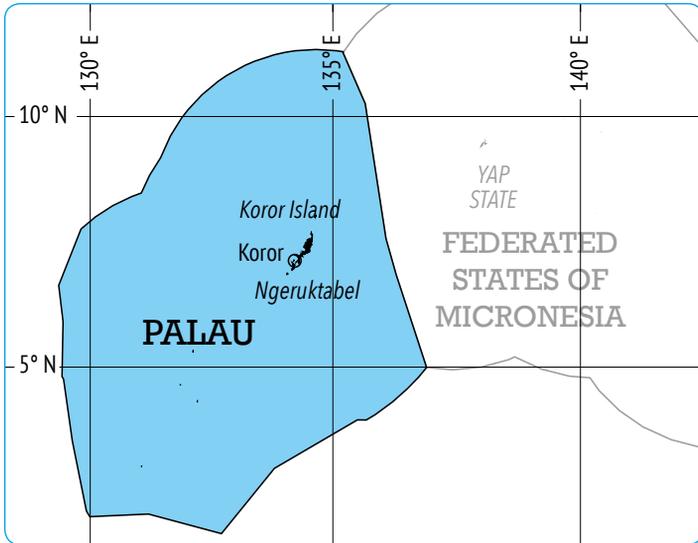


## 13 Palau



### 13.1 Volumes and Values of Fish Harvests in Palau

#### Coastal Commercial Catches in Palau

The major attempts to consolidate information on coastal fisheries production in Palau in recent years include the following:

- Preston (1990) gives the total inshore catch (including subsistence) as 1,700 mt.
- Kitalong and Dalzell (1994) examine several estimates of subsistence production in Palau, concluding: “Given the uncertainty surrounding these production estimates, it is probably most realistic to suggest that the subsistence fishery production for Palau may lie somewhere between 500 and 1,100 mt per year.”

- Dalzell et al. (1996) used the 1992 annual report of the Division of Marine Resources to estimate coastal commercial fisheries production of 736 mt (worth US\$2.4 million), and subsistence production of 750 mt (worth US\$1.8 million).
- PCS (2000) examined all available information on the amount of inshore catch in Palau for the years 1989 to 1998. An estimate of fishery production was made from that information and from individuals familiar with the fishery sector. PCS concluded that the annual average catch in the period 1989 to 1998 was 2,115 mt.
- Gillett and Lightfoot (2001) decided that the above PCS (2000) estimate was the most accurate available, and partitioned that estimate into coastal commercial and subsistence components of 865 mt (worth US\$2,595,000) and 1,250 mt (worth US\$2,500,000), respectively.
- Gillett (2009) considered the above studies, as well as some more recent information: (a) the results of the 2006 household income and expenditure survey, (b) some fisheries-focused surveys, (c) changes in production indicated by the surveys of some of the markets, (d) the views of fisheries specialists with long involvement in Palau fisheries, and (e) factors that may have influenced fishery production levels in recent years. Gillett (2009) concluded that: (1) there is a general consensus on the validity of the PCS survey, and (2) the recent information on coastal fisheries production in Palau is equivocal. He therefore estimated that the volume of coastal commercial production in the mid-2000s remained at 865 mt (with a value of US\$2,843,000 to fishers), and the volume of subsistence coastal production was 1,250 mt (with a value of US\$2,511,000 to fishers).
- Lingard et al. (2011) is a “reconstruction” of Palau’s marine fishery catch for the period 1950–2008. The estimate was made by interpolating between years of known data for human population data and per capita fish consumption rates. The total reconstructed catch for Palau, which includes subsistence, artisanal, locally based tuna fisheries and baitfish, totalled 200,817 mt for the period 1950–2008. On average, subsistence catches represented approximately 60% of the total coastal catches (subsistence and artisanal combined).
- Rhodes et al. (2011) state that: the “locally marketed reef fish catch” in Palau was 214 mt  $\pm$  60 mt per year, based on communication with the staff of the Bureau of Marine Resources (BMR). The report also states:

“Both marketed supplies and exports have held steady, each at 214 mt  $\pm$  60 mt /yr (2001-2009).”

