retail and restaurant markets; and (iii) whether to apply wholesale prices from the Tsukiji market to the proportion of sales assumed to be made through restaurants.

Based on interviews with middlemen at the Tsukiji fish market and confirmed by the Japan Fisheries Information Centre and other Japanese fish trade experts, there appear to be no data available on: (i) the proportion of sashimi-grade tuna that is sold to a) the retail sector, and b) the food service sector; or (ii) price differentials for tuna sold through retail and restaurant market outlets.

In the case of the food service sector, the range of sales outlets and their different emphasis on quality and margins make it impossible (at least within this study, and perhaps at all) to obtain data on the final sales value of tuna. However, it seems likely that restaurant prices are considerably

¹⁰ The analysis of sashimi prices in this study does not account for differences in quality grades of sashimi tuna.

Estimate of the global sales values from tuna fisheries - Phase 2 report

higher on average than retail prices. At the same time using wholesale prices from the Tsukiji market, while providing reliable data, would grossly under-estimate the final value of consumed sashimi grade tuna as the wholesale process are so far from the end point in the value chain.

For this reason, where retail prices are available as shown in Table 17 in Appendix 1 they are used, but where not it seems reasonable to apply a raising factor of 1.75 to wholesale Tsukiji price data (based on Table 17 showing that retail prices were on average 1.75 times the wholesale prices on the Tsukiji market), and to use the resulting prices to apply to the Phase 1 catch volumes. It should be stressed that even allowing for this raising factor, the resulting estimates of the value of consumed sashimi grade tuna are still likely to be conservative and to underestimate the actual values given the likely higher prices in the food service/restaurant sector than in the retail sector.

Validity of using Japanese price data as applicable for sales prices in other markets

A final methodological issue is the validity of applying Japanese prices to all global sales of sashimi grade tuna. The average price of yellowfin tuna sold in Europe based on an admittedly small number of 6 records from online retailer sales in June/July 2015 suggests that there may be only small differences between retail prices in Japan and other markets (see footnote to Table 11). Some other studies e.g. FAO, 2008, have also demonstrated little difference between average Japanese and EU wholesale/contract market prices for longline caught sashimi tuna. The reason for this being the fact that while higher-grade tuna may be destined for Japan, auction sales prices in Japan are unreliable with no price guarantees, meaning that while some tuna can sell for very high prices, when product is not deemed to be of sufficient quality then sales prices can be very low covering little more than handling costs. Sales to Europe on the other hand are typically negotiated prior to export and are based on agreed contract prices. Unpicking these complex marketing issues to determine any assumed difference between Japanese prices and prices of sashimi product elsewhere would be extremely problematic.

It is acknowledged that using Japanese price data and applying them to all sashimi product may slightly over-estimate global consumed values if prices are lower in other markets, but in the absence of better information, and given the (continuing, even if declining) dominance of Japan in terms of global consumption of sashimi tuna and the fact that other Asian markets are more important than the USA and EU in terms of sashimi consumption, the study has deemed it justifiable and necessary to apply the consumed prices of sashimi grade tuna in Japan to all quantities of tuna estimated during the Phase 1 study as destined for sashimi markets. This assumption is supported by the fact that the international market for longline caught tuna for sashimi trade is strongly integrated and dominated by the Japanese market (Sun 2010, Sun and Hsu 1998, Miyake 2010).

Final prices selected for use in the analysis of sashimi tuna

Given the above discussion, the final prices used in the Phase 2 estimates of consumed values of sashimi grade tuna are therefore those provided in the table below for 2012. As with the assumed canned prices, these prices are nuanced by species, but not by the ocean area or fishing gear (although most can be assumed to be longline caught) as market data provide no basis on which to distinguish between different methods of catching.

Table 4: Prices of sashimi grade tuna in US\$/tonne of whole landed weight equivalent, used in the estimation of consumed values of sashimi grade tuna

Estimate of the global sales values from tuna fisheries - Phase 2 report

Fresh sashimi prices	2012	2013	2014
bluefin	\$ 53,773	\$ 44,080	\$ 46,666
yellowfin	\$ 18,806	\$ 13,635	\$ 14,724
bigeye	\$ 22,089	\$ 21,649	\$ 17,438
albacore	\$ 11,421	\$ 9,583	\$ 13,856
southern bluefin	\$ 49,042	\$ 34,124	\$ 34,480
Frozen sashimi prices	2012	2013	2014
bluefin	\$ 74,169	\$ 56,984	\$ 57,645
yellowfin	\$ 18,321	\$ 13,222	\$ 14,254
bigeye	\$ 18,770	\$ 14,516	\$ 15,124
albacore	\$ 17,290	\$ 14,543	\$ 15,114
southern bluefin	\$ 47,042	\$ 32,638	\$ 32,162

Source: Poseidon analysis. Notes: (1) frozen prices are in some cases higher than fresh prices, possibly due to the high quality of frozen tuna when Ultra Low Temperature freezing of catch takes place immediately after fish have been brought on to vessels; (2) bluefin tuna prices are likely to be a combination of Atlantic and Pacific species but are not identified separately, or as such, in the Japanese price data; (3) prices for fresh tuna provided in the table are weighted averages of 'domestic', 'imported' and 'juvenile' data on monthly sales volumes and values as provided in the Japanese price data; (4) Japanese price data in Yen per kg are converted to US\$/tonne using average mid-year exchange rates; (5) 2012 data only used in the analysis of 2012 consumed values, but data for 2013 and 2014 are provided for interest.; (6) where retail prices are available (fresh yellowfin and fresh bigeye) they are used, but where not a raising factor of 1.75 is applied to wholesale Tsukiji price data.

2.2.3 'Domestic' consumption of tuna

Sample frame of data collected

Tuna caught and consumed in 'domestic' markets¹¹ mostly in fresh but also in smoked/dried form, was estimated during Phase 1 to be just 450,000 tonnes in 2012, representing under 10% of catch volumes and only 6% of the ex-vessel values. Of the 450,000 tonnes around 200,000 was from the WCPO, 100,000 from the WIO, and 127,750 from the EIO. Other ocean area catches destined for domestic consumption are small in comparison. Product is typically sold on domestic markets when the quality is not good enough for the product to enter other higher value marketing chains.

From the Phase 1 database on catches by gear type and flag and the market flow descriptions, and noting that there are other countries with important catch volumes going to domestic consumption (eg. gillnet catches in Yemen, Pakistan) the countries/gears providing the largest proportions of fresh or traditionally processed product for domestic consumption in the three ocean areas important in terms of domestic consumption are:

- EIO: Indonesia and Sri Lanka 'gill net' catches (75,122 tonnes in 2012);
- WCPO: Indonesian pole and line and 'other' gear catches (306,829 tonnes in 2012); and
- WIO: Maldivian 'pole and line' catches (62,030 tonnes).

