Pelagic Fisheries of the Western Pacific Region

2013 Annual Report

Western Pacific Regional Fishery Management Council
Honolulu, Hawaii

Cover photo: *Longliners idle at Honolulu Pier 16 during the 2015 two month closure of the Western and Central Pacific Ocean for bigeye. Source: WPRFMC*

A report of the Western Pacific Regional Fishery Management Council

Pelagic Fisheries of the Western Pacific Region

2013 Annual Report

November 2015

Prepared by the Pelagics Plan Team and Council Staff

for the

Western Pacific Regional Fishery Management Council
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I. Introduction

A. Background to the Annual Report

The Fishery Management Plan (FMP) for Pelagic Fisheries of the Western Pacific Region was implemented by the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NMFS) on 23 March 1987. The Western Pacific Regional Fishery Management Council (WPRFMC, or Council) developed the FMP to manage the pelagic resources that are covered by the Magnuson Fishery Conservation and Management Act of 1976 and that occur in the US Exclusive Economic Zone (EEZ) around American Samoa, Guam, Hawaii, the Commonwealth of the Northern Mariana Islands (CNMI), and the US possessions in the Western Pacific Region (Johnston Atoll, Kingman Reef and Palmyra, Jarvis, Howland, Baker, Midway, and Wake Islands). In 2010, the Council and NMFS implemented the Pelagics Fishery Ecosystem Plan (FEP) that manages the fisheries while taking ecosystem considerations into account.

Figure 1. **Map of the Western Pacific Region**

The abridged objectives of the Pelagics FEP are to:

- Utilize a science-based ecosystem approach to resource management in an ecologically and culturally-sensitive manner to maintain diverse, productive marine ecosystems.

- Flexible and adaptive management systems that respond quickly to new scientific information and changes in environmental conditions or human use patterns.
- Reduce unsustainable human impacts and foster stewardship through improving public and government awareness and understanding of marine environments.
- Encourage and provide for sustained and substantive participation of local communities in exploration, development, conservation, and management of marine resources.
- Minimize fishery bycatch and waste to the extent practicable.
- Manage and co-manage protected species, protected habitats, and protected areas.
- Promote safety of human life at sea.
- Encourage and support appropriate compliance and enforcement with local and federal fishery regulations.
- Increase collaboration with domestic and foreign regional fishery management organizations, communities, and public to successfully manage marine ecosystems.
- Improve quantity and quality of available information to support marine ecosystem management.

Non-tuna PMUS are sometimes referred to as "other PMUS" in this report. This term is equivalent to PMUS (Pelagic Management Unit Species) used in annual reports previous to 1992, before tunas were included in the management unit.

The PMUS are caught in the troll, longline, handline and pole-and-line (baitboat) fisheries. They are caught in oceanic as well as insular pelagic waters. Most of these species are considered to be epipelagic because they occupy the uppermost layers of the pelagic zone. All are trophically high-level predators. Pelagic fisheries for PMUS are among the most important, if not the dominant, Pacific Island fisheries.

This report contains fishery performance data from each of the four island groups through 2013, and interpretations of trends or important events occurring in the fisheries and recommendations. The Hawaii report is an integration of State of Hawaii Division of Aquatic Resources and NMFS summaries. This report was prepared using reports submitted by the following agencies:

- Territory of American Samoa, Department of Marine and Wildlife Resources
- Territory of Guam, Division of Aquatic and Wildlife Resources
- Territory of Guam, Department of Commerce
- State of Hawaii, Division of Aquatic Resources
- Commonwealth of the Northern Mariana Islands, Division of Fish and Wildlife
- NMFS, Pacific Islands Region (including Pacific Islands Fisheries Science Center, Pacific Islands Regional Office, and Office for Law Enforcement)
- US Coast Guard, District 14
- Pelagic Fisheries Research Program, University of Hawaii

A list of the Pelagic Plan Team members during 2013 and persons responsible for compilation of this report are included in Appendix 1.

B. The Pelagic Species of the Western Pacific Region

The Management Unit Species (MUS) managed under the Pelagic FEP excludes dogtooth tuna (*Gymnosarda unicolor*) and all sharks except the following nine species: pelagic thresher shark (*Alopias pelagicus*), bigeye thresher shark (*Alopias superciliosus*), common thresher shark (*Alopias vulpinus*), silky shark (*Carcharhinus falciformis*), oceanic whitetip shark, (*Carcharhinus longimanus*), blue shark (*Prionace glauca*), shortfin mako shark (*Isurus oxyrinchus*), longfin mako shark (*Isurus paucus*), and salmon shark (*Lamna ditropis*) (Table 1).

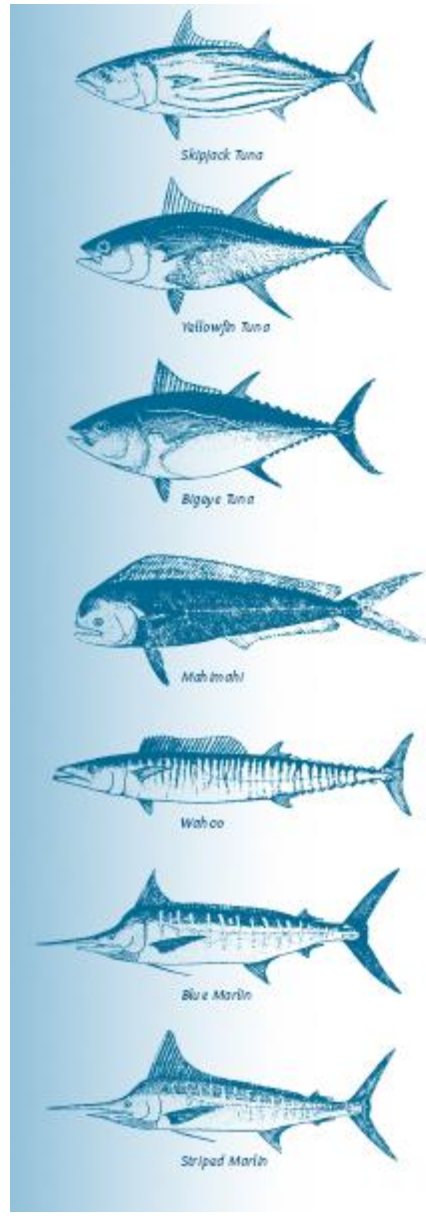
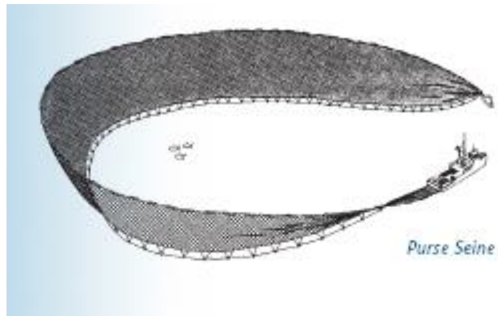


Table 1. Names of Pacific Pelagic Management Unit Species

English Common Name	Scientific Name	Samoan or AS local	Hawaiian or HI local	Chamorroan or Guam local	S. Carolinian or CNMI local	N. Carolinian or CNMI local
Mahimahi (dolphinfishes)	*Coryphaena* spp.	Masimasi	Mahimahi	Botague	Sopor	Habwur
Wahoo	*Acanthocybium solandri*	Paala	Ono	Toson	Ngaal	Ngaal
Indo-Pacific blue marlin Black marlin	*Makaira mazara:* *M. indica*	Sa'ula	A'u, Kajiki	Batto'	Taghalaar	Taghalaar
Striped marlin	*Tetrapturus audax*		Nairagi			
Shortbill spearfish	*T. angustirostris*	Sa'ula	Hebi	Spearfish		
Swordfish	*Xiphias gladius*	Sa'ula malie	A'u kū, Broadbill, Shutome	Swordfish	Taghalaar	Taghalaar
Sailfish	*Istiophorus platypterus*	Sa'ula	A'u lepe	Guihan layak	Taghalaar	Taghalaar
Pelagic thresher shark Bigeye thresher shark Common thresher shark Silky shark Oceanic whitetip shark Blue shark Shortfin mako shark Longfin mako shark Salmon shark	*Alopias pelagicus* *Alopias superciliosus* *Alopias vulpinus* *Carcharhinus falciformis* *Carcharhinus longimanus* *Prionace glauca* *Isurus oxyrinchus* *Isurus paucus* *Lamna ditropis*	Malie	Mano	Halu'u	Paaw	Paaw
Albacore	*Thunnus alalunga*	Apakoa	'Ahi palaha, Tombo	Albacore	Angaraap	Hangaraap
Bigeye tuna	*T. obesus*	Asiasi, To'uo	'Ahi po'onui, Mabachi	Bigeye tuna	Toghu, Sangir	Toghu, Sangir
Yellowfin tuna	*T. albacares*	Asiasi, To'uo	'Ahi shibi	'Ahi, Shibi	Yellowfin tuna	Toghu
Northern bluefin tuna	*T. thynnus*		Maguro			
Skipjack tuna	*Katsuwonus pelamis*	Atu, Faolua, Ga'oga	Aku	Bunita	Angaraap	Hangaraap
Kawakawa	*Euthynnus affinis*	Atualo, Kavalau	Kawakawa	Kawakawa	Asilay	Hailuway
Moonfish	*Lampris* spp	Koko	Opah		Ligehrigher	Ligehrigher
Oilfish family	Gempylidae	Palu talatala	Walu, Escolar		Tekiniipek	Tekiniipek
Pomfret	family Bramidae	Manifi moana	Monchong			
Other tuna relatives	*Auxis* spp, *Scomber* spp; *Allothunus* spp	(various)	Ke'o ke'o, saba (various)	(various)	(various)	(various)

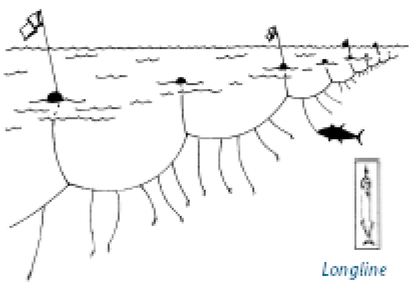
C. Pelagic Gear Types and Fisheries of the Western Pacific Region

U.S. pelagic fisheries in the Western Pacific Region are, with the exception of purse seining, primarily variations of hook-and-line fishing. These include longlining, trolling, handlining, and pole-and-line fishing.



The largest fishery in terms of tonnage of fish landed is the U.S. purse-seine fishery, with catches of skipjack, yellowfin and bigeye tuna amounting to 254,491 mt in 2013. The fleet contains 40 vessels as of 2013[1].

The U.S. fleet of albacore trollers, based at West Coast ports, amounts to about 400 vessels, fishing primarily in the temperate waters of the North Pacific. Some vessels from this fleet also fish seasonally for albacore in the South Pacific. In the past catches by this fishery reached about 4,900 mt (in 1991) but more recently catches have amounted to between 200-300 mt. In 2013, 6 trollers fished the South Pacific landing 390 mt of albacore.



U.S. longline vessels in the Western Pacific Region are based primarily in Hawaii and American Samoa, although Hawaii-based vessels targeting swordfish have also fished seasonally out of California. The Hawaii fishery, with 135 vessels, targets a range of species, with vessels setting shallow longlines to catch swordfish or fishing deep to maximize catches of bigeye tuna. Catches by the Hawaii fleet also include yellowfin tuna, mahimahi (dolphinfish, dorado), wahoo, blue and striped marlins, opah (moonfish) and monchong (pomfret). The Hawaii fishery does not freeze its catch, which is sold to the fresh fish and sashimi markets in Hawaii, Japan, and the U.S. mainland.

The American Samoa fleet of about 22 active vessels in 2013, down from a peak of 70 active vessels in 2001, fishes almost exclusively for albacore tuna, which is landed to two tuna canneries in American Samoa. The estimated pelagic fishery landings in 2013 amounted to 6.3 million pounds. Pelagic landings consisted primarily of four tuna species: albacore, yellowfin, bigeye, and skipjack. The pelagic species wahoo, blue marlin, and mahimahi comprised most of the non-tuna landings.

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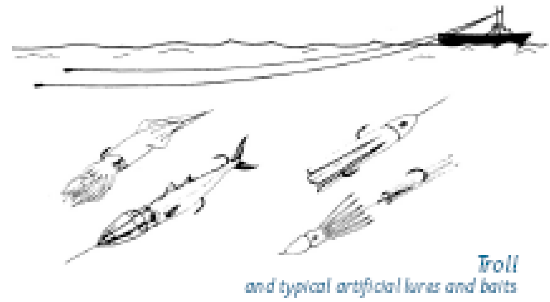
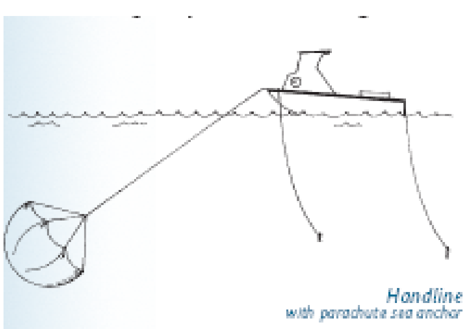
[1] www.wcpfc.int – WCFPC Tuna Fishery Yearbook

Trolling and, to lesser extent, handline fishing for pelagics is the largest commercial fishery in terms of participation, although it catches annually a relative modest volume of fish amounting to about 3.1 million lbs in 2013. Part of this catch is made by charter or for-hire fishing vessels. In 2013, there were 1,655 troll vessels and 523 handline vessels in Hawaii, 496 troll vessels in Guam, 28 troll vessels in CNMI and 13 troll vessels in American Samoa. Troll and handline catches are dominated by yellowfin tuna in Hawaii, by skipjack tuna in Guam, and skipjack and yellowfin tuna in American Samoa. Other commonly caught troll catches include mahimahi, wahoo, and blue marlin. About 80 percent of the troll and handline landings are made by Hawaii vessels.



Troll fishing for pelagics is the commonest recreational fishery in the islands of the Western Pacific Region. The definition of recreational fishing, however, continues to be problematic in a region where many fishermen who are fishing primarily for recreation may sell their fish to cover their expenses. Hawaii's 2013 recreational fishery landings amounted to about 12 million lbs, based on surveys of fishermen, with yellowfin tuna landings at about 159,540 lbs (34%). Recreational or non-commercial landings from boats in Guam were about 49,106 lbs in 2013, 64% of which was mahimahi. In 2013, recreational landings were not recorded in CNMI. Recreational landings from boats in American Samoa were about 569 lbs in 2013, substantially lower than 2012 landings; there is no breakout by species.



In 2013, tuna fisheries in the Western Pacific Ocean as a whole catch about 2.7 million mt of fish, with U.S. fisheries in the Western Pacific Region catching about 10.1% (265,053 mt) of the total. Most of the catch is taken by fleets of high seas longliners and purse seiners from countries such as Japan, Taiwan, Korea and the nations of Central and South America. Over the last 15 years, Pacific Island countries such as Papua New Guinea have grown in importance in terms of their large scale purse-seine and longline fisheries. Small scale artisanal longlining is also conducted in Pacific Island countries like Samoa and in South America, where there are thousands of small scale longline vessels fishing in coastal waters.

II. Development and Description of the Fisheries of the Western Pacific Region

A. American Samoa

The islands of American Samoa are an area of modest productivity relative to areas to the north and west. The region is traversed by two main currents: the southern branch of the westward-flowing South Equatorial Current during June - October and the eastward-flowing South Equatorial Counter Current during November - April. Surface temperatures vary between 27°-29° C and are highest in the January - April period. The upper limit of the thermocline in ocean areas is relatively shallow (27° C isotherm at 100m depth) but the thermocline itself is diffuse (lower boundary at 300m depth).

1. Traditional and Historical Pelagic Fisheries

Small-scale longline: This fishery is almost defunct with only one vessel still operating. Most participants in the small-scale domestic longline fishery were indigenous American Samoans with vessels under 50 ft in length, most of which are alia boats under 40 ft in length. The stimulus for American Samoa's commercial fishermen to shift from troll or handline gear to longline gear in the mid-1990s was the fishing success of 28' alia catamarans that engaged in longline fishing in the EEZ around Independent Samoa. Following this example, the fishermen in American Samoa deployed a short monofilament longline, with an average of 350 hooks per set, from a hand-powered reel (WPRFMC, 2000). An estimated 90 percent of the crews working in the American Samoa small-scale alia longline fleet were from Independent Samoa. Like the conventional monohull longline fishery (see below) the predominant catch from the small scale fishery albacore tuna, which is marketed to the local tuna canneries.

***Large-scale longline*:** American Samoa's domestic longline fishery expanded rapidly in 2001. Much of the recent (and anticipated future) growth is due to the entry of monohull vessels larger than 50 ft in length. The number of permitted longline vessels in this sector increased from seven in 2000 to 38 by 2003. Of these, five permits for vessels between 50.1 ft - 70 ft and five permits for vessels larger than 70 ft were believed to be held by indigenous American Samoans as of March 21, 2002. Economic barriers have prevented more substantial indigenous participation in the large-scale sector of the longline fishery. The lack of capital appears to be the primary constraint to substantial indigenous participation in this sector. In 2013, although there are still 37 permitted vessels greater than 50 feet length, only 22 are active compared to the 31 active vessels in 2003.

While the smallest (less than or equal to 40 ft) vessels average 350 hooks per set, a vessel over 50 ft can set 5-6 times more hooks and has a greater fishing range and capacity for storing fish (8-40 mt as compared to 0.5-2 mt on a small-scale vessel). Larger vessels are also outfitted with hydraulically-powered reels to set and haul mainline, and modern electronic equipment for navigation, communications and fish finding. Most are presently being operated to freeze albacore onboard, rather than to land chilled fish. It does not appear that large numbers of longliners from Hawaii are relocated in American Samoa, although 12 permits are owned by Hawaiian residents. Instead, large vessels have participated in the American Samoa longline fishery from diverse ports and fisheries, including American Samoa itself (17) and the US west coast (9) and New Jersey (3).

Distant-water purse seine fishery: The US purse seine fleet operating in the central and western Pacific uses large nets to capture skipjack, yellowfin and bigeye tuna near the ocean surface, in free-swimming schools and around fish aggregation devices (FADs) deployed by the fleet. These vessels often land their catches at canneries based in American Samoa. These large vessels (200-250 ft length) could not be economically operated for longline fishing but some former participants in the U.S. purse seine fishery have acquired more suitable vessels and participated in the American Samoa-based longline fishery.

Distant-water jig albacore fishery: Domestic albacore jig vessels also supply tuna to the canneries in American Samoa. Between 1988 and 2001, about 30-55 US vessels participated in the high-seas troll fishery for albacore. This fishery occurs seasonally (December through April) in international waters at 35°-40° S latitude. The vessels range in length from 50 to 120 feet, with the average length about 75 feet. They operate with crews of 3-5 and are capable of freezing 45-90 tons of fish. Currently (2007-2011), only 3-6 vessels have operated in this fishery and catch between 150 and 300 mt of fish annually.

Troll and handline fishery: From October 1985 to the present, catch and effort data in American Samoa fisheries have been collected through a creel survey that includes subsistence and recreational fishing, as well as commercial fishing. However, differentiating commercial troll fishing activity from non-commercial activity can be difficult.

Recreational fishing underwent a renaissance in American Samoa with the establishment of the Pago Pago Game Fishing Association (PPGFA), founded in 2003 by a group of recreational anglers. The motivation to form the PPGFA was the desire to host regular fishing competitions. There are about 15 recreational fishing vessels ranging from 10 ft single engine dinghies to 35 ft twin diesel engine cabin cruisers. The PPGFA has annually hosted international tournaments over the past 15 years, including the Steinlager I'a Lapo'a Game Fishing Tournament (a qualifying event for the International Game Fish Association's Offshore World Championship in Cabo San Lucas, Mexico). The recreational vessels use anchored fish aggregating devices (FADs) extensively, and on tournaments venture to the various outer banks which include the South Bank (35 miles), North East Bank (40 miles NE), South East bank (37 miles SE), 2% bank (40 miles), and East Bank (24 miles East).

There was no full-time regular charter fishery in American Samoa similar to those in Hawaii or Guam. However, Pago Pago Marine Charters, which is concerned primarily with industrial work such as underwater welding, construction, and salvage, now operates a full-time charter fishery.

Estimation of the volume and value of recreational fishing in American Samoa is not known with any precision. A volume approximation of boat based recreational fishing is generated in this annual report based on the annual sampling of catches conducted by WPacFIN. Boat-based recreational catches have ranged from 857 to 46,462 lb between 2002 and 2013, with an average of about 14,000 lbs; recreational catch in 2013 was approximately 569 lbs.

2. Pelagic Fisheries Development

American Samoan dependence on fishing undoubtedly goes back as far as the peopled history of the islands of the Samoan archipelago, about 3,500 years ago. Many aspects of the culture have changed in contemporary times but American Samoans have retained a traditional social system that continues to strongly influence and depend upon the culture of fishing. Centered around an extended family (`aiga) and allegiance to a hierarchy of chiefs (matai), this system is rooted in the economics and politics of communally-held village land. It has effectively resisted Euro-American colonial influence and has contributed to a contemporary cultural resiliency unique in the Pacific islands region.

The small economy in American Samoa continues to develop. Its two most important sectors are the American Samoa Government (ASG), which receives income and capital subsidies from the federal government, and tuna canning (BOH (Bank of Hawaii). 1997. American Samoa economic report. Bank of Hawaii, Honolulu.). In 2013 domestic exports from American Samoa amounted to $393,145,824 of which $383,730,000 or 98% comprised canned tuna (American Samoa Statistical Yearbook, 2013). Private businesses and commerce comprise a smaller third sector. Unlike some of its South Pacific neighbors, American Samoa has never had a robust tourist industry.

The excellent harbor at Pago Pago, 390,000 square kilometers of EEZ, and certain special provisions of U.S. law form the basis of American Samoa's decades-old fish processing industry (BOH 1997). The territory is exempt from the Nicholson Act, which prohibits foreign ships from landing their catches in U.S. ports. American Samoan products with less than 50 percent market value from foreign sources enter the United States duty free (Headnote 3(a) of the U.S. Tariff Schedule). In 1997, tuna processing directly and indirectly generated about 15% of current money wages, 10-12% of aggregate household income, and 7% of government receipts in the territory (BOH 1997); these numbers are thought to be fairly reliable up until Chicken-of-the-Sea (COS) closed in 2009. Prior to the COS tuna cannery closure, canning provided 8,118 jobs (5,538 direct 2,580 indirect) in American Samoa – 45.6 percent of total employment (McPhee and Associates 2008). The COS closure resulted in the loss of approximately 2,000 of those jobs. Although the private sector gross domestic product declined in 2012, it was offset by an increase in the tuna canning industry (BEA 2013). Cannery exports accounted for the majority of total exports of goods and services (DOC SD 2013); the value of canned tuna exports was approximately $383.7 million (DOC SD 2013, pg. 180) out of the total $393.1 million for total exports.

In 2013, the ASG employed 6,198 people (38 percent of total employment; DOC Statistical Yearbook, pg. 118, 2013), and the private sector employed 7,783 people. Canneries employed 2,108 people, which is 13% of the people employed. As of 2010, there were 34,767 people 16 years and older in the labor force (statistic is updated every 5 years).

Harsh working conditions, low wages and long fishing trips have discouraged American Samoans from working on foreign longline vessels delivering tuna to the canneries. American Samoans prefer employment on the U.S. purse seine vessels, but the capital-intensive nature of purse seine operations limits the number of job opportunities for locals in that sector as well. However, the presence of the industrial tuna fishing fleet has had a positive economic effect on the local economy as a whole. Ancillary businesses involved in re-provisioning the fishing fleet generate a significant number of jobs and amount of income for local residents.

The tuna processing industry has had a mixed effect on the commercial fishing activities undertaken by American Samoans. The canneries used to buy fish from the small-scale domestic longline fleet based in American Samoa, although the quantity of this fish was insignificant compared to cannery deliveries by the U.S. purse seine, U.S. albacore and foreign longline fleets. Moreover, the small scale alia fleet has been reduced to one vessel that still operates.

Local fishermen have indicated an interest in participating in the far more lucrative overseas market for fresh fish. To date, however, inadequate shore-side ice and cold storage facilities in American Samoa and infrequent and expensive air transportation links have been restrictive factors.

American Samoa's position in the industry is being eroded by forces at work in the world economy and in the tuna canning industry itself. Whereas wage levels in American Samoa are the US minimum wage, they are considerably higher than in other canned tuna production centers around the world. To remain competitive, U.S. tuna producers are purchasing more raw materials, especially pre-cooked loins, from foreign manufacturers. Tax benefits to US canneries operating in American Samoa have also been tempered by the removal of a provision in the US tax code that previously permitted the tax-free repatriation of corporate income in US territories. Trends in world trade, specifically reductions in tariffs, are reducing the competitive advantage of American Samoa's duty-free access to the US canned tuna market.

3. Administrative or Management Actions to Date

Along with the original measures placed into the Pelagics FMP, the following amendments were made which affected the pelagic fisheries of American Samoa:

FMP AMENDMENT 1 (effective March 1, 1991) defined recruitment overfishing and optimum yield for each PMUS.

FMP AMENDMENT 2 (effective May 26, 1991) implemented permitting and logbook requirements for domestic pelagic longline fishing and transshipment vessel operators.

FMP AMENDMENT 8 (effective Feb. 3, 1999, and July 3, 2003) addressed new requirements under the 1996 Sustainable Fisheries Act, included designations of essential fish habitat, descriptions of fishing communities, overfishing definitions and bycatch.

FMP AMENDMENT 10 (prepared and transmitted to the NMFS for approval in parallel with the FMP for Coral Reef Ecosystems of the Western Pacific Region) clarified the PMUS by removing all but truly oceanic sharks to the Coral Reef Ecosystems FMP along with dogtooth tuna.

FMP AMENDMENT 11 (effective May 24, 2005) established a limited access system for pelagic longlining in EEZ waters around American Samoa with initial entry criteria based on historical participation in the fishery.

In 2006 NMFS notified the Council that overfishing of Western and Central Pacific yellowfin tuna was occurring and requested the Council to take appropriate action to end the overfishing. The Council was informed that the entire U.S. harvest of yellowfin tuna in the Western and Central Pacific was only about 4 percent of the total area's catch and that NMFS welcomed the Council's participation as a member in international fishery management organizations.

FMP AMENDMENT 14 (partially approved by NMFS on May 16, 2007) was developed in response to NMFS' notifications that Pacific-wide bigeye and Western and Central Pacific yellowfin tuna were subject to overfishing. It contained recommendations regarding both international and domestic management, including a mechanism by which the Council could participate in international negotiations regarding these stocks.

FMP REGULATORY AMENDMENT 7 (effective May 17, 2007) provided pelagic fishery participants the option of using NMFS approved electronic logbooks in lieu of paper logbooks. This measure was implemented to improve the efficiency and accuracy of catch reporting.

FRAMEWORK MEASURE 1 (effective March 1, 2002) established an area seaward of 3 nm out to approximately 50 nm around the islands of American Samoa in which fishing for PMUS is prohibited by vessels greater than 50 feet in length overall that did not land PMUS in American Samoa under a federal longline general permit prior to Nov. 13, 1997.

FMP AMENDMENT 15 (effective December 22, 2008) designated three species of pelagic squid as management unit species, and established permitting, reporting, and observer requirements for squid jig fishing vessels over 50ft (15.4 m) in length.

FEP AMENDMENT 1 (effective September 3, 2010) established eligibility requirements and procedures for reviewing and approving community development plans for Western Pacific fisheries.

FEP AMENDMENT 2 was disapproved on July 11, 2011. The intent was to establish a purse seine area closure in American Samoa.

FEP AMENDMENT 4 (effective June 27, 2011) established a mechanism for specifying annual catch limits for Western Pacific fisheries.

FEP AMENDMENT 5 (effective August 24, 2011) modified gear configurations for the American Samoa longline fishery to reduce sea turtle interactions.

FEP AMENDMENT 7 notice of availability and request for comments was published December 30, 2013 (78 FR 29388). Amendment 7 proposed a process for specifying catch and effort limits and accountability measures in the US Pacific territories. It also establishes a framework within which the government of each territory could allocate a portion of its catch limit to a US fishing vessel(s) through a specified fishing agreement, adhering to established criteria. The amendment includes establishing bigeye tuna catch limits for the US territories.

B. Guam

Generally, the major surface current affecting Guam is the North Equatorial Current, which flows westward through the islands. Sea surface temperatures off Guam vary between 80.9° – 84.9° F, depending on the season. The mixed layer extends to depths between 300 and 400 ft.

1. Traditional and Historical Pelagic Fisheries

Guam's pelagic fisheries consist of primarily small, recreational, trolling boats that are either towed to boat launch sites or berthed in marinas and fish only within local waters, either within the EEZ around Guam or on some occasions in the adjacent EEZ waters around the Northern Mariana Islands.

Landings consisted primarily of five major species: mahimahi (*Coryphaena hippurus*), wahoo (*Acanthocybium solandri*), bonita or skipjack tuna (*Katsuwonus pelamis*), yellowfin tuna (*Thunnus albacares*), and Pacific blue marlin (*Makaira mazara*). Other minor pelagic species caught include rainbow runner (*Elagatis bipinnulatus*), great barracuda (*Sphyraena barracuda*), kawakawa (*Euthynnus affinis*), dogtooth tuna (*Gymnosarda unicolor*), double-lined mackerel *(Grammatorcynus bilineatus*), oilfish (*Ruvettus pretiosus*), and three less common species of barracuda.

The number of boats involved in Guam's pelagic or open ocean fishery gradually increased from about 200 vessels in 1982. There were 496 boats active in Guam's domestic pelagic fishery in 2013. A majority of the fishing boats are less than 10 meters (33 feet) in length and are usually owner-operated by fishermen who earn a living outside of fishing. Most fishermen sell a portion of their catch at one time or another and it is difficult to make a distinction between recreational, subsistence, and commercial fishers. A small, but significant, segment of Guam's pelagic fishery is made up of marina-berthed charter boats that are operated primarily by full-time captains and crews.

2. Pelagic Fisheries Development

Fishing in Guam continues to be important not only in terms of contributing to the subsistence needs of the Chamorro people but also in terms of preserving their history and identity. Fishing assists in perpetuating traditional knowledge of marine resources and maritime heritage of the Chamorro culture.

The importance of commercial fishing in Guam lies mainly in the territory's status as a major regional fish transshipment center and re-supply base for domestic and foreign tuna fishing fleets. Among Guam's advantages as a home port are well-developed and highly efficient port facilities in Apra Harbor; an availability of relatively low-cost vessel fuel; a well-established marine supply/repair industry; and recreational amenities for crew shore leave. In addition, the territory is exempt from the Nicholson Act, which prohibits foreign ships from landing their catches in U.S. ports. Initially, the majority of vessels calling in Apra Harbor to discharge frozen tuna for transshipment were Japanese purse seine boats and carrier vessels. In the late 1980s, Guam became an important port for Japanese and Taiwanese longline fleets, but port calls have steadily declined and the transshipment volume has also declined accordingly.

By the early 1990s, an air transshipment operation was also established on Guam. Fresh tuna was flown into Guam from the Federated States of Micronesia and elsewhere on air cargo planes and out of Guam to the Japanese market on wide-body passenger planes. Further, vessels from Japan and Taiwan also landed directly into Guam where their fish was packed and transshipped by air to Japan. A second air transshipment operation began in the mid-1990s; it was transporting to Europe fish that did not meet Japanese sashimi market standards, but this has since ceased operations. Moreover, the entire transshipment industry has contracted markedly with only a few operators still making transshipments to Japan. Annual volumes of tuna transshipped of between 2007 and 2011 averages about 3,400 mt, with a 2012 estimate of 2,222 mt, compared to over 12,000 mt at the peak of operations between 1995 and 2001.

3. Administrative or Management Actions to Date

Along with the original measures placed into the Pelagics FMP, the following amendments were made which affected the pelagic fisheries of Guam:

FMP AMENDMENT 1 (effective March 1, 1991) defined recruitment overfishing and optimum yield for each PMUS.

FMP AMENDMENT 2 (effective May 26, 1991) implemented permitting and logbook requirements for domestic pelagic longline fishing and transshipment vessel operators.

FMP AMENDMENT 5 (effective March 2, 1992) created domestic longline vessel exclusion zones around the Main Hawaiian Islands (MHI) ranging from 50 to 75 nm and a similar 50 nm exclusion zone around Guam and its offshore banks.

FMP AMENDMENT 6 (effective Nov. 27, 1992) specified that all tuna species are designated as fish under U.S. management authority and included tunas and related species as PMUS under the FMP. It also applied the longline exclusion zones of 50 nm around the island of Guam and the 25-75 nm zone around the MHI to foreign vessels.

AMENDMENT 8 (effective Feb. 3, 1999, and July 3, 2003) addressed new requirements under the 1996 Sustainable Fisheries Act, included designations of essential fish habitat, descriptions of fishing communities, overfishing definitions and bycatch.

FMP AMENDMENT 10 (prepared and transmitted to the NMFS for approval in parallel with the FMP for Coral Reef Ecosystems of the Western Pacific Region) clarified the PMUS by removing all but truly oceanic sharks to the Coral Reef Ecosystems FMP along with dogtooth tuna. In 2006 NMFS notified the Council that overfishing of Western and Central Pacific yellowfin tuna was occurring and requested the Council to take appropriate action to end the overfishing. The Council was informed that the entire U.S. harvest of yellowfin tuna in the Western and Central Pacific was only about 4 percent of the total area’s catch and that NMFS welcomed the Council’s participation as a member in international fishery management organizations.

FMP AMENDMENT 14 (partially approved by NMFS on May 16, 2007) was developed in response to NMFS’ notifications that Pacific-wide bigeye and Western and Central Pacific yellowfin tuna were subject to overfishing. It contained recommendations regarding both international and domestic management, including a mechanism by which the Council could participate in international negotiations regarding these stocks.

FMP REGULATORY AMENDMENT 7 (effective May 17, 2007) provided pelagic fishery participants the option of using NMFS approved electronic logbooks in lieu of paper logbooks. This measure was implemented to improve the efficiency and accuracy of catch reporting.

FMP AMENDMENT 15 (effective December 22, 2008) designated three species of pelagic squid as management unit species, and established permitting, reporting, and observer requirements for squid jig fishing vessels over 50ft (15.4 m) in length.

FEP AMENDMENT 1 (effective September 3, 2010) established eligibility requirements and procedures for reviewing and approving community development plans for Western Pacific fisheries.

FEP AMENDMENT 4 (effective June 27, 2011) established a mechanism for specifying annual catch limits for Western Pacific fisheries.

FEP AMENDMENT 7 notice of availability and request for comments was published December 30, 2013 (78 FR 29388). Amendment 7 proposed a process for specifying catch and effort limits and accountability measures in the US Pacific territories. It also establishes a framework within which the government of each territory could allocate a portion of its catch limit to a US fishing vessel(s) through a specified fishing agreement, adhering to established criteria. The amendment includes establishing bigeye tuna catch limits for the US territories.

C. Hawaii

The archipelago's position in the Pacific Ocean lies within the clockwise rotating North Pacific Subtropical Gyre, extending from the northern portion of the North Equatorial Current into the region south of the Subtropical High, where the water moves eastward in the North Pacific Current. At the pass between the MHI and the NWHI there is often a westward flow from the region of Kauai along the lee side of the lower NWHI. This flow, the North Hawaiian Ridge Current (NHRC), is extremely variable and can also be absent at times. The analysis of 10 years of shipboard acoustic Doppler current profiler data collected by the NOAA Ship Townsend Cromwell shows mean flow through the ridge between Oahu and Nihoa, and extending to a depth of 200 m.

Imbedded in the mean east-to-west flow are an abundance of mesoscale eddies created from a mixture of wind, current, and sea floor interactions. The eddies, which can rotate either clockwise or counter clockwise, have important biological impacts. For example, eddies create vertical fluxes, with regions of divergence (upwelling) where the thermocline shoals and deep nutrients are pumped into surface waters enhancing phytoplankton production, and also regions of convergence (downwelling) where the thermocline deepens. Sea surface temperatures around the Hawaiian Archipelago experience seasonal variability, but generally vary between 18°-28° C (64°-82° F) with the colder waters occurring more often in the NWHI.

A significant source of inter-annual physical and biological variation around Hawaii are El Niño and La Niña events. During an El Niño, the normal easterly trade winds weaken, resulting in a weakening of the westward equatorial surface current and a deepening of the thermocline in the central and eastern equatorial Pacific. Water in the central and eastern equatorial Pacific becomes warmer and more vertically stratified with a substantial drop in surface chlorophyll.

Physical and biological oceanographic changes have also been observed on decadal time scales. These low frequency changes, termed regime shifts, can impact the entire ocean ecosystem. Recent regime shifts in the North Pacific have occurred in 1976 and 1989, with both physical and biological (including fishery) impacts. In the late 1980's an ecosystem shift from high carrying capacity to low carrying capacity occurred in the NWHI. The shift was associated with the weakening of the Aleutian Low Pressure System (North Pacific) and the Subtropical Counter Current. The ecosystem effects of this shift were observed in lower nutrient and productivity levels and decreased abundance of numerous species in the NWHI including the spiny lobster, the Hawaiian monk seal, various reef fish, the red-footed booby, and the red-tailed tropic bird.

1. Traditional and Historical Pelagic Fisheries

Hawaii's pelagic fisheries, which include the longline, Main Hawaiian Islands troll and handline, offshore handline, and the aku boat (pole and line) fisheries, are the state's largest and most valuable fishery sector. The target species are tunas and billfish, but a variety of other species are also important. Collectively, these pelagic fisheries made approximately 32.9 million lbs of commercial landings with a total ex-vessel value of $102 million in 2013.

The largest component of pelagic catch in 2013 was tunas. Bigeye tuna was the largest component, both in pounds and revenue. Swordfish was the largest component of the billfish catch. Mahimahi was the traditionally largest component of the non-tuna and non-billfish catch, but is now has been exceeded by moonfish (opah) (1,614 lbs and 2,086 lbs respectively).

2. Pelagic Fisheries Development

The Hawaii longline fishery is by far the most important economically, accounting in 2013 for about 87% percent of the estimated ex-vessel value of the total commercial fish landings in the state. In 2013, it is estimated that the commercial seafood industry in Hawaii generated sales impacts of $855 million and income impacts of $262 million while supporting approximately 11,000 full and part time jobs in the State of Hawaii. The commercial harvest sector generated 3,800 jobs, $196 million in sales, $71 million in income, and $102 million in value added impacts (NMFS 2012[2]).

Recreational fisheries are also extremely important in the State of Hawaii economically, socially, and culturally. The total estimated pelagic recreational fisheries production in 2011 and 2012 was 10.6 and 12.3 million pounds, respectively. The resident angler population in 2009 was estimated

2 National Marine Fisheries Service. 2014. Fisheries Economics of the United States, 2012. US Dept. Commerce, NOAA Tech. Memo. NMFS-F/SPO-137, 175p.

to be 140,000 residents, supplemented by an additional 106,000 visitors who went fishing in Hawaii. These anglers took 2.2 million fishing trips in 2009 (80% were shore-based trips). In 2009, it is estimated that the recreational and charter fisheries in Hawaii generated sales impacts of $460 million, income impacts of $150 million, and value-added impacts of $228 million while supporting approximately 4,300 jobs in the State of Hawaii.

3. Administrative or Management Actions to Date

Along with the original measures placed into the Pelagics FMP, the following amendments were made which affected the pelagic fisheries of Hawaii:

FMP AMENDMENT 1 (effective March 1, 1991) defined recruitment overfishing and optimum yield for each PMUS.

FMP AMENDMENT 2 (effective May 26, 1991) implemented permitting and logbook requirements for domestic pelagic longline fishing and transshipment vessel operators.

FMP AMENDMENT 3 (effective Oct. 14, 1991) created a 50 nm longline exclusion zone around the Northwestern Hawaiian Islands (NWHI) to protect endangered Hawaiian monk seals and also implemented framework provisions for establishing a mandatory observer program to collect information on interactions between longline fishing and sea turtles.

FMP AMENDMENT 4 (effective Oct. 10, 1991, through April 22, 1994) established a three-year moratorium on new entry into the Hawaii-based domestic longline fishery and required Hawaii-based longline vessels to carry and use a National Marine Fisheries Service (NMFS)-owned vessel monitoring system (VMS) transmitter to ensure that they do not fish within prohibited areas.

FMP AMENDMENT 5 (effective March 2, 1992) created domestic longline vessel exclusion zones around the Main Hawaiian Islands (MHI) ranging from 50 to 75 nm and a similar 50 nm exclusion zone around Guam and its offshore banks.

FMP AMENDMENT 6 (effective Nov. 27, 1992) specified that all tuna species are designated as fish under U.S. management authority and included tunas and related species as PMUS under the FMP. It also applied the longline exclusion zones of 50 nm around the island of Guam and the 25-75 nm zone around the MHI to foreign vessels.

FMP AMENDMENT 7 (effective June 24, 1994) instituted a limited entry program for the Hawaii-based domestic longline fishery with transferable permits, a limit of 164 vessels, and a maximum vessel size of 101 feet in length overall.

FMP AMENDMENT 8 (effective Feb. 3, 1999, and July 3, 2003) addressed new requirements under the 1996 Sustainable Fisheries Act, included designations of essential fish habitat, descriptions of fishing communities, overfishing definitions and bycatch.

FMP AMENDMENT 9 (under development since early 2000) would manage the harvest and retention of sharks in the Hawaii-based longline fishery.

FMP AMENDMENT 10 (prepared and transmitted to the NMFS for approval in parallel with the FMP for Coral Reef Ecosystems of the Western Pacific Region) clarified the PMUS by removing all but truly oceanic sharks to the Coral Reef Ecosystems FMP along with dogtooth tuna.

In 2006 NMFS notified the Council that overfishing of Western and Central Pacific yellowfin tuna was occurring and requested the Council to take appropriate action to end the overfishing. The Council was informed that the entire U.S. harvest of yellowfin tuna in the Western and Central Pacific was only about 4 percent of the total area's catch and that NMFS welcomed the Council's participation as a member in international fishery management organizations.

FMP AMENDMENT 14 (partially approved by NMFS on May 16, 2007) was developed in response to NMFS' notifications that Pacific-wide bigeye and Western and Central Pacific yellowfin tuna were subject to overfishing. It contained recommendations regarding both international and domestic management, including a mechanism by which the Council could participate in international negotiations regarding these stocks. Amendment 14 also contained measures to implement control dates for Hawaii's non-longline commercial pelagic vessels (70 FR 47781, see above) and purse seine and longline vessels (70 FR 47782, see above), as well as requirements for federal permits and reporting for Hawaii-based non-longline commercial pelagic vessels. NMFS disapproved the Amendment's international measures as premature given ongoing international negotiations as well as the development of a memorandum of understanding by the Councils and the Secretary of Commerce, in consultation with the Secretary of State, regarding participation in U.S. delegations and other issues. NMFS disapproved Amendment 14's domestic permit and reporting requirements as duplicative of existing requirements imposed by the State of Hawaii and stated that they were working with the State to improve their data collection and processing system. NMFS also noted that Amendment 14 met the requirements of the Magnuson-Act regarding overfishing of fisheries that have been determined to be subject to overfishing due to excessive international fishing pressure.

At the request of the Council NMFS issued a control date of March 16, 2007, to notify persons who entered the Hawaii-based pelagic charter fishery after that date that they would not necessarily be assured of continuing participation if a limited entry program was subsequently implemented for their fishery. The control date was issued in response to concerns regarding significant expansion of the charter vessel fleet and its potential to impact billfishes and other pelagic species.

FMP AMENDMENTS 9, 12 and 13 were intended to address issues which have now become moot due to changing circumstances, thus these amendment numbers may be used to designate future amendments.

FMP FRAMEWORK MEASURE 2 (effective June 13, 2002) incorporated the terms and conditions of a Nov. 28, 2000, Biological Opinion issued by the U.S. Fish and Wildlife Service under section 7 of the Endangered Species Act to protect seabirds from longline fishing. These measures require Hawaii-based pelagic longline vessel operators to use blue-dyed bait, strategic offal discards and line shooters with weighted branch lines to mitigate seabird interactions when fishing north of 23° N. Also included was a requirement that all Hawaii-based longline vessel owners and operators annually attend a protected species workshop conducted by NMFS.

FMP REGULATORY AMENDMENT 1 (effective June 9, 2002) incorporated the reasonable and prudent alternative of a March 2001 Biological Opinion issued by NMFS under section 7 of the Endangered Species Act. To mitigate interactions with sea turtles, this amendment prohibits shallow set pelagic longlining north of the equator by vessels managed under the FMP and closed waters between 0° and 15°N from April through May of each year to longline fishing. It also institutes sea turtle handling requirements for all vessels using hooks to target pelagic species in the region's EEZ waters.

FMP REGULATORY AMENDMENT 2 (effective Oct. 4, 2002) established federal permit and reporting requirements for any vessel using troll or handline gear to catch PMUS in EEZ waters around the Pacific Remote Island Areas of Kingman Reef; Howland, Baker, Jarvis, Johnston and Wake Islands; and Palmyra and Midway Atolls.

FMP REGULATORY AMENDMENT 3 (effective April 1, 2005) reopened swordfish longline fishing in Hawaii. The amendment requires vessels targeting swordfish to use mackerel type bait and 18/0 circle hooks. It also set an effort limit of 2,120 set per year and hard caps on loggerhead and leatherback turtles takes, which if reached would close the fishery for the remainder to the year.

FMP REGULATORY AMENDMENT 5 (effective January 18, 2006) allowed operators of Hawaii-based longline vessels fishing north of 23 degrees north latitude, as well as those targeting swordfish south of 23 degrees north, to utilize side-setting to reduce seabird interactions in lieu of the seabird mitigation measures required by Framework Measure 1. Side-setting was tested on Hawaii-based longline vessels and found to be highly effective in reducing seabird interactions.

At the request of the Council NMFS published a temporary rule removing the delay in effectiveness for closing the Hawaii-based longline shallow-set swordfish fishery as a result of it having reached one of its turtle interaction limits (71 FR 14416). This rule was implemented as vessel communications had improved to the point that vessel operators could be immediately notified of a closure, thus removing the possibility of exceeding a turtle limit during the notification period. This rule was effective March 20, 2006 through September 18, 2006.

FMP REGULATORY AMENDMENT 6 (effective March 28, 2007) made the above temporary rule permanent.

FMP REGULATORY AMENDMENT 7 (effective May 17, 2007) provided pelagic fishery participants the option of using NMFS approved electronic logbooks in lieu of paper logbooks. This measure was implemented to improve the efficiency and accuracy of catch reporting.

NMFS published a temporary rule effective March 20, 2006 through December 31, 2006 closing the Hawaii-based longline swordfish fishery for the remainder of the calendar year due to its having reached its annual limit of 17 interactions with loggerhead turtles.

CONTROL DATE of June 19, 2008 set for Hawaii-based pelagic charter fishery. Anyone who enters this fishery after this control date is not guaranteed future participation in the fishery if the Western Pacific Regional Fishery Management Council recommends, and NMFS approves, management measures for this fishery (e.g. limited entry).

FMP AMENDMENT 15 (effective December 22, 2008) designated three species of pelagic squid as management unit species, and established permitting, reporting, and observer requirements for squid jig fishing vessels over 50ft (15.4 m) in length.

FEP AMENDMENT 1 (effective September 3, 2010) established eligibility requirements and procedures for reviewing and approving community development plans for Western Pacific fisheries.

FEP AMENDMENT 4 (effective June 27, 2011) established a mechanism for specifying annual catch limits for Western Pacific fisheries.

D. Commonwealth of the Northern Marianas Islands

Generally, the major surface current affecting CNMI is the North Equatorial Current, which flows westward through the islands, however the Subtropical Counter Current affects the Northern Islands and generally flows in a easterly direction. Depending on the season, sea surface temperatures near the Northern Mariana Islands vary between 80.9° – 84.9° F. The mixed layer extends to between depths of 300-400 ft.

1. Traditional and Historical Pelagic Fisheries

The CNMI's pelagic fisheries occur primarily from the island of Farallon de Medinilla south to the island of Rota. Trolling is the primary fishing method utilized in the pelagic fishery. The pelagic fishing fleet consists primarily of vessels less than 24 ft in length, which usually have a limited 20-mile travel radius from Saipan.

The primary target and most marketable species for the pelagic fleet is skipjack tuna (>72% of 2013 commercial landings). Yellowfin tuna and mahimahi are also easily marketable species but are seasonal. During their runs, these fish are usually found close to shore and provide easy targets for the local fishermen. In addition to the economic advantages of being near shore and their relative ease of capture, these species are widely accepted by all ethnic groups which has kept market demand fairly high.

2. Pelagic Fisheries Development

Fishery resources have played a central role in shaping the social, cultural and economic fabric of the CNMI. The aboriginal peoples indigenous to these islands relied on seafood as their principal source of protein and developed exceptional fishing skills. Later immigrants to the islands from East and Southeast Asia also possessed a strong fishing tradition. Under the MSA, the CNMI is defined as a fishing community.

In the early 1980s, U.S. purse seine vessels established a transshipment operation at Tinian Harbor. The CNMI is exempt from the Jones Act, which requires the use of U.S.-flag and U.S.-built vessels to carry cargo between U.S. ports. The U.S. purse seiners took advantage of this exemption by offloading their catch at Tinian onto foreign vessels for shipment to tuna canneries in American Samoa; however this operation closed in the 1990s. A small 2-4 vessel longline fishing operation operated in the CNMI for about ten years, but ceased in 2012.

3. Administrative or Management Actions to Date

Along with the original measures placed into the Pelagics FMP, the following amendments were made which affected the pelagic fisheries of CNMI:

FMP AMENDMENT 1 (effective March 1, 1991) defined recruitment overfishing and optimum yield for each PMUS.

FMP AMENDMENT 2 (effective May 26, 1991) implemented permitting and logbook requirements for domestic pelagic longline fishing and transshipment vessel operators.

FMP AMENDMENT 8 (effective Feb. 3, 1999, and July 3, 2003) addressed new requirements under the 1996 Sustainable Fisheries Act, included designations of essential fish habitat, descriptions of fishing communities, overfishing definitions and bycatch.

FMP AMENDMENT 10 (prepared and transmitted to the NMFS for approval in parallel with the FMP for Coral Reef Ecosystems of the Western Pacific Region) clarified the PMUS by removing all but truly oceanic sharks to the Coral Reef Ecosystems FMP along with dogtooth tuna.

In 2006 NMFS notified the Council that overfishing of Western and Central Pacific yellowfin tuna was occurring and requested the Council to take appropriate action to end the overfishing. The Council was informed that the entire U.S. harvest of yellowfin tuna in the Western and Central Pacific was only about 4 percent of the total area's catch and that NMFS welcomed the Council's participation as a member in international fishery management organizations.

FMP AMENDMENT 14 (partially approved by NMFS on May 16, 2007) was developed in response to NMFS' notifications that Pacific-wide bigeye and Western and Central Pacific yellowfin tuna were subject to overfishing. It contained recommendations regarding both international and domestic management, including a mechanism by which the Council could participate in international negotiations regarding these stocks.

FMP REGULATORY AMENDMENT 7 (effective May 17, 2007) provided pelagic fishery participants the option of using NMFS approved electronic logbooks in lieu of paper logbooks. This measure was implemented to improve the efficiency and accuracy of catch reporting.

CONTROL DATE of June 19, 2008 was set for the CNMI pelagic longline fishery. Anyone who enters this fishery after this control date is not guaranteed future participation in the fishery if the Western Pacific Regional Fishery Management Council recommends, and NMFS approves, management measures for this fishery (e.g. limited entry).

FMP AMENDMENT 15 (effective December 22, 2008) designated three species of pelagic squid as management unit species, and established permitting, reporting, and observer requirements for squid jig fishing vessels over 50ft (15.4 m) in length.

FEP AMENDMENT 1 (effective September 3, 2010) established eligibility requirements and procedures for reviewing and approving community development plans for Western Pacific fisheries.

FEP AMENDMENT 3 (effective June 27, 2011) established a purse seine area closure and longline area closure in CNMI, of which only the longline closure was approved.

FEP AMENDMENT 4 (effective June 27, 2011) established a mechanism for specifying annual catch limits for Western Pacific fisheries.

FEP AMENDMENT 7 notice of availability and request for comments was published December 30, 2013 (78 FR 29388). Amendment 7 proposed a process for specifying catch and effort limits and accountability measures in the US Pacific territories. It also establishes a framework within which the government of each territory could allocate a portion of its catch limit to a US fishing vessel(s) through a specified fishing agreement, adhering to established criteria. The amendment includes establishing bigeye tuna catch limits for the US territories.

E. Pacific Remote Island Areas

Baker Island lies within the westward flowing South Equatorial Current. Baker Island also experiences an eastward flowing Equatorial Undercurrent that causes upwelling of nutrient and plankton rich waters on the west side of the island (Brainard et. al 2005). Sea surface temperatures of pelagic EEZ waters around Baker Island are often near 30° C. Although the depth of the mixed layer in the pelagic waters around Baker Island is seasonally variable, average mixed layer depth is around 100 m.

Howland Island lies within the margins of the eastward flowing North Equatorial Counter Current and the margins of the westward flowing South Equatorial Current. Sea surface temperatures of pelagic EEZ waters around Baker Island are often near 30° C. Although the depth of the mixed layer in the pelagic waters around Howland Island is seasonally variable, average mixed layer depth is around 70 m – 90 m.

Jarvis Island lies within the South Equatorial Current which runs in a westerly direction. Sea surface temperatures of pelagic EEZ waters around Jarvis Island are often 28°- 30° C. Although depth of the mixed layer in the pelagic waters around Jarvis Island is seasonally variable, average mixed layer depth is around 80 m.

Palmyra Atoll and Kingman Reef lie in the North Equatorial Counter-current, which flow in a west to east direction. Sea surface temperatures of pelagic EEZ waters around Palmyra Atoll are often 27°- 30° C. Although the depth of the mixed layer in the pelagic waters around Kingman Reef is seasonally variable, average mixed layer depth is around 80 m.

Sea surface temperatures of pelagic EEZ waters around Johnston Atoll are often 27°- 30° C. Although the depth of the mixed layer in the pelagic waters around Johnston Atoll is seasonally variable, average mixed layer depth is around 80 m.

Sea surface temperatures of pelagic EEZ waters around Wake Island are often 27°- 30° C. Although the depth of the mixed layer in the pelagic waters around Wake Atoll is seasonally variable, average mixed layer depth is around 80 m.

1. Traditional and Historical Pelagic Fisheries

As many tropical pelagic species (e.g. skipjack tuna) are highly migratory, the fishing fleets targeting them often travel great distances. Although the EEZ waters around Johnston Atoll and Palmyra Atoll are over 750 nm and 1000 nm (respectively) away from Honolulu, the Hawaii longline fleet does seasonally fish in those areas. For example, the EEZ around Palmyra is visited by Hawaii-based longline vessels targeting yellowfin tuna, whereas at Johnston Atoll, albacore tuna is often caught in greater numbers than yellowfin or bigyeye tuna. Similarly, the U.S. purse seine fleet also targets pelagic species (primarily skipjack tuna) in the EEZs around some PRIA, specifically, the equatorial areas of Howland, Baker, and Jarvis Islands. The combined amount of fish harvested from these areas from the U.S. purse seine on average is less than 5 percent of their total annual harvest.

2. Pelagic Fisheries Development

The USFWS prohibits fishing within the Howland Island, Jarvis Island, and Baker Island National Wildlife Refuge (NWR) boundaries. Currently, Howland Island and Baker Island are uninhabited. The USFWS manages Johnston Atoll as a National Wildlife Refuge, but does allow some recreational fishing within the Refuge boundary.

3. Administrative or Management Actions to Date

Along with the original measures placed into the Pelagics FMP, the following amendments were made that affected the pelagic fisheries of the PRIAs:

FMP AMENDMENT 1 (effective March 1, 1991) defined recruitment overfishing and optimum yield for each PMUS.

FMP AMENDMENT 2 (effective May 26, 1991) implemented permitting and logbook requirements for domestic pelagic longline fishing and transshipment vessel operators.

FMP AMENDMENT 8 (effective Feb. 3, 1999, and July 3, 2003) addressed new requirements under the 1996 Sustainable Fisheries Act, included designations of essential fish habitat, descriptions of fishing communities, overfishing definitions and bycatch.

FMP AMENDMENT 10 (prepared and transmitted to the NMFS for approval in parallel with the FMP for Coral Reef Ecosystems of the Western Pacific Region) clarified the PMUS by removing all but truly oceanic sharks to the Coral Reef Ecosystems FMP along with dogtooth tuna.

In 2006, NMFS notified the Council that overfishing of Western and Central Pacific yellowfin tuna was occurring and requested the Council to take appropriate action to end the overfishing. The Council was informed that the entire U.S. harvest of yellowfin tuna in the Western and Central Pacific was only about 4 percent of the total area's catch and that NMFS welcomed the Council's participation as a member in international fishery management organizations.

FMP AMENDMENT 14 (partially approved by NMFS on May 16, 2007) was developed in response to NMFS' notifications that Pacific-wide bigeye and Western and Central Pacific yellowfin tuna were subject to overfishing. It contained recommendations regarding both international and domestic management, including a mechanism by which the Council could participate in international negotiations regarding these stocks.

FMP REGULATORY AMENDMENT 7 (effective May 17, 2007) provided pelagic fishery participants the option of using NMFS approved electronic logbooks in lieu of paper logbooks. This measure was implemented to improve the efficiency and accuracy of catch reporting.

FMP REGULATORY AMENDMENT 2 (effective Oct. 4, 2002) established federal permit and reporting requirements for any vessel using troll or handline gear to catch PMUS in EEZ waters around the Pacific Remote Island Areas of Kingman Reef; Howland, Baker, Jarvis, Johnston and Wake Islands; and Palmyra and Midway Atolls.

FMP AMENDMENT 15 (effective December 22, 2008) designated three species of pelagic squid as management unit species, and established permitting, reporting, and observer requirements for squid jig fishing vessels over 50ft (15.4 m) in length.

FEP AMENDMENT 1 (effective September 3, 2010) established eligibility requirements and procedures for reviewing and approving community development plans for Western Pacific fisheries.

FEP AMENDMENT 4 (effective June 27, 2011) established a mechanism for specifying annual catch limits for Western Pacific fisheries.

III. The Current Status of Pelagic Fisheries of the Western Pacific Region

A summary of the total pelagic landings during 2013 in the Western Pacific and the percentage change between 2012 and 2013 is shown in Table 2.

Table 2. Total pelagic landings in lbs in the Western Pacific Region in 2013

	American Samoa		Guam		CNMI		Hawaii	
Species	**Lbs**	**% change**	**Lbs**	**% change**	**Lbs**	**% change**	**Lbs**	**% change**
Swordfish	23,180	-22.8	0	0	0	0	2,888,000	-6.7
Blue marlin	67,557	-15.5	16,175	27.2	2,376	-75.6	1,141,000	20
Striped marlin	7,430	-54.2	0	0	0	0	888,000	37.0
Other billfish*	6,878	-35.6	1,304	-64	0	0	532,000	27.9
Mahimahi	42,825	90.4	165,034	95.3	79,138	101.7	1,614,000	-19.6
Wahoo	197,457	7.1	51,252	14.8	6,967	-62.3	877,000	8.4
Opah (moonfish)	4,840	-34.7	0	0	0	0	2,086,000	30.9
Sharks (whole wt)	2,600	-63.3	496		0	0	124,000	-31.5
Albacore tuna	4,679,946	-31.3	0	0	0	0	830,000	-58.7
Bigeye tuna	187,277	-49.2	0	0	0	0	15,524,000	10.7
Bluefin tuna	0	0	0	0	0	0	1,000	0
Skipjack tuna	151,680	-73.	501,005	59.9	378,558	31.2	1,090,000	20.2
Yellowfin tuna	933,408	20.2	52,745	78.1	47,121	36.1	3,628,000	-11.5
Other pelagics**	2,667	-46.9	420	-94.0	1,632	-94.1	1,682,000	23.1
Total	6,307,745	-29.0	788,431	59.2	515,792	12.8	32,905,000	2.5

Note: Total Pelagic Landings are based on commercial reports and/or creel surveys.
*Other billfish include: black marlin, spearfish, and sailfish
**Other pelagics include: kawakawa, unknown tunas, pelagic fishes (dogtooth tuna, rainbow runner, barracudas), oilfish, and pomfret

IV. 2013 International and Region-wide Pelagics Plan Team Recommendations

1. The Pelagics Plan Team understands that an official overfished determination is likely to be forthcoming from NMFS in the near future for the Western Central North Pacific Ocean (WCNPO) striped marlin stock. The PPT also noted with concern the level of depletion of the WCNPO striped marlin stock indicated in the recent stock assessment. The PPT noted that U.S. catches of WCNPO striped marlin have not exceeded the level allowed under WCPFC Conservation and Management Measure 2010-01 (458 mt/year) since that measure was adopted, but recommends that the Council continue to consider the likelihood of that occurring in the future and to continue to consider what domestic management measures might be adopted to ensure it does not occur. The PPT reminds the Council that live release, minimum and maximum sizes for retention, large (18/0) circle hooks, not setting hooks adjacent to the longline floats, and spatial area closures have all been evaluated by NMFS PIFSC.

V. Data Modules

A. American Samoa

Introduction

The pelagic fishery in American Samoa is, and has been, an important component of the American Samoan domestic economy. Prior to 1995, the pelagic fishery was largely a troll fishery. Horizontal longlining was introduced to the Territory by Western Samoan fishermen in 1995. Local fishers have found longlining worthwhile because they land more pounds with less effort and use less gasoline for trips. Initially the vessels used in longlining were “alias,” which are locally built, twin-hulled (wood with fiberglass or aluminum) vessels about 30 feet long, powered by 40HP gasoline outboard engines. Larger monohull vessels capable of longer multi-day trips began joining the longline fleet soon after the alias. Monohull vessels now dominate the fleet and landings. There are presently only a few alias participating in the fishery. Commercial troll vessels have also declined. Federal longline logbooks were implemented during 1996. Two 50-mile area closures for vessels longer than 50 feet were implemented by WPRFMC and NMFS during 2002; one surrounding Swains Island and one surrounding Tutuila and Aunu’u Islands. Federal longline limited entry permits were issued during December of 2005. Albacore is the primary species caught longlining; the bulk of the longline catch is sold to the Pago Pago canneries. Some of the catch is sold to stores, restaurants, and local residents, and some is donated for family functions.

Pago Pago Harbor on the island of Tutuila is a regional base for the trans-shipment and processing of tuna taken by domestic fleets from other South Pacific nations, the distant-waters longline fleets, and purse seine fleets. Purse seine vessels land skipjack, yellowfin and other tunas, with little albacore. Purse seine and non-US vessel landings are not included in this report.

Fishery Data History

Prior to 1985, only commercial landings were monitored. From October 1985 to the present, data was collected through a boat-based creel survey including subsistence, recreational, and commercial fishing sectors. In September 1990, a Commercial Purchase (receipt book) System was instituted requiring all businesses in Samoa that buy fish commercially, except for the canneries, to submit a copy of their purchase receipts to Department of Marine and Wildlife Resources (DMWR). In January 1996, in response to the developing longline fishery, a federal longline logbook system was implemented. All longline fishermen are required to obtain a federal permit and submit logs containing detailed data on each set including catch composition. From 1996 through 1999, logbooks submitted by local longliners were edited in American Samoa and sent to the NMFS Honolulu Lab weekly for further editing and data processing. Beginning in 2000, logbook data has been electronically entered and maintained in American Samoa and periodically uploaded to NMFS servers in Hawaii.

Changes to the algorithms for expanding the boat-based creel survey data were described in the 2008 Pelagics Annual Report. These changes were necessary due to peculiarities in the historical data and the emergence of multi-day trips. Data from 1982-1985 were left unchanged; data from 1986-2006 were re-expanded. This recalculation accounts for differences in figures and tables between annual reports issued prior 2008 and subsequent reports. Additionally, in 2000, larger fish began to be measured rather than weighed, and the creel survey system was modified to calculate and incorporate length to weight conversions. Issuance of cannery sampling forms began in 2001. Cannery sampling forms allow fishery managers to determine, for each species, whether catch was sold to small local vendors, to the canneries, or was unsold. Lastly, the method for determining price per pound was revised in 2001.

2013 Summary - American Samoa Pelagic Fishery

Total landings: This category refers to all fish returned to shore for commercial, recreational, or subsistence use.

Commercial landings: This category refers to that portion of the total landings that was sold commercially in American Samoa to canneries and other local businesses. Subsistence and recreational landing are excluded.

Landings (pounds): The estimated annual pelagic landings have varied widely, ranging from 1 to 15 million pounds between 1998 and 2011. Approximately 6.3 million pounds of pelagic species are estimated to have been landed in American Samoa in 2013, an increase of about 32% from 2012. Landings consisted mainly of four major tuna species – albacore, yellowfin, bigeye, and skipjack. Other species that made up most of the total landings are wahoo, blue marlin, swordfish and mahimahi. Tuna species comprised 94% of the total landings; albacore tuna comprised 79% of the tuna landings and 74% of the total pelagic landings.

Effort: Most active boats in 2013 were larger boats - 70 feet long or more. There was no fishing by Class B category vessels - 40 to 50 feet long. Of the five permitted in the Class A category, one was active. In B and C size classes, 7 boats were active out of 16 permitted; in Class D size, 14 out of 26 permitted were active. There were 47 permitted boats in all size classes**.**

The number of longline boats in American Samoa experienced a steep decrease from 62 in 2001 to 22 in 2013. The 22 boats that fished in 2013 took 96 trips, an average of about 4 trips per boat, deployed 3,393 sets, about 154 sets per boat, using 10.1 million hooks (Table 5). Most active boats during the year were those in the Class C and D - 70 feet long or more (

Table 20).

The lowest effort rate for 2013 is reflected in the total landings. This is due mainly to low catch by most boats coupled by the low price of tunas - mainly albacore, yellowfin and bigeye - at the cannery, resulting in most boats sitting in port instead of fishing.

Longline CPUE: The longline catch rate for tuna species continued to drop during the past ten years. The most notable drop is this year's catch rate for all pelagic species, as well as for the primary tuna species. Albacore tuna, the species targeted by longline boats, registered the lowest rate catch rate ever recorded (11.7 fish/1000 hooks). This was 21% less than 2012. Further, the catch rate for all pelagic species was 25% less in 2013 than 2012. We are expecting another drop in the catch rate of albacore tuna in 2014, as well as for the other main tuna species (yellowfin, bigeye, and skipjack), and for pelagic species as a whole.

Pounds-Per-Hour Trolling: While troll trips increased 36% from the previous year and troll hours increased about 42%, average catch per troll hour for all pelagic species decreased about two fold.The catch rates for mahimahi and wahoo were about the same as the previous year's rates, while skipjack and yellowfin CPUE decreased. This is despite a two-fold increase in the annual estimated total landings for wahoo and an increase of 47% for mahimahi.

Fish Size: Average weight-per-fish from the cannery samples for all tuna species are nearly the same in the last four years, especially for albacore and skipjack tuna. For bigeye and yellowfin tunas, there was a slight decrease in size. Albacore weight from the cannery sampling ranged from 38-39 pounds; the same was seen in creel survey data. There has been a slight variation for yellowfin

	Class A < 40 Feet		**Class B 40.1-50 Feet**		**Class C 50.1-70 Feet**		**Class D > 70 Feet**	
Year	**Permits**	**Active**	**Permits**	**Active**	**Permits**	**Active**	**Permits**	**Active**
1994	0	0	0	0	0	0	0	0
1995	14	4	0	0	0	0	0	0
1996	26	11	1	0	1	0	0	0
1997	35	19	1	0	1	1	2	2
1998	37	21	1	0	1	1	1	1
1999	45	35	2	1	2	2	1	1
2000	45	37	2	2	5	3	2	2
2001	61	37	6	6	11	9	23	18
2002	55	32	6	6	14	6	25	18
2003	31	17	5	4	15	9	23	22
2004	11	9	2	2	13	8	22	21
2005	8	5	3	2	11	9	20	18
2006	21	3	5	0	10	6	24	19
2007	18	2	6	0	9	5	26	22
2008	17	1	6	0	9	5	26	22
2009	1	1	1	0	8	5	26	20
2010	12	1	0	0	12	5	26	20
2011	12	1	1	0	12	5	27	18
2012	5	3	5	0	11	8	27	14
2013	5	1	5	0	11	7	26	14

and bigeye tunas in the past four years. For yellowfin, weight varied from 50-60 pounds and for bigeye tuna, it varied from 45-54 pounds. For non-tuna species, mahimahi mean weight remained relatively constant, while wahoo weights showed a slight increase (no big change) in mean weight. There were very few interviews collected from 2010-2012 by the creel survey for albacore and other tunas because of the small number of alia vessels still in operation, so there is not a lot of mean weight data.

Revenues: Commercial landings of tuna species have continued to decline.The 2013 commercial landing for tunas was the lowest in the past ten years of the fishery. Tunas account for 94% of total pelagic landings and adjusted revenue from tuna landings was estimated at about $6.3 million during 2013 with an accumulated average price per pound of $1.09. Revenue from albacore landings was estimated at 94% of revenue for all tunas, with an estimated price per pound of $1.15.

Bycatch: There was zero release recorded for the troll fishery in 2013. For the Longline boats, they released fewer tunas, non-tunas, other pelagic and sharks, compared to the number of fish released in the previous year. Most of the boats kept most of the tuna bycatch, releasing only 1%. But this could also mean that the boats caught less bycatch. Skipjack and bigeye tunas were the most released bycatch species. For the non-tunas and other species, sharks, oilfish, spearfish and sailfish had the highest numbers of released fish. Only 10% of all pelagic species caught were released.

Plan Team Recommendations

There were no Plan Team recommendations for American Samoa in 2013.

Table 3. American Samoa 2013 estimated total landings of pelagic species by gear type

Species	Longline Pounds	Troll Pounds	Other Pounds	Total Pounds
Skipjack tuna	143,347	8,334	0	151,680
Albacore tuna	4,679,946	0	0	4,679,946
Yellowfin tuna	926,140	7,037	231	933,408
Kawakawa	0	5	0	5
Bigeye tuna	187,277	0	0	187,277
Tunas (unknown)	377	0	0	377
TUNAS SUBTOTALS	**5,937,086**	**15,376**	**231**	**5,952,693**
Mahimahi	42,529	295	0	42,825
Black marlin	338	0	0	338
Blue marlin	67,557	0	0	67,557
Striped marlin	7,430	0	0	7,430
Wahoo	196,260	1,093	104	197,457
Sharks (all)	2,600	0	0	2,600
Swordfish	23,180	0	0	23,180
Sailfish	3,918	0	0	3,918
Spearfish	2,622	0	0	2,622
Moonfish	4,840	0	0	4,840
Oilfish	1,306	0	78	1,385
Pomfret	756	0	0	756
NON-TUNA PMUS SUBTOTALS	**353,337**	**1,388**	**182**	**354,908**
Pelagic fishes (unknown)	144	0	0	144
OTHER PELAGICS SUBTOTAL	**144**	**0**	**0**	**144**
TOTAL PELAGICS	**6,290,567**	**16,764**	**414**	**6,307,745**

Interpretation: More than 6.3 million pounds of pelagic species were landed in American Samoa during 2013 by the longline and troll fisheries; about 94% of the pelagic landings were tuna species. Albacore tuna, the species targeted by the longline fleet, accounted for 77% of the tuna landings followed by yellowfin tuna at 16%. Albacore landings accounted for 74% of the total pelagic landings. Wahoo topped the non-tuna species landings.

Calculations: “Longline Pounds” total landing estimates are from the boat-creel survey for the alia longliners. These boat-creel survey landing estimates are augmented with longline logbook data from the larger longliners. The “Troll Pounds” category includes the pelagic landings of combined troll/bottomfishing trips as well as the landings of purely troll trips. The “Other Pounds” category includes pelagic species not caught by longlining or trolling such as barracuda, rainbow runner and dogtooth tuna, caught with bottomfishing or spearfishing methods. In addition, the “All Sharks Species” categorizes all species of sharks that could and could not be identified by the fishermen.

Table 4. American Samoa 2013 estimated commercial landings, value and average price by pelagic species

	Longline			Troll / Non-Longline		
Species	**Pounds**	**Value($)**	**Price($)/lb**	**Pounds**	**Value($)**	**Price/lb**
Skipjack tuna	140,428	$107,242	$0.76	8,244	$31,037	$3.76
Albacore tuna	4,520,697	$5,215,654	$1.15	0	0	
Yellowfin tuna	912,859	$828,642	$0.91	6,537	$14,415	$2.21
Kawakawa	0	$0		5	$8	$1.50
Bigeye tuna	187,277	$149,821	$0.80	0	0	
TUNAS SUBTOTAL	**5,761,261**	**$6,301,359**	**$1.09**	**14,786**	**$45,460**	**$3.07**
Mahimahi	30,690	$68,339	$2.23	148	$401	$2.72
Blue marlin	424	$360	$0.85	0	0	
Striped marlin	449	$381	$0.85	0	0	
Wahoo	194,709	$77,884	$0.40	533	$622	$1.17
Swordfish	466	$1,431	$3.07	0	0	
Sailfish	373	$1,305	$3.50	0	0	
Oilfish	0	$0		78	$215	$2.75
Pomfret	114	$284	$2.50	0	0	
NON-TUNA PMUS SUBTOTAL	**227,224**	**$149,985**	**$0.66**	**759**	**$1,239**	**$1.63**
PELAGICS TOTALS	**5,988,486**	**$6,451,344**	**$1.08**	**15,545**	**$46,699**	**$3.00**

Interpretation: More than 6 million pounds of pelagic species were sold in 2013, earning an estimated revenue of about $6.5 million. Tuna sales accounted for about 97% of total earnings. They were sold at an average of $1.09 per pound. Albacore tuna sales accounted for 82% of tuna earnings and 80% of the total revenue. Yellowfin tuna was the second top money earner, earning more money than all non-tuna species earned.

Calculation: Estimated commercial landings, value, and price per pound calculations are the same as those described for Table 3 and in greater detail in the Fishery Data History section above. The Troll/Non-Longline category in Table 3 includes pelagic species not caught by longlining such as barracuda, rainbow runner and dogtooth tuna, that were caught with bottomfishing or spearfishing methods.

Table 5. Longline effort by American Samoan vessels during 2013

Boats	22
Trips	96
Sets	3,393
Hooks x 1000	10,129
Lightsticks	4,211

Table 6. Number of fish kept, released and percent released for all American Samoa longline vessels during 2013

Species	Number Kept	Number Released	Percent Released
Skipjack tuna	11,230	402	3%
Albacore tuna	118,414	335	0%
Yellowfin tuna	19,087	232	1%
Bigeye tuna	4,181	126	3%
Tuna (unknown)	21	0	0%
Tunas subtotals	**152,933**	**1,095**	**1%**
Mahimahi	1,854	598	24%
Black marlin	3	8	73%
Blue marlin	497	842	63%
Striped marlin	108	149	58%
Wahoo	5,868	1,235	17%
Sharks (all)	40	3,850	99%
Swordfish	181	108	37%
Sailfish	50	232	82%
Spearfish	57	816	93%
Moonfish	98	274	74%
Oilfish	69	6,762	99%
Pomfret	73	767	91%
Non-tuna PMUS subtotals	**8,898**	**15,641**	**64%**
Pelagic fishes (unknown)	3	1,756	100%
Other pelagic subtotals	**3**	**1,756**	**100%**
TOTAL PELAGICS	**161,834**	**18,492**	**10%**

Interpretation: In 2013, 22 vessels landed any pelagic species. The vessels took 96 fishing trips, which is a very low effort compared to previous years. They deployed 3,393 sets using 10.1

million hooks and 4,211 light sticks. It is estimated that each boat took 4.4 trips and deployed 154 sets; 35 sets were deployed per trip.

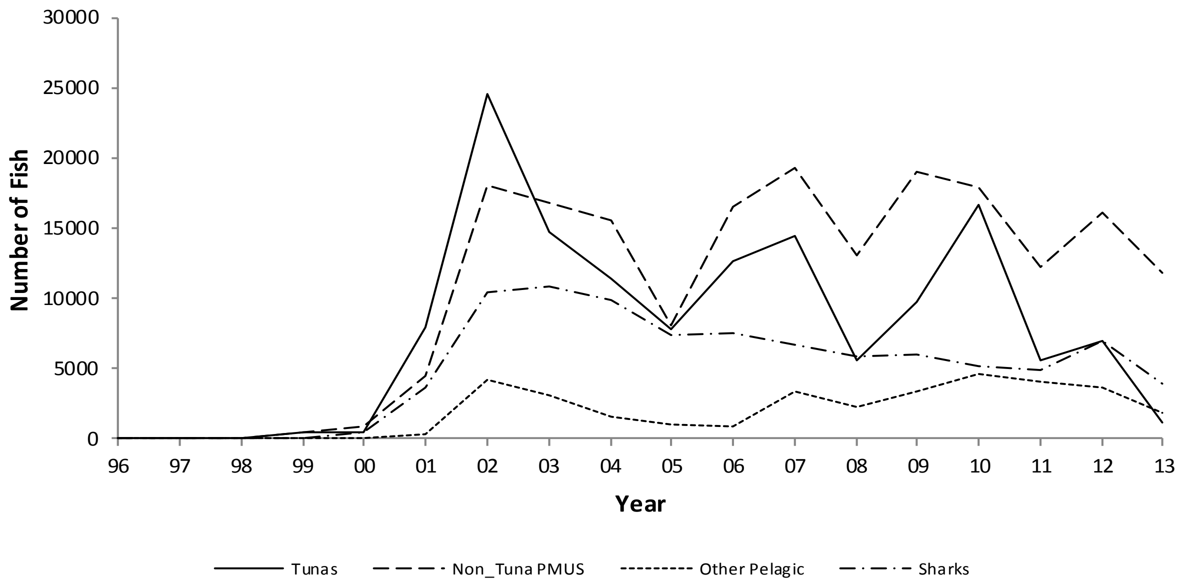
More than 180,000 pelagic fish were caught; 10% were released by all the longline boats.

Most tuna were kept (99 to 100%), especially albacore and yellowfin. Oilfish, sharks, spearfish, pomfret, and unknown pelagics topped the list of released species at a rate of 90 to 100%.

Fish can be released for various reasons including quality, handling and storage difficulties, and marketing problems. Investigation into the reasons for releasing pelagic species are recommended because of the high release rate for many non-tuna PMUS and releases of some tuna.

Calculation: These values are sums or the number of fish kept and the number of fish released from Longline Logbook data for all of the longline vessels in Samoa. The percent released is calculated as the number released divided by the sum of the number released and the number kept. The percentages for subtotals and totals are the sum of released species for the subtotal or total divided by the sum of kept plus the sum of released for the subtotal or total. The kept values for sharks include those that were finned. All species of sharks entered in the Longline Logs are combined in the All Sharks species. Rays and Sunfish are included in the Misc Pelagic Fish species. A completed trip is denoted when a vessel makes a landing within a given calendar year.

Figure 2. Number of fish released by American Samoa longline vessels, 1996-2013



Interpretation: The number of pelagic species released in 2013 by longline vessels decreased. All categories show a decline in number of released fish in comparison to previous years. Sharks and other pelagic had the highest number of releases but still fewer than numbers released in the past ten years. The non-tuna PMUS, sharks, and other pelagic species accounted for 94% of the total released species.

Calculation: These values are sums of Longline Logbook 'number of released fish' data for each year. They are summed according to the species groups in Table 3 with Sharks separated out of the "Non-Tuna PMUS" species group.