Since the above estimates were put forward there have been a number of changes that could have had major impacts on coastal fisheries production in Palau. Discussions with fishery stakeholders show the following were especially significant:

- Tourism has expanded substantially. Graduate School (2015) indicates that the number of visitors to Palau has increased from 87,141 in 2007 to 125,417 in 2014.
- In the past five years there have been periodic bans on the capture of certain fish species (e.g. groupers). (N. Idechong, per. com. September 2015)
- Because of the Helen Reef Management Project, there is much less fish arriving in Koror from the Southwest Islands. (A. Kitalong, per. com. September 2015)
- Two typhoons were especially destructive: Bopha in December 2012 and Haiyan in November 2013.
- There has been a decrease in the price of fuel since the 2008 peak.
- A number of studies have indicated a general decrease in abundance of the commonly targeted coastal fishery resources: Prince (2013), Gleason et al. (2014) and Moore (2015).
- The last trochus harvest was in 2013, when 350 mt was harvested. (BBP 2014)

A household income and expenditure survey (HIES) was carried out in 2014. That survey was the new “fisheries-useful” type, promoted by SPC and described in the FSM section of this book. The results are still being finalised and are therefore unavailable for this study.

There are a number of anecdotes obtained by the present study during a short visit to Palau in September 2015 that are conceivably applicable to estimating coastal fisheries production in Palau:

- Staff of the Bureau of Marine Resources indicate that current prices paid to fishers range from US\$1.50 to US\$2 per pound, with the average being about US\$1.70 per pound (US\$3.75/kg).

- There appears to be a general feeling among fisheries specialists in Palau that 30% to 50% of Palau's commercial fish catch for consumption goes through the store known as Happy Fish Market. The remainder is sold by roadside vendors or directly to restaurants. Some of the fish sold at the market is for individuals for export purposes.
- The owner of the Happy Fish Market indicates that he has bought about US\$500,000 worth of fish<sup>1</sup> from fishers annually in recent years, with about 20% of his fish purchased from locally based offshore longliners and 10% from trolling by small-scale vessels outside the lagoon. (S. Remoket, per. com. September 2015) There is no independent verification of this information.
- Although there monitoring of fish exports occurs at the airport (including coastal fish exports), the results of that monitoring are not readily available.

Some of the anecdotes in this section conflict with the observations of researchers. The events presented above that could impact on coastal fisheries production include some items that could increase fisheries production in Palau and others that could decrease production. It appears that the information available to the present study is inadequate for updating the historical estimates of coastal fisheries production in the country. In this situation it is considered most appropriate to maintain the coastal production volumes estimated in the Gillett (2009) study, and to increase the values given in that study to 2014 values.

Palau's coastal commercial fisheries production in 2014 is deemed to be 865 mt, worth US\$3.2 million to fishers.

### Coastal Subsistence Catches

Following the above approach, the coastal subsistence fish catch in Palau in 2014 is deemed to be 1,250 mt. Using the "farm gate" system of valuing subsistence production (discounting prices for commercial fish by 30%) this would be worth US\$3.3 million to fishers.

### Locally Based Offshore Catches

According to an official of Palau's Bureau of Oceanic Fishery Management, the locally based offshore fleet in 2014 consisted of 32 longliners operated by three companies, plus a single pole-and-line vessel operated by another company (K. Sisor, per. com. September 2015). Information in BOFM (2015)

<sup>1</sup> US\$500,000 value of fish at US\$3.75/kg equates to 133 mt of fish.

and FFA (2015) can be used to estimate the volume and value of the locally based offshore fleet (Table 13-1).

**Table 13-1:** Recent Catches by Palau-Based Longliners

	2010	2011	2012	2013	2014
Tuna catch Chinese Taipei longliners (mt)	1,616	1,505	809	1,075	2,486
Tuna catch Belize longliners (mt)	0	0	5	237	504
Total catch longline adjusted for bycatch (mt)	2,101	1,957	1,058	1,706	3,887
Value adjusted for bycatch and transport (US\$)	16,806,400	15,652,000	8,465,600	13,644,800	31,096,000

Source: BOFM (2015) and FFA (2015)

In addition to the above, the catches from the single Palau-based pole-and-line tuna vessel must be considered. A paper on global pole-and-line status (Gillett 2015) estimates that the Palau landings were about 100 mt in 2014. The value of that catch to fishers would be about US\$375,000.

In 2014 the Palau-based offshore fishing vessels are estimated to have caught 3,987 mt, worth US\$31,471,000 to fishers.

## Foreign-Based Offshore Catches

BOFM (2015) gives the foreign-based longline catch in the Palau zone (all Japanese). The purse seine catch in the Palau zone (all foreign-based) is given in FFA (2015). These catches are summarised in Table 13-2.

**Table 13-2:** Foreign-Based Offshore Catches in the Palau Zone

	2010	2011	2012	2013	2014
Volume purse seine catch in the Palau zone (mt)	336	0	738	310	2,825
Volume longline catch in the Palau zone, adjusted for bycatch (mt)	745	945	1,032	1,021	1,192
Value purse seine catch, adjusted for transport (US\$)	621,869	0	1,365,890	573,748	5,228,510
Value longline catch, adjusted for bycatch and transport (US\$)	8,329,100	10,565,100	11,537,760	11,414,780	13,326,560

Source: BOFM (2015) and FFA (2015)

In 2014 foreign-based offshore fishing vessels are estimated to have caught 4,017 mt, worth US\$18,555,070 to fishers.