It was therefore decided to examine prices in these countries and apply them globally.

For Sri Lanka, retail prices for whole round unprocessed tuna are available from the Ministry of Fisheries (Sri Lanka Ministry of Fisheries, 2014), and are shown in Table 18 in Appendix 1 along with wholesale market prices and price differentials between wholesale and retail prices. For Indonesia, communication with the Ministry of Maritime Affairs and Fisheries¹² confirmed that no retail price

¹¹ i.e. product generally sold fresh/dried/smoked and excluding product for canned and sashimi markets.

¹² Pers. Comm., September 2015

Estimate of the global sales values from tuna fisheries - Phase 2 report

data are collected/available in Indonesia. Research completed during Phase 1 did however generate some sales prices for traders buying fish from Indonesian fish landing sites in the Eastern Indian Ocean known to be selling to domestic markets, and these are presented in Table 19.

For the Maldives, the consultants' own field notes from working in Maldives in 2012 suggest: a) retail fish prices of a similar magnitude to those provided for Sri Lanka and Indonesia in Appendix 1, and b) only very small margins being made from any processing of tuna into traditional processed fish products (e.g. smoked/dried fish).

Final prices selected for use in the analysis of domestic sales

While admittedly not strongly empirically based, and drawing from a non-random sample and small sample size that could lead to bias in the prices used, given the above discussion and data limitations faced during Phase 2 it has been assumed that all domestic retail sales prices (whole round weight equivalents) in all oceans are as follows:

Table 5: 'Domestic' retail sales prices (whole fish equivalent) assumed in Phase 2 analysis

Species	Sales price (US\$/tonne)
Albacore	\$3,000
Skipjack	\$3,500
Yellowfin	\$5,500
Bigeye	\$4,000

Source: Poseidon analysis

In most cases these prices represent roughly double the ex-vessel prices used in Phase 1, which is line with the Sri Lankan price differentials shown in Table 18 and the consultants' own experience of working in developing countries.

It should also be remembered that given the small volumes and low values compared to other market flows, any discrepancies between the actual situation and the assumptions made for the domestically marketed sales of tuna are unlikely to materially impact on the validity of the overall global estimate of all market segments.

2.2.4 By-products of canning

Data collected and interviews completed

The fourth and final type of product flow considered during Phase 2 is the sales value generated from by-products from canning tuna. Given that the Phase 1 analysis estimated that 76% of global catches are destined for canning, and that processing waste and by-products represent 60% of the whole round wet weight of tuna, processing waste and by-products represented around 2.1 million tonnes in 2012.

Interviews completed with canneries during Phase 2 provided some information about what happens to processing waste. Interviews with Thai Union suggested that *of the by-products*: 40% (i.e. 22% of the whole round weight of fish) is discarded; 25% (i.e. 14% of the whole round weight of fish) is sold for fish meal; and 35% (i.e. 19% of the whole round weight of fish) is sold for pet food. The Indonesian cannery interviewed reported that of the whole fish, around 30% goes to fish meal, 45% to the can, and a similar proportion of the whole round weight of the fish (25%) is discarded with no sales value. The Indonesian cannery did not report any sales into the pet food value chain. The Indian Ocean Tuna cannery in the Seychelles, also reported that around 20% of the whole weight of fish is totally 'wasted' and not sold as a by-product. The explanation for these figures and the proportion of the whole weight discarded without sale is that the weight represents 'drip loss', which is the weight of the blood and water.

Estimate of the global sales values from tuna fisheries - Phase 2 report

Despite the figures provided by Thai Union on sales of pet food, in global terms, the amount of tuna processing by-products going to pet food is probably far smaller than that destined for fish meal (especially given that legal requirements to label pet food as 'tuna' require only very small proportions of the final product to be comprised of tuna (e.g. 4% in Europe¹³).

Fish meal prices have been obtained from the Thai Feed Mill Association¹⁴ (see Table 20 in Appendix 1) and when converted to US\$ were on average US\$1,005 per tonne in 2012, US\$934 in 2013 and US\$1,015 in 2014. The dried weight of fish meal product is around 25% of the wet weight of the processing by-products, so a price of 25% of the price for a tonne of fish meal is used in the analysis and applied to the volume of whole landed tuna ending up as sales of fish meal.

For canning by-products destined for the pet food industry, heads and red meat are typically sold by canneries in brine or frozen blocks, but may then be re-processed and sold to pet food manufacturers either in wet/frozen form to be used in canned pet food, or in dehydrated form (PAT - protein animal transformed) in dry pet food. Given the small proportions of the final product comprised of tuna as mentioned above, pricing pet food cans or dried pet food and using those prices in the Phase 2 model makes little sense. Some data have been obtained from Thai Union on prices of by-products sold in cans (red meat in brine) and exported to the USA for use in pet food (US\$ 2,600/tonne).¹⁵ Given that red meat as a proportion of whole tuna weight may be around 10% (our estimate), a sales value of US\$ 260/tonne of product caught for pet food is used in the analysis.

The fact that the assumed sales values of tuna used for fish meal (US\$250/tonne) and pet-food (US\$ 260/tonne) are so similar, means that the analysis is not sensitive to the assumption made about the volume of processing waste being sold for fish meal (or for pet food).

Final prices selected for use in the analysis of values of sales of canned tuna processing by-products, and assumptions about the volumes involved

Given the above discussion, for the Phase 2 analysis it is assumed that of the global landed catch destined for canning, 40% of the weight of catch is canned for human consumption, 20% is waste, and 40% is marketed as by-products of the canning process. Of the 40% of whole weight that is marketed as processing byproducts, it is assumed for the analysis based on the consultations with canneries that 90% is sold as fish meal and 10% as pet food (but given the small price difference between the fish meal prices assumed [US\$250/tonne] and the pet food prices assumed [US\$ 260/tonne] this % is not critical for the estimation of the sales values of by-products).

Given these data on the proportions of byproducts that are sold for fish meal and pet food, and the prices stated above, a weighted price of US\$ 251 is applied to the 40% of the whole round weight of fish that is estimated to be sold into the fish meal and pet food value chains (see Table 6).

¹³ Pers. Comm., October 2015, FACCO (association of pet food manufacturers in France; <http://www.facco.fr/>).

¹⁴ <http://www.thaifeedmill.com/tabid/78/Default.aspx>.

¹⁵ French pet food manufacturers were approached however they do not have a mandate to collect price information on behalf of their members and, then, were reluctant or unable to provide price data on the costs of tuna inputs to pet food.

