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ABSTRACT

The reconstructed total catch of the Federated States of Micronesia for 1950-2010 included estimates of the subsistence and artisanal sectors which are under-represented in the officially reported data. The reconstructed total catch (excluding industrial tuna catches) was almost 608,000 t, with 86% being subsistence and 14% artisanal catches. The reconstructed total catch was 6.7 times the 91,350 t (excluding industrial large pelagics) reported by the FAO on behalf of the FSM for the 1950-2010 period. The report focuses on the importance of FSM's inshore fisheries, for which very little catch data exist. Large-scale industrial tuna fisheries occurring within the FSM EEZ were not considered in this reconstruction.

INTRODUCTION

The Federated States of Micronesia (FSM), which consists of more than 600 islands divided into four states, is located in the Western Pacific Ocean between 135° - 165° E and 1° S to 14° N (Anon. 2005) (Figure 1) and has a total land area of about 700 km^2 (Lambeth 2001a). The Exclusive Economic Zone (EEZ) of FSM, which was declared in 1979 (Cassels 2006), covers an area of over 2.99 million km^2 (www.seaaaroundus.org). These waters are among the most productive areas for tuna production in the world (Anon. 1995), with the main commercially exploited species being skipjack (*Katsuwomis pelamis*), yellowfin (*Thunnus albacares*) and bigeye tuna (*Thunnus obesus*).

The FSM formed in 1979 when the states of Chuuk, Pohnpei, Yap and Kosrae, which were part of the former United States administered Trust Territories of the Pacific Islands (TTPI), agreed on a constitution and became a self governing body, attaining full independence in 1986 (Anon. 2005). Both the Japanese and the American former colonial powers tried to develop the fisheries sector in the FSM. For example, prior to WWII the Japanese carried out studies in the waters around the FSM to find the best way to use the marine resources available (Anon. 2005). In 1986, the FSM entered a Compact of Free Association with the United States of America, which grants it economic benefits from the USA in exchange for use of its waters for military purposes. With this Compact the colonial rule of the USA in

the FSM ended (Anon. 2005). This led to an increased dependence by the FSM on imported products, such as canned fish and meats for consumption, reducing their dependence on subsistence activities (Cassels 2006).

In 2003, the Compact was amended and was introduced as Compact II to help the FSM in developing a sustainable economic plan for itself while reducing its dependence on the USA. This included reduced and conditional funding from the US government (Anon. 2005). As a result of Compact II, there is increased pressures on marine resources from artisanal (small-scale commercial) and subsistence fisheries, which if continued without a plan for sustainability can lead to the depletion of the inshore fish stocks (Anon. 2005). Compact II has also encouraged the FSM government to develop its offshore fisheries sector, which in the past has met with limited success, especially for the domestic FSM longline fishing industry and the FSM fish transshipment facilities**.** Since the FSM government does not have the required expertise or infrastructure to efficiently process and use most of its offshore resources directly, it allows other countries, mainly Japan, China, Republic of Korea and the USA, to fish in its waters by granting them access agreements at a small fraction of the value of the resources being exploited (Anon. 2005).

The population of the FSM, as estimated by the FSM statistics department, was 107,839 in 2010, having decreased slightly from the 2009 estimate of 107,973. The Chuuk state makes up almost 50% of the population, followed by Pohnpei, which makes up a third of the total population.[1] Each state varies in their dependence on subsistence activities, which includes fishing and agriculture for personal consumption. Subsistence activities accounted for 29% and 26% of the household income of Yap and Chuuk, respectively, whereas only 8% and 9% of the household income of Pohnpei and Kosrae, respectively, came from subsistence activities (Anon. 2007).

Inshore fishing, for subsistence and artisanal purposes, is done by both men and women, although there is a clear distinction between their responsibilities (Chapman 1987; Matthews 1991). Women are responsible for collecting crabs and other invertebrates that inhabit intertidal areas. Men are responsible for fish and lobsters caught by spear and free-dive fishing, as well as for other boat-based fishing. Both men and women are responsible for catching fish using gillnets, and for catching octopus using hooks (Lambeth 2000, 2001a, 2001b, 2001c). Most of these catches are for subsistence purposes, though starting in the early 1990s, crabs were caught for domestic commercial and foreign markets as well (Lambeth 2000, 2001a, 2001b, 2001c).

The National Oceanic Resource Management Authority (NORMA), formed initially as the Micronesian Maritime Authority in 1979 (Anon. 1995), is responsible for the sustainable development, use and conservation of both the living and non-living resources within the FSM EEZ. NORMA is also

[1] Available at http://www.spc.int/prism/country/fm/stats/Projections/proj-index.htm (accessed 05/20/2011)

responsible for the negotiation and the implementation of foreign fishing access agreements and fishing permits in the FSM EEZ (Anon. 2003). The revenue generated from these access agreements makes up a significant portion of the FSM economy (Anon. 2005). For example, the revenue generated from access agreements alone accounted for about 22% of the total domestic revenue of the FSM national government in the year 1999 (Gillett and Lightfoot 2002).