### Freshwater Catches

There are no major freshwater fisheries in Palau, but the larger islands of Palau (especially Babeldaob) have freshwater bodies that support edible freshwater fish and invertebrates. Jenkins (1999) reports 47 freshwater fish species, including four endemic and five introduced. Anon. (2005) states that Lake Ngardok in Melekeok State, on the island of Babeldaob, is the largest lake in Micronesia, with an area of approximately 0.18 square km. The longest river in Palau, the Ngerdorch River, drains from Lake Ngardok and flows 10 km to its mouth in Ngchesar State, on the east coast of Babeldaob.

Staff of the Bureau of Marine Resources indicate that eels and shrimp are the most important of the edible freshwater animals. The consumption of eels by Palauans is minimal due to cultural attitudes, but Filipinos resident in Palau are thought to eat eels occasionally. A small amount of freshwater shrimp is taken and consumed. (H. Renguul and S. Victor, per. com. September 2015).

For the purpose of the present study, annual freshwater fisheries production in Palau in recent years is taken to be 1 mt, worth US\$10,000.

### Aquaculture Harvests

The Micronesian Mariculture Demonstration Center (later renamed the Palau Mariculture Demonstration Center, PMDC) was established in Palau in 1972. Culture of a large number of organisms has been attempted in Palau over four decades, both at the centre and independently.

Aquaculture production in Palau is currently confined to milkfish, giant clams and, to a far lesser extent, coral, mangrove crab, groupers and rabbitfish. One of the giant clam producers in Palau stated: "Milkfish is now the only real commercial aquaculture commodity in the country; all others are cultured on a semi-hobby basis." (T. Watson, per. com. September 2015).

With regard to milkfish culture, Palau has three farms: the Ngatpang State Milkfish Farm, the Shallum Etpison Palau Aquaculture Project, and the Melwert Tmetuchel Airai Fish Farm. These farms import fry from hatcheries in Taiwan or the Philippines for grow-out to supply both fresh fish to the public and bait fish for the tuna longline fishery (Pickering et al. 2013).

According to staff of the Bureau of Marine Resources, two of those farms combined sell about 500 pounds of fish about every two weeks, at around US\$2.75 per pound. The other milkfish farm is dedicated to producing bait. The latter sold 327,800 individual baitfish in 2014, at a price of US\$0.20 per piece (M. Tmetuchl, per. com. September 2015).

With regard to giant clam culture, there are five to ten small companies that produce four different species. According to staff of the Bureau of Marine Resources, 8 to 10 cm clams are worth US\$5–6 apiece, and larger sizes are sold to local restaurants for US\$6 to US\$10 per clam. According to the CITES database, a total of 19,173 live giant clams were exported from Palau in 2013. In 2014 one of the producers experienced difficulties in obtaining small clams for growing out (T. Watson, per. com. September 2015).

The current aquaculture production of coral, mangrove crab, groupers and rabbitfish appears to be either very small or non-existent.

The above information is inadequate for making a good estimate of aquaculture production in Palau in 2014. For the purposes of the present study, 2014 production is deemed to be: (a) 22 mt of milkfish plus 327,800 pieces worth about US\$200,000 at the farm gate, and (b) 16,000 pieces of giant clams (for both the aquarium and restaurant trade), worth US\$85,000 at the farm gate – representing a total 2014 production of 22 mt and 343,800 pieces, worth US\$285,000.

## Summary of Harvests

A crude approximation of the annual volumes and values<sup>2</sup> of the fishery and aquaculture harvests in 2014 can be made from the above sections (Table 13-3).

**Table 13-3:** Annual Fisheries and Aquaculture Harvest in Palau, 2014

Harvest Sector	Volume (mt, and pcs where indicated)	Value (US\$)
Coastal Commercial	865	3,200,000
Coastal Subsistence	1,250	3,300,000
Offshore Locally based	3,987	31,471,000
Offshore Foreign-based	4,017	18,555,070
Freshwater	1	10,000
Aquaculture (pcs and mt)	22 mt and 343,800 pcs	285,000
<b>Total</b>	<b>10,142 mt and 343,800 pcs</b>	<b>56,821,070</b>

<sup>2</sup> The values in the table are dockside/farm gate prices, except in the case of offshore foreign-based fishing, where the value in local waters (overseas market prices less imputed transshipment costs) is given.