Estimate of the global sales values from tuna fisheries - Phase 2 report

Table 6: Volumes (in tonnes), whole round equivalent prices (US\$/tonne) for sales of by-products from tuna canning as fish meal and pet food, and resulting sales values of by-products (US\$)

	volume	unit value	sales value
Total catch for canning	3,502,466		
Total catch canned	1,400,986		
Unsold waste	700,493		
Marketed by-products of canning	1,400,986		
<i>Fish meal sales</i>	<i>1,260,888</i>	\$ 250	\$ 315,221,945
<i>Pet food sales</i>	<i>140,099</i>	\$ 260	\$ 36,425,647
Total			\$ 351,647,591
weighted price of by-products		\$ 251	

Source: Poseidon analysis

3 PHASE 2 RESULTS AND DISCUSSION

Phase 2 of this study has used the prices assumed for the different market segments as discussed above, and applied them to the 2012 catch data collected and presented during Phase 1 of this study.

The resulting analysis showing the assumed final values per tonne (by species and market segment), and the resulting sales values by species, gear types, ocean area and market segment are provided in Table 21 and Table 22 in Appendix 1.

The analysis is summarised in the table below, which estimates a **final global value of sales of tuna products of US\$ 33.36 billion in 2012**. This value is based on the methodology described earlier whereby only the value of tuna in the can is included, rather than the full retail price of canned tuna i.e. the price of the tuna, the can, and the liquid contents.

Using the drained weight value of canned tuna, has a very important impact on the final global sales value estimated given the importance of canned tuna in total global sales. Using the total canned sales price in the analysis rather than the value of the drained tuna (i.e. without reducing prices by 68%) results in an increase in the global estimate of canned tuna of US\$ 8.27 billion, and a **final global value of sales of tuna products of US\$ 41.63 billion in 2012** (see Table 23 in Appendix 1). The rest of this section of the Phase 2 report provides some observations and conclusions based on the lower and more conservative estimate of US\$ 33.36 billion.

Table 7: Global sales value of tuna in 2012 by species, market segment, ocean area, and fishing gear (US\$)

Species	US\$	% of species total	Market segment	US\$	% by market segment
ALB	\$ 1,826,487,972	5.5%	Canning	\$ 17,574,003,397	52.7%
BET	\$ 5,946,861,172	17.8%	fish meal/pet food	\$ 263,586,449	0.8%
BFT	\$ 873,600,924	2.6%	Domestic	\$ 1,756,022,309	5.3%
PBF	\$ 903,627,794	2.7%	Fresh sashimi	\$ 4,686,386,077	14.0%
SBF	\$ 491,301,000	1.5%	Frozen sashimi	\$ 9,084,529,608	27.2%
SKJ	\$10,674,453,267	32.0%			
YFT	\$12,648,195,712	37.9%			
Total	\$33,364,527,841		Total	\$ 33,364,527,841	
Ocean Area	US\$	% by ocean	Gear	US\$	% by gear
WCPO	\$17,415,671,287	52.2%	Pole and line	\$ 2,016,194,730	6.0%
EPO	\$ 4,279,997,819	12.8%	Gillnet	\$ 875,312,321	2.6%
WIO	\$ 5,023,295,234	15.1%	Handline	\$ 2,490,363,045	7.5%
EIO	\$ 2,183,794,187	6.5%	Longline	\$ 9,091,631,363	27.2%
EAO	\$ 2,860,327,128	8.6%	Other	\$ 2,222,896,295	6.7%
WAO	\$ 1,110,141,186	3.3%	Purse seine	\$16,230,625,352	48.6%
Antartic	\$ 491,301,000	1.5%	Troll	\$ 437,504,735	1.3%
Total	\$33,364,527,841		Total	\$ 33,364,527,841	

Source: Poseidon analysis Notes: Canned sales values reflect only the value of tuna in cans, not the retail canned price. 'Domestic' sales are typically fresh, smoked, dried tuna in the same country from which vessels are based (and excludes product for canning or sashimi markets).

Some observations and comments on the results are:

- As with the ex-vessel value estimated during Phase 1 of this study, the estimation of the final global sales value of tuna is underpinned by many assumptions and data limitations which could impact on the validity of the final estimate. This report has attempted to be as

Estimate of the global sales values from tuna fisheries - Phase 2 report

transparent as possible with regards to these assumptions and to the workings used to arrive at the estimate provided.

- Wherever possible a conservative approach has also been taken to the assumptions made so that if the final estimate generated is more likely to be an under-estimate than an over-estimate;
- The estimated global sales value of tuna of US\$33.36 billion for 2012 (when using the value of tuna in cans not the retail value of cans) compares with the figure of US\$ 12.2 billion for 2012 calculated for the ex-vessel value of tuna catches made during Phase 1 of the study i.e. final sales values are 2.73 times the ex-vessel values. This cross-references well with known and often-stated multipliers between the catching sector and upstream and downstream activity of around 1:3;
- By species, final sales values are dominated by two species, skipjack (32% of total global sales values) and yellowfin (38% of total global sales values);
- Tuna catches from one ocean area, the WCPO, account for more than half of the global sales value of tuna resulting in sales of US\$17.5 billion a year;
- Likewise, one gear type, purse seine fishing, accounts for almost 50% of the global sales value of tuna (valued at almost US\$ 16.2 billion), but longline fishing is also important contributing 27% (and over US\$ 9 billion) of global sales values. Other gear types are less important and individually each contribute less than 8% of the total sales value; and
- Canned tuna accounts for 53% of global sales values with a sales value of just over US\$17.5 billion a year, while fresh and frozen sashimi tuna products combined represented sales of 41% of global sales values (at just under US\$ 14 billion).

REFERENCES

FAO, 2008. Tuna Longline sector development in Sri Lanka – Technical Cooperation Project support to the planning and implementation of strategies for components and key activities under the Ten Year Development Policy Framework of the MFAR Fisheries and Aquatic Resources Sector Plan

FAO, 2012. Tuna Commodity update. Globefish: Rome. 68 p.

Hamilton, A., Lewis, A., McCoy, M.A., Havice, E., Campling, L., 2011. Market and Industry Dynamics in the Global Tuna Supply Chain. Pacific Islands Forum Fisheries Agency, Honiara.

IATTC, 2007. International Dolphin Conservation Program Permanent Working Group On Tuna Tracking 23rd Meeting Cancun, (Mexico) 18 June 2007. Document Tt-23-04 Matters Related To The Tuna Tracking And Dolphin-Safe Certification Programs

Jimenez-Toribio Ramon, Guillotreau Patrice, Mongrue Remi, 2010. Global integration of European tuna markets. Progress In Oceanography, 86(1-2), 166-175

Maldives Fisheries Management Agency, 2013. Basic Fisheries Statistics booklet

Sri Lanka Ministry of Fisheries, 2014. Annual Fisheries Statistics bulletin

Sun, C-H., 2010. Global tuna demand and fisheries dynamics in the EPO. Workshop report

Sun, C.H.J. and W.H. Hsu. 1998. Analysis of the price cointegration across different countries for the frozen tuna sashimi market in Japan, Selected Paper of the Ninth International Conference of the International Institute of Fisheries Economics and Trade, Tromsø, Norway.