Year	Tunas	Non-Tuna PMUS	Sharks	Other Pelagics
1996	0	0	37	0
1997	50	36	19	1
1998	71	29	28	0
1999	492	438	37	43
2000	371	815	386	0
2001	7,888	4,457	3,648	239
2002	24,601	18,100	10,459	4,183
2003	14,679	16,826	10,831	3,125
2004	11,323	15,481	9,918	1,521
2005	7,830	8,039	7,318	1,057
2006	12,609	16,498	7,487	842
2007	14,418	19,350	6,667	3,308
2008	5,542	13,039	5,833	2,274
2009	9,717	19,028	5,931	3,291
2010	16,695	17,944	5,108	4,576
2011	5,567	12,161	4,835	4,035
2012	6,924	16,062	6,932	3,572
2013	1,095	11,791	3,850	1,771

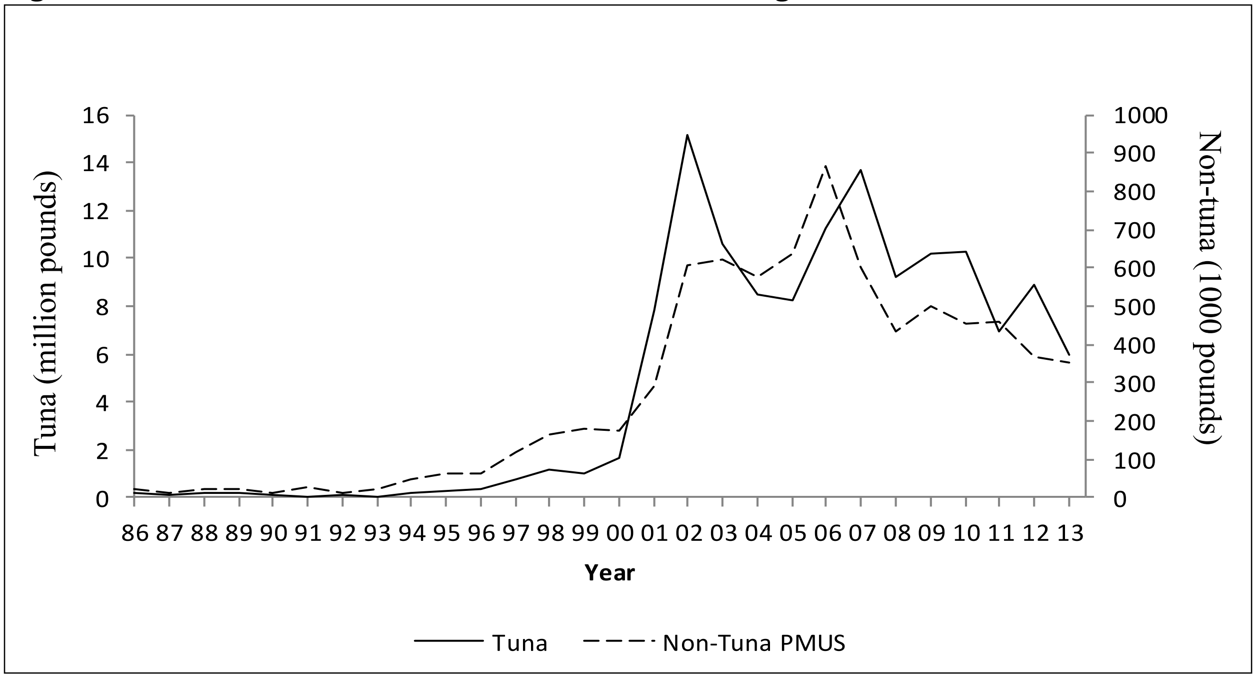
Table 7. American Samoa 2013 trolling bycatch

Bycatch							Interviews		
Catch	**Alive**	**Injured**	**Dead**	**Unknown**	**Total**	**%BC**	**BC**	**All**	**%BC**
1899	0	0	0	0	0	0	0	127	0

Interpretation: There was no bycatch/release recorded for 2013 in the troll fishery; 127 interviews were conducted and 1,899 pelagic fish were landed during those interviews. Using fishermen's reports at the dock may not accurately reflect the number of fish released at sea. The troll fishery in American Samoa has never released any fish; every fish is brought to port.

Calculation: The trolling bycatch table is obtained from creel survey interviews. The bycatch numbers are obtained by counting fish on interview forms for purely troll trips with a disposition of bycatch. Bycatch is reported by fishermen when interviewed at the landing site in response to questions from the data collector. Bycatch are fish thrown back at sea by the fishermen. The catch for all species is included for comparison and is obtained by counting all fish listed on the same interview forms. The number of interviews is a count of the purely trolling interview forms.

Figure 3. American Samoa annual estimated total landings of tuna and non-tuna PMUS



Interpretation: Total landing estimates amount to about 6.3 million pounds for both tuna and non-tuna species during 2013 and it continued a downward trend since the peak in 2002. The 2013 tuna landings were the lowest in the past 10 years of the fishery.

Calculation: Estimated total landings for Tunas and Non-Tuna PMUS were calculated by summing the total landings for the species in these categories as defined by Table 3.

Table 8. American Samoa annual estimated total landings (lbs) of tuna and non-tuna PMUS, 1986 - 2013

Year	Tuna	Non Tuna PMUS
1986	190,967	23,899
1987	144,037	10,894
1988	207,095	23,462
1989	171,809	20,534
1990	81,736	10,494
1991	72,645	28,092
1992	94,060	12,328
1993	47,815	21,736
1994	190,262	48,146
1995	288,667	64,329
1996	317,601	64,473
1997	802,077	119,961
1998	1,160,724	163,726
1999	1,004,615	178,648
2000	1,685,591	175,061
2001	7,870,925	292,699
2002	15,169,356	606,670
2003	10,617,519	621,523
2004	8,489,580	575,669
2005	8,204,994	639,043
2006	11,242,553	865,217
2007	13,731,224	601,292
2008	9,252,262	433,255
2009	10,214,177	497,872
2010	10,305,460	453,461
2011	6,957,377	459,699
2012	8,922,860	366,123
2013	5,952,693	354,908
Average	**4,764,215**	**276,186**
Std. Dev	**4,962,541**	**252,433**

Figure 4. American Samoa annual estimated total mahimahi landings by gear

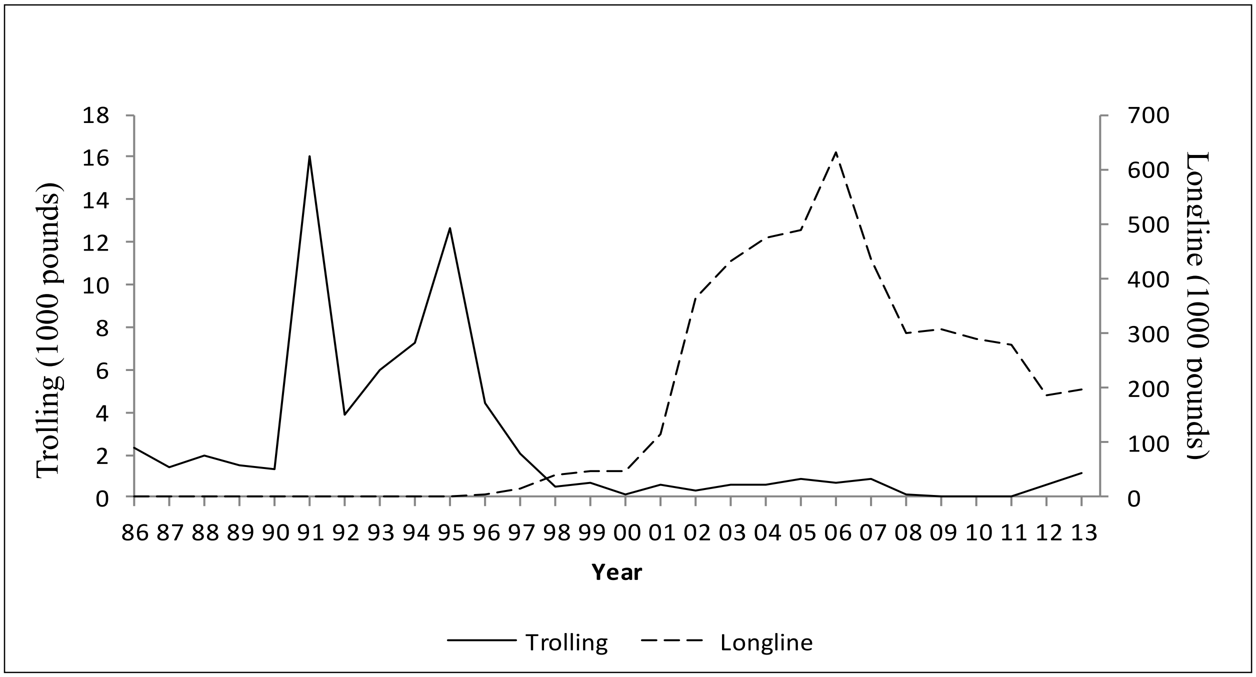
Interpretation: Estimated landings of mahimahi by longline gear increased by 47% in 2013 and showed a continuous rate from 2010, while trolling gear shows a slight increase. A total of 42,824 lbs were landed by both gears. Longline gear landed about 99% of the total landing.

Calculation: The estimated total annual landings of mahimahi are listed for longline and trolling fishing methods as explained in Table 3.

Table 9. American Samoa annual estimate total mahimahi landings (lbs) by gear, 1987-2013

	Pounds	Landed
Year	**Longline**	**Trolling**
1987	0	3,049
1988	0	6,736
1989	0	3,170
1990	0	3,169
1991	61	2,090
1992	0	2,325
1993	212	4,000
1994	101	9,086
1995	2,373	8,393
1996	5,395	5,022
1997	33,412	3,623
1998	33,484	843
1999	35,779	2,193
2000	42,857	66
2001	87,037	782
2002	84,603	720
2003	81,022	1,434
2004	42,718	469
2005	53,078	161
2006	48,705	1,164
2007	31,415	684
2008	28,027	931
2009	36,799	113
2010	18,049	0
2011	21,260	611
2012	22,645	157
2013	42,529	295
Average	**32,677**	**2,565**
Std. Dev	**25,850**	**2,872**

Figure 5. American Samoa annual estimated total wahoo landings (lbs) by gear



Interpretation: Estimated landings of wahoo in 2013 continued to decline since 2006 despite a slight increase from 2012. Longline gear landed more wahoo, accounting for 99% of total landings.

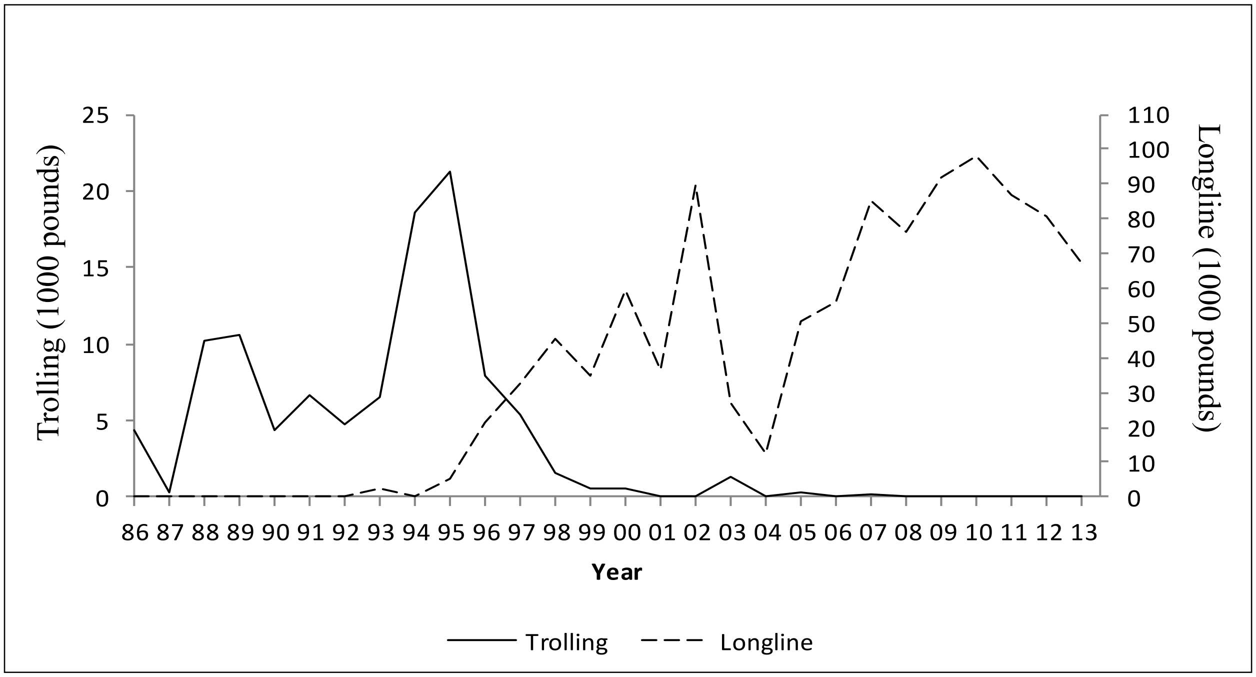
Estimated troll landings of wahoo peaked in 1991 at 16,081 pounds. The 2013 landings continued an upward rate from 2010. 2013 landings were twice as high as 2012 landings.

Calculation*:* The estimated total annual landings of wahoo are listed for longline and trolling fishing methods as explained in Table 3.

Table 10. American Samoa annual estimated total wahoo landings (lbs) by gear, 1986-2013

	Pounds	Landed
Year	**Longline**	**Trolling**
1986	0	2,282
1987	0	1,395
1988	84	1,962
1989	0	1,476
1990	0	1,333
1991	0	16,081
1992	0	3,904
1993	1,227	5,977
1994	0	7,261
1995	1,642	12,625
1996	3,570	4,399
1997	15,807	2,074
1998	40,439	487
1999	48,181	685
2000	47,330	140
2001	114,219	587
2002	362,689	351
2003	431,531	612
2004	475,032	537
2005	487,394	828
2006	630,329	696
2007	436,921	889
2008	299,481	165
2009	305,835	0
2010	289,545	64
2011	278,296	55
2012	187,851	597
2013	196,260	1,903
Average	**178,987**	**2,448**
Std. Dev	**193,556**	**3,769**

Figure 6. American Samoa annual estimated total blue marlin landings (lbs) by gear



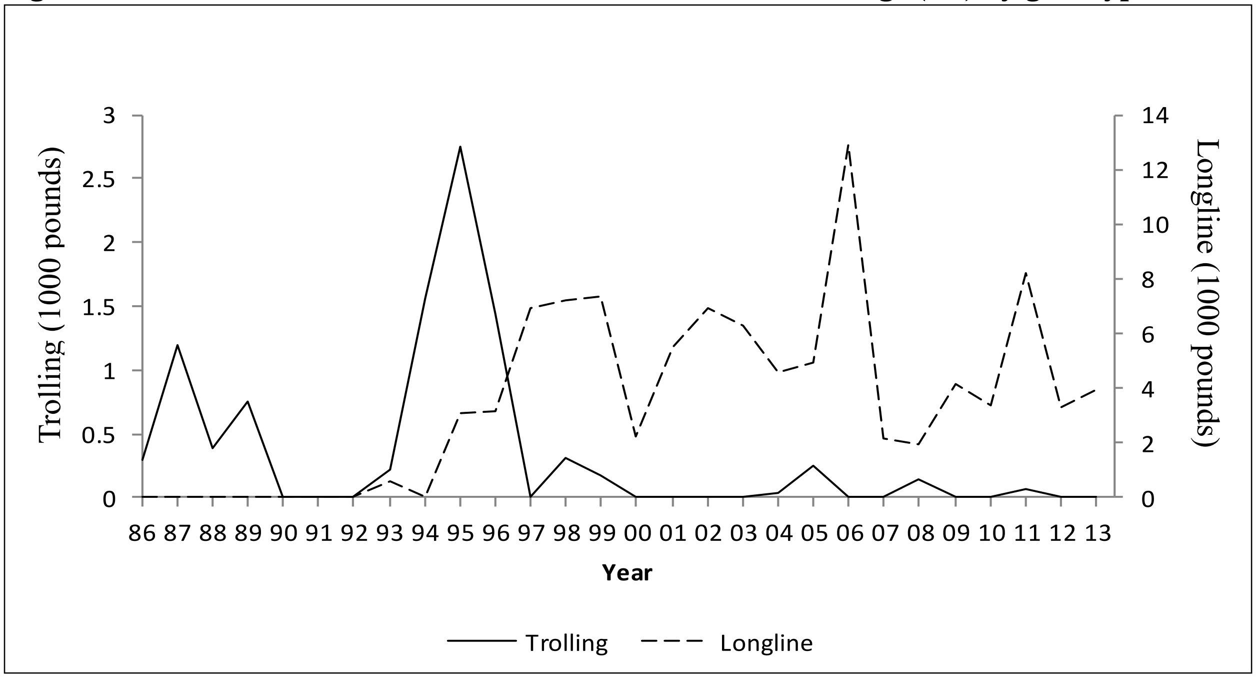
Interpretation: Blue marlin landings from longline gear totaled 67,557 pounds, a decrease of 16% from 2012 and continued a downward trend from 2010. The troll gear had zero landings, as in the past five years. The year 2010 had the highest landings ever of 98,000 pounds.

Calculation: The estimated total annual landing of blue marlin is listed for longline and trolling fishing methods as explained in Table 3. The average and standard deviation for the Longline Method is calculated from 1993 onward.

Table 11. American Samoa annual estimated total blue marlin landings (lbs) by gear, 1986-2013

Year	Pounds Longline	Landed Trolling
1986	0	4,327
1987	0	265
1988	0	10,217
1989	0	10,590
1990	0	4,339
1991	0	6,669
1992	0	4,807
1993	2,168	6,545
1994	0	18,661
1995	5,338	21,272
1996	21,576	7,867
1997	32,434	5,379
1998	45,475	1,592
1999	34,883	590
2000	59,505	623
2001	36,792	0
2002	89,825	0
2003	26,994	1,344
2004	12,314	0
2005	50,584	300
2006	56,047	0
2007	84,970	204
2008	76,297	0
2009	91,753	0
2010	98,141	0
2011	86,587	0
2012	80,471	0
2013	67,557	0
Average	**50,462**	**3,771**
Std. Dev	**31,268**	**5,552**

Figure 7. American Samoa annual estimated total sailfish landings (lbs) by gear type



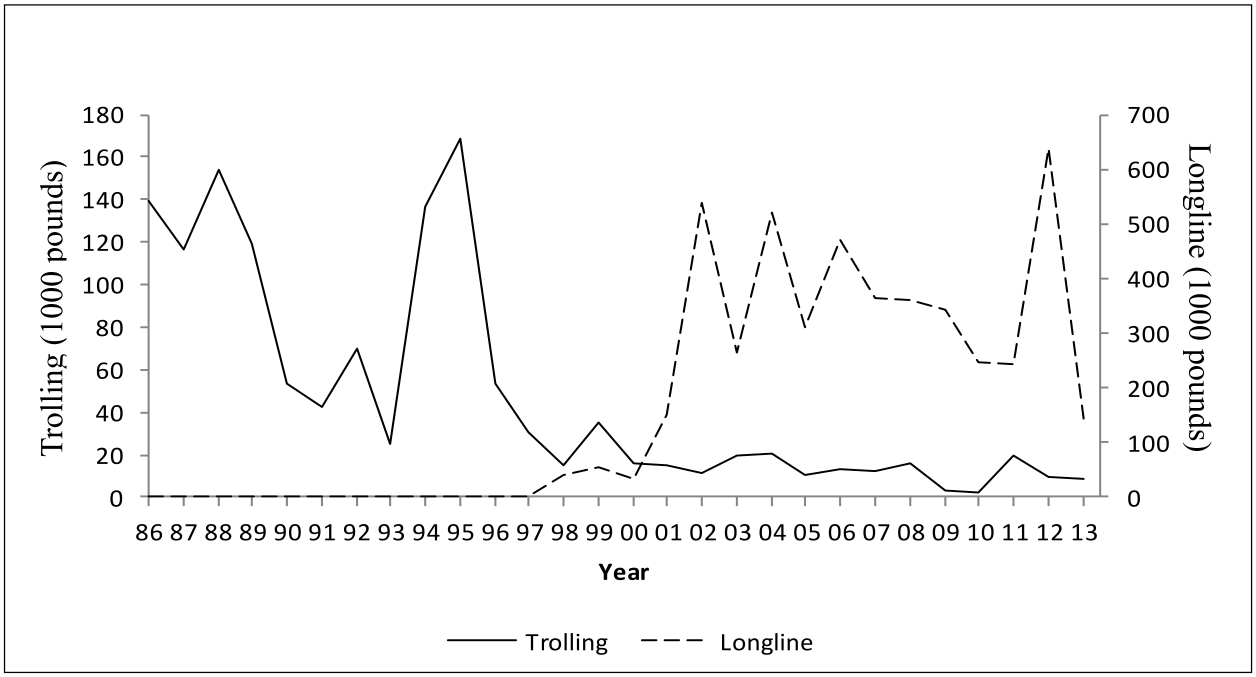
Interpretation: Sailfish landings in 2013 only came from the longline gear; troll gear had zero landings. Longline landed 3,918 pounds indicating no major change in pounds from 2009 through 2013, with the exception of a spike in 2011. The 2006 landing is recorded as the highest.

Calculation: The estimated total annual landings of sailfish are listed for longline and trolling fishing methods as explained in Table 3.

Table 12. American Samoa annual estimated total sailfish landing (lbs) by gear type, 1986-2013

	Pounds	Landed
Year	**Longline**	**Trolling**
1986	0	294
1987	0	1,187
1988	0	394
1989	0	757
1990	0	0
1991	0	0
1992	0	0
1993	618	218
1994	0	1,561
1995	3,078	2,751
1996	3,130	1,444
1997	6,921	0
1998	7,191	314
1999	7,391	184
2000	2,257	0
2001	5,498	0
2002	6,932	0
2003	6,268	0
2004	4,598	32
2005	4,959	248
2006	12,933	0
2007	2,167	0
2008	1,931	148
2009	4,184	0
2010	3,404	0
2011	8,226	73
2012	3,333	0
2013	3,918	0
Average	**4,711**	**343**
Std. Dev	**2,887**	**635**

Figure 8. American Samoa annual estimated total skipjack tuna landings (lbs) by gear type



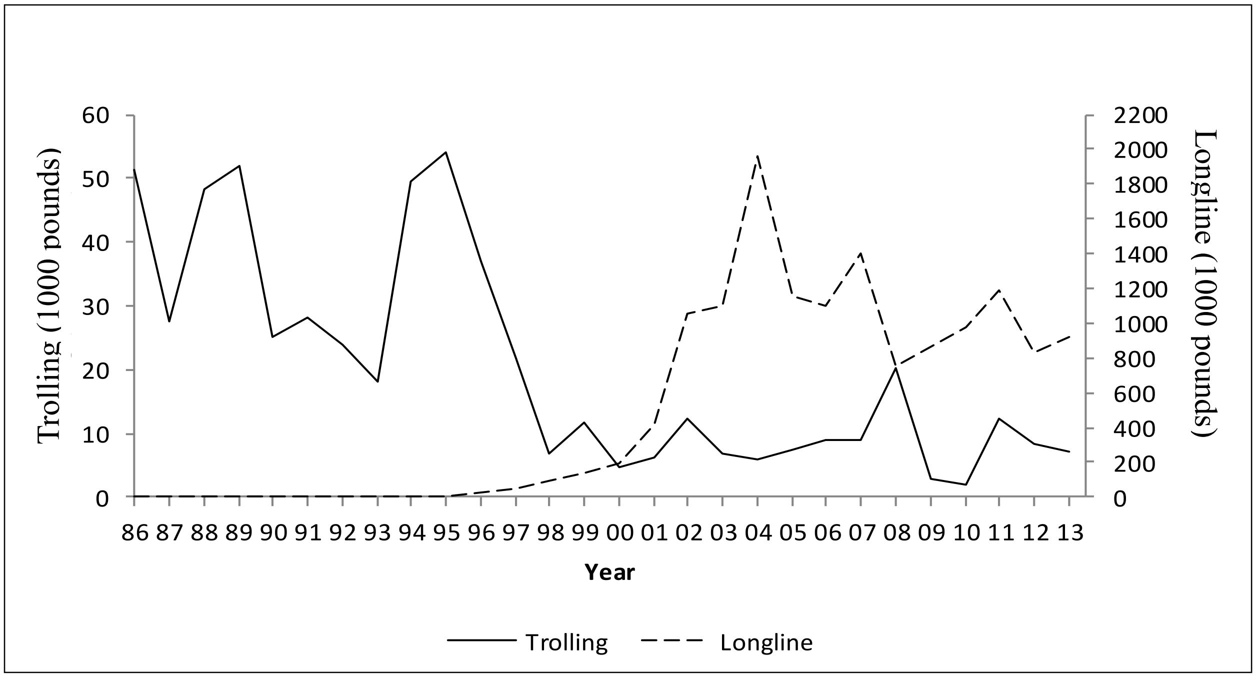
Interpretation: Total landings of skipjack tuna for both gears amounted to 151,681 pounds in 2013 - a steep decline, particularly for the longline gear from the previous year and in comparison to the past ten years. The longline landings of 2013 were about five times lower than 2012. Troll landings also decreased, probably due to low catch rates by the fleet and low effort. This species is characterized by a large stock size, fast growth, early maturity and high fecundity.

Calculation: The estimated total annual landings of skipjack tuna are listed for longline and trolling fishing methods as explained in Table 3.

Table 13. American Samoa annual estimated total skipjack tuna landings (lbs) by gear type, 1986-2013

Year	Pounds Longline	Landed Trolling
1986	0	139,421
1987	0	116,436
1988	0	153,903
1989	0	118,948
1990	0	53,423
1991	345	42,137
1992	0	69,901
1993	533	25,356
1994	103	136,762
1995	160	168,389
1996	438	53,149
1997	2,546	30,430
1998	40,625	14,822
1999	56,014	35,171
2000	32,153	16,211
2001	149,565	15,086
2002	538,700	11,376
2003	264,414	19,464
2004	519,129	20,728
2005	312,055	10,845
2006	470,166	13,040
2007	365,220	12,255
2008	359,568	16,294
2009	343,586	2,775
2010	245,572	2,043
2011	243,284	19,862
2012	637,461	9,703
2013	143,347	8,334
Average	**205,434**	**47,724**
Std. Dev	**201,375**	**50,774**

Figure 9. American Samoa annual estimated total yellowfin tuna landings (lbs) by gear



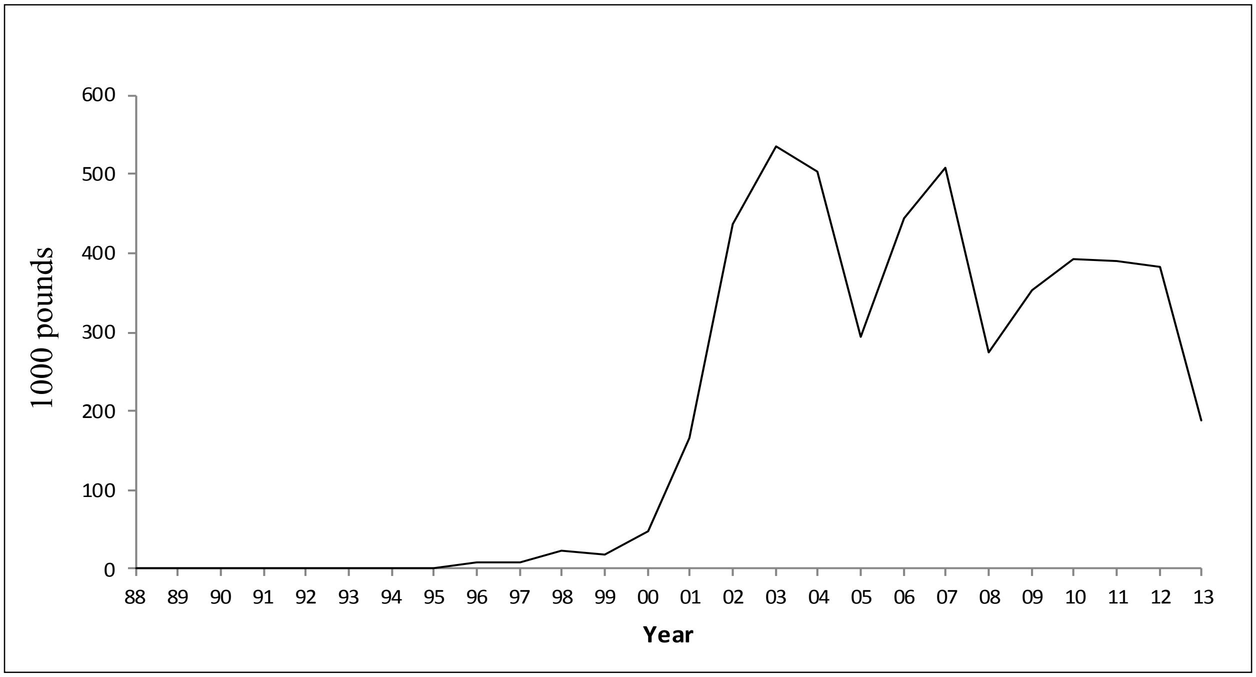
Interpretation: Although yellowfin tuna landings increased slightly in 2013 from 2012, landings continued a declining trend from the peak year of 2004 (1,960,000 lbs). Troll landings also showed a decrease. The gear types landed a combined 933,177 pounds, of which longline gear landed 99 percent.

Calculation: The estimated total annual landings of yellowfin tuna are listed for longline and trolling fishing methods as explained in Table 3.

Table 14. American Samoa annual estimated total yellowfin tuna landings (lbs) by gear, 1986-2013

Year	Longline	Trolling
1986	0	51,439
1987	0	27,451
1988	1,775	48,319
1989	127	51,873
1990	0	25,188
1991	262	28,046
1992	0	23,916
1993	2,632	18,180
1994	1,716	49,415
1995	4,052	54,139
1996	25,662	37,051
1997	48,589	21,679
1998	92,528	6,762
1999	139,496	11,566
2000	190,564	4,827
2001	413,999	6,116
2002	1,060,315	12,353
2003	1,096,218	6,953
2004	1,959,674	5,939
2005	1,151,375	7,501
2006	1,095,952	9,106
2007	1,396,331	9,023
2008	749,825	20,089
2009	866,522	2,785
2010	981,258	2,052
2011	1,191,634	12,382
2012	828,424	8,479
2013	926,140	7,037
Average	**547,158**	**20,345**
Std. Dev	**566,353**	**16,649**

Figure 10. American Samoa annual estimated total bigeye tuna landings (lbs) by longlining



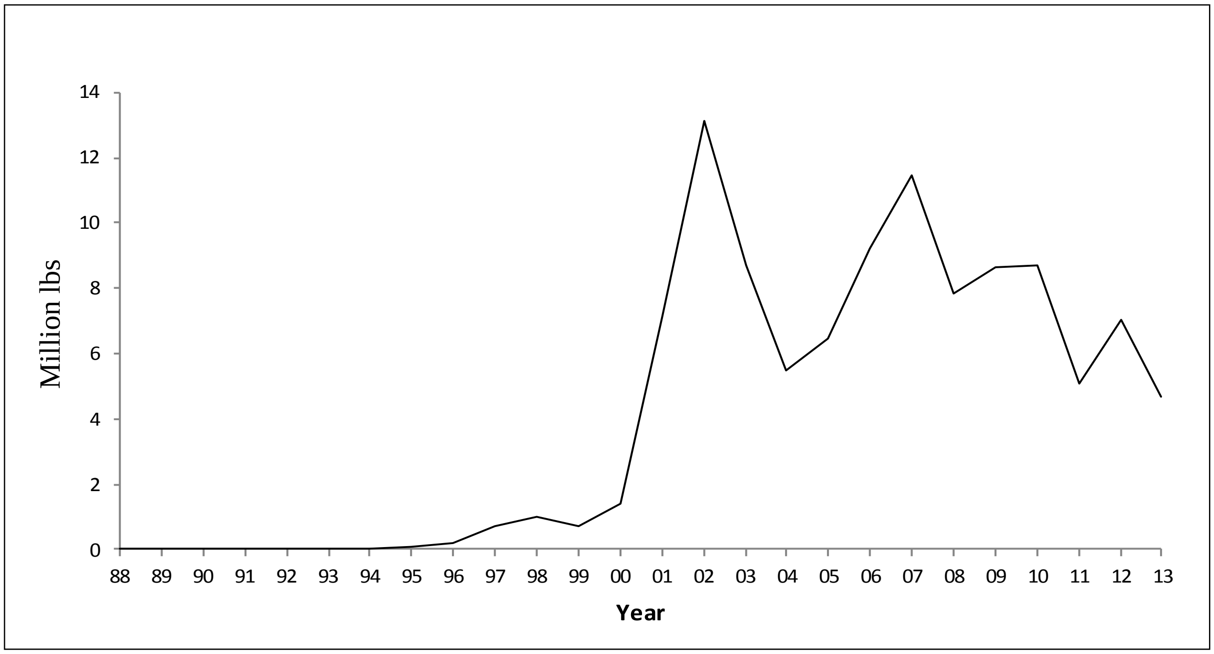
Interpretation: Longline landings of bigeye tuna showed an overall declining trend after 2007; 2013 experienced a steep decline with landings roughly two times lower than 2012. Landings from 2010 to 2012 were about the same. Estimated bigeye tuna longline landings peaked in 2003 at 534,903 pounds and went up again in 2007, declined in 2008, regained ground from 2009 through 2012, then declined steeply in 2013.

Calculation: The estimated total annual landings of bigeye tuna is listed for longline fishing method as explained in Table 3. The average and standard deviation for the pounds caught is calculated from 1991 onward.

Table 15. American Samoa annual estimated total bigeye tuna landings (lbs) by gear, 1988-2013

Year	Pounds
1988	0
1989	0
1990	0
1991	0
1992	0
1993	708
1994	0
1995	2,191
1996	8,701
1997	8,808
1998	22,291
1999	19,211
2000	47,710
2001	165,755
2002	436,280
2003	534,903
2004	502,541
2005	293,605
2006	443,042
2007	509,385
2008	274,482
2009	353,779
2010	392,896
2011	389,132
2012	383,023
2013	187,277
Average	**191,377**
Std. Dev	**199,772**

Figure 11. American Samoa annual estimated total albacore landings (lbs) by longlining



Interpretation: Albacore landings in 2013 amounted to 4.7 million pounds, the lowest landings in more than ten years. There has been a declining trend for the last 7 years. The highest ever recorded landings in the history of the fishery was in 2002.

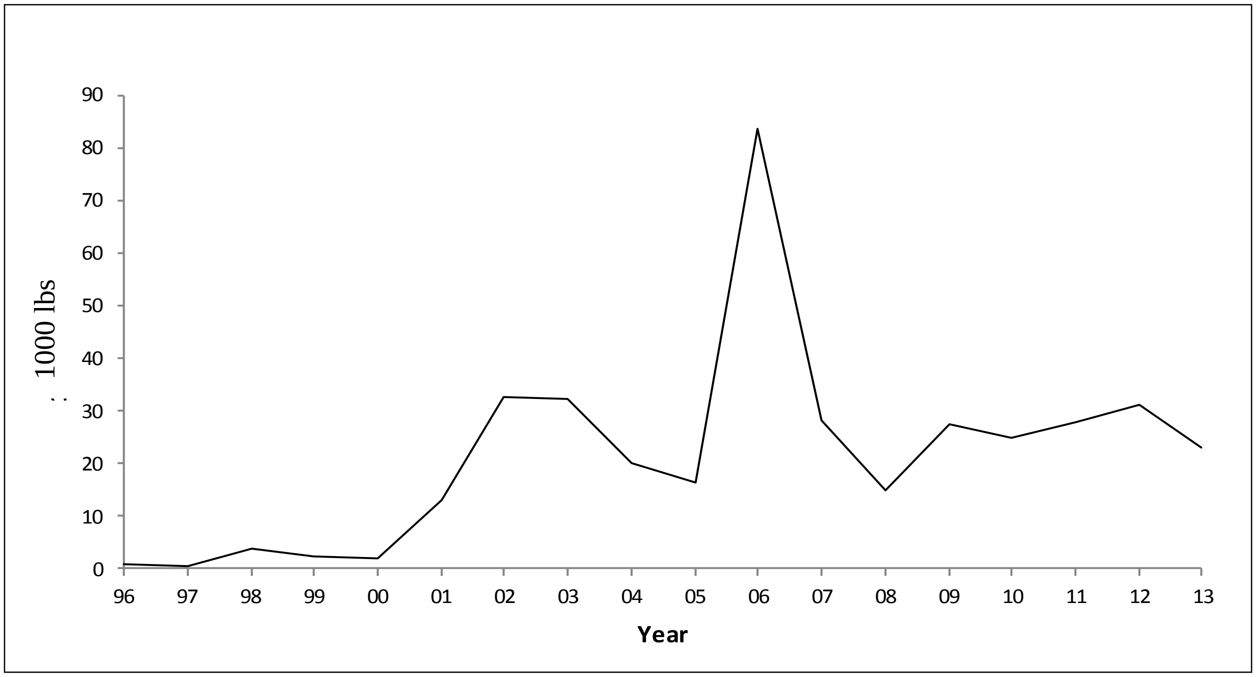
Since the longline fishery initially began, it has been the most commonly used method of fishing for the main pelagic species, especially for albacore tuna.

Calculation: The estimated total annual landings of albacore tuna is listed for the longline fishing methods. The average and standard deviation is calculated from 1988 onward.

Table 16. American Samoa annual estimated total albacore tuna landings (lbs) by gear, 1988-2013

Year	Pounds
1988	1,875
1989	241
1990	0
1991	1,730
1992	0
1993	315
1994	1,609
1995	58,949
1996	190,269
1997	689,397
1998	983,560
1999	743,038
2000	1,394,011
2001	7,120,245
2002	13,109,695
2003	8,693,212
2004	5,480,841
2005	6,429,023
2006	9,210,565
2007	11,438,307
2008	7,831,590
2009	8,646,726
2010	8,684,611
2011	5,098,823
2012	7,054,206
2013	4,679,946
Average	**4,136,261**
Std. Dev	**4,176,453**

Figure 12. American Samoa annual estimated total longline swordfish landings in pounds

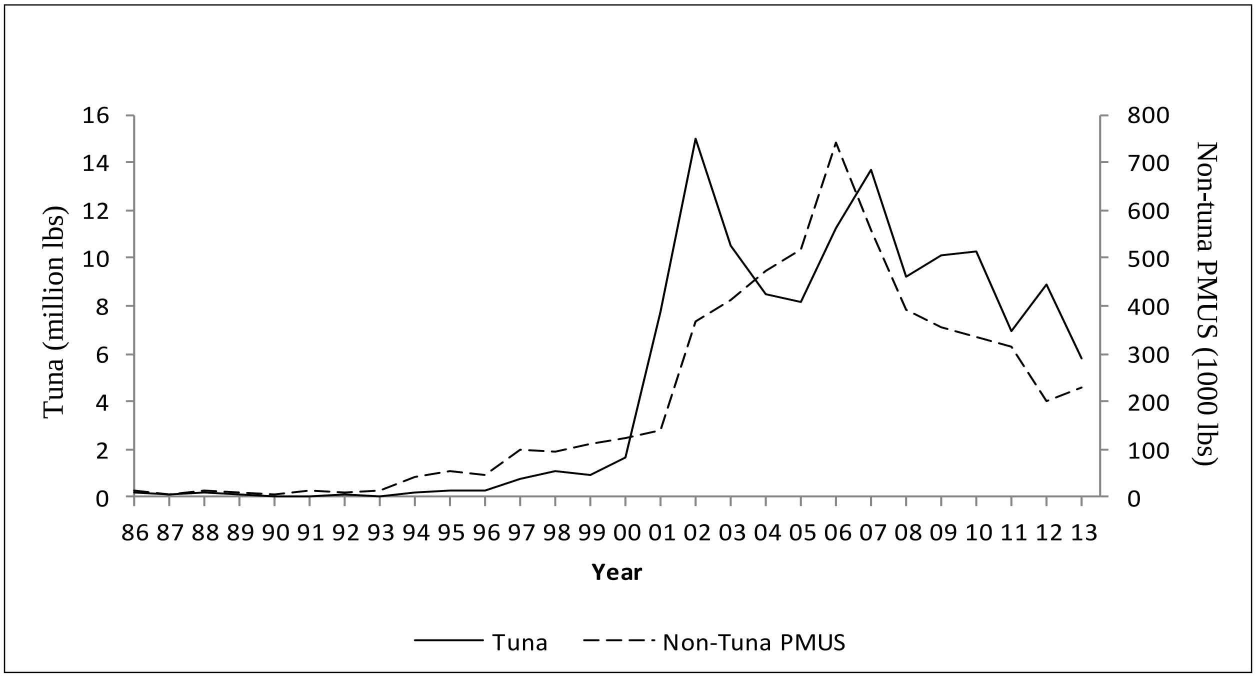


Interpretation: More than 23,000 pounds of swordfish were landed in 2013, which was approximately 8,000 pounds less than 2012. The 2006 landing showed the highest pounds landed by this fishery. Other than a spike in 2006 and two troughs in 2005 and 2008, landings have been relatively stable from 2002 through 2013.

Calculation: The estimated total annual landings of swordfish are listed for longline and trolling fishing methods as explained in Table 3.

Year	Pounds
1996	893
1997	701
1998	3,716
1999	2,259
2000	2,056
2001	13,091
2002	32,710
2003	32,231
2004	20,195
2005	16,491
2006	83,615
2007	28,287
2008	14,889
2009	27,615
2010	24,816
2011	27,997
2012	31,179
2013	23,180
Average	**21,440**
Std. Dev	**18,849**

Figure 13. American Samoa annual commercial landings of tunas and non-tuna PMUS



Interpretation: The estimated total commercial landings for both tuna and non-tuna species declined by 3 million pounds. A continuous decline has prevailed since 2006. Landings for tuna dropped by about 35% in 2013 and was the lowest since 1997. The commercial landings of non-tuna PMUS also declined through the years; landings ranged between 200,000 and 400,000 pounds from 2008 in a declining rate.

Calculation: Estimated commercial landings for Tunas and Non-Tuna PMUS were calculated by summing the commercial landings for the species these categories as defined by in Table 3.

Table 17. American Samoa annual commercial landings of tunas and non-tuna PMUS, 1986-2013

	Pounds Landed	
Year	**Tuna**	**Non-Tuna**
1986	170,150	15,291
1987	132,238	4,841
1988	172,803	12,111
1989	113,545	8,164
1990	56,622	3,627
1991	58,027	15,027
1992	90,575	11,088
1993	44,407	14,479
1994	188,980	41,330
1995	281,804	55,056
1996	311,348	46,254
1997	799,911	97,956
1998	1,115,310	95,011
1999	946,855	109,638
2000	1,646,902	124,833
2001	7,746,689	138,967
2002	14,989,385	367,251
2003	10,554,312	410,305
2004	8,449,678	473,258
2005	8,159,461	518,561
2006	11,228,163	743,235
2007	13,727,477	558,635
2008	9,248,516	389,997
2009	10,145,828	357,183
2010	10,295,267	335,981
2011	6,948,153	315,467
2012	8,920,560	198,971
2013	5,776,047	227,984
Average	**4,725,679**	**203,232**
Std. Dev	**4,945,309**	**203,644**

Figure 14. Number of American Samoa vessels landing any pelagic species, tunas and non-tuna PMUS

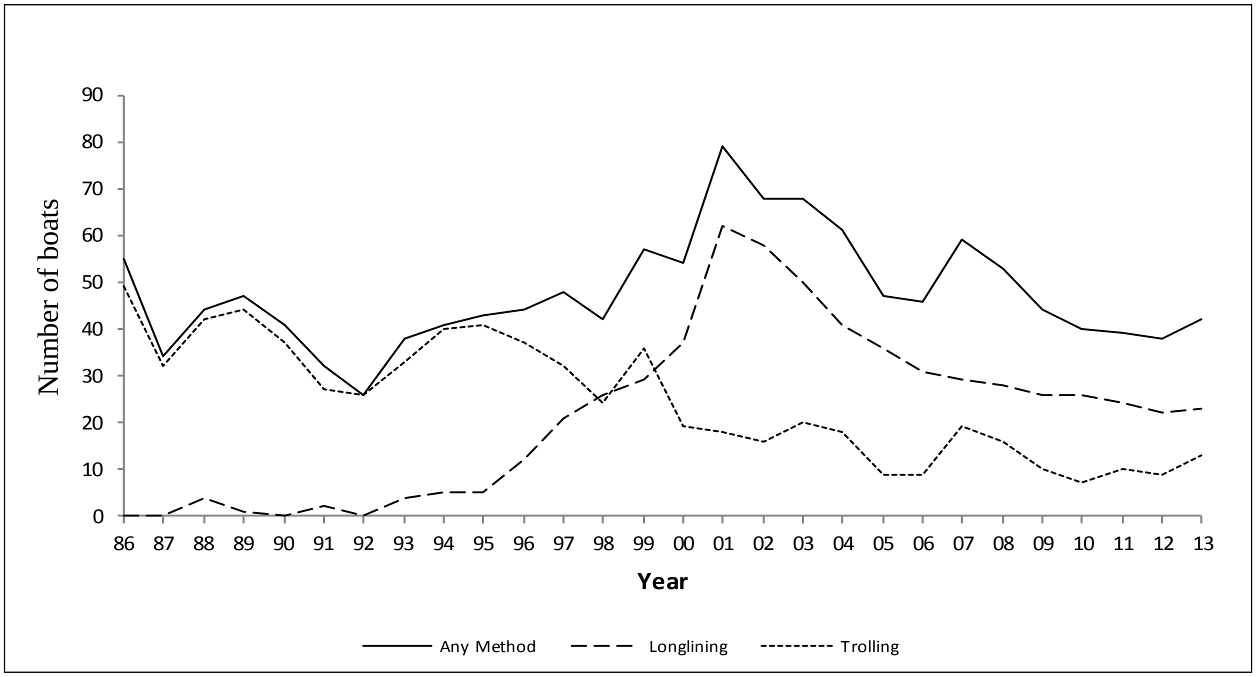
Interpretation: The total number of American Samoa vessels landing any pelagic species continued to decline from 79 vessels in 2001 to 42 in 2013. The average number of boats landing tuna species and non-tuna PMUS varied from 34 to 42 in the past five years. This fleet includes seasonal fishing small motorized and non-motorized aluminum boats as long as they landed any pelagic species.

Calculation: Prior to 1997, each boat counted in the Any Pelagics column made at least one landing in an offshore creel survey interview of at least one species in Table 4 in the given year. Likewise each boat counted in the other two columns made at least one landing in an offshore creel survey interview of at least one species in the corresponding subgroup of Table 3 in the given year. In 1997 and after, the count of non-interviewed boats that made at least one landing of the appropriate species in a longline log was added to the count of interviewed boats from the offshore creel survey.

Table 18. Number of American Samoa boats landing any pelagic species, tunas and non-tuna PMUS, 1986-2013

	Number of Vessels Landing Pelagic Species		
Year	**Any Pelagics**	**Tuna**	**Non-Tuna PMUS**
1986	55	54	40
1987	34	32	20
1988	44	42	33
1989	47	45	29
1990	41	38	28
1991	32	28	21
1992	26	26	20
1993	38	34	29
1994	41	40	28
1995	43	43	39
1996	44	43	37
1997	48	45	43
1998	42	38	36
1999	57	56	49
2000	54	52	43
2001	79	76	69
2002	68	67	62
2003	68	66	65
2004	61	59	54
2005	47	45	44
2006	46	39	37
2007	59	50	44
2008	53	44	38
2009	44	39	34
2010	40	38	35
2011	39	37	32
2012	38	38	33
2013	42	37	36
Average	**48**	**45**	**39**
Std. Dev	**12**	**12**	**12**

Figure 15. Number of American Samoa boats landing any pelagic species by longlining, trolling and all methods



Interpretation: The number of American Samoan vessels landing any pelagic species in 2013 using any method totaled 42. Twenty-three boats used longline gear and 13 used trolling gear. The number of longline boats varied from 22 to 26 in five years. The troll boats increased by four in 2013. The number of American Samoan vessels using any method and longline gear have been declining over the years since the peak in 2001.

Calculation: Prior to 1997, each boat counted in the Any Method column made at least one landing in an offshore creel survey interview of at least one species in Table 4 in the given year. Each boat counted in the Longlining and Trolling columns made at least one landing in an offshore creel survey interview of at least one species in Table 4, using the longline or troll or combined troll/bottom fishing methods in the given year. In 1997 and after the count of non-interviewed boats that made at least one landing of the species in Table 4 in a longline log during the given year was added to the count of interviewed boats from the offshore creel survey in the Any Method and Longlining columns. The average and standard deviation for the number of boats using Longlining is calculated from 1988 onward.

Table 19. Number of American Samoa boats landing any pelagic species by longlining, trolling and all methods, 1986-2013

	Number of Boats		
Year	**Any Method**	**Longlining**	**Trolling**
1986	55	0	49
1987	34	0	32
1988	44	4	42
1989	47	1	44
1990	41	0	37
1991	32	2	27
1992	26	0	26
1993	38	4	33
1994	41	5	40
1995	43	5	41
1996	44	12	37
1997	48	21	32
1998	42	26	24
1999	57	29	36
2000	54	37	19
2001	79	62	18
2002	68	58	16
2003	68	50	20
2004	61	41	18
2005	47	36	9
2006	46	31	9
2007	59	29	19
2008	53	28	16
2009	44	26	10
2010	40	26	7
2011	39	24	10
2012	38	22	9
2013	42	23	13
Average	**48**	**23**	**25**
Std. Dev	**12**	**17**	**12**

Figure 16. Number of permitted and active longline fishing vessels in the A (≤ 40 foot) and D (> 70.1 foot) size classes

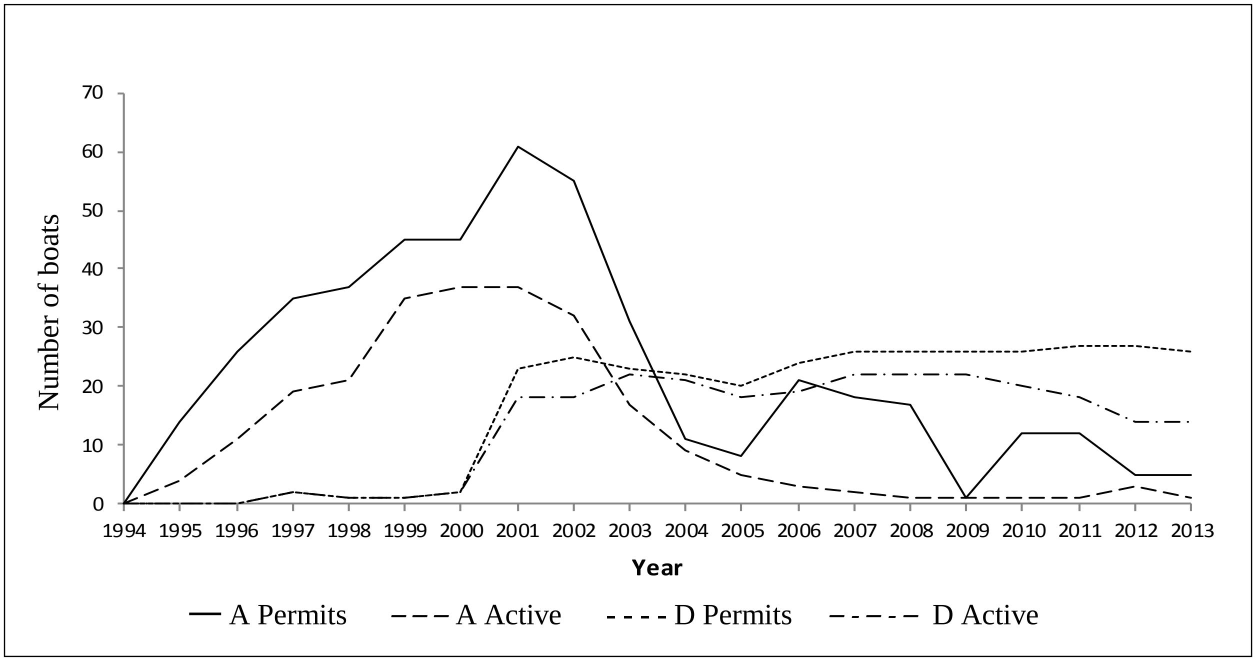
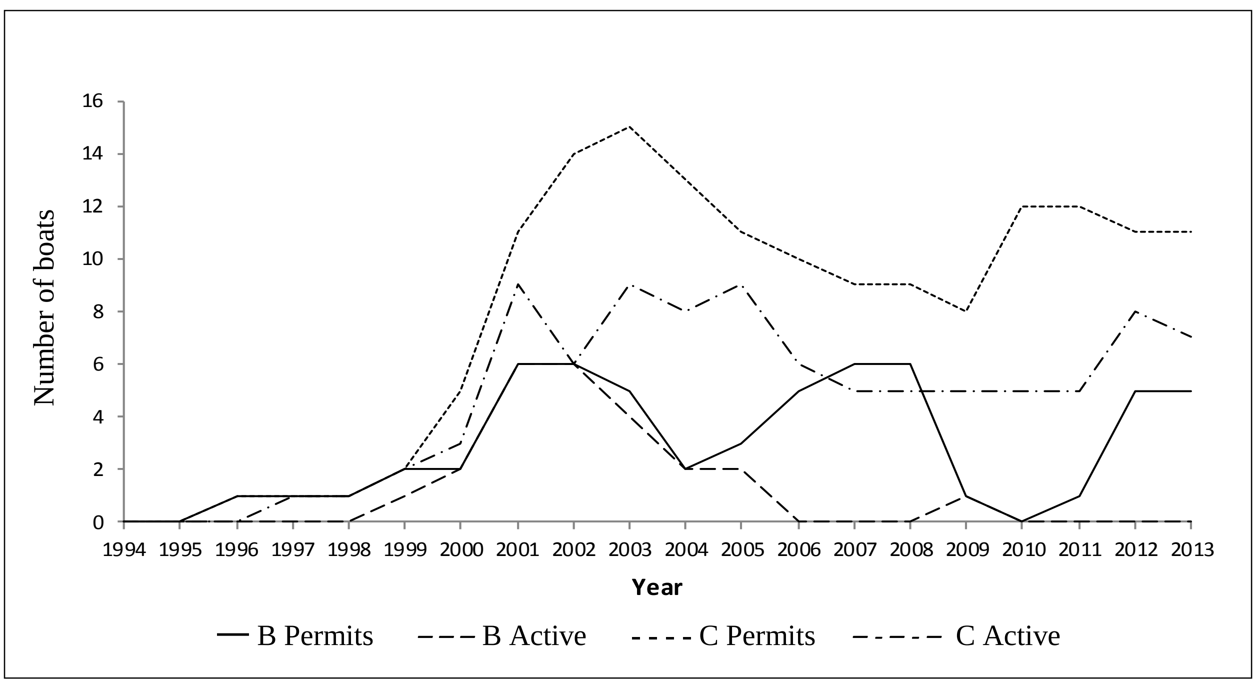


Figure 17. Number of permitted and active longline fishing vessels in the B (40.1 to 50 foot) and C (50.1 to 70 foot) size classes



Interpretation: Most active boats in 2013 were larger boats that were 70 feet long or more. There was no fishing by Class B category vessels (40 to 50 feet long). Of the five permitted in the Class A category, and one was active. In B and C size classes, 7 boats were active out of 16 permitted. And in Class D size 14 out of 26 permitted were active. There were 47 permitted boats in all size classes.

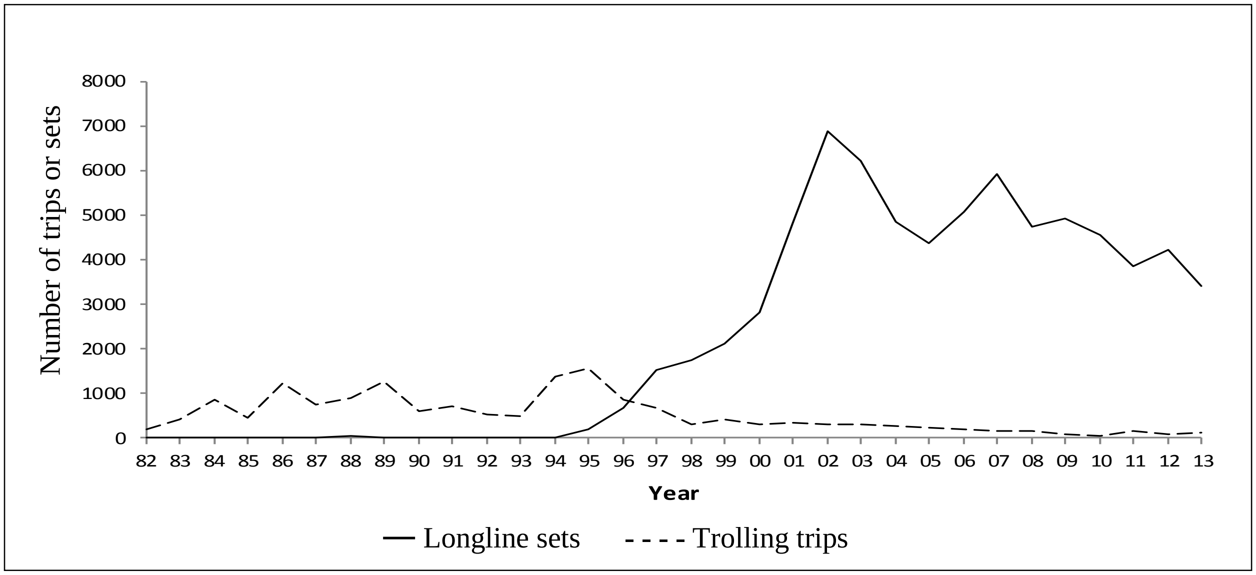
Calculation: For 2006, the number of permits is the number actual of Limited Entry Longline Permits issued for each size class late in 2005. For earlier years, the number of permits is the number of federal general longline permits issued for each vessel size category. For the C and D size classes the number of permits may include those for Hawaiian permitted boats landing their fish in American Samoa. The number of active boats is those that have submitted longline logs or have been interviewed in the boat-based creel survey after a longline fishing trip during the year. Boats in the boat-based creel survey are not counted as active if they are interviewed using only fishing methods other than longlining such as bottomfishing or trolling.

The range of dates that constitutes a year of activity is skewed to be in line with when the longline permits are issued and expire, roughly Feb. 25th. The active year of 1996 is from February 25, 1996 to February 24 1997. This applies through 2004. The active year 2005 is from February 25, 2005 to December 31, 2005. The active year of 2006 is the calendar year; the active year of 1995 is January 1, 1995 to February 24, 1996. This causes the number of active vessels to be slightly different from other counts of longline vessel activity based on the calendar year.

Table 20. Number of permits and active permits by class

	Class A < 40 Feet		Class B 40.1-50 Feet		Class C 50.1-70 Feet		Class D > 70 Feet	
Year	**Permits**	**Active**	**Permits**	**Active**	**Permits**	**Active**	**Permits**	**Active**
1994	0	0	0	0	0	0	0	0
1995	14	4	0	0	0	0	0	0
1996	26	11	1	0	1	0	0	0
1997	35	19	1	0	1	1	2	2
1998	37	21	1	0	1	1	1	1
1999	45	35	2	1	2	2	1	1
2000	45	37	2	2	5	3	2	2
2001	61	37	6	6	11	9	23	18
2002	55	32	6	6	14	6	25	18
2003	31	17	5	4	15	9	23	22
2004	11	9	2	2	13	8	22	21
2005	8	5	3	2	11	9	20	18
2006	21	3	5	0	10	6	24	19
2007	18	2	6	0	9	5	26	22
2008	17	1	6	0	9	5	26	22
2009	1	1	1	0	8	5	26	20
2010	12	1	0	0	12	5	26	20
2011	12	1	1	0	12	5	27	18
2012	5	3	5	0	11	8	27	14
2013	5	1	5	0	11	7	26	14

Figure 18. Number of American Samoa troll trips and longline sets for all pelagic species by method



Interpretation: The number of longline sets decreased by 815 trips (19%) in 2013 and troll trips increased by 47 trips (56%). Longline sets varied from 3,000 to 5,000 in the past five years. The number of troll trips showed no major change in ten years.

Calculation: The number of Troll Trips is calculated by first subtracting the total longline pounds from the total pounds to get an estimate of the number of pounds caught by trolling and other fishing methods. This value is divided by the catch per hour for pure troll trips, from the offshore creel survey system expansion, to get the number of trolling hours. The number of trolling hours is then divided by the hours per trip for a purely trolling trip from the offshore creel survey system expansion to get the number of troll trips.

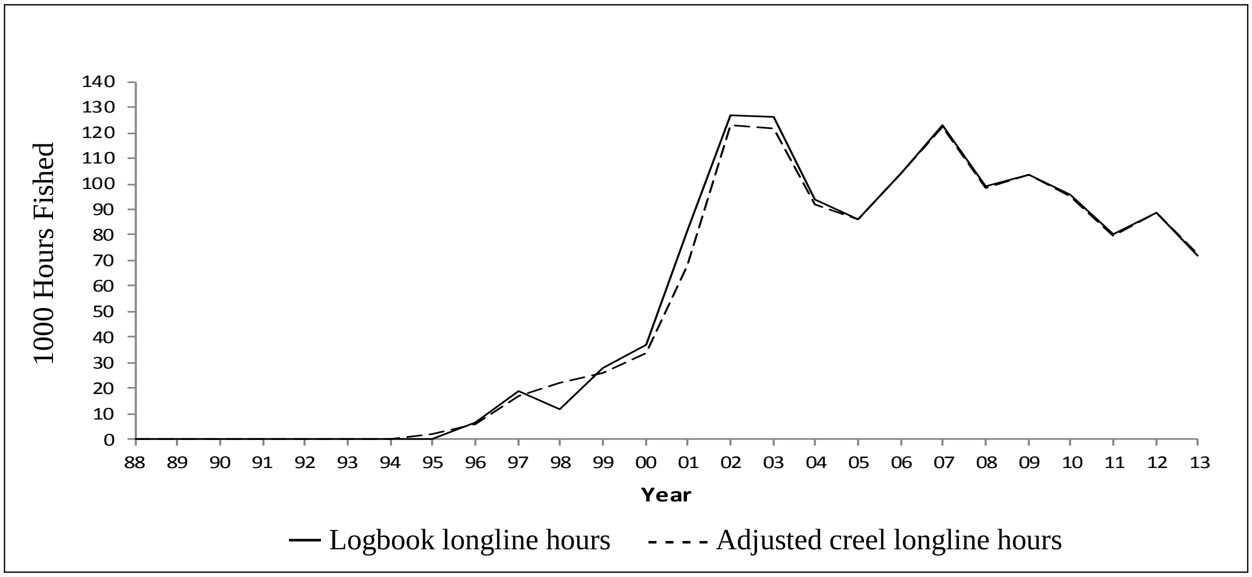
The number of longline sets using logbook data is obtained by counting all of the sets entered in the longline logbook system for the given year for interviewed and non-interviewed boats.

Prior to 1997, the number of longline sets using creel survey data is the expanded number of longline fishing trips from the offshore creel survey system. In 1997 and after this number is the expanded number of longline fishing trips from the offshore creel survey system for interviewed vessels plus the count of all of the sets entered in the longline logbook system for non-interviewed vessels. The average and standard deviation for Longline Sets from logbook data and creel data is calculated from 1996 onward for comparison.

Table 21. Number of American Samoa troll trips and longline sets for all pelagic species by method, 1982-2013

Year	Troll Trips	Longline Sets
1982	177	0
1983	406	0
1984	853	0
1985	464	0
1986	1,234	0
1987	751	0
1988	875	31
1989	1,269	3
1990	615	0
1991	699	21
1992	513	0
1993	481	16
1994	1,355	20
1995	1,548	187
1996	847	653
1997	656	1,528
1998	316	1,754
1999	429	2,108
2000	292	2,814
2001	330	4,801
2002	288	6,872
2003	310	6,221
2004	276	4,853
2005	211	4,359
2006	193	5,069
2007	145	5,919
2008	143	4,754
2009	81	4,911
2010	53	4,537
2011	141	3,847
2012	84	4,208
2013	131	3,393
Average	**510**	**4,232**
Std. Dev	**416**	**1,472**

Figure 19. Number of American Samoa hours fished for all species by longlining



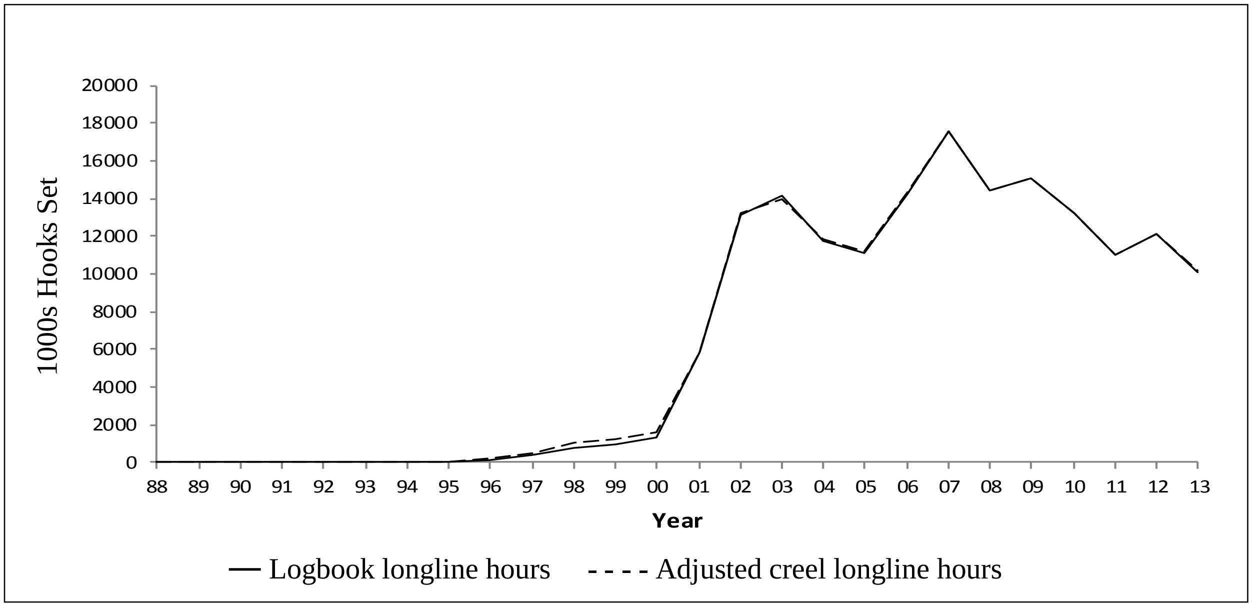
Interpretation: The number of hours fished from both creel and longline logs showed a declining trend at about the same rate. There were no notable difference in fished hours, as shown in the chart and table.

Calculation:

Table 22. Number of American Samoa hours fished for all species by longlining – logbook and creel survey comparison, 1988-2013

	Hours Fished	
Year	**Longline Logbook**	**Longline Adj. Creel**
1988	0	198
1989	0	17
1990	0	0
1991	0	164
1992	0	0
1993	0	296
1994	0	161
1995	0	1,860
1996	6,366	5,906
1997	19,065	16,956
1998	11,995	22,012
1999	27,708	25,721
2000	36,973	33,790
2001	81,291	67,755
2002	127,123	123,194
2003	126,282	121,664
2004	94,054	91,865
2005	86,332	86,164
2006	104,320	104,132
2007	123,288	122,631
2008	99,178	98,676
2009	103,807	103,790
2010	95,579	94,930
2011	80,292	79,439
2012	88,762	88,725
2013	71,730	72,570
Avg	**53,233**	**52,408**
Std. Dev.	**47,756**	**46,611**

Figure 20. Number of American Samoa thousands of hooks set for all species by longlining from logbook and creel survey



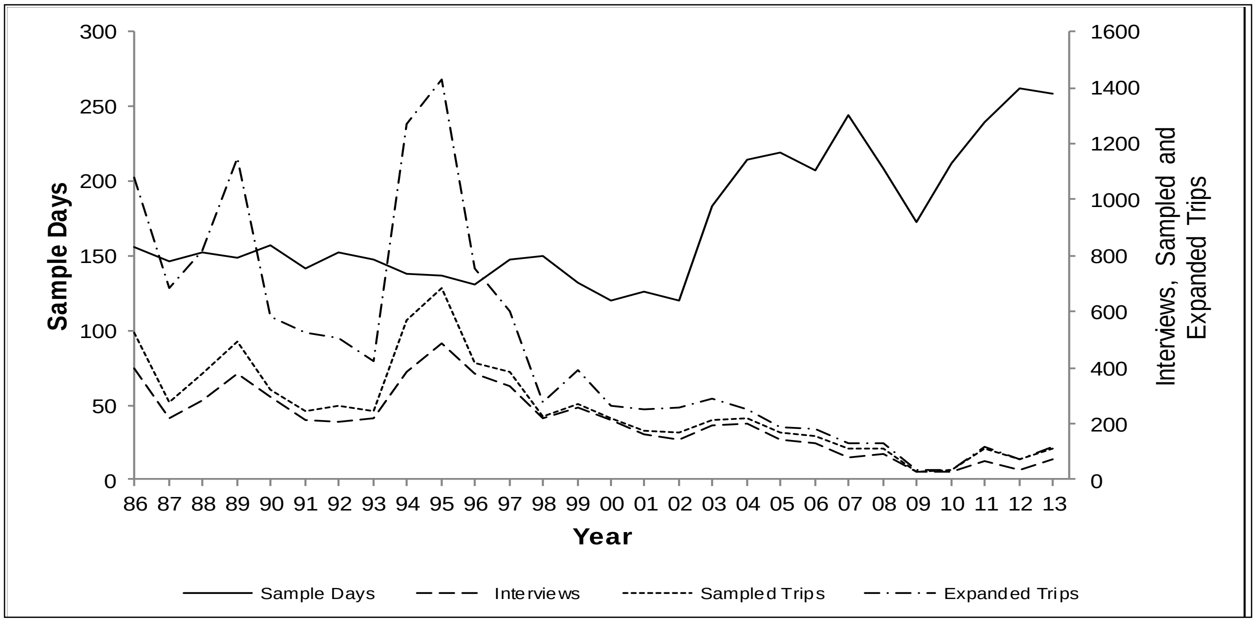
Interpretation: There is no significant difference in the number of hooks set for all species from logbook data versus creel survey data. However, the numbers continue to decline through the years after the peak in 2007.

Calculation:

Table 23. Number of American Samoa hooks (1000s) set for all species by longlining from logbook and creel survey data

	1000s Longline Hooks	
Year	Logbook	Adj. Creel
1988	0	1
1989	0	0
1990	0	0
1991	0	0
1992	0	0
1993	0	2
1994	0	0
1995	0	45
1996	99	157
1997	419	518
1998	771	1,042
1999	915	1,226
2000	1,335	1,587
2001	5,795	5,808
2002	13,096	13,245
2003	14,165	13,991
2004	11,742	11,806
2005	11,129	11,177
2006	14,262	14,319
2007	17,555	17,589
2008	14,444	14,464
2009	15,077	15,094
2010	13,184	13,198
2011	10,966	10,990
2012	12,109	12,141
2013	10,129	10,162
Avg	**6,430**	**6,483**
Std. Dev.	**6,465**	**6,442**

Figure 21. Number of American Samoa sample days, trolling interviews, and trolling trips



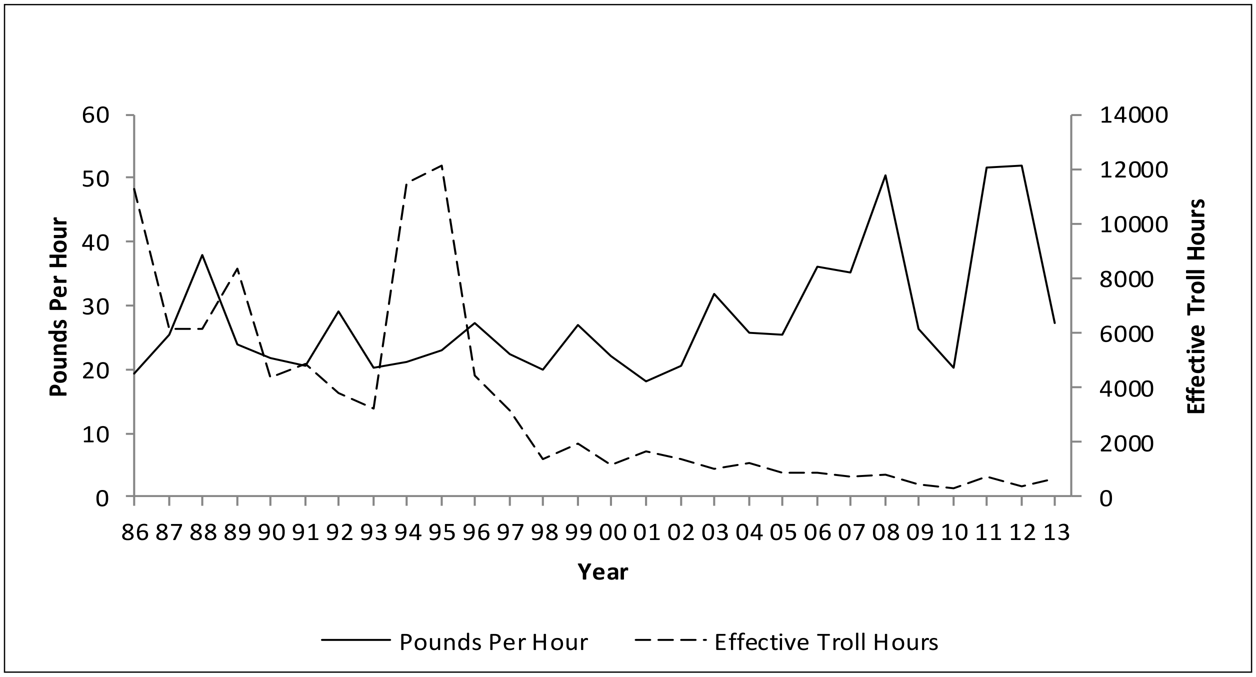
Interpretation: The number of sample days for troll gear decreased slightly from 2012, while the number of interviews increased in 2013 to twice the number in 2012. The number of troll trips sampled also increased 38% in 2013.

Calculation: All data in this table and chart comes from the Tutuila and Manua Boat-Based Creel Survey. The number of Sample Days is the number of weekend/holiday and weekday sample days in the Tutuila Boat-based Creel survey for the year. The number of Trolling Interviews is the number of Tutuila pure trolling interviews without pooling plus the number of unadjusted Manua pure trolling interviews for the year. The number of Sampled Trips is the number of pure trolling trips actually counted in the Tutuila and Manua surveys. The Expanded Number of Trips is the expanded number of Tutuila pure troll trips plus the number of Manua troll trips adjusted for the coverage factor.

Table 24. Number of American Samoa sample days, trolling interviews, and trolling trips

Year	Sample Days	Trolling Interviews	Trolling Sampled	Trips Expanded	Percent
1986	156	398	523	1,077	49
1987	146	217	277	686	40
1988	152	285	379	817	46
1989	149	376	496	1,148	43
1990	157	293	321	583	55
1991	142	213	248	524	47
1992	152	206	263	503	52
1993	148	222	245	423	58
1994	138	387	567	1,273	45
1995	137	489	683	1,429	48
1996	131	377	420	754	56
1997	147	337	386	603	64
1998	150	220	227	280	81
1999	132	257	271	393	69
2000	120	212	221	263	84
2001	126	163	175	250	70
2002	120	143	169	259	62
2003	183	194	214	287	75
2004	214	198	219	252	87
2005	219	146	169	187	90
2006	207	133	156	182	86
2007	244	82	114	133	86
2008	208	90	111	132	84
2009	172	27	30	37	81
2010	212	31	36	38	95
2011	239	67	113	119	95
2012	262	37	71	76	93
2013	259	73	114	119	96
Average	**172**	**210**	**258**	**458**	**69**
Std. Dev	**43**	**122**	**161**	**383**	**18**

Figure 22. American Samoa pelagic catch per hour of trolling and number of trolling hours.



Interpretation: Trolling catch rate increased steeply from 2010 to 2011 and remained about the same in 2012; it dropped again in 2013 by 48% despite a 42% increase in troll hours. The 2012 catch rate was the highest rate in the history of the fishery despite having the second lowest effective troll hours in all 20+ years of the fishery. Troll hours have been generally declining while catch rate fluctuated.

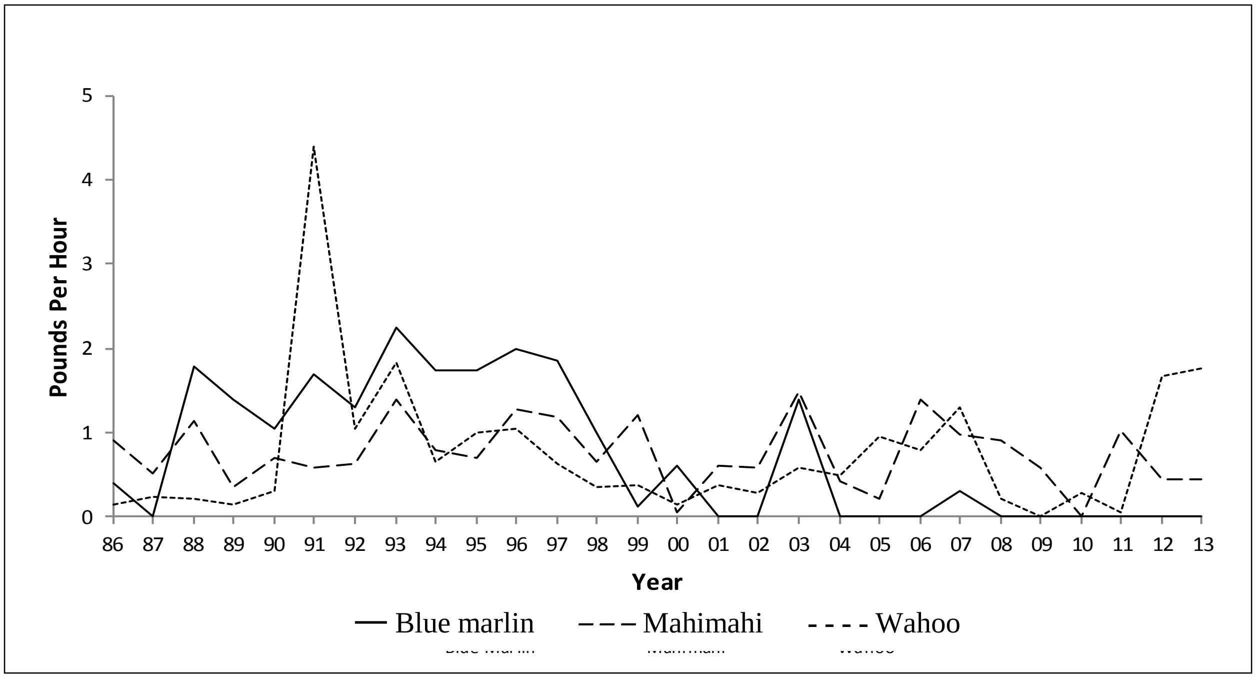
Calculation: For purely trolling trips where the number of hours was recorded, the total catch was divided by the total number of trolling hours to obtain CPUE.

The number of effective Trolling Hours is calculated by first subtracting the total longline pounds of Table 3 from the total pounds to get an estimate of the number of pounds caught by trolling and other fishing methods. This value is divided by the catch per hour for pure troll trips, from the offshore creel survey system expansion, to get the number of trolling trip-hours.