Palau’s coastal commercial fisheries production in 2014 is deemed to be 865 mt, worth US\$3.2 million. The methodology used to estimate coastal fisheries production (both commercial and subsistence) is quite weak.

Figures 13-1 and 13-2 show the volumes and values of the 2014 Palau fisheries production. Aquaculture is not shown on the volumes figure due to the use of mixed units (pieces and mt).

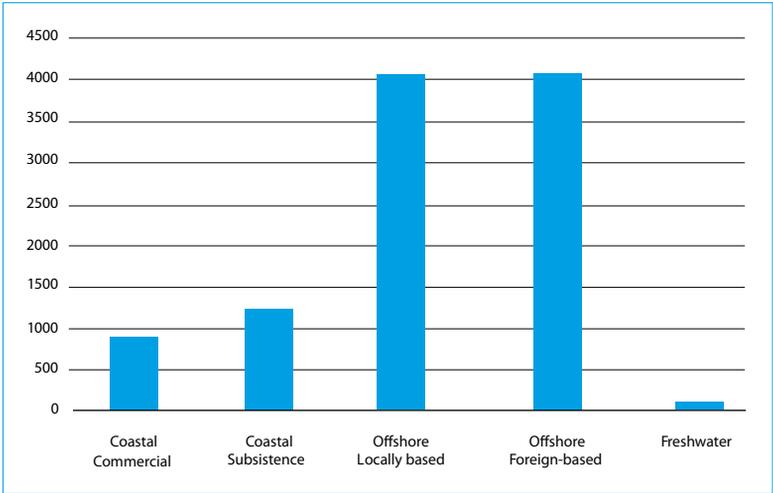


Figure 13-1: Palau Fisheries Production by Volume (mt), 2014

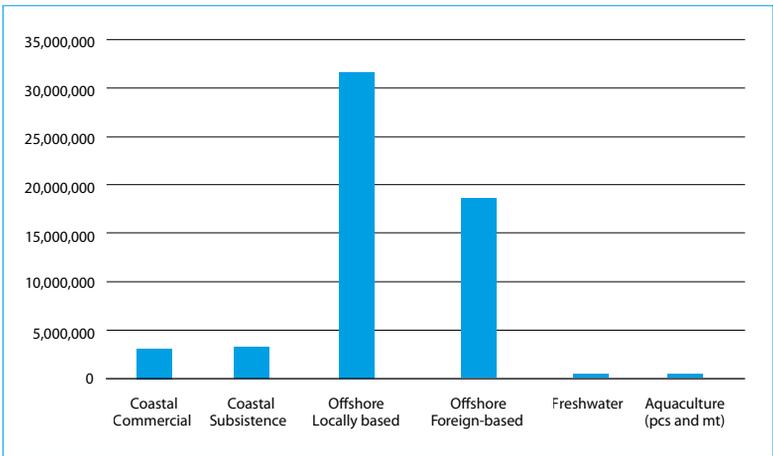


Figure 13-2: Palau Fisheries Production by Value (US\$), 2014

## Past Estimates of Fishery Production Levels by the Benefish Studies

Similar studies of the benefits to Pacific Island countries and territories from fisheries (“Benefish” studies) have been carried out in the past. Gillett and Lightfoot (2001) focused on the year 1999, Gillett (2009) focused on 2007, and the present study focuses on 2014. The fishery production levels for Palau from those three studies are provided in Table 13-4.<sup>3</sup>

**Table 13-4:** Estimates by the Benefish Studies of Annual Fisheries/Aquaculture Harvests

Harvest Sector	Estimate Year	Volume (mt, and pcs where indicated)	Nominal Value (US\$)
Coastal Commercial	1999	865	2,595,000
	2007	865	2,843,000
	2014	865	3,200,000
Coastal Subsistence	1999	1,250	2,500,000
	2007	1,250	2,511,000
	2014	1,250	3,300,000
Offshore Locally based	1999	2,500	12,500,000
	2007	3,030	13,779,656
	2014	3,987	31,471,000
Offshore Foreign-based	1999	124	270,000
	2007	1,464	4,947,496
	2014	4,017	18,555,070
Freshwater	1999	n/a	n/a
	2007	1	8,000
	2014	1	10,000
Aquaculture	1999	n/a	n/a
	2007	3,100 pcs and 2 mt	50,000
	2014	343,800 pcs and 22 mt	285,000

Source: The present study; Gillett (2009), Gillett and Lightfoot (2001)

The apparent changes in production for the three-year period represents a real change in production in some cases, but this can also represent a change in the methodology for measuring the production (hopefully an improvement). In the table above, the volume of production for coastal commercial, coastal subsistence and freshwater did not change between the years. This is

<sup>3</sup> The earliest Benefish Study, Gillett and Lightfoot (2001), did not include aquaculture, freshwater fisheries or the non-independent territories.

because there have been no new data on production and no anecdotal information suggesting significant changes in production. In contrast, changes in production figures in the table for the offshore fisheries and aquaculture (based on the availability of better quality data) are likely to reflect real changes in the amounts being harvested.