Apart from NORMA, each state of the FSM has their own regulatory body for managing their coastal resources. Chuuk has the largest fishery agency to manage the inshore resources, which are under pressure due to its growing population. Chuuk also has problems of dynamite fishing and poison fishing, which add further pressure to Chuuk's inshore resources. To date, Chuuk's fishery agency has had little success in stemming these practices. While Pohnpei's resources and fishery agency is smaller than Chuuk's, Pohnpei officials have taken some initiatives to protect their marine resources by implementing Marine Protected Areas (MPAs), seasonal bans on fishing, and size limits for sale of certain fish. Yap has traditional marine tenure arrangements, which are upheld on the outer islands, thereby providing a framework for resource management. Kosrae has a small fishery agency, but is the most effective in managing its resources compared to the other states (Anon. 2005).

The purpose of this report is to estimate total fisheries catches by the FSM within their EEZ waters and to create a time series of total catch by the subsistence and artisanal fisheries sectors. We employ a catch reconstruction approach as documented in Zeller *et al.* (2007). The data given by the Food and Agriculture Organization of the United Nations (FAO) on behalf of the FSM are for fish caught by FSM in FAO statistical area 71 (Pacific, Western Central) and are not limited to the EEZ area. Furthermore, the data provided to the FAO do not provide a good taxonomic breakdown for non-pelagic fishes. Apart from the FAO data, NORMA also has records for fish caught by the FSM in their EEZ. NORMA data, however, only exist as of 1991, and are limited to fish caught by the larger-scale commercial fleets. Large-scale industrial catches for pelagic species are not considered in this reconstruction, and, therefore, our comparison with the FAO data excludes tuna and other large pelagic species.

METHODS

Human population data

Human population data were used to calculate subsistence and artisanal catches from catch rates presented in the literature or estimated. The population data from 1950–1990 was obtained from the online population database Populstat (www.populstat.info; accessed May 2013), and the population data from 1994 to 2010 was taken from the FSM government web site.[2] However, another FSM government site[3] was used to obtain data for the years in which the government had conducted a

[2] Available at http://www.spc.int/prism/country/fm/stats/Projections/proj-index.htm (accessed June 8, 2011)
[3] Available at http://www.spc.int/prism/country/fm/stats/Census%20&%20Surveys/census-index.htm (accessed June 3, 2011)

population census (1973, 1980, 1994 and 2004). For the years when no population data were available, the population was estimated by interpolating between years of known data. All the population sources reported the total population as well as the population of each of the four states (Figure 2).

Artisanal and subsistence fisheries

A total catch of 9,800 tonnes for subsistence fisheries and 2,800 tonnes for artisanal fisheries was estimated by Gillett (2009) for the FSM for the year 2007. We converted these estimates to a *per capita* subsistence (90.71 kg·person^{-1}·year^{-1}) and a *per capita* artisanal catch rate (25.92 kg·person^{-1}·year^{-1}) using the FSM population data (Table 1).

Total subsistence catch estimate

To obtain a 1950 *per capita* subsistence catch rate, we assumed that 80% of the 2007 *per capita* artisanal catch rate of 25.92 kg·person^{-1}·year^{-1} was caught as subsistence catch in 1950. Gillett (2009) also estimated that 27 kg·person^{-1}·year^{-1} of imported canned fish was consumed in the year 1998. We assumed that in 1950, this portion of seafood consumption demand was also met through domestic subsistence fishing; therefore, this amount was added to our estimate for *per capita* subsistence catch for 1950. Furthermore, we calculated the total amount of non-fish, meat imports taking place in Kiribati from the FAO stat website[4] for the year 2007, and used this information to estimate FSM imports of non-fish meat. We had to rely on Kiribati data, as it was the only country in Micronesia for which FAO had seemingly complete trade data. Therefore, we used the 2007 *per capita* non-fish, meat imports of Kiribati, and assumed that half of this amount was imported by FSM in the year 1950 and the rest was supplied domestically through subsistence fisheries (Table 1). Thus, we assumed that in 1950, the FSM did not rely much on foreign meats for consumption and its consumption demands were mainly met by fresh domestic fish. Thus, our *per capita* subsistence catch estimate for the year 1950 (i.e., 153.77 kg·person^{-1}·year^{-1}, Table 1) was based on the sum of the 2007 *per capita* subsistence catch rate, 80% of the 2007 *per capita* artisanal catch rate, the 1998 *per capita* canned fish consumption rate and 50% of the 2007 *per capita* non fish, meat imports (as estimated via Kiribati import data).

We then interpolated the *per capita* subsistence catch rates between our two anchor points (1950 and 2007) and extrapolated to 2010 to get a complete time series of *per capita* subsistence catch rates for the years 1950 – 2010. Using these *per capita* subsistence rates and the FSM population data, we estimated the total subsistence catch for the years 1950–2010.