Note: other references related to data sources are provided underneath the data tables themselves in Appendix 1

Appendix 1: Additional data tables

Table 8: Indexed Average Monthly Selling Prices In French Metropolis – Canned Tuna In Water (160 G)

		Indexed prices
Year	Month	
2015	6	2
2015	5	2.01
2015	4	2.01
2015	3	2.01
2015	2	2
2015	1	2
2014	12	2.01
2014	11	2.01
2014	10	2.02
2014	9	2.01
2014	8	2.02
2014	7	2.03
2014	6	2.02
2014	5	2.02
2014	4	2.01
2014	3	2.02
2014	2	2.02
2014	1	2.02
2013	12	2.03
2013	11	2.05
2013	10	2.05
2013	9	2.04
2013	8	2.04
2013	7	2.04
2013	6	2.04
2013	5	2.06
2013	4	2.05
2013	3	2.03
2013	2	2.03
2013	1	2.04
2012	12	2.02
2012	11	2
2012	10	1.98
2012	9	1.96
2012	8	1.96
2012	7	1.96
2012	6	1.96
2012	5	1.96
2012	4	1.94
2012	3	1.95
2012	2	1.95
2012	1	1.95

Source: French statistical agency (INSEE)

Estimate of the global sales values from tuna fisheries - Phase 2 report

Table 9: 2012 – 2014 variations in French canned tuna prices

Preserved canned tuna products	2012	2014	Variation 2012/2014
tuna in water	9.50 €	8.18 €	-14%
tuna in oil	12.30 €	11.90 €	-3%
tuna crumbs/flakes	6.60 €	6.85 €	4%
tuna in sauce	7.30 €	7.75 €	6%
other tuna preparations	6.10 €	6.98 €	14%
Average	8.36 €	8.33 €	-0.3%

Source: French Kantar Worldpanel. In nominal terms

Table 10: Average FOB canned tuna prices from Thailand, June 2012 and June 2014

		UK	Germany	France	Italy	USA	UAE ('Dubai')	Australia	South Africa	Nigeria
June 2014	Volume (kg)	555,385	419,103	540,249	199,913	7,915,980	700,954	2,297,338	1,115,864	888
	FOB Value (THB)	79,180,702	60,747,896	87,168,588	31,265,710	1,001,843,260	91,182,785	360,579,775	113,300,255	133,867
	FOB Value (USD)	2,438,766	1,871,035	2,684,793	962,984	30,856,772	2,808,430	11,105,857	3,489,648	4,123
	FOB Price USD/kg	4.39	4.46	4.97	4.82	3.90	4.01	4.83	3.13	4.64
	Average all countries	4.35								
	Price compared to average	101%	103%	114%	111%	90%	92%	111%	72%	107%
June 2012	Volume (kg)	263,315	133,192	198,294	242,720	6,849,729	672,263.00	2,527,843.00	1,468,794.00	
	FOB Value (THB)	46,715,498	21,333,198	31,884,485	50,026,140	1,136,356,610	93,583,855	444,018,201	203,083,954	
	FOB Value (USD)	1,480,881	676,262	1,010,738	1,585,829	36,022,505	2,966,608	14,075,377	6,437,761	
	FOB Price USD/kg	5.62	5.08	5.10	6.53	5.26	4.41	5.57	4.38	
	Average all countries	5.24								
	Price compared to average	107%	97%	97%	125%	100%	84%	106%	84%	

Source: Thai customs - <http://www.customs.go.th>, extracted in August 2015. Notes: (1) prices for HS customs code 1604.1411.000 / canned tunas ('Prepared or preserved tunas and skipjack in vegetable oil or other'. (2) prices in THB (thai Baht) converted to US\$ using mid-year exchange rates www.oanda.com. (3) values in nominal terms

Estimate of the global sales values from tuna fisheries - Phase 2 report

Table 11: Retail prices of yellowfin tuna for sashimi in Osaka, 2010-2014 (US\$/tonne)

	2010	2011	2012	2013	2014
January	\$ 41,471	\$ 40,959	\$ 42,462	\$ 34,680	\$ 37,125
February	\$ 36,838	\$ 38,499	\$ 42,084	\$ 33,558	\$ 36,432
March	\$ 38,081	\$ 40,467	\$ 43,974	\$ 31,824	\$ 34,056
April	\$ 38,872	\$ 41,574	\$ 42,966	\$ 32,334	\$ 35,145
May	\$ 37,968	\$ 41,820	\$ 43,092	\$ 33,558	\$ 35,739
June	\$ 40,341	\$ 37,515	\$ 38,178	\$ 32,436	\$ 35,244
July	\$ 42,488	\$ 40,467	\$ 38,304	\$ 31,518	\$ 34,749
August	\$ 38,307	\$ 41,328	\$ 40,446	\$ 31,518	\$ 34,155
September	\$ 37,855	\$ 41,697	\$ 40,950	\$ 31,926	\$ 36,432
October	\$ 38,194	\$ 42,189	\$ 42,714	\$ 33,558	\$ 37,422
November	\$ 37,629	\$ 43,911	\$ 41,454	\$ 34,782	\$ 36,135
December	\$ 36,160	\$ 42,927	\$ 44,856	\$ 35,496	\$ -
average	\$ 38,684	\$ 41,113	\$ 41,790	\$ 33,099	\$ 32,720
av. Round weight	\$ 17,408	\$ 18,501	\$ 18,806	\$ 14,895	\$ 14,724

Source: Statistics of Ministry of Internal Affairs and Communications. JAFIC, <http://osakana-hiroba.jafic.jp/index.html>. Notes: (1) recorded retail prices converted to whole round weight on basis that 45% of round weight is marketed; (2) prices in Yen converted to US\$ using mid-year exchange rates from www.oanda.com; (3) the average price of yellowfin tuna sold in Europe based on a small number of 6 records from online retailer sales in June/July 2015 was \$29,185/tonne, which while not statistically very reliable, suggests that there may be only small differences between retail prices in Japan and other markets (i.e. \$29,185/tonne for 2015 compares with \$32,720 for 2014 in the table above); (4) prices in nominal terms

Table 12: Retail prices of bigeye tuna for sashimi in Tokyo, 2010-2014 (US\$/tonne)