## 13.2 Contribution of Fishing to GDP

### Current Official Contribution

The official contribution of fisheries to nominal GDP is given in Graduate School (2015). A more detailed disaggregation of the contribution is provided in Table 13-5 below.

**Table 13-5:** Fisheries Contribution to the Palau GDP (US\$ thousands)

	FY2010	FY2011	FY2012	FY2013	FY2014
Aquaculture	84	912	807	454	337
Fishing support services	568	519	705	703	589
Fishing coastal fish	1,721	1,808	1,912	1,977	2,008
Fishing coastal non-fish	88	168	371	77	205
Subsistence	1,989	2,090	2,210	2,286	2,321
Total fisheries	4,450	5,497	6,005	5,497	5,460
Palau GDP	183,642	200,774	215,539	228,310	249,082
Fisheries as a % of GDP	2.4%	2.7%	2.8%	2.4%	2.2%

Source: Bureau of Budget and Planning (unpublished data)

### Method Used to Calculate the Official Fishing Contribution to GDP

The documentation that accompanies the unpublished data from which the table above is constructed includes an explanation of the sources of the data:

- Aquaculture: social security and taxation databases
- Fishing support services: trade database
- Fishing coastal fish: Gillett (2009)
- Fishing coastal non-fish: trade database
- Subsistence: Gillett (2009)

The individuals in the Graduate School responsible for the national accounts have a considerable amount of national accounts expertise and years of experience in Micronesia. For various reasons, described in Section 31-4 of this book, those individuals have decided to treat the fishing sector in Palau somewhat differently than, for example, the International Monetary Fund and what is described in Appendices 2 and 3 of this book (hence “fisheries” instead of “fishing” in Table 13-5 above). The major changes the Graduate School has made are excluding the value added from foreign-owned locally based fishing vessels, but including the shore-based services of the companies operating those vessels. (G. McKinlay, per. com. September 2015).

### Alternative Estimate of Fishing Contribution to GDP

Table 13-6, below, represents an alternative to the official method of estimating fishing contribution to GDP in Palau. It is a simplistic production approach that takes the values of five types of fishing/aquaculture activities for which production values were determined in Section 13.1, above (summarised in Table 13-3), and determines the value added by using value added ratios (VARs) that are characteristic of the type of fishing concerned. Those VARs were determined through knowledge of the fisheries sector, and by using specialised studies (Appendix 3).

It is not intended that the approach in Table 13-6 replace the official methodology, but rather that the results obtained serve as a comparator to gain additional information about the appropriateness and accuracy of the official methodology, and to indicate any need for its modification.

**Table 13-6:** Fishing Contribution to GDP in 2014 Using an Alternative Approach

Harvest Sector	Gross Value of Production (US\$, from Table 13-4)	VAR	Value Added (US\$)
Coastal Commercial	3,200,000	0.70	2,240,000
Coastal Subsistence	3,300,000	0.80	2,640,000
Offshore Locally based			
Longlining	31,096,000	0.20	6,219,200
Pole-and-line	375,000	0.60	225,000
Freshwater	10,000	0.95	9,500
Aquaculture	285,000	0.60	171,000
<b>Total</b>	<b>38,266,000</b>	<b>--</b>	<b>11,504,700</b>

Source: This chapter, and VARs from Appendix 3

In 2014 the fishing contribution of US\$11,504,700 represents about 4.6% of the US\$249 million GDP of Palau.

The major difference between the above estimate and the official estimate of the fisheries contribution given in the section above is obviously that the official estimate includes shore-based services and excludes the operations of some locally based industrial fishing vessels. Both the methodology of the official estimate and that of the present study have their respective advantages. The former is oriented towards obtaining a picture of the entire national economy – and the ups/downs of industrial tuna fishing may distort other important changes in the economy. The present study is fisheries-oriented and, as such, it is important for tracking the economic contribution of locally based fleets – something that most countries of the region (including FSM) have been promoting for many years. Also, it is important for comparison purposes that the present study uses a methodology consistent with Gillett (2009).

### 13.3 Exports of Fishery Production

The official statistics on exports from Palau are given in Graduate School (2015). A summary of the export items of relevance to fisheries is provided in Table 13-7.