Table 25. American Samoa pelagic catch per hour of trolling and number of trolling hours

Year	CPUE	Hours
1982	25.91	1,019
1983	27.41	3,513
1984	30.97	7,785
1985	32.59	4,394
1986	19.36	11,294
1987	25.34	6,179
1988	38.01	6,125
1989	23.79	8,370
1990	21.86	4,362
1991	20.64	4,884
1992	28.97	3,809
1993	20.09	3,216
1994	21.23	11,448
1995	22.94	12,143
1996	27.38	4,442
1997	22.31	3,144
1998	19.93	1,405
1999	26.81	1,981
2000	22.01	1,149
2001	18.09	1,655
2002	20.62	1,362
2003	31.78	1,044
2004	25.70	1,204
2005	25.44	862
2006	36.02	883
2007	35.15	723
2008	50.44	808
2009	26.38	424
2010	20.32	308
2011	51.56	711
2012	52.03	389
2013	27.29	666
Average	**27.91**	**3,393**
Std. Dev	**9.55**	**3,512**

Figure 23. American Samoa trolling CPUEs (lbs per hour fished) for blue marlin, mahimahi, and wahoo



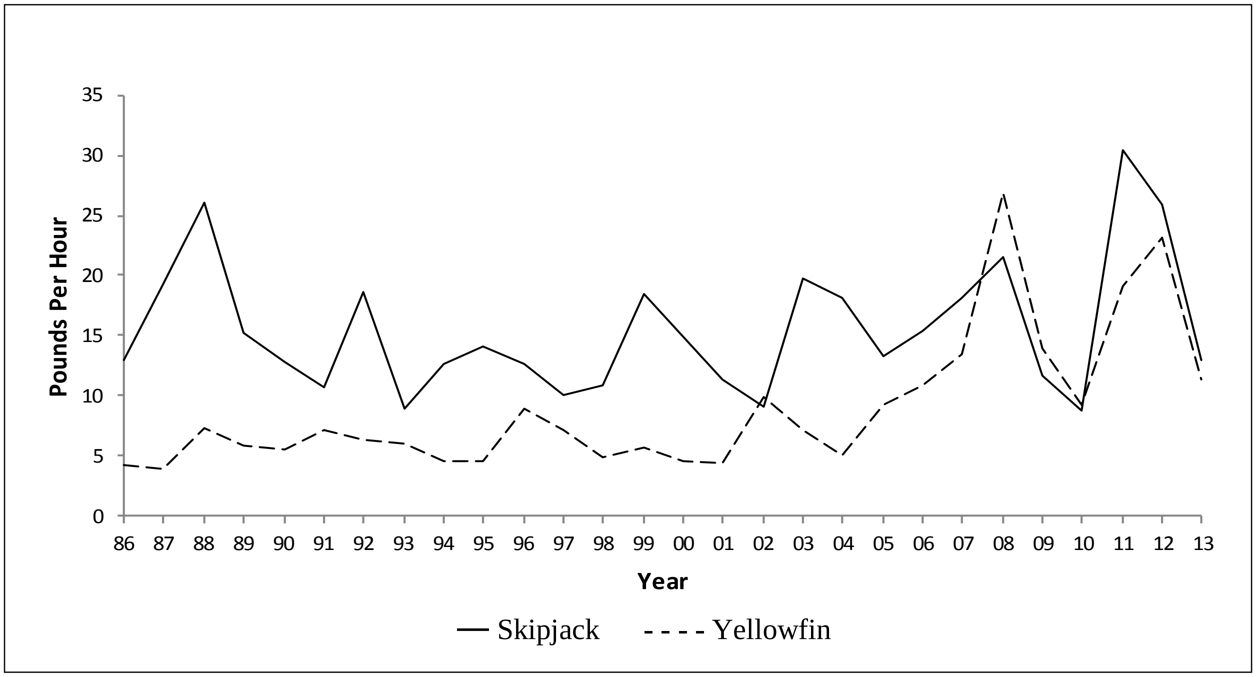
Interpretation: Troll catch rate (CPUE; catch per unit effort) for blue marlin has generally remained at zero since 2001. Mahimahi CPUE in 2012 and 2013 were relatively the same, as were catch rates for wahoo. The 2013 catch rate for wahoo was the highest in ten years and the second highest in all years.

Calculation: The values for each of the three species is obtained by dividing the Troll Pounds for each species in Table 3 by the expanded number of trip-hours for purely trolling trips from the offshore creel survey system.

Table 26. American Samoa trolling CPUEs (lbs/hour fished) for blue marlin, mahimahi, and wahoo

Trolling CPUEs: Blue Marlin, Mahimahi, Wahoo (pounds per hour)			
Year	**Blue Marlin**	**Mahimahi**	**Wahoo**
1986	0.39	0.9	0.15
1987	0	0.52	0.23
1988	1.79	1.13	0.22
1989	1.4	0.36	0.15
1990	1.05	0.7	0.3
1991	1.7	0.57	4.39
1992	1.29	0.62	1.04
1993	2.25	1.38	1.84
1994	1.74	0.8	0.64
1995	1.74	0.69	1
1996	1.99	1.27	1.05
1997	1.86	1.18	0.63
1998	0.99	0.65	0.35
1999	0.13	1.21	0.37
2000	0.6	0.06	0.14
2001	0	0.6	0.37
2002	0	0.59	0.28
2003	1.39	1.49	0.59
2004	0	0.43	0.48
2005	0	0.21	0.94
2006	0	1.4	0.79
2007	0.31	0.98	1.29
2008	0	0.9	0.22
2009	0	0.58	0
2010	0	0	0.29
2011	0	1.02	0.04
2012	0	0.44	1.67
2013	0	0.45	1.77
Average	**0.74**	**0.75**	**0.76**
Std. Dev	**0.80**	**0.39**	**0.87**

Figure 24. American Samoa trolling CPUEs (lbs/hr fished) for skipjack and yellowfin tuna



Interpretation: The estimated CPUE for skipjack and yellowfin tunas showed a sharp increase from 2010 to 2011; CPUE for yellowfin increased again in 2012. However, both experienced a steep drop in 2013. CPUE for skipjack has fluctuated from 10 to 26 pounds since 2005. The skipjack rate dropped to about 3 times the highest historical rate in 2011. The yellowfin tuna catch rate had been generally declining since the peak year of 2008.

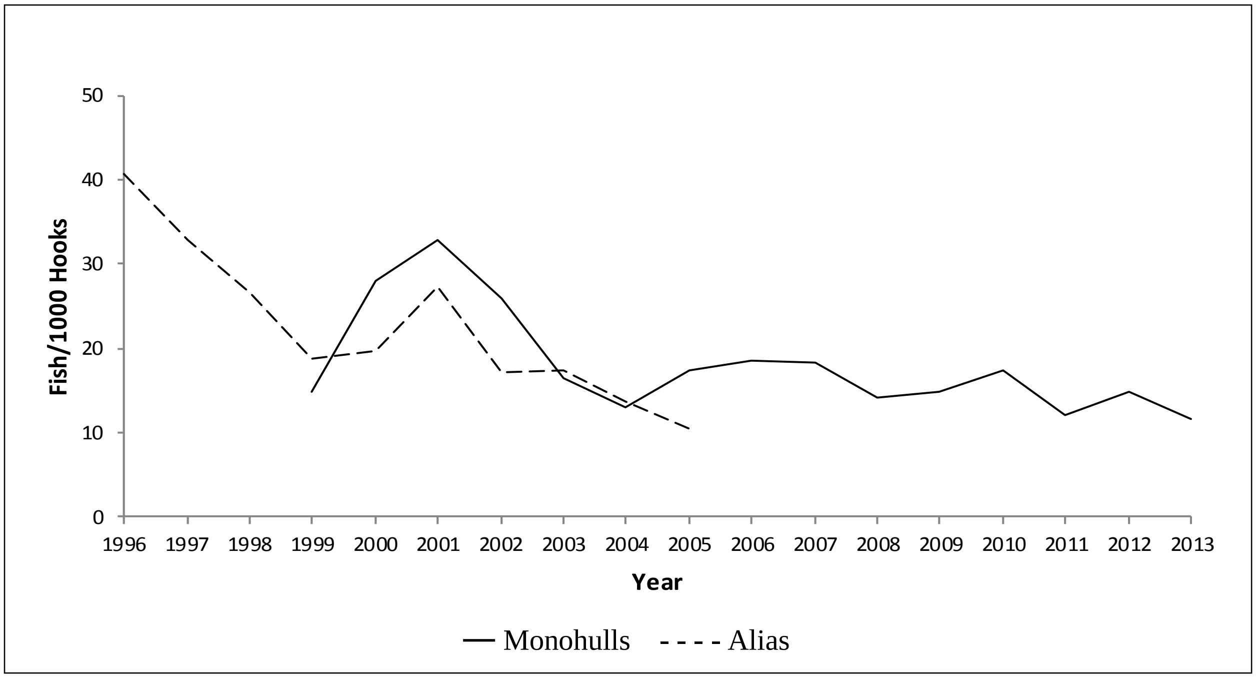
Trolling regularly occurs closer to the islands of American Samoa, at different times, and targets different depths than longline fishing.

Calculation: The values for each of the two species is obtained by dividing the Troll Pounds for each species in Table 3 by the expanded number of trip-hours for purely trolling trips from the offshore creel survey system.

Table 27. American Samoa trolling CPUEs (lbs per hour fished) for skipjack and yellowfin tuna

Trolling CPUE: Skipjack Tuna, Yellowfin Tuna (pounds per hour)		
Year	**Skipjack**	**Yellowfin**
1982	15.9	7.8
1983	21	5.04
1984	18.1	7.2
1985	13.8	8.9
1986	12.9	4.31
1987	19.3	3.88
1988	26	7.3
1989	15.2	5.9
1990	12.8	5.51
1991	10.7	7.06
1992	18.7	6.4
1993	8.89	6.06
1994	12.6	4.49
1995	14.1	4.57
1996	12.7	8.98
1997	10.1	7.19
1998	10.8	4.89
1999	18.4	5.62
2000	14.9	4.61
2001	11.4	4.44
2002	9.03	9.83
2003	19.8	7.1
2004	18.2	5.1
2005	13.3	9.25
2006	15.4	10.8
2007	18.2	13.4
2008	21.5	26.9
2009	11.7	14
2010	8.78	9.23
2011	30.50	19.10
2012	25.90	23.20
2013	13.00	11.40
Average	**15.53**	**8.95**
Std. Dev	**5.43**	**5.67**

Figure 25. American Samoa longline albacore tuna CPUE for alias and monohull vessels from longline logbook data



Interpretation: Due to fishery data confidentiality, albacore information for alias from 2006 through 2013 is omitted. Monohull catch rates have been decreasing slightly since 2005, although generally ranging from 12 to 18 fishes per 1000 hooks for the last ten years.

Calculation: These values are sums of the Longline Logbook albacore catch (number of fish kept + released) from the longline logs for the two types of longline vessels in Samoa, alias and mono-hulls, divided by the total number of hooks set by each type of vessel. The 2006 mono-hull value is the value for all vessels for confidentiality reasons.

American Samoa Longline Albacore CPUE (fish per 1000 hooks)		
Year	**Alias**	**Monohulls**
1996	40.6	--
1997	32.8	--
1998	26.6	--
1999	18.8	14.8
2000	19.8	28
2001	27.3	32.9
2002	17.2	25.8
2003	17.3	16.4
2004	13.7	12.9
2005	10.3	17.4
2006	--	18.4
2007	--	18.3
2008	--	14.2
2009	--	14.8
2010	--	17.4
2011	--	12.1
2012	--	14.8
2013	--	11.7

Table 28. American Samoa catch/1000 hooks for two types of longline vessels, 1996-1999

Species	1996 Alias	1997 Alias	1998 Alias	1999 Alias	1999 Monohulls
Skipjack tuna	0.1	1.2	3.7	5.0	4.5
Albacore tuna	40.6	32.8	26.6	18.8	14.8
Yellowfin tuna	6.5	2.7	2.2	6.7	2.1
Bigeye tuna	1.3	0.3	0.3	0.7	0.5
TUNAS SUBTOTAL	**48.5**	**37**	**32.8**	**31.2**	**21.9**
Mahimahi	2.3	2.2	1.7	2.2	0.3
Black Marlin	0.0	0.1	0.0	0.2	0.1
Blue Marlin	0.9	0.7	0.6	0.5	0.1
Striped Marlin	0.0	0.0	0.0	0.0	0.2
Wahoo	0.8	0.9	2.2	2.1	1.2
Sharks (all)	0.7	0.1	0.1	0.1	1.2
Sailfish	0.2	0.2	0.1	0.0	0.1
Spearfish	0.0	0.0	0.0	0.0	0.1
Moonfish	0.0	0.1	0.1	0.1	0.1
Oilfish	0.0	0.0	0.0	0.0	0.6
Pomfret	0.0	0.0	0.0	0.0	0.2
NON-TUNA PMUS SUBTOTAL	**4.9**	**4.3**	**4.8**	**5.2**	**4.2**
Other Pelagic Fishes	0.0	0.0	0.2	0.3	0.2
OTHER PELAGICS SUBTOTAL	**0.0**	**0.0**	**0.2**	**0.3**	**0.2**
TOTAL PELAGICS	**53.4**	**41.3**	**37.7**	**36.7**	**26.3**

Table 29. American Samoa catch/1000 hooks for two types of longline vessels, 2000-2002

	2000		2001		2002	
Species	**Alias**	**Monohulls**	**Alias**	**Monohulls**	**Alias**	**Monohulls**
Skipjack tuna	2.0	1.7	3.1	2.1	6.0	4.9
Albacore tuna	19.8	28.0	27.3	32.9	17.2	25.8
Yellowfin tuna	6.2	3.1	3.3	1.4	7.1	1.3
Bigeye tuna	0.4	1.0	0.6	1.0	0.6	0.9
TUNAS SUBTOTAL	**28.4**	**33.8**	**34.3**	**37.4**	**30.9**	**32.9**
Mahimahi	1.7	0.4	3.4	0.5	4.0	0.6
Black Marlin	0.1	0.1	0.1	0.0	0.0	0.0
Blue Marlin	0.5	0.2	0.4	0.2	0.2	0.3
Striped Marlin	0.1	0.3	0.0	0.1	0.1	0.0
Wahoo	1.2	1.1	1.5	0.6	2.7	1.0
Sharks (all)	0.0	0.7	0.0	0.7	0.0	0.8
Swordfish	0.0	0.0	0.1	0.0	0.1	0.0
Spearfish	0.0	0.1	0.0	0.0	0.0	0.0
Moonfish	0.1	0.2	0.1	0.1	0.1	0.1
Oilfish	0.0	0.1	0.0	0.2	0.0	0.5
Pomfret	0.0	0.1	0.0	0.1	0.0	0.1
NON-TUNA PMUS SUBTOTAL	**3.6**	**3.3**	**5.6**	**2.6**	**7.2**	**3.5**
Barracudas	0.0	0.0	0.0	0.0	0.0	0.1
Other Pelagic Fishes	0.0	0.0	0.0	0.0	0.0	0.3
OTHER PELAGICS SUBTOTAL	**0.0**	**0.0**	**0.1**	**0.1**	**0.0**	**0.3**
TOTAL PELAGICS	**32.0**	**37.0**	**40.0**	**40.1**	**38.1**	**36.6**

Table 30. American Samoa catch/1000 hooks for two types of longline vessels, 2003-2005

	2003		2004		2005	
Species	**Alias**	**Monohulls**	**Alias**	**Monohulls**	**Alias**	**Monohulls**
Skipjack tuna	4.7	2.9	3.0	3.9	1.0	2.7
Albacore tuna	17.3	16.4	13.7	12.9	10.3	17.4
Yellowfin tuna	5.9	2.0	8.8	3.2	7.0	2.6
Bigeye tuna	1.6	1.1	0.8	1.3	1.0	0.9
TUNAS SUBTOTAL	**29.5**	**22.4**	**26.3**	**21.2**	**19.3**	**23.7**
Mahimahi	2.2	0.4	2.1	0.2	2.0	0.3
Blue Marlin	0.2	0.2	0.1	0.2	0.2	0.2
Striped Marlin	0.0	0.0	0.1	0.0	0.1	0.0
Wahoo	1.8	1.1	3.1	1.6	2.3	1.4
Sharks (all)	0.3	0.8	0.1	0.9	0.0	0.7
Swordfish	0.1	0.0	0.1	0.0	0.1	0.0
Sailfish	0.1	0.0	0.0	0.1	0.1	0.1
Spearfish	0.1	0.0	0.0	0.1	0.0	0.1
Moonfish	0.1	0.1	0.1	0.1	0.1	0.1
Oilfish	0.3	0.5	0.0	0.7	0.0	0.3
Pomfret	0.1	0.1	0.0	0.1	0.1	0.1
NON-TUNA PMUS SUBTOTAL	**5.2**	**3.3**	**5.7**	**3.8**	**4.8**	**3.1**
Other Pelagic Fishes	0.2	0.2	0.0	0.1	0.0	0.1
OTHER PELAGICS SUBTOTAL	**0.2**	**0.2**	**0.0**	**0.1**	**0.0**	**0.1**
TOTAL PELAGICS	**34.9**	**25.8**	**32.0**	**25.2**	**24.2**	**26.9**

Table 31. American Samoa catch/1000 hooks for two types of longline vessels, 2006-2009

Species	2006 All Vessels	2007 All Vessels	2008 All Vessels	2009 All Vessels
Skipjack Tuna	3.2	2.3	2.4	2.3
Albacore Tuna	18.5	18.3	14.2	14.8
Yellowfin Tuna	1.6	1.9	1.0	1.1
Bigeye Tuna	1.0	0.9	0.5	0.6
TUNAS SUBTOTAL	**24.2**	**23.5**	**18.2**	**18.8**
Mahimahi	0.4	0.1	0.1	0.2
Blue Marlin	0.2	0.2	0.2	0.2
Wahoo	1.5	1.0	0.7	1.0
Sharks (all)	0.5	0.4	0.4	0.4
Swordfish	0.1	0.0	0.0	0.0
Spearfish	0.1	0.0	0.1	0.1
Oilfish	0.5	0.5	0.4	0.5
Pomfret	0.1	0.1	0.1	0.1
NON-TUNA PMUS SUBTOTAL	**3.3**	**2.4**	**2**	**2.5**
Other Pelagic Fishes	0.1	0.2	0.1	0.2
OTHER PELAGIC FISHES SUBTOTAL	**0.1**	**0.2**	**0.1**	**0.2**
TOTAL PELAGICS	**27.5**	**26.0**	**20.3**	**21.5**

Table 32. American Samoa catch/1000 hooks for two types of longline vessels, 2010-2013

Species	2010 All Vessels	2011 All Vessels	2012 All Vessels	2013 All Vessels
Skipjack Tuna	2.4	2.5	4.3	1.2
Albacore Tuna	17.4	12.1	14.8	11.7
Yellowfin Tuna	1.8	2.0	1.2	1.9
Bigeye Tuna	0.8	0.7	0.7	0.4
TUNAS SUBTOTAL	**22.4**	**17.3**	**21.0**	**15.2**
Mahimahi	0.2	0.1	0.1	0.2
Blue Marlin	0.2	0.2	0.2	0.1
Wahoo	1.0	0.9	0.7	0.7
Sharks (all)	0.4	0.5	0.6	0.4
Swordfish	0.0	0.0		
Spearfish	0.1	0.1	0.1	0.1
Oilfish	0.6	0.6	0.8	0.7
Pomfret	0.1	0.1	0.1	0.1
NON-TUNA PMUS SUBTOTAL	**2.5**	**2.4**	**2.5**	**2.3**
Other Pelagic Fishes	0.3	0.4	0.3	0.2
OTHER PELAGIC FISHES SUBTOTAL	**0.3**	**0.4**	**0.3**	**0.2**
TOTAL PELAGICS	**25.2**	**20.0**	**23.7**	**17.7**

Interpretation: The total pelagic catch rate by all longline vessels dropped by 6 points in 2013. The tuna catch rate dropped 6 points in 2013, while albacore and skipjack rates both decreased 3 points. Non-tuna species and other pelagics all showed relatively constant rates in 2009 to 2013.

Calculation: These values are sums of the Longline Logbook catch (number of fish kept + released) from the longline logs for the two types of longline vessels in Samoa, alias and monohulls, divided by the total number of hooks set by each type of vessel. All species of sharks entered in the Longline Logs are combined in the All Sharks species category. Rays and sunfish are included in the Misc Pelagic Fish category.

Figure 26. Albacore average weight per fish, 1996-2013

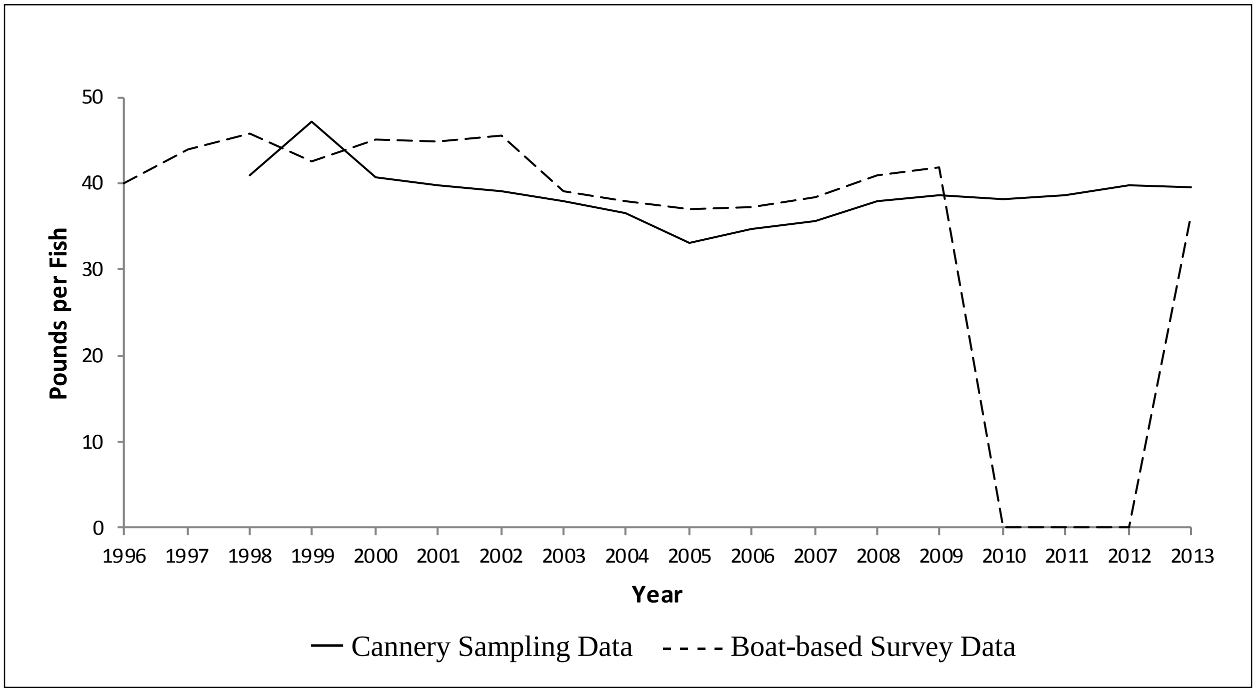
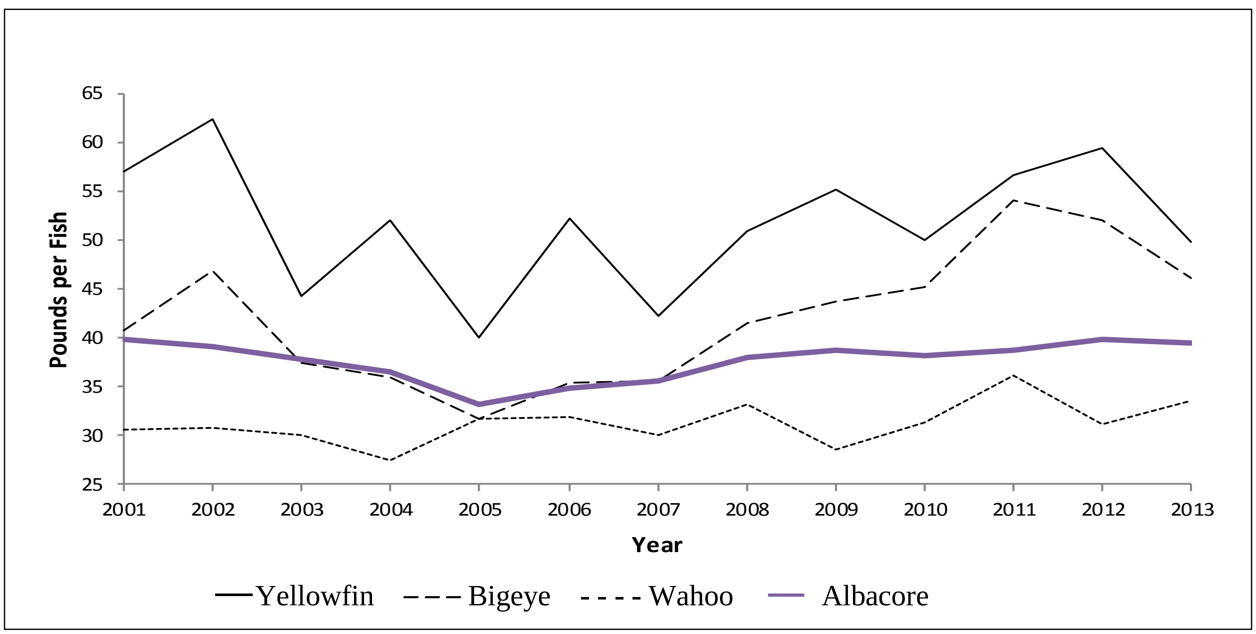


Figure 27. Average weight per fish for other tuna and cannery species (cannery-sampled)



Interpretation: The tables for cannery data represents the portion of the catch unloaded by larger vessels fishing further away from Tutuila while the table from the Creel Survey represents fish caught by alias near Tutuila.

After 2009, the creel survey collected very few samples from the alia boats, resulting in no weights showing in 2010 to 2013. From the cannery samples, albacore average weight remained at about 40 lbs or less from 2008 to 2013. The bigeye tuna average weight showed a gradual increase to about 54 lbs in 2011, then decreased to about 47 lbs in 2013. Yellowfin also showed a steady increase from 42 lbs in 2007 to about 58 lbs in 2012, then dropped to about 50 pounds in 2013. Wahoo weights showed a steady increase from 28 lbs in 2009 to 35 lbs in 2011, then dropped to about 32 lbs in 2012 and slightly increased again to 34 lbs in 2013.

In 1999, longline boats began landing their catches gilled and gutted to obtain higher prices at the canneries. It is possible that this new method could have an impact on size variation for the longline fishery.

Calculation: The Creel Survey Annual Average Pounds/Fish for each species was calculated from the creel survey interviews by dividing the total pounds of each species sampled during the year by the number of fish of sampled during the year. If the fish were sampled as other than whole (i.e. Gilled and Gutted) the sampled weight is divided by the appropriate factor (less than 1) to get the whole weight. All weights were measured directly before 2000, but after that most weights were calculated from length measurements. Since these fish are caught by alias operating close to Tutuila this represents fish sizes close to shore.

The Cannery Sampled Annual Average Pounds/Fish for each species was calculated from the length measurements made at the canneries when the fish are unloaded there. The weight of each sampled fish is calculated from the length measurements. These weights are summed over the year for each species and are then divided by the number of fish of that species sampled during the year. Since these fish are caught by larger boats operating away from Tutuila these catches represent fish sizes further out to sea from Tutuila.

Table 33. Cannery sampled average weight per fish in pounds, 1998-2002

Species	1998	1999	2000	2001	2002
Skipjack				16.8	11.3
Albacore	41	47.2	40.7	39.8	39.1
Yellowfin				57	62.4
Bigeye				40.7	46.8
Mahimahi				16.2	13.5
Black marlin				36.3	
Blue marlin					
Wahoo				30.6	30.7
Swordfish					
Sailfish					27.4
Moonfish				147.6	117.6
Pomfret				5.1	6.2
Rainbow Runner					9.4

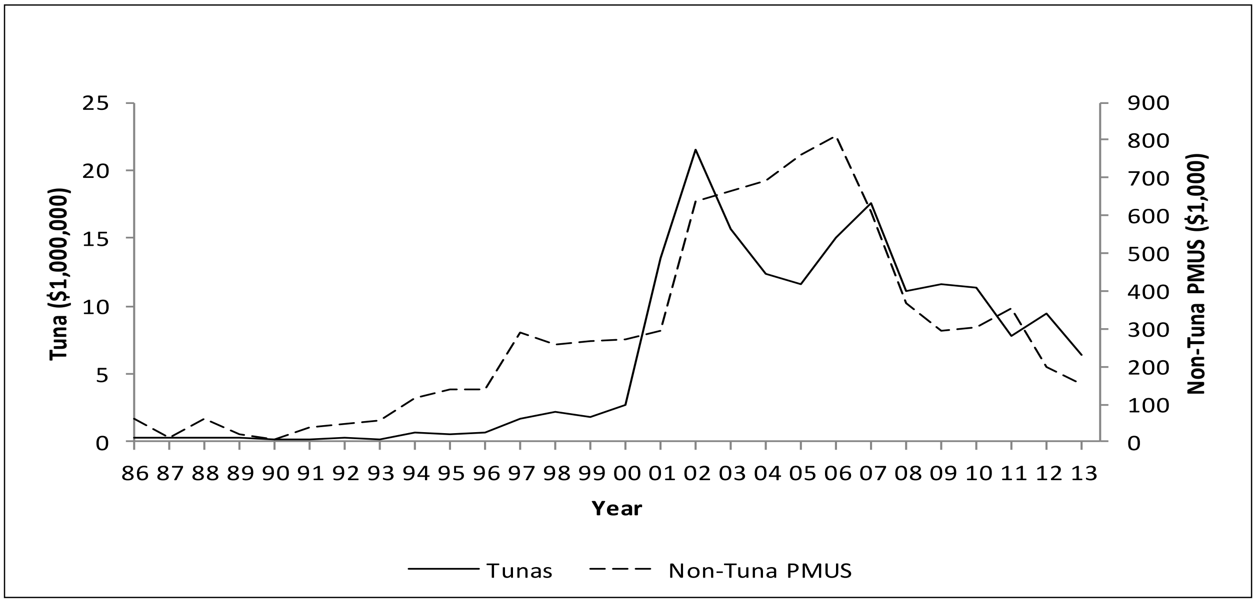
Table 34. Cannery-sampled average weight per fish in pounds, 2003-2008

Species	2003	2004	2005	2006	2007	2008
Skipjack	9.9	13.6	13.1	12.3	12.1	12.0
Albacore	37.8	36.5	33.2	34.8	35.6	37.9
Yellowfin	44.3	52.1	40.1	52.1	42.2	50.9
Bigeye	37.4	35.9	31.6	35.5	35.6	41.4
Mahimahi	20.7	13.0	17.2	13.4	13.5	19.1
Black marlin						
Blue marlin			45.8			
Wahoo	30	27.4	31.7	31.9	29.9	33.2
Swordfish		72.3		90.3		
Sailfish			22.9	21.7		
Moonfish			95.5	34.7		
Pomfret			7.8		5.4	
Rainbow Runner		10.8				

Table 35. Cannery-sampled average weight per fish in pounds, 2009-2013

Species	2009	2010	2011	2012	2013
Skipjack	12.1	12.1	10.4	13.2	12.8
Albacore	38.7	38.1	38.7	39.7	39.4
Yellowfin	55.2	49.9	56.7	59.4	49.8
Bigeye	43.7	45.3	54.0	52.0	46.2
Mahimahi	15.1	23.7	21.6	22.8	22.4
Black marlin					
Blue marlin			48.9		
Wahoo	28.5	31.4	36.2	31.1	33.5
Swordfish					
Sailfish					
Moonfish					
Pomfret					
Rainbow Runner					

Figure 28. American Samoa 2013 annual inflation-adjusted revenue ($) for tuna and non-tuna PMUS



Interpretation: Inflation-adjusted revenues for tunas and non-tuna PMUS both decreased in 2013. Adjusted revenue for tunas in 2013 showed the lowest earnings since 2000. This year's earnings were almost the same as the overall average at a little over $6.3 million. Non-tuna adjusted revenues in 2013 also decreased; it was the lowest earning since 1996 and also was lower than the overall average earning.

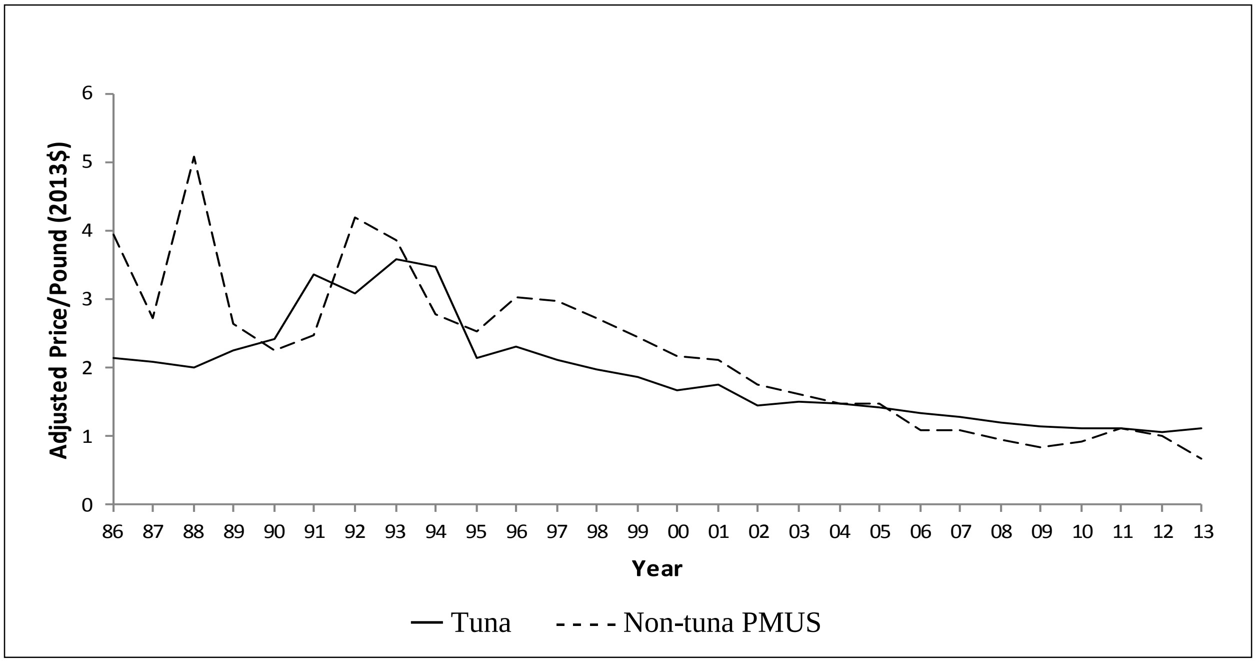
Calculation: The unadjusted revenues for Tunas and Other PPMUS were calculated by summing the values for the species in these categories as defined by Table 4. The unadjusted revenue for All Pelagics is the sum of the value for the Tuna, Other PPMUS and Miscellaneous categories as defined by Table 4.

The unadjusted revenues from commercial landings for the pelagic species subgroups above were adjusted for inflation by multiplying a given year's revenue by the 2000 consumer price index (CPI) divided by the CPI for that year.

Table 36. American Samoa commercial pelagic fishing revenues in unadjusted and inflation-adjusted dollars 1986-2013 including consumer price index (CPI)

		Revenue ($)			
		Tunas		Non-Tuna PMUS	
Year	CPI	Unadjusted	Adjusted	Unadjusted	Adjusted
1986	107.1	$139,021	$362,288	$23,117	$60,244
1987	111.8	$110,012	$274,590	$5,267	$13,146
1988	115.3	$143,623	$347,711	$25,384	$61,455
1989	120.3	$110,343	$255,996	$9,338	$21,663
1990	129.6	$63,285	$136,315	$3,813	$8,213
1991	135.3	$94,344	$194,632	$17,923	$36,975
1992	140.9	$141,106	$279,530	$23,451	$46,457
1993	141.1	$80,250	$158,734	$28,181	$55,741
1994	143.8	$337,977	$656,013	$59,266	$115,035
1995	147	$319,213	$606,185	$73,194	$138,994
1996	152.5	$393,770	$720,599	$76,234	$139,507
1997	156.4	$941,063	$1,679,797	$162,262	$289,638
1998	158.4	$1,241,313	$2,187,194	$146,754	$258,580
1999	159.9	$1,016,156	$1,773,192	$153,286	$267,485
2000	166.7	$1,656,449	$2,772,895	$161,748	$270,797
2001	169.9	$8,226,280	$13,515,778	$178,111	$292,636
2002	172.1	$13,284,647	$21,547,697	$393,751	$638,664
2003	176.0	$9,905,705	$15,700,543	$420,253	$666,101
2004	188.5	$8,384,420	$12,408,942	$167,170	$691,411
2005	198.3	$8,206,541	$11,546,603	$539,924	$759,673
2006	204.3	$11,046,801	$15,089,930	$592,765	$809,716
2007	215.5	$13,583,174	$17,590,210	$471,547	$610,653
2008	231.5	$9,196,349	$11,090,797	$306,141	$369,206
2009	240.7	$9,997,635	$11,587,259	$255,246	$295,830
2010	249.4	$10,187,511	$11,399,825	$273,140	$305,644
2011	269.4	$7,470,861	$7,739,812	$340,591	$352,852
2012	279.1	$9,512,685	$9,512,685	$196,475	$196,475
2013	279.1	$6,346,819	$6,346,819	$151,224	$151,224
Average	**177.1**	**$4,719,191**	**$6,338,663**	**$198,413**	**$282,999**
Std Dev	**50.38**	**$4,797,510**	**$6,522,282**	**$176,342**	**$242,312**

Figure 29. American Samoa average inflation-adjusted price per pound of tunas and non-tuna PMUS



Interpretation: The average inflation-adjusted price-per-pound for tunas and non-tunas have experienced a declining trend since 1996. The average price-per-pound for tuna was $1.10 in 2013. In the past ten years, the average price has ranged from $1.10 to $1.50. The 2013 average price was lower than the overall average, a contributing factor to the low effort in 2013. The average price for non-tuna ranged from $0.66 to $1.68 between 2002 and 2013. Average price in 2013 was $0.66. Tuna price-per-pound peaked at $3.45 in 1993; and for non- tuna average peaked in 1988 at $4.90.

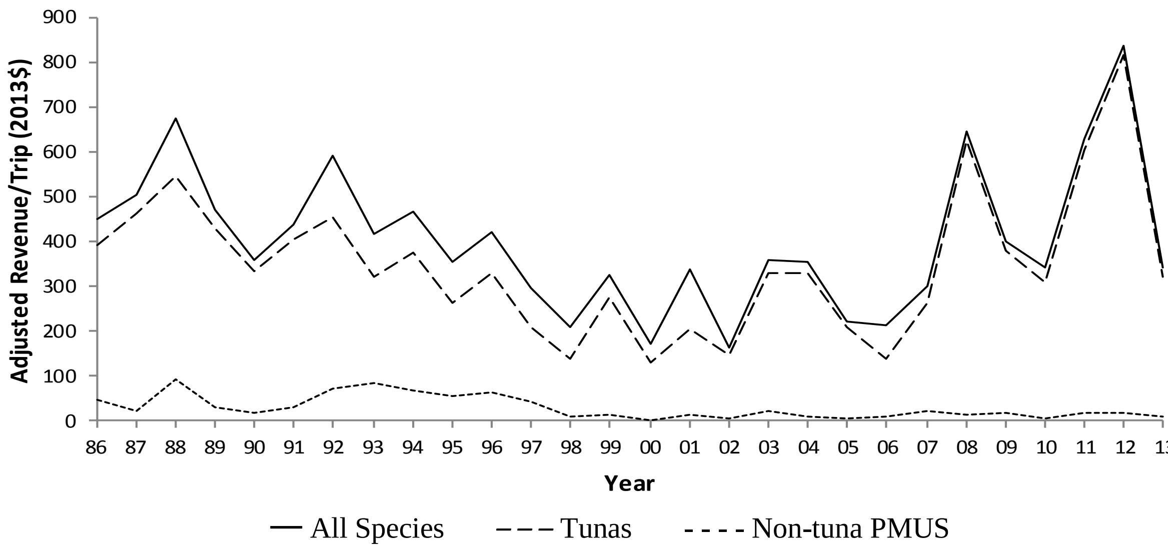
Calculation: The unadjusted price/pound for Tunas and Non-Tuna PMUS were calculated by dividing the sum of the values for the species in these categories as defined by Table 4 by the sum of their commercial landings or pounds.

The unadjusted price/pound values for the pelagic species subgroups above were adjusted for inflation by multiplying the given year's price/pound by the 2006 consumer price index (CPI) divided by the CPI for that year.

Table 37. American Samoa average price per pound of tuna PMUS and non-tuna PMUS in unadjusted and inflation-adjusted dollars, 1986-2013

	Average Price/Pound ($)			
	Tunas		Non-Tuna PMUS	
Year	**Unadjusted**	**Adjusted**	**Unadjusted**	**Adjusted**
1986	$0.82	$2.13	$1.51	$3.94
1987	$0.83	$2.08	$1.09	$2.72
1988	$0.83	$2.01	$2.10	$5.07
1989	$0.97	$2.25	$1.14	$5.65
1990	$1.12	$2.41	$1.05	$2.26
1991	$1.63	$3.35	$1.19	$2.46
1992	$1.56	$3.09	$2.12	$4.19
1993	$1.81	$3.57	$1.95	$3.85
1994	$1.79	$3.47	$1.43	$2.78
1995	$1.13	$2.15	$1.33	$2.52
1996	$1.26	$2.31	$1.65	$3.02
1997	$1.18	$2.10	$1.66	$2.96
1998	$1.11	$1.96	$1.54	$2.72
1999	$1.07	$1.87	$1.40	$2.44
2000	$1.01	$1.68	$1.30	$2.17
2001	$1.06	$1.74	$1.29	$2.11
2002	$0.89	$1.44	$1.07	$1.74
2003	$0.94	$1.49	$1.02	$1.62
2004	$0.99	$1.47	$0.99	$1.46
2005	$1.01	$1.42	$1.04	$1.46
2006	$0.98	$1.34	$0.80	$1.09
2007	$0.99	$1.28	$0.84	$1.09
2008	$0.99	$1.20	$0.79	$0.95
2009	$0.99	$1.14	$0.71	$0.82
2010	$0.99	$1.11	$0.81	$0.91
2011	$1.08	$1.11	$1.08	$1.12
2012	$1.07	$1.07	$0.99	$0.99
2013	$1.10	$1.10	$0.66	$0.66
Average	**$1.11**	**$1.91**	**$1.23**	**$2.21**
Std. Dev	**$0.26**	**$0.73**	**$0.39**	**$1.11**

Figure 30. American Samoa average inflation-adjusted revenue per trolling trip landing pelagic species



Interpretation: Adjusted revenues per trolling trip for tunas and non-tunas decreased in 2013 to less than half the revenue earned in 2012. The 2012 average revenue per trolling trip for tunas was the highest recorded; it then dropped steeply in 2013. The highest average revenue for non-tuna was $38.60 in 1988.

Calculation: The purely trolling interviews in the offshore creel survey system landing any of the species listed in Table 3 and selling part or all of their catch are first counted for the given year to get the number of trips. The unadjusted revenue/trip for Tunas and Non-Tuna PMUS is calculated by first summing the value of the species in these pelagic subgroups caught and sold by purely trolling methods and then dividing this by the number of pure trolling trips. The unadjusted revenue/trip for all species is the sum of the value of all species, in Table 3 or not, caught by the purely trolling trips that sold all or part of their catch divided by the number of such trips. The unadjusted revenue/trip values for the pelagic species subgroups above and for all species were adjusted for inflation by multiplying the given year's revenue/trip by the 2003 consumer price index (CPI) divided by the CPI for that year.

Table 38. American Samoa commercial pelagic revenues in unadjusted and inflation-adjusted dollars per trip, 1986-2013

	All Species		Tunas		Non-Tuna PMUS	
Year	**Unadjusted**	**Adjusted**	**Unadjusted**	**Adjusted**	**Unadjusted**	**Adjusted**
1986	$173	$452	$150	$390	$17.4	$45.3
1987	$201	$502	$185	$462	$9.1	$22.7
1988	$278	$674	$225	$544	$38.6	$93.5
1989	$202	$469	$185	$430	$12.5	$29.0
1990	$166	$357	$154	$332	$7.8	$16.8
1991	$212	$438	$195	$402	$15.4	$31.8
1992	$298	$590	$228	$454	$36.8	$72.9
1993	$211	$418	$162	$320	$41.7	$82.5
1994	$241	$467	$194	$376	$33.7	$65.4
1995	$187	$355	$139	$264	$29.7	$56.4
1996	$230	$422	$180	$329	$35.3	$64.6
1997	$165	$295	$116	$207	$23.1	$41.2
1998	$119	$210	$78	$137	$6.1	$10.7
1999	$187	$326	$158	$275	$7.4	$12.9
2000	$102	$171	$76	$128	$0.8	$1.3
2001	$206	$339	$124	$203	$8.6	$14.1
2002	$101	$163	$91	$148	$3.8	$6.2
2003	$226	$359	$208	$330	$14.0	$22.2
2004	$239	$354	$223	$330	$6.4	$9.5
2005	$158	$223	$148	$208	$4.2	$5.9
2006	$155	$212	$100	$137	$5.7	$7.8
2007	$233	$302	$201	$261	$17.8	$23.1
2008	$535	$645	$518	$624	$11.4	$13.7
2009	$345	$400	$328	$381	$15.9	$18.4
2010	$307	$343	$277	$310	$3.6	$4.0
2011	$608	$630	$584	$605	$14.8	$15.3
2012	$835	$835	$816	$816	$16.5	$16.5
2013	$342	$342	$323	$323	$8.3	$8.3
Average	**$259**	**$403**	**$227**	**$347**	**$15.9**	**$29.0**
Std. Dev	**$157**	**$157**	**$161**	**$158**	**$11.7**	**$25.5**

B. Commonwealth of the Northern Mariana Islands

Introduction

The Northern Mariana Islands pelagic fishery occurs primarily from the island of Farallon de Medinilla south to the island of Rota. The fishery is characterized using data from the Commercial Receipt Invoice Database and the Boat-based Creel Survey. The commercial purchase collection system is dependent upon first-level purchasers of local fresh fish to accurately record all fish purchases by species categories on specially designed invoices. Staff from the Department of Lands and Natural Resources, Division of Fish and Wildlife (DFW) routinely distributes and collects invoice books from participating local fish purchasers on Saipan. This program is a voluntary program that includes purchasers at some fish markets, stores, restaurants, hotels and roadside vendors ("fish-mobiles").

The Commercial Purchase Database Collection System and the Boat-based Creel Survey is currently documenting landings only on the island of Saipan. The establishment of a data collection system for the islands of Tinian and Rota are in the process, however funding is an issue. It is believed that the commercial purchase database landings include around 90% of all commercial landings on Saipan. There is also a subsistence fishery on Saipan were profits are made by selling a small portion of catch to cover fishing expenses. Some fishermen sell their catch going “door to door,” which results in around 30% unreported commercial landings.

Although the Saipan Commercial Purchase Database Collection System has been in operation since the mid-1970s, only data collected since 1983 are considered accurate enough to be used.

The boat-based creel survey was re-implemented in April 2000 and is still ongoing. Data from this survey is used in this report and analyzes fishing activity only on the island of Saipan. Currently no boat-based creel survey programs are being conducted on the islands of Tinian and Rota.

Summary

Trolling is the primary fishing method utilized in the pelagic fishery. The pelagic fishing fleet, other than charter boats, consists primarily of vessels less than 24 ft in length, which usually have a limited 20-mile travel radius from Saipan.

Charter vessel landings from the Creel Survey are used in this report. Recorded Charter boat landings make up less than 2% of the total pelagics landings on Saipan.

The total pelagics landed in 2012 increased 33%, and continued its increase in 2013 (up another 13%). The primary target and most marketable species for the pelagic fleet are skipjack tuna. In 2013, skipjack tuna landings comprised over 70% of the entire pelagic landings. Schools of skipjack tuna have historically been common in near shore waters, providing an opportunity to catch numerous fish with a minimum of travel time and fuel costs. Skipjack is readily consumed by the local populace and restaurants, primarily as sashimi.

Yellowfin tuna and mahimahi are also easily marketable species but are seasonal. During their seasonal runs, these fish are usually found close to shore and provide easy targets for the local fishermen.

In late 2007, Crystal Seas became the first established longline fishing company in the CNMI to begin its operation out of the island of Rota. However, by 2009 Crystal Seas became Pacific Seafoods and relocated its operation to Saipan. In 2011, four licensed longline fishing vessels were stationed in the CNMI. Federal log book data are being collected and submitted to NMFS. This report did not include any data or landings from longline vessels.

Plan Team Recommendations

1. There were no recommendations made for CNMI by the Plan Team in 2013.

Table 39. CNMI Creel Survey 2013 pelagic species composition

Species	Total Landings (Lbs)	Non-Charter	Charter
Skipjack Tuna	378,558	378,558	0
Yellowfin Tuna	47,121	47,121	0
Kawakawa	1,632	1,632	0
Tuna PMUS	**427,311**	**427,311**	**0**
Mahimahi	79,138	79,138	0
Wahoo	6,967	6,967	0
Blue Marlin	2,376	2,376	0
Sailfish	0	0	0
Shortbill Spearfish	0	0	0
Non-tuna PMUS	**88,481**	**88,481**	**0**
Total Pelagics	**524,776**	**524,776**	**0**

Interpretation: Skipjack tuna continued to dominate the pelagic landings, comprising around 72% of the total pelagic catch. Skipjack tunas are easily caught in near shore waters throughout the year. Mahimahi is seasonal with peak catch usually from February through April. Yellowfin season usually runs from April to September.

Source and Calculations: Data are from the Division of Fish and Wildlife (DFW) boat-based creel survey. A 365-day (366 days during leap years) annual expansion is run for each calendar year of survey data to produce catch and effort estimates for the pelagic fishery to avoid over-estimating seasonal pelagic species. Percent species composition is calculated by weight for the sampled catch for each method to produce catch estimates for each species for the expanded period. The annual catch for all pelagic species and the PMUS separately are summed across all methods to obtain the numbers plotted above.

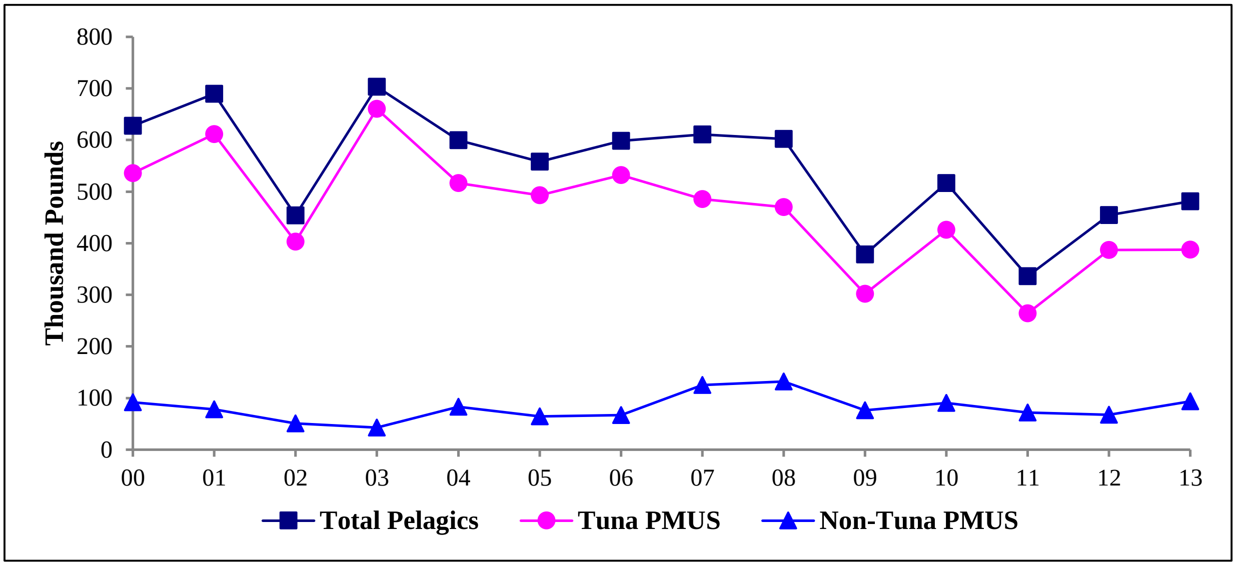
Table 40. CNMI 2013 estimated commercial pelagic landings, revenues and price (from Commercial Receipt invoices)

Species	Landing (Lbs)	Value ($)	Avg. Price ($/Lb)
Skipjack Tuna	147,896	300,493	2.03
Yellowfin Tuna	28,878	63,318	2.19
Saba (kawakawa)	1,703	3,604	2.12
Tunas (misc.)	92	231	2.50
Tuna PMUS	**178,570**	**367,646**	**2.06**
Mahimahi	43,852	99,170	2.26
Wahoo	5,113	12,263	2.40
Blue Marlin	1,782	4,389	2.46
Sailfish	214	460	2.15
Sickle Pomfret (w/woman)	412	1,254	3.05
Non-tuna PMUS	**51,373**	**117,537**	**2.29**
Total Pelagics	**230,893**	**487,393**	**2.11**

Interpretation: In 2013, skipjack tuna dominated the pelagic landings, comprising around 64% of the (commercially receipted) industry's pelagic catch. In 2013, mahimahi and yellowfin tuna ranked second and third in total landings. Skipjack tunas are easily caught in near shore waters throughout the year. Mahimahi is seasonal with catch peak usually from February through April. Yellowfin season usually runs from April to September.

The highest average price of identified pelagic species was $3.05/lb for sickle pomfret. The lowest priced species was skipjack tuna, which sold at an average price of $2.03/lb and is the main target in the CNMI pelagic fishery.

Figure 31. Annual CNMI boat-based creel estimated total landings for all pelagics, tuna PMUS, and non-tuna PMUS

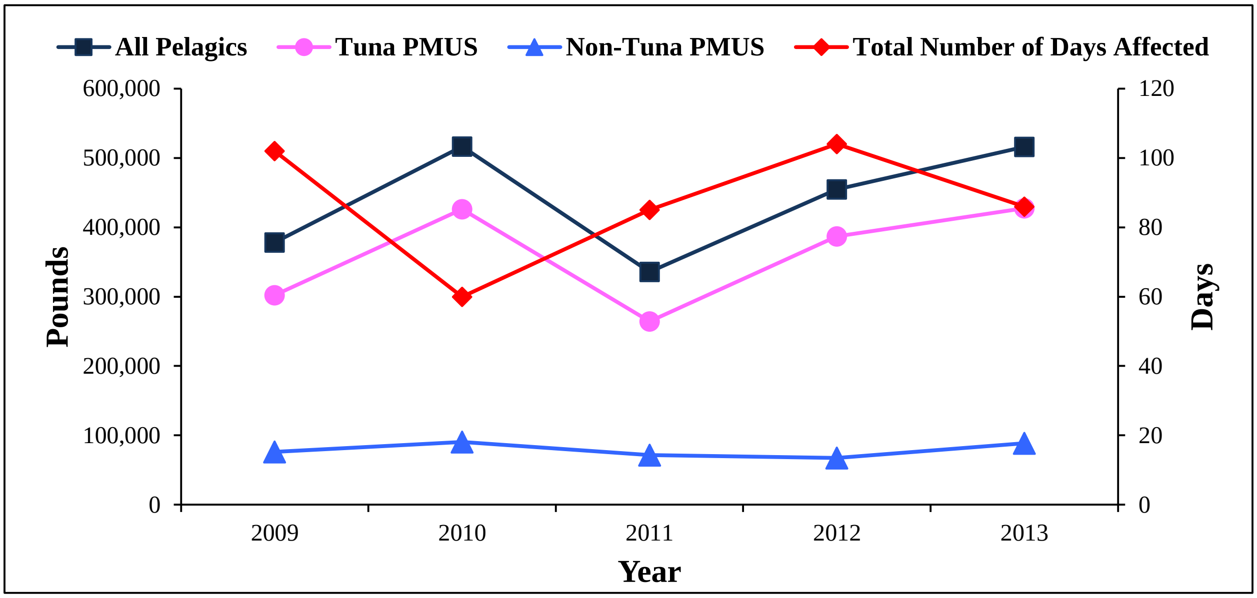


Interpretation: Creel survey landings declined in 2002, possibly due to several typhoons hitting the Mariana Islands. Since then, landings of pelagic species have been relatively stable until 2009 when landings of tuna PMUS decreased 42% due to fewer fishing trips and shorter trips. The decrease in 2011 tuna PMUS landings was partly due to many days of unfavorable weather conditions. In 2012, tuna PMUS landings increased 46% over the 2011 landings, and slightly increased again in 2013 with fishermen reporting better catch rates and favorable fishing conditions.

Annual Boat-based Creel Estimated Landings (lbs)			
Year	**All Pelagics**	**Tuna PMUS**	**Non-Tuna PMUS**
2000	627,277	535,741	91,536
2001	689,372	611,209	78,164
2002	454,126	403,062	51,064
2003	703,326	660,587	42,584
2004	599,469	516,500	82,773
2005	557,828	492,725	64,661
2005	598,611	531,855	66,757
2007	610,609	485,613	124,996
2008	602,371	470,059	132,312
2009	378,203	301,895	76,308
2010	516,663	425,969	90,694
2011	335,855	264,175	71,681
2012	454,472	387,029	67,442
2013	515,792	427,310	88,482
Average	**545,998**	**465,266**	**80,675**
Std. Dev.	**105,539**	**104,461**	**23,865**

Source and Calculations: Data are from the Division of Fish and Wildlife (DFW) boat-based creel survey. A 365-day (366 days during leap years) annual expansion is run for each calendar year of survey data to produce catch and effort estimates for the pelagic fishery to avoid over-estimating seasonal pelagic species. Percent species composition is calculated by weight for the sampled catch for each method to produce catch estimates for each species for the expanded period. The annual catch for total of pelagic species, Tuna PMUS and Non-Tuna PMUS separately are summed across all methods to obtain the numbers plotted above.

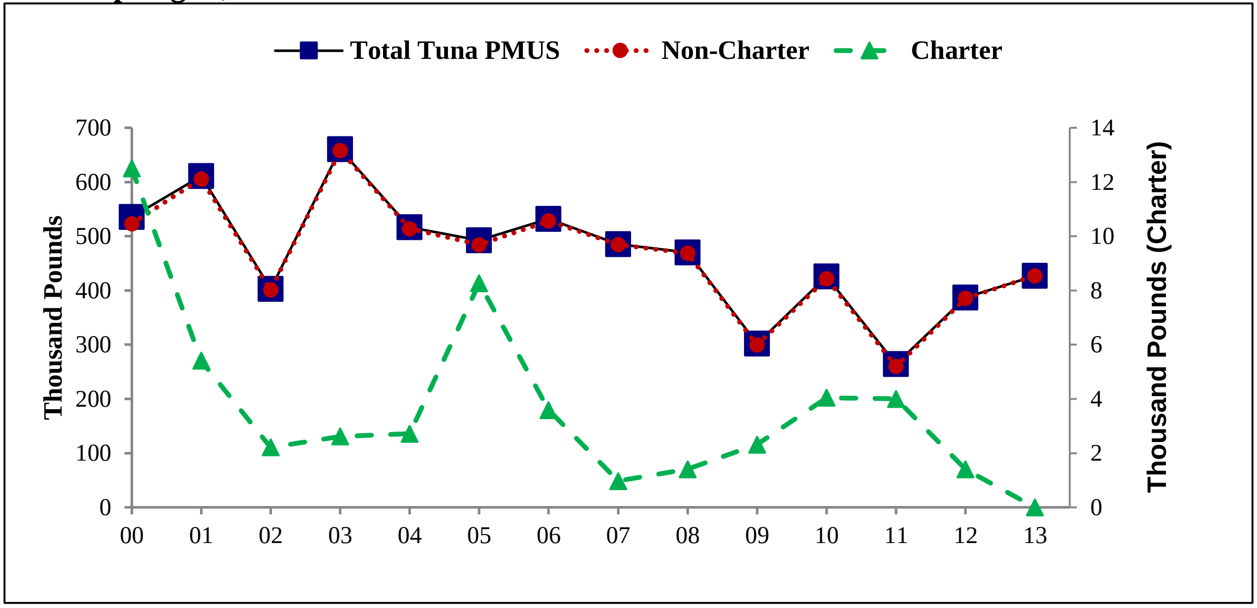
Figure 32. Annual CNMI boat-based creel estimated total landings for all pelagics, tuna PMUS, non-tuna PMUS, and total affected days, 2009-2013



Interpretation: As stated in the previous figure, there were fewer and shorter trips taken in 2009 compared to previous years. In 2010, landings increased at the same time that fewer fishing days were affected by weather. In 2011, landings decreased while days affected by weather increased. However, in 2012, landings increased concurrently with an increase in affected fishing days. In 2013, landings increased yet again, however the increased landings were in conjunction with a decrease in the number of fishing days affected by bad weather.

Source and Calculations: The NOAA - National Weather Service Weather Forecast Office Guam. A 365-day (366 days during leap years) annual expansion is run for each calendar year of survey data to produce catch and effort estimates for the pelagic fishery to avoid over-estimating seasonal pelagic species. Percent species composition is calculated by weight for the sampled catch for each method to produce catch estimates for each species for the expanded period. The annual catch for total of pelagic species, Tuna PMUS and Non-Tuna PMUS separately are summed across all methods to obtain the numbers plotted above.

Figure 33. Annual CNMI boat-based creel estimated tuna landings for all, non-charter, and charter pelagics, 2000-2013



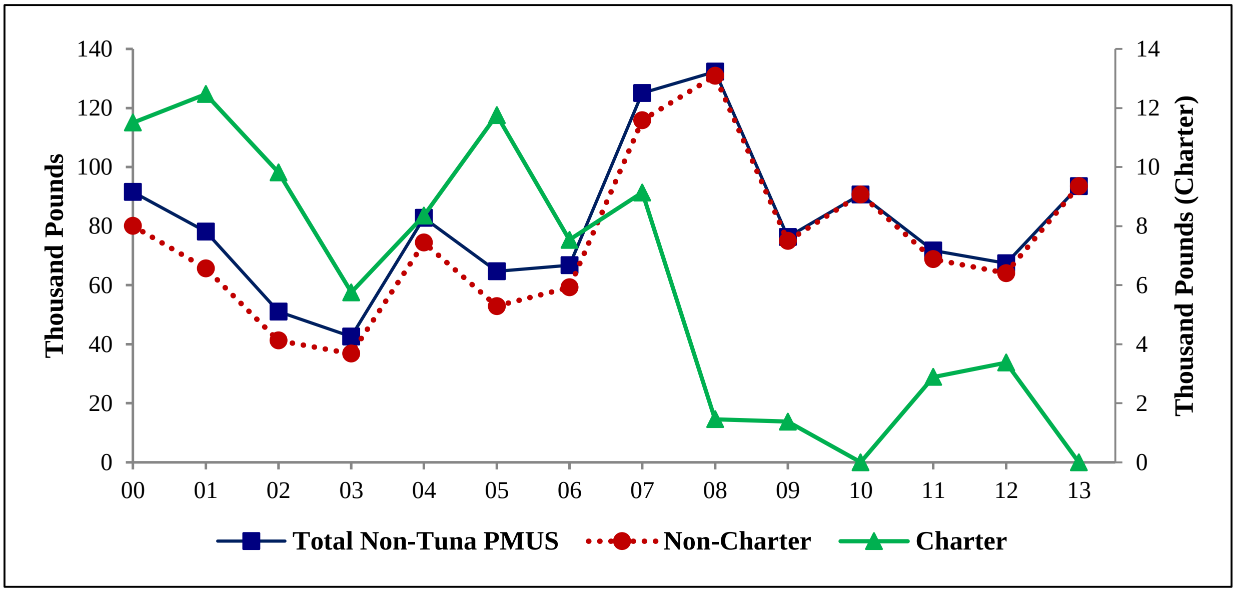
Interpretation: Total landings over the time series indicate that 98% of all tuna PMUS are landed by non-charter vessels. 2011 non-charter landings decreased 38% over 2010, but increased in 2012 by 48% and 10% in 2013. 2010 charter landings increased significantly by 51% over 2009. 2011 charter landings were similar to 2010, while charter landings decreased by 65% in 2012 and were not captured in 2013.

Boat-based Creel Estimated Tuna Landings (lbs)

Year	Total Tunas	Non-charter	Charter
2000	535,741	523,233	12,507
2001	611,209	605,798	5,410
2002	403,062	400,848	2,214
2003	660,587	657,971	2,616
2004	516,500	513,783	2,718
2005	492,725	484,451	8,275
2006	531,855	528,264	3,591
2007	485,613	484,638	975
2008	470,059	468,651	1,408
2009	301,895	299,580	2,315
2010	425,969	421,927	4,043
2011	264,175	260,173	4,002
2012	387,029	385,627	1,403
2013	427,310	427,310	0
Average	**465,266**	**461,590**	**3,677**
Std. Dev.	**104,461**	**103,668**	**3,157**

Source and Calculations: Data are from the Division of Fish and Wildlife (DFW) boat-based creel survey. A 365-day (366 days during leap years) annual expansion is run for each calendar year of survey data to produce catch and effort estimates for the pelagic fishery to avoid over-estimating seasonal pelagic species. Percent species composition is calculated by weight for the sampled catch for each method to produce catch estimates for each species for the expanded period. The annual catch for total tuna PMUS, charter and non-charter separately are summed across all methods to obtain the numbers plotted above.

Figure 34. Annual CNMI boat-based creel estimated non-tuna PMUS landings for all, non-charter, and charter, 2000-2013

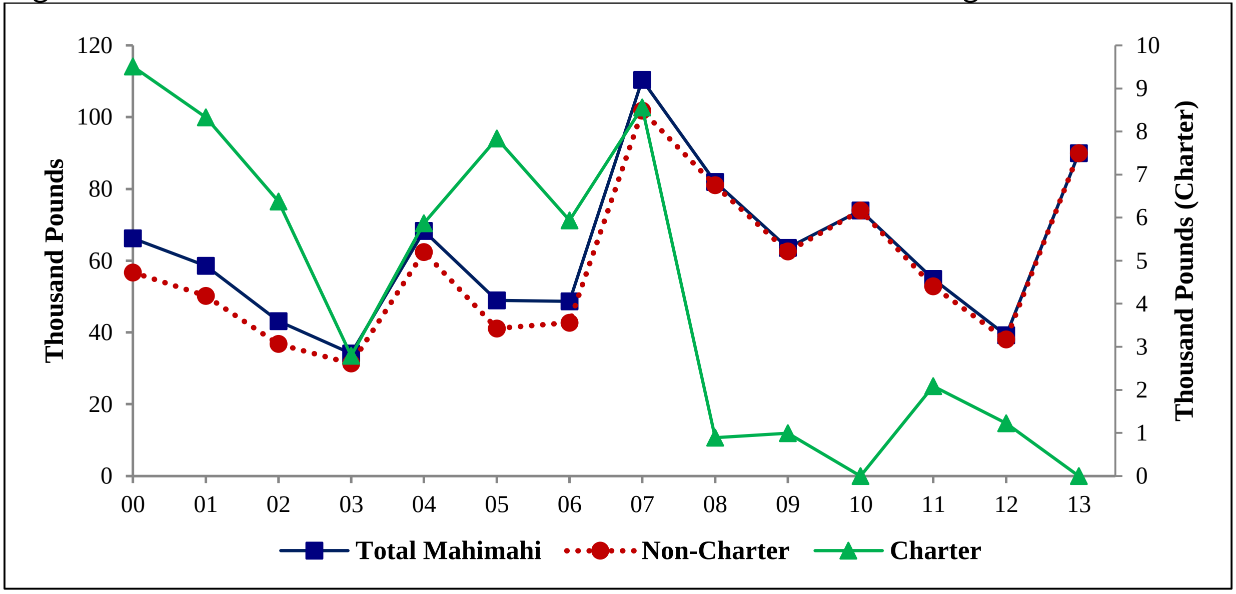


Interpretation: Non-tuna landings decreased by 19% and 6% in 2011 and 2012, respectively. However, increased by 31% in 2013. The non-charter landings track the non-tuna landings. The charter landings were not captured in 2013.

Source and Calculations: Data are from the Division of Fish and Wildlife (DFW) boat-based creel survey. A 365-day (366 days during leap years) annual expansion is run for each calendar year of survey data to produce catch and effort estimates for the pelagic fishery to avoid over-estimating seasonal pelagic species. Percent species composition is calculated by weight for the sampled catch for each method to produce catch estimates for each species for the expanded period. The annual catch for Total Non-Tuna PMUS, Charter and Non-Charter separately are summed across all methods to obtain the numbers plotted above.

Non-tuna PMUS Landings (lbs)			
Year	**Total Non-tuna PMUS**	**Non-charter**	**Charter**
2000	91,536	80,029	11,507
2001	78,164	65,692	12,472
2002	51,064	41,246	9,819
2003	42,584	36,827	5,758
2004	82,773	74,416	8,357
2005	64,661	52,898	11,762
2006	66,757	59,223	7,533
2007	124,996	115,861	9,135
2008	132,312	130,854	1,458
2009	76,308	74,929	1,379
2010	90,694	90,694	0
2011	71,681	68,790	2,891
2012	67,442	64,066	3,376
2013	88,482	88,842	0
Average	**80,675**	**74,572**	**6,103**
Std. Dev.	**23,865**	**25,099**	**4,377**

Figure 35. Annual CNMI boat-based creel estimated mahimahi landings



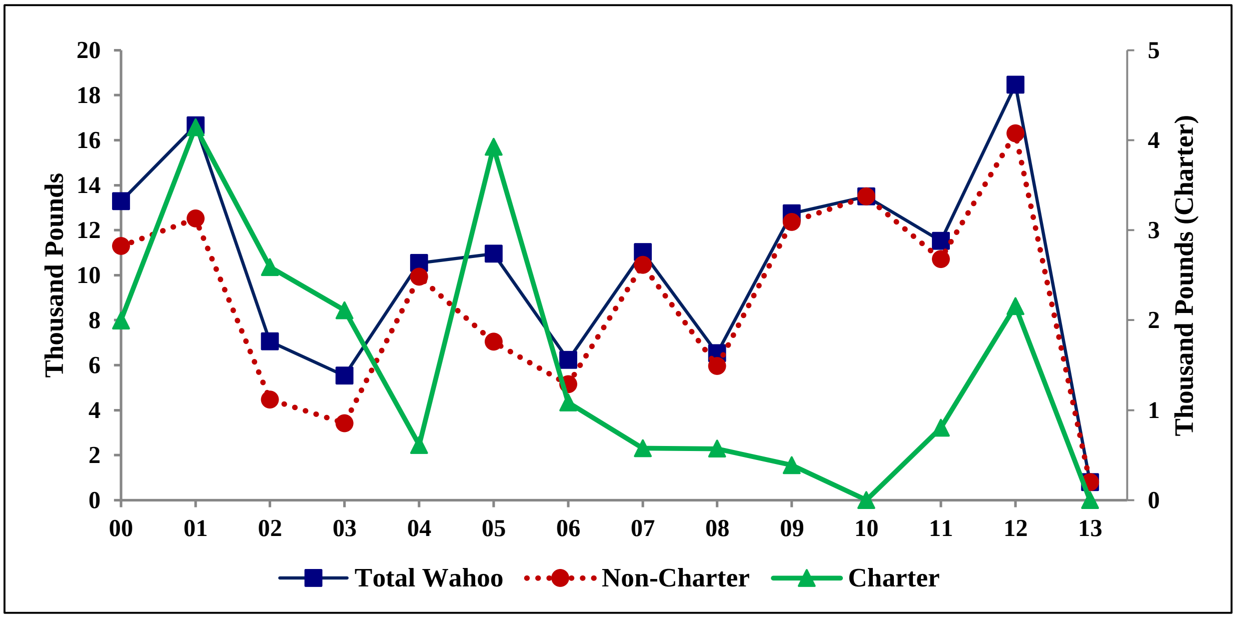
Interpretation: Mahimahi landings have fluctuated yearly, usually in a two year cycle. The bulk of mahimahi landings are from non-charter vessels. Although mahimahi is a favorite target by charter boats, the decreasing number of tourists arriving into Saipan has deeply impacted the charter fishing industry.

Landings (both total and non-charter) declined in 2011 (24%) and again in 2012 (29%). However, they increased significantly in 2013 by 102%. Charter landings decreased significantly by 42% in 2012 and were not recorded in 2013.

Mahimahi Landings (lbs)			
Year	Total Mahimahi	Non-Charter	Charter
2000	66,230	56,719	9,512
2001	58,548	50,219	8,328
2002	43,149	36,774	6,375
2003	34,128	31,338	2,790
2004	68,302	62,433	5,869
2005	48,960	41,122	7,839
2006	48,666	42,729	5,937
2007	110,351	101,792	8,559
2008	81,912	81,025	887
2009	63,559	62,568	991
2010	73,965	73,965	0
2011	54,935	52,846	2,089
2012	39,235	38,015	1,221
2013	79,138	79,138	0
Average	**62,220**	**57,906**	**4,314**
Std. Dev.	**19,440**	**19,562**	**3,378**

Source and Calculations: Data are from the Division of Fish and Wildlife (DFW) boat-based creel survey. A 365-day (366 days during leap years) annual expansion is run for each calendar year of survey data to produce catch and effort estimates for the pelagic fishery to avoid over-estimating seasonal pelagic species. Percent species composition is calculated by weight for the sampled catch for each method to produce catch estimates for each species for the expanded period. The annual catch for Total Mahimahi, Charter and Non-Charter are separately summed across all methods to obtain the numbers plotted above.

Figure 36. Annual CNMI boat-based creel estimated wahoo landings



Wahoo Landings (lbs)			
Year	Total Wahoo	Non-Charter	Charter
2000	13,282	11,287	1,996
2001	16,653	12,509	4,144
2002	7,060	4,471	2,589
2003	5,528	3,417	2,110
2004	10,537	9,924	613
2005	10,956	7,033	3,924
2006	6,225	5,141	1,085
2007	11,023	10,447	576
2008	6,525	5,954	571
2009	12,750	12,362	388
2010	13,494	13,494	0
2011	11,516	10,714	802
2012	18,456	16,301	2,155
2013	6,967	6,967	0
Average	**10,784**	**9,287**	**1,497**
Std. Dev.	**3,840**	**3,693**	**1,309**

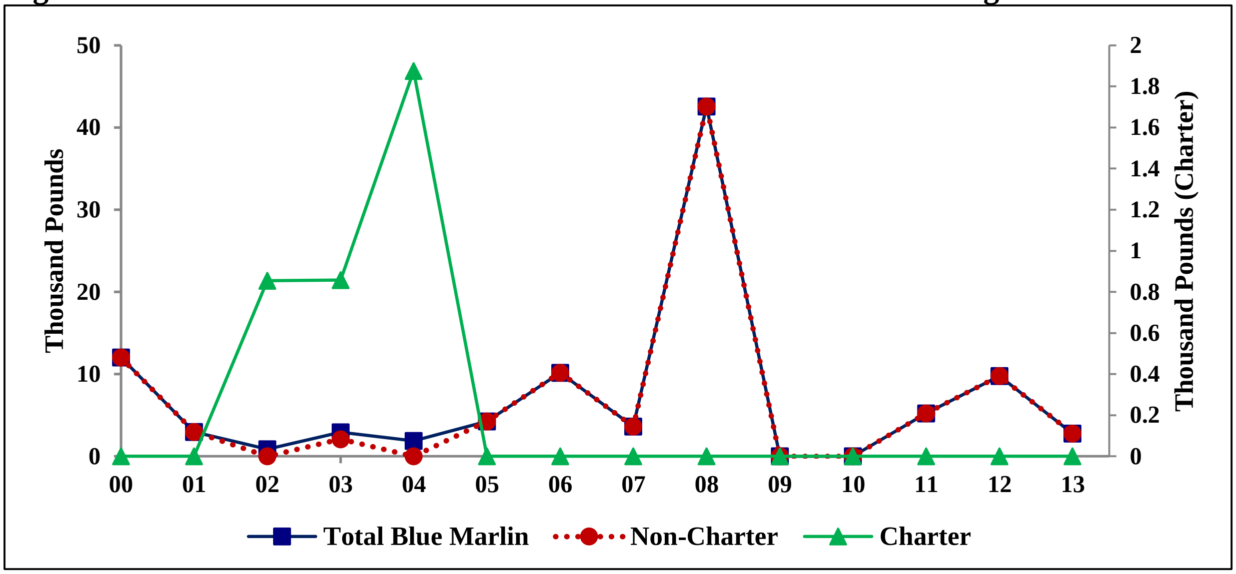
Interpretation: Wahoo landings have fluctuated yearly with majority of landings being made by non-charter vessels. Total wahoo landings averaged 12,000 lbs from 2009 through 2011, then significantly increased in 2012 by 60%, and decreased in 2013 by 62%. Non-charter landings roughly followed that same trajectory and quantity of landings.

There were no wahoo landings recorded during creel survey sample days of charter boats in 2010. Charter landings increasing significantly by 169% in 2012, but none were recorded in 2013.

The significant decline in wahoo landings in 2013 may be attributed to the increased number of bad weather days.

Source and Calculations: Data are from the Division of Fish and Wildlife (DFW) boat-based creel survey. A 365-day (366 days during leap years) annual expansion is run for each calendar year of survey data to produce catch and effort estimates for the pelagic fishery to avoid over-estimating seasonal pelagic species. Percent species composition is calculated by weight for the sampled catch for each method to produce catch estimates for each species for the expanded period. The annual catch for Total Wahoo landings, Charter and Non-Charter separately are summed across all methods to obtain the numbers plotted above.

Figure 37. Annual CNMI boat-based creel estimated blue marlin landings

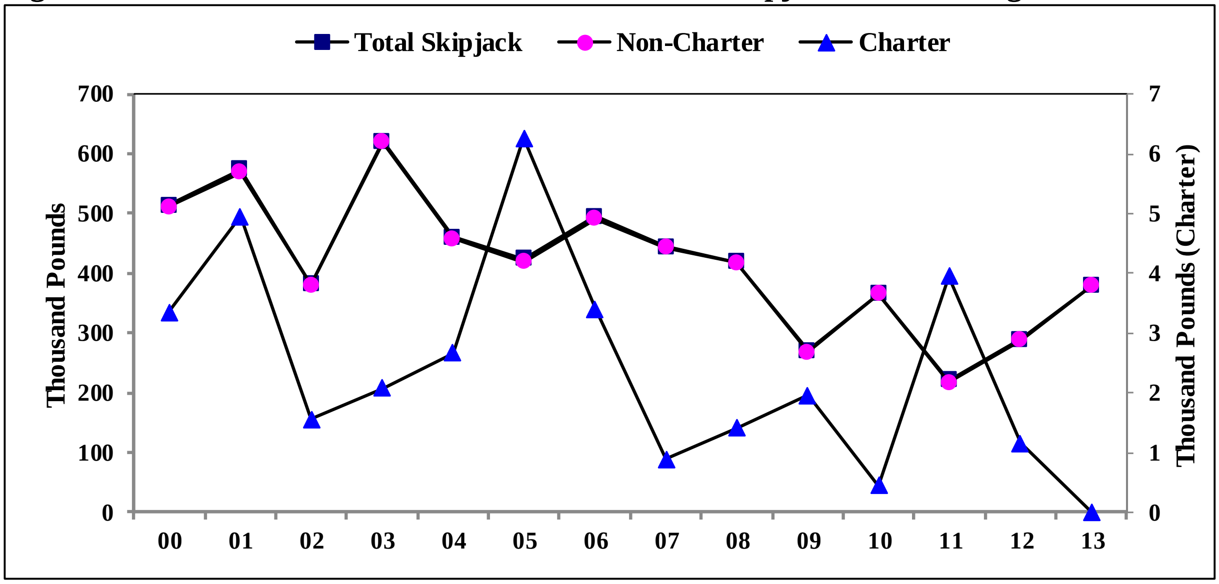


Interpretation: Blue marlin is rarely targeted by non-charter vessels. Charter vessels prefer to land blue marlin, but seldom do due to the short fishing time (avg. 4 hrs) tourists charter their vessels. Non-charter fishermen find it difficult to find a market for blue marlin. Although most fishing is by non-charter vessels, the vessels are usually smaller (15-18 ft long), thus it's difficult to haul blue marlin. No blue marlin landings were recorded during 2009-2010 creel survey sample days, but non-charter vessels landed over 5,000 pounds in 2011. In 2012, non-charter vessels recorded total blue marlin landings of nearly 10,000 pounds, but landings decreased by 76% in 2013. No landings from charter vessels were recorded in 2012 and charter landings were not recorded in 2013.