	2010	2011	2012	2013	2014
January	\$ 45,539	\$ 49,077	\$ 50,652	\$ 39,678	\$ 37,125
February	\$ 43,618	\$ 49,077	\$ 48,762	\$ 38,454	\$ 37,125
March	\$ 43,844	\$ 48,708	\$ 49,392	\$ 37,230	\$ 37,323
April	\$ 44,748	\$ 50,922	\$ 49,896	\$ 36,924	\$ 37,917
May	\$ 43,957	\$ 49,692	\$ 49,518	\$ 36,312	\$ 38,808
June	\$ 45,087	\$ 48,708	\$ 48,888	\$ 35,904	\$ 38,016
July	\$ 44,296	\$ 49,692	\$ 49,896	\$ 37,026	\$ 37,323
August	\$ 44,070	\$ 48,216	\$ 49,140	\$ 35,904	\$ 38,610
September	\$ 43,505	\$ 47,970	\$ 49,896	\$ 36,720	\$ 39,897
October	\$ 44,183	\$ 49,077	\$ 48,132	\$ 35,904	\$ 40,689
November	\$ 44,296	\$ 47,970	\$ 48,006	\$ 37,434	\$ 40,194
December	\$ 44,522	\$ 48,462	\$ 46,872	\$ 38,862	\$ 41,976
average	\$ 44,305	\$ 48,964	\$ 49,088	\$ 37,196	\$ 38,750
av. Round weight	\$ 19,937	\$ 22,034	\$ 22,089	\$ 16,738	\$ 17,438

Source: Statistics of Ministry of Internal Affairs and Communications. JAFIC, <http://osakana-hiroba.jafic.jp/index.html>. Notes: (1) recorded retail prices converted to whole round weight on basis that 45% of round weight is marketed; (2) prices in Yen converted to US\$ using mid-year exchange rates www.oanda.com; (3) prices in nominal terms.

Estimate of the global sales values from tuna fisheries - Phase 2 report

Table 13: Average retail price in Tokyo, Sapporo and Osaka of Bluefin tuna for sashimi, 2014

Yen/100gr	\$/100gr	\$/tonne	\$/tonne landed weight
1,047	\$ 10.37	\$ 103,702	\$ 46,666

Source: Japan Fisheries Information Center, Osakana Hiroba, <http://osakana-hiroba.jafic.jp/index.html>. Notes: (1) price based on average of 158 individual sales records over 2014 from Tokyo, Sapporo and Osaka; (2) recorded retail prices converted to whole round weight on basis that 45% of round weight is marketed; (3) prices in Yen converted to US\$ using mid-year exchange rates www.oanda.com.

Table 14: Frozen tuna on Tsukiji market, 2012-2014 (US\$)

\$/kg of frozen tuna on Tsukiji market	2012	2013	2014
bluefin	\$ 48.74	\$ 37.45	\$ 37.88
yellowfin tuna	\$ 12.04	\$ 8.69	\$ 9.37
bigeye tuna	\$ 12.33	\$ 9.54	\$ 9.94
albacore tuna	\$ 11.36	\$ 9.56	\$ 9.93
southern bluefin tuna	\$ 30.91	\$ 21.45	\$ 21.13
\$/tonne whole round weight equivalent	2012	2013	2014
bluefin	\$ 42,383	\$ 32,562	\$ 32,940
yellowfin tuna	\$ 10,469	\$ 7,555	\$ 8,145
bigeye tuna	\$ 10,726	\$ 8,295	\$ 8,642
albacore tuna	\$ 9,880	\$ 8,310	\$ 8,637
southern bluefin tuna	\$ 26,881	\$ 18,650	\$ 18,378

Source: Tokyo Metropolitan Central Wholesale Market, "Shijyo tokei jyoho (Information of market statistics)," <http://www.shijou-tokei.metro.tokyo.jp/index.html>. Notes: (1) prices on market converted to whole landed weight assuming landed weight 1.15 x marketed weight; (2) prices in Yen converted to US\$ using mid-year exchange rates www.oanda.com; (3) bluefin tuna data likely to include Atlantic and Pacific species, although not distinguished in the trade/price data; (4) prices in nominal terms.

Estimate of the global sales values from tuna fisheries - Phase 2 report

Table 15: Fresh tuna on Tsukiji market, 2012-2014 (US\$)

	2012		2013		2014	
	\$/kg	Weight (kg)	\$/kg	Weight (kg)	\$/kg	Weight (kg)
bluefin domestic	\$ 44.78	2,666,516	\$ 36.37	2,921,814	\$ 33.28	3,757,664
bluefin imported	\$ 43.61	792,276	\$ 28.37	1,240,451	\$ 28.24	1,041,605
bluefin juvenile	\$ 14.57	1,296,770	\$ 13.62	779,079	\$ 12.69	1,576,776
bluefin weighted/total	\$ 35.34	4,755,562	\$ 28.97	4,941,344	\$ 25.43	6,376,045
yellowfin domestic	\$ 12.64	1,604,173	\$ 11.17	1,202,625	\$ 10.72	781,372
yellowfin imported	\$ 14.71	68,197	\$ 11.46	20,208	\$ 17.43	13,127
yellowfin juvenile	\$ 6.40	245,104	\$ 5.74	93,897	\$ 6.14	112,098
yellowfin weighted/total	\$ 10.12	1,917,474	\$ 8.96	1,316,730	\$ 9.11	906,597
bigeye domestic	\$ 22.28	1,382,900	\$ 15.85	1,090,778	\$ 19.33	844,462
bigeye imported	\$ 17.39	1,151,203	\$ 14.98	688,937	\$ 15.66	528,174
bigeye juvenile	\$ 11.75	409,538	\$ 10.63	487,267	\$ 10.54	627,650
bigeye weighted/total	\$ 18.00	2,943,641	\$ 14.23	2,266,982	\$ 14.86	2,000,286
albacore	\$ 7.51	1,207,383	\$ 6.30	818,061	\$ 7.33	627,650
southern bluefin domestic	\$ 38.06	2,140	\$ 26.60	79	\$ 13.54	313
southern bluefin imported	\$ 31.64	427,258	\$ 22.42	525,612	\$ 22.66	430,949
SBT weighted/total	\$ 32.23	429,398	\$ 22.42	525,691	\$ 22.66	431,262

Source: source: Poseidon analysis based on data from Tokyo Metropolitan Central Wholesale Market, "Shijyo tokei jyoho (Information of market statistics)," <http://www.shijou-tokei.metro.tokyo.jp/index.html>. Notes: (1) bluefin tuna data likely to include Atlantic and Pacific species, although not distinguished in the trade/price data; (2) prices in nominal terms.