**Table 13-7:** Value of Fishery Product Exports (US\$ millions)

	FY2011	FY2012	FY2013	FY2014
<b>Exports of goods</b>	12.8	15.0	14.4	19.1
Re-exports	11.2	12.8	13.1	17.8
Fuel	10.2	11.7	10.2	11.5
Other, mostly capital goods	1.0	1.1	3.0	6.3
Other exports	1.6	2.3	1.3	1.3
<b>Exports of services</b>	102.8	104.0	125.7	142.4
Fish processing	1.1	1.5	1.5	1.2

Source: Graduate School (2015)

From the information in the above table it appears that the overseas shipment of the catch of locally based offshore vessels is not considered an export of the country in the official statistics, but rather the fish processing that occurs on that fish is considered an export of a service. The value of the service in the table (US\$1.2 million) appears to be about 11% of the free-on-board (FOB)

value of the fish exported (as estimated below). The exports of “other goods” in the table is not disaggregated to the point of being able to determine reef fish exports, and it is unclear whether fish exports as passenger baggage are part of the official exports.

The World Bank categorises Palau exports in a different manner from is the above descriptions (the bank includes the exported catch of locally based offshore vessels). In 2014 Palau’s fish exports are given as US\$11.4 million.<sup>4</sup>

The Bureau of Oceanic Fisheries Management tracks what they consider as exports from the locally based offshore vessels. The figures for 2012–2014 are given in Table 13-8. Using the weight of exports in the table, in conjunction with tuna price information in FFA (2015), the FOB value can be estimated as approximately US\$12.7 million in 2013 and US\$10.5 million in 2014.

Table 13-8: Exports of Tuna, Billfish, and Loins

Year	Pieces	Weight (kg)
2012	53,155	1,998,356
2013	44,079	1,713,437
2014	37,151	1,425,610

Source: Bureau of Oceanic Fisheries Management (unpublished data)

Data from Palau’s Customs Department, kindly provided by SPC’s Statistics for Development Division, gives information on exports of all types of fishery products. In 2013 there were 1,797,135 kg of such exports, with a declared FOB value of US\$6,612,902. This is an average value of US\$3.68 per kg, which seems low, especially as sashimi-quality tuna (FOB value was about US\$7.39/kg in 2014) make up most of the exports. This US\$6.6 million FOB value (which includes the exports of the locally based offshore vessels) is half of the value estimated above for just the exports from the locally based offshore vessels.

The following is a summary of further relevant information on fishery exports from Palau:

- Rhodes et al. (2011) indicate that the export of reef fish is 213 mt, plus/minus 60 mt. The FOB value of 213 mt of reef fish is about US\$877,000.
- According to the CITES database, a total of 19,173 live giant clams were exported from Palau in 2013. At US\$5.50 per clam, that represents an FOB value of about US\$105,451.

<sup>4</sup> [its.worldbank.org/CountryProfile/en/Country/PLW/Year/2014](http://its.worldbank.org/CountryProfile/en/Country/PLW/Year/2014)

- Apparently, the last trochus harvest was in 2013, when an FOB value of US\$350,000 was exported (BBP 2014).
- Although monitoring of fish exports occurs at the airport, the results of that monitoring are not readily available.

The recent FOB value of exported reef fish and giant clams estimated above is close to US\$1 million – which is almost as large as all of the bona fide exports of the country, as given in the table at the beginning of this section (i.e. “other exports”). The FOB value of the exports from locally based offshore vessels has been about US\$11 million annually in recent years. If both (a) reef fish and giant clams, and (b) exports from locally based offshore vessels are considered “exports” then virtually all of the exports of the country (given above by the World Bank to be US\$11.4 million in 2014) are fishery products.

## 13.4 Government Revenue from Fisheries

### Access Fees for Foreign Fishing

There are five arrangements by which Palau receives payment for foreign fishing in its waters:

- The locally based foreign fleet: there are three locally based fishing companies that have been operating for some years.
- The Japanese agreement: this covers three types of tuna fishing by vessels based in Japan: longline, pole-and-line and purse seine. In its present form, the agreement has been in effect since 1992, with minor changes. Although the agreement covers fishing by all three methods, there has been no Japanese pole-and-line fishing in Palau waters since 1994. (M. McCoy, per. com. November 2008).
- US treaty: under the terms of the US multilateral tuna treaty, Palau and other Pacific Island countries receive payments from the US government and the US tuna industry, which are associated with fishing access by US purse seine vessels. Some Pacific Island countries consider that all payments under the US treaty are for fishing access, while others treat some components as aid.<sup>5</sup>
- The FSM Arrangement: this is a treaty between participating Pacific Island countries that allows access on favourable conditions to fishing zones by purse seine vessels registered in those participating countries.