Blue Marlin Landings (lbs)			
Year	Total Blue Marlin	Non-Charter	Charter
2000	12,024	12,024	0
2001	2,963	2,963	0
2002	855	0	855
2003	2,928	2,071	857
2004	1,876	0	1,876
2005	4,248	4,248	0
2006	10,161	10,161	0
2007	3,623	3,623	0
2008	42,586	42,586	0
2009	0	0	0
2010	0	0	0
2011	5,230	5,230	0
2012	9,751	9,751	0
2013	2,376	2,376	0
Average	**7,044**	**6,788**	**256**
Std. Dev.	**10,514**	**10,652**	**539**

Source and Calculations: Data are from the Division of Fish and Wildlife (DFW) boat-based creel survey. A 365-day (366 days during leap years) annual expansion is run for each calendar year of survey data to produce catch and effort estimates for the pelagic fishery to avoid over-estimating seasonal pelagic species. Percent species composition is calculated by weight for the sampled catch for each method to produce catch estimates for each species for the expanded period. The annual catch for blue marlin, Charter and Non-Charter separately are summed across all methods to obtain the numbers plotted above.

Figure 38. Annual CNMI boat-based creel estimated skipjack tuna landings

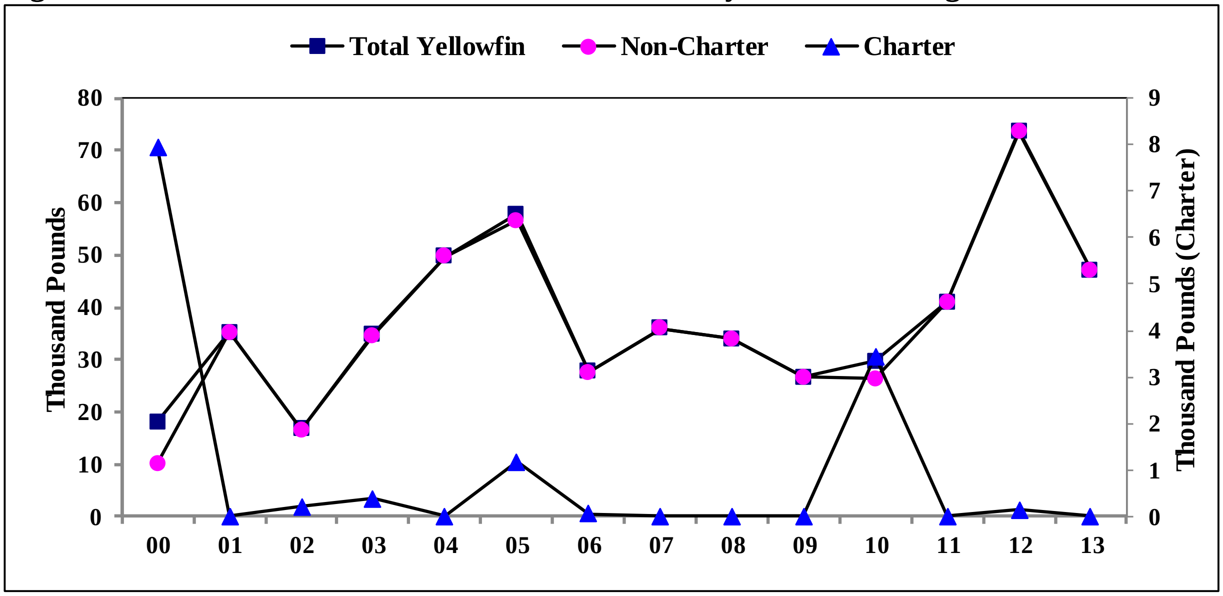


Interpretation: Skipjack tuna comprise the majority of all pelagic landings. 2010 total skipjack landings increased 37% over 2009, but decreased 39% in 2011. This decrease may be partially due to increasing fuel prices, the current economic situation in CNMI, and unfavorable sea conditions for fishing that caused several long-time troll fishermen to leave the fishery. However, total skipjack landings in 2012 increased 30% and again in 2013 by 31%. Non-charter landings follow the total landings very closely. Charter landings increased significantly in 2011 by 788%, but declined steeply by 71% in 2012. No charter landings were recorded in 2013.

Skipjack Tuna Landings (lbs)			
Year	Total Skipjack	Non-Charter	Charter
2000	514,027	510,678	3,350
2001	573,996	569,041	4,955
2002	381,612	380,062	1,550
2003	621,204	619,130	2,073
2004	460,626	457,966	2,660
2005	424,597	418,340	6,258
2006	494,927	491,520	3,407
2007	444,493	443,600	893
2008	419,311	417,903	1,408
2009	270,439	268,484	1,955
2010	365,636	365,192	444
2011	221,575	217,633	3,943
2012	288,642	287,482	1,160
2013	378,558	378,558	0
Average	**418,546**	**416,114**	**2,433**
Std. Dev.	**108,903**	**108,491**	**1,715**

Source and Calculations: Data are from the DFW boat-based creel survey. A 365-day (leap year = 366 days) annual expansion is run for each calendar year of survey data to produce catch and effort estimates for the pelagic fishery to avoid over-estimating seasonal pelagic species. Percent species composition is calculated by weight for the sampled catch for each method to produce catch estimates for each species for the expanded period. The annual catch for Skipjack Tuna, Charter and Non-Charter separately are summed across all methods to obtain the numbers plotted above.

Figure 39. Annual CNMI boat-based creel estimated yellowfin landings



Interpretation: In 2010, yellowfin tuna comprised only 6% of all total pelagic landings. Yellowfin tuna catches are usually smaller in size than other geographical areas; the average length of yellowfin tuna measured during creel surveys on Saipan was 48.7 cm. Fishermen on Saipan recorded a good year for yellowfin tuna in 2011, with non-charter landings increasing by 39%. Non-charter landings increased again in 2012 by 80% (as did total landings), but decreased in 2013 by 36% (as did total landings). There were no yellowfin tuna landings from charter vessels recorded in the boat-based creel survey in 2011, and only 142 lbs in 2012; charter landings were not recorded in 2013.

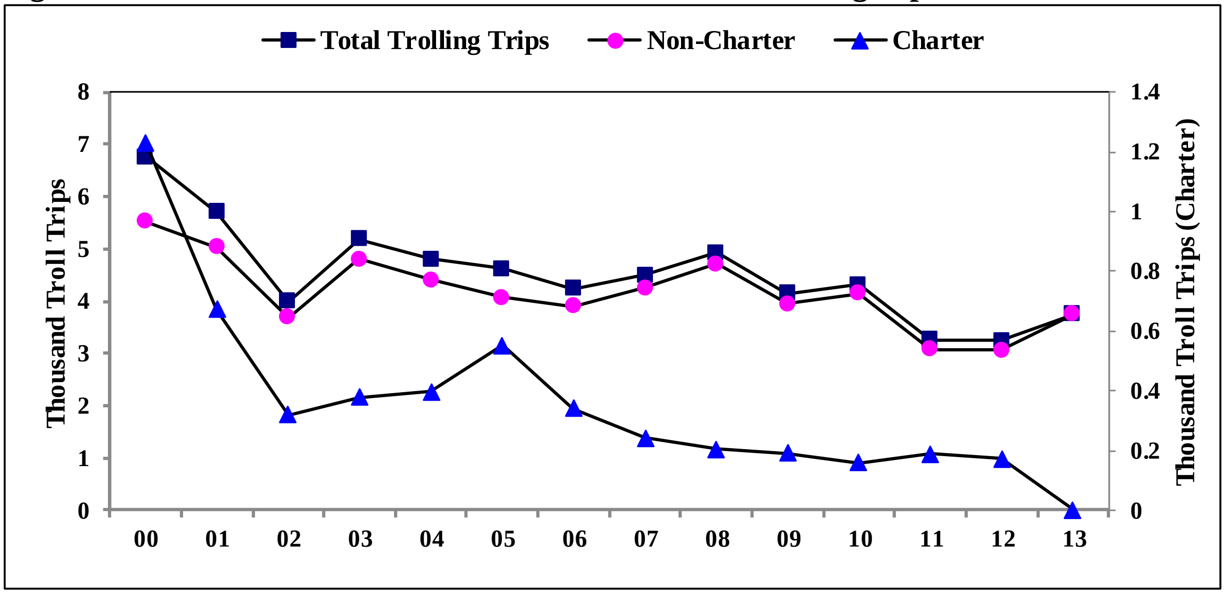
Yellowfin Tuna Landings (lbs)			
Year	Total Yellowfin	Non-Charter	Charter
2000	18,123	10,195	7,928
2001	35,265	35,265	0
2002	16,714	16,494	220
2003	34,953	34,568	384
2004	49,674	49,674	0
2005	57,829	56,656	1,173
2006	27,658	27,599	59
2007	35,958	35,958	0
2008	33,906	33,906	0
2009	26,602	26,602	0
2010	29,730	26,289	3,441
2011	41,006	41,006	0
2012	73,707	73,565	142
2013	47,121	47,121	0
Average	37,732	36,778	953
Std. Dev.	14,849	15,747	2,131

Source and Calculations: Data are from the Division of Fish and Wildlife (DFW) boat-based creel survey. A 365-day (366 days during leap years) annual expansion is run for each calendar year of survey data to produce catch and effort estimates for the pelagic fishery to avoid over-estimating seasonal pelagic species. Percent species composition is calculated by weight for the sampled catch for each method to produce catch estimates for each species for the expanded period. The annual catch for Yellowfin Tuna, Charter and Non-Charter separately are summed across all methods to obtain the numbers plotted above.

Table 41. Boat-based survey statistics: raw data

Year	Survey Days	Total Trips (Boat Log)	Non-Charter Trips (Boat Log)	Charter Trips (Boat Log)	Total Interviews Conducted	Non-charter Interviews	Charter Interviews
2000	66	130	115	15	123	104	19
2001	67	221	202	19	215	196	19
2002	75	149	138	11	163	137	26
2003	91	248	224	24	278	223	55
2004	77	211	191	20	211	187	24
2005	78	293	259	34	294	247	47
2006	71	212	198	14	222	193	29
2007	63	199	193	6	194	187	7
2008	56	164	160	4	160	155	5
2009	66	140	137	3	137	132	5
2010	70	122	118	4	115	112	3
2011	73	111	106	5	105	100	5
2012	73	134	127	7	126	119	7
2013	57	133	133	0	122	122	0

Figure 40. CNMI boat-based creel estimated number of trolling trips



Interpretation: The total number of trolling trips has slightly decreased over the 12 years since the start of the boat-based creel survey, which is partly due to the down turn in economic activity in CNMI, rising fuel cost, and fishermen leaving the fishery. 2010 total trips increased 5% because non-charter boats trips increased 6%. Total trips then decreased more in 2011 and 2012 by 22%. However they have increased in 2013 by 16%. Non-charter trips followed almost identically.

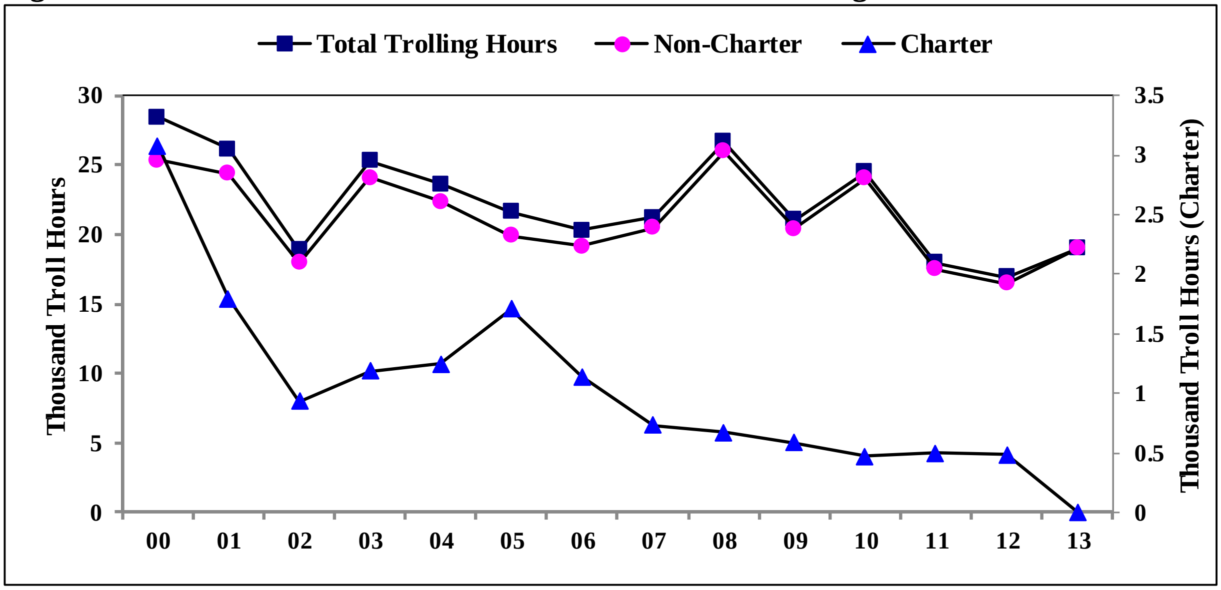
In 2011, charter trips increased by 19%. They decreased slightly in 2012 by 8%. Charter trips were not interviewed in 2013.

CNMI Estimated Number of Trips

Year	Total Trips	Non-Charter	Charter
2000	6,755	5,528	1,227
2001	5,709	5,039	671
2002	4,001	3,683	318
2003	5,181	4,804	377
2004	4,810	4,412	398
2005	4,616	4,064	553
2006	4,235	3,896	340
2007	4,504	4,261	242
2008	4,921	4,717	204
2009	4,141	3,951	190
2010	4,312	4,154	158
2011	3,262	3,074	188
2012	3,242	3,069	173
2013	3,748	3,748	0
Average	**4,531**	**4,171**	**360**
Std. Dev.	**904**	**672**	**292**

Source and Calculations: Data are from the Division of Fish and Wildlife (DFW) boat-based creel survey. The data expansion system is run on a calendar year's worth of survey data to produce catch and effort estimates for each fishing method surveyed. These plots are of the estimated number of trips for the trolling method as taken directly from creel survey expansion outputs.

Figure 41. CNMI boat-based creel estimated number of trolling hours



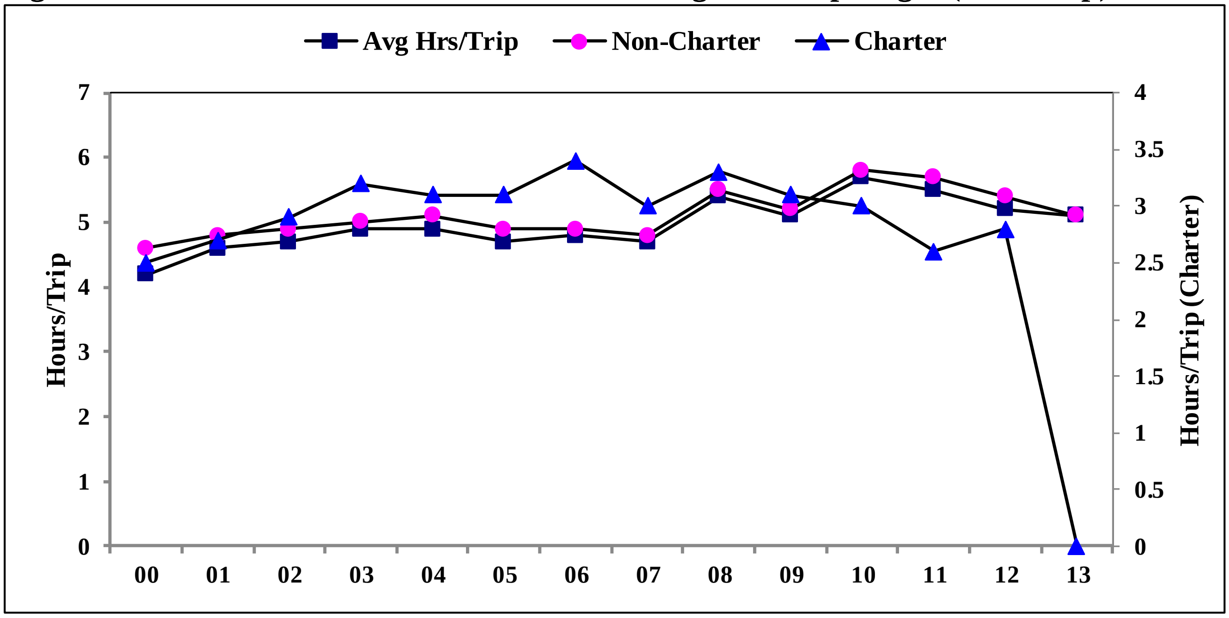
Interpretation: In 2011, total estimated trolling hours decreased 25% and decreased another 6% in 2012. In 2013, total trolling hours increased 12%. Trolling hours for non-charter boats decreased 27% in 2011 and 6% in 2012, but increased 12% in 2013, almost identically tracking the total estimated trolling hours. In 2011, charter trolling hours increased by 5%, but then decreased 3% in 2012 and were not monitored in 2013.

Source and Calculations: Data are from the Division of Fish and Wildlife (DFW) boat-based creel survey. The data expansion system is run on a calendar year's worth of survey data to produce catch and effort estimates for each fishing method surveyed. These plots are of the estimated boat hours spent fishing for the trolling method as taken directly from creel survey expansion outputs.

CNMI Estimated Trolling Hours

Year	Total Hours	Non-Charter	Charter
2000	28,425	25,349	3,077
2001	26,166	24,370	1,796
2002	18,870	17,940	930
2003	25,266	24,078	1,188
2004	23,623	22,375	1,248
2005	21,619	19,915	1,705
2006	20,299	19,160	1,140
2007	21,232	20,499	733
2008	26,642	25,969	673
2009	21,027	20,443	584
2010	24,473	24,000	473
2011	17,973	17,475	498
2012	16,928	16,447	481
2013	19,012	19,012	0
Average	**22,254**	**21,217**	**1,038**
Std. Dev.	**3,422**	**3,003**	**741**

Figure 42. CNMI boat-based creel estimated average troll trip length (hours/trip)

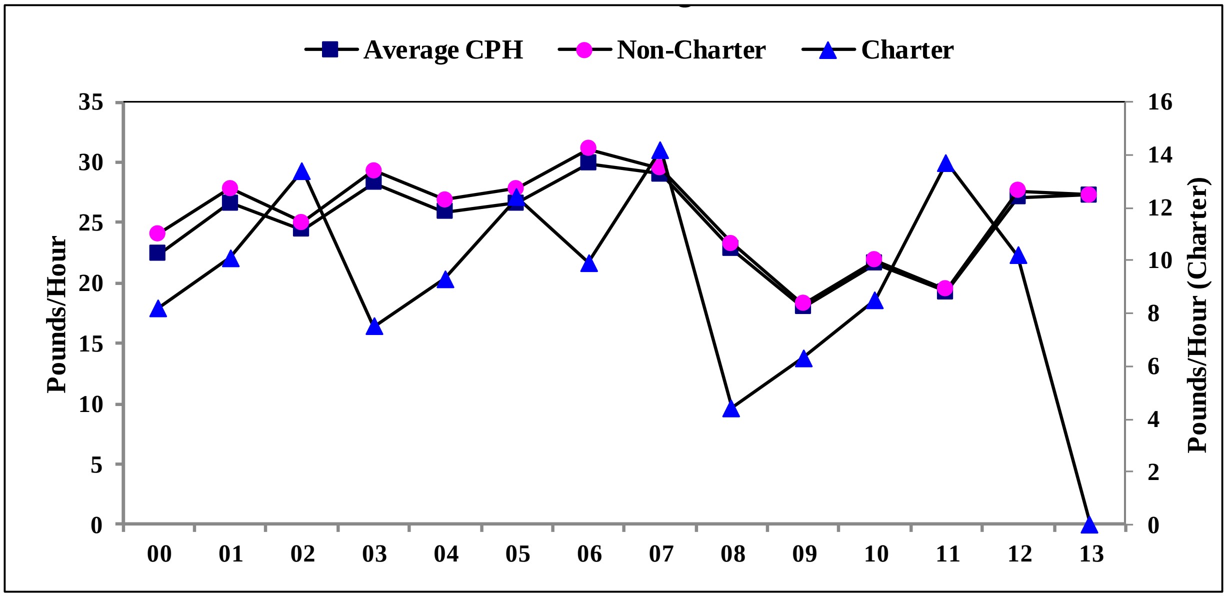


Interpretation: The overall average trolling hours/trips have increased over the 14 year time series, although it has decreased over the last 4 years. Total average trip length peaked in 2010 because non-charter boats fished longer hours, possibly due to remaining fishermen fishing longer to meet the demand in the market created when some fishermen left the industry. Total hours and non-charter hours have decreased since 2010, by 4% in 2011, 5% in 2012, and 2% in 2013. In 2011, charter hours per trip decreased 10%, increased by 8% in 2012 (partly due to lower catch rates being reported by the charter fleet and tourists requesting longer fishing trips), and were not monitored in 2013. The 2011 decrease may be attributed to unfavorable sea conditions and rising fuel prices. Favorable sea conditions play a major role in hours/trips that non-charter and charter boats spend in the ocean.

Estimated Troll Trip Length			
Year	**Average Hours/Trip**	**Non-Charter**	**Charter**
2000	4.2	4.6	2.5
2001	4.6	4.8	2.7
2002	4.7	4.9	2.9
2003	4.9	5.0	3.2
2004	4.9	5.1	3.1
2005	4.7	4.9	3.1
2006	4.8	4.9	3.4
2007	4.7	4.8	3.0
2008	5.4	5.5	3.3
2009	5.1	5.2	3.1
2010	5.7	5.8	3.0
2011	5.5	5.7	2.6
2012	5.2	5.4	2.8
2013	5.1	5.1	0.0
Average	**5.0**	**5.1**	**2.8**
Std. Dev.	**0.4**	**0.4**	**0.8**

Source and Calculations: Data are from the Division of Fish and Wildlife (DFW) boat-based creel survey. The data expansion system is run on a calendar year's worth of survey data to produce catch and effort estimates for each fishing method surveyed. These plots are of the estimated boat hours spent fishing and number of trips for the trolling method, as taken directly from creel survey, expansion system outputs.

Figure 43. CNMI boat-based creel trolling CPUE (pounds/hour) for all pelagic species

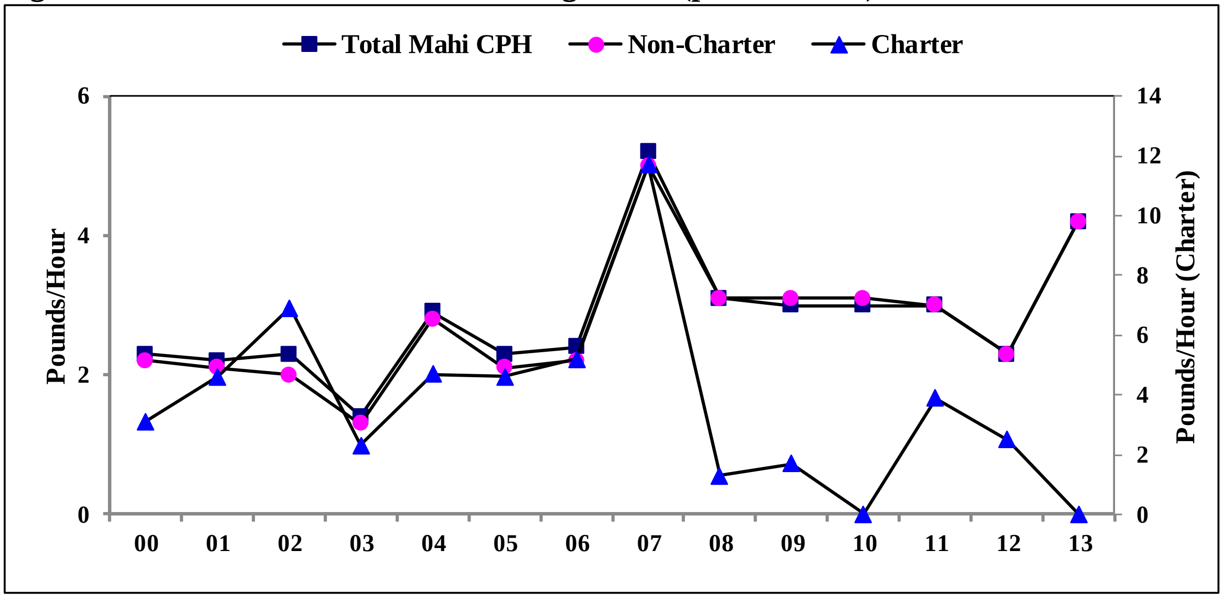


Interpretation: The trolling catch rates yearly fluctuations may be associated with weather patterns that affect sea conditions. 98% of total pelagic fish landed are from non-charter vessels, which are usually smaller boats, to target mainly skipjack. Smaller boats allow fishermen to save on fuel costs by using smaller boat engines. However, it also affects their ability to fish efficiently during rough weather days. Very few charter vessels have fished receintly, thus the average CPU and non-charter CPU are very similar. In 2011, average CPUE and non-charter CPUE decreased 10%, but increased by 40% in 2012 and changed very little in 2013. Charter boats CPUE increased consistently from 2008 through 2011, with a 55% increase from 2010 to 2011. However, charter boat catch rates declined by 26% in 2012 and were not monitored in 2013.

CPUE (pounds/hour): All Pelagic Species			
Year	**Combined Average**	**Non-Charter**	**Charter**
2000	22.4	24.1	8.2
2001	26.6	27.8	10.1
2002	24.4	25.0	13.4
2003	28.3	29.3	7.5
2004	25.9	26.9	9.3
2005	26.6	27.8	12.4
2006	29.9	31.1	9.9
2007	29.0	29.5	14.2
2008	22.8	23.3	4.4
2009	18.0	18.3	6.3
2010	21.6	21.9	8.5
2011	19.3	19.5	13.7
2012	27.1	27.6	10.2
2013	27.3	27.3	0.0
Average	**24.9**	**25.7**	**9.2**
Std. Dev.	**3.5**	**3.7**	**3.7**

Source and Calculations: Data are from the Division of Fish and Wildlife (DFW) boat-based creel survey. The data expansion system is run on a calendar year's worth of survey data to produce catch and effort estimates for each fishing method. This plot and table of catch per unit of effort (CPUE) are based on the total annual landings of all troll catch, divided by the total number of hours spent fishing.

Figure 44. CNMI boat-based creel trolling CPUE (pounds/hour) for mahimahi



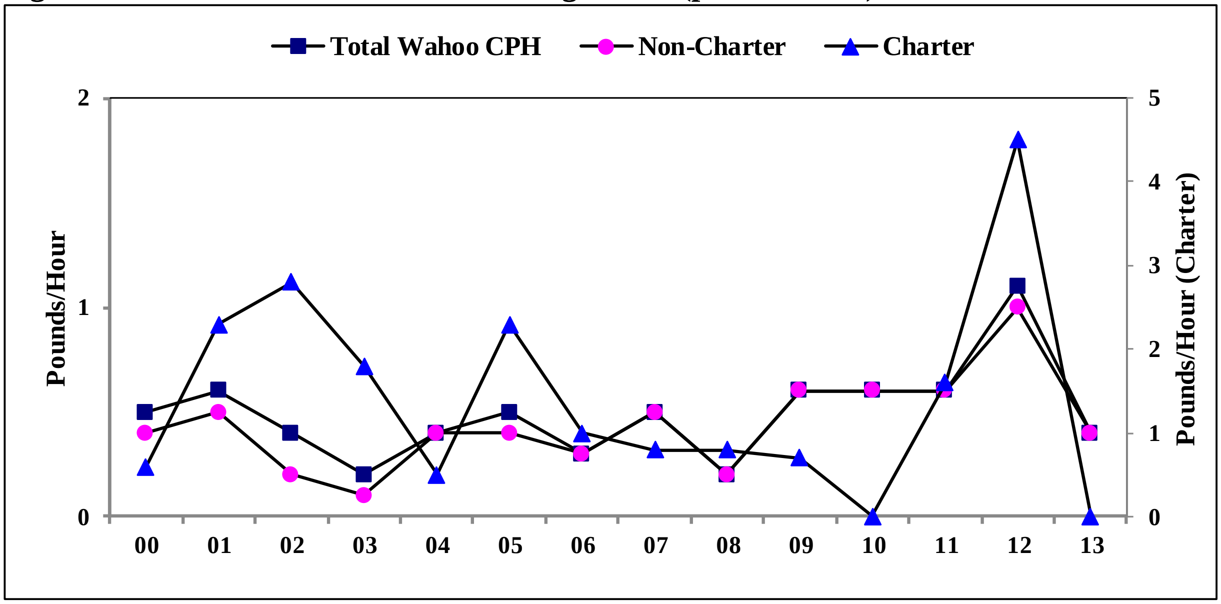
Interpretation: Mahimahi landings fluctuate yearly possibly due to seasonal availability of stocks and abundance, as well as varying demand (mahimahi is not a very marketable fish on Saipan, thus fishermen do not target it). While non-charter vessels catch rates (as well as overall catch rates) remained consistent from 2008 through 2011, they declined in 2012 by 23%. Charter vessel catch rate increased significantly in 2011, but decreased 36% in 2012 and were not monitored in 2013.

Source and Calculations: Data are from the Division of Fish and Wildlife (DFW) boat-based creel survey. The data expansion system is run on a calendar year's worth of survey data to produce catch and effort estimates for each fishing method. This plot and table of catch per unit of effort (CPUE) are based on the total annual landings of mahimahi divided by the total number of hours spent fishing (gear in use).

CPUE (pounds/hour): Mahimahi

Year	Combined	Non-Charter	Charter
2000	2.3	2.2	3.1
2001	2.2	2.1	4.6
2002	2.3	2.0	6.9
2003	1.4	1.3	2.3
2004	2.9	2.8	4.7
2005	2.3	2.1	4.6
2006	2.4	2.2	5.2
2007	5.2	5.0	11.7
2008	3.1	3.1	1.3
2009	3.0	3.1	1.7
2010	3.0	3.1	0.0
2011	3.0	3.0	3.9
2012	2.3	2.3	2.5
2013	4.2	4.2	0.0
Average	**2.8**	**2.8**	**3.8**
Std. Dev.	**0.9**	**0.9**	**2.9**

Figure 45. CNMI boat-based creel trolling CPUE (pounds/hour) for wahoo

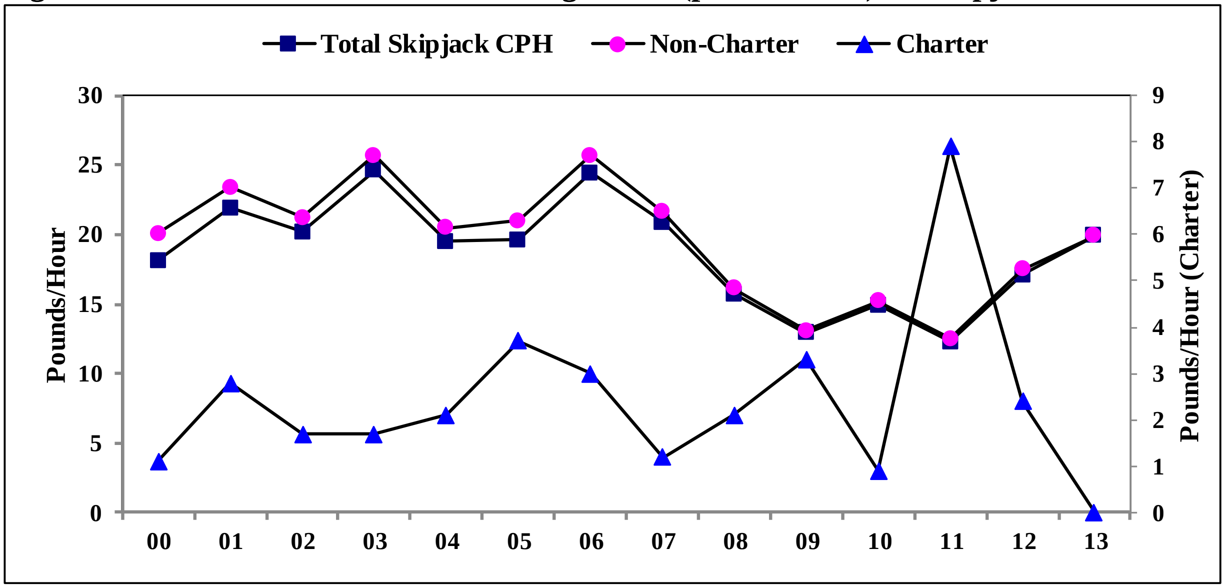


Interpretation: The yearly fluctuation in wahoo catch rates is probably similar to Guam's wide fluctuations in their CPUE, possibly due to variability in the interannual abundance and availability of the stocks. Catch rates for non-charter boats remained constant from 2009 to 2011, increased 67% in 2012, and decreased 60% in 2013. Catch rates fluctuated for charter vessels, with a significant increase of 181% from 2011 to 2012 of 1.6 lbs/hr to 4.5 lbs/hr, which is the highest catch rate recorded in 12 years. However, charter vessels were not monitored in 2013. The combined non-charter and charter total wahoo catch rates remained constant from 2009 to 2011, increased by 83% in 2012, and decreased 64% in 2013.

CPUE (pounds per hour): Wahoo			
Year	**Combined**	**Non-Charter**	**Charter**
2000	0.5	0.4	0.6
2001	0.6	0.5	2.3
2002	0.4	0.2	2.8
2003	0.2	0.1	1.8
2004	0.4	0.4	0.5
2005	0.5	0.4	2.3
2006	0.3	0.3	1.0
2007	0.5	0.5	0.8
2008	0.2	0.2	0.8
2009	0.6	0.6	0.7
2010	0.6	0.6	0.0
2011	0.6	0.6	1.6
2012	1.1	1.0	4.5
2013	0.4	0.4	0.0
Average	**0.5**	**0.4**	**1.4**
Std. Dev.	**0.2**	**0.2**	**1.2**

Source and Calculations: Data are from the Division of Fish and Wildlife (DFW) boat-based creel survey. The data expansion system is run on a calendar year's worth of survey data to produce catch and effort estimates for each fishing method. This plot and table of catch per unit of effort (CPUE) are based on the total annual landings of wahoo divided by the total number of hours spent fishing (gear in use).

Figure 46. CNMI boat-based creel trolling CPUE (pounds/hour) for skipjack tuna

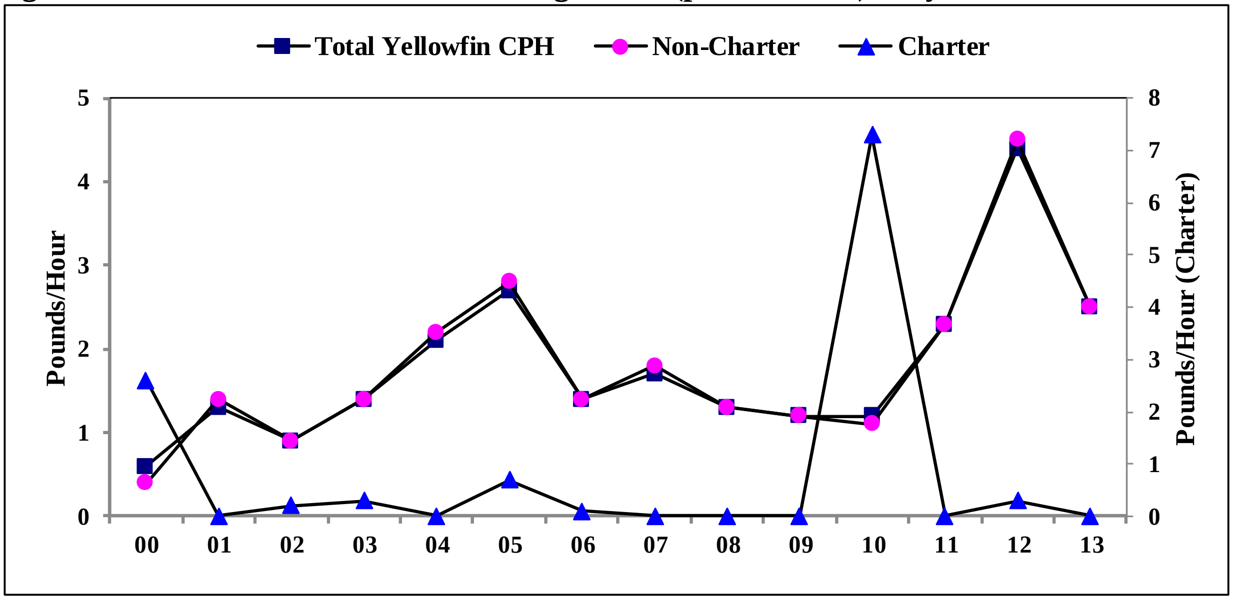


Interpretation: Skipjack tuna is the main targeted species in the pelagic fishery of CNMI. Yearly fluctuations of catch rates may be due to availability of the stock and the sea conditions; smaller vessels typical for the commercial troll fishermen are affected more by unfavorable sea conditions. The combined catch rates for 2011 decreased 17%, but increased in 2012 by 39% and again by 16% in 2013. The non-charter boat catch rates for skipjack tuna, their primary target, decreased by 18% in 2011, but rebounded by 40% in 2012 and 14% in 2013. Charter vessels showed a significant increase from 0.9 lbs/hr in 2010 to 7.4 lbs/hr in 2011, but decreased by 70% in 2012 and were not monitored in 2013. Fishermen reported a better catch rate in 2012, which is also reflected in the shorter trips/hour that fishermen spent trolling.

CPUE (pounds/hour): Skipjack Tuna			
Year	**Combined**	**Non-Charter**	**Charter**
2000	18.1	20.1	1.1
2001	21.9	23.4	2.8
2002	20.2	21.2	1.7
2003	24.6	25.7	1.7
2004	19.5	20.5	2.1
2005	19.6	21.0	3.7
2006	24.4	25.7	3.0
2007	20.9	21.6	1.2
2008	15.7	16.1	2.1
2009	12.9	13.1	3.3
2010	14.9	15.2	0.9
2011	12.3	12.5	7.9
2012	17.1	17.5	2.4
2013	19.9	19.9	0.0
Average	**18.7**	**19.5**	**2.4**
Std. Dev.	**3.7**	**4.0**	**1.8**

Source and Calculations: Data are from the Division of Fish and Wildlife (DFW) boat-based creel survey. The data expansion system is run on a calendar year's worth of survey data to produce catch and effort estimates for each fishing method surveyed. This plot and table of catch per unit of effort (CPUE) are based on the total annual landings of skipjack divided by the total number of hours spent fishing (gear in use).

Figure 47. CNMI boat-based creel trolling CPUE (pounds/hour) for yellowfin tuna

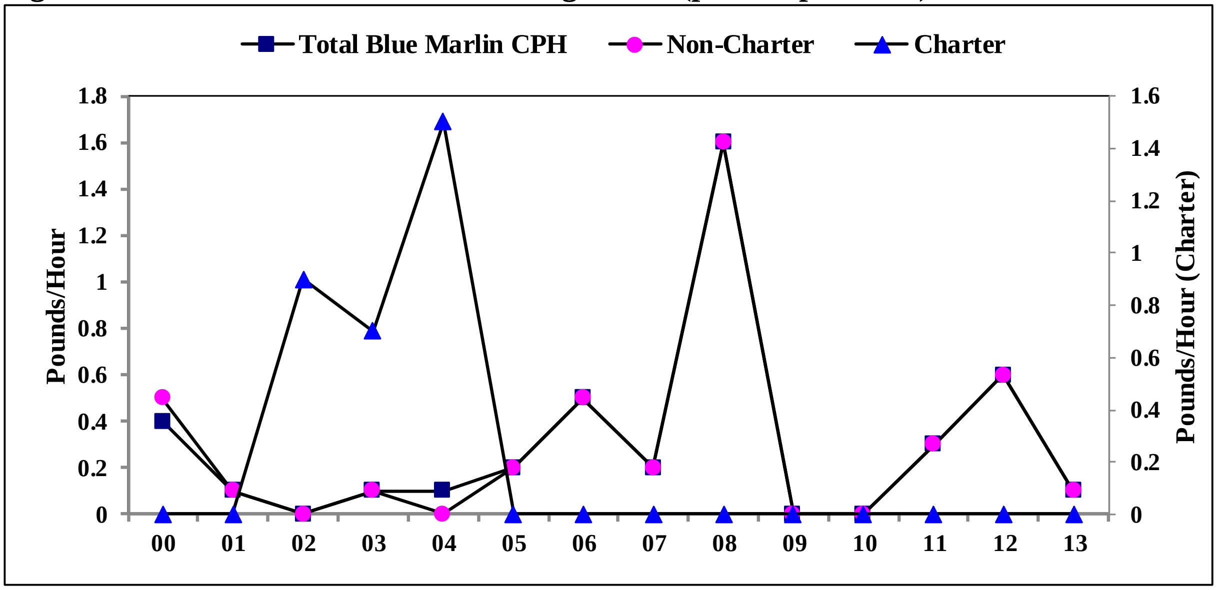


Interpretation: Yellowfin tuna landed on Saipan are usually smaller in size than other geographical areas, with an average length of about 48.7 cm from creel survey samples. Fluctuations in yellowfin tuna catch rates are similar to mahimahi and wahoo in that it may have more to do with abundance and availability of stock. Yellowfin tuna are seasonal in CNMI. In 2011, non-charter fishermen reported a good year for landing yellowfin tuna, which is reflected in an increase in CPUE of 109%; there were no creel survey recorded landings of yellowfin tuna by charter vessels. In 2012, yellowfin tuna catch rates for non-charter boats continued to increase by 96%, but decreased 44% in 2013. Charter boats also experienced increased catch rates to 0.3 lbs/hr in 2012, but were not monitored in 2013.

CPUE (pounds/hour): Yellowfin Tuna			
Year	**Combined**	**Non-Charter**	**Charter**
2000	0.6	0.4	2.6
2001	1.3	1.4	0.0
2002	0.9	0.9	0.2
2003	1.4	1.4	0.3
2004	2.1	2.2	0.0
2005	2.7	2.8	0.7
2006	1.4	1.4	0.1
2007	1.7	1.8	0.0
2008	1.3	1.3	0.0
2009	1.2	1.2	0.0
2010	1.2	1.1	7.3
2011	2.3	2.3	0.0
2012	4.4	4.5	0.3
2013	2.5	2.5	0.0
Average	**1.8**	**1.8**	**0.8**
Std. Dev.	**0.9**	**1.0**	**1.9**

Source and Calculations: Data are from the Division of Fish and Wildlife (DFW) boat-based creel survey. The data expansion system is run on a calendar year's worth of survey data to produce catch and effort estimates for each fishing method surveyed. This plot and table of catch per unit of effort (CPUE) are based on the total annual landings of yellowfin divided by the total number of hours spent fishing (gear in use).

Figure 48. CNMI boat-based creel trolling CPUE (pounds per hour) for blue marlin



Interpretation: Blue marlin is rarely a target for non-charter boats. There is almost no market for blue marlin and boats that make up the majority of the troll fishing industry are generally too small to transport blue marlins. Blue marlins are mostly only targeted during fishing tournaments. There have been no trips for blue marlins by charter vessels from 2005 through 2012, and charter vessels were not monitored in 2013. The non-charter catch rate increased by 100% in 2012, but decreased 83% in 2013. Although landings are recorded in the creel survey, blue marlin is rarely a target for non-charter boats and catch rates reported are more like an incidental catch rate.

CPUE (pounds/hour): Blue Marlin			
Year	**Combined**	**Non-Charter**	**Charter**
2000	0.4	0.5	0.0
2001	0.1	0.1	0.0
2002	0.0	0.0	0.9
2003	0.1	0.1	0.7
2004	0.1	0.0	1.5
2005	0.2	0.2	0.0
2006	0.5	0.5	0.0
2007	0.2	0.2	0.0
2008	1.6	1.6	0.0
2009	0.0	0.0	0.0
2010	0.0	0.0	0.0
2011	0.3	0.3	0.0
2012	0.6	0.6	0.0
2013	0.1	0.1	0.0
Average	**0.3**	**0.3**	**0.2**
Std. Dev.	**0.4**	**0.4**	**0.5**

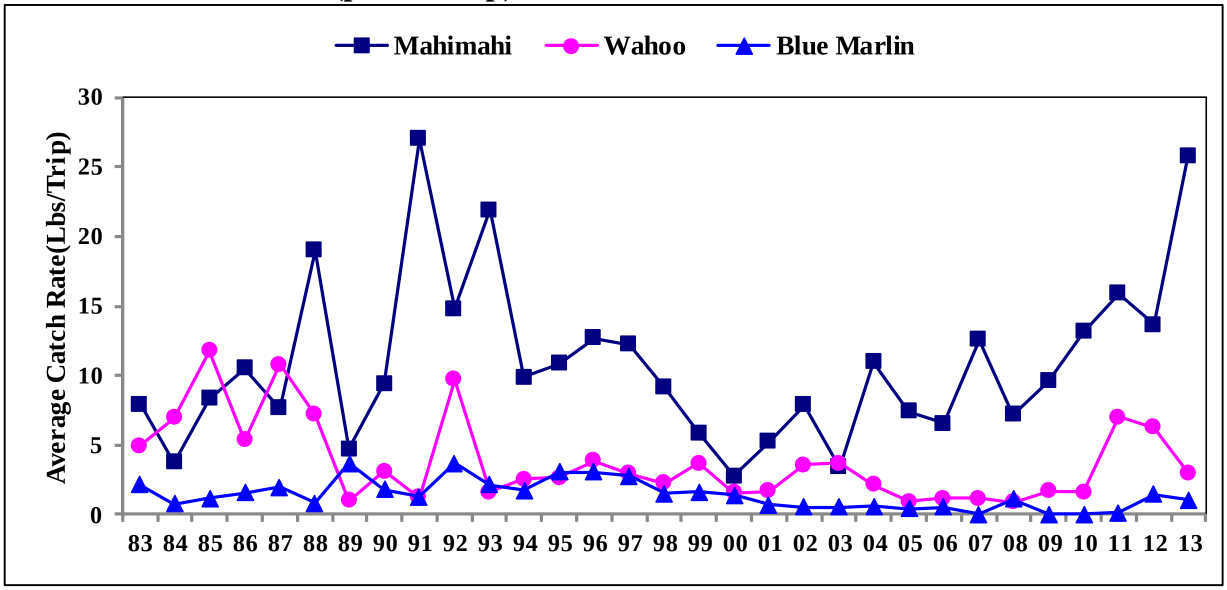
Source and Calculations: Data are from the Division of Fish and Wildlife (DFW) boat-based creel survey. The data expansion system is run on a calendar year's worth of survey data to produce catch and effort estimates for each fishing method surveyed. This plot and table of catch per unit of effort (CPUE) are based on the total annual landings of marlin divided by the total number of hours spent fishing (gear in use).

Table 42. CNMI consumer price index, consumer price index adjustment factor, and commercial receipt invoices data coverage

Year	CPI	CPI Adjustment Factor	Data Coverage
1983	140.90	2.98	80.00
1984	153.20	2.74	80.00
1985	159.30	2.63	80.00
1986	163.50	2.56	80.00
1987	170.70	2.46	80.00
1988	179.60	2.33	80.00
1989	190.20	2.20	80.00
1990	199.33	2.10	80.00
1991	214.93	1.95	80.00
1992	232.90	1.80	80.00
1993	243.18	1.72	80.00
1994	250.00	1.68	80.00
1995	254.48	1.65	80.00
1996	261.98	1.60	80.00
1997	264.95	1.58	80.00
1998	264.18	1.59	80.00
1999	267.80	1.57	80.00
2000	273.23	1.53	80.00
2001	271.01	1.55	80.00
2002	271.55	1.54	80.00
2003	268.92	1.56	80.00
2004	271.28	1.55	55.00
2005	271.90	1.54	55.00
2006	285.96	1.47	55.00
2007	301.72	1.39	65.00
2008	320.39	1.31	65.00
2009	325.20	1.29	55.00
2010	351.05	1.19	45.00
2011	363.90	1.15	40.00
2012	369.10	1.14	65.00
2013	419.30	1.00	65.00

Calculations: The Commonwealth of the Northern Mariana Islands' Consumer Price Index is computed by the CNMI Department of Commerce using the Laspeyres' formula.

Figure 49. CNMI trolling catch rates from commercial receipt invoices for mahimahi, wahoo, and blue marlin (pounds/trip)



Interpretation: The mahimahi catch appears to be highly variable, shifting between high and low CPUE annually. It may be biological because it appears that the trolling catch rates of Guam and the CNMI have fluctuated similarly over the last twenty-nine years. Mahimahi catch rates increased steadily from 2008 through 2011, increasing 121%. It declined in 2012 by 18%, but then increased by 89% in 2013.

Prior to the 1989 low, wahoo catch rates rivaled those for mahimahi. Wahoo catch rates never regained those historical levels, instead staying stable around 2 lbs/trip from 1990 through 2010. There was a brief spike in catch rates in 2011 and 2012, but in 2013 catch rates returned to 3 lbs/trip, a decrease of 52% from 2012.

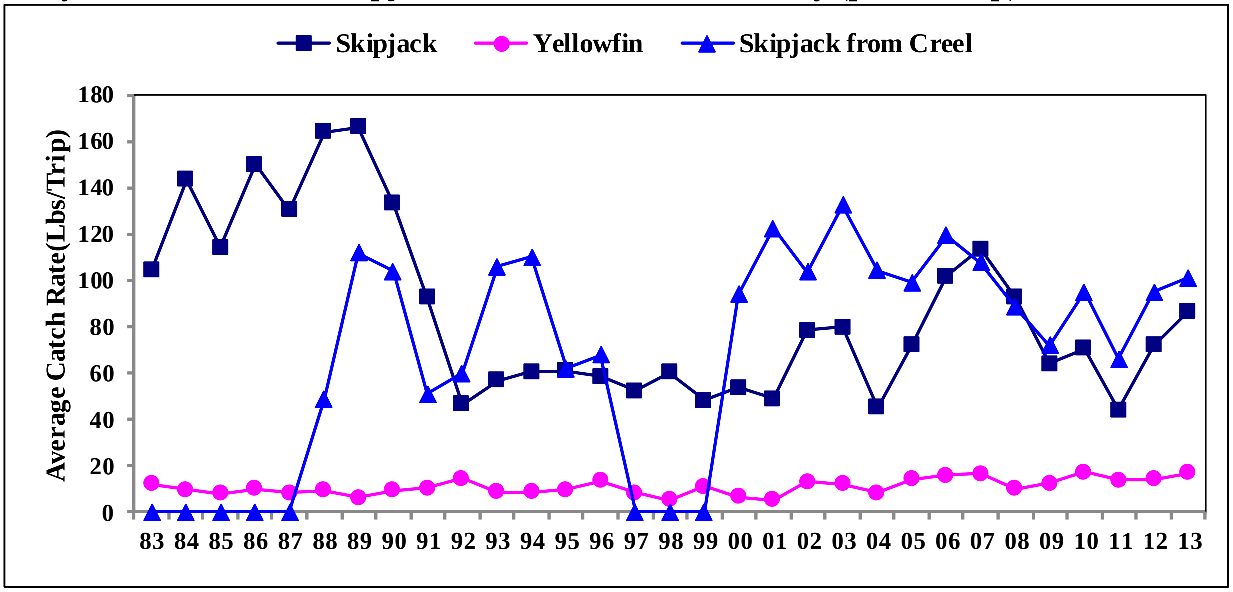
Large blue marlins are not uncommon around the waters of the CNMI; however, non-charter boats, which make up over 90% of the troll boat fleet, rarely, target this species. They are not a marketable species and are typically only targeted during fishing tournaments. When landed, they are rarely sold to vendors participating in the Commercial Purchase Data Collection Program; therefore it is not recorded in the Commercial Purchase Database used to generate these reports. During the 2011 Saipan International Fishing Derby, a 997 pound blue marlin was landed. Blue marlin catch rates have been less than 1.0 since 2001, except for one spike in 2008 at 1.1 lbs/trip. Blue marlin catch rates decreased 28% in 2013.

Source and Calculations: Annual catch rates for selected species were obtained by calculating the average weight per trip for each year. Trips were assumed to be one day in length and each commercial invoice assumed to represent one trip.

Table 43. CNMI trolling catch rates from commercial receipt invoices for mahimahi, wahoo, and blue marlin (pounds/trip)

CPUE: Mahimahi, Wahoo, and Blue Marlin (pounds/trip)			
Year	**Mahimahi**	**Wahoo**	**Blue Marlin**
1983	7.92	4.98	2.15
1984	3.76	6.95	0.76
1985	8.36	11.77	1.20
1986	10.50	5.35	1.57
1987	7.66	10.81	1.98
1988	18.98	7.21	0.81
1989	4.71	1.01	3.67
1990	9.40	3.12	1.83
1991	27.03	1.22	1.26
1992	14.80	9.68	3.72
1993	21.89	1.62	2.15
1994	9.89	2.54	1.73
1995	10.84	2.66	3.08
1996	12.68	3.84	3.06
1997	12.25	2.97	2.77
1998	9.13	2.27	1.51
1999	5.86	3.67	1.61
2000	2.80	1.56	1.38
2001	5.23	1.67	0.71
2002	7.87	3.58	0.55
2003	3.43	3.71	0.53
2004	10.94	2.12	0.61
2005	7.43	0.93	0.44
2006	6.58	1.19	0.54
2007	12.57	1.19	0.04
2008	7.19	0.91	1.11
2009	9.60	1.68	0.04
2010	13.17	1.64	0.04
2011	15.90	7.00	0.13
2012	13.66	6.29	1.46
2013	25.75	3.00	1.05
Average	**10.90**	**3.81**	**1.40**
Std. Dev.	**5.91**	**2.94**	**1.03**

Figure 50. CNMI trolling catch rates from commercial receipt invoices for skipjack tuna and yellowfin tuna, and skipjack tuna from the Creel Survey (pounds/trip)



Interpretation: The Creel Survey data on skipjack tuna catch rates showed a very different pattern from the Commercial Purchase data until they appeared to stabilize in 2006. Catch rates based on the Commercial Purchase Data Base and from the Creel Survey data declined from 2007 through 2011. The 2011 skipjack tuna catch rates decreased 38% from 2010 figures, but then increased 57% in 2012 and again by 21% in 2013. Creel survey data reflects similar increases, although the percentages are different (44% in 2012 and 6.5% in 2013). These increases are partly due to better sea conditions.

Catch rates of yellowfin tuna per trip, as indicated by commercial receipt invoices, have been relatively consistent since 2005, varying between 13 and 17 lbs/trip, except a low of 10 lbs/trip in 2008. In 2011, the yellowfin tuna catch rate decreased by 3 lb/trip (18%) to 14 lbs/trip, remained the same in 2012, and increased in 2013 by 21%.

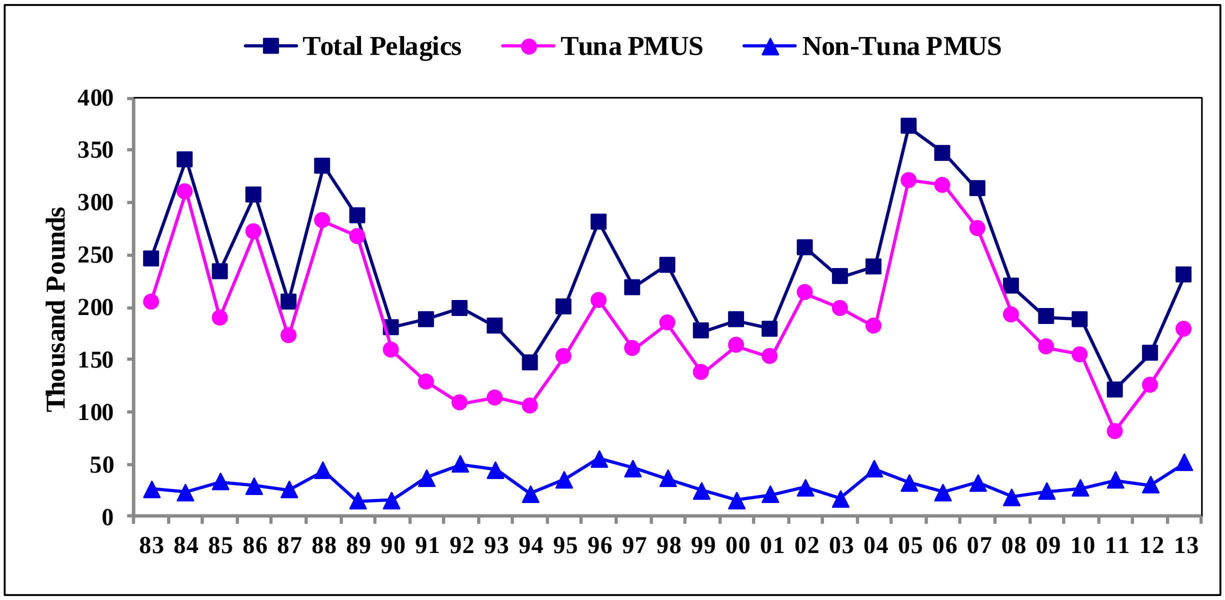
Source and Calculations: Data were summarized from the Commercial Purchase Database, which provides average pounds caught per trip. Annual catch rates for selected species were obtained by calculating the average weight per trip for each year. Trips were assumed to be one day in length and each commercial invoice represents one trip. Creel skipjack CPUE was calculated by dividing the sum of skipjack weight from all trolling trip interviews by the number of trolling trips interviewed.

Table 44. CNMI trolling catch rates from commercial receipt invoices for skipjack tuna and yellowfin tuna, and skipjack tuna from the Creel Survey (pounds/trip)

CPUE: Skipjack, Yellowfin, and Skipjack from Creel Survey (pounds/trip)			
Year	**Skipjack**	**Yellowfin**	**Skipjack Creel**
1983	104	12	0
1984	144	10	0
1985	114	8	0
1986	150	10	0
1987	130	8	0
1988	164	9	49
1989	166	7	112
1990	133	9	104
1991	93	10	51
1992	46	14	60
1993	57	9	106
1994	61	9	110
1995	61	10	62
1996	59	14	68
1997	52	8	0
1998	60	5	0
1999	48	11	0
2000	54	7	94
2001	49	5	122
2002	78	13	104
2003	80	12	133
2004	45	8	104
2005	72	14	99
2006	102	16	119
2007	114	17	108
2008	93	10	88
2009	64	13	72
2010	71	17	95
2011	44	14	66
2012	72	14	95
2013	87	17	101
Average	**86**	**11**	**68**
Std. Dev.	**36**	**3**	**45**

Source and Calculations: Annual summaries for each species are from the Commercial Purchase Database invoices.

Figure 51. CNMI estimated total commercial landings (lbs) from commercial receipt invoices for tuna and non-tuna PMUS



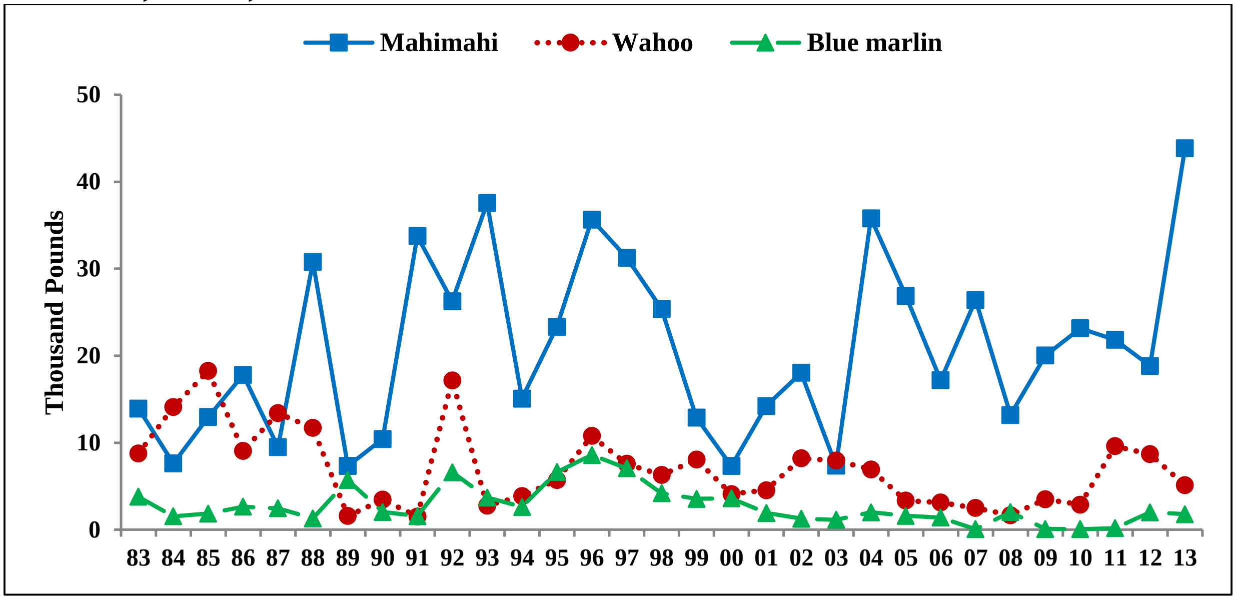
Interpretation: The total pelagics landed in 2012 increased 33%, and increased an additional 49% in 2013. Tuna PMUS landing increased in 2012 by 54% and by 42% in 2013, and remains lower than the 30 year mean. Non-tuna PMUS landings decreased in 2012 by 14%, but increased in 2013 by 71%. Fluctuations in total pelagic landings are mostly due to the low demand for troll fish in the CNMI.

Source and Calculations: All pelagics, tuna and non-tuna PMUS landings were summed from the Commercial Purchase Database.

Table 45. CNMI estimated total commercial landings (lbs) from commercial receipt invoices for all pelagic, tuna, and non-tuna PMUS

CNMI Estimated Total Commercial Landings			
Year	All Pelagics	Tuna PMUS	Non-Tuna PMUS
1983	245,985	204,692	26,544
1984	341,136	310,424	23,244
1985	234,178	189,809	33,143
1986	307,459	271,279	29,626
1987	205,068	171,957	25,450
1988	334,523	281,872	43,805
1989	286,784	267,811	14,595
1990	180,450	158,430	15,936
1991	188,561	128,848	36,975
1992	199,228	108,314	50,159
1993	181,328	113,207	44,518
1994	147,329	105,942	21,657
1995	200,180	152,756	35,759
1996	281,277	206,247	55,712
1997	218,873	159,626	46,049
1998	240,263	184,450	35,979
1999	177,031	136,907	24,768
2000	187,295	162,747	15,551
2001	179,181	152,144	21,198
2002	256,982	213,565	27,876
2003	228,416	198,843	17,346
2004	239,007	181,331	45,737
2005	372,375	321,089	32,136
2006	346,885	316,446	23,080
2007	312,554	275,614	32,755
2008	219,187	192,598	18,454
2009	190,796	161,778	24,284
2010	188,351	154,871	26,978
2011	121,118	81,269	34,757
2012	155,443	125,411	30,031
2013	230,893	178,580	51,373
Average	**232,198**	**189,318**	**31,144**
Std. Dev.	**62,448**	**64,126**	**11,125**

Figure 52. CNMI estimated commercial landings from commercial receipt invoices for mahimahi, wahoo, and blue marlin



Interpretation: Mahimahi was on a downward trend from 2010 through 2012, however landings increased significantly in 2013 by 133%. This may be attributed to better weather conditions in 2013. It is noteworthy that the CNMI and Guam mahimahi catches have been fluctuating similarly since 1987, which may indicate a strong biological influence in local landing patterns.

Wahoo landings were relatively stable, although low, from 2005 through 2010. Wahoo landings in 2011 showed a significant increase in landings, from 2,887 pounds in 2010 to 9,606 pounds in 2011, a 230% increase. Fishermen have reported that they fished closer to land and near reefs to lower fuel cost which may be attributed to increase in wahoo landings. Wahoo landings in 2012 declined slightly by 10% and again in 2013 by 41%. Yearly fluctuations with wahoo landings are not unusual for the CNMI since fishermen mainly target skipjack tuna.

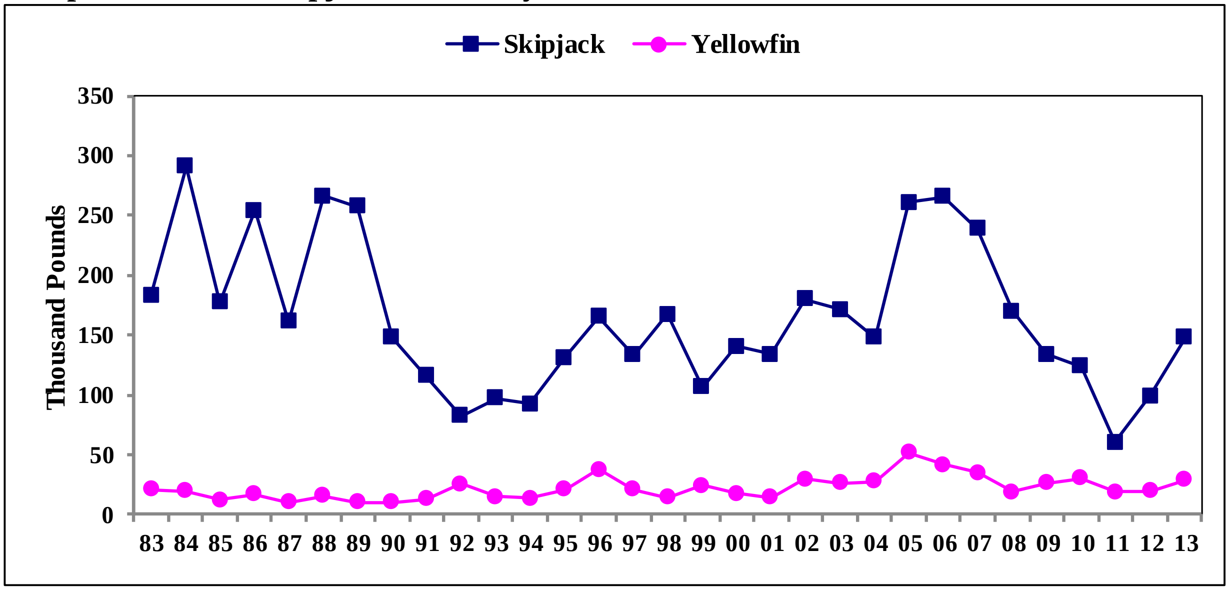
Blue marlin is rarely a target by the commercial fishermen except for charter boats and during fishing tournaments. If blue marlins are landed, they are often kept by the fishermen and therefore rarely ever recorded in the Commercial Purchase Data Base. From 2009 through 2011 landings were very low (<175 lbs), but in 2012 there was over 2,000 pounds of blue marlin recorded as being sold, a level not seen since 2008 and prior to that, in 2004. 1,782 lbs were sold in 2013, which is an 11% decrease from 2012.

Source and Calculations: The annual commercial landings of the three major PMUS species (mahimahi, wahoo and blue marlin) were summed directly from the Commercial Purchase Database.

Table 46. CNMI estimated commercial landings for mahimahi, wahoo, and blue marlin

Estimated Commercial Landings			
Year	**Mahimahi**	**Wahoo**	**Blue Marlin**
1983	13,939	8,760	3,787
1984	7,614	14,087	1,544
1985	12,955	18,251	1,860
1986	17,796	9,062	2,654
1987	9,502	13,404	2,460
1988	30,799	11,697	1,309
1989	7,320	1,571	5,704
1990	10,439	3,462	2,034
1991	33,756	1,521	1,568
1992	26,257	17,172	6,603
1993	37,545	2,779	3,687
1994	15,063	3,863	2,635
1995	23,321	5,722	6,619
1996	35,655	10,783	8,593
1997	31,277	7,580	7,068
1998	25,375	6,299	4,201
1999	12,882	8,063	3,541
2000	7,324	4,097	3,608
2001	14,229	4,550	1,924
2002	18,042	8,212	1,261
2003	7,357	7,950	1,130
2004	35,808	6,936	2,001
2005	26,891	3,349	1,595
2006	17,181	3,116	1,402
2007	26,410	2,504	76
2008	13,187	1,669	2,027
2009	20,030	3,500	82
2010	23,157	2,887	73
2011	21,821	9,606	175
2012	18,826	8,677	2,010
2013	43,852	5,113	1,782
Average	20,826	6,976	2,742
Std. Dev.	9,935	4,416	2,143

Figure 53. CNMI estimated commercial purchase database landings from commercial receipt invoices for skipjack tuna and yellowfin tuna



Interpretation: Skipjack tuna was on a steady decline from 2006 through 2011 as a result of the current downward trend of the CNMI economy and also lack of vendor participation in this voluntary program. Sea conditions were also not favorable in 2011. In 2012, skipjack landings recovered slightly by 64% and recovered more in 2013 by 49%. Fishermen reported better catch rates and better sea conditions in 2012, and even better sea conditions in 2013.

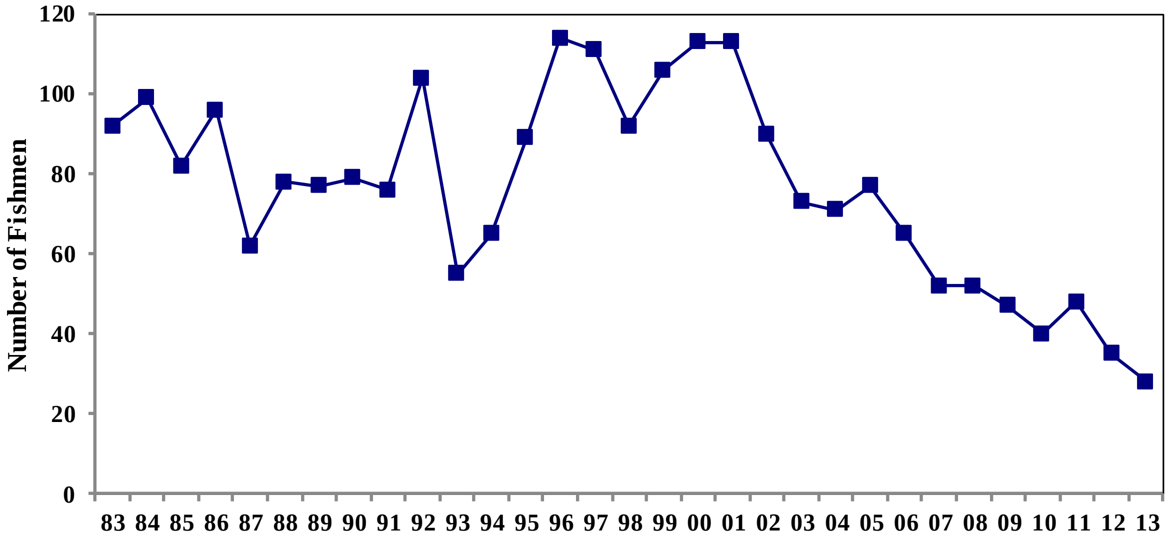
Although more highly prized than skipjack, yellowfin tuna are not as common, and therefore not landed as often. The average fish size tends to be smaller when compared with yellowfin tuna from other geographic areas. Landings decreased steadily from 2005 through 2008, recovered somewhat over 2009 and 2010, but then decreased by 37% in 2011, partially due to some vendors not participating in this voluntary program. Landings remained steady in 2012, increasing only 2%, and increased substantially by 48% in 2013. This increase is due to better participation by vendors in this data collection program as well as an increase in yellowfin tuna landings, as indicated in the creel survey program.

Source and Calculations: Landings were summed directly from the Commercial Purchase Database.

Table 47. CNMI estimated commercial purchase database landings for skipjack tuna and yellowfin tuna

Estimated Commercial Landings		
Year	**Skipjack**	**Yellowfin**
1983	183,411	21,281
1984	290,843	19,580
1985	177,344	12,466
1986	254,362	16,917
1987	161,504	10,454
1988	266,497	15,375
1989	257,703	10,109
1990	147,962	10,468
1991	115,802	13,042
1992	82,280	25,687
1993	97,268	14,898
1994	92,212	13,445
1995	131,377	20,918
1996	165,037	38,043
1997	133,446	21,352
1998	167,114	14,570
1999	106,297	24,419
2000	140,389	17,673
2001	133,769	14,543
2002	179,966	30,017
2003	171,574	26,042
2004	148,328	27,548
2005	260,614	52,014
2006	265,753	41,996
2007	238,972	34,894
2008	170,059	18,695
2009	133,794	26,463
2010	124,096	30,507
2011	60,431	19,059
2012	99,348	19,447
2013	147,896	28,878
Average	164,692	22,284
Std. Dev.	60,465	9,719

Figure 54. CNMI number of commercial vessels landing pelagic species from commercial receipt invoices



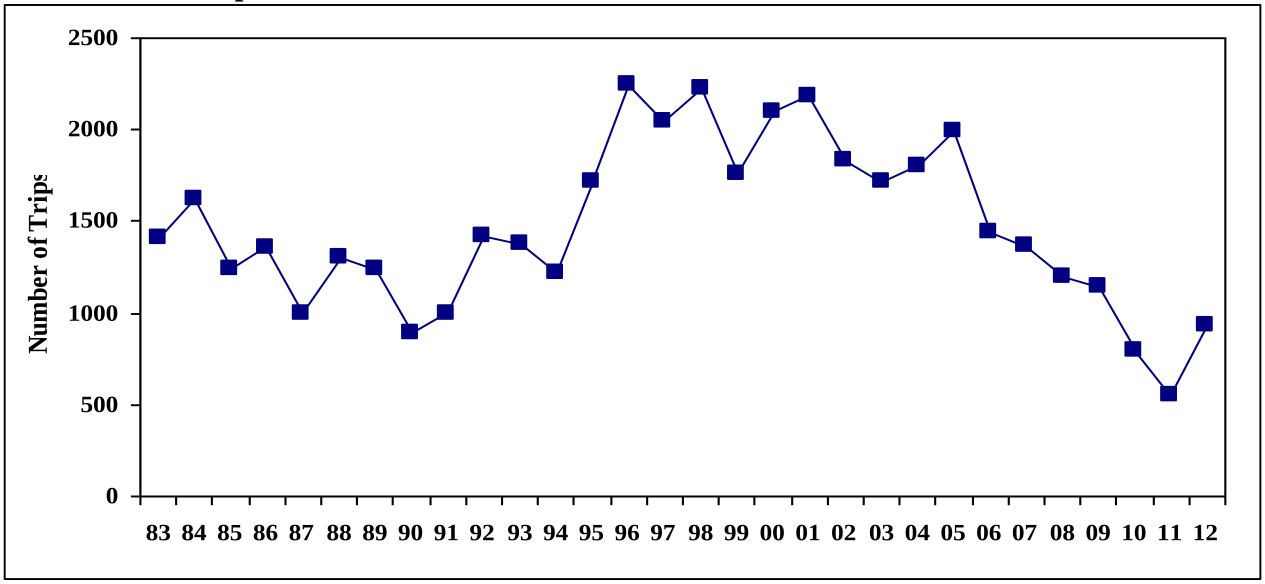
Interpretation: The number of fishers (vessels) making pelagic landings has been steadily decreasing from 2001 through 2013, despite a slight increase in 2011 of 17%. In 2012, the number of fishers declined 27% from 2011 and another 20% in 2013. There are several reasons for the decrease in the number of fishermen, and these vary based on the year. For example, bad weather plagued the Marianas in 2003 and early 2004, and gas prices increased until the last couple years. The decrease is also partly due to vendors who own multiple fishing boats entering all their landings on a single receipt and at times combining monthly total landings onto a single receipt. Other factors that may have influenced a drop in fishermen making pelagic landings are a decline in the average price per pound of skipjack tuna, and flatline trend in the CNMI economy. Lastly, several long-time fishermen have left the fishery.

Source and Calculations: Each invoice from the Commercial Purchase Database records the fisherman's name from whom the fish were purchased. The number of fishermen who sold any pelagic species was calculated directly from the data invoices.

Table 48. CNMI number of commercial vessels from commercial receipt invoices

Year	Number of Vessels
1983	92
1984	99
1985	82
1986	96
1987	62
1988	78
1989	77
1990	79
1991	76
1992	104
1993	55
1994	65
1995	89
1996	114
1997	111
1998	92
1999	106
2000	113
2001	113
2002	90
2003	73
2004	71
2005	77
2006	65
2007	52
2008	52
2009	47
2010	40
2011	48
2012	35
2013	28
Average	77
Std. Dev.	24

Figure 55. CNMI number of fishing trips commercially landing any pelagic species from commercial receipt invoices



Interpretation: Despite a slight upward trend in 2004 and 2005, the number of commercial trips to land pelagic species has declined from 2001 through 2011. However, in 2012 and 2013, the number of trips increased by 70% and 24%, respectively.

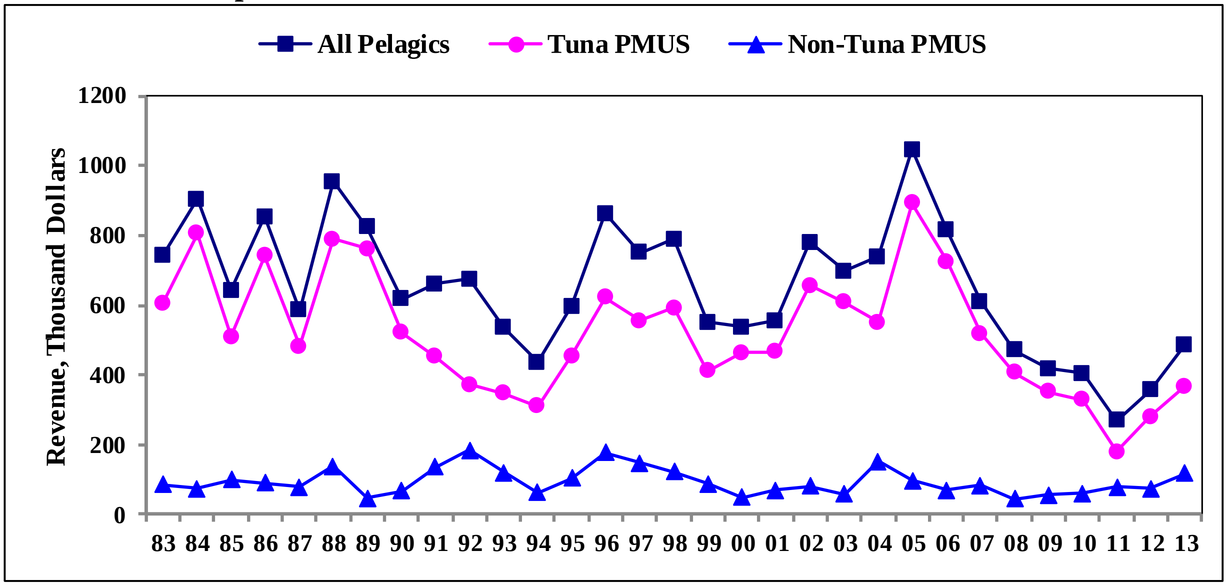
The decline in the number of trips from 2005 to 2009 was related to the lack of market demand for pelagics. Typhoons hit the Marianas region frequently, which may have contributed to some decline in fishing trips, as well as the increasing price of fuel cost ($3.58/gallon in 2006 compared to $4.33/gallon in 2007). The decline in 2010 and 2011 may be partly due to the lack of requirements of vendors and fishermen to participate in this commercial receipt invoice program. However, the CNMI Division of Fish and Wildlife (DFW) are currently trying to implement a legislative requirement to address this issue. In 2012, DFW began actively encouraging fish vendors to participate in this program. With this determined new effort to have better commercial receipt invoice data coverage, the number of fishing trips reported has increased. Although dealer reporting was made mandatory in 2012, no rules and regulations have yet been drafted.