Table 16: US\$/tonne whole round weight equivalent for fresh tuna on Tsukiji market, 2012-2014 (US\$)

\$/tonne whole round weight equivalent	2012	2013	2014
bluefin	\$ 30,727	\$ 25,189	\$ 22,113
yellowfin	\$ 8,804	\$ 7,791	\$ 7,918
bigeye	\$ 15,655	\$ 12,371	\$ 12,921
albacore	\$ 6,526	\$ 5,476	\$ 7,918
southern bluefin	\$ 28,024	\$ 19,500	\$ 19,703

Source: source: Poseidon analysis based on data from Tokyo Metropolitan Central Wholesale Market, "Shijyo tokei jyoho (Information of market statistics)," <http://www.shijou-tokei.metro.tokyo.jp/index.html>. Notes: (1) prices on market converted to whole landed weight assuming landed weight 1.15 x marketed weight; (2) prices in Yen converted to US\$ using mid-year exchange rates www.oanda.com; (3) bluefin tuna data likely to include Atlantic and Pacific species, although not distinguished in the trade/price data; (4) prices in nominal terms.

Estimate of the global sales values from tuna fisheries - Phase 2 report

Table 17: Analysis of differences between retail prices and wholesale Tsukiji prices

Tsukiji fresh prices	2012	2013	2014
bluefin	\$ 30,727	\$ 25,189	\$ 22,113
yellowfin	\$ 8,804	\$ 7,791	\$ 7,918
bigeye	\$ 15,655	\$ 12,371	\$ 12,921
albacore	\$ 6,526	\$ 5,476	\$ 7,918
southern bluefin	\$ 28,024	\$ 19,500	\$ 19,703
Tsukiji frozen prices	2012	2013	2014
bluefin	\$ 42,383	\$ 32,562	\$ 32,940
yellowfin	\$ 10,469	\$ 7,555	\$ 8,145
bigeye	\$ 10,726	\$ 8,295	\$ 8,642
albacore	\$ 9,880	\$ 8,310	\$ 8,637
southern bluefin	\$ 26,881	\$ 18,650	\$ 18,378
Retail prices (Tokoyo, Osaka, Sapparo)	2012	2013	2014
yellowfin	\$ 18,806	n/a	\$ 14,724
bigeye	\$ 22,089	n/a	\$ 17,438
bluefin	n/a	n/a	\$ 46,666
Ratio retail price to fresh Tsukiji price	2012	2013	2014
yellowfin	2.14	n/a	1.86
bigeye	1.41	n/a	1.35
bluefin	n/a	n/a	2.11
average	1.77	n/a	1.77

Source: Poseidon analysis based on other data tables provided in this Appendix. Prices in nominal terms.

Table 18: wholesale and retail market prices for tuna, Sri Lanka, 2012-2013(US\$)

retail market price	2012	2013
skipjack	\$ 3,360	\$ 4,180
yellowfin	\$ 5,424	\$ 5,670
wholesale market price	2012	2013
skipjack	\$ 1,991	\$ 2,067
yellowfin	\$ 2,960	\$ 3,093
retail vs wholesale difference	2012	2013
skipjack	169%	202%
yellowfin	183%	183%
average difference	184%	

Source: Sri Lanka Ministry of Fisheries, 2014. <http://www.fisheries.gov.lk/elfinder-2.0-rc1/files/stat/Fisheries%20Statistics/Tables.pdf>. Note: Sri Lankan Rupees converted to US\$ using www.oanda.com. Prices in nominal terms.

Estimate of the global sales values from tuna fisheries - Phase 2 report

Table 19: Sales prices of traders at Indonesian ports, 2014

Species / Price	IDR/kg	\$/tonne
Albacore	29,816	\$ 2,982
Skipjack	35,422	\$ 3,542
Yellowfin	60,329	\$ 6,033
Bigeye	40,915	\$ 4,091

Source: Ministry of Maritime Affairs and Fisheries

Table 20: Fish Meal prices in Thai Baht/kg, 1998 to 2015

Month	Jan	Feb	Mar	Apr	May	June	Jul	Aug	Setp	Oct	Nov	Dec	Average	Lowest	Highest
1998	25.83	25.83	20.52	17.97	19.30	20.44	21.71	22.42	21.70	24.91	25.36	23.70	22.47	17.97	25.83
1999	19.02	16.48	18.22	17.30	18.45	18.15	18.55	21.07	20.93	17.13	16.50	16.60	18.20	16.48	21.07
2000	15.71	14.27	14.81	15.89	16.75	18.52	17.09	16.81	18.79	16.37	16.70	17.33	16.59	14.27	18.79
2001	18.76	19.60	19.60	19.79	20.40	22.69	24.02	21.15	20.23	18.64	17.60	17.95	20.04	17.60	24.02
2002	20.50	22.48	22.51	21.61	20.13	19.83	19.73	20.52	21.86	18.87	18.02	17.50	20.30	17.50	22.51
2003	17.54	20.13	19.90	19.90	19.80	20.63	19.68	20.96	20.33	19.73	21.43	20.52	20.05	17.54	21.43
2004	19.90	17.62	21.61	23.46	23.73	24.93	25.34	25.75	26.07	22.22	21.43	22.55	22.88	17.62	26.07
2005	22.03	20.40	21.09	23.06	21.50	21.32	21.80	21.28	22.18	21.60	21.80	23.08	21.76	20.40	23.08
2006	23.43	25.05	27.76	28.17	30.79	29.58	31.23	31.18	27.39	25.10	22.59	21.92	27.02	21.92	31.23
2007	21.64	23.40	22.47	24.11	23.99	21.86	23.18	23.25	23.95	23.91	24.08	25.62	23.45	21.64	25.62
2008	26.10	27.04	29.27	29.60	29.36	30.79	33.65	35.66	34.19	30.93	25.11	26.03	29.81	25.11	35.66
2009	29.61	26.84	25.69	29.08	33.5	34.19	34.58	36.04	34.58	33.29	29.96	31.80	31.58	25.69	36.04
2010	33.40	34.20	35.28	36.53	31.53	28.31	28.92	30.82	29.78	27.78	25.28	25.57	30.62	25.28	36.53
2011	25.00	28.91	37.98	31.77	32.09	31.29	32.32	32.58	31.42	28.86	28.46	27.50	30.68	25.00	37.98
2012	27.64	28.81	32.21	33.24	30.26	29.38	34.70	37.70	35.06	30.95	32.83	33.80	32.22	27.64	37.70
2013	32.49	31.30	31.30	29.94	26.74	24.80	29.84	30.78	29.00	31.90	26.59	24.72	29.12	24.72	32.49
2014	26.20	30.92	31.12	33.93	30.24	29.74	31.50	37.70	37.70	36.47	34.78	35.45	32.98	26.20	37.70
2015	37.14	39.83	42.26	42.74	37.58	36.70	36.85	36.70					38.73	36.70	42.74

Source: <http://www.thaifeedmill.com/tabid/78/Default.aspx>. Note : US\$ 1 = Baht 35 (October 2015). Prices in nominal terms.