<sup>5</sup> In the table 13-9, the amounts listed are taken as though all fees are for access.

- The Parties to the Nauru Agreement Vessel Day Scheme (PNA VDS): the Parties to the Nauru Agreement have the Vessel Day Scheme, in which foreign purse seine vessels purchase fishing days from PNA countries.

Unpublished data kindly provided by Palau's Bureau of Oceanic Fisheries Management was used to construct Table 13-9. It shows the payments received by Palau under these five arrangements.

**Table 13-9:** Access Fees for Foreign Fishing in the Palau Zone (US\$)

	Locally based foreign fleet	Japan-based (longline and purse seine)	Other purse seine (US treaty, FSM Arrangement, PNA/VDS)	Total
2010	219,000	373,362	353,786	946,147
2011	283,502	448,577	1,060,773	1,792,852
2012	284,600	867,120	1,541,914	2,693,634
2013	265,488	196,100	3,242,037	3,703,625
2014	262,079	433,998	2,924,510	3,620,586
<b>Total 2010–2014</b>				<b>12,756,844</b>

Source: Bureau of Oceanic Fisheries Management (unpublished data)

The total revenue of the Palau government (including tax revenue, grants and other revenue) is US\$108.6 million (Graduate School 2015). The US\$3.6 million in access fees in the above table therefore represents about 3.3% of the government's revenue.

Graduate School (2015) contains a section on balance of payments, which has some data on "fishing license fees" by fiscal year (in US\$ millions), as follows:

- FY2010: US\$1.1 million
- FY2011: US\$1.7 million
- FY2012: US\$1.5 million
- FY2013: US\$3.4 million
- FY2014: US\$4.6 million<sup>6</sup>
- Total FY2010 to FY2014: US\$12.3 million

At least some of the difference between the two sets of access fees, above, can be explained by the use of calendar years (BOFM data) and fiscal years (Graduate School). Also, different methods used to account for government revenue (i.e. cash method vs the accrual method) could cause a difference for some years.

<sup>6</sup> In the government revenue section of Graduate School (2015), "Royalties (fishing fees)" are given as US\$3.151 million in FY 2014

## Other Government Revenue from Fisheries

The other significant source of direct government revenue from fisheries activities is the fish export tax. During the period 1999 to 2007 there was a tax of US\$0.25 per kg of fish landed by longliners in Palau, irrespective of quality or marketing destination (for example, sashimi grade for air export, bycatch species and reject tuna). In 2008 the tax rate was increased to US\$0.35 per kg. Unpublished data from the Bureau of Oceanic Fisheries Management shows the tax collected in recent years, as follows: 2012: US\$699,425; 2013: US\$248,319; 2014: US\$498,963.

In addition to the export tax, the government also charges fees for several activities related to fisheries, including the following:

- Marine Export Declaration Fee: citizen (US\$5), non-citizen (US\$10), commercial (US\$25), scientific research (US\$25)
- CITES permit: non-commercial (US\$5), commercial (US\$25), scientific research (US\$25)

## 13.5 Fisheries-Related Employment

The Fiscal Year 2014 Statistical Appendices (Graduate School 2015) has information on employment in Palau, obtained through the Social Security and tax records, and therefore relates to formal wage-paying jobs. Table 13-10 summarises the fisheries-relevant information contained in the Statistical Appendices.

**Table 13-10:** Information about Formal Jobs in the Fishing Sector

	FY2010	FY2011	FY2012	FY2013	FY2014
Number of fishing workers	92	87	85	81	83
Total number of workers in Palau	10,044	9,931	9,973	10,108	10,386
Fishing workers as a % of all workers	0.9%	0.9%	0.9%	0.8%	0.8%
Fishing workers that are Palau citizens	22	19	19	15	17
Palau citizen fishing workers as a % of all fishing workers	23.9%	21.8%	22.4%	18.5%	20.5%
Fishing average wages (US\$)	4,434	4,589	4,856	4,983	5,459
All workers average wages (US\$)	8,541	8,898	9,188	9,265	9,950
Fishing wages as a % of average wages	51.9%	51.6%	52.9%	53.8%	54.9%

Note: The number of workers includes both full-time and part-time workers  
Source: Graduate School (2015)

From the table it can be seen that, in Palau, formal employment in the fishing sector is characterised by a small portion of people formally employed, most not being Palau citizens, and with relatively low wages – about half of the average wage in the country.