[4] Available at http://faostat.fao.org/site/535/DesktopDefault.aspx?PageID=535#ancor (accessed 06/17/2011)

Total artisanal catch estimate

To obtain a 1950 *per capita* artisanal catch rate, we assumed that 20% of the 2007 *per capita* artisanal catch rate of 25.92 kg·person^{-1}·year^{-1} by Gillett (2009) was artisanal catch in 1950 (Table 1). We then interpolated the *per capita* artisanal catch rates between our two anchor points (1950 and 2007) and extrapolated to 2010 to obtain the assumed *per capita* artisanal catch rates for the years 1950–2010. Using these rates and the FSM population data we estimated the total artisanal catch for the years 1950–2010. However, it is possible that truly artisanal fishing (i.e., fishing for the near-exclusive market sale of a fisher's catch) may not have taken hold in FSM until well after 1950, as there are suggestions that many parts of the FSM may not have had artisanal fisheries until the 1980s. If this is correct, our present estimates may over-estimate artisanal catches and underestimate subsistence catches for the earlier time period.

Taxonomic breakdown

The taxonomic breakdown of artisanal catches in the FSM was derived from Rhodes *et al.* (2008), who present species data on the frequency of occurrence (numbers of individuals) taken by the coral reef fishery in Pohnpei state. Although there are known to be differences in the taxonomic composition of catches between the different states in the FSM and likely over time (K. Rhodes, pers. obs.), the species data from Pohnpei was used because it is the only known representation of the artisanal species catch data for all of FSM.

Using the number of individuals of each species presented in Rhodes *et al.* (2008) and the average weight for each species, we estimated the catch weight and hence percentage breakdown by weight. Weights were derived from length–weight relationships (www.fishbase.org; accessed July 2013). However, weights were not available for all species. Therefore, we assumed that the species with weight estimates represented 80% of the artisanal catches and the species with no available weight estimates contributed the remaining 20% of the artisanal catches, and were simply assigned equal proportions.

Using the breakdown for artisanal catch, we then derived a taxonomic composition for the subsistence catch. The assigned taxa from the artisanal catch composition were sorted in descending order of percentage contribution by weight. Taxa which represented less than 1% of the artisanal catch were considered of minor importance, whereas taxa greater than 1% were considered the dominant commercially targeted taxa (accounting for 72.8% of artisanal catch).

Using the reverse logic, we assumed that dominant taxa in the artisanal fishery would be caught in smaller proportions in the subsistence fishery (or be sold and therefore be artisanal catch). We realise this is a considerable simplification, and suggest that comprehensive accounting of taxonomic composition of both sectors be undertaken at regular, although not annual intervals. Artisanal taxa contributing greater than 1% to the total artisanal catch ('assigned taxa') represented 72.8% of the

artisanal catch, and taxa contributing less than 1% of the total artisanal catch, together represented 7.2% of the artisanal catch. For subsistence catches we assumed the inverse. Therefore, the proportions were re-calibrated to derive the taxonomic breakdown for the subsistence catch with the dominant taxa in the artisanal catch becoming the taxa of lesser importance in the subsistence catch. These proportions were then compared to data on the percent contribution of families by weight for subsistence fishers in Pohnpei in 2010 (K. Rhodes, unpubl. data). There was good correspondence between most families, with only slight adjustments being made in order to better reflect the data from Pohnpei. Although this process was completed with fine taxonomic detail to the species level, the results were pooled to the family level as there was considerable variation at the species level. The family breakdown for artisanal and subsistence catch is summarized in Table (2).

FAO non–large pelagics data

FAO landings data for the categories “Indo–Pacific swamp crabs”, “Natantian decopods nei”, “Tropical spiny lobsters nei” and “Octopuses, etc. nei” were accepted as reliable, as no other sources were found that reported catches for these groups. Since many crabs (although mangrove crabs are generally sold), shrimps and octopuses are mainly fished for subsistence purposes (Smith 1992), these were considered as reported subsistence catch estimates for FSM and were disaggregated from our estimate of total subsistence catch (see above).

The landings reported under the category “Marine fishes nei” by FAO were compared to our estimated artisanal and subsistence catches (Figure 3) to find what portion of these are artisanal or subsistence. Any value that was higher than the artisanal catch estimate, but below the subsistence catch estimate was assumed to be as reported subsistence catch and those values that were below the artisanal catch estimate were assumed to be reported artisanal catch.

Domestic fishery for large pelagics

The FSM large pelagic catch is dominated by tuna (*Katsuwonus pelamis*, *Thunnus albacares*, *Thunnus obesus* and *Thunnus alalunga*), along with billfishes, such as blue marlin (*Makaira mazara*), black marlin (*Istiompax indica*), striped marlin (*Tetrapturus audax*) and swordfish (*Xiphias gladius*). For the purposes of this report, the catch data for the FSM industrial large pelagic fisheries were not included in the total reconstructed catch.