Source and Calculations: The total trips for all pelagic species were summed from the Commercial Purchase Database. Trips were calculated based on the assumptions that no fisherman makes more than one trip per day, and that all sales from a single trip are made on a single day.

Table 49. CNMI Number of fishing trips commercially landing any pelagic species

Year	Number of Trips
1983	1,408
1984	1,621
1985	1,240
1986	1,356
1987	992
1988	1,298
1989	1,242
1990	888
1991	999
1992	1,419
1993	1,372
1994	1,218
1995	1,721
1996	2,249
1997	2,042
1998	2,223
1999	1,759
2000	2,095
2001	2,178
2002	1,835
2003	1,715
2004	1,801
2005	1,990
2006	1,436
2007	1,366
2008	1,192
2009	1,148
2010	791
2011	549
2012	896
2013	1,107
Average	1,456

Figure 56. CNMI annual adjusted commercial revenues from pelagic species obtained from commercial receipt invoices



Interpretation: The erratic fluctuations of the inflation-adjusted revenues for tunas and for all pelagics prior to 1990 is most likely due to the annual variations in skipjack tuna landings, which completely dominated the tuna category and the "All Pelagics" category. In 2003, the tuna inflation-adjusted revenue decreased 8% from the 2002 figures and continued to decline to 11% for 2004. This is due to the decrease in landings of skipjack tuna, which in 2004 comprised only of 67% of the total pelagic landings compared to 2003, where it comprised 87% of the total pelagic landings. The tuna inflation-adjusted revenue increased significantly by 38% in 2005, but steadily declined through 2011. According to vendors, these declines are due to the low demand for pelagic or troll species. This decrease in tuna adjusted revenues continued annually until 2012, when revenues increased 56%, and increased again in 2013 by 31%. This increase in revenue is due to an increase in landings and better data coverage in this program.

In 2003, a drop of 31% occurred for the non-tuna PMUS inflation-adjusted revenues, however 2004 revenue increased 158% compared to 2003 because mahimahi landings increased by 387%. The inflation adjusted revenue decreased from 2004 through 2008, but has been slowly increasing since 2009. The inflation adjusted revenue increased again in 2013 by 56%.

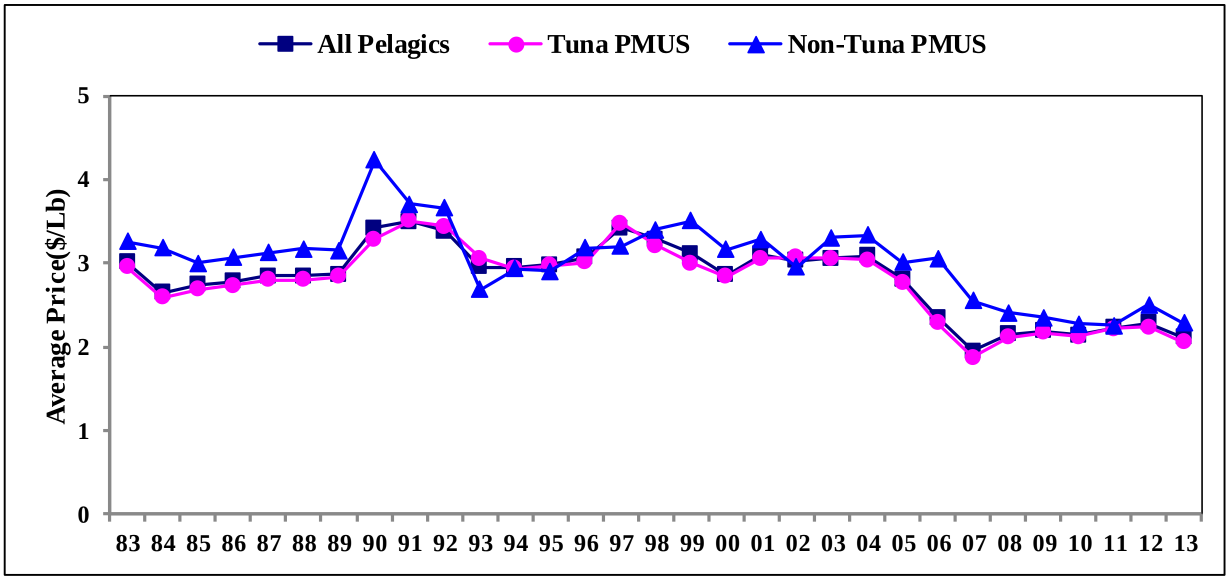
The 2010 inflation adjusted revenues for all pelagic declined slightly and declined further in 2011. The decline in 2010 is related to the decreasing price per pound for pelagics and decline in total landings that is reported on the commercial receipt invoice program. However, in 2012, the inflation adjusted revenue for all pelagics increased by 39% and another 37% in 2013.

Source and Calculations: Annual revenue in dollars was summed separately for all pelagic fish, tunas and non-tuna PMUS. Inflation-adjusted revenues were calculated using the Consumer Price Index, with 1998 as a base by which previous years' nominal prices are adjusted.

Table 50. CNMI annual adjusted commercial revenues from pelagic species

	All Pelagics		Tuna PMUS		Non-tuna PMUS	
Year	Unadjusted	Adjusted	Unadjusted	Adjusted	Unadjusted	Adjusted
1983	248,387	740,193	202,800	604,344	29,059	86,596
1984	330,254	904,896	294,077	805,771	27,044	74,101
1985	244,171	642,170	193,920	510,010	37,882	99,630
1986	333,766	854,441	289,681	741,583	35,488	90,849
1987	237,687	584,710	195,793	481,651	32,344	79,566
1988	409,075	953,145	338,348	788,351	59,701	139,103
1989	373,927	822,639	345,839	760,846	20,917	46,017
1990	293,993	617,385	248,144	521,102	32,102	67,414
1991	338,643	660,354	232,077	452,550	70,235	136,958
1992	374,977	674,959	206,950	372,510	102,133	183,839
1993	311,342	535,508	201,350	346,322	69,592	119,698
1994	259,470	435,910	185,381	311,440	37,818	63,534
1995	361,511	596,493	275,080	453,882	62,920	103,818
1996	539,628	863,405	388,691	621,906	110,939	177,502
1997	474,509	749,724	351,492	555,357	93,306	147,423
1998	496,652	789,677	372,142	591,706	77,011	122,447
1999	351,062	551,167	261,394	410,389	55,404	86,984
2000	350,468	536,216	302,473	462,784	32,186	49,245
2001	358,656	555,917	300,154	465,239	44,987	69,730
2002	506,302	779,705	425,961	655,980	53,468	82,341
2003	447,647	698,329	390,100	608,566	36,764	57,352
2004	476,543	738,642	356,110	551,971	98,417	152,546
2005	678,773	1,045,310	578,914	891,528	62,759	96,649
2006	554,373	814,928	492,762	724,360	48,026	70,598
2007	439,953	611,535	372,573	517,876	60,137	83,590
2008	359,427	470,849	310,855	407,220	33,954	44,480
2009	324,637	418,782	271,832	350,663	44,309	57,159
2010	339,846	404,417	276,286	328,780	51,525	61,315
2011	234,249	269,386	156,557	180,041	68,250	78,488
2012	311,921	355,590	246,037	280,482	65,884	75,108
2013	487,393	487,393	367,646	367,646	117,537	117,537
Average	**382,234**	**650,444**	**304,239**	**520,092**	**57,164**	**94,246**

Figure 57. CNMI average inflation-adjusted price for commercially landed pelagic species (dollars per pound)



Interpretation: The inflation-adjusted average price of all pelagics declined steadily from 2004 to 2007, but recovered some in 2008 by 10%. The price has remained stable from 2008 through 2013, fluctuating between $2.11 and $2.29. Over the last 6 years, the highest average adjusted price was in 2012 at $2.29, and the lowest adjusted price was 2013 at $2.11. The all pelagics adjusted price decreased 8% in 2013.

The inflation-adjusted average price of tuna declined steadily from 2002 through 2007, but recovered slightly in 2008 by 13%. It has fluctuated between $2.06 and $2.24 since, with a high of $2.24 in 2012 and low of $2.06 in 2013, which is an 8% decrease from 2012.

Decline in price per pound for skipjack tuna is a direct result from strong competition among fishermen. Fishermen land large amounts of skipjack tuna, flooding markets and consequently causing prices to drop as low as $.75 per pound. This saturation of the local markets directly affects both the inflation-adjusted average prices and the inflation-adjusted revenues.

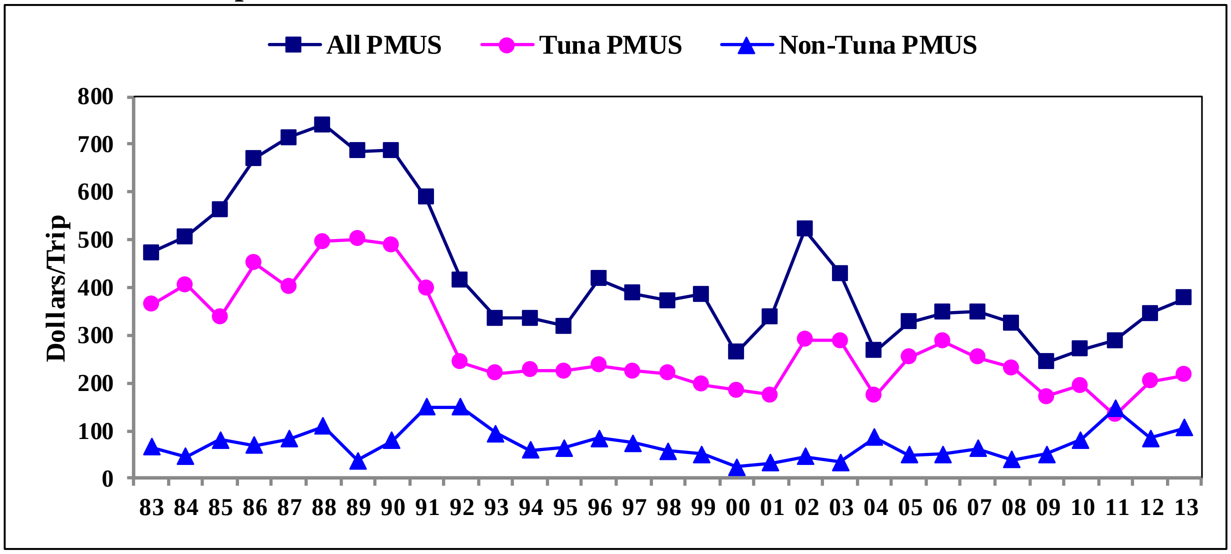
The average for the inflation-adjusted price of non-tuna PMUS has steadily decreased since 2005 through 2013. It was $2.29 in 2013, a decrease of 8% from a brief small spike in 2012 of $2.50.

Source and Calculations: The unadjusted average price is calculated by dividing the total revenues generated by the total weight sold. The inflation adjustment is made using the 1998 NMI Consumer Price Index (CPI) as the basis by which calculations of previous years' prices are made.

Table 51. CNMI average adjusted price for commercially landed pelagic species ($/lb)

	All Pelagics		Tuna PMUS		Non-Tuna PMUS	
Year	**Unadjusted**	**Adjusted**	**Unadjusted**	**Adjusted**	**Unadjusted**	**Adjusted**
1983	1.01	3.01	0.99	2.95	1.09	3.26
1984	0.97	2.65	0.95	2.60	1.16	3.19
1985	1.04	2.74	1.02	2.69	1.14	3.01
1986	1.09	2.78	1.07	2.73	1.20	3.07
1987	1.16	2.85	1.14	2.80	1.27	3.13
1988	1.22	2.85	1.20	2.80	1.36	3.18
1989	1.30	2.87	1.29	2.84	1.43	3.15
1990	1.63	3.42	1.57	3.29	2.01	4.23
1991	1.80	3.50	1.80	3.51	1.90	3.70
1992	1.88	3.39	1.91	3.44	2.04	3.67
1993	1.72	2.95	1.78	3.06	1.56	2.69
1994	1.76	2.96	1.75	2.94	1.75	2.93
1995	1.81	2.98	1.80	2.97	1.76	2.90
1996	1.92	3.07	1.88	3.02	1.99	3.19
1997	2.17	3.43	2.20	3.48	2.03	3.20
1998	2.07	3.29	2.02	3.21	2.14	3.40
1999	1.98	3.11	1.91	3.00	2.24	3.51
2000	1.87	2.86	1.86	2.84	2.07	3.17
2001	2.00	3.10	1.97	3.06	2.12	3.29
2002	1.97	3.03	1.99	3.07	1.92	2.95
2003	1.96	3.06	1.96	3.06	2.12	3.31
2004	1.99	3.09	1.96	3.04	2.15	3.34
2005	1.82	2.81	1.80	2.78	1.95	3.01
2006	1.60	2.35	1.56	2.29	2.08	3.06
2007	1.41	1.96	1.35	1.88	1.84	2.55
2008	1.64	2.15	1.61	2.11	1.84	2.41
2009	1.70	2.19	1.68	2.17	1.82	2.35
2010	1.80	2.15	1.78	2.12	1.91	2.27
2011	1.93	2.22	1.93	2.22	1.96	2.26
2012	2.01	2.29	1.96	2.24	2.19	2.50
2013	2.11	2.11	2.06	2.06	2.29	2.29
Average	**1.69**	**2.81**	**1.67**	**2.78**	**1.82**	**3.04**

Figure 58. CNMI per-trip adjusted revenues for commercially sold pelagic species from commercial receipt invoices



Interpretation: The inflation-adjusted revenue per trip for all species has been steadily increasing since its low is 2009; it increased 20% in 2012 and another 9% in 2013. Although fishermen earned the same price pound in 2012 and 2011 for skipjack tuna, the average price for other non-tuna species increased. 2012 tuna PMUS inflation-adjusted revenue increased significantly by 52% and increased again in 2013 by 6%. In 2012, non-tuna PMUS per trip adjusted revenue declined 43%, but recovered some in 2013 with a 26% increase.

Source and Calculations: Values were obtained by selecting, from the Commercial Purchase Database, all trips which landed at least one PMUS, and then calculating a) the average revenue of all species combined, b) the average revenue of non-tuna PMUS only, and c) the average revenue of tuna only.

Table 52. CNMI per-trip adjusted revenues for commercially sold pelagic species

	All Pelagics		Tuna PMUS		Non-Tuna PMUS	
Year	**Unadjusted**	**Adjusted**	**Unadjusted**	**Adjusted**	**Unadjusted**	**Adjusted**
1983	159.00	473.82	122.00	363.56	22.00	65.56
1984	185.00	506.90	148.00	405.52	17.00	46.58
1985	214.00	562.82	128.00	336.64	31.00	81.53
1986	262.00	670.72	176.00	450.56	27.00	69.12
1987	290.00	713.40	163.00	400.98	34.00	83.64
1988	318.00	740.94	213.00	496.29	47.00	109.51
1989	312.00	686.40	228.00	501.60	17.00	37.40
1990	327.00	686.70	233.00	489.30	38.00	79.80
1991	302.00	588.90	204.00	397.80	77.00	150.15
1992	231.00	415.80	135.00	243.00	83.00	149.40
1993	195.00	335.40	128.00	220.16	55.00	94.60
1994	200.00	336.00	135.00	226.80	35.00	58.80
1995	193.00	318.45	136.00	224.40	39.00	64.35
1996	261.00	417.60	148.00	236.80	53.00	84.80
1997	245.00	387.10	143.00	225.94	47.00	74.26
1998	234.00	372.06	138.00	219.42	36.00	57.24
1999	246.00	386.22	125.00	196.25	33.00	51.81
2000	172.00	263.16	121.00	185.13	16.00	24.48
2001	219.00	339.45	113.00	175.15	21.00	32.55
2002	339.00	522.06	189.00	291.06	30.00	46.20
2003	275.00	429.00	185.00	288.60	22.00	34.32
2004	172.00	266.60	112.00	173.60	56.00	86.80
2005	213.00	328.02	165.00	254.10	32.00	49.28
2006	236.00	346.92	195.00	286.65	35.00	51.45
2007	251.00	348.89	182.00	252.98	45.00	62.55
2008	248.00	324.88	177.00	231.87	30.00	39.30
2009	189.00	243.81	133.00	171.57	39.00	50.31
2010	227.00	270.13	164.00	195.16	68.00	80.92
2011	251.00	288.65	116.00	133.40	127.00	146.05
2012	304.00	346.56	178.00	202.92	74.00	84.36
2013	377.00	377.00	216.00	216.00	106.00	106.00
Average	**246.68**	**428.85**	**159.65**	**280.43**	**44.90**	**72.68**

Table 53. CNMI non-charter and charter trolling bycatch summary based on interview catch data, 2000-2013

		Number Caught					Trips		
	Species	**Released**	**Dead/Inj**	**Both**	**All**	**BC%**	**With BC**	**All**	**BC%**
Non-Charter							3	2,114	0.14
	Mahimahi	4		4	3,450	0.12			
	Yellowfin Tuna		1	1	2,533	0.04			
	Skipjack Tuna	1		1	46,345				
	Total			6	52,328	0.01			
	Compared with all species			6	55,676	0.01			
Charter							0	207	0.00
	Compared with all species						0	1,081	0.00

Interpretation: With the assistance of NMFS staff, the implementation of an Offshore Day Time Creel Survey program began in April 2000. One of the main purposes of re-implementing the Offshore Creel Survey was to address the issue of bycatch. This bycatch summary data is not expanded.

A summary report from the year 2000 to 2013 by both non-charter and charter boats indicates less than 1%, or 6 out of 55,676, of the total pelagic species landed is released. Only three species were reported as bycatch: mahimahi, yellowfin tuna and skipjack tuna. Four out of 3,450 (0.12%) mahimahi landed were released. One out of 2,533 (0.04%) yellowfin tuna landed was released. Only 1 of 46,345 skipjack tuna recorded as released. Charter boats reported no bycatch.

Bycatch in the CNMI has been believed in the past not to exist because fishermen retain most of their catch, which is further supported by the results of the Offshore (Boat Based) Creel Survey. The CNMI will continue sampling in order to monitor this issue however it is a common practice by fishermen to keep all species caught regardless of size, species or condition.

Source: Offshore (Boat Based) Creel Survey Expansion Program.

C. Guam

Introduction

Pelagic fishing vessels based in Guam are classified into two general groups: 1) distant-water purse seiners and longliners that fish outside Guam's economic exclusive zone (EEZ) and transship through the island and, 2) small recreational trolling boats that fish only within local waters, either within Guam's EEZ, or occasionally, in Commonwealth of the Northern Mariana Islands (CNMI) waters. Primarily, this module covers the Guam-based small-boat pelagic fishery.

The estimated annual pelagic landings have varied widely, ranging between 322,000 and 937,000 pounds over the 32-year time series. The trend for average total catch has been slowly increasing. The 2012 total pelagic landings were approximately 488,432 pounds, an increase of 61% over 2012. Landings consisted primarily of five major species: mahimahi (*Coryphaena hippurus*), wahoo (*Acanthocybium solandri*), bonita or skipjack tuna (*Katsuwonus pelamis*), yellowfin tuna (*Thunnus albacares*), and Pacific blue marlin (*Makaira mazara*). Other minor species caught include kawakawa, sailfish, and oceanic sharks. However, sailfish and sharks were not encountered during offshore creel surveys and thus not available for expansion for this year's report. While sailfish are kept, sharks are often discarded as bycatch.

The number of boats involved in Guam's pelagic or open ocean fishery gradually increased from 193 in 1983. The number of vessels decreased until 2001, but has generally been increasing since that year. There were 496 boats involved in Guam's pelagic fishery in 2013, an increase of 29.8% from 2012. A majority of the fishing boats are less than 10 meters (33 feet) in length and are usually owner-operated by fishermen who earn a living outside of fishing. Most fishermen sell a portion of their catch at one time or another and it is difficult to make a distinction between recreational, subsistence, and commercial fishers. A small, but significant, segment of the pelagic group is made up of marina-berthed charter boats that are operated primarily by full-time captains and crews. Data and graphs for non-charters, charters, and bycatch are represented in this report.

There are general wide year-to-year fluctuations in the estimated landings of the five major pelagic species. Catch amounts for the five common species increased from 2012 levels. From 2012, 2013 mahimahi catch increased about 92%, wahoo catch increased 14%, skipjack (bonita) catch increased by 60%, Pacific blue marlin catch increased 21%, and yellowfin tuna catch increased 81%.

Aggregate landings of all pelagics, tuna, and non-tuna Pelagic Management Unit Species (PMUS) increased in 2013 from 2012 levels. Landings of all pelagics increased 61%, with tuna PMUS increasing 20% and non-tuna PMUS increasing 58%. The number of trolling boats increased by 30% to the highest number in 31 years. The number of trolling trips increased by 29% and hours spent trolling increased by 32%. Trolling catch rates (pounds per hour (CPUE)) increased from 2012. Total CPUE increased 25% with mahimahi showing the greatest increase. Yellowfin and bonita CPUE also increased, while wahoo decreased and marlin remained unchanged. Weather did not seem to affect fishing activity as much in 2013 as in previous years.

There were 68 high surf advisories in 2013, an increase from 61 in 2012. Only 49 of these involved the west side of Guam, where the majority of pelagic fishing occurs, and nearly all of the west side warnings occurred during September-October, after much of the fishing season has passed.

Commercial landing data for 2013 increased from 2012 levels. Commercial landings and revenues increased in 2013, with total adjusted revenues increasing 32%. The adjusted revenue per trolling trip increased 23% for all pelagic species, decreased 27% for tuna PMUS, and increased 35% for non-tuna PMUS. Commercial landings have shown a decreasing trend over the past ten years. A majority of troll fishermen do not rely on the catch or selling of fish as their primary source of income. Previously, Guam law required the government of Guam to provide locally caught fish to food services in government agencies, such as Department of Education and Department of Corrections. In 2002, the government of Guam began implementing cost-saving measures, including privatization of food services. The requirement that locally-caught fish be used for food services, while still a part of private contracts, is not being enforced. This has allowed private contractors to import cheaper foreign fish, and reduced the sales of vendors selling locally caught fish. This represented a substantial portion of sales of locally caught pelagic fish. The decrease in commercial sales seen following 2002 may be, in part, due to this change.

In early 2010, the U.S. military began exercises in an area south and southeast of Guam designated W-517. W-517 is a special use airspace (SUA) (approximately 14,000 nm^2) that overlays deep open ocean approximately 50 miles south-southwest of Guam. Exercises in W-517 generally involve live fire and/or pyrotechnics. When W-517 is in use, a notice to mariners (NTM) is issued, and vessels attempting to use the area are advised to be cautious of objects in the water and other small vessels. This discourages access to virtually all banks south of Guam, including Galvez, Santa Rosa, White Tuna, and other popular fishing areas. From 1982-2009, DAWR surveys recorded more than 2020 trolling and bottom fishing trips to these southern banks, an average of more than 72 trips per year. During 2012, 32 NTM comprising a total of 72 days (19.7% of all days) were issued for area W-517. The number of closure days in 2013 was unavailable, but certainly impacted the number of fishing days south of Guam.

The shortage of staff biologists has been significant in the past several years. DAWR staff biologists continue to oversee several projects simultaneously, while providing on-going training to ensure the high quality of data being collected by all staff. All fisheries staff are trained to identify the most commonly caught fish to the species level. New staff are mentored by biologists and senior technicians in the field before conducting creel surveys on their own.

The makeshift ramp at Ylig Bay was eliminated in 2010 due to widening of the main road on the south east coast of Guam. In December 2006, a new launch ramp and facility was opened in Acfayan Bay, located in the village on Inarajan on the southeast coast of Guam. Monitoring of this ramp for pelagic fishing activity began at the start of 2007. In early 2007, this facility was damaged by heavy surf and has yet to be repaired. Monitoring of this ramp is currently on hold until the ramp is repaired. The current financial situation for the Guam government makes it unlikely this ramp will be repaired in the near future. With the loss of the Ylig ramp and the destruction of the ramp in Acfayan Bay, there are no boat launching facilities on the east side of Guam.

No FADs were deployed in 2013. Issues with procurement delayed awarding of a FAD deployment contract. DAWR has ordered 3 more systems, and is awaiting the awarding of a deployment contract. If these three systems are deployed, there should be 10 FADs on station (of the 14 considered a full complement).

Plan Team Recommendations

1. There were no recommendations from the 2013 Plan Team meeting for Guam.

Table 54. Guam 2013 creel survey - pelagic species composition

	Total Landing (Lbs)	Non-Charter	Charter
Tuna PMUS			
Skipjack Tuna	501,005	493,838	7,167
Yellowfin Tuna	52,745	52,745	0
Kawakawa	420	420	0
Albacore	0	0	0
Bigeye Tuna	0	0	0
Other Tuna PMUS	0	0	0
Tuna PMUS Total	**554,170**	**547,003**	**7,167**
Non-Tuna PMUS			
Mahimahi	165,034	133,418	31,616
Wahoo	51,252	48,479	2,773
Blue Marlin	16,175	8,625	7,550
Black Marlin	0	0	0
Striped Marlin	0	0	0
Sailfish	1,304	1,304	0
Shortbill Spearfish	0	0	0
Swordfish	0	0	0
Oceanic Sharks	496	496	0
Pomfrets	0	0	0
Oilfish	0	0	0
Moonfish	0	0	0
Misc. Longline Fish	0	0	0
Non-Tuna PMUS Total	**234,261**	**192,322**	**41,939**
Non-PMUS Pelagics			
Misc. Troll Fish	0	0	0
Non-PMUS Pelagics Total	**0**	**0**	**0**
Total Pelagics	**788,431**	**739,325**	**49,106**

Source: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel survey data. This table includes several species of barracuda and the double-lined mackerel, species that may not be included in other tables in this report. Pelagic totals may slightly differ in those tables.

Table 55. Guam 2013 average commercial price of pelagic species

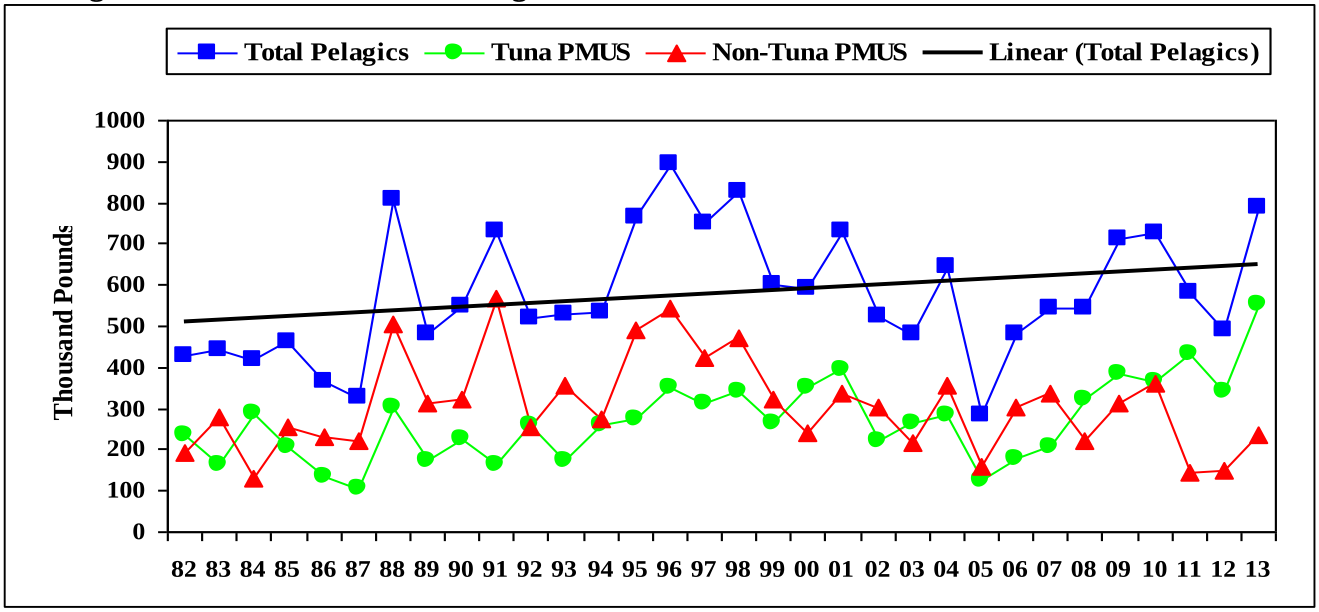
	Average Price ($/Lb)
Tuna PMUS	
Bonita/skipjack Tuna	2.10
Yellowfin Tuna	2.27
Tuna PMUS Average	**2.18**
Non-Tuna PMUS	
Mahi / Dolphinfish	2.41
Wahoo	2.45
Marlin	1.72
Sailfish	1.84
Spearfish	1.35
Monchong	1.46
Non-Tuna PMUS Average	**2.04**
Pelagics Average	**2.08**

Source: The WPacFIN-sponsored commercial landings system.

Table 56. Annual consumer price indices (CPI) and CPI adjustment factors

Year	CPI	CPI Adjustment factor
1980	134.0	6.11
1981	161.4	5.07
1982	169.7	4.82
1983	175.6	4.66
1984	190.9	4.29
1985	198.3	4.13
1986	203.7	4.02
1987	212.7	3.85
1988	223.8	3.66
1989	248.2	3.30
1990	283.5	2.89
1991	312.5	2.62
1992	344.2	2.38
1993	372.9	2.19
1994	436.0	1.88
1995	459.2	1.78
1996	482.0	1.70
1997	491.3	1.67
1998	488.2	1.68
1999	497.2	1.65
2000	507.1	1.61
2001	500.0	1.64
2002	503.2	1.63
2003	517.0	1.58
2004	548.5	1.49
2005	590.5	1.39
2006	658.9	1.24
2007	703.5	1.16
2008	733.7	1.12
2009	749.2	1.09
2010	768.5	1.06
2011	793.5	1.03
2012	818.1	1.00
2013	818.0	1.00

Figure 59. Guam annual estimated total landings: all pelagics landings, tuna PMUS landings, and non-tuna PMUS landings



Interpretation: The estimated pelagic landings have been cyclic with alternating high and low multi-year periods and annual variation within those smaller time periods. Total pelagic catch peaked in 1996 and reached an historic low in 2005. Landings rose in 2009 and 2010, but returned to 2006-2008 levels for 2011 and 2012. However, in 2013, landings increased 61%. Factors relating to this cycle may be associated with the biology of the fish or be weather related. There is also evidence from the fishermen and historic creel survey data that some pelagic fish species are not caught consistently year round around Guam.

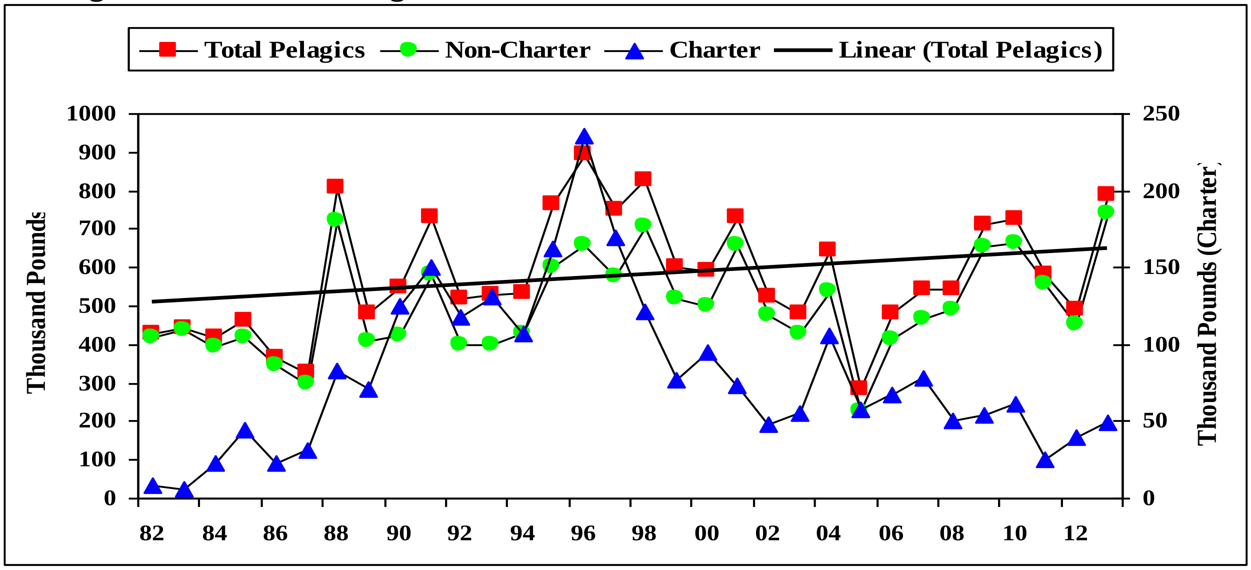
Tuna PMUS increased by 62% in 2013 and non-tuna PMUS increased 58%. Non-tuna PMUS catch was well below the 32 year average, while the tuna PMUS catch was more than double the 32 year average and the highest on record. Total catch was also above the 32 year average. Generally, skipjack tuna are consistently caught year round, with the other major pelagic species being more seasonal. A small fleet of vessels targets skipjack tuna that fish almost every day, contributing to the high levels of tuna catch.

Source and Calculation: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel survey. A 365-day (366 days during leap years) quarterly expansion is run for each calendar year of survey data to produce catch and effort estimates for the pelagic fishery to avoid over-estimating seasonal pelagic species. Percent species composition is calculated by weight for the sampled catch for each method to produce catch estimates for each species for the expanded period. The annual catch for all pelagic species and the PMUS separately are summed across all methods to obtain the numbers plotted above.

Table 57. Guam estimated total pelagics landings: all pelagics landings, tuna PMUS landings, and non-tuna PMUS landings, 1982-2013

Year	All Pelagics	Tuna PMUS	Non-Tuna PUMS
1982	428,577	235,931	192,025
1983	442,274	165,095	277,179
1984	417,394	287,367	130,027
1985	459,992	207,216	252,707
1986	366,777	134,307	230,814
1987	327,594	105,073	222,521
1988	806,192	303,389	502,803
1989	481,449	170,693	310,755
1990	548,898	227,257	321,641
1991	730,622	164,381	566,242
1992	516,897	261,424	255,473
1993	529,117	171,329	357,789
1994	534,036	260,869	273,167
1995	763,800	274,043	489,757
1996	893,498	352,181	541,317
1997	748,406	313,235	420,967
1998	827,511	342,906	469,897
1999	599,042	263,880	320,529
2000	592,229	349,119	242,558
2001	730,051	393,479	336,571
2002	524,461	221,950	302,510
2003	482,804	265,364	217,440
2004	642,257	285,090	357,168
2005	285,192	125,263	159,929
2006	481,522	178,224	303,297
2007	542,888	208,289	334,599
2008	542,856	319,721	223,135
2009	710,103	384,186	311,891
2010	724,490	365,387	359,104
2011	581,462	435,058	146,405
2012	490,790	342,748	148,042
2013	788,432	554,171	234,261
Average	**579,425**	**270,895**	**306,641**
Std. Dev.	**151,535**	**97,626**	**112,582**

Figure 60. Guam annual estimated total landings: total pelagics landings, non-charter landings, and charter landings



Interpretation: Non-charter trolling trips have always accounted for the bulk of the pelagic catch, although charter boats, which make up less than 5% of the troll fleet, account for a high proportion of trolling effort and catch. Prior to 1988, non-charter boats accounted for over 90% of the troll catch. In 1988, this percentage decreased due to an increase in charter boat activity catering specifically to Asian visitors. Beginning in 1996 however, a downturn in Japan's economy caused a significant decrease in charter trips and subsequent landings; no such trend is observed for non-charters.

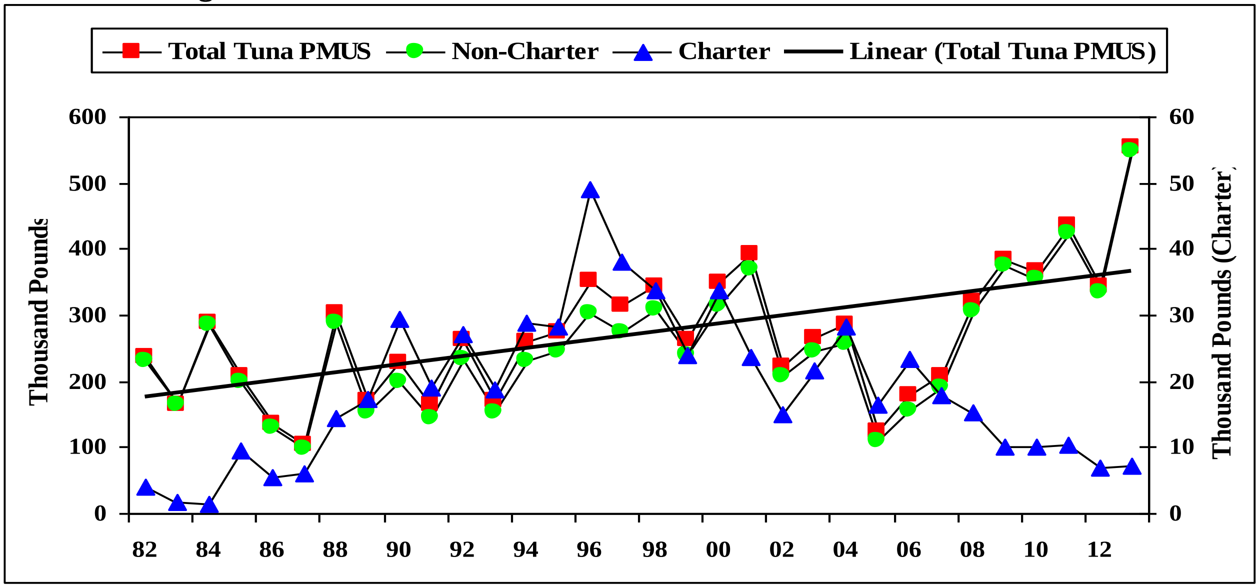
Total pelagics and non-charter landings steadily increased from 2005 through 2010, but decreased in 2011 and 2012. In 2013, total pelagics and non-charter landings increased 61 and 64%, respectively. Charter landings appear to be increasing since 2011, with a 62% increase in 2013. Non-charter boats landed 94% of all pelagics in 2013.

Source and Calculations: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel survey data. A 365-day (366 days during leap years) quarterly expansion is run for each calendar year of survey data to produce catch and effort estimates for trolling. Percent species composition is calculated by weight for the sampled catch for each method to produce catch estimates for each species for the expanded period. The annual catch for all pelagic species and the PMUS separately are summed across all methods to obtain the numbers plotted above.

Table 58. Guam annual boat-based creel estimated landings: total pelagics, non-charter landings, and charter landings, 1982-2013

Year	Total Pelagics	Non-Charter	Charter
1982	428,577	419,799	8,778
1983	442,274	436,636	5,638
1984	417,394	394,782	22,612
1985	459,992	415,874	44,118
1986	366,777	344,465	22,312
1987	327,594	296,852	30,742
1988	806,192	722,706	83,486
1989	481,449	410,957	70,492
1990	548,898	424,089	124,809
1991	730,622	580,112	150,510
1992	516,897	399,406	117,491
1993	529,117	397,724	131,393
1994	534,036	427,067	106,969
1995	763,800	601,169	162,631
1996	893,498	658,087	235,411
1997	748,406	578,872	169,535
1998	827,511	706,266	121,244
1999	599,042	521,543	77,500
2000	592,229	497,869	94,361
2001	730,051	656,771	73,280
2002	524,461	476,797	47,664
2003	482,804	427,538	55,266
2004	642,257	536,746	105,512
2005	285,192	227,242	57,950
2006	481,522	414,745	66,777
2007	542,888	465,079	77,809
2008	542,856	492,238	50,618
2009	710,103	656,085	54,019
2010	724,490	663,592	60,898
2011	581,462	556,199	25,264
2012	490,790	450,823	39,967
2013	788,432	739,326	49,107
Average	**579,425**	**499,920**	**79,505**
Std. Dev.	**151,535**	**125,345**	**51,287**

Figure 61. Guam annual tuna PMUS landings: total landings, non-charter landings, and charter landings



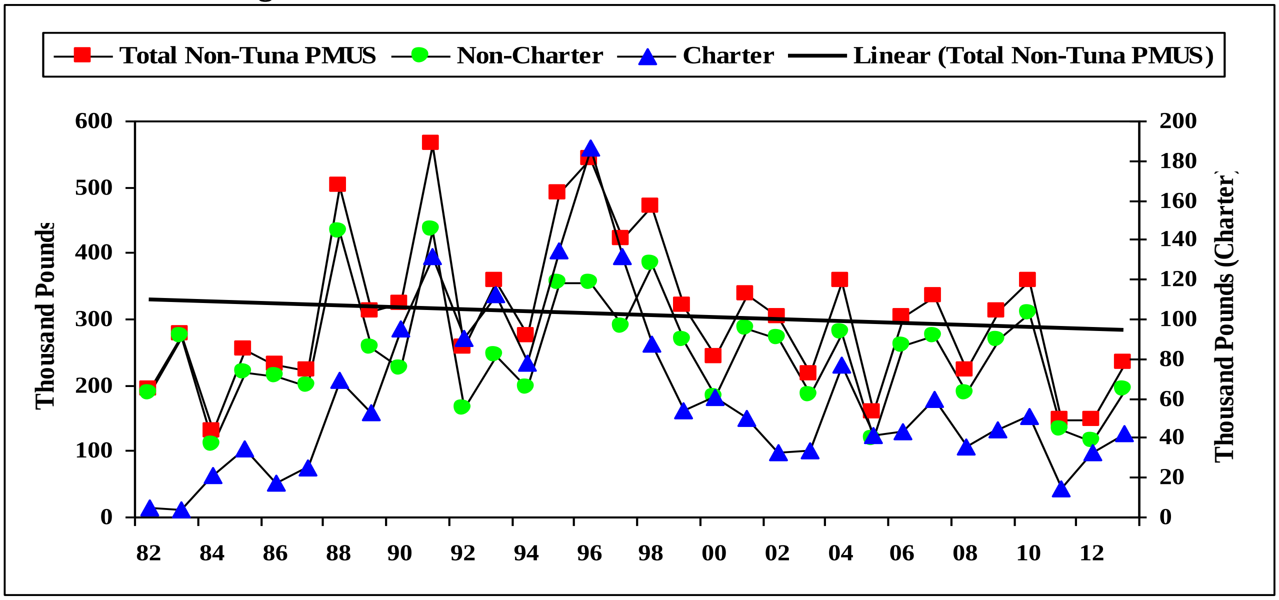
Interpretation: The general trend of the estimated total tuna landings is increasing. Non-charter boats account for the bulk of the total tuna catch. In 2012, 93% of tuna were caught by non-charter boats. In 2013, 99% of tuna were caught by non-charter boats. In 2013, total, non-charter, and charter tuna landings increased by 62%, 63%, and 3% respectively. The 2013 estimated tuna PMUS landings were the highest in the 32 year time series, and 105% higher than the 32 year average.

Source and Calculations: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program, expanded with the assistance of NMFS. A 365-day (366 days during leap years) quarterly expansion is run for each calendar year of survey data to produce catch and effort estimates for trolling. Percent species composition is calculated by weight for the sampled catch for each method to produce catch estimates for each species for the expanded period. The annual catch for all pelagic species and the PMUS separately are summed across all methods to obtain the numbers plotted above.

Table 59. Guam annual boat-based creel estimated tuna landings: total landings, non-charter landings, and charter landings, 1982-2013

Year	Total Tunas	Non-Charter	Charter
1982	235,931	231,941	3,990
1983	165,095	163,435	1,660
1984	287,367	285,811	1,556
1985	207,216	197,777	9,439
1986	134,307	128,913	5,394
1987	105,073	98,873	6,199
1988	303,389	288,933	14,456
1989	170,693	153,449	17,245
1990	227,257	197,825	29,431
1991	164,381	145,280	19,100
1992	261,424	234,307	27,117
1993	171,329	152,583	18,745
1994	260,869	231,933	28,937
1995	274,043	245,833	28,210
1996	352,181	303,265	48,916
1997	313,235	275,072	38,163
1998	342,906	309,277	33,628
1999	263,880	239,797	24,083
2000	349,119	315,452	33,666
2001	393,479	369,955	23,524
2002	221,950	207,070	14,880
2003	265,364	243,871	21,493
2004	285,090	256,875	28,215
2005	125,263	108,813	16,450
2006	178,224	154,766	23,459
2007	208,289	190,404	17,885
2008	319,721	304,551	15,170
2009	384,186	374,014	10,172
2010	365,387	355,184	10,203
2011	435,058	424,580	10,478
2012	342,748	335,822	6,926
2013	554,171	547,004	7,167
Average	**270,895**	**252,271**	**18,624**
Std. Dev.	**97,626**	**96,742**	**11,250**

Figure 62. Guam estimated non-tuna PMUS landings: total landings, non-charter landings, and charter landings



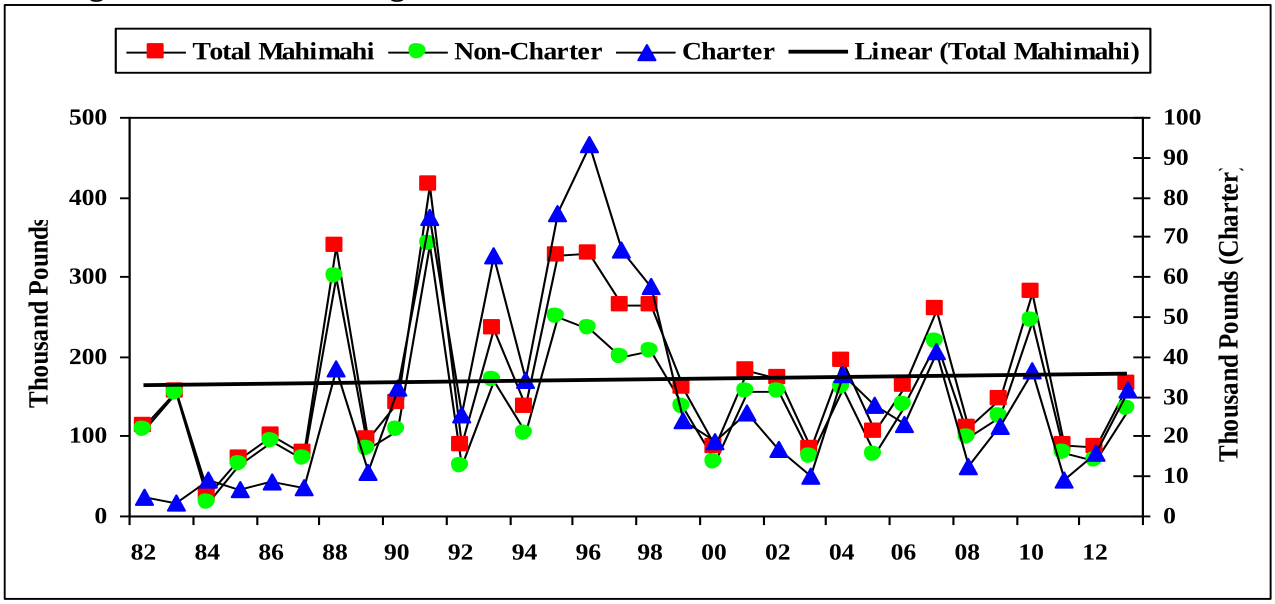
Interpretation: The estimated total non-tuna PMUS landings showed a general increase between 1984 and 1996, corresponding with an increase in boats entering the fishery. However, the non-tuna PMUS landings have been experiencing a general decline over the last 30 years. Non-charter trolling trips accounts for the bulk of the non-tuna PMUS catch. In 2013, total non-tuna PMUS increased 58%, non-charter non-tuna PMUS increased 67%, and charter non-tuna PMUS increased 27%. The increased landings may be due to the biology of non-tuna PMUS species, primarily mahimahi. Non-charter boats accounted for 82% of non-tuna PMUS landings in 2013.

Source and Calculation: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program, expanded with the assistance of NMFS. A 365-day (366 days during leap years) expansion is run for each calendar year of survey data to produce catch and effort estimates for each fishing method surveyed. Percent species composition is calculated by weight for the sampled catch for each method to produce catch estimates for each species for the expanded period. The annual catch for all pelagic species and the PMUS separately are summed across all methods to obtain the numbers plotted above.

Table 60. Guam annual boat-based creel estimated non-tuna PMUS landings: total, non-charter vessels, and charter vessels (pounds), 1982-2013

Year	Total Non-Tuna PMUS	Non-Charter	Charter
1982	192,025	187,236	4,788
1983	277,179	273,201	3,978
1984	130,027	108,971	21,056
1985	252,707	218,028	34,678
1986	230,814	213,897	16,917
1987	222,521	197,979	24,542
1988	502,803	433,773	69,030
1989	310,755	257,508	53,247
1990	321,641	226,264	95,378
1991	566,242	434,832	131,410
1992	255,473	165,099	90,374
1993	357,789	245,141	112,648
1994	273,167	195,134	78,032
1995	489,757	355,337	134,421
1996	541,317	354,822	186,495
1997	420,967	289,596	131,371
1998	469,897	382,281	87,616
1999	320,529	267,112	53,417
2000	242,558	181,863	60,695
2001	336,571	286,816	69,756
2002	302,510	269,726	32,784
2003	271,440	183,667	33,773
2004	357,168	279,871	77,297
2005	159,929	118,429	41,500
2006	303,297	259,979	43,318
2007	334,599	274,675	59,924
2008	223,135	187,687	35,449
2009	311,891	268,044	43,847
2010	359,104	308,409	50,695
2011	146,405	131,619	14,786
2012	148,042	115,001	33,041
2013	234,261	192,322	41,939
Average	**306,641**	**245,760**	**60,881**
Std. Dev.	**112,582**	**83,282**	**41,785**

Figure 63. Guam annual estimated mahimahi landings: total landings, non-charter landings, and charter landings



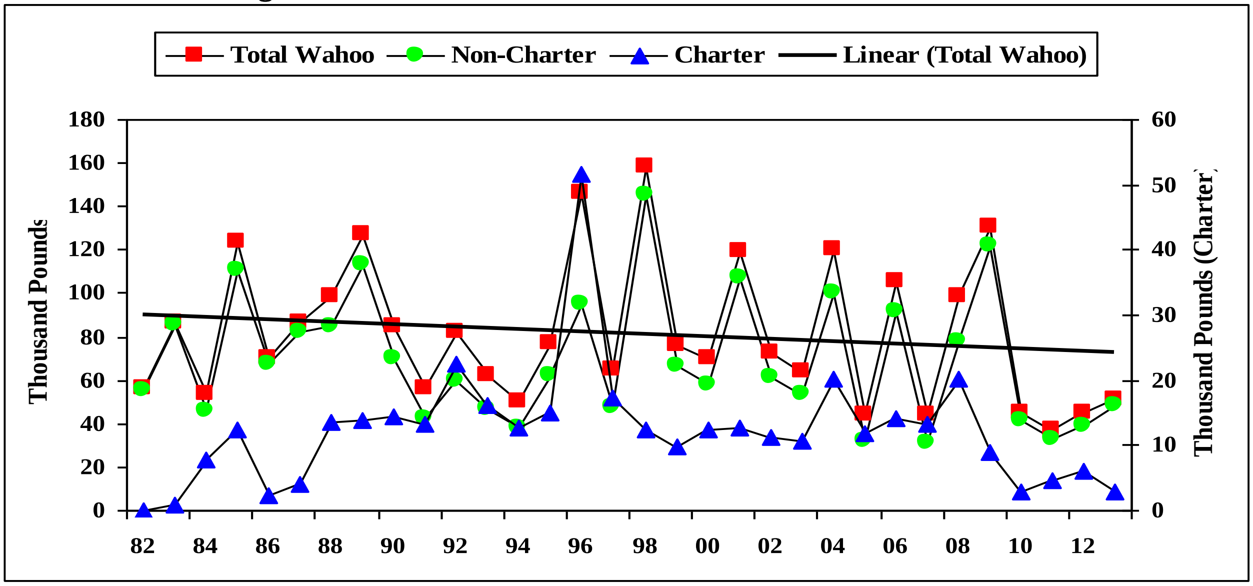
Interpretation: Historically, mahimahi catches have fluctuated wildly, with a good year followed by one or two down years. Catch peaked in 1996, and has been lower since, although still demonstrating the cyclical nature. Non-charter trips account for the bulk of the mahimahi catch, with charter activity harvesting proportionally more beginning in the late 1980s as tourist arrivals to Guam increased. A drop in charter catch corresponds to decreasing tourist arrivals in the late 1990s. In 2013, total mahimahi landings increased 92%, non-charter mahimahi landings increased 91%, and charter mahimahi landings increased 97%. All three categories are near the 32 year average.

Source and Calculations: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program and its associated computerized data expansion system files, expanded with the assistance of NMFS. Totals by species are summed across all fishing methods as described in Figure 59 through Figure 62.

Table 61. Guam annual estimated mahimahi landings: total, non-charter landings, and charter landings (pounds), 1982-2013

Year	Total Mahimahi	Non-Charter	Charter
1982	112,259	107,558	4,701
1983	156,340	153,158	3,183
1984	26,174	17,228	8,946
1985	72,361	65,442	6,919
1986	101,108	92,620	8,488
1987	79,480	72,200	7,280
1988	337,769	300,520	37,249
1989	96,043	84,791	11,253
1990	140,629	108,368	32,259
1991	415,944	341,139	74,805
1992	87,944	62,276	25,668
1993	234,979	169,663	65,317
1994	138,014	103,648	34,367
1995	326,979	250,910	76,069
1996	328,315	235,144	93,170
1997	265,157	198,344	66,813
1998	264,382	206,592	57,790
1999	161,936	137,811	24,126
2000	85,561	66,575	18,986
2001	183,278	157,293	25,986
2002	173,133	156,175	16,958
2003	84,739	74,766	9,973
2004	195,719	160,327	35,392
2005	105,715	77,931	27,784
2006	162,512	139,365	23,147
2007	259,828	218,521	41,307
2008	111,540	99,060	12,480
2009	147,122	124,533	22,588
2010	280,963	244,374	36,589
2011	88,915	79,669	9,246
2012	86,019	69,938	16,081
2013	165,034	133,418	31,616
Average	**171,122**	**140,917**	**30,204**
Std. Dev.	**93,329**	**74,671**	**23,210**

Figure 64. Guam annual estimated wahoo landings: total landings, non-charter landings, and charter landings



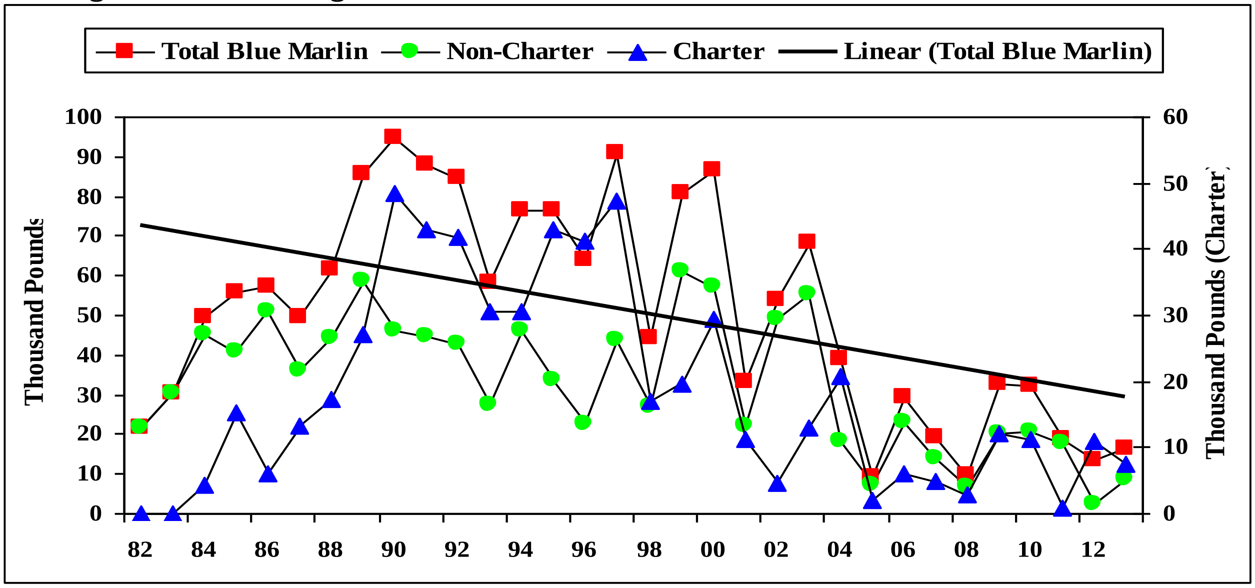
Interpretation: The wide fluctuations in wahoo landings are probably due to the high variability in the year-to-year abundance and availability of the stocks. Until 1987, non-charter landings accounted for over 95% of the total catch. In 1988, this percentage decreased due to an increase in charter boat activity. In 1996, wahoo charter landings peaked, accounting for 35% of the total catch. Wahoo charter landings remained relatively stable through 2009, but have been low the last four years. In 2013, total and non-charter wahoo landings increased by 14% and 25%, respectively, while charter wahoo landings decreased 53%. Charter landings accounted for only 5% of the total wahoo landings. The total wahoo catch was 37% below the 32 year average.

Source and Calculations: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program and its associated computerized data expansion system files, expanded with the assistance of NMFS. Totals by species are summed across all fishing methods as described in Figure 59 through Figure 62.

Table 62. Guam annual estimated wahoo landings: total landings, non-charter landings, and charter landings (pounds)

Year	Total Wahoo	Non-Charter	Charter
1982	55,849	55,762	87
1983	86,530	85,735	795
1984	53,804	45,900	7,905
1985	123,685	111,144	12,540
1986	70,337	67,909	2,428
1987	86,465	82,477	3,989
1988	98,679	85,006	13,673
1989	127,325	113,557	13,768
1990	84,817	70,419	14,398
1991	55,926	42,633	13,293
1992	82,446	60,003	22,444
1993	62,551	46,533	16,018
1994	50,457	37,766	12,691
1995	77,391	62,365	15,026
1996	146,521	94,896	51,624
1997	65,034	47,693	17,341
1998	158,182	145,659	12,523
1999	76,338	66,673	9,665
2000	70,433	58,157	12,277
2001	119,765	107,150	12,616
2002	72,808	61,552	11,257
2003	64,266	53,505	10,761
2004	120,481	100,156	20,325
2005	43,906	32,201	11,704
2006	105,878	91,713	14,166
2007	44,528	31,166	13,362
2008	98,345	78,274	20,071
2009	130,738	121,703	9,035
2010	44,572	41,670	2,902
2011	37,355	32,809	4,545
2012	44,859	38,925	5,935
2013	51,252	48,479	2,773
Average	**81,610**	**69,362**	**12,248**
Std. Dev.	**32,267**	**28,983**	**9,020**

Figure 65. Guam annual estimated blue marlin landings: total landings, non-charter landings, charter landings



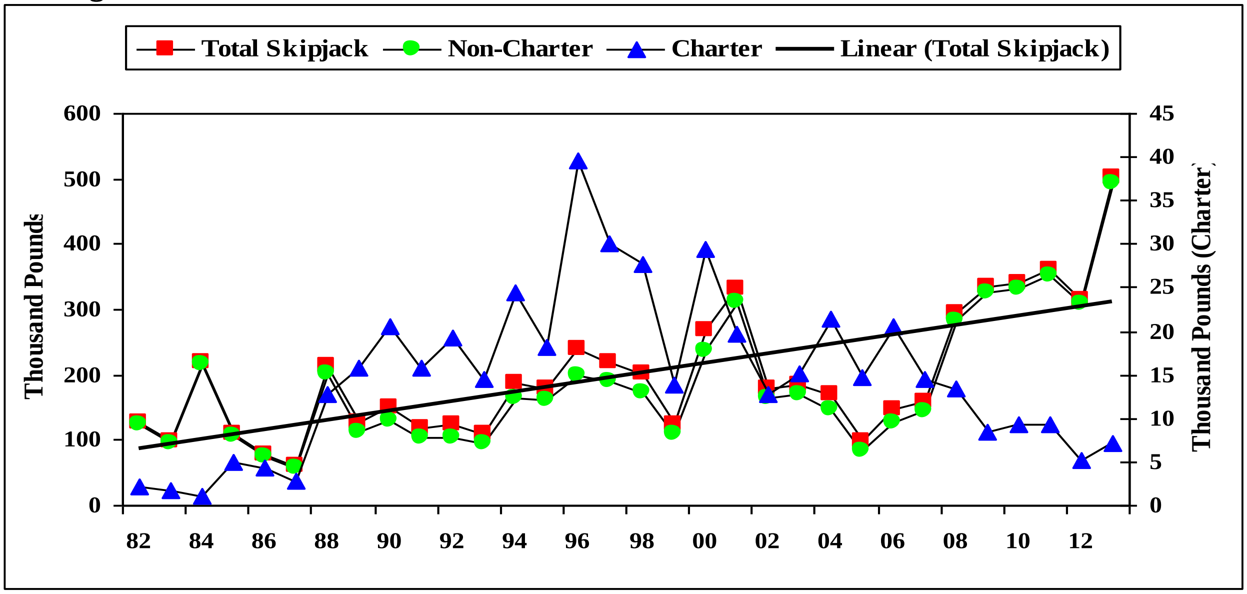
Interpretation: During the 1980s, non-charter boats accounted for the bulk of the blue marlin catch. In the early 1990s, the charter share of the marlin catch began to increase, peaking at 64% in 1996. The increases were due to an increase in charter boat activity and the active targeting of blue marlin by charter boats during the summer months. The decrease in charter landings after 1997 corresponded to the decrease in tourist charter trips. In 2013, total blue marlin catch increased by 21% and non-charter blue marlin landings more than tripled. Charter landings of blue marlin decreased in 2013 by 32%. Non-charter blue marlin landings accounted for 53% of the total blue marlin harvest. All categories of blue marlin landings were below the 32 year average in 2013.

Source and Calculations: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program and its associated computerized data expansion system files, expanded with the assistance of NMFS. Totals by species are summed across all fishing methods as described in Figure 59 through Figure 62.

Table 63. Guam annual estimated blue marlin landings: total landings, non-charter landings, charter landings (pounds)

Year	Total Blue Marlin	Non-Charter	Charter
1982	21,809	21,809	0
1983	30,402	30,402	0
1984	49,438	45,233	4,205
1985	55,945	40,726	15,219
1986	57,076	51,074	6,002
1987	49,360	36,087	13,274
1988	61,427	44,242	17,185
1989	85,515	58,477	27,038
1990	94,798	46,343	48,455
1991	87,869	44,899	42,970
1992	84,498	42,810	41,688
1993	57,993	27,280	30,713
1994	76,633	46,057	30,576
1995	76,569	33,535	43,034
1996	63,919	22,602	41,318
1997	90,777	43,559	47,217
1998	43,999	27,009	16,990
1999	80,537	61,032	19,505
2000	86,424	56,992	29,432
2001	33,302	22,148	11,154
2002	53,763	49,194	4,569
2003	68,204	55,165	13,039
2004	38,845	18,036	20,809
2005	9,270	7,258	2,012
2006	29,222	23,217	6,005
2007	18,994	14,148	4,846
2008	9,704	6,807	2,898
2009	32,606	20,412	12,194
2010	32,042	20,838	11,204
2011	18,895	17,901	994
2012	13,316	2,290	11,206
2013	16,175	8,625	7,550
Average	**50,916**	**32,694**	**18,223**
Std. Dev.	**26,457**	**16,444**	**15,073**

Figure 66. Guam annual estimated skipjack tuna landings: total, non-charter, and charter landings



Interpretation: Skipjack tuna catch has fluctuated over the reporting period, reaching a high in 2001 and again in 2011. However, the fishery hit a new high in 2013, with landings at 152% over the 32 year average. The increasing catch in skipjack tuna since 2007 reflects an increase in small boats targeting this species, which are primarily crewed by Micronesian fishermen.

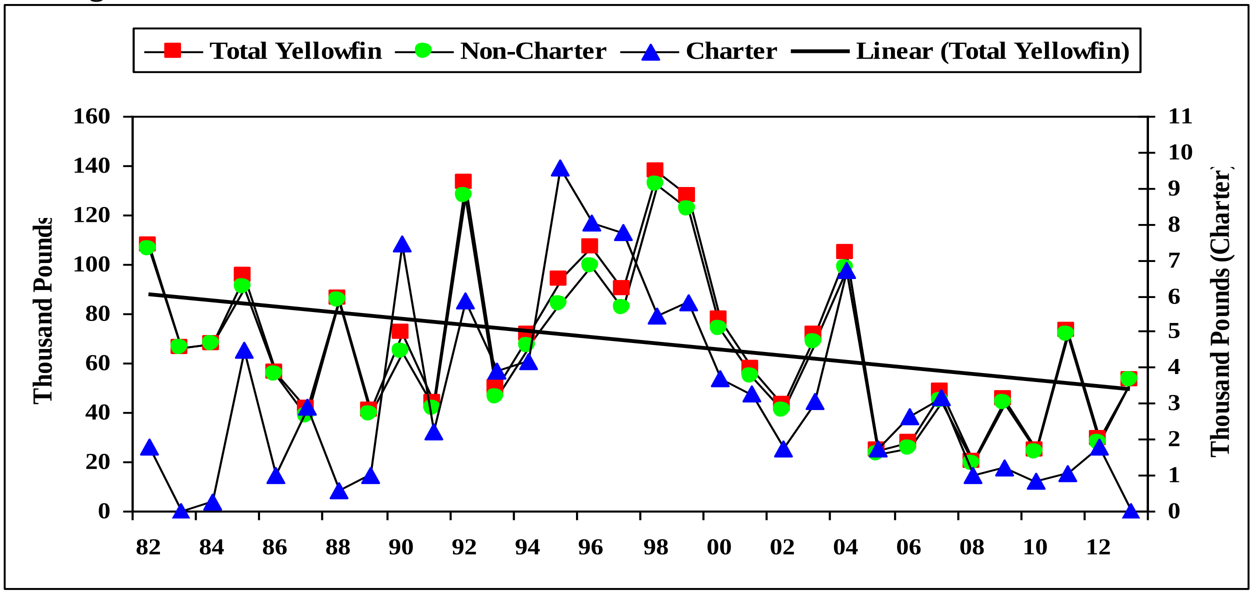
Total skipjack tuna, non-charter, and charter landings increased in 2013 by 60%, 60%, and 39% respectively.

Source and Calculations: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program and its associated computerized data expansion system files, expanded with the assistance of NMFS. Totals by species are summed across all fishing methods as described in Figure 59 through Figure 62.

Table 64. Guam annual estimated skipjack tuna landings: total, non-charter, and charter landings (pounds)

Year	Total Skipjack	Non-Charter	Charter
1982	126,082	124,906	2,176
1983	97,802	96,142	1,660
1984	218,307	217,152	1,155
1985	110,303	105,359	4,944
1986	78,283	73,878	4,405
1987	61,806	58,948	2,858
1988	214,328	201,561	12,766
1989	128,209	112,364	15,845
1990	149,851	129,260	20,592
1991	118,708	102,845	15,862
1992	123,367	104,111	19,257
1993	109,344	94,842	14,502
1994	188,784	164,288	24,496
1995	179,036	160,771	18,265
1996	238,583	198,888	39,695
1997	219,177	189,211	29,966
1998	201,689	173,892	27,796
1999	123,538	109,696	13,841
2000	266,907	237,538	29,368
2001	331,768	312,001	19,767
2002	178,435	165,582	12,852
2003	185,575	170,352	15,223
2004	168,838	147,447	21,391
2005	99,391	84,762	14,629
2006	146,658	126,042	20,616
2007	157,861	143,332	14,529
2008	295,520	282,097	13,423
2009	335,534	327,153	8,381
2010	339,596	330,310	9,286
2011	361,696	352,437	9,259
2012	313,326	308,190	5,136
2013	501,006	493,838	7,167
Average	**199,072**	**184,350**	**14,722**
Std. Dev.	**98,373**	**98,377**	**9,058**

Figure 67. Guam annual estimated yellowfin tuna landings: total, non-charter, and charter landings



Interpretation: The overall yellowfin landings show wide fluctuations during the 30-year time series, although the total and non-charter estimated landings showed a significant decrease from 1998 to 2002 and have been on a steady decline over the 32-year time series. Charter landings of yellowfin tuna peaked in 1985, 1990, and 1995, and then showed a general decrease until 2002. Yellowfin tuna catch by charter boats was up significantly in 2012, but there were no yellowfin tuna landings recorded in 2013.

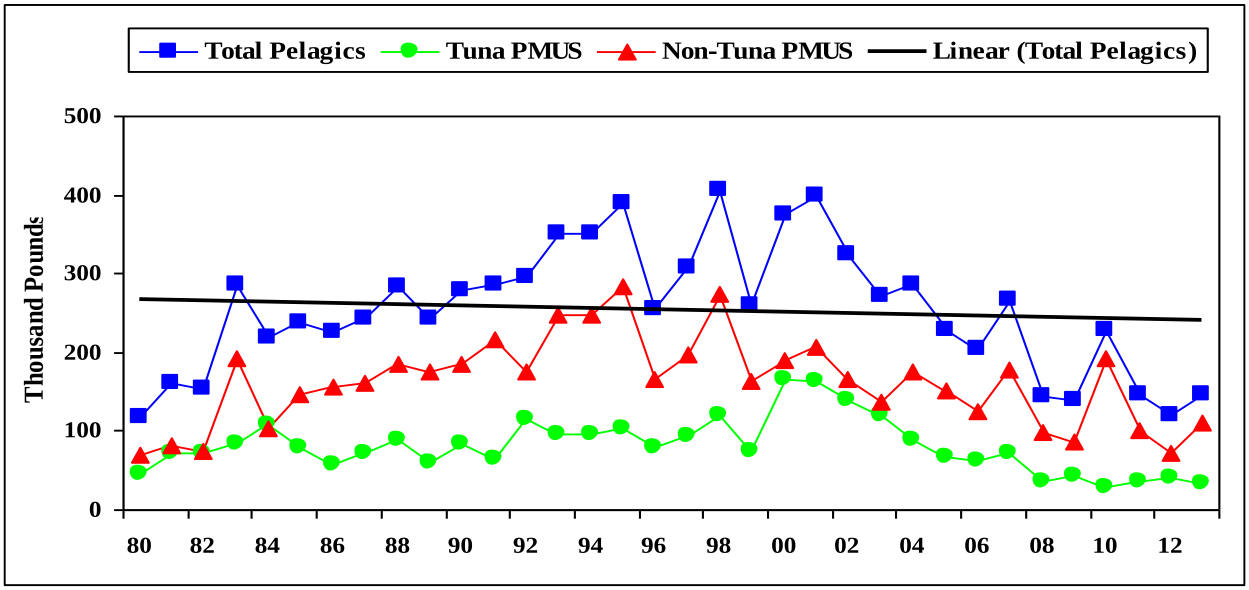
Total yellowfin tuna catch and non-charter catch increased in 2013 by 81% and 92%, respectively; non-charter boats harvested 100% of the total yearly catch of yellowfin. All categories are below their 32-year averages.

Source and Calculations: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program and its associated computerized data expansion system files, expanded with the assistance of NMFS. Totals by species are summed across all fishing methods for all years except 1992-93 as described in Figure 59.

Table 65. Guam annual estimated yellowfin tuna landings: total, non-charter, and charter landings (pounds)

Year	Total Yellowfin	Non-Charter	Charter
1982	108,071	106,257	1,813
1983	65,996	65,996	0
1984	67,975	67,710	266
1985	95,273	90,778	4,495
1986	56,024	55,035	989
1987	41,444	38,561	2,883
1988	86,251	85,682	569
1989	40,457	39,453	1,004
1990	72,394	64,940	7,452
1991	44,034	41,822	2,212
1992	133,170	127,311	5,859
1993	50,351	46,444	3,906
1994	71,221	67,022	4,199
1995	93,495	83,913	9,582
1996	107,038	99,005	8,033
1997	90,167	82,408	7,759
1998	137,472	132,020	5,451
1999	128,026	122,204	5,822
2000	77,445	73,761	3,684
2001	57,929	54,668	3,261
2002	42,884	41,131	1,753
2003	71,626	68,573	3,053
2004	104,954	98,255	6,700
2005	24,884	23,130	1,754
2006	28,049	25,419	2,630
2007	48,118	44,934	3,184
2008	19,888	18,900	987
2009	45,436	44,222	1,214
2010	24,502	23,659	843
2011	72,709	71,658	1,051
2012	29,220	27,430	1,770
2013	52745	52,745	0
Average	**68,414**	**65,158**	**3,473**
Std. Dev.	**32,148**	**30,654**	**2,511**

Figure 68. Guam annual estimated commercial landings: all pelagics, tuna PMUS, and non-tuna PMUS



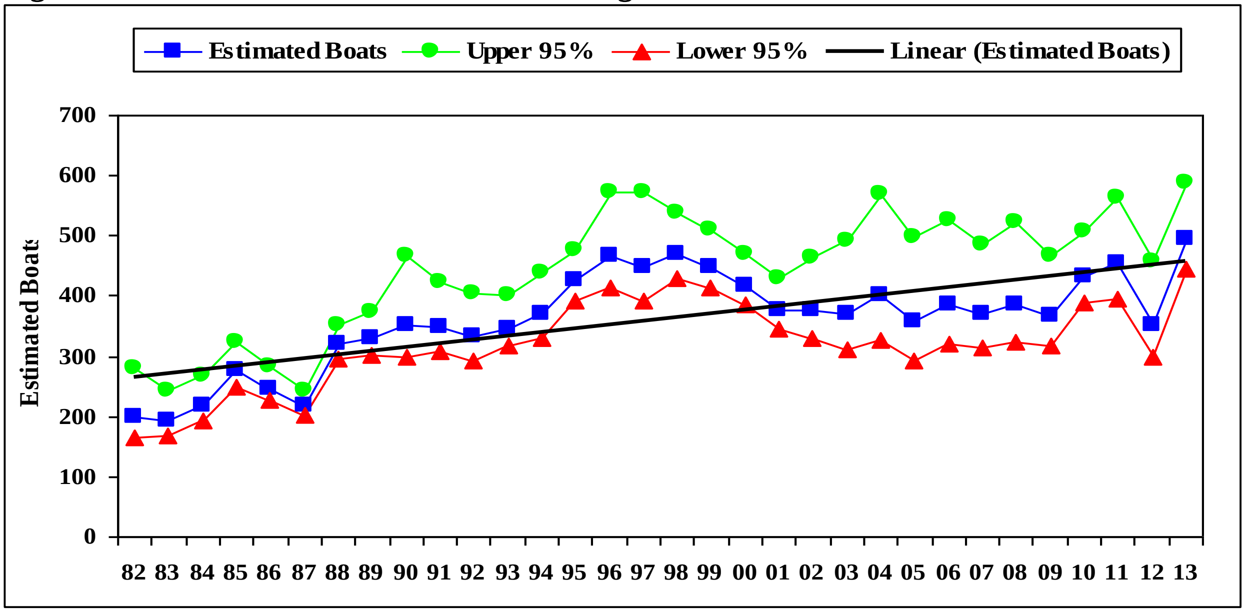
Interpretation: Commercial pelagic fishery landings showed a general increase for the first 20 years in the 30-year time series, but the overall trend is slightly decreasing. Total pelagic landings have steadily declined from 2002 with a couple upticks in 2007 and 2010. Total commercial catch in 2013 increased 22%; tuna PMUS landings decreased by 18% and non-tuna PMUS increased by 52%. Total commercial catch is 42% below the 30 year average.

Source and Calculations: The WPACFIN-sponsored commercial landings system. Total commercial landings were estimated by summing the weight fields in the commercial landings database from the principle fish wholesalers on Guam, and then multiplying by an estimated percent coverage expansion factor. The annual expansion factor was subjectively created based on as much information as possible depending on the year, including: an analysis of the "disposition of catch" data available from the DAWR offshore creel survey; an evaluation of the fishermen in the fishery and their entry/exit patterns; general "dock-side" knowledge of the fishery and the status of the marketing conditions and structure; the overall number of records in the data base; and a certain measure of best guesses.

Table 66. Guam annual estimated commercial landings: all pelagics, tuna PMUS, and non-tuna PMUS

Year	All Pelagics	Tuna PMUS	Non-Tuna PMUS
1980	118,251	45,043	69,062
1981	162,186	72,229	81,808
1982	153,577	72,347	74,832
1983	285,118	83,764	191,676
1984	218,028	107,568	102,398
1985	237,695	79,028	146,477
1986	226,138	57,689	157,377
1987	242,444	72,004	161,657
1988	284,408	88,093	185,451
1989	242,554	59,825	175,667
1990	279,121	84,176	185,934
1991	285,696	64,694	216,611
1992	296,809	114,765	175,751
1993	351,201	96,289	248,070
1994	351,187	95,321	246,860
1995	389,849	102,236	282,468
1996	255,281	78,636	166,702
1997	307,764	93,825	196,335
1998	405,666	120,186	272,882
1999	260,669	75,346	164,082
2000	376,192	165,898	190,761
2001	399,471	163,369	205,648
2002	325,299	139,009	164,853
2003	272,633	121,326	138,160
2004	285,545	89,479	175,777
2005	228,936	66,804	150,770
2006	203,139	63,579	125,847
2007	266,964	72,271	178,660
2008	144,110	36,009	98,207
2009	138,854	43,760	86,040
2010	228,620	27,935	191,275
2011	145,750	36,939	100,868
2012	120,210	41,004	72,849
2013	147,087	33,456	110,388
Average	**254,013**	**81,291**	**161,535**
Std. Dev.	**80,645**	**33,864**	**55,496**

Figure 69. Guam estimated number of trolling vessels



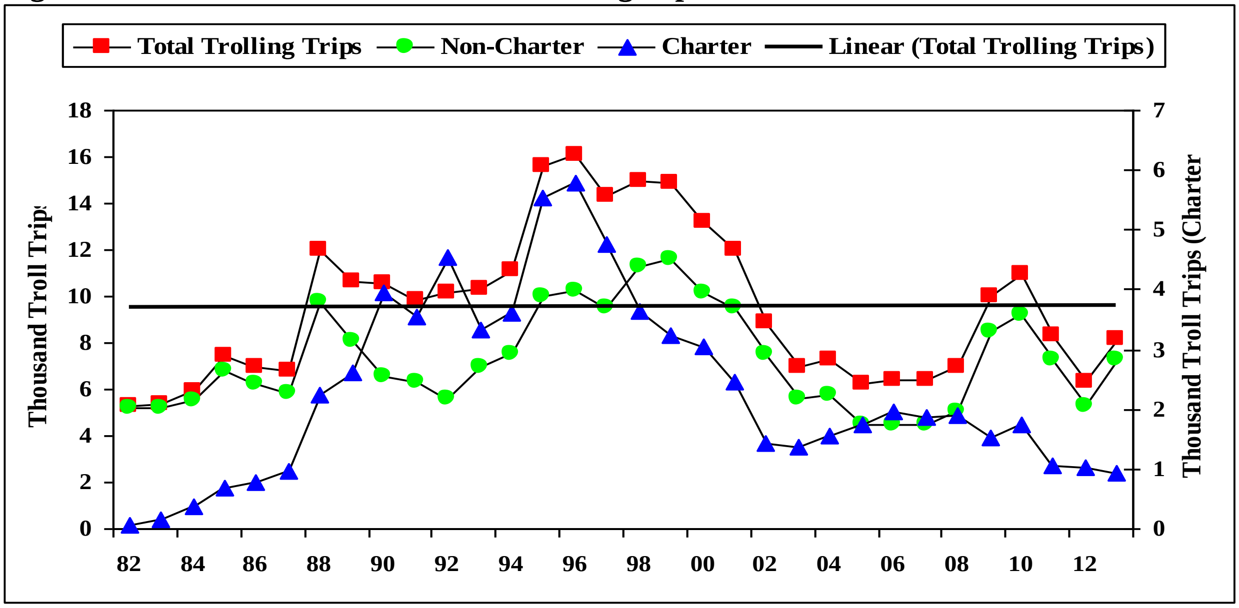
Interpretation: Since 1982, the general trend on Guam has been an increase in the number of boats participating in the pelagic fishery, especially since the addition of two marinas to the offshore sampling program. There appears to be a general increase in the number of small boats participating in Guam's pelagic fishery, while the number of charter vessels has remained fairly constant for several years. The number of vessels increased in 2013 by 30% to 496 vessels.