Estimate of the global sales values from tuna fisheries - Phase 2 report

Table 21: Final sales prices (US\$/tonne) used in the Phase 2 analysis

Final consumed prices in \$	BB/P&L						GN						HL						LL						Other						PS						TR														
	ALB	BET	BFT	PBF	SBF	SKU	YFT	ALB	BET	BFT	PBF	SBF	SKU	YFT	ALB	BET	BFT	PBF	SBF	SKU	YFT	ALB	BET	BFT	PBF	SBF	SKU	YFT	ALB	BET	BFT	PBF	SBF	SKU	YFT	ALB	BET	BFT	PBF	SBF	SKU	YFT	ALB	BET	BFT	PBF	SBF	SKU	YFT		
WCPO																																																			
For loining/canning	6,227	5,502			4,305	6,750	6,227	5,502			4,305	6,750							6,227					4,305			6,227						5,502			4,305	6,750	6,227						4,305							
Canning byproducts	251	251			251	251	251	251			251	251							251					251			251						251			251	251	251						251							
For domestic (fresh or processing)	3,000	4,000			3,500	5,500	3,000	4,000			3,500	5,500	3,000											3,500									3,500											3,500							
For fresh sashimi			53,773												22,089																53,773											22,089								18,806	
For frozen sashimi														18,321	17,290	17,290		74,169											18,321			17,290											17,290								18,321
For ranching																																											53,773								
EPO																																																			
For loining/canning					4,305	6,750									6,227	5,502						6,750	6,227								4,305	6,750	5,502						4,305	6,750	6,227						4,305				
Canning byproducts					251	251									251	251						251	251								251	251	251								251	251	251						251		
For domestic (fresh or processing)					3,500	5,500									3,000							3,500	5,500								3,500	5,500									3,000										
For fresh sashimi															22,089																	53,773											18,806								
For frozen sashimi														17,290															17,290			74,169											74,169								
For ranching																																											74,169								
WIO																																																			
For loining/canning		5,502			4,305	6,750	5,502				4,305	6,750			6,227	5,502						4,305	6,750	6,227	5,502					4,305	6,750	6,227	5,502						4,305	6,750											
Canning byproducts		251			251	251	251	251			251	251			251	251						251	251	251	251					251	251	251	251						251	251											
For domestic (fresh or processing)		4,000			3,500	5,500	4,000				3,500	5,500	3,000									3,000	4,000						3,000	4,000									3,000	4,000											
For fresh sashimi														11,421	22,089																													11,421	18,806						
For frozen sashimi														17,290	17,290														17,290	18,321	17,290	17,290									18,321										
EIO																																																			
For loining/canning					4,305	6,750	6,227	5,502			4,305	6,750			6,227							4,305				5,502			4,305	6,750	6,227	5,502						4,305	6,750												
Canning byproducts					251	251	251	251			251	251			251							251				251			251	251	251	251						251	251												
For domestic (fresh or processing)					3,500	5,500	3,000	4,000			3,500	5,500	3,000									3,500				3,000			3,500	5,500									3,000	4,000											
For fresh sashimi															18,806														18,806			22,089											18,806								
For frozen sashimi														18,321															17,290			18,321											18,321								
EAO																																																			
For loining/canning	6,227	5,502			4,305	6,750					4,305				6,227							4,305				5,502			4,305	6,750	6,227	5,502						4,305	6,750												
Canning byproducts	251	251			251	251					251				251							251				251			251	251	251	251						251	251												
For domestic (fresh or processing)											3,704	3,000	4,000	4,010		5,500						3,876				3,000			3,500							3,000															
For fresh sashimi			53,773												53,773														53,773														53,773								
For frozen sashimi			74,169												74,169														17,290	74,169			18,321											74,169							
For ranching																																											74,169								
WAO																																																			
For loining/canning	6,227	5,502			4,305	6,750									6,227							4,305				5,502			4,305	6,750	6,227	5,502						4,305	6,750												
Canning byproducts	251	251			251	251									251							251				251			251	251	251	251						251	251												
For domestic (fresh or processing)	6,904	4,000			3,500	5,500					3,500	3,704	4,000		3,500							6,904	4,000			3,500			3,500	5,500									3,500												
For fresh sashimi															53,773														53,773														53,773								
For frozen sashimi															17,290	74,169													18,321			17,290											74,169								
For ranching																																											74,169								
Antarctic																																																			
For ranching																																												49,042							
For frozen sashimi																													47,042																						

Source: Poseidon analysis

Estimate of the global sales values from tuna fisheries - Phase 2 report

Table 22: Final sales revenues (US\$) estimated during the Phase 2 analysis for 2012

Total final sales values in \$	BB/P&L							GN							HL						
	ALB	BET	BFT	PBF	SBF	SKJ	YFT	ALB	BET	BFT	PBF	SBF	SKJ	YFT	ALB	BET	BFT	PBF	SBF	SKJ	YFT
WCPO																					
For loining/canning	144,675,861	14,878,926				504,817,412	160,891,431	143,158	1,775,806				80,294,375	6,147,855							
Canning byproducts	1,780,702	207,256				8,987,213	1,826,770	1,762	24,736				1,429,473	69,803							
For domestic (fresh or processing)	30,404,700	4,718,400				179,028,150	57,184,050	7,800	146,000				7,382,550	566,500	1,134,000						38,678,500
For fresh sashimi					6,076,343											67,085,432					
For frozen sashimi																					687,006,951
For ranching																					
EPO																					
For loining/canning						1,281,583	2,739,012														
Canning byproducts						22,816	31,099														
For domestic (fresh or processing)																					
For fresh sashimi																					
For frozen sashimi																					
For ranching																					
WIO																					
For loining/canning		967,638				64,897,609	22,986,480		6,448,039				102,533,443	257,581,212							
Canning byproducts		13,479				1,155,366	260,990		89,818				1,825,392	2,924,592							
For domestic (fresh or processing)		2,148,000				161,106,750	57,189,000		1,192,800				21,211,400	53,403,900							
For fresh sashimi															2,145,384	1,295,542				23,851,617	1,171,788,570
For frozen sashimi															573,166	178,952				6,372,258	201,455,046
For ranching																					
EIO																					
For loining/canning						4,663,187	2,713,811	34,872	441,384				13,198,195	4,673,232							
Canning byproducts						83,018	30,813	429	6,148				234,966	53,060							
For domestic (fresh or processing)						21,866,250	12,753,400	324,900	6,205,400				207,506,600	73,635,925	1,020,000						17,020,500
For fresh sashimi																					45,426,566
For frozen sashimi																					103,262,646
For ranching																					
EAO																					
For loining/canning	89,063,865	51,576,744				190,697,925	43,300,267						20,919,841								4,153,515
Canning byproducts	1,096,217	718,437				3,394,976	491,634						372,434								73,945
For domestic (fresh or processing)														2,237,324	51,000	1,068,000	0				7,353,500
For fresh sashimi						11,372,979														7,702,975	
For frozen sashimi						5,228,949														3,541,593	
For ranching																					
WAO																					
For loining/canning	5,631,800	2,439,368				123,329,567	6,980,833														
Canning byproducts	69,317	33,979				2,195,624	79,261														
For domestic (fresh or processing)	334,499	95,000				5,371,275	304,700						182,000	85,196	1,396,000						1,095,500
For fresh sashimi																				51,138,075	44,493,813
For frozen sashimi																					
For ranching																					
Antarctic																					
For ranching																					
For frozen sashimi																					