RESULTS

The reconstructed total non-pelagic catch, which includes our estimates for subsistence and artisanal catches for the years 1950–2010, is 6.7 times the data reported by FAO (excluding large pelagics) on behalf of the FSM (Figure 4a). Subsistence catch contributes 86% and the artisanal sector makes up the remaining 14% of the reconstructed total domestic catches (Figure 4a). The contribution of the artisanal sector was estimated to increase from an average of just over 4% in the 1950s, to almost 23% in the late 2000s, with the subsistence sector exhibiting the inverse trend. The total catch in the 1950s was estimated to be approximately 6,000 $t \cdot year^{-1}$ and increased gradually to its peak in 1994 with 13,300 $t \cdot year^{-1}$, after which it dropped to 12,300 $t \cdot year^{-1}$ in 2010 (Figure 4a). The artisanal catch has increased steadily over the study period, increasing from 165 $t \cdot year^{-1}$ in 1950 to 2,900 $t \cdot year^{-1}$ in 2010 (Figure 4a). The reconstructed subsistence catch for the period 1950–2010 increased from 4,900 $t \cdot year^{-1}$ in 1950 to its peak of 11,000 $t \cdot year^{-1}$ in 1994, before declining slightly to 9,400 $t \cdot year^{-1}$ in 2010 (Figure 4a).

The largest taxonomic contribution to the reconstructed total catch was by Scaridae followed by Lethrinidae, with total catches of approximately 22% and 14% of the total catch, respectively, over the period 1950-2010 (Figure 4b). Other major contributors include Carangidae (9.5%), Siganidae (9.4%), Lutjanidae (8.8%), and Serranidae (8.7%; Figure 4b).

DISCUSSION

The total reconstructed catches for the FSM for the period 1950-2010 were approximately 6.7 times the landings (excluding large pelagics) reported to FAO on behalf of the FSM (Figure 4a). The largest portion of the total reconstructed catch was from subsistence fisheries (86%) followed by the artisanal catch (14%, Figure 4a). Despite this reliance on the subsistence sector, it is the artisanal catch which dominates the reported data. It is estimated that 74% of the reported data is from the artisanal sector with 80% of the total artisanal catch being reported. Subsistence catches were almost entirely unreported, except for invertebrates reported by FAO (which were assumed to have been caught for subsistence purposes) and some miscellaneous marine fishes in select years. Overall, only 5% of the total subsistence catch was estimated to be included in the reported statistics. The subsistence catch, which increased up until the 1990s, has been decreasing steadily since 1994. This decrease in reliance on subsistence fisheries is largely due to the shift to a cash economy by the FSM and an increasing dependence on canned fish and other currently easily accessible protein sources in the markets (Cassels 2006). The decrease in subsistence catch corresponds to the increase in food and financial aid to the FSM by the USA which increased considerably with the first Compact in 1986. This allowed a higher *per capita* income for the FSM population, which made unhealthy protein sources such as imported high-fat and processed meats easily accessible. Hence, these were substituted for traditional protein sources, such a fresh fish (Cassels 2006). In contrast, the artisanal catch rate has steadily increased since 1950.

This increase in artisanal catch can be attributed to the increase in demand by the growing cash-based economy. The recent increase in artisanal catches is important, because as the Compact funding from the USA decreases, more people opt for earning their income through artisanal fisheries, which puts more pressure on the FSM's marine resources (Anon. 2005).

CONCLUSIONS AND RECOMMENDATIONS

The FSM government has, for recent years, managed to keep reasonably good records of the commercially important landings for its large pelagic fishery and seems to be managing its offshore resources somewhat better with suitable regulations (Rhodes 2003). The FSM is also initiating efforts to protect vulnerable species in its EEZ, for example the newly formed shark sanctuary in its EEZ to prevent fishing of sharks for their fins; however, non-target species-specific monitoring, including sharks, is still needed.[5] The FSM government, however, does not have good data on its inshore resources and the amount or species of fish that are being caught for subsistence and artisanal fisheries, which account for a large portion of total EEZ catches (Rhodes 2003). Due to the lack of data on inshore resources, management of these resources is difficult and may lead to an accelerated depletion of fish stocks, which will affect the livelihood and fundamental food security of the FSM population in the future. The FSM government also does not have any provision for registration of boats of artisanal fisheries, nor does it require records of the reef fish sold in local markets or exported within and outside the FSM, which makes the management of the inshore resources even more difficult.

The individual state governments, however, have made some effort to establish sustainable fishing practices based on fisher surveys and traditional knowledge. An example of this is the ban on fishing groupers from March – April in Pohnpei to prevent groupers from being fished during their spawning season (Rhodes 2003). However, other state governments need to improve management and enforcement, for example to deal with the continuing use of dynamite and poison fishing in the state of Chuuk, even though Chuuk has very strict laws to prevent dynamite fishing. FSM has made a notable effort in maintaining the offshore fisheries (in its EEZ) within sustainable levels; however, a comprehensive plan, involving the other Pacific Island countries, is needed to better manage the yellowfin, bigeye and skipjack tuna stocks present in the Western Pacific Ocean, to prevent overexploitation of stocks (Gillett 2010). The FSM government should make similar efforts in managing its inshore fisheries to maintain self-sufficiency and economic capacity; particularly in light of the decreasing economic support from Compact II (Anon. 2005). Furthermore, the revenue generated by FSM from access agreements, though large, should more appropriately reflect the true value of the resources being extracted from their EEZ.