Source and Calculations: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program and its associated computerized data expansion system files, expanded with the assistance of NMFS. Since only a fraction of the days of the year are sampled, it is not possible to know the exact number of boats participating in the fishery. The 2013 trolling boat log was converted and processed through a boat estimator model 1,000 times.

Table 67. Guam estimated number of trolling vessels from boat-based creel surveys

Year	Estimated Boats	Upper 95%	Lower 95%
1982	199	280	165
1983	193	242	168
1984	219	267	193
1985	276	323	249
1986	246	284	226
1987	219	244	201
1988	320	353	297
1989	329	374	303
1990	352	467	299
1991	349	422	309
1992	332	405	294
1993	346	401	316
1994	369	439	329
1995	427	476	393
1996	466	572	415
1997	449	572	393
1998	469	537	430
1999	449	510	415
2000	416	470	385
2001	375	429	345
2002	375	464	330
2003	371	492	312
2004	401	568	326
2005	358	498	293
2006	386	527	321
2007	370	485	315
2008	385	523	322
2009	368	468	316
2010	432	508	390
2011	454	563	396
2012	351	457	298
2013	496	588	446

Figure 70. Guam estimated number of trolling trips



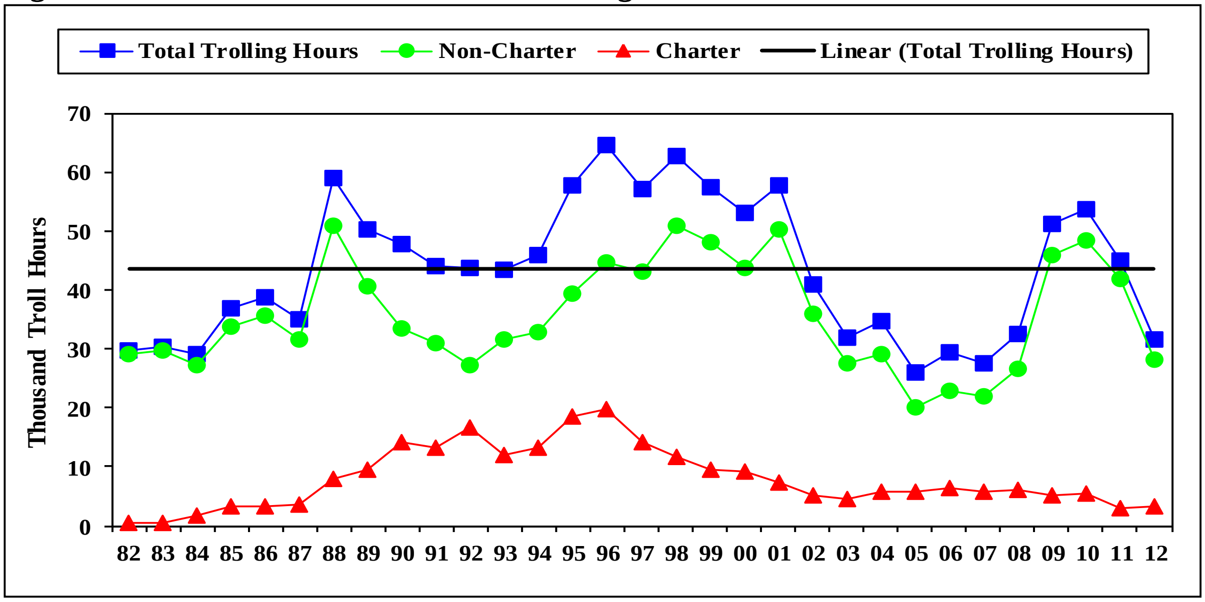
Interpretation: Non-charter and charter troll trips generally increased for the first 15 years of the 30-year time series. The number of troll trips began to decline in 1999 due to a number of factors including a continuing economic recession on the island, a decline in Asian visitors for charter boats, and an increase in cost to maintain, repair, and fuel boats for the average fishermen compared with fish caught for sale to make up for expenses. In 2013, the total number of troll trips increased by 29% and non-charter trips increased 36%. The number of charter trips decreased by 10%. The decrease may be attributed to an increase in gas prices, as well as changes in tourist demographics. In 2013, one major charter business owner sold his vessels and closed his business due to decreased business. Total trips are 15% below the 32 year average.

Source and Calculations: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program and its associated computerized data expansion system files. The data expansion system is run on a calendar year's worth of survey data to produce catch and effort estimates for each fishing method surveyed. These plots are of the estimated number of trips for the trolling method as taken directly from creel survey expansion system printouts.

Table 68. Guam estimated number of trolling trips

Year	Estimated Trips	Non-Charter	Charter
1982	5,292	5,230	62
1983	5,339	5,187	151
1984	5,913	5,554	359
1985	7,454	6,783	671
1986	6,999	6,227	772
1987	6,776	5,818	958
1988	11,981	9,727	2,254
1989	10,660	8,049	2,612
1990	10,531	6,571	3,960
1991	9,868	6,317	3,550
1992	10,167	5,617	4,551
1993	10,295	6,971	3,324
1994	11,125	7,515	3,610
1995	15,562	10,030	5,532
1996	16,060	10,274	5,787
1997	14,313	9,555	4,758
1998	14,944	11,304	3,641
1999	14,848	11,610	3,239
2000	13,203	10,154	3,049
2001	11,977	9,522	2,456
2002	8,917	7,497	1,420
2003	6,991	5,622	1,368
2004	7,307	5,754	1,553
2005	6,238	4,495	1,743
2006	6,414	4,440	1,973
2007	6,395	4,520	1,875
2008	6,947	5,057	1,891
2009	10,014	8,488	1,526
2010	10,935	9,193	1,743
2011	8,336	7,268	1,068
2012	6,337	5,320	1,017
2013	8,165	7,245	920
Average	9,572	7,279	2,294
Std. Dev.	3,173	2,080	1,513

Figure 71. Guam estimated number of trolling hours



Interpretation: Trolling hours for non-charters and charters have generally increased over the first 15 years. Beginning in 1996, charter troll hours began to decrease. This corresponded to a downturn in Asian economies, which resulted in fewer charter trolling hours. After 2001, charter activity dropped off dramatically. Tourism was also down due to the 9/11 attacks, the SARS scare, and two typhoons striking Guam in 2002. From 2005 through 2010, the number of total, and non-charter hours trolling generally increased, but dropped for two years. In 2013, total and non-charter trolling hours increased 32% and 38%, respectively. 2013 charter trolling hours continued the decline that started in 1997, decreasing another 18%. Total hours trolling were 1.7% below the 32-year average.

Source and Calculations: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program and its associated computerized data expansion system files. The data expansion system is run on a calendar year's worth of survey data to produce catch and effort estimates for each fishing method surveyed. These plots are of the estimated boat hours spent fishing for the trolling method as taken directly from creel survey expansion system printouts.

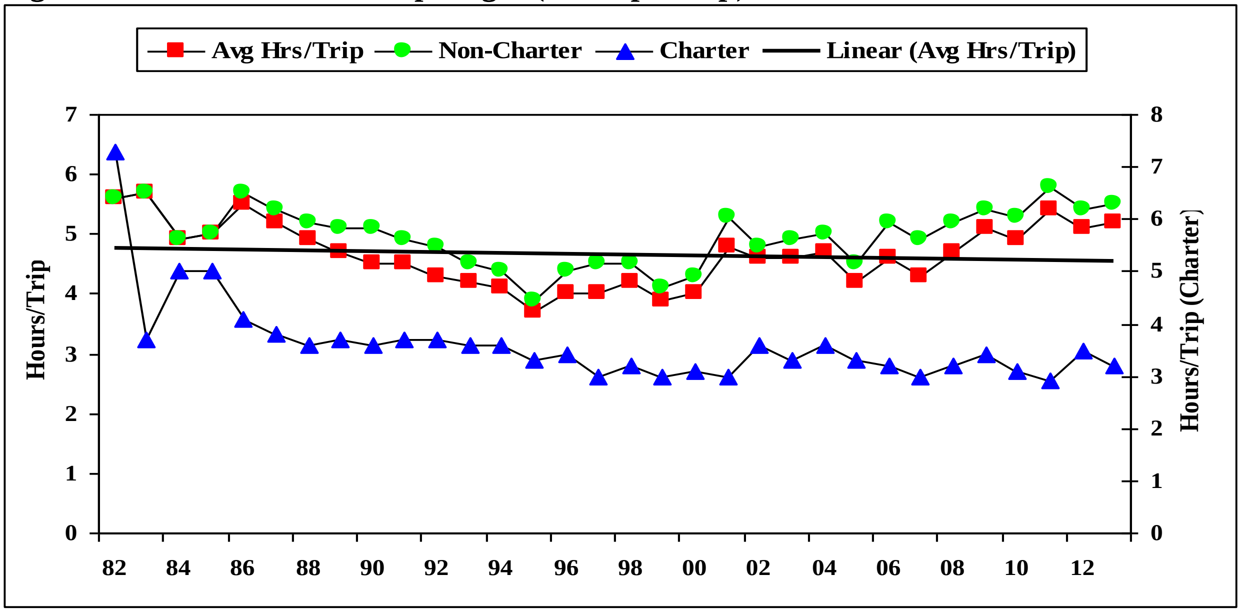
Table 69. Guam estimated number of trolling hours

Year	Estimated Hours	Non-Charter	Charter
1982	29,678	29,226	453
1983	30,363	29,803	560
1984	29,115	27,332	1,783
1985	36,967	33,630	3,337
1986	38,621	35,489	3,132
1987	35,112	31,441	3,671
1988	59,043	50,971	8,073
1989	50,220	40,685	9,535
1990	47,865	33,567	14,298
1991	44,136	30,981	13,155
1992	43,865	27,080	16,785
1993	43,354	31,465	11,889
1994	46,017	32,903	13,113
1995	57,767	39,409	18,359
1996	64,452	44,748	19,704
1997	57,122	42,965	14,157
1998	62,584	50,969	11,614
1999	57,533	47,973	9,560
2000	53,072	43,743	9,329
2001	57,572	50,231	7,341
2002	40,950	35,787	5,162
2003	31,974	27,511	4,463
2004	34,635	29,026	5,608
2005	25,903	20,116	5,786
2006	29,250	22,987	6,263
2007	27,644	21,955	5,689
2008	32,624	26,538	6,087
2009	51,145	45,890	5,255
2010	53,667	48,295	5,372
2011	45,053	41,944	3,108
2012	32,480	28,946	3,534
2013	42,761	39,847	2,914
Average	**43,518**	**35,734**	**7,784**
Std. Dev.	**11,298**	**8,865**	**5,087**

Table 70. Numbers of trips and interviews for the creel trolling method

Year	Survey Days	Trips in Boat Log	Interviews
1982	46	393	363
1983	47	363	351
1984	54	486	365
1985	66	737	503
1986	49	629	382
1987	48	614	431
1988	51	1032	698
1989	60	1053	462
1990	60	1098	804
1991	60	1097	773
1992	60	1170	843
1993	61	1149	844
1994	69	1224	878
1995	96	1540	1110
1996	96	1543	1146
1997	96	1378	949
1998	96	1477	1052
1999	96	1436	917
2000	96	1338	854
2001	96	1076	620
2002	84	730	396
2003	79	531	289
2004	96	716	366
2005	97	698	377
2006	96	763	413
2007	96	755	391
2008	96	788	405
2009	96	1018	604
2010	96	1135	683
2011	96	878	496
2012	96	645	334
2013	93	777	441

Figure 72. Guam estimated trip length (hours per trip)



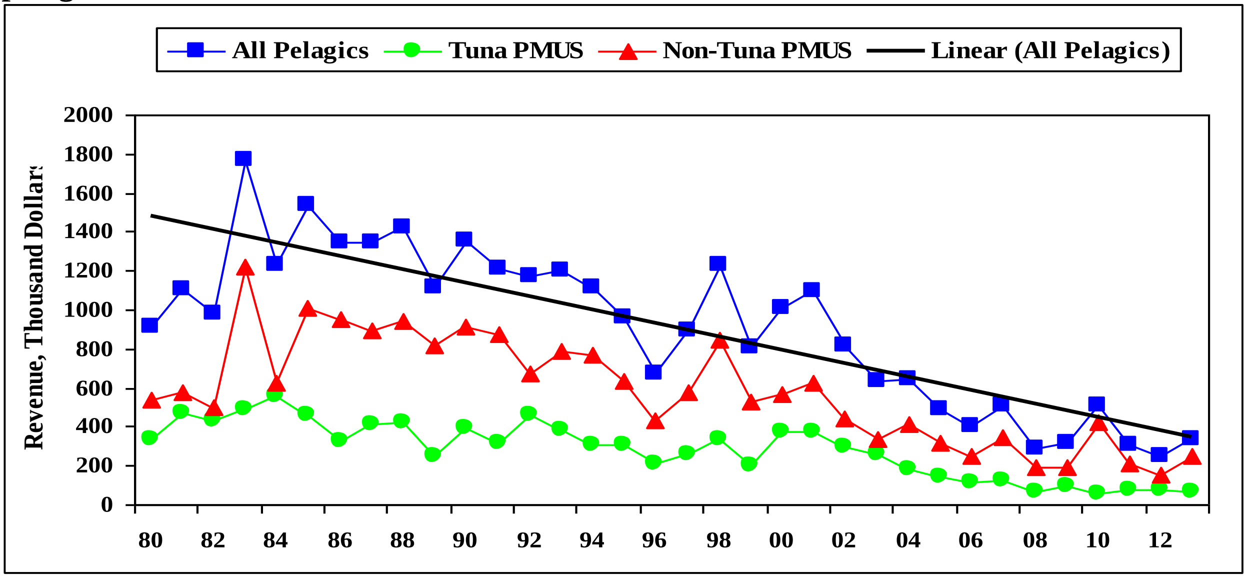
Interpretation: The overall average trolling trip and non-charter average trolling trip increased slightly in 2013 by 2% each. 2013 charter average hours per trip decreased by 9%. The redeployment of fish aggregating devices (FADs) still provided charter boats and non-charter fishermen with a prescribed route for trolling activity, although many boats have been observed to be making longer trips to the banks located north and south of Guam. Overall trolling trip length appears to have remained fairly constant throughout the 32-year time series, and the 2013 overall average hours per trip is 11% higher than the 32 year average.

Source and Calculations: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program and its associated computerized data expansion system files. The data expansion system is run on a calendar year's worth of survey data to produce catch and effort estimates for each fishing method surveyed. These plots are of the estimated boat hours spent fishing and number of trips for the trolling method, as taken directly from creel survey, expansion system printouts.

Table 71. Guam estimated trip length (hours per trip)

Year	Estimated Trips	Non-Charter	Charter
1982	5.6	5.6	7.3
1983	5.7	5.7	3.7
1984	4.9	4.9	5.0
1985	5.0	5.0	5.0
1986	5.5	5.7	4.1
1987	5.2	5.4	3.8
1988	4.9	5.2	3.6
1989	4.7	5.1	3.7
1990	4.5	5.1	3.6
1991	4.5	4.9	3.7
1992	4.3	4.8	3.7
1993	4.2	4.5	3.6
1994	4.1	4.4	3.6
1995	3.7	3.9	3.3
1996	4.0	4.4	3.4
1997	4.0	4.5	3.0
1998	4.2	4.5	3.2
1999	3.9	4.1	3.0
2000	4.0	4.3	3.1
2001	4.8	5.3	3.0
2002	4.6	4.8	3.6
2003	4.6	4.9	3.3
2004	4.7	5.0	3.6
2005	4.2	4.5	3.3
2006	4.6	5.2	3.2
2007	4.3	4.9	3.0
2008	4.7	5.2	3.2
2009	5.1	5.4	3.4
2010	4.9	5.3	3.1
2011	5.4	5.8	2.9
2012	5.1	5.4	3.5
2013	5.2	5.5	3.2
Average	**4.7**	**5.0**	**3.6**
Std. Dev.	**0.5**	**0.5**	**0.8**

Figure 73. Guam estimated annual commercial revenues in inflation-adjusted dollars: all pelagics, tuna PMUS, and non-tuna PMUS



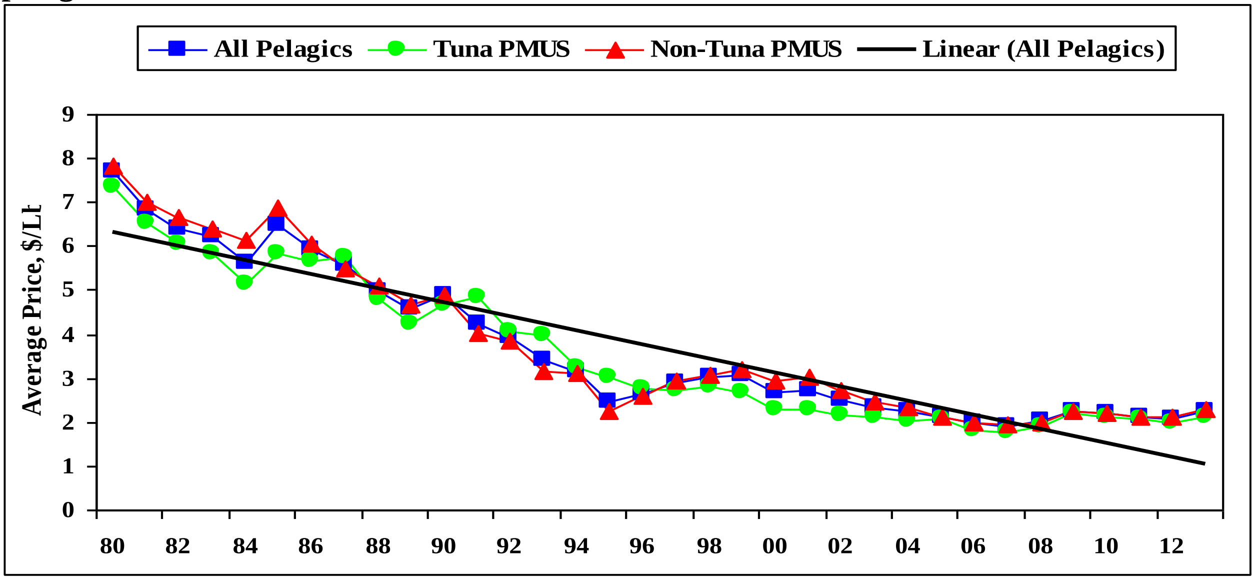
Interpretation: Commercial revenues have shown a gradual decrease since the early 1980's. A large drop occurring after 2002 can partly be attributed to two typhoons striking Guam, as well as a change in government policy (see introduction). Although revenues were slightly up overall and for non-tuna PMUS, all three adjusted revenue categories are well below the 32-year averages. Tuna PMUS adjusted revenue declined again by 12%.

Source and Calculations: The WPACFIN-sponsored commercial landings system. Commercial revenues were estimated by summing the revenue fields in the commercial landings database from the principle fish wholesalers on Guam, and then multiplying by the same percent coverage expansion factor. Inflation-adjusted total revenue per trip is derived from the Guam Annual Consumer Price Index (CPI).

Table 72. Guam estimated annual commercial revenues in inflation-adjusted dollars: all pelagics, tuna PMUS, and non-tuna PMUS

	All Pelagics		Tuna PMUS		Non-Tuna PMUS	
Year	**Unadjusted**	**Adjusted**	**Unadjusted**	**Adjusted**	**Unadjusted**	**Adjusted**
1980	149124	910252	54353	331768	88775	541885
1981	218384	1106772	92914	470890	113212	573760
1982	203847	982544	90719	437265	103459	498672
1983	380231	1771114	105308	490525	262817	1224201
1984	286490	1227610	129389	554433	146339	627065
1985	373796	1541907	112286	463178	244423	1008246
1986	334955	1345180	81299	326498	237826	955110
1987	350828	1349284	107642	413992	231451	890159
1988	388630	1420441	115243	421214	258203	943734
1989	337586	1112683	76865	253348	249421	822090
1990	471241	1359532	136321	393286	316491	913076
1991	462191	1209553	119640	313098	333096	871712
1992	492707	1170673	195547	464619	284546	676082
1993	547835	1201951	175360	384741	358592	786751
1994	593838	1114041	165296	310095	411832	772596
1995	537889	957981	173629	309234	356256	634492
1996	398375	676043	127375	216155	254063	431145
1997	534352	889697	154819	257773	344972	574378
1998	733101	1227944	201639	337745	502801	842192
1999	489605	805400	122023	200729	319342	525318
2000	626803	1011033	234735	378628	349312	563440
2001	667648	1092272	228652	374074	379174	620328
2002	500777	814263	184705	300331	274929	447035
2003	399989	632782	163423	258535	214143	338775
2004	432735	645208	122098	182048	277544	413819
2005	353131	489086	100720	139498	232336	321785
2006	324686	402935	94040	116704	202560	251377
2007	437861	509232	109201	127001	296385	344695
2008	260474	290428	61360	68417	174973	195095
2009	286514	312873	88918	97099	176071	192270
2010	474481	504848	55183	58715	397710	423164
2011	297294	306510	73945	76237	206185	212577
2012	252145	252145	81441	81441	154924	154924
2013	332185	332185	71501	71501	252391	252391
Average	**409757**	**911070**	**123753**	**284730**	**264899**	**583657**
Standard Deviation	**133651**	**400574**	**47896**	**141675**	**91953**	**271141**

Figure 74. Guam annual estimated inflation-adjusted average price of pelagics ($/lb): all pelagics, tuna PMUS, and non-tuna PMUS



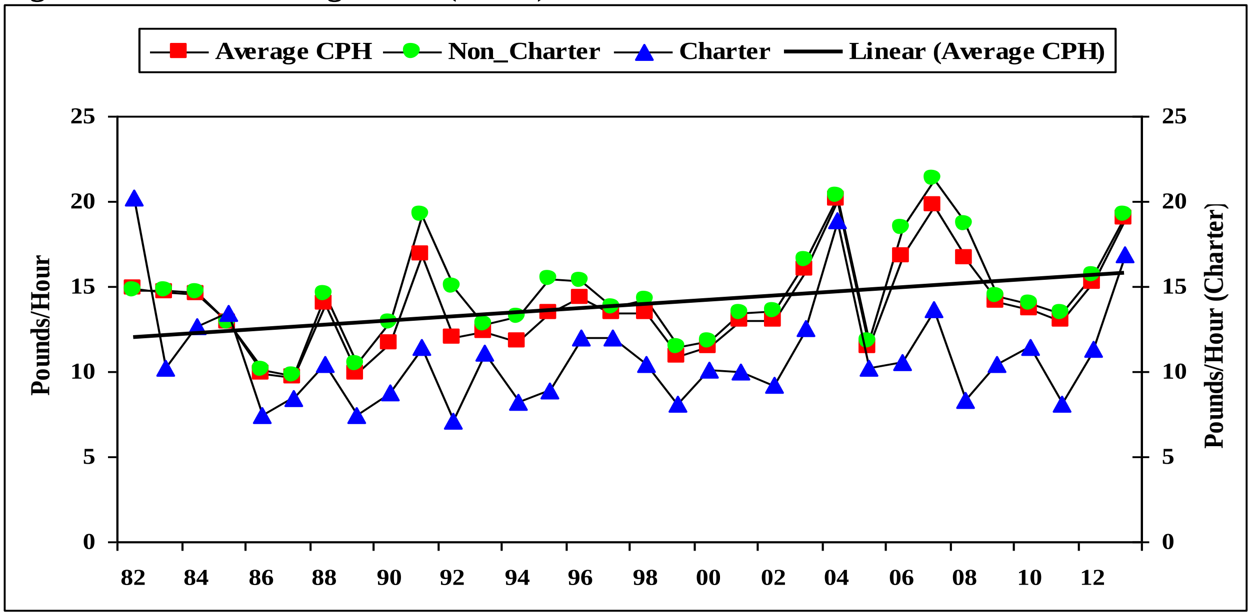
Interpretation: The inflation-adjusted price of tuna and other non-tuna PMUS has shown a steady decline since data on the pelagic fishery was first collected in 1980. In 2007, the trend started to change slightly. In 2013, prices increased slightly; the adjusted price for all pelagics increased 8%, 8% for tuna PMUS, and 8% for non-tuna PMUS species. All three categories are above their 32 year averages. Locally-caught pelagic fish continues to compete with cheaper pelagic fish caught by longliners. These are value-added products sold at several supermarkets and roadside vendors.

Source and Calculations: The WPACFIN-sponsored commercial landings system. The average price of the Tunas and other PMUS groups are calculated by dividing the total revenue for each by the sold weight. The inflation adjustment is made by using the Consumer Price Index (CPI) for Guam and establishing the current year figure as the base from which to calculate expansion factors for all previous years (e.g., divide the current year CPI by the CPI of any given year), and then multiplying that factor by the unadjusted average price for the given year.

Table 73. Guam annual estimated inflation-adjusted average price of pelagics ($/lb): all pelagics, tuna PMUS, and non-tuna PMUS

	All Pelagics		Tuna PMUS		Non-Tuna PMUS	
Year	Unadjusted	Adjusted	Unadjusted	Adjusted	Unadjusted	Adjusted
1980	1.26	7.70	1.21	7.37	1.29	7.85
1981	1.35	6.82	1.29	6.52	1.38	7.01
1982	1.33	6.40	1.25	6.04	1.38	6.66
1983	1.33	6.21	1.26	5.86	1.37	6.39
1984	1.31	5.63	1.20	5.15	1.43	6.12
1985	1.57	6.49	1.42	5.86	1.67	6.88
1986	1.48	5.95	1.41	5.66	1.51	6.07
1987	1.45	5.57	1.49	5.75	1.43	5.51
1988	1.37	4.99	1.31	4.78	1.39	5.09
1989	1.39	4.59	1.28	4.23	1.42	4.68
1990	1.69	4.87	1.62	4.67	1.70	4.91
1991	1.62	4.23	1.85	4.84	1.54	4.02
1992	1.66	3.94	1.70	4.05	1.62	3.85
1993	1.56	3.42	1.82	4.00	1.45	3.17
1994	1.69	3.17	1.73	3.25	1.67	3.13
1995	1.38	2.46	1.70	3.02	1.26	2.25
1996	1.56	2.65	1.62	2.75	1.52	2.59
1997	1.74	2.89	1.65	2.75	1.76	2.93
1998	1.81	3.03	1.68	2.81	1.84	3.09
1999	1.88	3.09	1.62	2.66	1.95	3.20
2000	1.67	2.69	1.41	2.28	1.83	2.95
2001	1.67	2.73	1.40	2.29	1.84	3.02
2002	1.54	2.50	1.33	2.16	1.67	2.71
2003	1.47	2.32	1.35	2.13	1.55	2.45
2004	1.52	2.26	1.36	2.03	1.58	2.35
2005	1.54	2.14	1.51	2.09	1.54	2.13
2006	1.60	1.98	1.48	1.84	1.61	2.00
2007	1.64	1.91	1.51	1.76	1.66	1.93
2008	1.81	2.02	1.70	1.90	1.78	1.99
2009	2.06	2.25	2.03	2.22	2.05	2.23
2010	2.08	2.21	1.98	2.10	2.08	2.21
2011	2.04	2.10	2.00	2.06	2.04	2.11
2012	2.10	2.10	1.99	1.99	2.13	2.13
2013	2.26	2.26	2.14	2.14	2.29	2.29
Average	**1.63**	**3.69**	**1.57**	**3.56**	**1.65**	**3.76**
Std. Dev.	**0.25**	**1.70**	**0.26**	**1.64**	**0.5**	**1.77**

Figure 75. Guam trolling CPUE (lbs/hr)



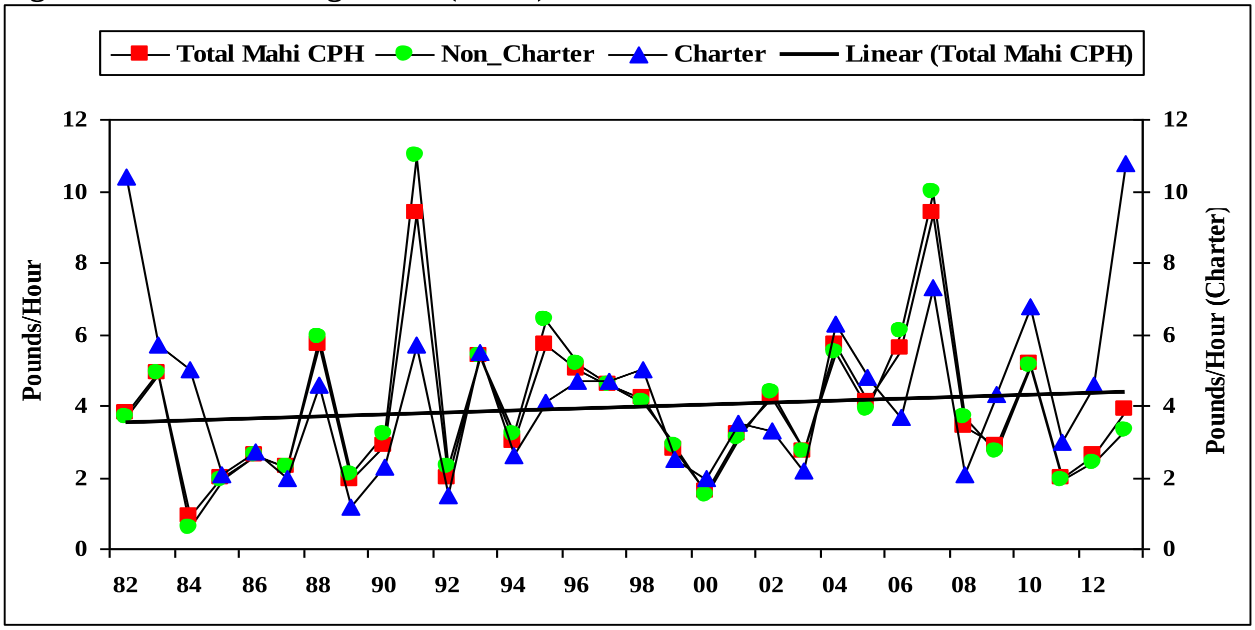
Interpretation: The fluctuations in CPUE are probably due to variability in the year-to-year abundance and availability of the stocks. However, since it is not possible to allocate species-specific effort, effort used to target other species can also result in artificially high or low catch rates for a given species. This is especially true with charter boats targeting blue marlin during the summer months. In 2013, total overall and non-charter catch rates increased 25% and 22%, respectively, while charter catch rates increased by 50%. Charter catch rates have generally been lower than catch rates of non-charter boats, probably due to their shorter fishing time and non-charter boats beginning earlier in the morning and ending as late as early evening.

Source and Calculations: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program and its associated computerized data expansion system files. The data expansion system is run on a calendar year's worth of survey data to produce catch and effort estimates for each fishing method. This plot and table of catch per unit of effort (CPUE) are based on the total annual landings of all troll catch, divided by the total number of hours spent fishing (gear in use).

Table 74. Guam trolling CPUE (lbs/hr)

Year	Catch Rate	Non-Charter	Charter
1982	14.9	14.8	20.2
1983	14.7	14.8	10.2
1984	14.6	14.7	12.7
1985	12.9	12.9	13.4
1986	9.9	10.1	7.5
1987	9.7	9.8	8.4
1988	14.0	14.6	10.4
1989	9.9	10.5	7.4
1990	11.7	12.9	8.8
1991	16.9	19.2	11.5
1992	12.0	15.0	7.1
1993	12.3	12.8	11.1
1994	11.8	13.2	8.2
1995	13.4	15.5	8.9
1996	14.3	15.3	12.0
1997	13.4	13.8	12.0
1998	13.5	14.2	10.4
1999	10.9	11.5	8.1
2000	11.5	11.8	10.1
2001	13.0	13.4	10.0
2002	13.0	13.6	9.2
2003	16.0	16.6	12.6
2004	20.1	20.3	18.9
2005	11.5	11.8	10.2
2006	16.8	18.5	10.6
2007	19.8	21.3	13.7
2008	16.7	18.7	8.3
2009	14.1	14.5	10.4
2010	13.7	14.0	11.4
2011	13.0	13.4	8.1
2012	15.2	15.7	11.3
2013	19.0	19.2	16.9
Average	**13.9**	**14.6**	**10.9**
Std. Dev.	**2.6**	**2.8**	**3.1**

Figure 76. Guam trolling CPUE (lbs/hr): mahimahi



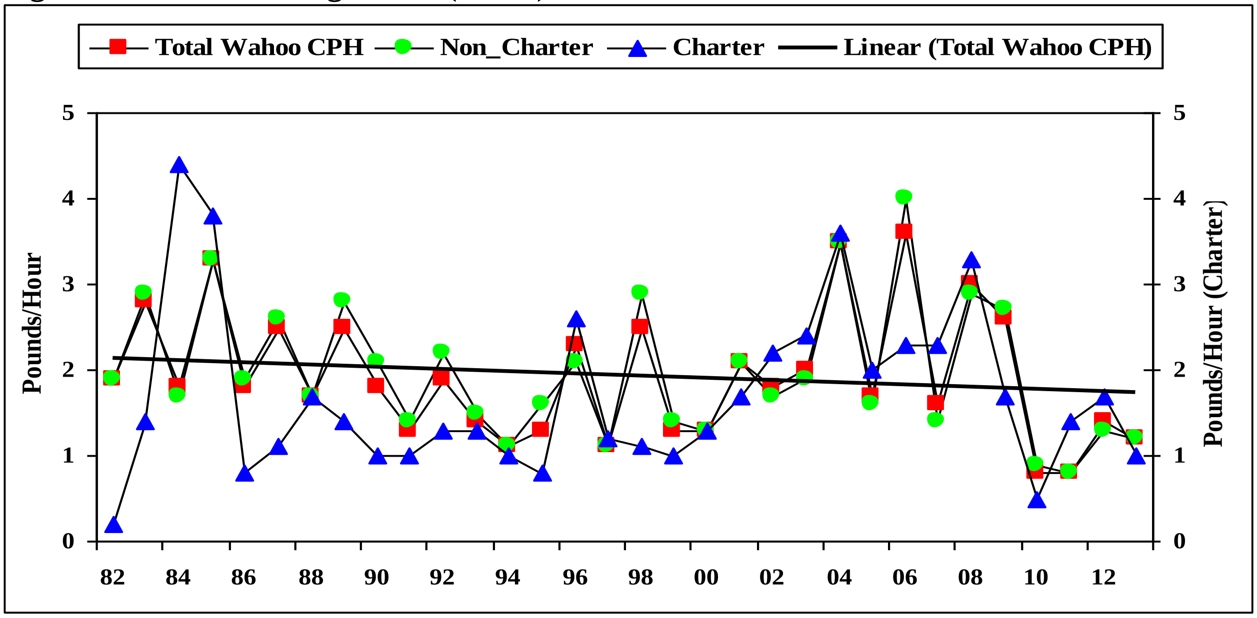
Interpretation: The wide fluctuations in mahimahi CPUEs are probably due to the high variability in the year-to-year abundance and availability of the stocks. It is not possible to allocate species-specific effort one particular species; effort used to target other species can result in artificially high or low catch rates for a given species. In 2013, the catch rate for total and non-charter mahimahi increased 50%, and 38%, respectively, while charter CPUE increased by 135%. Total CPUE was equal to the 32-year average, while non-charter CPUE was a little below and charter CPUE was well above it.

Source and Calculations: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program and its associated computerized data expansion system files. The data expansion system is run on a calendar year's worth of survey data to produce catch and effort estimates for each fishing method. This plot and table of catch per unit of effort (CPUE) are based on the total annual landings of mahimahi divided by the total number of hours spent fishing (gear in use).

Table 75. Guam boat-based creel trolling CPUE (lbs/hr): mahimahi

Year	Total Mahimahi	Non-Charter	Charter
1982	3.8	3.7	10.4
1983	4.9	4.9	5.7
1984	0.9	0.6	5.0
1985	2.0	1.9	2.1
1986	2.6	2.6	2.7
1987	2.3	2.3	2.0
1988	5.7	5.9	4.6
1989	1.9	2.1	1.2
1990	2.9	3.2	2.3
1991	9.4	11.0	5.7
1992	2.0	2.3	1.5
1993	5.4	5.4	5.5
1994	3.0	3.2	2.6
1995	5.7	6.4	4.1
1996	5.0	5.2	4.7
1997	4.6	4.6	4.7
1998	4.2	4.1	5.0
1999	2.8	2.9	2.5
2000	1.6	1.5	2.0
2001	3.2	3.1	3.5
2002	4.2	4.4	3.3
2003	2.7	2.7	2.2
2004	5.7	5.5	6.3
2005	4.1	3.9	4.8
2006	5.6	6.1	3.7
2007	9.4	10.0	7.3
2008	3.4	3.7	2.1
2009	2.9	2.7	4.3
2010	5.2	5.1	6.8
2011	2.0	1.9	3.0
2012	2.6	2.4	4.6
2013	3.9	3.3	10.8
Average	**3.9**	**4.0**	**4.3**
Std. Dev.	**1.9**	**2.2**	**2.3**

Figure 77. Guam trolling CPUE (lbs/hr): wahoo



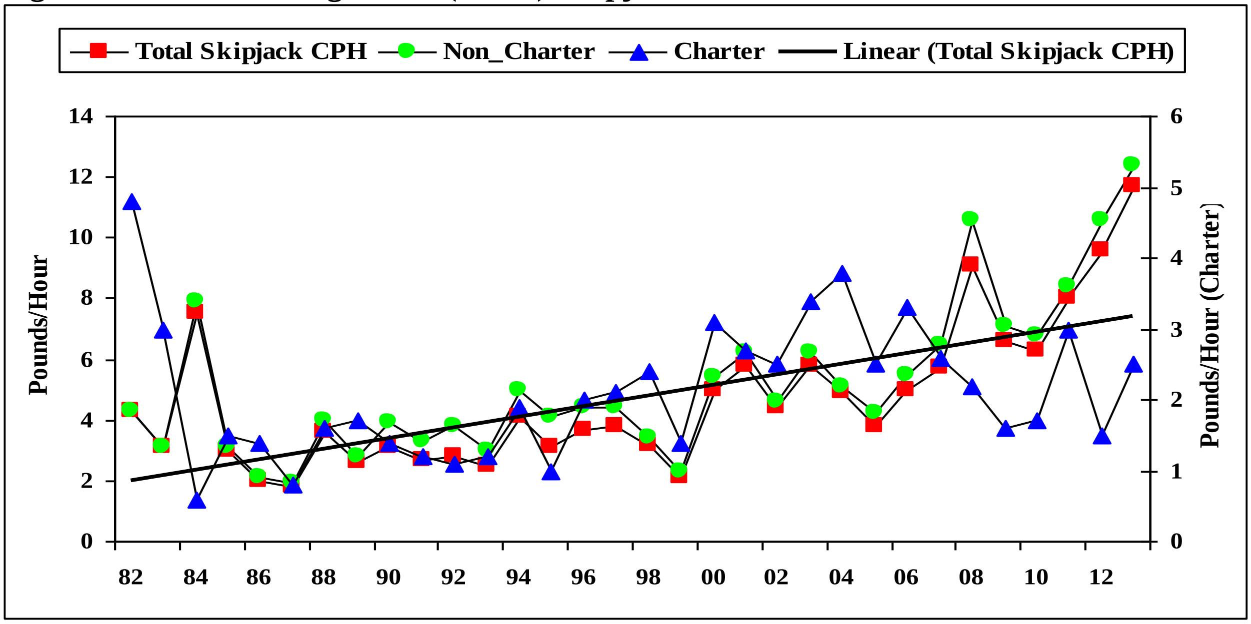
Interpretation: The wide fluctuations in CPUEs are probably due to the high variability in the year-to-year abundance and availability of the stocks. The trend for the 32 year series has slowly declined. In 2013, all three categories decreased. Total wahoo CPUE decreased 15%, non-charter CPUE decreased by 8%, and charter CPUE decreased by 41%. Total CPUE was 37% below the 32 year average.

Source and Calculations: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program and its associated computerized data expansion system files. The data expansion system is run on a calendar year's worth of survey data to produce catch and effort estimates for each fishing method. This plot and table of catch per unit of effort (CPUE) are based on the total annual landings of wahoo divided by the total number of hours spent fishing (gear in use).

Table 76. Guam boat-based creel trolling CPUE (lbs/hr): wahoo

Year	Catch Rate	Non-Charter	Charter
1982	1.9	1.9	0.2
1983	2.8	2.9	1.4
1984	1.8	1.7	4.4
1985	3.3	3.3	3.8
1986	1.8	1.9	0.8
1987	2.5	2.6	1.1
1988	1.7	1.7	1.7
1989	2.5	2.8	1.4
1990	1.8	2.1	1.0
1991	1.3	1.4	1.0
1992	1.9	2.2	1.3
1993	1.4	1.5	1.3
1994	1.1	1.1	1.0
1995	1.3	1.6	0.8
1996	2.3	2.1	2.6
1997	1.1	1.1	1.2
1998	2.5	2.9	1.1
1999	1.3	1.4	1.0
2000	1.3	1.3	1.3
2001	2.1	2.1	1.7
2002	1.8	1.7	2.2
2003	2.0	1.9	2.4
2004	3.5	3.4	3.6
2005	1.7	1.6	2.0
2006	3.6	4.0	2.3
2007	1.6	1.4	2.3
2008	3.0	2.9	3.3
2009	2.6	2.7	1.7
2010	0.8	0.9	0.5
2011	0.8	0.8	1.4
2012	1.4	1.3	1.7
2013	1.2	1.2	1.0
Average	**1.9**	**2.0**	**1.7**
Std. Dev.	**0.7**	**0.8**	**1.0**

Figure 78. Guam trolling CPUE (lbs/hr): skipjack tuna



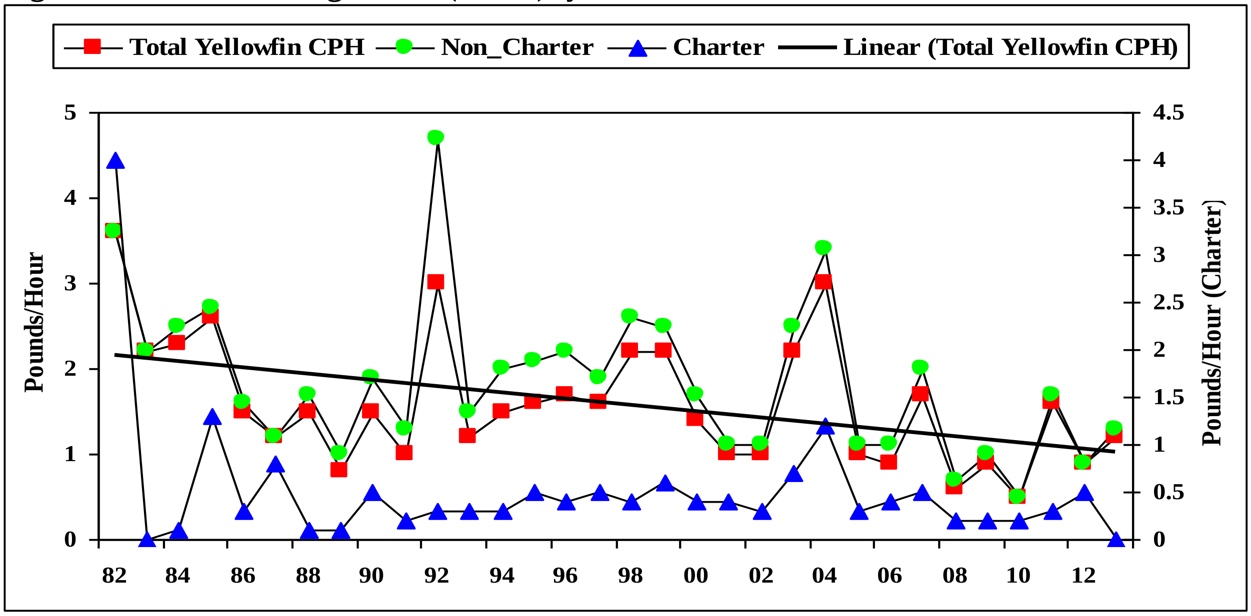
Interpretation: The wide fluctuations in CPUE for skipjack tuna are probably due to the high variability in the year-to-year abundance and availability of the stocks, although skipjack tuna is caught year round. However, it is not possible to allocate species-specific effort, since effort used to target other species can result in an artificially high or low catch rate for a given species. In 2013, the catch rates for total and non-charter increased for a third year, increasing by 22% and 17%, respectively. Charter rates also increased by 67% in 2013. Total CPUE was 149% above the 32-year average and was the highest rate in the data set.

Source and Calculations: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program and its associated computerized data expansion system files, expanded with the assistance of NMFS. The data expansion system is run on a calendar year's worth of survey data to produce catch and effort estimates for each fishing method surveyed. This plot and table of catch per unit of effort (CPUE) are based on the total annual landings of skipjack divided by the total number of hours spent fishing (gear in use).

Table 77. Guam boat-based creel trolling CPUE (lbs/hr): skipjack tuna

Year	Total Skipjack	Non-Charter	Charter
1982	4.3	4.3	4.8
1983	3.1	3.1	3.0
1984	7.5	7.9	0.6
1985	3.0	3.1	1.5
1986	2.0	2.1	1.4
1987	1.8	1.9	0.8
1988	3.6	4.0	1.6
1989	2.6	2.8	1.7
1990	3.1	3.8	1.4
1991	2.7	3.3	1.2
1992	2.8	3.8	1.1
1993	2.5	3.0	1.2
1994	4.1	5.0	1.9
1995	3.1	4.1	1.0
1996	3.7	4.4	2.0
1997	3.8	4.4	2.1
1998	3.2	3.4	2.4
1999	2.1	2.3	1.4
2000	5.0	5.4	3.1
2001	5.8	6.2	2.7
2002	4.3	4.6	2.5
2003	5.8	6.2	3.4
2004	4.9	5.1	3.8
2005	3.8	4.2	2.5
2006	5.0	5.5	3.3
2007	5.7	6.5	2.6
2008	9.1	10.6	2.2
2009	6.6	7.1	1.6
2010	6.3	6.8	1.7
2011	8.0	8.4	3.0
2012	9.6	10.6	1.5
2013	11.7	12.4	2.5
Average	**4.7**	**5.2**	**2.1**
Std. Dev.	**2.4**	**2.5**	**0.9**

Figure 79. Guam trolling CPUE (lbs/hr): yellowfin tuna



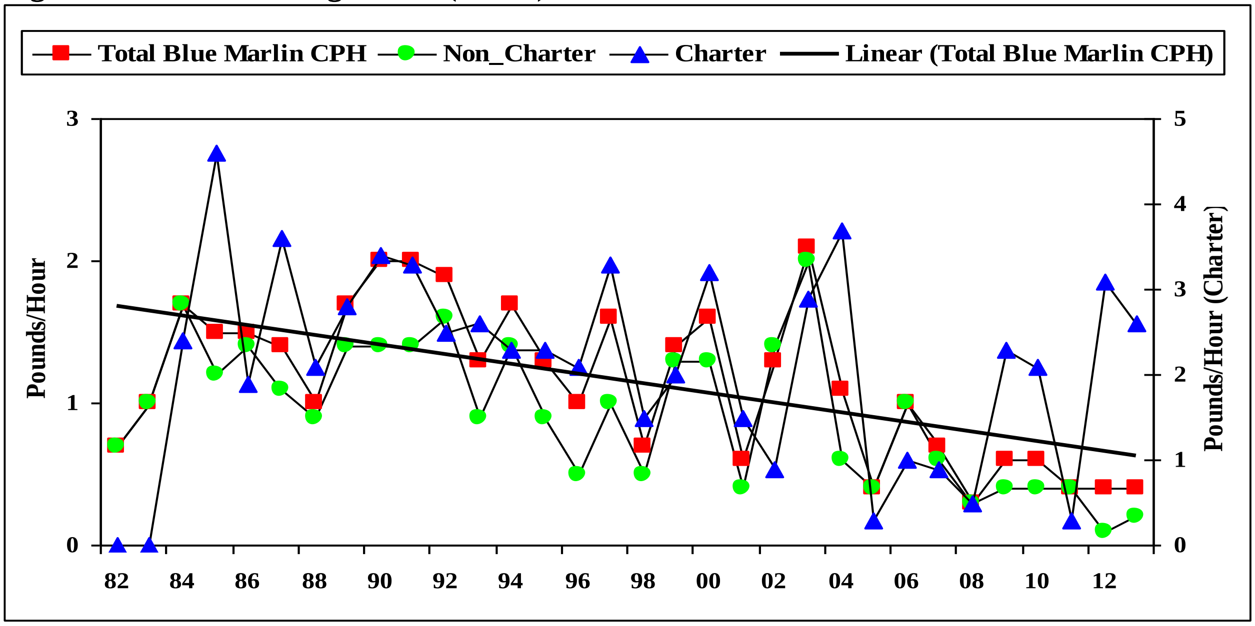
Interpretation: The wide fluctuations in CPUE for yellowfin tunas are probably due to the high variability in the year-to-year abundance and availability of the stocks. It is not possible to allocate species-specific effort, since effort used to target other species can also result in an artificially high or low catch rate for a given species. In 2013, the yellowfin catch rates for total and non-charter catch increased by 33% and 44% respectively. There were no yellowfin recorded in the charter fishery. All three categories were under their 30-year averages.

Source and Calculations: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program and its associated computerized data expansion system files, expanded with the assistance of NMFS. The data expansion system is run on a calendar year's worth of survey data to produce catch and effort estimates for each fishing method surveyed. This plot and table of catch per unit of effort (CPUE) are based on the total annual landings of yellowfin divided by the total number of hours spent fishing (gear in use).

Table 78. Guam boat-based creel trolling CPUE (lbs/hr): yellowfin tuna

Year	Total Yellowfin	Non-Charter	Charter
1982	3.6	3.6	4.0
1983	2.2	2.2	0.0
1984	2.3	2.5	0.1
1985	2.6	2.7	1.3
1986	1.5	1.6	0.3
1987	1.2	1.2	0.8
1988	1.5	1.7	0.1
1989	0.8	1.0	0.1
1990	1.5	1.9	0.5
1991	1.0	1.3	0.2
1992	3.0	4.7	0.3
1993	1.2	1.5	0.3
1994	1.5	2.0	0.3
1995	1.6	2.1	0.5
1996	1.7	2.2	0.4
1997	1.6	1.9	0.5
1998	2.2	2.6	0.4
1999	2.2	2.5	0.6
2000	1.4	1.7	0.4
2001	1.0	1.1	0.4
2002	1.0	1.1	0.3
2003	2.2	2.5	0.7
2004	3.0	3.4	1.2
2005	1.0	1.1	0.3
2006	0.9	1.1	0.4
2007	1.7	2.0	0.5
2008	0.6	0.7	0.2
2009	0.9	1.0	0.2
2010	0.5	0.5	0.2
2011	1.6	1.7	0.3
2012	0.9	0.9	0.5
2013	1.2	1.3	0.0
Average	**1.6**	**1.9**	**0.5**
Std. Dev.	**0.7**	**0.9**	**0.7**

Figure 80. Guam trolling CPUE (lbs/hr): blue marlin



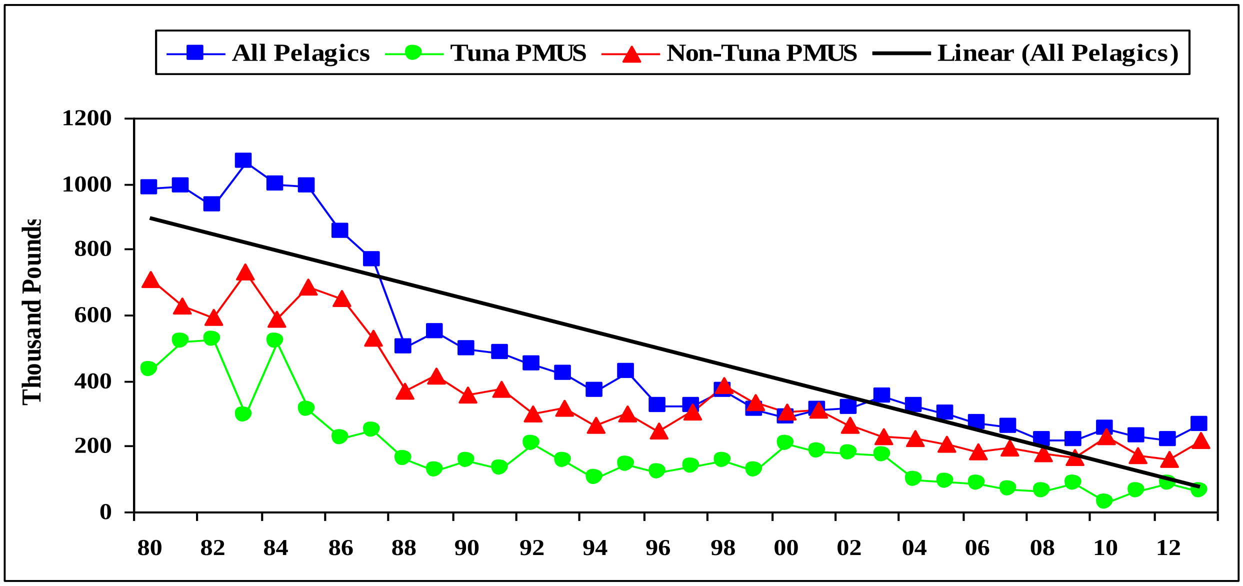
Interpretations: The wide fluctuations in CPUE are probably due to the high variability in the year-to-year abundance and availability of the stocks. Since it is not possible to allocate species-specific effort, effort used to target other species can also result in an artificially high or low catch rate for a given species. The 2013 blue marlin non-charter CPUE increased 100% and total CPUE was unchanged, while charter CPUE decreased 16%. Total catch CPUE is 67% below the 32 year average.

Source and Calculations: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program and its associated computerized data expansion system files, expanded with the assistance of NMFS. The data expansion system is run on a calendar year's worth of survey data to produce catch and effort estimates for each fishing method surveyed. This plot and table of catch per unit of effort (CPUE) are based on the total annual landings of marlin divided by the total number of hours spent fishing (gear in use).

Table 79. Guam boat-based creel trolling CPUE (lbs/hr): blue marlin

Year	Total Blue Marlin	Non-Charter	Charter
1982	0.7	0.7	0.0
1983	1.0	1.0	0.0
1984	1.7	1.7	2.4
1985	1.5	1.2	4.6
1986	1.5	1.4	1.9
1987	1.4	1.1	3.6
1988	1.0	0.9	2.1
1989	1.7	1.4	2.8
1990	2.0	1.4	3.4
1991	2.0	1.4	3.3
1992	1.9	1.6	2.5
1993	1.3	0.9	2.6
1994	1.7	1.4	2.3
1995	1.3	0.9	2.3
1996	1.0	0.5	2.1
1997	1.6	1.0	3.3
1998	0.7	0.5	1.5
1999	1.4	1.3	2.0
2000	1.6	1.3	3.2
2001	0.6	0.4	1.5
2002	1.3	1.4	0.9
2003	2.1	2.0	2.9
2004	1.1	0.6	3.7
2005	0.4	0.4	0.3
2006	1.0	1.0	1.0
2007	0.7	0.6	0.9
2008	0.3	0.3	0.5
2009	0.6	0.4	2.3
2010	0.6	0.4	2.1
2011	0.4	0.4	0.3
2012	0.4	0.1	3.1
2013	0.4	0.2	2.6
Average	**1.2**	**0.9**	**2.3**
Std. Dev.	**0.5**	**0.5**	**1.0**

Figure 81. Guam annual inflation-adjusted revenue per trolling trip: all pelagics, tuna PMUS, and non-tuna PMUS



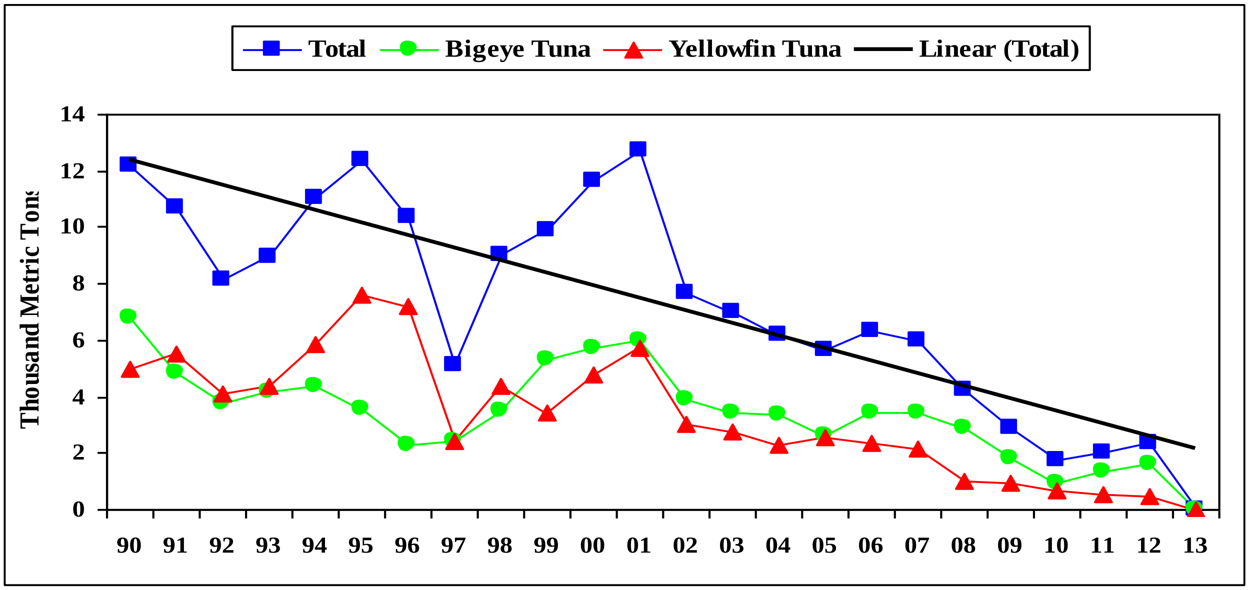
Interpretation: There has been a general decrease from 1980 in the adjusted revenues per trolling trip for all pelagics, tunas and other PMUS, although the revenue values have remained fairly constant for 10 years. In 2013, the adjusted revenue per trip decreased 23% for all pelagics. Tuna PMUS revenues decreased by 27%, and non-tuna PMUS increased by 35%. Despite continual declines in revenues, trolling effort still occurs since most charter and non-charter trolling boats do not rely on selling fish caught as their primary source of income and there is a reliable market for members of the local fishermen's cooperative that provides additional income.

Source and Calculations: Data are from the WPacFIN-sponsored commercial landings system. The average revenue per trip was calculated by summing the revenue of all species sold then dividing by the number of trips, and summing the revenue of tunas and other PMUS sold, and then dividing each by the number of trips, respectively, for any trip, which landed PMUS. Adjusted revenue per trip was derived from the Guam Annual Consumer Price Index (CPI).

Table 80. Guam annual inflation-adjusted revenue per trolling trip: all pelagics, tuna PMUS, and non-tuna PMUS

	All Pelagics		Tuna PMUS		Non-Tuna PMUS	
Year	Unadjusted	Adjusted	Unadjusted	Adjusted	Unadjusted	Adjusted
1980	161.31	984.64	71.14	434.24	116.20	709.28
1981	195.29	989.73	102.24	518.15	124.58	631.37
1982	194.29	936.48	108.45	522.73	123.68	596.14
1983	229.26	1067.89	62.81	292.57	156.75	730.14
1984	233.01	998.45	121.56	520.88	137.48	589.10
1985	240.34	991.40	76.21	314.37	165.90	684.34
1986	212.25	852.40	55.68	223.61	162.89	654.17
1987	199.18	766.05	64.07	246.41	137.77	529.86
1988	137.30	501.83	44.98	164.40	100.78	368.35
1989	166.79	549.74	38.89	128.18	126.20	415.96
1990	172.68	498.18	53.19	153.45	123.50	356.30
1991	185.96	486.66	51.79	135.53	144.20	377.37
1992	188.33	447.47	86.72	206.05	126.18	299.80
1993	191.92	421.07	70.60	154.90	144.36	316.73
1994	197.09	369.74	56.32	105.66	140.32	263.24
1995	239.79	427.07	82.55	147.02	169.38	301.67
1996	191.10	324.30	72.55	123.12	144.71	245.57
1997	192.95	321.26	82.74	137.76	184.35	306.94
1998	221.01	370.19	92.81	155.45	231.44	387.66
1999	190.05	312.63	78.35	128.89	205.04	337.29
2000	179.42	289.40	127.01	204.87	189.00	304.86
2001	188.68	308.68	113.92	186.37	188.92	309.07
2002	193.42	314.50	109.41	177.90	162.85	264.79
2003	223.73	353.94	110.95	175.52	145.38	229.99
2004	215.10	320.71	65.56	97.75	149.03	222.20
2005	216.34	299.63	64.62	89.50	149.05	206.43
2006	219.47	272.36	68.83	85.42	148.26	183.99
2007	221.40	257.49	61.56	71.59	167.09	194.33
2008	196.13	218.68	55.86	62.28	159.29	177.61
2009	202.16	220.76	76.76	83.82	152.00	165.98
2010	238.87	254.16	29.75	31.65	214.40	228.12
2011	221.87	228.75	60.94	62.83	169.93	175.20
2012	216.61	216.61	85.65	85.65	169.92	162.92
2013	266.47	266.47	62.39	62.39	220.24	220.24
Average	**204.11**	**483.51**	**75.50**	**185.03**	**155.18**	**357.27**
Std. Dev.	**25.63**	**274.27**	**23.55**	**131.56**	**29.91**	**172.66**

Figure 82. Guam foreign longline transshipment landings (mt) from vessels fishing outside the Guam EEZ



Interpretation: Annual landings from a primarily foreign longline fishing fleet have ranged from a low of 0 metric tons in 2013 to a high of 12,716 metric tons in 2001. These vessels fish primarily outside Guam's EEZ, but tranship their catch through Guam. The dramatic drop observed in 1997 was due to a large number of foreign fishing boats leaving the western Pacific that year for several reasons, including availability of fish stocks. In 2013, total longline landings decreased 13% to zero metric tons, with bigeye landings decreasing 16%, and yellowfin landings decreasing 12%. 2013 yellowfin totals were the lowest in the 24 year data set, and total catch was 86% below the 24 year average. The lower numbers may be due to a reduction in the number of agents reporting sales, and vessels relocating to other regions of the Pacific, or may indicate a decline in yellowfin stock in the region.

Source and Calculations: Data are from the Bureau of Statistics and Plans. Pre-1990 data was extracted directly from transshipment agents' files. Beginning in 1990, a mandatory data submission program was implemented.

Table 81. Guam foreign longline transshipment landings (mt)

Year	Total	Bigeye	Yellowfin
1990	12,198	6,793	5,011
1991	10,707	4,824	5,505
1992	8,157	3,754	4,104
1993	8,981	4,178	4,379
1994	11,023	4,400	5,878
1995	12,366	3,560	7,635
1996	10,356	2,280	7,214
1997	5,093	2,395	2,392
1998	9,032	3,533	4,379
1999	9,865	5,328	3,404
2000	11,664	5,725	4,795
2001	12,716	5,996	5,711
2002	7,691	3,904	3,011
2003	7,010	3,418	2,788
2004	6,190	3,375	2,287
2005	5,660	2,618	2,574
2006	6,315	3,455	2,377
2007	5,991	3,439	2,134
2008	4,215	2,926	1,014
2009	2,874	1,813	934
2010	1,779	935	656
2011	2,016	1,343	532
2012	2,342	1,637	492
2013	0	0	0
Average	**7,260**	**3,401**	**3,300**
Std. Dev.	**3,669**	**1,608**	**2,129**

Table 82. Trolling bycatch annual summaries

Year	Released alive	Released dead/ injured	Total Number Released	Total Number Landed	Percent Bycatch*	Interviews with Bycatch	Total Number of Interviews	Percent of Interviews with Bycatch
2001	7	3	10	5,289	0.2	10	461	2.2
2002	1	2	3	3,443	0.1	3	258	1.2
2003	5	0	5	3,026	0.2	2	178	1.1
2004	0	0	0	4,292		0	91	0
2005	3	0	3	2,631	0.11	3		
2006	2	1	3	3,478	0.09	3	413	0.7
2007	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2008	1	0	1	3,495	0.02	1	98	1.02
2009	2	1	3	3,478	0.08	3	604	0.05
2010	0	0	0	6,085	0	0	670	0
2011	0	1	1	7,100	0.00014	1	496	0.002
2012	0	0	0	5,570	0	0	330	0
2013	9	19	28	7,035	0.39	8	328	2.43

*"percent bycatch" represents the number of pieces that were discarded compared to the total number of fish caught trolling. The bycatch information is from unexpanded data, taken only from actual interviews that reported bycatch.

Interpretation: Bycatch information was recorded beginning in 2000 as a requirement of the pelagic FMP. Historically, most fish landed are kept regardless of size and species. Bycatch for this fishery are sharks, shark-bitten pelagics, small pelagics, or other pelagic species. In 2010 and 2012, bycatch was not encountered by Fisheries staff when interviewing trollers. In 2013, 9 fish were released alive, 19 were released dead or injured, for a total of 28 fish as bycatch.

Source and Calculations: The DAWR creel survey data for boat based methods. Bycatch is obtained directly from trolling interviews where bycatch was voluntarily reported. The number of bycatch reported is from unexpanded data.

Plan Team Recommendations

1. The Pelagics Plan Team noted the expansion of the retail pelagic fish trade in Guam and recommended that the Council review the CNMI legislation for mandatory fish dealer reporting and evaluate if it would be applicable to Guam where fish dealer reporting is voluntary.

D. Hawaii

Introduction

Hawaii's pelagic fisheries, which include the longline, main Hawaiian Island (MHI) troll and handline, offshore handline, and aku boat (pole and line) fisheries, are the state's largest and most valuable commercial fisheries. These pelagic fisheries landed an estimated 32.9 million pounds worth about $102 million (ex-vessel revenue) in 2013. The deep-set longline fishery was the largest of all commercial pelagic fisheries in Hawaii and represented 75% of the total commercial pelagic landings and 84% of the ex-vessel revenue. The MHI troll was the second largest fishery in Hawaii and accounted for 10% and 7% of the landings and revenue, respectively. The shallow-set longline, MHI handline, aku boat, offshore handline fisheries and other gear types made up the remainder.

Target species for Hawaii's pelagic fisheries are tunas and billfishes, but a variety of other pelagic species are also important to these fisheries. The largest component of the pelagic landings was tunas, which comprised 64% of the total in 2013. Bigeye tuna alone accounted for 74% of the tunas and 47% of all pelagic landings. Billfish landings made up 17% of the total landings in 2013. Swordfish was the largest of these at 53% of the billfish and 9% of the total landings. Landings of other pelagic management unit species (PMUS) represented 19% of the total landings in 2013 with moonfish being the largest component at 33% of the other PMUS and 6% of the total landings.

Data Sources and Calculation Procedures

This report contains the most recently available information on Hawaii's commercial pelagic fisheries, as compiled from three data sources: The State of Hawaii's Division of Aquatic Resources (HDAR) Commercial Fishing Report data (Fishing Report), HDAR Commercial Marine Dealer (Dealer) data, and the National Oceanic and Atmospheric Administration (NOAA) Fisheries, Pacific Islands Fisheries Science Center's (PIFSC) longline logbook data. The data sources and estimation procedures are described below.

The Hawaii-based Longline Fishery: The federal longline logbook system was implemented in December 1990 and is the main source of the data used to determine longline vessel activity, effort, and fish catches. The logbook data has detailed operational information and catch in number of fish. Number of fish caught by the Hawaii-based longline fishery is a sum of the number of fish kept and released, whereas the calculation of weight for longline catch only includes the number of fish kept. Another important data set is the State of Hawaii DAR Commercial Dealer data, from which revenue, average weight, and average price are derived. The Dealer data dates back to 1990 with electronic submission beginning in mid-1999.

The logbook and Dealer data were used to calculate the weight of longline catch. The longline purchases in the Dealer data were identified and separated out by matching longline trips based on a specific vessel name and its return to port date in the logbook data with the corresponding vessel name and purchase date(s) in the Dealer data. The general procedure for estimating longline catch was done by first calculating an average weight by dividing the longline Dealer data “Pounds Bought” by the “Number Bought” for each species. This average weight was multiplied by the total number kept from the longline logbook data to estimate the total weigh of catch kept. Revenue was the simple sum of “Amount Paid” from the Dealer data based on longline trips which were matched with the logbook data.

The catch and effort summaries in this Module were based on Regional Fishery Management Organization (RFMO) standards and business rules. Longline catch and effort statistics in this module consist of U.S. longline fisheries in the north Pacific Ocean, CNMI in the north Pacific Ocean, and American Samoa in the north Pacific Ocean. Longline vessels operating from California were included in this report to satisfy confidentiality standards. Most of these vessels had Hawaii limited-entry permits. The only exception to summaries using RFMO standards was catch and effort statistics using boundaries within or outside of U.S. EEZs. Since there were substantial differences in operational characteristics and catch between the deep-set longline fishery targeting tunas and the shallow-set longline fishery sector targeting swordfish, separate summaries were provided for each longline sector.

MHI Troll Fishery: Catch and effort by the MHI troll fishery was defined as using a combination of pelagic species, gear and area codes from the HDAR Fishing Report data. The codes for the MHI troll fishery includes summaries of PMUS caught by Miscellaneous Trolling Methods (HDAR gear code 6), Lure Trolling (61), Bait Trolling (62), Stick Trolling (63), Casting, Light Tackle, Spinners or Whipping (10) and Hybrid Methods (97) in HDAR statistical areas 100 through 642. These are areas that begin from the shoreline out to 20 minute squares around the islands of Hawaii, Maui, Kahoolawe, Lanai, Mokolai, Oahu, Kauai and Niihau.

MHI Handline Fishery: The MHI handline fishery includes PMUS caught by Deep Sea or Bottom Handline Methods (HDAR gear code 3), Inshore Handline or Cowrie Shell (Tako) Methods (4), Ika_Shibi (8), Palu-Ahi, Drop Stone or Make Dog Methods (9), Drifting Pelagic Handline Methods (35) and Floatline Methods (91) in HDAR statistical areas 100 to 642 except areas 175, 176, and 181.

Offshore Handline Fishery: The offshore handline fishery includes PMUS caught by Ika-Shibi (HDAR gear code 8), Palu-Ahi, Drop Stone or Make Dog Methods (9), Drifting Pelagic Handline Methods (35), Miscellaneous Trolling Methods (6), Lure Trolling (61), and Hybrid Methods (97) in Areas 15217 (NOAA Weather Buoy W4), 15717 (NOAA Weather Buoy W2), 15815, 15818 (Cross Seamount) , 16019 (NOAA Weather Buoy W3), 16223 (NOAA Weather Buoy W1), 175, 176, 181, 804, 807, 816, 817, 825, 839, 842, 892, 893, 894, 898, 900, 901, 15416, 15417, 15423, 15523, 15718, 15918, 15819, and 16221. This fishery also includes pelagic species caught by Deep Sea or Bottom Handline Methods (3) in Area 16223.

Other Gear: This category represents pelagic species caught by other methods or in areas other than those methods mentioned above. Catch and revenue from this category is primarily composed of PMUS caught by the aku boat fishery, fishers trolling in areas outside of the MHI (the distant water albacore troll fishery) or PMUS caught close to shore by diving, spearfishing, squidding, or netting inside of the MHI.

Calculations: Calculating catch by the MHI troll, MHI handline, offshore handline, and other gear involved processing of two data sets: the HDAR Fishing Report data collected and submitted by the aforementioned fishers, and HDAR Dealer data collected and submitted by seafood dealers. "Pounds Landed" from HDAR Fishing Report data was summed by species for each of the above fisheries. Total "Pounds Landed" for each species was then calculated by summing the catch of that particular species for the MHI troll, MHI handline, offshore handline fisheries and other gear category. The percent catch of each species by fishery was also calculated and later used in conjunction with the HDAR Dealer data.

Catch in the HDAR Dealer data, referred to as "Pounds Bought", by each fishery was not clearly differentiated; however, "Pounds Bought" by the longline and aku boat fisheries were identified by CML numbers and/or vessel names and kept separate from the "non-longline & non-aku boat" Dealer data. The remaining "non-longline and non-aku" boat "Pounds Bought" was presumed to be from the MHI troll, MHI handline, offshore handline fisheries or other gear category. "Pounds Bought" from this data was summed on a species specific basis with fishery specific landings of each particular species allocated based on the percent catch by fishery calculated from the HDAR Dealer data. The fishery specific HDAR Dealer data allocation was then compared to the "Pounds Landed" from the HDAR Fishing Report total. The greater value of "Pounds Bought" from the HDAR Dealer data or the "Pounds Landed" from the HDAR Fishing Report catch data was used as the catch. This process was repeated on a monthly basis.

This module was prepared by Russell Ito of the PIFSC. Summaries for the longline fishery that originate from NOAA Fisheries longline logbook data were provided by Karen Sender of the PIFSC. NOAA Fisheries logbook data that were integrated with corresponding HDAR Dealer data was provided by Dios Gonzales and Grace Kagami from the PIFSC. HDAR Commercial Fish Catch and Dealer data used calculate the MHI troll, MHI handline, offshore handline, and other gear landings were compiled by Karen Brousseau and Ashley Tomita from JIMAR. Information on HDAR CMLs was provided by Reginald Kokubun of HDAR.

Plan Team Recommendations

1. The Pelagics Plan Team recommends NMFS-PIFSC conduct an analysis of swordfish landings by deep set longline vessels carrying observers since the new swordfish trip limit rule went into effect on August 27, 2012. Are deep set longline vessels with observers retaining more than 25 swordfish than prior to the new trip limits? If so, this may indicate a change in vessel operations and potential targeting since very few vessels incidentally caught more than 25 swordfish prior to the change in trip limits.

Table 83. Number of Hawaii licenses per fishing method in 2012-2013

Primary Fishing Method	Number of licensees 2012	2013
Trolling	1,221	1,170
Longline	752	765
Ika Shibi & Palu Ahi	241	262
Aku Boat (Pole and Line)	16	20
Total Pelagic	2,230	2,217
Total All Methods	3,841	3,821

Interpretation: A total of 3,821 fishermen were licensed in 2013, including 2,217 (58%) who indicated that their primary fishing method and gear was intended to catch pelagic fish. Most licenses that indicated pelagic fishing as their primary method were issued to trollers (53%) and longline fishermen (36%). The remainder was issued to ika shibi and palu ahi (handline) (12%) and aku boat fishers (1%).

Sources and calculations: Any fisherman who takes marine species for commercial purposes is required by the State of Hawaii, Division of Aquatic Resources (HDAR) to have a Commercial Marine License (CML) and submit a monthly catch report. An exception to this rule is that should a fishing trip occur on a boat, only one person per vessel is required to submit a catch report. This person is usually, but not necessarily, the captain. Crew members do not ordinarily submit catch reports. HDAR asks fishermen to identify their primary fishing gear or method on the CML at time of licensing. This does not preclude fishermen from using other gears or methods.

Table 84. Hawaii commercial pelagic landings, revenue, and average price by species, 2012-2013

	2012			2013		
Species	Catch (1000 lbs)	Ex-vessel revenue ($1000)	Average price ($/lb)	Catch (1000 lbs)	Ex-vessel revenue ($1000)	Average price ($/lb)
Tuna PMUS						
Albacore	2,009	$4,187	$1.89	830	$1,749	$2.18
Bigeye tuna	14,022	$64,940	$4.29	15,524	$65,689	$4.27
Bluefin tuna	1	$3	$5.26	1	$3	$5.71
Skipjack tuna	907	$930	$1.15	1,090	$1,324	$1.44
Yellowfin tuna	4,098	$13,405	$1.78	3,628	$12,461	$3.65
Other tunas	67	$244	$1.00	12	$22	$2.86
Tuna PMUS subtotal	**21,104**	**$83,709**	**$3.23**	**21,085**	**$81,247**	**$3.96**
Billfish PMUS						
Swordfish	3,094	$6,817	$2.78	2,888	$4,561	$2.67
Blue marlin	951	$1,475	$1.52	1,141	$1,460	$1.55
Spearfish (hebi)	386	$763	$1.75	496	$612	$1.32
Striped marlin	648	$1,382	$2.15	888	$1,338	$1.30
Other marlins	30	$40	$2.65	36	$25	$2.42
Billfish PMUS subtotal	**5,109**	**$10,477**	**$2.32**	**5,449**	**$7,997**	**$1.94**
Other PMUS						
Mahimahi	2,007	$5,369	$1.36	1,614	$4,109	$2.72
Ono (wahoo)	809	$2,301	$1.51	877	$2,312	$3.17
Opah (moonfish)	1,593	$3,219	$2.07	2,086	$3,187	$1.55
Oilfish	563	$867	$1.43	566	$410	$0.70
Pomfrets (monchong)	710	$2,125	$2.68	1,087	$2,582	$2.25
PMUS Sharks	181	$132	$1.32	124	$104	$1.32
Other PMUS subtotal	**5,863**	**$14,013**	**$1.64**	**6,354**	**$12,704**	**$2.08**
Other pelagics	**26**	**$39**	**$1.74**	**17**	**$26**	**$1.33**
Total pelagics	**32,102**	**$108,237**	**$3.12**	**32,905**	**$101,973**	**$3.31**

Interpretation: The total commercial pelagic landings in 2013 were 32.9 million pounds, up 3% from 2012. Tunas represented 66% of the total landings. Bigeye tuna was the largest component of the pelagic landings (47%) followed by yellowfin tuna (11%) and swordfish (9%).

Total Hawaii commercial ex-vessel revenue exceeded $100 million in 2012 and 2013. However revenue decreased 6% from 2012 to 2013. Tunas comprised 80% of total revenue. Bigeye tuna alone accounted for 64% of the total revenue at $66 million. Yellowfin tuna revenue decreased 7% to $12.4 million. Billfish revenue ($8 million) was down substantially from 2012. Swordfish was the third highest contributor to total revenue at $4.6 million. Revenue of other PMUS decreased 9% in 2013. The average price for all pelagic fish increased by 6%. Average prices for tunas and other PMUS rose in 2013, but decreased for billfish PMUS and other pelagics.