Continued overleaf

Estimate of the global sales values from tuna fisheries - Phase 2 report

Total final sales values in \$	LL							Other							PS							TR										
	ALB	BET	BFT	PBF	SBF	SKU	YFT	ALB	BET	BFT	PBF	SBF	SKU	YFT	ALB	BET	BFT	PBF	SBF	SKU	YFT	ALB	BET	BFT	PBF	SBF	SKU	YFT				
WCO																																
For loining/canning	491,494,514					8,345,096		2,600,092								309,397,757					5,888,833,649	2,637,794,707						21,871,364			18,460,300	
Canning byproducts	6,049,421					148,567		32,003								4,309,750					104,838,308	29,949,671			269,198				328,647			
For domestic (fresh or processing)													429,201,500																	6,546,750		
For fresh sashimi		877,169,081						748,759,788		193,547,104		145,993,558									208,800,363						3,015,200			36,999,821		
For frozen sashimi	347,260,804	686,588,921			15,575,593			729,455,953						1,138,208,508													2,360,095				36,045,926	
For ranching																													30,650,581			
EPO																																
For loining/canning	137,804,887	34,296,562						13,421,823	3,444,357				439,460	1,750,846		409,386,690					1,084,921,719	1,313,246,897					91,588,095					
Canning byproducts	1,696,133	477,733						152,392	42,394				7,824	19,879		5,702,544					19,314,751	14,910,680					1,127,286					
For domestic (fresh or processing)									1,689,000				3,272,850	1,452,000															4,990,200			
For fresh sashimi		210,215,746						57,087,856				2,043,372																				
For frozen sashimi		274,237,897						92,693,450													321,417,190											
For ranching																																
WIO																																
For loining/canning	46,368,515	0				6,564,414							169,186	530,559	7,934,870	92,282,423					348,590,698	863,989,217										
Canning byproducts	570,714	0				116,866							3,012	6,024	97,664	1,285,446					6,205,925	9,809,783										
For domestic (fresh or processing)																												24,000	592,000		37,072,000	47,784,000
For fresh sashimi																																
For frozen sashimi	32,761,236	927,647,162						427,293,078																								
BIO																																
For loining/canning	131,283,244								636,258				10,603,728			26,910,076					122,139,555	29,790,902		2,978,788	3,274,293				37,111,358	17,106,557		
Canning byproducts	1,615,863								7,831				188,777			374,843					2,174,438	338,248		36,664	45,609				660,690	194,229		
For domestic (fresh or processing)						23,404,500	163,515,000	312,000					8,774,500																162,300	269,200	3,412,150	1,576,300
For fresh sashimi		370,129,568					326,134,384			16,920,461					9,224,098																	
For frozen sashimi		289,712,515					45,389,470			13,244,198					8,986,291																	
EAO																																
For loining/canning	15,117,242					1,467,688							617,529		1,621,234	115,592,236					644,869,105	447,089,019		18,228,176								
Canning byproducts	186,066					26,129							10,994		19,955	1,610,140					11,480,539	5,076,274		224,356								
For domestic (fresh or processing)				664,734					9,906,000																				8,938,500			
For fresh sashimi				27,666,183																												
For frozen sashimi		290,404,118	76,320,404					98,840,036				187,055,452																				
For ranching																										452,878,901						
WAO																																
For loining/canning	128,750,449														2,037,249	470,305					22,002,631	21,898,833										
Canning byproducts	1,584,689														25,075	6,551					391,711	248,641										
For domestic (fresh or processing)				0				24,605,856	132,000				24,500	1,815,000																476,000		
For fresh sashimi				11,840,803								5,377,295																			3,084,102	
For frozen sashimi		372,704,880	32,664,243					234,596,229																								
For ranching																										148,339						
Antarctic																																
For ranching																											217,942,275					
For frozen sashimi						273,358,725																										

Source: Poseidon analysis

Estimate of the global sales values from tuna fisheries - Phase 2 report

Table 23: Global sales value of tuna in 2012 by species, market destination, ocean area, and fishing gear (US\$), using total price for the retail sales values of canned tuna not just the value of tuna in cans

Species	US\$	% of species total	Market segment	US\$	% by market segment
ALB	\$ 2,458,633,332	5.9%	Canning	\$ 25,844,122,643	62.1%
BET	\$ 6,450,455,640	15.5%	fish meal/pet food	\$ 263,586,449	0.6%
BFT	\$ 873,600,924	2.1%	Domestic	\$ 1,756,022,309	4.2%
PBF	\$ 903,627,794	2.2%	Fresh sashimi	\$ 4,686,386,077	11.3%
SBF	\$ 491,301,000	1.2%	Frozen sashimi	\$ 9,084,529,608	21.8%
SKJ	\$15,053,711,041	36.2%			
YFT	\$15,403,317,356	37.0%			
Total	\$41,634,647,087		Total	\$ 41,634,647,087	
Ocean Area	US\$	% by ocean	Gear	US\$	% by gear
WCPO	\$22,259,164,135	53.5%	Pole and line	\$ 2,693,151,586	6.5%
EPO	\$ 5,736,149,316	13.8%	Gillnet	\$ 1,107,872,985	2.7%
WIO	\$ 5,880,633,730	14.1%	Handline	\$ 2,492,317,640	6.0%
EIO	\$ 2,375,586,864	5.7%	Longline	\$ 9,569,238,156	23.0%
EAO	\$ 3,634,122,133	8.7%	Other	\$ 2,232,680,773	5.4%
WAO	\$ 1,257,689,908	3.0%	Purse seine	\$ 23,002,766,421	55.2%
Antartic	\$ 491,301,000	1.2%	Troll	\$ 536,619,526	1.3%
Total	\$41,634,647,087		Total	\$ 41,634,647,087	

Source: Poseidon analysis