[5] Available at http://green.blogs.nytimes.com/2011/08/04/pacific-islands-band-together-on-a-shark-sanctuary/?partner=rss&emc=rss (accessed August 4, 2011)

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Tables:

Table 1. FSM per capita rates used for estimating subsistence and artisanal catches for FSM for 1950 - 2009

Year	Per capita catch rate		Per capita non-fish meat imports
	Subsistence (kg/person)	Artisanal (kg/person)	(kg/person)
2007	90.71	25.92	30.65
1950	153.77	5.18	15.33

Table 2. Taxonomic breakdown of artisanal and subsistence catches for FSM.

Family	Artisanal %	Subsistence %
Acanthuridae	8.63	5.10
Caesionidae	1.33	1.33
Carangidae	10.44	9.34
Haemulidae	0.78	7.95
Holocentridae	1.33	1.33
Kyphosidae	0.21	2.11
Labridae	15.57	4.10
Lethrinidae	12.66	14.32
Lutjanidae	7.20	9.02
Mullidae	2.44	5.00
Scaridae	17.27	22.96
Serranidae	16.75	7.43
Siganidae	5.37	10.00
Total	100.00	100.00

Appendix Table A1. Total reconstructed catch for the FSM (t) separated by sectors and assumed small-scale FAO landings presented on behalf of FSM (1950 – 2010).

Year	FAO Landings	Total reconstructed catch	Artisanal	Subsistence
1950	0.25	5,090	166	4,920
1951	0.25	5,340	187	5,150
1952	0.25	5,590	210	5,380
1953	0.25	5,840	234	5,610
1954	100.00	6,090	259	5,830
1955	100.00	6,330	286	6,050
1956	100.00	6,370	304	6,070
1957	300.00	6,410	322	6,090
1958	300.00	6,450	341	6,110
1959	400.00	6,490	360	6,130
1960	400.00	6,520	380	6,140
1961	500.00	6,560	400	6,160
1962	500.00	6,690	426	6,270
1963	600.00	6,830	453	6,370
1964	600.00	6,960	481	6,480
1965	700.00	7,090	510	6,580
1966	800.00	7,220	540	6,680
1967	1,000.00	7,350	571	6,780
1968	1,000.00	7,630	615	7,010
1969	1,000.00	7,910	660	7,250
1970	1,001.00	8,260	714	7,540
1971	1,001.00	8,410	752	7,660
1972	1,001.00	8,560	791	7,770
1973	1,001.00	8,700	831	7,870
1974	1,001.00	8,850	872	7,980
1975	1,001.00	9,120	927	8,190
1976	1,001.00	9,380	983	8,400
1977	1,003.75	9,640	1,041	8,600
1978	1,005.75	9,620	1,070	8,550
1979	1,005.75	9,810	1,123	8,690
1980	1,012.25	10,000	1,178	8,820
1981	1,012.25	10,460	1,267	9,200
1982	1,017.25	10,920	1,359	9,560
1983	1,017.25	11,370	1,454	9,920
1984	1,017.25	11,820	1,552	10,270
1985	3,021.25	11,950	1,610	10,340
1986	3,021.25	12,080	1,670	10,410
1987	3,023.25	12,200	1,730	10,470
1988	2,023.25	12,330	1,792	10,530
1989	1,523.25	12,450	1,855	10,590
1990	1,525.25	12,820	1,958	10,860
1991	999.25	12,950	2,025	10,930
1992	1,063.25	13,080	2,094	10,980
1993	1,094.25	13,200	2,164	11,040
1994	1,044.25	13,320	2,236	11,090
1995	1,135.25	13,280	2,279	11,000
1996	1,245.25	13,230	2,323	10,910
1997	1,345.25	13,180	2,367	10,810
1998	1,345.25	13,130	2,412	10,720
1999	1,445.25	13,090	2,456	10,630
2000	1,445.25	13,040	2,501	10,540
2001	1,545.25	12,990	2,546	10,440
2002	2,045.25	12,930	2,590	10,340
2003	2,645.00	12,870	2,633	10,240
2004	3,245.00	12,810	2,676	10,140
2005	3,845.00	12,740	2,718	10,030
2006	4,445.00	12,670	2,759	9,910
2007	5,045.00	12,600	2,800	9,800
2008	5,645.00	12,520	2,839	9,680
2009	6,245.00	12,430	2,877	9,560
2010	6,845.00	12,340	2,913	9,420

Appendix Table A2. Reconstructed catch (t) of major families caught within FSM's EEZ during the period 1950-2010.