Source and Calculations: NOAA Fisheries longline logbook and HDAR Dealer data were used to produce longline landings, revenue, and average price estimates. The Main Hawaiian Islands (MHI) troll, MHI handline, offshore handline, and other gear landings, revenue, and average price estimates were produced from HDAR Commercial Fish Catch and Dealer data.

Tuna MUS included albacore, bigeye tuna, bluefin tuna, skipjack tuna, yellowfin tuna and other tuna species such as kawakawa, keokeo. Billifsh MUS are composed on swordfish, blue marlin, striped marlin, spearfish, sailfish, black marlin and unclassified marlins. Mahimahi, monchong, moonfish, oilfish, and ono made up the other PMUS. The shark MUS were blue shark, mako shark, thresher shark, and white-tipped sharks. “Other pelagics” includes non-PMUS fish species.

The revenue for the current year is an unadjusted value while the revenue for the previous year is adjusted by the CPI. The average price is the total revenue divided by the pounds sold for each species where pounds sold is equal to or less than the total catch for each species.

Table 85. Hawaii-based deep-set and shallow-set longline landings, ex-vessel value, and average price by species, 2012-2013

	Deep-set longline						Shallow-set longline					
	2012			2013			2012			2013		
	Catch (1000 lbs)	Ex-vessel value ($1000)	Avg. Price ($/lb)	Catch (1000 lbs)	Ex-vessel value ($1000)	Avg. Price ($/lb)	Catch (1000 lbs)	Ex-vessel value ($1000)	Avg. Price ($/lb)	Catch (1000 lbs)	Ex-vessel value ($1000)	Avg. Price ($/lb)
Tuna PMUS												
Albacore	1,421	$3,339	$2.43	699	$1,545	$2.26	26	$23	$1.78	15	$7	$2.10
Bigeye tuna	12,741	$62,285	$4.87	14,067	$62,718	$4.41	75	$365	$5.18	44	$194	$5.32
Bluefin tuna	1	$3	$5.35	1	$3	$5.71	0	$0	$0.00	0	$0	$0.00
Skipjack tuna	541	$433	$1.40	497	$403	$0.85	1	$0	$0.10	0	$0	$0.62
Yellowfin tuna	1,886	$7,670	$3.99	1,525	$6,832	$4.19	29	$155	$4.81	22	$123	$5.34
Other tunas	0	$0	$0.00	0	$0	$0.00	0	$0	$0.00	0	$0	$0.00
Tuna PMUS Subtotal	**16,590**	**$73,730**	**$4.50**	**16,789**	**$71,501**	**$4.20**	**131**	**$544**	**$4.69**	**81**	**$324**	**$5.16**
Billfish PMUS												
Swordfish	566	$1,614	$2.97	666	$1,750	$2.54	2,508	$5,143	$2.83	2,164	$2,680	$2.79
Blue marlin	630	$1,074	$1.87	831	$997	$1.50	26	$23	$1.34	17	$20	$1.15
Spearfish	354	$649	$1.85	465	$585	$1.27	5	$5	$1.88	4	$46	$1.94
Striped marlin	596	$1,344	$2.21	829	$1,248	$1.34	25	$59	$2.03	34	$4	$1.24
Other Marlins	21	$34	$3.89	27	$17	$2.60	0	$0	$0.00	0	$0	$0.00
Billfish PMUS Subtotal	**2,167**	**$4,715**	**$2.26**	**2,818**	**$4,596**	**$1.67**	**2,564**	**$5,230**	**$2.80**	**2,219**	**$2,750**	**$2.70**
Other PMUS												
Mahimahi	889	$2,256	$2.53	847	$1,943	$2.16	46	$90	$2.84	42	$104	$2.39
Ono (wahoo)	366	$1,116	$3.24	459	$1,243	$2.75	1	$3	$2.84	1	$2	$2.16
Opah (moonfish)	1,574	$3,210	$2.08	2,075	$3,186	$1.55	17	$5	$2.71	11	$1	$2.98
Oilfish	537	$833	$1.43	548	$405	$0.71	24	$31	$1.51	12	$2	$0.46
Pomfrets (monchong)	682	$2,034	$2.89	1,015	$2,367	$2.20	5	$2	$3.78	1	$1	$3.18
PMUS sharks	150	$116	$1.33	106	$97	$1.38	26	$10	$1.35	14	$5	$0.85
Other PMUS Subtotal	**4,198**	**$9,564**	**$2.30**	**5,050**	**$9,242**	**$1.80**	**119**	**$142**	**$2.23**	**81**	**$115**	**$2.06**
Non-PMUS pelagics	**20**	**$36**	**$1.83**	**14**	**$24**	**$1.79**	**0**	**$0**	**$0.00**	**0**	**$0**	**$0.00**
Total pelagics	**22,975**	**$88,046**	**$3.89**	**24,671**	**$85,363**	**$3.43**	**2,814**	**$5,916**	**$2.89**	**2,381**	**$3,189**	**$2.81**

Interpretation: Deep-set longline landings was 7% higher in 2013, but ex-vessel revenue and average price for the deep-set longline fishery decreased by 3% and 12%, respectively. Catch, revenue, and average price for the shallow-set longline fishery decreased in 2013. Bigeye tuna is the largest component of the landings and the most valuable species for the deep-set longline fishery, while swordfish was the most important species in terms of landings and revenue for the shallow-set longline fishery.

Source and calculations:
The NOAA Fisheries longline logbook data (number of fish kept) was used in conjunction with the HDAR Commercial Marine Dealer data (average pounds) to calculate pounds kept or landings. The longline ex-vessel revenue was calculated by summing longline records in the HDAR Commercial Marine Dealer data for each species. The HDAR Dealer data was used to calculate average price by dividing the "Amount Paid" for longline fish sales by the "Pounds Bought". Ex-vessel revenue and average price was adjusted for inflation by dividing the current year Honolulu CPI (H-CPI) by the previous year H-CPI then multiplying the nominal revenue for that respective year.

Table 86. Hawaii commercial pelagic landings, revenue, and average price by fishery, 2012-2013

	2012			2013		
Fishery	Catch (x1000)	Ex-vessel revenue ($1000)	Average price ($/lb)	Catch (x1000)	Ex-vessel revenue ($1000)	Average price ($/lb)
Deep-set longline	22,975	$88,046	$3.89	24,671	$85,363	$3.43
Shallow-set longline	2,814	$5,916	$2.89	2,381	$3,189	$2.81
MHI trolling	3,690	$8,745	$3.29	3,128	$7,296	$3.35
MHI handline	1,602	$3,420	$2.54	1,332	$3,348	$2.59
Offshore handline	562	$1,113	$2.95	834	$1,636	$3.00
Other gear	459	$997	$2.81	559	$1,141	$2.86
Total	**32,102**	**$108,237**	**$3.12**	**32,905**	**$101,973**	**$3.31**

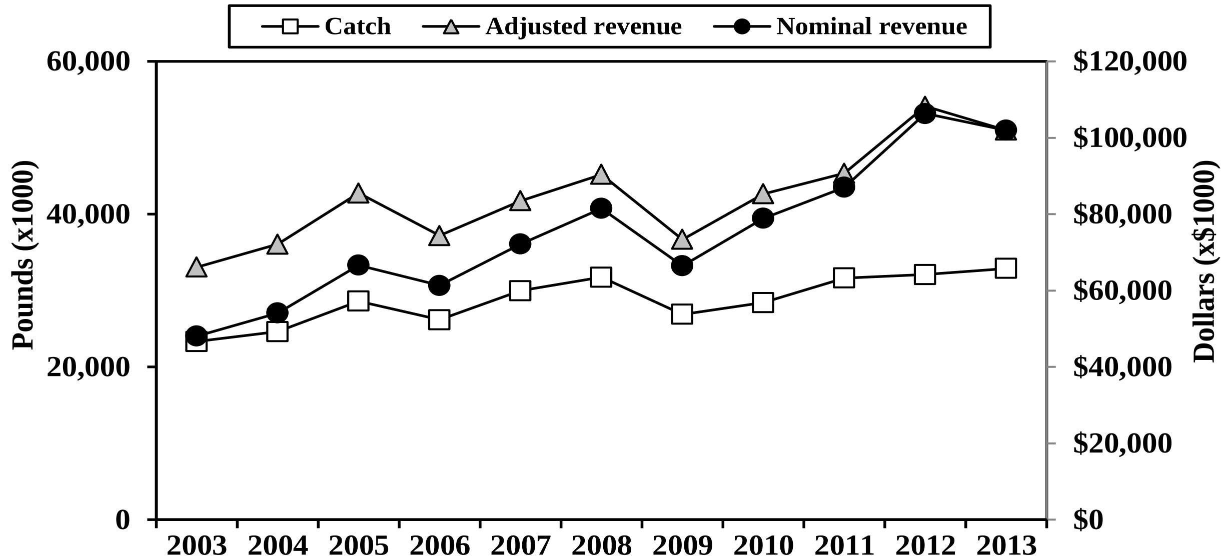
Interpretation: The deep-set longline fishery is the largest commercial fishery in Hawaii. The deep-set longline landings and revenue in 2013 were 24.7 million pounds and $85.4 million, respectively. 2013 landings by this fishery increased by 1.7 million pounds, but revenue decreased $2.7 million. The average price for the deep-set longline fishery decreased 12% in 2013. The shallow-set longline fishery landed 2.4 million pounds worth $3.2 million in 2013.

The MHI troll fishery was the second largest commercial fishery. It produced 3.1 million pounds worth $7.2 million; a decrease of 15% and 17%, respectively, from the previous year. The MHI handline fishery produced 1.3 million pounds of pelagic fish worth $3.3 million while the offshore handline fishery landed 559,000 pounds worth $1.1 million in 2013.

Source and calculations: Number of fish from the NOAA Fisheries longline logbook data and average weight of fish from the HDAR Commercial Marine Dealer (Dealer) data were used to calculate longline landings. The ex-vessel revenue was the sum of "Amount Paid" from the HDAR Dealer data. The average price was calculated by dividing the total "Amount Paid" by the "Pounds Bought" from the Dealer data.

The landings and revenue is the sum of the all pelagic species for each fishery. The revenue for 2011 is inflation-adjusted by the Honolulu CPI. The average price was calculated from the HDAR Commercial Marine Dealer data by dividing the "Amount Paid" by the "Pounds Bought" for each fishery.

Figure 83. Hawaii total commercial landings and revenue, 2003-2013

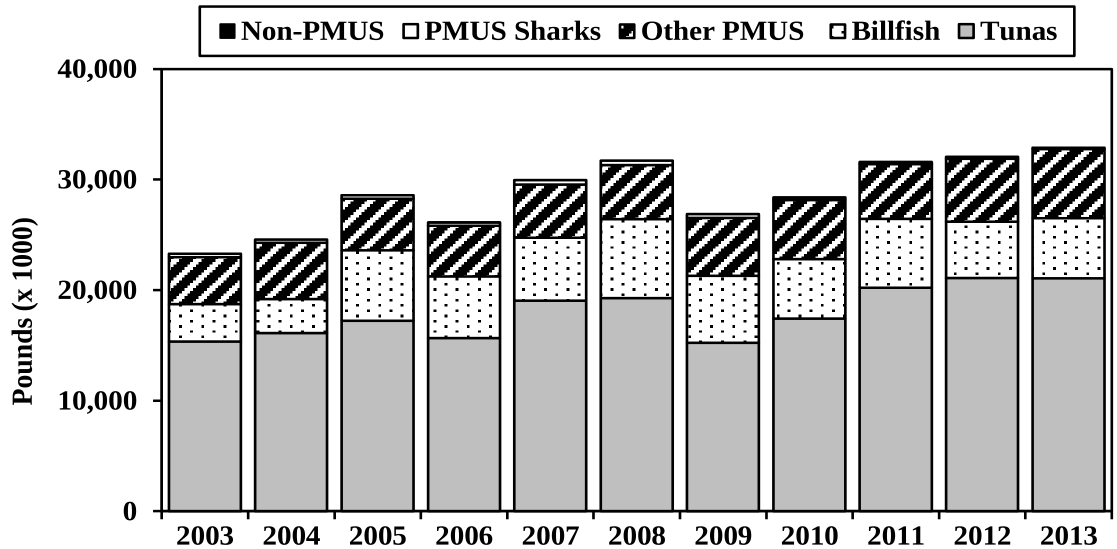


__Interpretation:__ Catch of all fisheries combined reached a record high of 32.9 million pounds while revenue dropped to $102 million. The trend for both landings and inflation-adjusted revenue were increasing. Gear and species specific changes over the 11-year period are explained in greater detail in the following figures and tables.

__Source and calculations:__ The pounds and nominal revenue values are obtained by adding the landings and revenue values for all species and all fisheries for each year. The inflation-adjusted revenue for each year is calculated by multiplying the nominal value by the Honolulu CPI for the current year and then dividing by the Honolulu CPI for that year.

Year	Catch (1000)	Nominal revenue ($1000)	Adjusted revenue ($1000)	Honolulu CPI
2003	23,330	$48,069	$66,151	184.5
2004	24,622	$54,147	$72,130	190.6
2005	28,631	$66,651	$85,555	197.8
2006	26,179	$61,349	$74,387	209.4
2007	29,980	$72,196	$83,511	219.5
2008	31,761	$81,499	$90,400	228.9
2009	26,897	$66,472	$73,379	230.0
2010	28,434	$78,922	$85,306	234.9
2011	31,646	$87,052	$90,732	243.6
2012	32,102	$106,362	$108,237	249.5
2013	32,905	$101,973	$101,973	253.9
Average	**28,771.5**	**74,972.1**	**84,705.6**	
SD	**3,225.4**	**18,468.1**	**12,885.6**	

Figure 84. Hawaii commercial tuna, billfish, shark, and other PMUS landings, 2003-2013



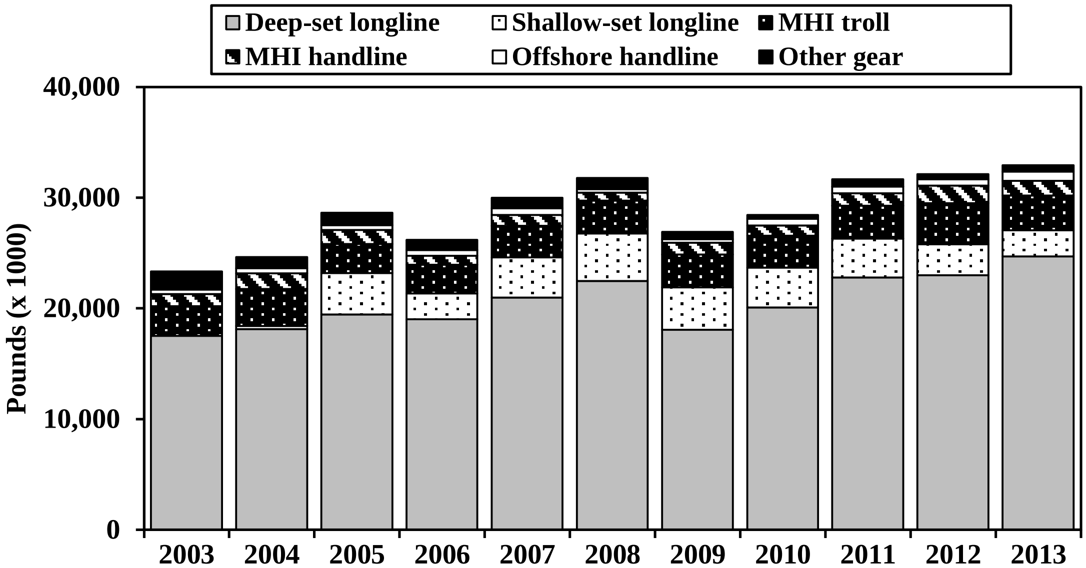
Interpretation: Hawaii's pelagic landings reached a record 32.9 million pounds in 2013. Tunas were the largest group followed by other PMUS and billfish. In general, the trends for tuna, billfish and other PMUS were increasing. Sharks and non-PMUS landings were relatively small.

Source and calculations:
Pelagic landings were calculated from NOAA Fisheries longline logbook, HDAR Commercial Fish Catch and Marine Dealer data. The landings values are obtained by adding the landing values for species in the pelagic species groups defined below for the longline and non-longline fisheries for each year. The PMUS in each group included:

	Hawaii pelagic catch (1000 pounds)					
Year	Tunas	Billfish	Other PMUS	PMUS Sharks	Non-PMUS	Total
2003	15,381	3,375	4,242	305	27	23,330
2004	16,152	3,046	5,109	273	42	24,622
2005	17,262	6,367	4,645	311	46	28,631
2006	15,696	5,560	4,589	285	49	26,179
2007	19,058	5,689	4,814	396	23	29,980
2008	19,306	7,137	4,892	390	36	31,761
2009	15,257	6,062	5,226	332	20	26,897
2010	17,450	5,364	5,343	244	33	28,434
2011	20,235	6,234	4,936	190	51	31,646
2012	21,104	5,109	5,682	181	26	32,102
2013	21,085	5,449	6,230	124	17	32,905
Average	**17,998.7**	**5,399.3**	**5,064.4**	**275.5**	**33.6**	**28,771.5**
SD	**2,256.7**	**1,221.7**	**550.7**	**85.6**	**12.0**	**3,225.4**

Tunas:	Albacore, Bigeye tuna, Bluefin tuna, Kawakawa, Skipjack tuna, Unclassified tuna, Yellowfin tuna
Billfishes:	Blue marlin, Black marlin, Sailfish, Spearfish, Striped marlin, Swordfish, Unclassified billfish
Other PMUS:	Mahimahi, Moonfish, Oilfish, Pomfret, Wahoo
Sharks:	Blue shark, Mako shark, Thresher shark, Oceanic white-tip shark
Non-PMUS:	Barracuda, Beltfish, Flying fish, Frigate mackerel, Stingray, Sunfish, Hammerhead shark, Tiger shark, Unclassified sharks

Figure 85. Hawaii total commercial pelagic landings by gear type, 2003-2013

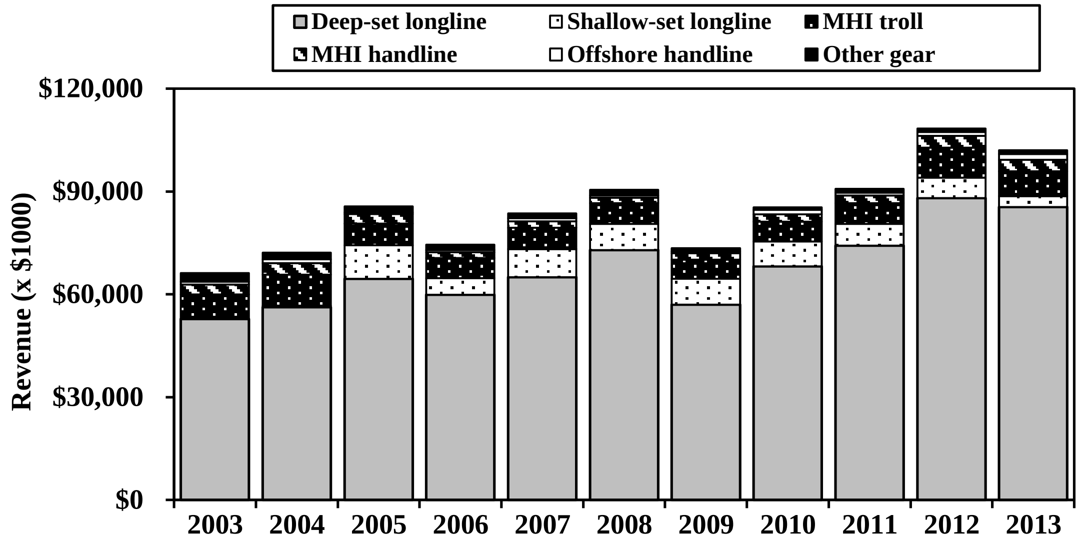


Interpretation: Hawaii commercial pelagic landings were dominated by the deep-set longline fishery. Total landings increased to a record level largely due to higher landings by this fishery and higher landings by the shallow-set longline fishery. MHI troll was typically the third largest fishery, but became the second largest fishery in 2012 and 2013. Landings by the MHI handline and offshore fisheries were the next two largest fisheries in Hawaii. Landings by the offshore handline and other gear accounted for 1.4 million pounds in 2013.

Source and calculations: Pelagic landings were calculated from NOAA Fisheries longline logbook, HDAR Commercial Fish Catch and Marine Dealer data. The landing estimates were calculated by adding the landings values of all species of each fishery. The total column includes the five major pelagic fisheries and contributions from the other gear category. The other gear category includes landings from the aku boat fishery to maintain confidentiality standard of the fishery statistics.

	Hawaii pelagic total catch (1000 pounds)						
Year	**Deep-set longline**	**Shallow-set longline**	**MHI troll**	**MHI handline**	**Offshore handline**	**Other gear**	**Total**
2003	17,509	0	2,693	1,089	402	1,637	23,330
2004	18,119	285	3,348	1,407	470	993	24,622
2005	19,452	3,739	2,606	1,288	424	1,122	28,631
2006	19,008	2,328	2,590	818	502	933	26,179
2007	20,967	3,644	2,835	982	598	954	29,980
2008	22,456	4,301	2,971	701	326	1,006	31,761
2009	18,071	3,833	2,958	1,067	298	670	26,897
2010	20,075	3,614	2,855	933	614	343	28,434
2011	22,796	3,500	2,966	1,129	610	645	31,646
2012	22,975	2,814	3,690	1,602	562	459	32,102
2013	24,671	2,381	3,128	1,332	834	559	32,905
Average	**20,554.5**	**2,767.2**	**2,967.3**	**1,122.5**	**512.7**	**847.4**	**28,771.5**
SD	**2,383.8**	**1,435.9**	**327.3**	**266.9**	**153.5**	**364.0**	**3,225.4**

Figure 86. Total commercial pelagic ex-vessel revenue by gear type, 2003-2013

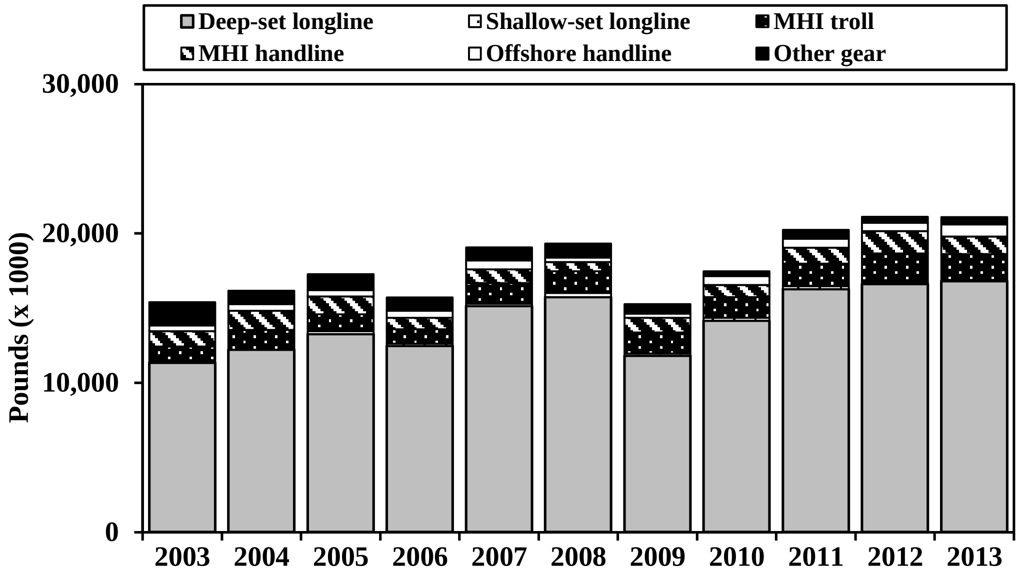


Interpretation: Ex-vessel revenue from Hawaii's pelagic fisheries has been trending upward, reaching a record $108 million in 2012, then decreasing 6% in 2013 to $102 million. The highest grossing fishery in Hawaii in 2013 was the deep-set longline, which accounted for 84% of the total revenue, or $85.4 million. The next three largest revenue generating fisheries were the MHI troll, MHI handline fisheries, and shallow-set longline. MHI troll revenue was $7.3 million in 2013. Shallow-set longline revenue increased dramatically after it reopened in 2004 but decreased gradually to $5.8 million in 2012. MHI handline revenue has been increasing from its low of $1.6 million in 2008 to $3.3 million in 2013. The offshore handline fishery and other gear category (which also includes aku boat revenue) generated $2.1 million in 2013.

Year	Hawaii pelagic total revenue ($1000) Deep-set longline	Shallow-set longline	MHI troll	MHI handline	Offshore handline	Other gear	Total	Honolulu CPI
2003	$52,751	$0	$7,168	$2,905	$790	$2,536	$66,151	184.5
2004	$56,239	$399	$9,064	$3,344	$1,134	$1,952	$72,130	190.6
2005	$64,484	$9,804	$6,304	$2,720	$553	$1,691	$85,555	197.8
2006	$59,842	$4,832	$5,890	$1,648	$618	$1,556	$74,387	209.4
2007	$64,962	$8,176	$6,264	$1,821	$927	$1,361	$83,511	219.5
2008	$72,854	$7,609	$6,052	$1,570	$634	$1,680	$90,400	228.9
2009	$56,956	$7,509	$5,553	$1,932	$434	$996	$73,379	230.0
2010	$68,126	$7,187	$5,848	$2,060	$1,329	$756	$85,306	234.9
2011	$74,156	$6,344	$6,010	$2,222	$869	$1,132	$90,732	243.6
2012	$88,046	$5,916	$8,745	$3,420	$1,113	$997	$108,237	249.5
2013	$85,363	$3,189	$7,296	$3,348	$1,636	$1,141	$101,973	253.9
Average	**$67,616.2**	**$5,542.3**	**$6,744.8**	**$2,453.5**	**$912.5**	**$1,436.1**	**$84,705.6**	
SD	**$11,593.7**	**$3,161.4**	**$1,194.4**	**$715.0**	**$364.1**	**$514.7**	**$12,885.6**	

Source and Calculations: The HDAR Commercial Marine Dealer data was used in conjunction with the NOAA Fisheries logbook and the HDAR Fish Report data to calculated ex-vessel revenue. Ex-vessel revenue values were obtained by adding the revenue for all pelagic species of each fishery for each year. Ex-vessel revenue was then adjusted for inflation using the Honolulu Consumer Price Index (CPI).

Figure 87. Hawaii commercial tuna landings by gear type, 2003-2013

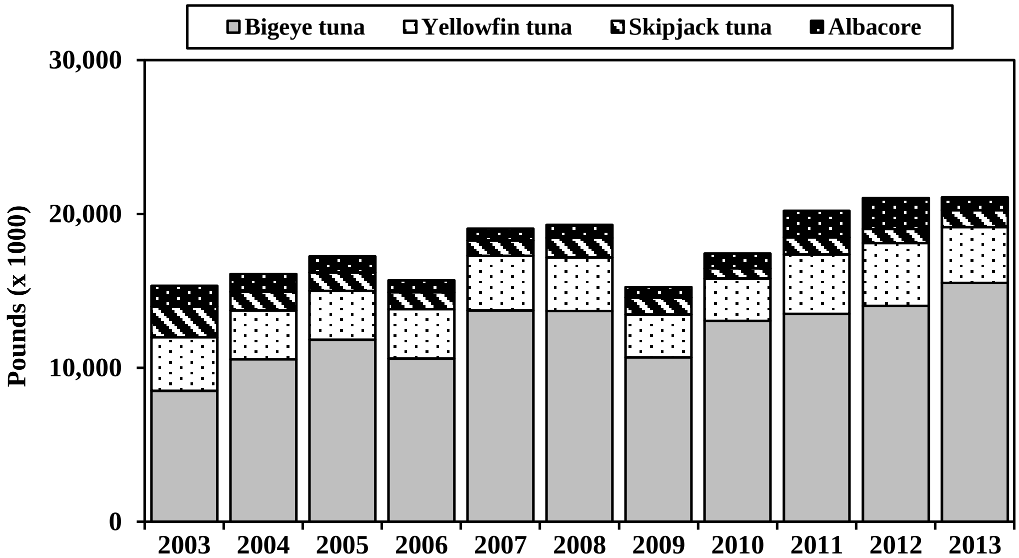


Interpretation: The deep-set longline fishery was the largest single contributor to the tuna landings. It accounted for 79% of the tuna landings during 2003-2013. The MHI troll fishery was the second largest fishery, followed by the MHI handline and offshore handline fisheries. Tuna landings by other gears also included the aku boat fishery, which was responsible for a large part of the decline in this category. Tuna landings by the shallow-set longline fishery were relatively small.

Source and calculations: Tuna landings by gear types were summarized for the longline, MHI troll, MHI handline, offshore handline, aku boat fisheries, and other gear. The tuna landing statistics for the longline fishery were derived from NOAA Fisheries longline logbook and HDAR Commercial Marine Dealer data while landing estimates for the MHI troll, MHI handline, offshore handline, fisheries and other gear category originate from HDAR Commercial Fish Catch and Marine Dealer data.

	Hawaii tuna catch by gear type (1000 pounds)						
Year	Deep-set longline	Shallow-set longline	MHI troll	MHI handline	Offshore handline	Other gear	Total
2003	11,329	0	1,088	1,023	382	1,559	15,381
2004	12,204	2	1,316	1,286	446	898	16,152
2005	13,243	209	1,116	1,204	413	1,077	17,262
2006	12,454	147	979	749	485	882	15,696
2007	15,130	148	1,382	930	579	889	19,058
2008	15,723	270	1,462	607	311	933	19,306
2009	11,794	156	1,417	970	286	634	15,257
2010	14,140	200	1,381	818	597	314	17,450
2011	16,250	209	1,509	1,061	602	604	20,235
2012	16,590	131	1,926	1,496	548	413	21,104
2013	16,789	81	1,732	1,167	811	505	21,085
Average	**14,149.6**	**141.2**	**1,391.6**	**1,028.3**	**496.4**	**791.6**	**17,998.7**
SD	**2,043.5**	**85.2**	**276.6**	**254.8**	**152.0**	**351.1**	**2,256.7**

Figure 88. Species composition of the tuna landings, 2003-2013

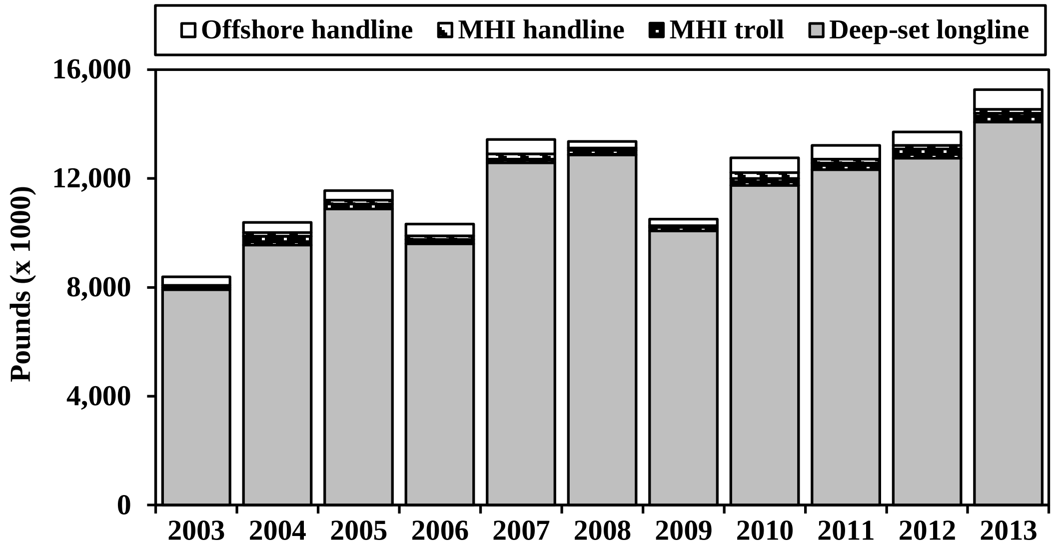


Interpretation: Bigeye tuna was the largest component of the tuna landings and reached a record level in 2013. Yellowfin tuna was the second largest component of the tuna landings and down from a record amount in 2012. Skipjack tuna landings decreased to its lowest levels in 2010; it recovered in subsequent years. Albacore landings rose from a low of 670,000 pounds in 2009 to a record 2 million pounds in 2012, but dropped to 830,000 pounds in 2013.

Source and Calculations: Tuna landing statistics were derived from NOAA Fisheries longline logbook, HDAR Commercial Fish Catch, and Marine Dealer data and was calculated for each gear type. Landings by the longline were derived from the logbook and HDAR Dealer data while the MHI troll, MHI handline, offshore handline, aku boat fisheries and other gear originate from the HDAR Commercial Fish Catch and Dealer data sets. Tuna landings were composed of albacore, bigeye tuna, bluefin tuna, skipjack tuna, yellowfin tuna and other tunas.

	Hawaii tuna catch (1000 pounds)						
Year	**Bigeye tuna**	**Yellowfin tuna**	**Skipjack tuna**	**Albacore**	**Bluefin tuna**	**Other tunas**	**Total**
2003	8,507	3,481	1,991	1,356	0	46	15,381
2004	10,563	3,171	1,191	1,162	1	64	16,152
2005	11,816	3,186	1,193	1,038	1	28	17,262
2006	10,606	3,211	1,090	769	0	20	15,696
2007	13,729	3,541	1,015	758	0	15	19,058
2008	13,689	3,479	1,281	843	0	14	19,306
2009	10,683	2,788	1,099	667	0	20	15,257
2010	13,052	2,747	662	963	0	26	17,450
2011	13,496	3,877	1,105	1,734	0	23	20,235
2012	14,022	4,098	907	2,009	1	67	21,104
2013	15,524	3,628	1,090	830	1	12	21,085
Average	**12,335.2**	**3,382.5**	**1,147.6**	**1,102.6**	**0.4**	**30.5**	**17,998.7**
SD	**2,060.0**	**416.0**	**324.8**	**432.8**	**0.5**	**19.6**	**2,256.7**

Figure 89. Hawaii bigeye tuna landings by gear type, 2003-2013

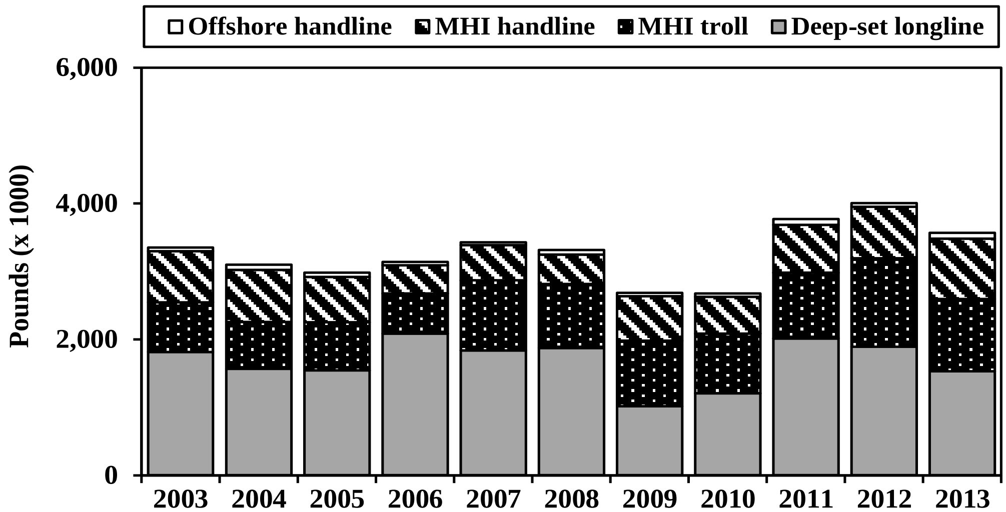


Interpretation: Annual bigeye tuna landings gradually increased to a record of 15.5 million pounds in 2013. The deep-set longline fishery is the dominate gear type for bigeye tuna, which accounted for 91% of the total bigeye tuna landings. Landings by the shallow-set longline, MHI troll, MHI, handline and offshore handline varied considerably over the 11-year period, but were far below that of the deep-set longline fishery.

Source and Calculations: Bigeye tuna landings statistics were derived from NOAA Fisheries longline logbook, HDAR Commercial Fish Catch, and Marine Dealer data. The gear types summarized for landings of bigeye tuna included the longline, MHI troll, MHI handline, and offshore handline fisheries and the other gear category.

	Hawaii bigeye tuna catch (1000 pounds)						
Year	Deep-set longline	Shallow-set longline	MHI troll	MHI handline	Offshore handline	Other gear	Total
2003	7,911	0	82	75	316	123	8,507
2004	9,554	2	328	125	370	184	10,563
2005	10,873	160	188	143	345	107	11,816
2006	9,597	126	154	135	431	163	10,606
2007	12,567	115	140	188	535	184	13,729
2008	12,858	167	166	86	245	167	13,689
2009	10,067	96	130	70	239	81	10,683
2010	11,736	143	261	212	542	158	13,052
2011	12,315	106	243	140	515	177	13,496
2012	12,741	75	341	131	491	243	14,022
2013	14,067	44	325	146	719	223	15,524
Average	**11,298.7**	**94.0**	**214.4**	**131.9**	**431.6**	**164.5**	**12,335.2**
SD	**1,847.2**	**58.2**	**90.0**	**43.8**	**145.8**	**47.5**	**2,060.0**

Figure 90. Hawaii yellowfin tuna landings by gear type, 2003-2013

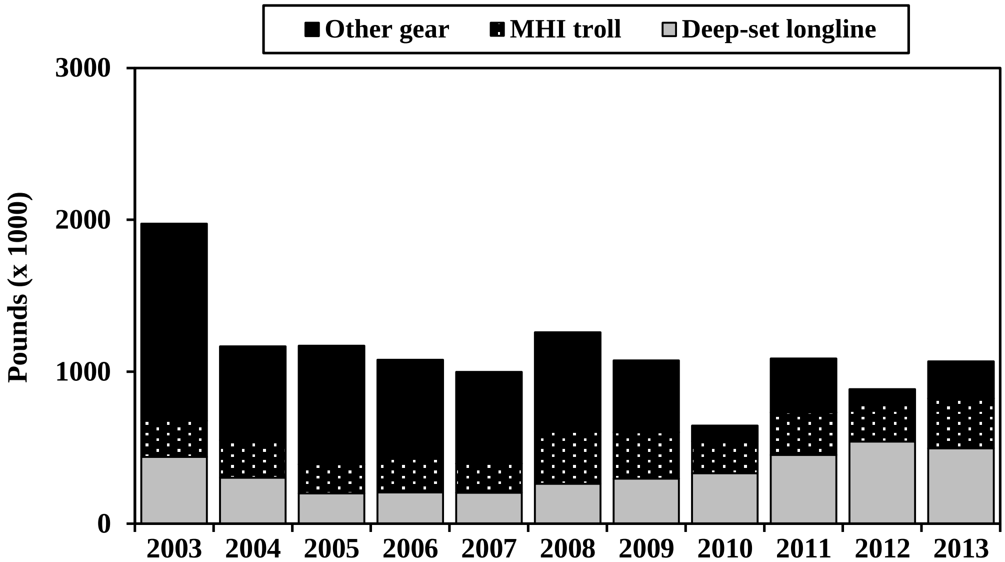


Interpretation: Yellowfin tuna landings rose gradually peaking at 4.1 million pounds in 2012. Three gear types contributed to majority of the yellowfin tuna landings. The deep-set longline fishery was the largest fishery landing yellowfin tuna and accounted for 42% of the total landings. The MHI troll fishery represented 29% of the landings, followed by a record MHI handline catch at 24%. The MHI troll fishery and MHI handline fisheries were on an increasing trend; there was no pattern for the deep-set longline.

Source and calculations: Yellowfin tuna landing statistics were derived from NOAA Fisheries longline logbook, HDAR Commercial Fish Catch, and Marine Dealer data. The gear types summarized for landings of yellowfin tuna included the longline, MHI troll, MHI handline, offshore handline fisheries and other gear that included landings from the aku boat fishery.

	Hawaii yellowfin tuna catch (1000 pounds)						
Year	Deep-set longline	Shallow-set longline	MHI troll	MHI handline	Offshore handline	Other gear	Total
2003	1,811	0	732	752	53	133	3,481
2004	1,561	0	690	770	75	75	3,171
2005	1,541	22	708	665	67	183	3,186
2006	2,082	10	590	414	52	63	3,211
2007	1,835	13	1,032	517	42	102	3,541
2008	1,869	56	941	437	64	112	3,479
2009	1,014	28	964	656	46	80	2,788
2010	1,202	23	881	542	49	50	2,747
2011	2,009	38	970	704	84	72	3,877
2012	1,886	29	1,304	759	53	67	4,098
2013	1,525	22	1,068	888	82	43	3,628
Average	**1,666.8**	**21.9**	**898.2**	**645.8**	**60.6**	**89.1**	**3,382.5**
SD	**334.2**	**16.4**	**206.2**	**150.6**	**14.7**	**41.0**	**416.0**

Figure 91. Hawaii skipjack tuna landings by gear type, 2003-2013

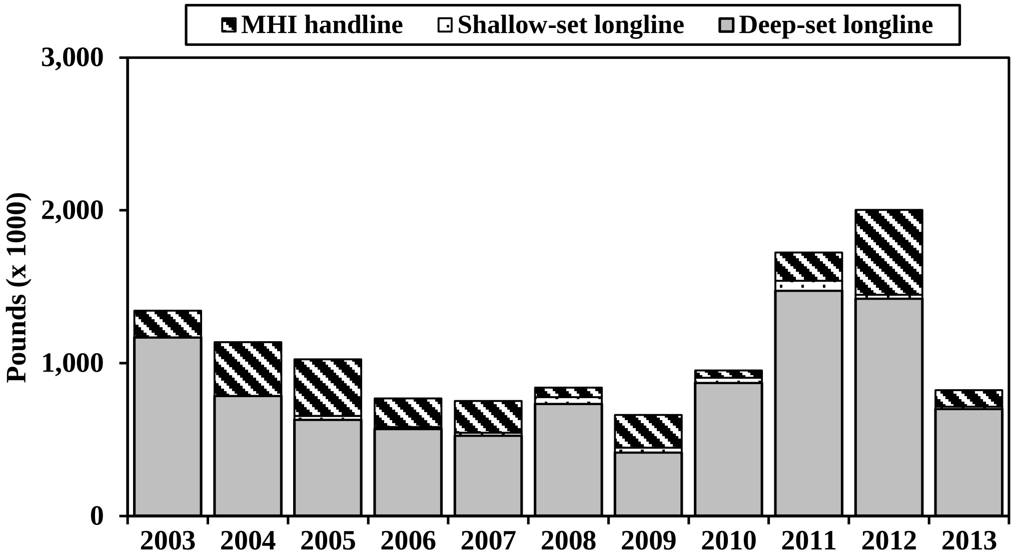


Interpretation: Skipjack tuna landings peaked at almost 2 million pounds in 2003, declined to a low in 2010 of 662,000 pound, and was 1.1 million pounds in 2013. The decline of skipjack tuna landings is a result of the attrition in the aku boat fishery, which was combined with other gear to satisfy confidentiality standards. This decline in skipjack tuna landings was not apparent or as apparent in other fisheries. Increasing skipjack tuna landings by the deep-set longline fishery has made this the largest fishery for this species from 2010. Landings by the MHI troll fishery were stable during the 11-year period.

Source and calculations: Skipjack tuna landing statistics were derived from NOAA Fisheries longline logbook, HDAR Commercial Fish Catch, and Marine Dealer data. The gear types summarized for landings of skipjack tuna included the deep-set longline, shallow-set longline, MHI troll, MHI handline fisheries, and other gear types that contributed a small amount of skipjack tuna and included landings by the aku boat fishery.

	Hawaii skipjack tuna catch (1000 pounds)					
Year	**Deep-set longline**	**Shallow-set longline**	**MHI troll**	**MHI handline**	**Other gear**	**Total**
2003	440	0	237	16	1298	1,991
2004	303	0	246	23	619	1,191
2005	200	1	191	21	780	1,193
2006	206	0	221	11	652	1,090
2007	204	1	192	15	603	1,015
2008	264	2	344	20	651	1,281
2009	298	1	303	24	473	1,099
2010	332	1	211	14	104	662
2011	453	1	279	17	355	1,105
2012	541	1	240	20	105	907
2013	497	0	327	22	244	1,090
Average	**339.8**	**0.7**	**253.7**	**18.5**	**534.9**	**1,147.6**
SD	**123.6**	**0.6**	**52.7**	**4.1**	**342.4**	**324.8**

Figure 92. Hawaii albacore landings by gear type, 2003-2013

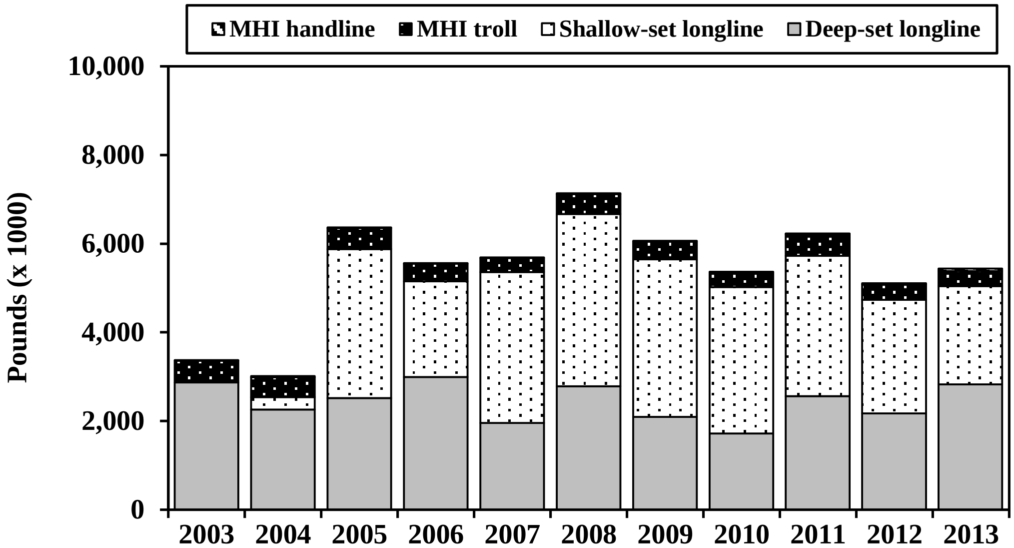


Interpretation: Albacore catch decreased slowly from 1.4 million pounds in 2003 to 667,000 pounds in 2009, rose by more than 3-fold to 2 million pounds in 2012, then dropped substantially in 2013. The deep-set longline fishery accounted for 84% of the albacore catch. The MHI handline fishery was the second largest fishery for albacore and represented 13% of the total. Albacore catch by this fishery varied considerably ranging from 48,000 pounds in 2010 to a record 554,000 pounds in 2012. Albacore catch by the shallow-set longline and MHI troll fisheries were small. On rare occasions, the MHI troll fishery has encountered short "runs" of albacore, but those catches were negligible in comparison to the deep-set longline and MHI handline fisheries.

Source and calculations: Albacore landing statistics were derived from NOAA Fisheries longline logbook, HDAR Commercial Fish Catch, and Marine Dealer Data. The gear types summarized for landings of albacore included the deep-set longline, shallow-set longline, MHI troll, and MHI handline fisheries.

	Hawaii albacore catch (1000 pounds)					
Year	**Deep-set longline**	**Shallow-set longline**	**MHI troll**	**MHI handline**	**Other gear**	**Total**
2003	1,167	0	10	176	3	1,356
2004	785	0	7	351	19	1,162
2005	628	26	14	370	0	1,038
2006	569	11	2	187	0	769
2007	524	19	7	208	0	758
2008	732	45	3	62	1	843
2009	415	31	7	214	0	667
2010	870	33	4	48	8	963
2011	1,473	64	8	186	3	1,734
2012	1,421	26	7	554	1	2,009
2013	699	15	4	107	5	830
Average	**843.9**	**24.5**	**6.6**	**223.9**	**3.6**	**1,102.6**
SD	**357.7**	**19.0**	**3.4**	**149.2**	**5.7**	**432.8**

Figure 93. Hawaii commercial billfish landings by gear type, 2003-2013

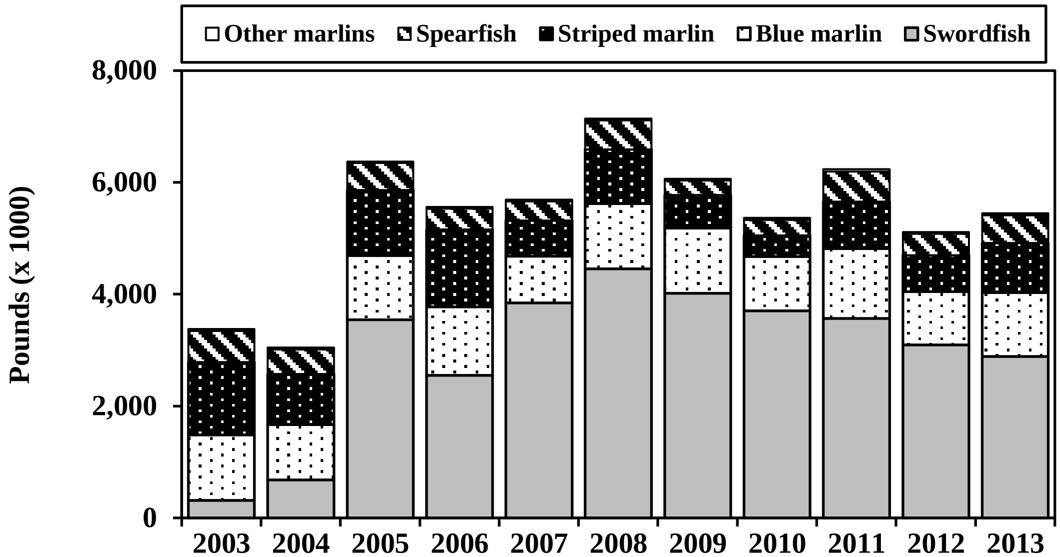


Interpretation: The largest fisheries for billfish were the deep-set and shallow-set longline fisheries. The most significant event that led to the large increase in billfish landings was the reopening of the shallow-set longline fishery in 2004. Billfish landings by the shallow-set longline fishery increased dramatically in 2005. Billfish landings by the shallow-set fishery have steadily declined since a high in 2008. Billfish landings by the deep-set longline fishery were mostly marlins; landings have been stable around 2,000,000 lbs. The MHI troll fishery in 2013 landed more than double the 2012 landings.

Source and calculations: Billfish landing statistics were derived from NOAA Fisheries longline logbook, HDAR Commercial Fish Catch, and Marine Dealer data and was calculated for each gear type. Landings by the longline were derived from the logbook and HDAR Dealer data while the MHI troll, MHI handline, offshore handline, aku boat fisheries and other gear originate from the HDAR Fish Catch and Dealer data sets. The billfish group was composed of swordfish, blue marlin, striped marlin, spearfish, sailfish, black marlin, and other marlins.

	Hawaii billfish catch (1000 lbs)						
Year	**Deep-set longline**	**Shallow-set longline**	**MHI troll**	**MHI handline**	**Offshore handline**	**Other gear**	**Total**
2003	2,864	0	485	18	2	6	3,375
2004	2,249	280	451	23	1	42	3,046
2005	2,506	3,365	476	16	1	3	6,367
2006	2,987	2,158	397	12	3	3	5,560
2007	1,948	3,409	315	14	1	2	5,689
2008	2,776	3,892	445	17	0	7	7,137
2009	2,087	3,552	404	14	0	5	6,062
2010	1,710	3,305	335	11	1	2	5,364
2011	2,549	3,176	486	15	1	7	6,234
2012	2,167	2,564	346	22	1	9	5,109
2013	2,818	2,219	338	57	6	11	5,449
Average	**2,423.7**	**2,538.2**	**407.1**	**19.9**	**1.5**	**8.8**	**5,399.3**
SD	**419.4**	**1,307.1**	**65.3**	**12.9**	**1.7**	**11.4**	**1,221.7**

Figure 94. Species composition of the billfish landings, 2003-2013

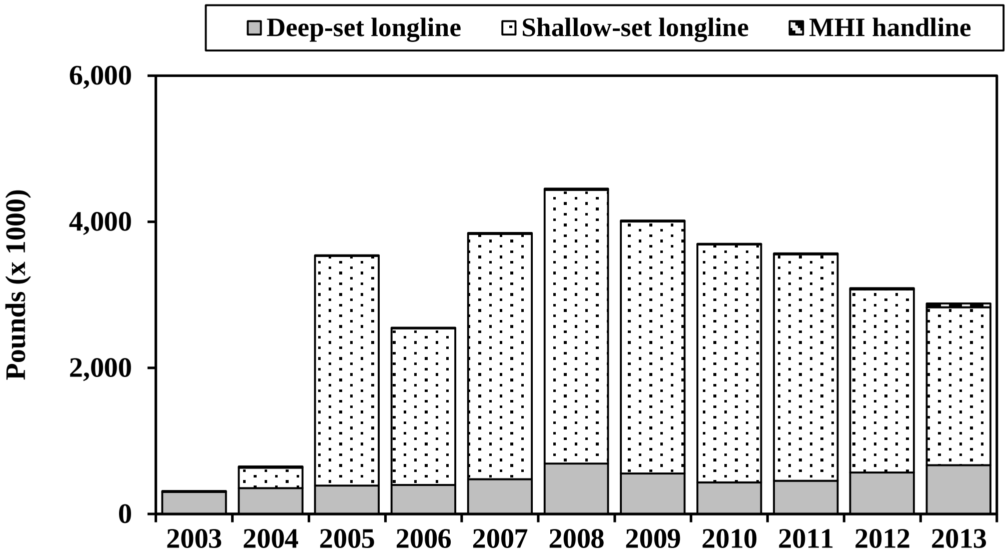


Interpretation: Billfish landings consisted mostly of swordfish, blue marlin, and striped marlin with smaller catches of spearfish and other marlins. Swordfish landings dominated billfish landings from 2005 with the reopening of the shallow-set longline fishery in 2004. Blue marlin, striped marlin, and spearfish were the next largest components of the billfish landings. Small catches of other marlins were composed of sailfish and black marlin.

Source and calculations: The billfish landing statistics were derived from NOAA Fisheries longline logbook, HDAR Commercial Fish Catch, and Marine Dealer data and was calculated for each species. The gear types summarized for each species include landings from the longline, MHI troll, MHI handline, offshore handline, aku boat fisheries, and other gear category.

	Hawaii billfish catch (1000 lbs)					
Year	Swordfish	Blue marlin	Striped marlin	Spearfish	Other marlins	Total
2003	316	1,172	1,298	559	30	3,375
2004	682	986	905	441	32	3,046
2005	3,543	1,147	1,171	481	25	6,367
2006	2,552	1,223	1,382	375	28	5,560
2007	3,846	834	638	339	32	5,689
2008	4,455	1,165	969	518	30	7,137
2009	4,019	1,159	591	261	32	6,062
2010	3,700	975	376	280	33	5,364
2011	3,569	1,247	835	543	40	6,234
2012	3,094	951	648	386	30	5,109
2013	2,888	1,141	888	496	36	5,449
Average	**2,969.5**	**1,090.9**	**881.9**	**425.4**	**31.6**	**5,399.3**
SD	**1,333.0**	**132.0**	**311.8**	**104.1**	**4.0**	**1,221.7**

Figure 95. Hawaii swordfish landings, 2003-2013

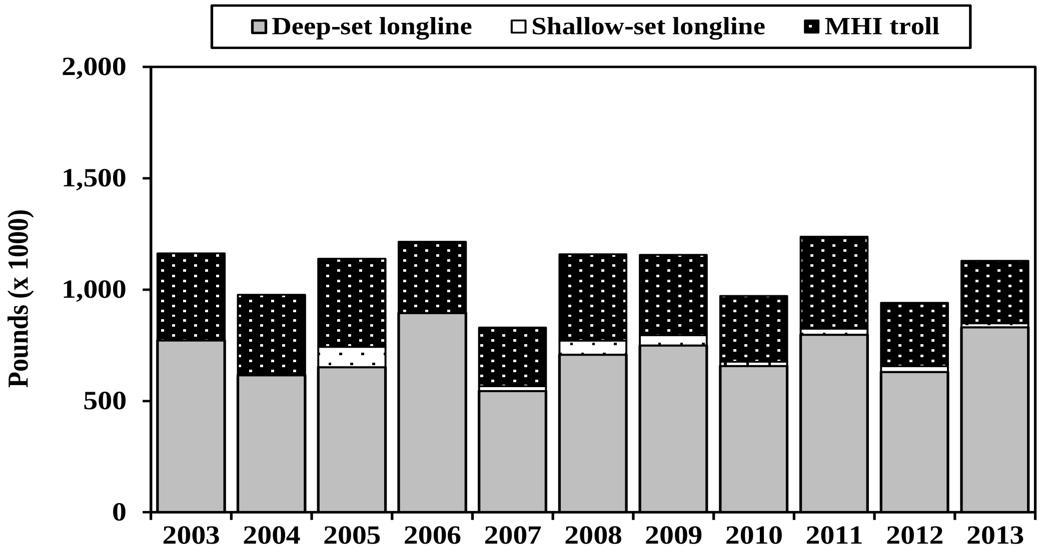


Interpretation: Swordfish landings were low in 2003 due to a prohibition on shallow-set longline fishery targeting swordfish due to high sea turtle interaction rates. Swordfish landings increased marginally in 2004 with the shallow-set longline fishery reopening under several new regulations intended to reduce sea turtle interactions. Swordfish landings then rose rapidly, peaking at 4.5 million pounds in 2008 then declined gradually to 2.9 million pounds in 2013. The shallow-set longline fishery accounted for 75% of the total swordfish landings. Although deep-set longline landings of swordfish were higher in recent years, it only represented 23% of the 2013 landings. Swordfish landings by the MHI handline fishery were negligible.

Source and calculations: Swordfish landing statistics were derived from NOAA Fisheries longline logbook, HDAR Commercial Fish Catch, and Marine Dealer data. The gear types summarized for landings of swordfish included the deep-set longline, shallow-set longline, and MHI troll fisheries and other gear.

	Swordfish catch (1000 lbs)						
Year	Deep-set longline	Shallow-set longline	MHI troll	MHI handline	Offshore handline	Other gear	Total
2003	301	0	1	12	0	2	316
2004	354	279	0	16	0	33	682
2005	388	3,144	1	10	0	0	3,543
2006	399	2,144	1	8	0	0	2,552
2007	476	3,357	1	12	0	0	3,846
2008	689	3,749	1	14	0	2	4,455
2009	554	3,451	1	12	0	1	4,019
2010	432	3,258	1	9	0	0	3,700
2011	456	3,100	1	11	0	1	3,569
2012	566	2,508	1	18	0	1	3,094
2013	666	2,164	2	53	1	2	2,888
Average	**480.1**	**2,468.5**	**1.0**	**15.9**	**0.1**	**3.8**	**2,969.5**
SD	**125.3**	**1,263.3**	**0.4**	**12.6**	**0.3**	**9.7**	**1,333.0**

Figure 96. Hawaii blue marlin landings by gear type, 2003-2013



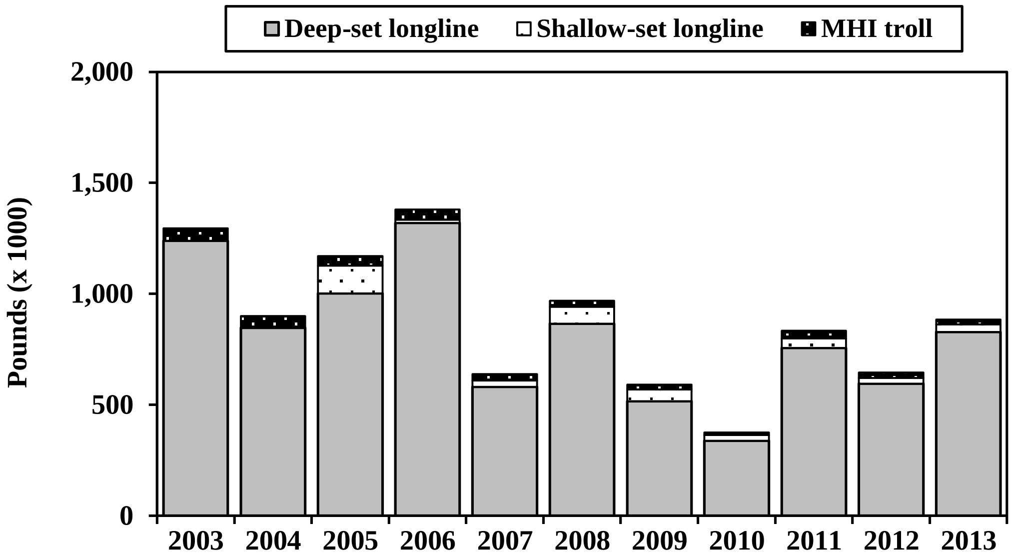
Interpretation: Blue marlin landings were relatively stable from 2003-2013, ranging from 834,000 pounds in 2007 to 1.2 million pounds in 2006 and 2011. The deep-set longline and MHI troll fisheries accounted for the majority of blue marlin landings, which represented 73% and 25% of the marlin landings, respectively. Blue marlin landings by the shallow-set longline and handline fisheries were relatively small in comparison.

Source and calculations: Blue marlin landing statistics were derived from NOAA Fisheries longline logbook, HDAR Commercial Fish Catch, and Marine Dealer data. Gear types summarized for landings of blue marlin included the deep-set longline, shallow-set longline, MHI troll, MHI handline, offshore handline, and other gear category.

Longline blue marlin landings are nominal estimates that do not account for misidentification problems. Results of the marlin misidentification problem showed that striped marlin in longline logbooks were misidentified as blue marlin in a Pelagic Fisheries Research Program (PFRP) project. Thus, blue marlin were overreported in logbooks; nominal blue marlin landing estimates for the longline fishery are therefore probably inflated.

	Blue marlin catch (1000 lbs)						
Year	**Deep-set longline**	**Shallow-set longline**	**MHI troll**	**MHI handline**	**Offshore handline**	**Other gear**	**Total**
2003	772	0	390	5	1	4	1,172
2004	616	0	360	5	0	5	986
2005	652	90	396	6	1	2	1,147
2006	895	0	320	4	3	1	1,223
2007	545	21	263	2	1	2	834
2008	708	62	388	3	0	4	1,165
2009	749	45	362	2	0	1	1,159
2010	657	18	296	2	1	1	975
2011	797	27	414	4	1	4	1,247
2012	630	26	285	4	1	5	951
2013	831	17	281	4	3	5	1,141
Average	**713.8**	**27.8**	**341.4**	**3.7**	**1.1**	**3.1**	**1,090.9**
SD	**105.0**	**28.1**	**53.9**	**1.3**	**1.0**	**1.7**	**132.0**

Figure 97. Hawaii striped marlin landings by gear type, 2003-2013



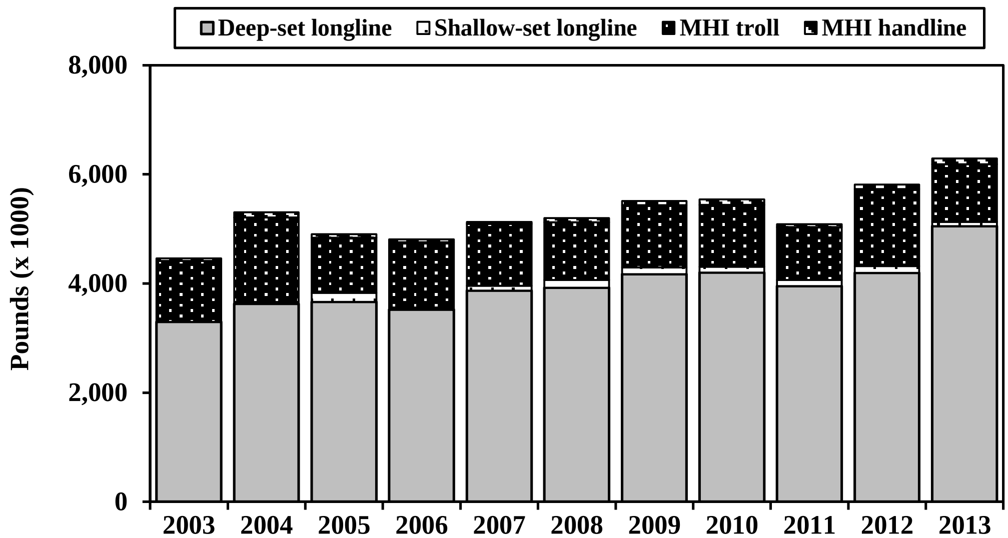
Interpretation: Striped marlin landings varied over the 11-year period, ranging from a peak of 1.4 million pounds in 2006 to a low of 376,000 pounds in 2010. The deep-set longline fishery was responsible for over 90% of the striped marlin landings. The shallow-set longline fishery was the second largest producer of striped marlin, followed by the MHI troll fishery. Deep-set and shallow-set landings of striped marlin increased in 2013, but decreased for MHI troll.

Source and Calculations: Striped marlin landing statistics were derived from NOAA Fisheries longline logbook, HDAR Commercial Fish Catch, and Marine Dealer data. Gear types summarized for catches of striped marlin included deep-set longline, shallow-set longline, MHI troll, MHI handline, offshore handline, and other gear.

Striped marlin landings by the longline fishery are nominal estimates which do not account for misidentification problems. Striped marlin in longline logbooks were misidentified as blue marlin in a Pelagic Fisheries Research Program (PFRP) project. Thus, the nominal striped marlin landing estimates for the longline fishery are negatively biased and the longline landings presented in this report are a conservative estimate.

	Striped marlin catch (1000 lbs)						
Year	**Deep-set longline**	**Shallow-set longline**	**MHI troll**	**MHI handline**	**Offshore handline**	**Other gear**	**Total**
2003	1,239	0	57	1	1	0	1,298
2004	847	1	52	2	1	2	905
2005	1,002	125	44	0	0	0	1,171
2006	1,320	14	47	0	0	1	1,382
2007	581	29	28	0	0	0	638
2008	866	76	27	0	0	0	969
2009	516	53	22	0	0	0	591
2010	338	26	12	0	0	0	376
2011	756	43	35	0	0	1	835
2012	596	25	25	0	0	2	648
2013	829	34	21	0	1	3	888
Average	**808.2**	**38.7**	**33.6**	**0.3**	**0.3**	**0.8**	**881.9**
SD	**299.4**	**36.1**	**14.4**	**0.6**	**0.5**	**1.1**	**311.8**

Figure 98. Hawaii commercial landings of other PMUS by gear type, 2003-2013

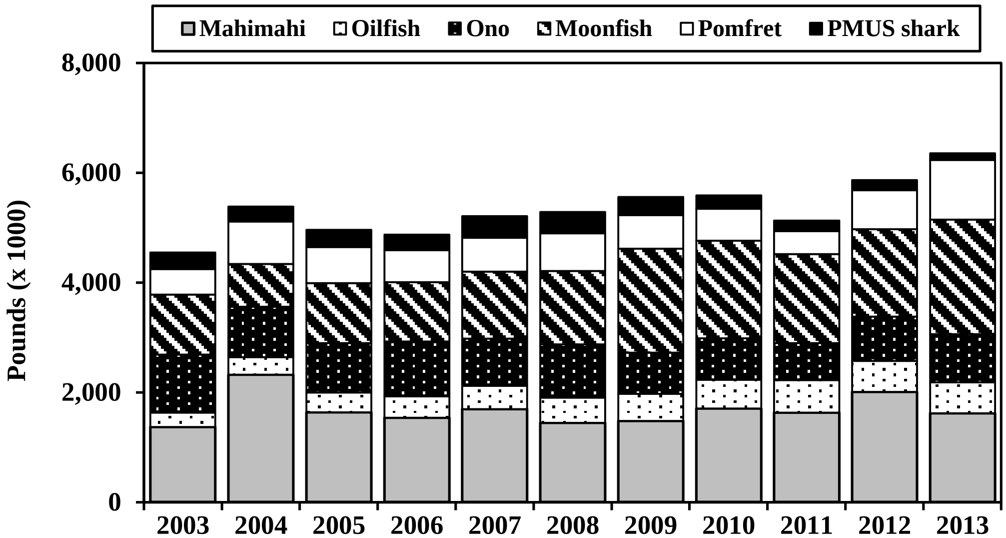


Interpretation: The landings of other PMUS increased gradually from 4.5 million pounds in 2003 to 6.3 million pounds in 2013. Most of the growth was attributed to increased landings by the deep-set longline fishery. The MHI troll fishery was the second highest contributor to other PMUS landings and was reasonably stable. Other PMUS landings by the MHI handline, offshore handline, other gears, and shallow-set longline fisheries were much lower than the deep-set longline and MHI troll fisheries.

Source and calculations: Other pelagic PMUS landing statistics were derived from NOAA Fisheries longline logbook, HDAR Commercial Fish Catch, and Marine Dealer data and was calculated for each gear type. Landings by the longline fishery were derived from the logbook and HDAR Dealer data while the MHI troll, MHI handline, offshore handline, and other gear originate from the HDAR Fish Catch and Dealer data sets. The other PMUS category includes mahimahi, moonfish, oilfish, ono, pomfret, and PMUS sharks.

	Catch of other PMUS by gear type (1000 lbs)						
Year	Deep-set longline	Shallow-set longline	MHI troll	MHI handline	Offshore handline	Other gear	Total
2003	3,295	0	1,118	47	18	69	4,547
2004	3,627	3	1,579	97	23	53	5,382
2005	3,663	163	1,012	67	10	41	4,956
2006	3,520	23	1,212	57	14	48	4,874
2007	3,870	87	1,136	37	18	62	5,210
2008	3,924	139	1,061	77	15	66	5,282
2009	4,173	125	1,135	82	12	31	5,558
2010	4,199	109	1,135	102	16	26	5,587
2011	3,952	115	967	52	7	33	5,126
2012	4,198	119	1,413	83	13	37	5,863
2013	5,050	81	1,056	108	17	42	6,354
Average	**3,951.9**	**87.6**	**1,165.8**	**73.5**	**14.8**	**46.2**	**5,339.9**
SD	**468.1**	**55.6**	**180.4**	**23.5**	**4.4**	**14.7**	**497.1**

Figure 99. Species composition of other PMUS landings, 2003-2013

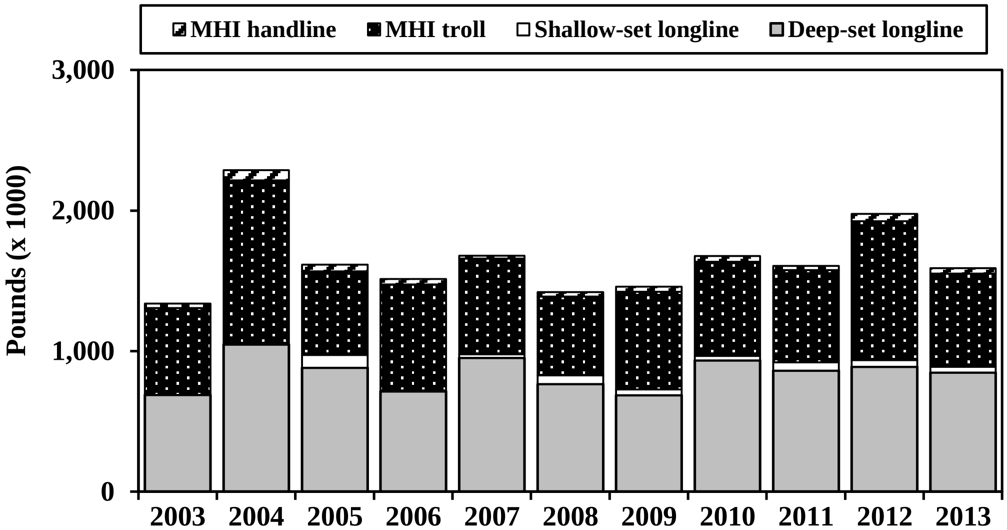


<u>Interpretation:</u> Mahimahi, pomfret, and moonfish were the three largest components of other PMUS landings. Landings of pomfret, oilfish, and moonfish were above their respective long-term averages in 2013 and were all on increasing trends. Ono landings fluctuated over the past 11 years and was slightly above its long-term average in 2013. Though oilfish landings were lower than species mentioned above, they have notable rates of increase from 2003 through 2013. Shark landings gradually decreased after its peak in 2007.

<u>Source and calculations:</u> The other pelagic PMUS landing statistics were derived from NOAA Fisheries longline logbook, HDAR Commercial Fish Catch, and Marine Dealer data and was calculated for each species. The gear types summarized for each species include landings from the longline, MHI troll, MHI handline, offshore handline, and other gear category.

	Catch of other PMUS by species (1000 lbs)						
Year	Mahimahi	Oilfish	Ono	Moonfish	Pomfret	PMUS shark	Total
2003	1,365	264	1,058	1,094	461	305	4,547
2004	2,318	321	919	780	771	273	5,382
2005	1,630	365	897	1,096	657	311	4,956
2006	1,531	391	1,002	1,080	585	285	4,874
2007	1,692	425	857	1,225	615	396	5,210
2008	1,443	455	975	1,338	681	390	5,282
2009	1,473	498	748	1,897	610	332	5,558
2010	1,703	521	758	1,781	580	244	5,587
2011	1,628	589	675	1,622	422	190	5,126
2012	2,007	563	809	1,593	710	181	5,863
2013	1,614	566	877	2,086	1,087	124	6,354
Average	**1,673.1**	**450.7**	**870.5**	**1,417.5**	**652.6**	**275.5**	**5,339.9**
SD	**272.8**	**107.5**	**116.8**	**406.6**	**176.0**	**85.6**	**497.1**

Figure 100. Hawaii mahimahi landings by gear type, 2003-2013

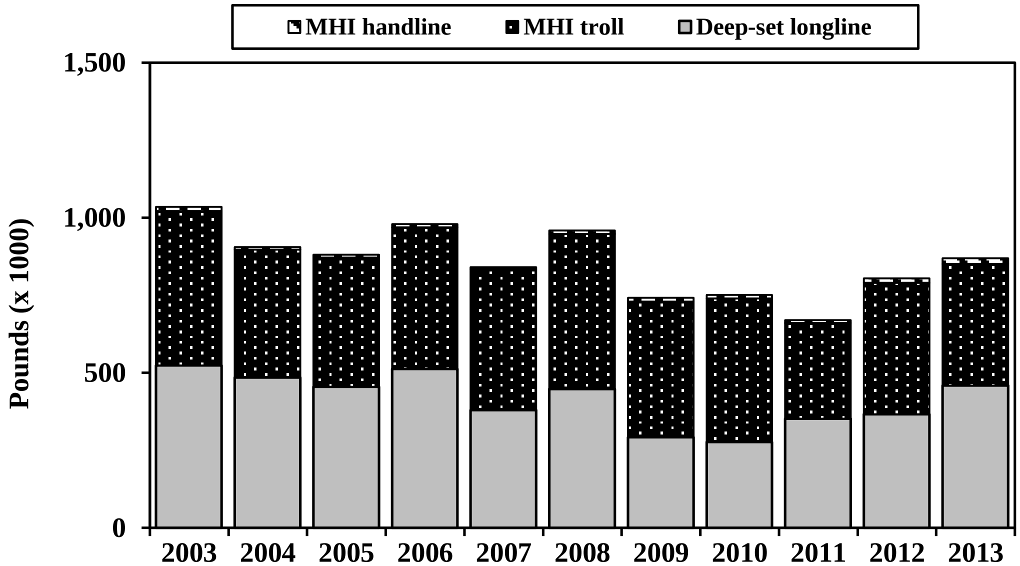


Interpretation: Mahimahi landings peaked at 2.3 million pounds in 2004. Landings have been relatively stable around 1.6 million pounds, other than a spike in 2012 of 2 million pounds. The deep-set longline and MHI troll fisheries accounted for 94% of mahimahi landings. The shallow-set longline, MHI handline, offshore handline, and other gear type landings of mahimahi were very low.

Source and calculations: Mahimahi landing statistics were derived from NOAA Fisheries longline logbook, HDAR Commercial Fish Report and Marine Dealer data. The gear types summarized for mahimahi landings included the deep-set and shallow-set longline, MHI troll, MHI handline, offshore handline fisheries and the other gear category.

	Mahimahi catch (1000 lbs)						
Year	Deep-set longline	Shallow-set longline	MHI troll	MHI handline	Offshore handline	Other gear	Total
2003	688	0	619	31	14	13	1,365
2004	1,047	1	1,166	72	14	18	2,318
2005	881	91	595	47	8	8	1,630
2006	714	6	754	38	8	11	1,531
2007	951	26	681	21	6	7	1,692
2008	765	62	560	32	9	15	1,443
2009	686	40	696	35	7	9	1,473
2010	934	31	671	41	14	12	1,703
2011	860	60	656	30	6	16	1,628
2012	889	46	988	53	12	19	2,007
2013	847	42	663	38	12	12	1,614
Average	**842.0**	**36.8**	**731.7**	**39.8**	**10.0**	**12.7**	**1,673.1**
SD	**117.0**	**28.2**	**182.7**	**13.7**	**3.3**	**4.0**	**272.8**

Figure 101. Hawaii wahoo (ono) landings by gear type, 2003-2013



Interpretation: Ono landings peaked above 1 million pounds in 2003 and 2006, and were below their long-term average, but stable, from 2009 through 2012. The deep-set longline and MHI troll fisheries were the main contributors to ono landings. Landings increased for most gear types in 2013 and total landings increased by 8.4%.

Source and calculations: Ono landing statistics were derived from NOAA Fisheries longline logbook, HDAR Commercial Fish Report and Marine Dealer data. The gear types summarized for landings of ono included the deep-set and shallow-set longline, MHI troll, and MHI handline fisheries. The total column also contains small ono landings by the offshore handline fishery and other gear category.