FFA (2015) has information on the employment of Palauans in the tuna industry (Table 13-11). Thirty-six Palauans were employed in the tuna industry in 2014. Across the Pacific 17,663 people were employed as crew on tuna vessels or in tuna processing. Tuna-related employment in Palau therefore represents 0.2% of the regional tuna-related employment.

**Table 13-11:** Employment of Palauans in the Tuna Industry

	2009	2010	2011	2012	2013	2014
Local crew on vessels	3	0	0	0	0	0
Processing and ancillary	8	7	84	70	36	36
<b>Total</b>	<b>11</b>	<b>7</b>	<b>84</b>	<b>70</b>	<b>36</b>	<b>36</b>

Source: FFA (2015)

Although formal employment in the fishing sector is small in Palau, many people have non-formal fishing jobs, and there is a high level of involvement in subsistence fishing. SPC's ProcFish programme surveyed four locations in Palau that were representative of the country in terms of fisheries conditions (Friedman et al. 2009). In terms of participation in fisheries, the survey showed that 62.7% of households were involved with reef fisheries in Koror, 62.7% in Ngarchelong, 88% in Ngatpang, and 77.8% in Airai. The ProcFish work in Palau also showed that 68% of fishers were men and 32% were women.

The 2005 census contains some information on employment in fisheries (Office of Planning and Statistics, 2005). Unfortunately, much of the employment-relevant data is aggregated with jobs from other sectors. For example, in 2005 there were 559 people with the occupation of "farming, forestry, and fishing". Information that is specific to fisheries-related employment includes the following:

- Of the 13,800 people reporting income in 2004, 305 people (2.2%) reported income from selling fish.
- Of 14,154 people over 18 years old in 2004, 933 people (6.6%) reported some subsistence fishing activity.
- Of the 933 subsistence fishers, 186 (19.9%) were female.

- The census defined participation in subsistence activities if he/she mainly produced goods for his/her own or family's use and needs, and this is therefore only a small subset of all people involved in subsistence fishing.

## 13.6 Levels of Fishery Resource Consumption

Preston (2000), using 1995 FAO production, import, and export data, indicated annual per capita fish consumption in Palau of 85 kg.

Fifteen years ago the Palau Conservation Society estimated: (i) local coastal production of 2,115 mt; (ii) fishery product imports of 610 mt; (iii) fishery product exports of 400 mt; (iv) a mean resident population in Palau in the 1990s of 16,600; and (e) visitors to Palau (full-time resident equivalents) of 500. This equates to annual per capita fishery product consumption of 135 kg (PCS 2000).

Gillett (2009) updated the above PCS estimate with new estimates of population and local consumption of the production from offshore fisheries:

- SPC (2008) indicated that the mid-2007 population of Palau was 20,162.
- BMR unpublished data shows that, in 2007, "local sales and donations" of tuna and billfish from the locally based longline fleet was 216,789 kg.
- Assuming other factors are similar to those of the PCS study, the annual per capita fishery product consumption of whole fish equivalent was 123 kg in 2007.

The SPC ProcFish programme surveyed four locations in Palau that were representative of the country in terms of fisheries conditions (Friedman et al. 2009). In terms of fish consumption (fresh fish, invertebrates and canned fish) the annual per capita results were as follows: Ngarchelong – 73.1 kg, Ngatpang – 72.0 kg, Airai – 81.7 kg, and Koror – 86.8 kg; representing an average of 78.4 kg across the four sites.

Bell et al. (2009) uses information from household income and expenditure surveys conducted between 2001 and 2006 to estimate patterns of fish consumption in Pacific Island countries. The HIES were designed to enumerate consumption based on both subsistence and cash acquisitions. For all of Palau the annual per capita fish consumption (whole weight equivalent) was 33.4 kg, of which 78% was fresh fish. For rural areas the figure for per capita

consumption of fish was 43.3 kg, and for urban areas it was 27.8 kg. The following should be noted with respect to these results:

- Gillett (2009) expressed some reservations about the fish production amounts from the 2006 Palau HIES, on which this estimate was based.
- The ProcFish results, above, indicate a Palau consumption rate about twice as high as the Bell et al. (2009) estimated rate.

The locally based offshore fishing operations sell fish locally and donate some fish for various activities in Palau. During the most recent five-year period a total of 68.3 mt of fish was donated, and 349.6 mt was sold from the longline companies (Bureau of Oceanic Fishery Management, unpublished data). The sole pole-and-line vessel had recent average annual catches of about 100 mt (Gillett 2015). This equates to 183.6 mt of fish entering the Palau food supply each year from locally based offshore fishing. It is unclear whether the previous estimates of Palau fish consumption cited above have adequately considered this fish source.

## 13.7 Exchange Rates

Palau uses the US dollar (US\$).