Year	Scaridae	Lethrinidae	Carangidae	Siganidae	Lutjanidae	Serranidae	Others
1950	1,160	726	477	501	456	394	1,380
1951	1,220	762	501	525	479	415	1,440
1952	1,270	797	525	550	501	435	1,510
1953	1,330	833	548	573	523	456	1,580
1954	1,380	868	572	597	545	477	1,650
1955	1,440	902	595	620	566	498	1,720
1956	1,450	908	599	623	570	502	1,730
1957	1,450	913	602	626	573	507	1,740
1958	1,460	918	606	629	576	511	1,750
1959	1,470	923	610	632	579	516	1,760
1960	1,480	928	613	635	582	520	1,770
1961	1,480	933	617	637	585	525	1,780
1962	1,510	951	630	650	596	537	1,820
1963	1,540	970	643	662	608	550	1,850
1964	1,570	989	655	674	619	562	1,890
1965	1,600	1,007	668	685	631	575	1,930
1966	1,630	1,025	680	697	642	587	1,960
1967	1,650	1,042	692	708	653	599	2,000
1968	1,720	1,082	719	734	677	625	2,070
1969	1,780	1,121	746	760	702	650	2,150
1970	1,850	1,170	779	793	732	680	2,250
1971	1,890	1,191	794	806	745	695	2,290
1972	1,920	1,212	808	819	758	710	2,330
1973	1,950	1,232	822	832	770	725	2,370
1974	1,980	1,252	836	844	783	739	2,410
1975	2,040	1,290	862	869	806	764	2,490
1976	2,100	1,327	887	892	828	789	2,560
1977	2,150	1,362	912	915	851	814	2,630
1978	2,150	1,358	909	912	848	814	2,620
1979	2,190	1,385	928	928	864	834	2,680
1980	2,230	1,410	946	944	880	852	2,730
1981	2,330	1,475	990	986	920	895	2,860
1982	2,430	1,539	1,033	1,027	959	937	2,980
1983	2,520	1,602	1,077	1,068	998	980	3,110
1984	2,620	1,664	1,119	1,108	1,037	1,022	3,230
1985	2,650	1,681	1,132	1,118	1,047	1,037	3,270
1986	2,670	1,698	1,144	1,128	1,058	1,052	3,300
1987	2,700	1,715	1,157	1,138	1,068	1,067	3,340
1988	2,720	1,732	1,169	1,147	1,078	1,082	3,370
1989	2,750	1,748	1,181	1,156	1,087	1,096	3,410
1990	2,830	1,800	1,217	1,189	1,119	1,134	3,510
1991	2,850	1,818	1,230	1,200	1,130	1,150	3,550
1992	2,880	1,834	1,242	1,208	1,140	1,166	3,590
1993	2,900	1,851	1,255	1,218	1,150	1,181	3,620
1994	2,920	1,866	1,266	1,225	1,159	1,196	3,650
1995	2,910	1,858	1,262	1,219	1,153	1,197	3,640
1996	2,890	1,849	1,257	1,211	1,147	1,197	3,630
1997	2,880	1,842	1,253	1,204	1,142	1,197	3,620
1998	2,870	1,834	1,249	1,197	1,137	1,198	3,610
1999	2,850	1,826	1,245	1,190	1,132	1,198	3,590
2000	2,840	1,819	1,241	1,183	1,127	1,199	3,580
2001	2,830	1,811	1,237	1,176	1,122	1,200	3,570
2002	2,810	1,802	1,232	1,169	1,116	1,200	3,560
2003	2,800	1,793	1,227	1,161	1,110	1,199	3,540
2004	2,780	1,783	1,222	1,153	1,103	1,199	3,530
2005	2,760	1,773	1,216	1,144	1,096	1,197	3,510
2006	2,740	1,762	1,210	1,135	1,089	1,196	3,490
2007	2,720	1,751	1,203	1,126	1,082	1,194	3,480
2008	2,700	1,739	1,196	1,116	1,074	1,192	3,450
2009	2,680	1,726	1,189	1,106	1,065	1,189	3,430
2010	2,660	1,712	1,180	1,094	1,056	1,185	3,410

Figures:

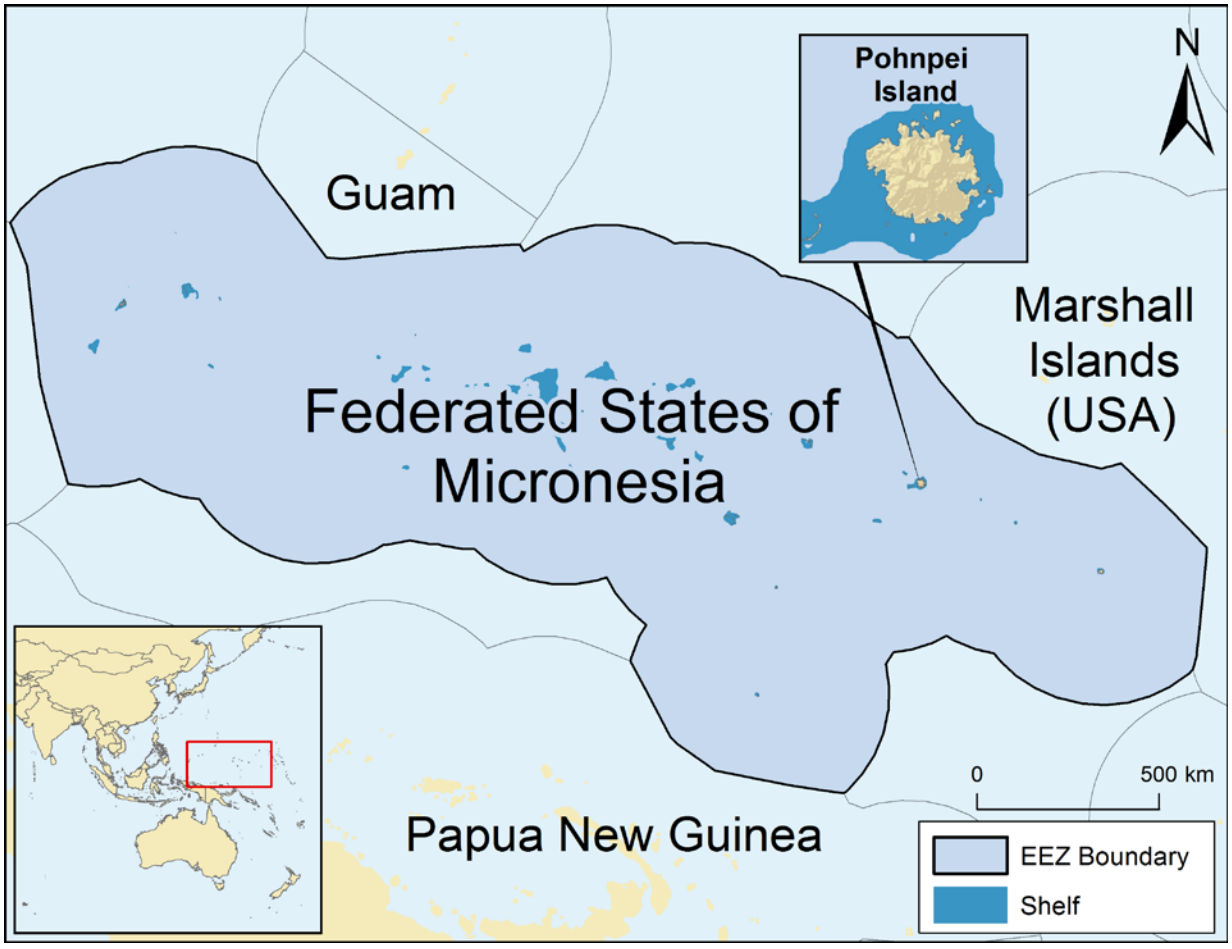

Figure 1: Exclusive Economic Zone (EEZ) and shelf areas to 200 m depth for the Federated States of Micronesia (FSM).

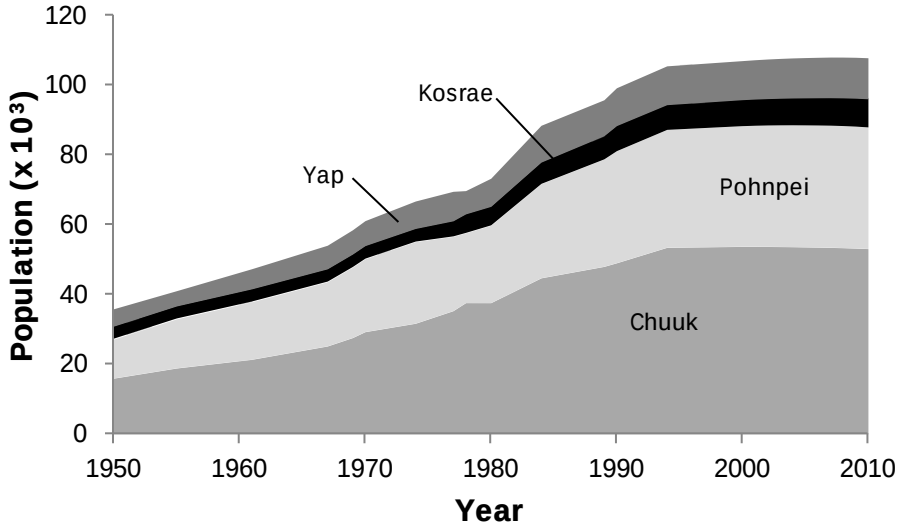

Figure 2. Human population trend of the four states of FSM in the period 1950-2010.

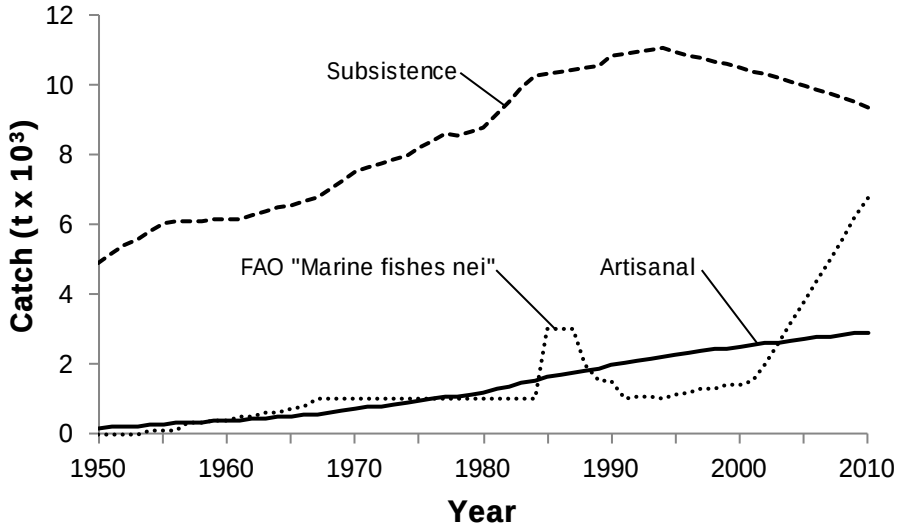

Figure 3. Total reconstructed catch by sector (minus reported subsistence invertebrates), compared to the reported "marine fishes nei" for the FSM, 1950-2010.

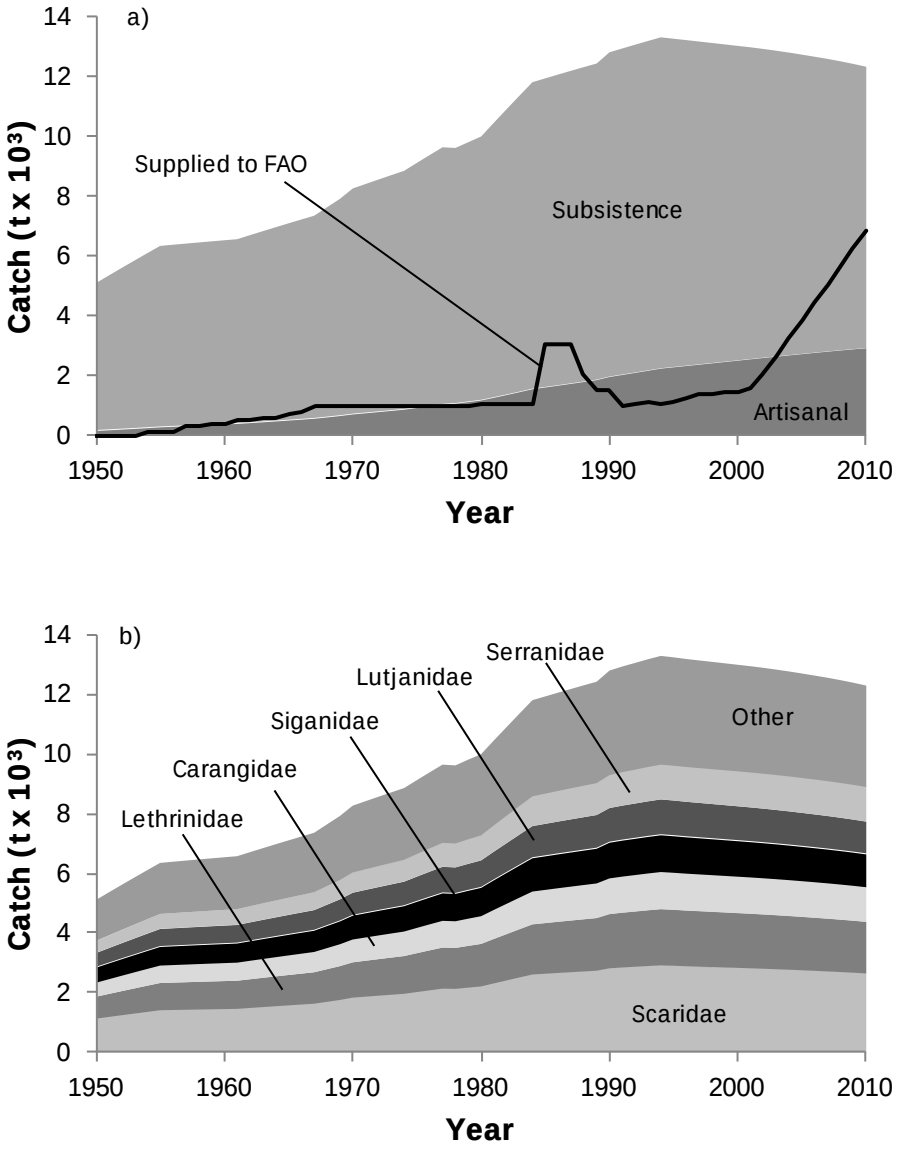

Figure 4. Total reconstructed catch of the FSM, 1950-2010, by a) fisheries sectors. Note, the FAO reported data (small-scale only) is overlaid as line graph; and b) major taxonomic groups. 'Others' contains 11 additional taxonomic categories.