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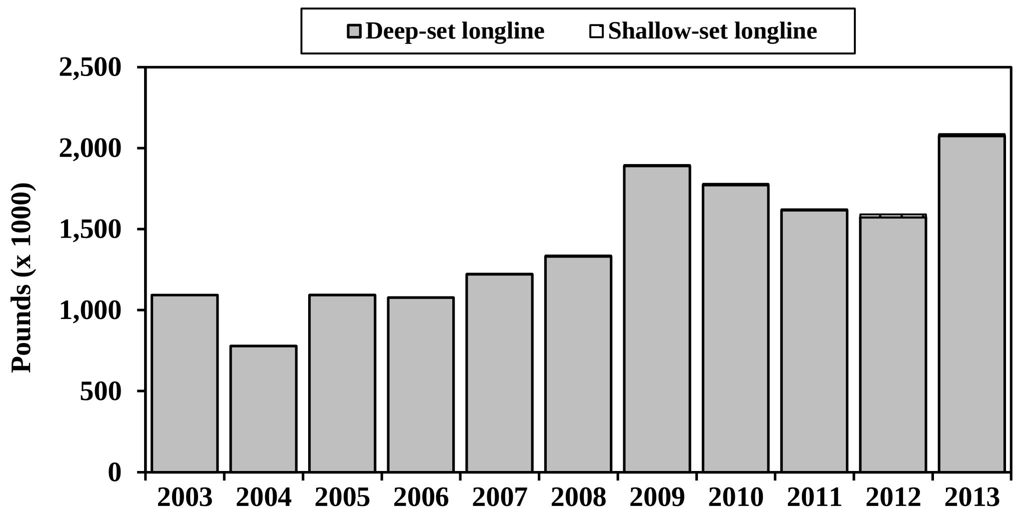
	Ono catch (1000 lbs)						
Year	Deep-set longline	Shallow-set longline	MHI troll	MHI handline	Offshore handline	Other gear	Total
2003	524	0	498	13	4	19	1,058
2004	485	0	412	8	3	11	919
2005	455	4	416	10	1	11	897
2006	512	0	457	10	2	21	1,002
2007	380	3	454	7	1	12	857
2008	448	5	500	11	1	10	975
2009	292	2	438	12	1	3	748
2010	277	3	463	11	1	3	758
2011	352	1	309	9	1	3	675
2012	366	1	424	15	1	2	809
2013	459	1	392	18	2	5	877
Average	**413.6**	**1.8**	**433.0**	**11.3**	**1.6**	**9.1**	**870.5**
SD	**85.2**	**1.7**	**53.4**	**3.2**	**1.0**	**6.6**	**116.8**

Figure 102. Hawaii moonfish landings, 2003-2013

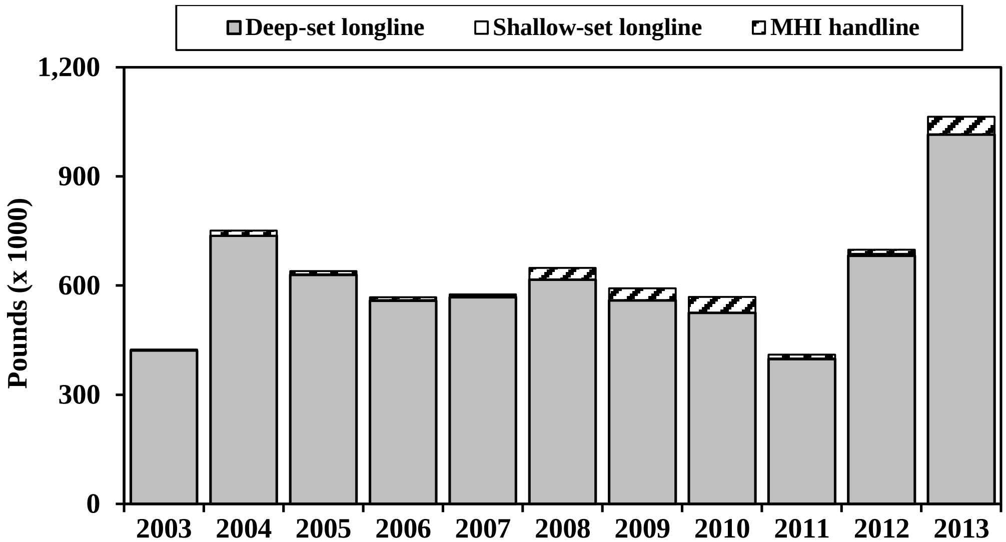


Interpretation: Moonfish are unique among the PMUS because they are caught exclusively by the longline fishery, primarily by the deep-set sector (99.5% of 2013 landings). Although moonfish landings by the shallow-set longline fishery were increasing, they were still well below the level landed by the deep-set sector. Landings have risen from 780,000 pounds in 2004 to a peak of 2.1 million pounds in 2013.

Source and calculations: Moonfish landing statistics were derived from NOAA Fisheries longline logbook and HDAR Commercial Marine Dealer data. There were no landings of moonfish in the HDAR Commercial Fish Report data by the MHI troll, MHI handline, and offshore handline fisheries.

	Moonfish catch (1000 lbs)			
Year	Deep-set longline	Shallow-set longline	Other gear	Total
2003	1,094	0	0	1,094
2004	779	1	0	780
2005	1,093	3	0	1,096
2006	1,078	2	0	1,080
2007	1,222	3	0	1,225
2008	1,332	6	0	1,338
2009	1,891	6	0	1,897
2010	1,772	9	0	1,781
2011	1,616	6	0	1,622
2012	1,574	17	2	1,593
2013	2,075	11	0	2,086
Average	**1,411.5**	**5.8**	**0.2**	**1,417.5**
SD	**403.0**	**5.0**	**0.6**	**406.6**

Figure 103. Hawaii pomfret landings, 2003-2013

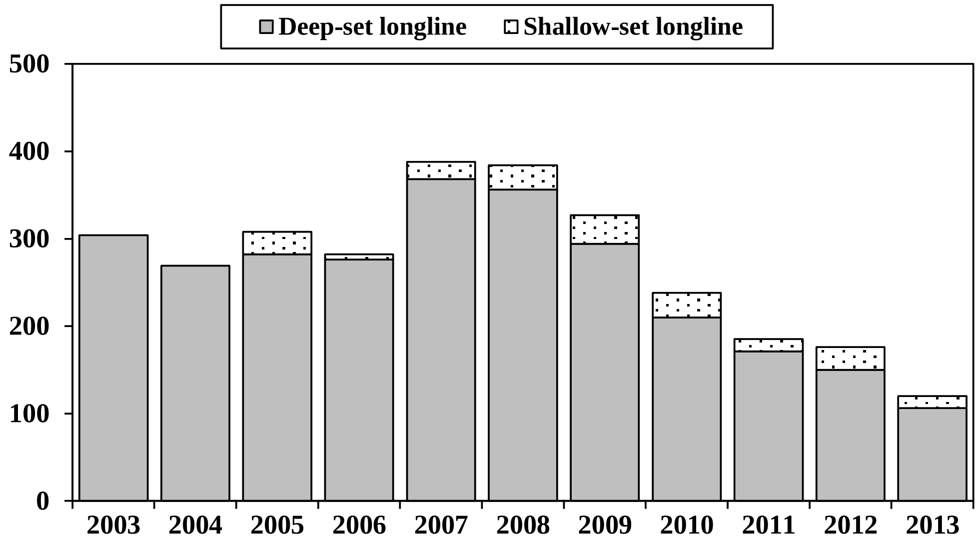


Interpretation: Pomfret landings ranged from 298,000 pounds in 2011 to a record 1.1 million pounds in 2013. Pomfret landings rose in 2013 by 53%; the longline fishery was responsible for 93% of the total pomfret landings. The MHI handline, offshore handline, shallow-set longline fisheries, and other gear types contributed to the rest of the pomfret landings. There was no trend with respect to total pomfret landings from 2003-2013.

Source and calculations: Pomfret landing statistics were derived from NOAA Fisheries longline logbook and HDAR Commercial Fish Catch, and Marine Dealer data. The gear types summarized for landings of pomfrets included the longline, MHI troll, MHI handline fisheries, and other gear category.

	Pomfret catch (1000 lbs)					
Year	Deep-set longline	Shallow-set longline	MHI handline	Offshore handline	Other gear	Total
2003	421	0	3	0	37	461
2004	737	0	14	5	15	771
2005	629	2	9	1	16	657
2006	558	2	8	3	14	585
2007	568	2	6	10	29	615
2008	616	1	31	3	30	681
2009	559	1	32	4	14	610
2010	525	1	43	1	10	580
2011	398	1	11	0	12	422
2012	682	5	11	0	12	710
2013	1,015	1	48	2	21	1,087
Average	**609.8**	**1.5**	**19.6**	**2.6**	**19.1**	**652.6**
SD	**167.5**	**1.4**	**15.9**	**3.0**	**9.0**	**176.0**

Figure 104. Hawaii PMUS shark landings, 2003-2013

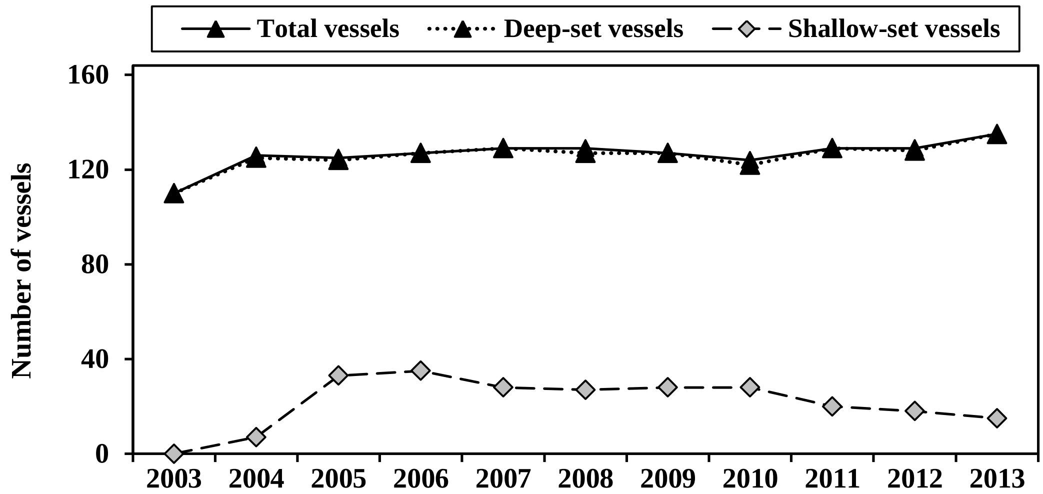


Interpretation: Sharks were landed almost exclusively by the deep-set longline fishery. Shark landings were relatively stable from 2002 through 2006, then peaked in 2007 and 2008, and decreased to a low of 124,000 pounds in 2013. The deep-set longline fishery accounted for 85% of the shark landings. Since mako and thresher sharks had markets for fillets and fish steaks, they were the species typically landed by the longline fishery. Most other shark species were released.

Source and calculations: Shark catch (in number of fish kept) were derived from NOAA Fisheries longline logbook. The HDAR Dealer data included sharks which were typically landed headed and gutted and were raised to an estimated whole weight. The number of sharks was multiplied by the mean whole weight to yield shark landings. For shark species with no the weight data from HDAR Dealer data, landings were extrapolated by using an average length calculated from the observer data that was converted to weight which was then used to multiply number of fish as a crude method to estimate shark biomass.

	PMUS shark catch (1000 lbs)			
Year	**Deep-set longline**	**Shallow-set longline**	**Non-longline**	**Total**
2003	304	0	1	305
2004	269	0	4	273
2005	282	26	3	311
2006	276	6	3	285
2007	368	20	8	396
2008	356	28	6	390
2009	294	33	5	332
2010	210	28	6	244
2011	171	14	5	190
2012	150	26	5	181
2013	106	14	4	124
Average	**253.3**	**17.7**	**4.5**	**275.5**
SD	**84.0**	**11.7**	**1.9**	**85.6**

Figure 105. Number of Hawaii-based longline vessels, 2003-2013

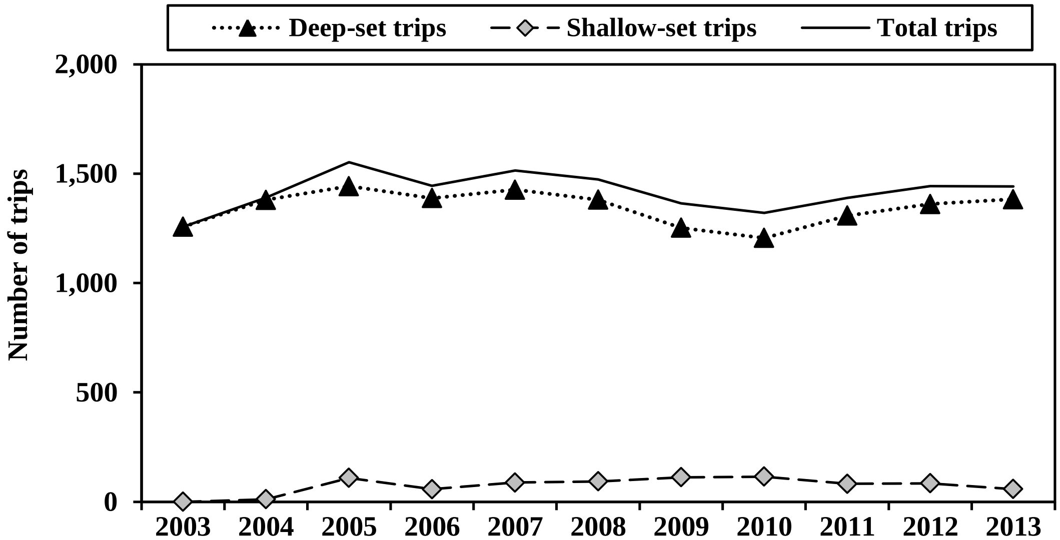


<u>Interpretation</u>: There were 135 active Hawaii-based longline vessels in 2013, six more vessels than the previous year. Vessel activity was lowest in 2003 when shallow-set longline fishing was prohibited. The increase in vessel activity in 2003 and 2004 is from California-based vessels migrating back to Hawaii due to the reopening of the shallow-set longline fishery in April 2004 under a new regulations intended to reduce the number of sea turtle interactions. The total number of deep-set vessels varied little from 2004 through 2012 until the increase in 2013. The pattern for shallow-set vessel activity was quite different. Only 7 vessels embarked on shallow-set trips in 2004, but this number rose dramatically in 2005, peaking at 35 vessels in 2006. Participation declined slowly to 15 vessels in 2013. Almost all shallow-set longline vessels switch to deep-set longline fishing after the swordfish season.

<u>Source and calculations:</u> The number of vessels was compiled from NMFS federal longline logbook data. The vessel summary was based on haul date. The vessel counts were based on whether they went deep-set or shallow-set longline fishing. A deep-set trip was defined as one which fishing operations set 15 or more hooks between floats while a shallow-set trip was characterized by sets with less than 15 hooks between floats. Shallow-set effort was prohibited in 2002 and 2003. Almost all vessels that went shallow-set longline fishing switched to deep-set longline fishing at some time of the year.

Year	Deep-set vessels	Shallow-set vessels	Total vessels
2003	110	0	110
2004	125	7	126
2005	124	33	125
2006	127	35	127
2007	129	28	129
2008	127	27	129
2009	127	28	127
2010	122	28	124
2011	129	20	129
2012	128	18	129
2013	135	15	135
Average	**125.7**	**21.7**	**126.4**
SD	**6.2**	**11.0**	**6.2**

Figure 106. Number of trips by the Hawaii-based longline fishery, 2003-2013

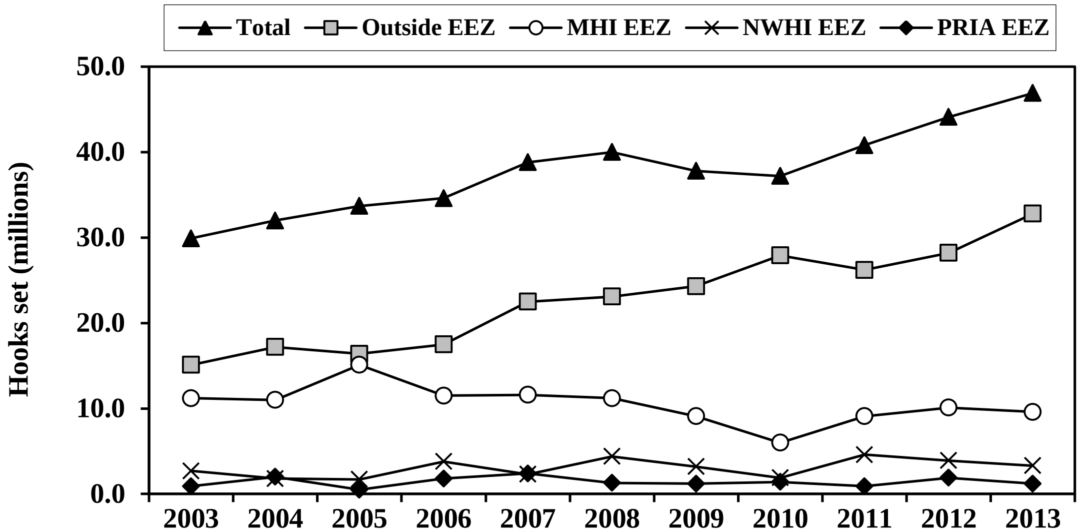


Interpretation: The Hawaii-based longline fleet made 1,441 trips in 2013. The total number of trips was lowest in 2003 when only deep-set longline fishing was allowed. Trips increased in 2004 with the return of longline vessels that were in California and peaked in 2005 as shallow-set longline fishing increased. The total number of trips decreased gradually to 1,321 in 2010, but have since increased. Deep-set trips made up 95% of the total number of trips during 2003-2013. Shallow-set trips are highest in the early part of each year when swordfish season is at its peak.

Source and calculations: The number of trips was compiled from NMFS federal longline logbook data. The trip summary was based on haul date. The trip type was separated into deep-set or shallow-set. A deep-set trip was defined as one in which fishing operations set 15 or more hooks between floats while a shallow-set trip was characterized by sets with less than 15 hooks between floats. Shallow-set effort was prohibited in 2002 and 2003.

	Hawaii longline trip activity		
Year	Deep-set trips	Shallow-set trips	Total trips
2003	1,257	0	1,257
2004	1,380	11	1,391
2005	1,443	109	1,552
2006	1,388	57	1,445
2007	1,427	88	1,515
2008	1,381	93	1,474
2009	1,253	112	1,365
2010	1,206	115	1,321
2011	1,308	82	1,390
2012	1,361	84	1,443
2013	1,383	58	1,441
Average	**1,344.3**	**73.5**	**1,417.6**
SD	**77.0**	**38.8**	**84.9**

Figure 107. Number of hooks set by the Hawaii-based deep-set longline fishery, 2003-2013

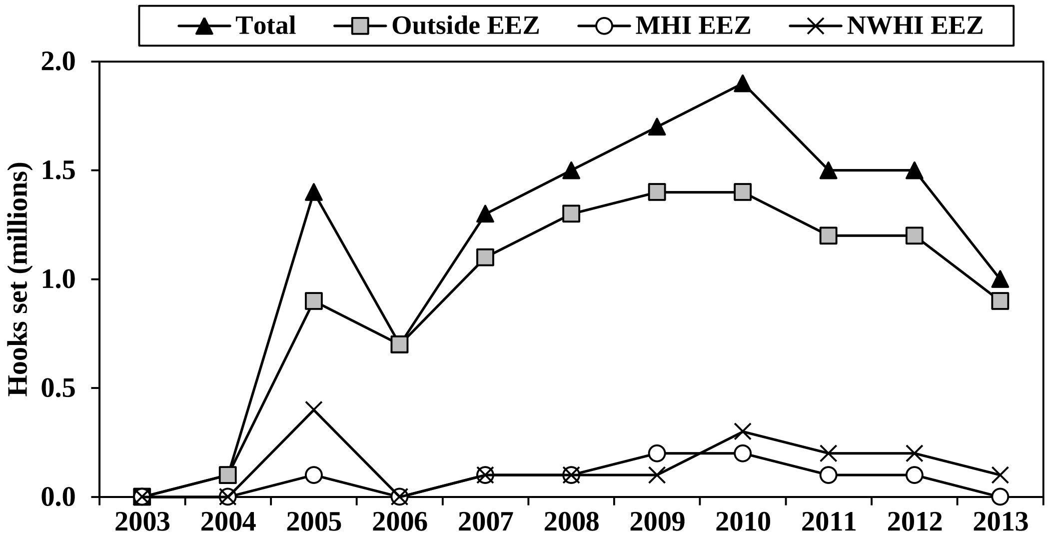


Interpretation: The total number of hooks set by the Hawaii-based deep-set longline fishery increased steadily from 27 million hooks in 2002 to a record 46.9 million hooks in 2013. Much of the increase in effort is due to higher effort outside the EEZ. Hooks set outside the EEZ represented 70% of the total effort in 2013. Hooks set in the MHI EEZ were relatively stable and was close to its long-term average in 2013. Hooks set in the NWHI EEZ and PRIA EEZ were relatively low compared to effort outside the EEZ and MHI EEZ.

Source and calculations: Number of hooks set was compiled from NMFS federal longline logbook data collected from 2004 to 2012. The Hawaii-based longline fishery was separated into deep-set or shallow-set sectors. The set type was based the number of hooks between floats with a deep-set defined as a fishing operation with 15 or more hooks between floats and a shallow-set characterized by having less than 15 hooks between floats. The time series for the shallow-set sector was truncated since this type of longline fishing was prohibited in 2002 and 2003. The summary of hooks set was based on date of haul and grouped into general areas of operation, i.e., Main Hawaiian Islands EEZ, Northwestern Hawaiian Islands EEZ, Pacific Remote Island Area EEZ, and the Outside of the U.S. EEZs.

	Number of hooks set by area (milions)				
Year	Outside EEZ	MHI EEZ	NWHI EEZ	PRIA EEZ	Total
2003	15.1	11.2	2.7	0.9	29.9
2004	17.2	11.0	1.8	2.0	32.0
2005	16.4	15.1	1.7	0.5	33.7
2006	17.5	11.5	3.8	1.8	34.6
2007	22.5	11.6	2.3	2.4	38.8
2008	23.1	11.2	4.4	1.3	40.0
2009	24.3	9.1	3.2	1.2	37.8
2010	27.9	6.0	1.9	1.4	37.2
2011	26.2	9.1	4.6	0.9	40.8
2012	28.2	10.1	3.9	1.9	44.1
2013	32.8	9.6	3.3	1.2	46.9
Average	**22.84**	**10.50**	**3.05**	**1.41**	**37.80**
SD	**5.73**	**2.23**	**1.05**	**0.56**	**5.11**

Figure 108. Number of hooks set by the Hawaii-based shallow-set longline fishery, 2004-2013



Interpretation: The total number of hooks set by the Hawaii-based shallow-set longline fishery was low when it was first reopened in 2004 since fishermen were uncertain how successful their operations would be under the new set of regulations and the timing of the reopening at near or just past the peak of swordfish season. Effort increased in 2005 as fishermen adapted to the new regulations. However, the shallow-set fishery was closed when it reached the loggerhead sea turtle limit in March 2006. The shallow-set fishery reopened in 2007. The number of hooks set peaked at 1.9 million hooks in 2010, but have decreased to 1 million hooks in 2013.

Most of the hooks set by the shallow-set longline fishery from 2004-2013 were outside the EEZ (81%). Much less effort was observed in the NWHI EEZ (12%) and the MHI EEZ (7%). The shallow-set effort in the NWHI EEZ and MHI EEZ usually occur later in the swordfish season when fish migrate closer the Hawaiian Islands.

Source and calculations: Number of hooks set was compiled from NMFS federal longline logbook data collected from 2004 to 2012. The Hawaii-based longline fishery was separated into deep-set or shallow-set sectors. Set type was based the number of hooks between floats; deep-set was defined as 15 or more hooks between floats. Shallow-set was defined as less than 15 hooks between floats. The time series for the shallow-set sector was truncated since it was prohibited in 2002 and 2003. The summary of hooks set was based on date of haul and grouped into general areas of operation, i.e., Main Hawaiian Islands EEZ, Northwestern Hawaiian Islands EEZ, Pacific Remote Island Area EEZ, and the Outside of the U.S. EEZs.

	Number of hooks set by area (milions)				
Year	Outside EEZ	MHI EEZ	NWHI EEZ	PRIA EEZ	Total
2003	0.0	0.0	0.0	0.0	0.0
2004	0.1	0.0	0.0	0.0	0.1
2005	0.9	0.1	0.4	0.0	1.4
2006	0.7	0.0	0.0	0.0	0.7
2007	1.1	0.1	0.1	0.0	1.3
2008	1.3	0.1	0.1	0.0	1.5
2009	1.4	0.2	0.1	0.0	1.7
2010	1.4	0.2	0.3	0.0	1.9
2011	1.2	0.1	0.2	0.0	1.5
2012	1.2	0.1	0.2	0.0	1.5
2013	0.9	0.0	0.1	0.0	1.0
Average	0.93	0.08	0.14	0.00	1.15
SD	0.49	0.08	0.13	0.00	0.63

Table 87. Hawaii-based deep-set longline catch (number of fish) by area, 2003-2013

	Tunas			Billfish				Other PMUS			
Year	**Bigeye tuna**	**Yellowfin tuna**	**Albacore**	**Swordfish**	**Blue marlin**	**Striped marlin**	**Spearfish**	**Mahimahi**	**Ono (Wahoo)**	**Moonfish**	**PMUS sharks**
Main Hawaiian Islands EEZ											
2003	39,907	10,058	2,593	1,422	1,742	12,247	8,118	25,255	4,751	3,454	25,683
2004	49,152	8,847	3,031	1,166	1,135	6,665	5,099	26,631	3,204	2,707	24,761
2005	52,783	13,717	4,604	1,205	1,523	6,738	7,551	39,772	5,448	4,228	26,338
2006	32,799	6,731	1,598	916	1,547	7,479	3,771	16,869	4,130	3,298	17,593
2007	43,850	6,102	1,233	813	629	2,344	3,127	21,435	2,845	2,950	16,159
2008	34,778	13,021	1,303	590	917	3,270	4,773	14,596	2,540	2,456	12,788
2009	23,800	2,584	490	563	551	1,753	1,764	9,367	1,240	2,454	10,297
2010	15,872	3,131	1,568	430	417	669	1,383	6,604	1,025	1,354	8,245
2011	26,828	8,473	4,077	545	894	3,966	3,138	14,611	1,285	1,878	13,307
2012	35,067	7,131	2,578	637	547	2,646	2,613	12,696	1,554	1,951	12,896
2013	34,886	5,387	1,588	718	882	3,852	3,767	13,563	2,212	1,983	13,636
Northwestern Hawaiian EEZ											
2003	8,929	2,522	2,286	259	1,035	4,703	2,523	3,559	1,596	1,372	11,773
2004	8,906	932	708	187	265	1,290	913	3,863	469	662	6,552
2005	6,337	1,968	1,014	107	240	1,268	915	2,751	552	861	8,212
2006	20,383	4,162	1,005	256	480	3,291	1,554	4,005	1,322	1,291	12,608
2007	11,321	1,966	965	165	139	1,154	714	2,739	465	926	6,720
2008	18,036	7,861	1,262	354	743	3,521	2,457	5,821	1,560	1,375	8,509
2009	11,292	1,756	1,779	280	210	1,183	687	1,505	488	1,033	5,527
2010	6,965	1,252	2,266	216	131	364	362	548	405	1,055	3,348
2011	17,337	4,408	7,038	322	558	3,252	2,747	7,395	733	1,259	9,520
2012	13,880	3,514	3,985	311	219	1,412	1,027	3,542	651	1,122	8,123
2013	14,160	2,322	1,895	206	299	1,784	1,666	3,106	698	976	7,099
Pacific Remote Islands Area EEZ											
2003	2,106	2,392	2,202	83	443	572	436	842	1,058	117	2,416
2004	9,813	4,587	2,661	253	426	618	508	1,049	1,344	288	4,673
2005	1,428	1,714	1,089	64	143	161	155	316	569	46	870
2006	6,698	7,353	2,359	134	614	520	514	1,126	1,486	311	3,294
2007	14,509	3,257	1,432	248	426	383	526	870	1,677	137	4,211
2008	5,987	2,247	2,422	120	310	293	581	1,535	1,122	127	2,655
2009	3,985	1,922	1,073	138	291	206	389	348	552	159	3,267
2010	7,447	1,584	779	165	334	129	203	332	628	132	3,016
2011	4,082	2,560	998	91	195	390	295	578	643	111	1,582
2012	6,475	5,063	3,138	192	233	288	614	1,987	1,189	235	3,077
2013	4,548	958	1,478	113	203	174	493	1,001	800	120	2,011
Outside EEZ											
2003	56,284	12,957	13,783	1,780	2,439	8,433	6,913	25,727	10,985	6,954	28,782
2004	74,300	11,541	10,648	2,147	3,019	6,585	7,512	35,034	10,592	4,876	35,977
2005	66,767	11,388	5,693	1,718	1,962	6,027	5,964	28,549	9,461	8,138	23,275
2006	57,585	12,189	6,026	1,842	3,050	9,618	6,084	30,150	10,191	7,860	23,873
2007	88,406	14,826	5,823	2,204	2,046	4,008	5,598	55,921	7,482	10,304	31,512
2008	92,051	10,897	8,736	2,585	1,904	6,394	7,491	40,504	8,887	11,062	24,436
2009	79,127	6,905	5,310	2,353	3,041	4,224	5,933	49,261	6,518	17,620	31,624
2010	105,352	7,630	14,153	2,105	2,514	2,512	6,427	84,810	6,678	16,982	36,535
2011	107,009	15,883	19,387	2,174	2,780	8,644	9,377	52,265	7,790	14,462	31,485
2012	103,783	11,996	19,946	2,406	2,297	4,751	7,042	59,145	8,027	13,812	33,042
2013	138,768	10,351	9,564	3,223	2,564	6,723	8,992	59,013	10,526	20,097	34,185
All areas											
2003	107,226	27,929	20,864	3,544	5,659	25,955	17,990	55,383	18,390	11,897	68,654
2004	142,171	25,907	17,048	3,753	4,845	15,158	14,032	66,577	15,609	8,533	71,963
2005	127,315	28,787	12,400	3,094	3,868	14,194	14,585	71,388	16,030	13,273	58,695
2006	117,465	30,435	10,988	3,148	5,691	20,908	11,923	52,150	17,129	12,760	57,368
2007	158,086	26,151	9,453	3,430	3,240	7,889	9,965	80,965	12,469	14,317	58,602
2008	150,852	34,026	13,723	3,649	3,874	13,478	15,302	62,456	14,109	15,020	48,388
2009	118,204	13,167	8,652	3,334	4,093	7,366	8,773	60,481	8,798	21,266	50,715
2010	135,636	13,597	18,766	2,916	3,396	3,674	8,375	92,294	8,736	19,523	51,144
2011	155,256	31,324	31,500	3,132	4,427	16,252	15,557	74,849	10,451	17,710	55,894
2012	159,205	27,704	29,647	3,546	3,296	9,097	11,296	77,370	11,421	17,120	57,138
2013	192,362	19,018	14,525	4,260	3,948	12,533	14,918	76,683	14,236	23,176	56,931

Table 88. Hawaii-based shallow-set longline catch (number of fish) by area, 2004-2013

Year	Tunas			Billfish				Other PMUS			PMUS
	Bigeye tuna	Yellowfin tuna	Albacore	Swordfish	Blue marlin	Striped marlin	Spearfish	Mahimahi	Ono (Wahoo)	Moonfish	PMUS sharks
Main Hawaiian Islands EEZ											
2004											
2005	73	45	2	1,259	71	215	31	398	25	0	627
2006											
2007	37	25	3	1,116	7	63	17	167	19	0	433
2008	29	69	0	620	74	127	15	195	22	0	300
2009	29	32	0	2,024	51	199	26	199	15	24	715
2010	25	65	3	963	18	36	13	414	14	0	906
2011	26	19	4	409	9	24	22	181	4	3	240
2012	4	16	2	282	10	16	5	167	4	0	204
2013	6	4	2	187	7	13	2	24	1	0	80
Northwestern Hawaiian EEZ											
2004											
2005	372	62	27	5,923	272	919	112	2,946	68	4	3,197
2006											
2007	69	7	1	2,220	22	58	7	272	11	1	639
2008	342	201	9	2,346	170	418	64	1,220	30	9	543
2009	58	23	2	1,872	52	79	11	204	2	1	401
2010	193	38	15	2,560	24	102	20	378	43	4	1,275
2011	185	74	14	1,697	76	246	55	1,325	6	1	893
2012	62	39	10	1,948	51	147	36	669	19	1	710
2013	87	72	3	1,320	36	285	30	1,655	7	0	739
Pacific Remote Islands Area EEZ											
2004											
2005											
2006											
2007											
2008											
2009											
2010											
2011											
2012											
2013											
Outside EEZ											
2004	11	0	293	1,422	1	4	0	31	1	29	1,642
2005	1,598	80	1,208	14,078	110	466	87	3,230	44	55	12,363
2006	1,200	135	434	13,437	13	110	4	465	6	49	10,087
2007	1,244	97	1,387	17,507	22	197	47	1,477	57	53	15,391
2008	1,119	234	2,921	17,376	107	392	90	3,378	82	96	12,860
2009	760	192	1,509	14,612	77	321	40	2,818	21	71	8,291
2010	1,367	102	1,902	13,604	22	117	37	1,810	15	213	16,776
2011	849	226	2,928	14,074	30	252	104	4,892	24	202	7,806
2012	811	227	1,142	12,011	41	122	102	3,623	17	284	6,066
2013	359	126	556	9,222	20	92	84	1,995	22	241	5,442
All areas											
2004	11	0	293	1,422	1	4	0	31	1	29	1,642
2005	2,043	187	1,237	21,260	453	1,600	230	6,574	137	59	16,187
2006	1,200	135	434	13,437	13	110	4	465	6	49	10,087
2007	1,350	129	1,391	20,843	51	318	71	1,916	87	54	16,463
2008	1,490	504	2,930	20,342	351	937	169	4,793	134	105	13,703
2009	847	247	1,511	18,508	180	599	77	3,221	38	96	9,407
2010	1,585	205	1,920	17,127	64	255	70	2,602	72	217	18,957
2011	1,060	319	2,946	16,180	115	522	181	6,398	34	206	8,939
2012	877	282	1,154	14,241	102	285	143	4,459	40	285	6,980
2013	452	202	561	10,729	63	390	116	3,674	30	241	6,261

Interpretation: With the exception of swordfish, the largest catches were made by deep-set sector of the longline fishery. Catches for most species were usually highest outside the U.S. EEZ for both sectors. Bigeye tuna catches by the deep-set sector were higher in the latter part of the time series, while swordfish catches by the shallow-set sectors were trending down after its peak in 2005.

Source and calculations: Catches (number of fish) by area were compiled from NMFS federal longline logbook data. The catch tables are based on date of haul and include fish that were kept and released. The shallow-set sector of the Hawaii-based longline fishery was reopened in March 2004. The set type was based the number of hooks between floats with a deep-set defined as a fishing operation with 15 or more hooks between floats and a shallow-set characterized by having less than 15 hooks between floats. Longline vessel operators are required to declare what set type they plan to make prior to leaving on a trip. The bolded numbers in the above tables show the area with the highest catch for a particular species in each area. The bolded numbers in the total catch table is the year which the record high catch was made for each species of fish.

Table 89. Average weight of the Hawaii-based longline fishery by species and sector, 2003-2013

	Tunas					Billfish						Other PMUS					Sharks	
Hawaii deep-set longline fishery																		
Year	**Bigeye tuna**	**Yellowfin tuna**	**Albacore**	**Skipjack tuna**	**Bluefin Tuna**	**Swordfish**	**Striped marlin**	**Blue marlin**	**Spearfish**	**Sailfish**	**Black marlin**	**Mahimahi**	**Ono (Wahoo)**	**Moonfish**	**Pomfrets**	**Oilfish**	**Mako shark**	**Thresher shark**
2003	77	68	57	19	184	129	49	138	31	56	151	13	29	93	13	16	182	190
2004	68	62	46	16	184	122	57	130	30	40	187	16	31	92	11	16	173	173
2005	88	58	51	16	184	148	72	170	31	43	189	13	29	83	13	16	177	197
2006	84	71	52	17	184	141	64	159	30	48	185	14	30	85	13	17	179	190
2007	82	73	56	16	184	159	74	170	33	47	189	12	31	86	14	15	190	180
2008	87	58	53	18	184	209	65	184	32	59	252	12	32	89	14	15	184	192
2009	86	78	48	18	184	180	71	184	28	45	189	12	33	90	15	15	186	189
2010	88	90	47	18	184	160	92	195	31	55	189	10	32	91	14	15	200	169
2011	81	66	47	18	184	169	47	182	33	58	189	12	34	92	12	15	182	164
2012	81	69	48	16	184	172	66	192	32	56	189	12	32	92	13	16	196	174
2013	74	81	48	16	184	180	67	212	31	61	189	11	32	90	13	17	191	154
Average	**81.4**	**70.4**	**50.4**	**17.0**	**184.3**	**161.0**	**65.8**	**174.2**	**31.2**	**51.5**	**190.8**	**12.4**	**31.3**	**89.2**	**13.4**	**15.9**	**185.4**	**179.4**
SD	**6.2**	**9.8**	**3.6**	**1.1**	**0.0**	**25.2**	**12.5**	**24.5**	**1.4**	**7.0**	**23.1**	**1.5**	**1.7**	**3.3**	**1.1**	**0.7**	**8.3**	**13.4**
Hawaii shallow-set longline fishery																		
	Tunas					**Billfish**						**Other PMUS**					**Sharks**	
Year	**Bigeye tuna**	**Yellowfin tuna**	**Albacore**	**Skipjack tuna**	**Bluefin Tuna**	**Swordfish**	**Striped marlin**	**Blue marlin**	**Spearfish**	**Sailfish**	**Black marlin**	**Mahimahi**	**Ono (Wahoo)**	**Moonfish**	**Pomfrets**	**Oilfish**	**Mako shark**	**Thresher shark**
2003	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2004	92		36	19	164	205	85	204	-	-	-	16	-	78	16	20	175	-
2005	85	126	31	19	164	165	92	226	40	52	-	17	32	59	17	19	163	218
2006	110	77	30	19	164	170	130	204	34	52	-	14	35	54	17	21	124	-
2007	99	107	22	19	-	179	105	428	36	52	-	15	42	77	18	17	173	218
2008	121	117	25	19	164	202	86	185	35	52	189	14	36	77	17	18	207	218
2009	121	113	28	19	164	200	91	264	36	52	-	13	43	79	19	16	177	218
2010	95	116	24	19	164	202	106	299	37	52	-	12	42	74	18	18	155	218
2011	110	127	26	19	-	214	90	242	38	52	-	11	37	53	18	17	196	218
2012	92	109	25	19	164	193	95	259	36	52	-	11	34	74	18	17	180	218
2013	106	110	32	19	164	221	90	269	35	52	-	12	35	78	16	17	168	218
Average	**103.0**	**111.4**	**28.0**	**19.3**	**164.1**	**195.1**	**96.9**	**258.1**	**36.4**	**51.6**	**188.6**	**13.4**	**37.2**	**70.3**	**17.3**	**17.9**	**171.7**	**218.0**
SD	**12.5**	**14.8**	**4.2**	**0.0**	**0.0**	**18.4**	**13.7**	**69.3**	**1.9**	**0.0**	**-**	**2.1**	**4.0**	**10.5**	**1.0**	**1.7**	**22.6**	**0.0**

Interpretation: The deep-set sector targets bigeye tuna, while the shallow-set sector fishes for swordfish. However, both sectors catch and land a variety of pelagic species. The mean weight of fish landed by the shallow-set sector was larger for most of the major species. Bigeye tuna from the deep-set sector was below its long-term mean weight at 74 lbs in 2013. There was no clear trend with mean weight for bigeye tuna over the 11 year period. Mean weight of swordfish by the shallow-set sector was lowest at 165 lbs in 2005 and highest at 221 lbs in 2013.

Source and calculations: Average weight of the longline landings was summarized from the HDAR, State Commercial Marine Dealer data identified as landed by longline fishing during 2002 to 2012. Swordfish and sharks were landed headed and gutted. In December 2004, the Honolulu Auction required fishers to gill and gut tunas and mahimahi that weighed more than 20 pounds and marlins greater than 40 pounds. When fish were processed prior to sale, e.g., headed and gutted, gilled and gutted, a conversion factor was applied to convert it to an estimated whole weight. Discarded fish were not represented in the size summaries. Average weight statistics were also calculated for deep-set and shallow-set longline sectors. The set type was based the number of hooks between floats with a deep-set defined as a fishing operation with 15 or more hooks between floats and a shallow-set characterized by having less than 15 hooks between floats. Longline vessel operators are required to declare what set type they plan to make prior to leaving on a trip. Each species needed a minimum of 20 samples within a month of each RFMO area, i.e., WCPO or EPO, in order to calculate a mean weight. If this criteria was not met, the time strata was increased to a quarter, year or multi-year period until there were enough samples to calculate a mean weight. Some species which were landed in low numbers needed to be aggregated to a multi-year period. Consequently, their respective annual mean weights are the same from year to year or repeat over time.

Table 90. Numbers of released catch, retained catch, and total catch for the Hawaii-based longline fishery, 2013

	Deep-set longline fishery				Shallow-set longline fishery			
	Released catch	Percent released	Retained catch	Total Catch	Released catch	Percent released	Retained catch	Total Catch
Tuna								
Albacore	60	0.4	14,465	14,525	92	16.4	469	561
Bigeye tuna	3,187	1.7	189,175	192,362	33	7.3	419	452
Bluefin tuna	0	0.0	4	4	0	0.0	3	3
Skipjack tuna	414	1.3	31,752	32,166	1	5.9	16	17
Yellowfin tuna	195	1.0	18,823	19,018	0	0.0	202	202
Other tuna	14	70.0	6	20	0	0.0	0	0
Total tunas	**3,870**	**1.5%**	**254,225**	**258,095**	**126**	**10.2%**	**1,109**	**1,235**
Billfish								
Blue marlin	33	0.8	3,915	3,948	1	1.6	62	63
Spearfish	63	0.4	14,855	14,918	9	7.8	107	116
Striped marlin	88	0.7	12,445	12,533	12	3.1	378	390
Other marlin	14	3.1	445	459	0	0.0	8	8
Swordfish	563	13.2	3,697	4,260	934	8.7	9,795	10,729
Total billfish	**761**	**2.1%**	**35,357**	**36,118**	**956**	**8.5%**	**10,350**	**11,306**
Other PMUS								
Mahimahi	545	0.7	76,138	76,683	156	4.2	3,518	3,674
Moonfish	94	0.4	23,082	23,176	94	39.0	147	241
Oilfish	534	1.6	31,949	32,483	383	35.4	700	1,083
Pomfret	411	0.5	78,176	78,587	45	34.1	87	132
Wahoo	51	0.4	14,185	14,236	7	23.3	23	30
Total other PMUS	**1,635**	**0.7%**	**223,530**	**225,165**	**685**	**13.3%**	**4,475**	**5,160**
Non-PMUS fish	4,053	77.4	1,183	5,236	14	87.5	2	16
Total non-shark	**10,319**	**2.0%**	**514,295**	**524,614**	**1,781**	**10.1%**	**15,936**	**17,717**
PMUS Sharks								
Blue shark	46,984	100.0	22	47,006	5,149	100.0	0	5,149
Mako shark	2,200	81.6	496	2,696	947	91.7	86	1,033
Thresher shark	6,428	98.9	72	6,500	50	100.0	0	50
Other PMUS sharks	725	99.5	4	729	29	100.0	0	29
Total PMUS sharks	**56,337**	**99.0%**	**594**	**56,931**	**6,175**	**98.6%**	**86**	**6,261**
Non-PMUS sharks	682	99.6	3	685	18	100.0	0	18
Grand Total	**67,338**	**11.6%**	**514,892**	**582,230**	**7,974**	**33.2%**	**16,022**	**23,996**

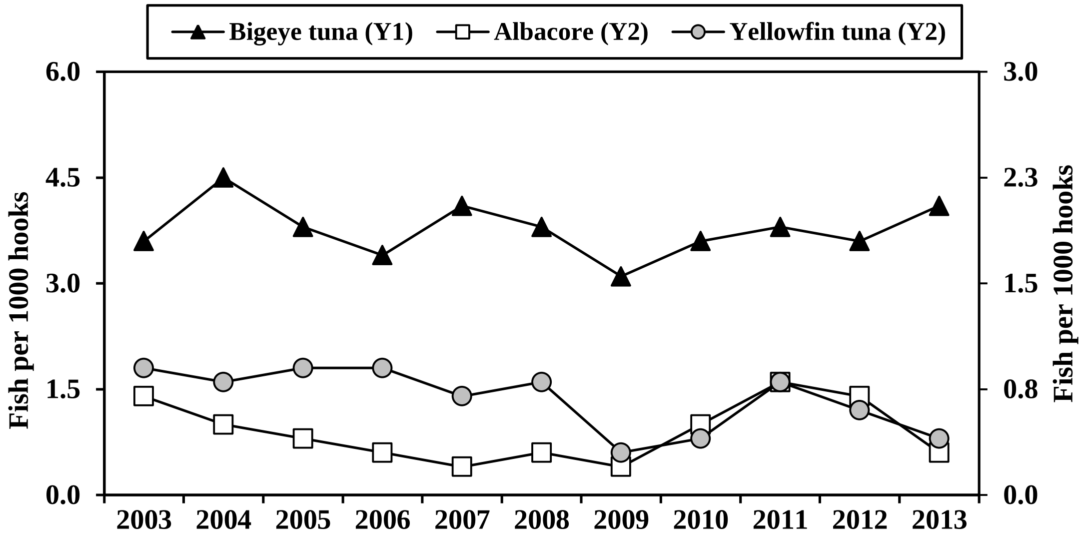
Interpretation: Released, retained and total catch by the Hawaii-based longline fishery was measured in number of fish. Since fishing techniques and target species were different between the deep-set and shallow-set sectors of the longline fishery, the catch table was split into their respective sectors. The disposition of sharks was significantly different from tunas, billfish, and other PMUS. Therefore, sharks were separated into a group of its own.

The number and percentage of fish released by the deep-set sector of the longline fishery in 2013 was 67,338 fish and 12%, respectively. Two percent of tuna, billfish and other PMUS were released by the deep-set sector of the longline fishery. Bigeye tuna, the target species of the deep-set sector, had the highest number of fish released although the rate of fish released was only 1.7%. Although billfish and other PMUS are not targeted, these species are highly marketable and also have low rates of release (2.1% and 0.7%, respectively). In contrast to tunas, billfish, and other PMUS, sharks had the highest number and percentage released. There were 56,337 sharks released, which represented 99% of the total sharks caught by the deep-set sector.

The number of fish released by the shallow-set sector of the longline fishery was lower compared to the deep-set sector, but the rate of fish released was higher; 7,974 fish and 33%, respectively. The higher release rate by the shallow-set sector may be related conserving space for swordfish and the limited shelf life of incidental catch of other marketable species of fish. 8.6% of tuna, billfish and other PMUS was released by the shallow-set sector of the longline fishery in 2013. Swordfish, the target species of the shallow-set sector, had the highest number of non-shark catch released. However, the percent of swordfish released (8.7%) was close to the total non-shark release rate. In contrast to tunas, billfish, and other PMUS, sharks had the highest number and percent of fish released. There were 6,175 sharks released which represented 98.6% of the total sharks caught by the shallow-set sector. With the exception of mako shark, other shark species have no market so they are released.

Source and calculations: Longline released catch, retained catch and total catch along with their respective percentages were compiled from NMFS longline logbook data. Longline catch was summarized on date of haul. The set type was based the number of hooks between floats with a deep-set defined as a fishing operation with 15 or more hooks between floats and a shallow-set characterized by having less than 15 hooks between floats. Longline vessel operators are required to declare what set type they plan to make prior to leaving on a trip.

Figure 109. Hawaii longline CPUE for major tunas on tuna trips, 2003-2013

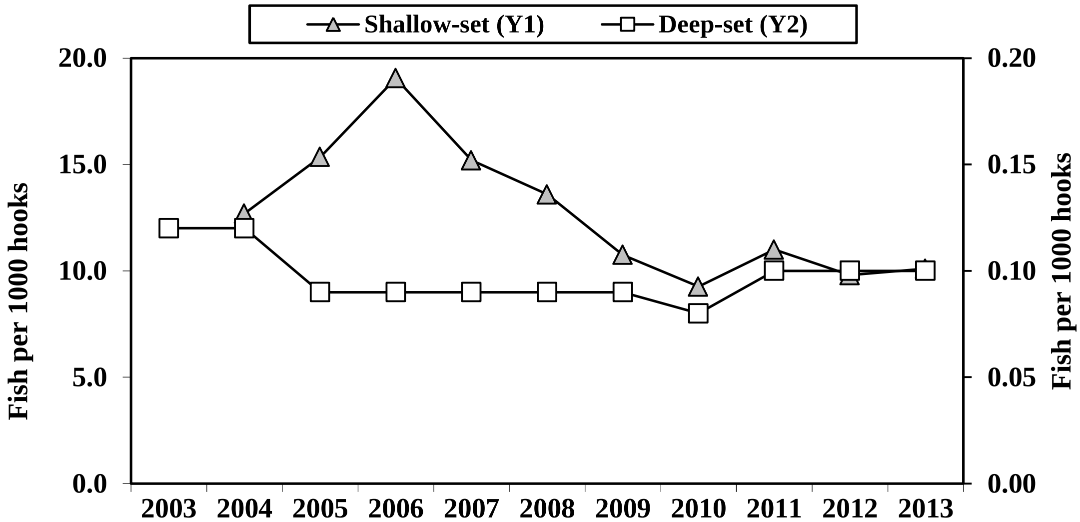


Interpretation: Bigeye tuna CPUE was consistently higher than CPUE for albacore or yellowfin tuna. Bigeye tuna CPUE was relatively steady from 2003-2013, ranging between 3.1 and 4.5. Albacore is caught incidentally or seldom targeted, therefore its CPUE is much lower than bigeye tuna. Albacore CPUE declined from 2003 through 2009, increased from 2010-2012, but decreased to 0.3 in 2013. CPUE for yellowfin tuna was steady from 2003 through 2008, dropped the following two years, recovered in 2011 and 2012, but decreased again in 2013 to 0.4.

Source and calculation: Tuna CPUE was compiled from NMFS longline logbook data and summarized on date of haul. CPUE was measured as number of fish caught (kept + released) per 1000 hooks. Set type CPUE summaries were based the number of hooks between floats with a deep-set defined as a set with 15 or more hooks between floats and a shallow-set characterized by having less than 15 hooks between floats. Longline vessel operators are required to declare what set type they plan to make prior to leaving on a trip.

	Deep-set longline CPUE (fish per 1000 hooks)		
Year	Bigeye tuna	Albacore	Yellowfin tuna
2003	3.6	0.7	0.9
2004	4.5	0.5	0.8
2005	3.8	0.4	0.9
2006	3.4	0.3	0.9
2007	4.1	0.2	0.7
2008	3.8	0.3	0.8
2009	3.1	0.2	0.3
2010	3.6	0.5	0.4
2011	3.8	0.8	0.8
2012	3.6	0.7	0.6
2013	4.1	0.3	0.4
Average	**3.76**	**0.45**	**0.68**
SD	**0.38**	**0.21**	**0.22**

Figure 110. Hawaii longline swordfish CPUE by trip type, 2003-2013



Interpretation: Shallow-set longline fishing was prohibited in 2003 due to sea turtle conservation measures, then reopened under a new set of regulations with intentions to reduce sea turtle interactions in April 2004. A few shallow-set trips were made before the end of the year and had respectable swordfish CPUEs (Y1 axis) under the new regulations. In 2005, the first complete year since its reopening, the shallow-set sector equaled a pre-closure CPUE of 15.3 fish per 1000 hooks attained back in 1991. Although shallow-set CPUE for swordfish was a record 19.0 in 2006, it was only because the shallow-set fishery was closed in March due to reaching the limit of 17 loggerhead turtle interactions. This prohibited this sector from fishing for the remainder of the year when shallow-set CPUE for swordfish is typically lower. Swordfish CPUE for the shallow-set fishery decreased to its lowest level at 9.3 in 2010 and remained low the following three years.

Deep-set longline swordfish CPUEs (Y2 axis) were more than 100 times lower compared to shallow-set longline swordfish CPUEs. Deep-set swordfish CPUE was slightly higher in the earlier period, decreased in 2005 and remained constant thereafter.

Source and calculation: Longline swordfish CPUE was compiled from NMFS longline logbook data and summarized based on date of haul. CPUE was based on number of swordfish caught (kept + released) divided by the number of hooks set. Set type CPUE summaries were based the number of hooks between floats with a deep-set defined as a set with 15 or more hooks between floats and a shallow-set characterized by having less than 15 hooks between floats. Longline vessel operators are required to declare what set type they plan to make prior to leaving on a trip.

	Swordfish CPUE	
Year	Shallow-set	Deep-set
2003	-	0.1
2004	12.7	0.1
2005	15.3	0.1
2006	19.0	0.1
2007	15.2	0.1
2008	13.6	0.1
2009	10.8	0.1
2010	9.3	0.1
2011	11.0	0.1
2012	9.8	0.1
2013	10.1	0.1
Average	**12.68**	**0.10**
SD	**3.10**	**0.01**

Figure 111. Longline striped marlin CPUE by trip type, 2003-2013

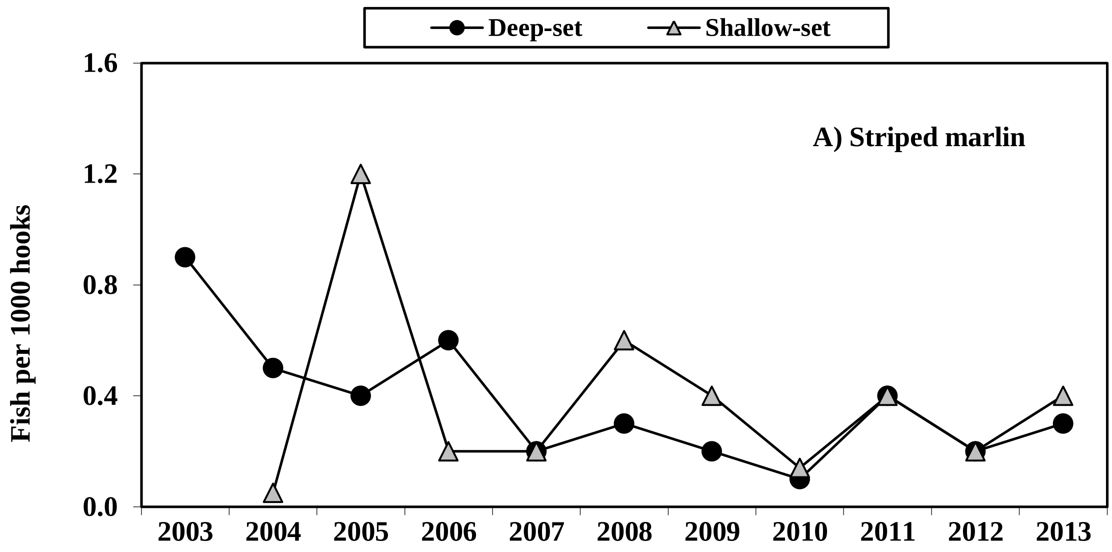
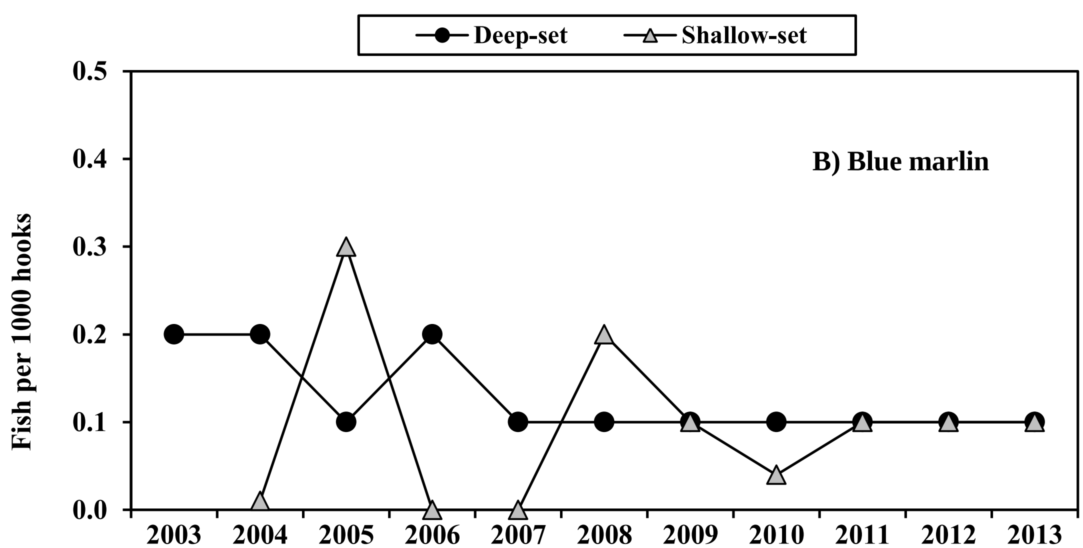


Figure 112. Longline blue marlin CPUE by trip type, 2003-2013

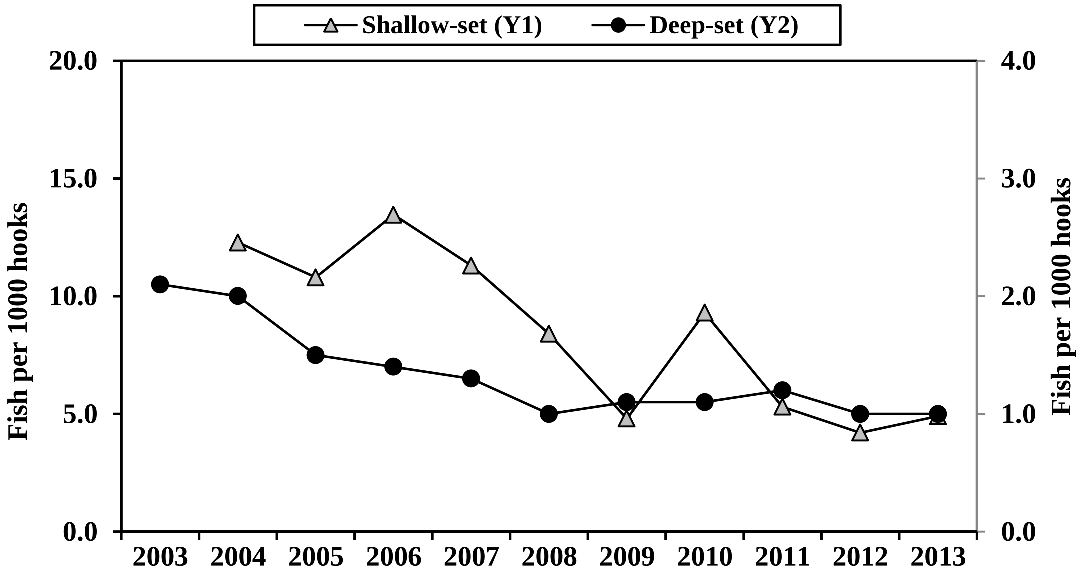


Interpretation: Striped marlin and blue marlin are caught incidentally by the longline fishery. Therefore, their catch rates are significantly lower than those for target species such as swordfish and bigeye tuna. There was little difference in striped marlin CPUE between the deep-set and shallow-set sectors. CPUE for both sectors exhibited variability with the appearance of a downward trend. Blue marlin CPUE was similar between sectors and its trend for both sectors was stable from 2008.

Source and calculation: Longline marlin CPUEs were compiled from NMFS longline logbook data and summarized based on date of haul. CPUE was based on number of marlin caught (kept + released) divided by the number of hooks set. Set type CPUE summaries were based the number of hooks between floats with a deep-set defined as a set with 15 or more hooks between floats and a shallow-set characterized by having less than 15 hooks between floats. Longline vessel operators are required to declare what set type they plan to make prior to leaving on a trip.

	Striped marlin		Blue marlin	
Year	Deep-set	Shallow-set	Deep-set	Shallow-set
2003	0.9	-	0.2	-
2004	0.5	0.1	0.2	0.0
2005	0.4	1.2	0.1	0.3
2006	0.6	0.2	0.2	0.0
2007	0.2	0.2	0.1	0.0
2008	0.3	0.6	0.1	0.2
2009	0.2	0.3	0.1	0.1
2010	0.1	0.1	0.1	0.0
2011	0.4	0.4	0.1	0.1
2012	0.2	0.2	0.1	0.1
2013	0.3	0.4	0.1	0.1
Average	**0.37**	**0.37**	**0.13**	**0.09**
SD	**0.23**	**0.33**	**0.05**	**0.10**

Figure 113. Hawaii longline blue shark CPUE by trip type, 2003-2013

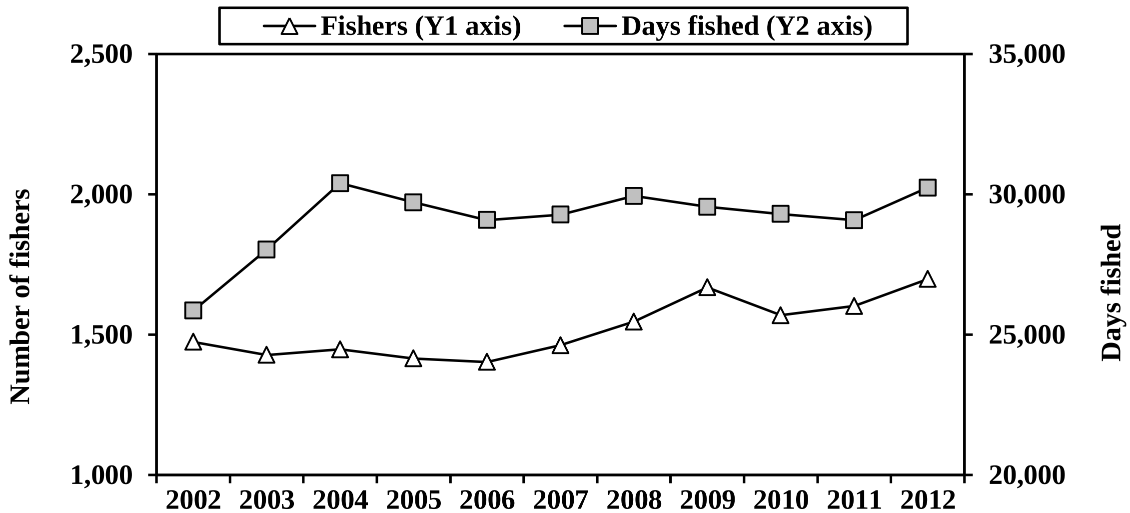


Interpretation: Blue sharks are caught incidentally by the longline fishery. The blue shark CPUE by the shallow-set sector (Y1 axis) was more than 6-fold greater than the deep-set sector (Y2 axis). Shallow-set blue shark CPUE decreased from 13.5 in 2006 to 4.2 in 2012; it increased marginally in 2013 to 4.9. Blue shark CPUE in the deep-set sector declined also, although at a more gradual rate.

Source and calculation: Longline blue shark CPUEs were compiled from NMFS longline logbook data and summarized based on date of haul. CPUE was based on number of sharks caught (kept + released) divided by the number of hooks set. Set type CPUE summaries were based the number of hooks between floats with a deep-set defined as a set with 15 or more hooks between floats and a shallow-set characterized by having less than 15 hooks between floats. Longline vessel operators are required to declare what set type they plan to make prior to leaving on a trip.

	Blue shark CPUE (fish per 1000 hooks)	
Year	Shallow-set	Deep-set
2003	-	2.1
2004	12.3	2.0
2005	10.8	1.5
2006	13.5	1.4
2007	11.3	1.3
2008	8.4	1.0
2009	4.8	1.1
2010	9.3	1.1
2011	5.3	1.2
2012	4.2	1.0
2013	4.9	1.0
Average	**8.48**	**1.34**
SD	**3.47**	**0.39**

Figure 114. Number of Main Hawaiian Islands troll fishers and number of days fished, 2003-2013

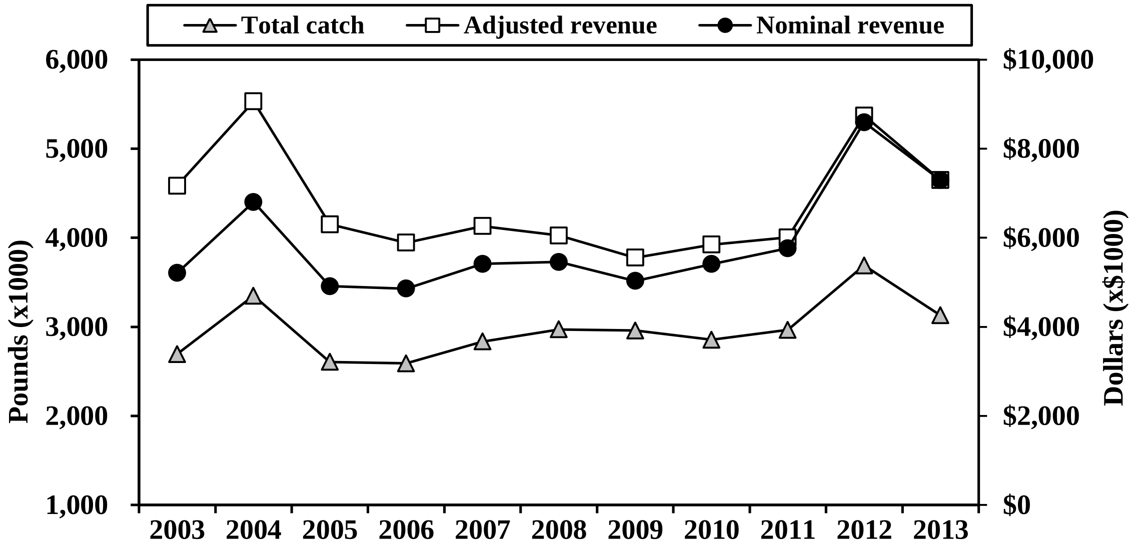


Interpretation: The trend for the number of Main Hawaiian Islands (MHI) troll fishers is increasing participation. The number of fishers rose from 1,402 fishers in 2006 to a peak of 1,698 fishers in 2012; it decreased in 2013 to 1,655 fishers. The trend of effort by the MHI troll fishery was different with number of days fished relatively steady from 2004 through 2012, then dropping to an 11-year low of 26,359 trips in 2013.

Source and calculations: The number of MHI troll fishers was based on the number of unique State of Hawaii, Division of Aquatic Resources (HDAR) issued Commercial Marine Licenses (CMLs) submitting Fishing Reports. The number of days fished by the MHI troll fishery was calculated using the Fishing Report data. A MHI troll day fished is defined as a unique CML number fishing on a unique day for the gear types and fishing in areas defined for the MHI troll fishery at the beginning of this module. The number of days fished includes days that fishers did not catch anything or days that fish were caught but not sold.

Year	Fishers	Days fished
2003	1,427	28,028
2004	1,447	30,395
2005	1,415	29,714
2006	1,402	29,080
2007	1,462	29,271
2008	1,546	29,938
2009	1,668	29,553
2010	1,569	29,298
2011	1,602	29,073
2012	1,698	30,232
2013	1,655	26,359
Average	**1,535.5**	**29,176.5**
SD	**110.1**	**1,136.2**

Figure 115. Main Hawaiian Islands troll landings and revenue, 2003-2013

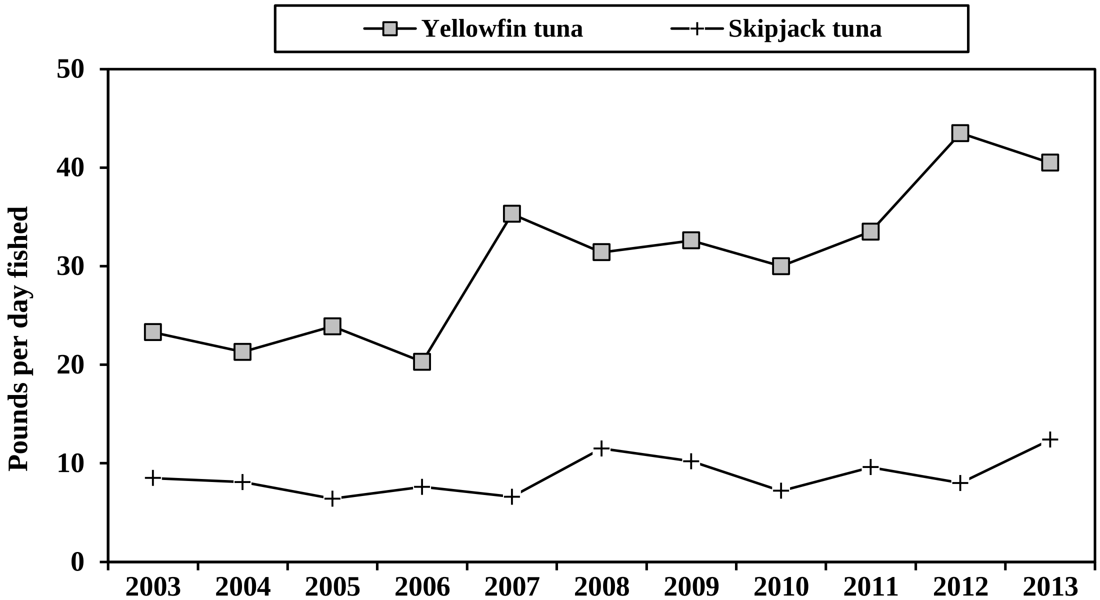


Interpretation: The total landings by the MHI troll fishery in 2013 were 3.1 million pounds worth an estimated $7.3 million. Total landings during the 11-year period was highest in 2012 with a general increasing trend from 2005-2006. Adjusted revenue peaked in 2004, decreased the following year, and remained stable through 2011. Revenue was above the long-term average in 2012 and 2013.

Source and calculations: Total landings and nominal revenue for the MHI troll fishery were derived from HDAR Commercial Fishing and Marine Dealer Report data. Total landings by the MHI troll fishery was based on a sum of Pounds Landed from the Fishing Report data or an extrapolation of Pounds Bought from the non-longline Dealer Report data. Nominal revenue is a sum of the Amount Paid from the Dealer Report data for fish caught by the MHI troll fishery. The adjusted revenue is calculated by dividing the nominal revenue by the Honolulu CPI for the respective year then multiplying the result by the current year (2012) Honolulu CPI.

Year	Total catch (1000 lbs)	Adjusted revenue ($1000)	Nominal revenue ($1000)	Honolulu CPI
2003	2,693	$7,168	$5,209	184.5
2004	3,348	$9,064	$6,804	190.6
2005	2,606	$6,304	$4,911	197.8
2006	2,590	$5,890	$4,858	209.4
2007	2,835	$6,264	$5,415	219.5
2008	2,971	$6,052	$5,456	228.9
2009	2,958	$5,553	$5,030	230.0
2010	2,855	$5,848	$5,410	234.9
2011	2,966	$6,010	$5,766	243.6
2012	3,690	$8,745	$8,594	249.5
2013	3,128	$7,296	$7,296	253.9
Average	**2,967.3**	**$6,744.8**	**$5,886.3**	
SD	**327.3**	**$1,194.4**	**$1,183.6**	

Figure 116. Main Hawaiian Islands troll tuna CPUE, 2003-2013



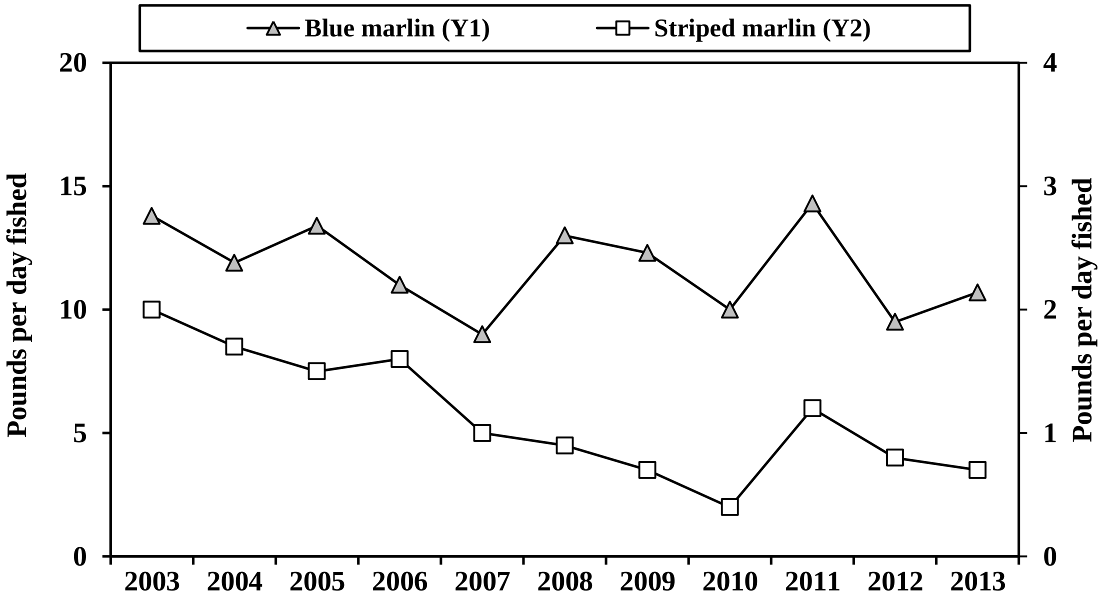
Interpretation: MHI troll yellowfin tuna CPUE was consistently higher than skipjack tuna CPUE. Yellowfin tuna CPUE was a record 44 pounds per trip in 2012 and had an increasing trend. Yellowfin tuna has been above its long-term average CPUE for the past seven years. Skipjack tuna reached an 11-year high of 12 pounds per trip in 2013. The trend for skipjack tuna was a gradual increase from 2007.

Source and calculations: The MHI troll CPUE values originate from HDAR Commercial Fishing Report data. CPUE based on pounds per day fished was calculated from Pounds Landed of yellowfin tuna and skipjack tuna divided by the number of MHI troll Days Fished. The number of Days Fished includes days that fishers did not catch anything or days that fish were caught but not sold. The pounds per hour fished CPUE calculation was based on the Pounds Landed divided by the sum of MHI troll Hours Fished.

MHI troll tuna CPUE (pounds per day fished)		
Year	Yellowfin tuna	Skipjack tuna
2003	23.3	8.5
2004	21.3	8.1
2005	23.9	6.4
2006	20.3	7.6
2007	35.3	6.6
2008	31.4	11.5
2009	32.6	10.2
2010	30.0	7.2
2011	33.5	9.6
2012	43.5	8.0
2013	40.5	12.4
Average	30.51	8.74
SD	7.68	1.97

MHI troll tuna CPUE (pounds per hour fished)		
Year	Yellowfin tuna	Skipjack tuna
2003	3.9	1.4
2004	3.6	1.4
2005	4.1	1.1
2006	3.5	1.3
2007	5.9	1.1
2008	5.4	2.0
2009	5.5	1.7
2010	5.0	1.2
2011	5.5	1.6
2012	7.0	1.3
2013	6.5	2.0
Average	5.08	1.46
SD	1.19	0.32

Figure 117. Main Hawaiian Islands troll marlin CPUE, 2003-2013



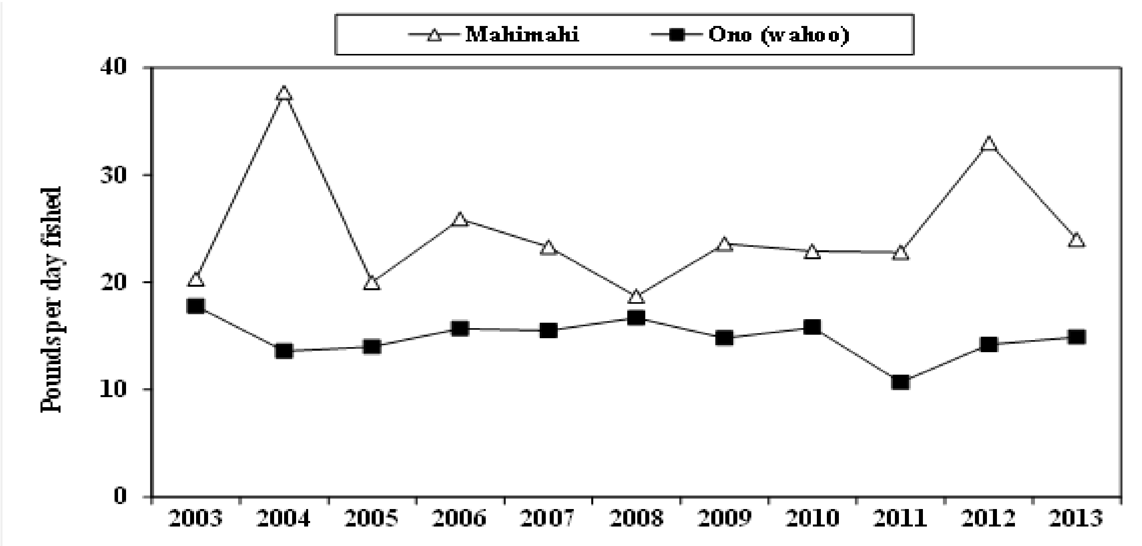
Interpretation: CPUE for blue marlin (Y1 axis) was substantially higher compared to the CPUE for striped marlin (Y2 axis). The CPUE trend for blue marlin was declining from 2003 to a low in 2007; the highest CPUE was 14.3 pounds per day fished in 2011. Striped marlin CPUE declined from 2002 to a low in 2010. Although striped marlin CPUE increased in 2011 through 2013, it was below its long-term average in 2012 and 2013.

Source and calculations: The MHI troll CPUE values originate from HDAR Commercial Fishing Report data. CPUE based on pounds per day fished was calculated from Pounds Landed of blue marlin and striped marlin divided by the number of MHI troll Days Fished. The number of Days Fished includes days that fishers did not catch anything or days that fish were caught but not sold. The pounds per hour fished CPUE calculation was based on the Pounds Landed divided by the sum of MHI troll Hours Fished.

MHI troll marlin CPUE (pounds per day fished)		
Year	Blue marlin	Striped marlin
2003	13.8	2.0
2004	11.9	1.7
2005	13.4	1.5
2006	11.0	1.6
2007	9.0	1.0
2008	13.0	0.9
2009	12.3	0.7
2010	10.0	0.4
2011	14.3	1.2
2012	9.5	0.8
2013	10.7	0.7
Average	**11.72**	**1.14**
SD	**1.81**	**0.50**

MHI troll marlin CPUE (pounds per hours fished)		
Year	Blue marlin	Striped marlin
2003	2.3	0.3
2004	2.0	0.3
2005	2.3	0.3
2006	1.9	0.3
2007	1.5	0.2
2008	2.2	0.2
2009	2.1	0.1
2010	1.7	0.1
2011	2.4	0.2
2012	1.5	0.1
2013	1.7	0.1
Average	**1.95**	**0.19**
SD	**0.31**	**0.09**

Figure 118. Main Hawaiian Islands troll mahimahi and ono CPUE, 2003-2013



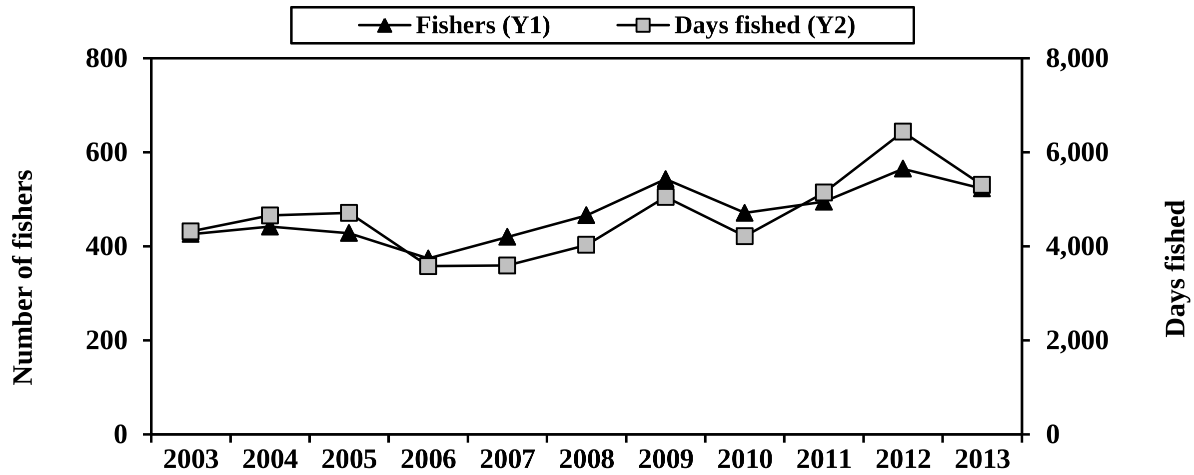
Interpretation: Mahimahi CPUE for the MHI troll fishery was slightly higher and exhibited more variability than ono. Mahimahi CPUE has been flat, with the exception of peaks in 2004 and 2012. Ono CPUE was stable from 2003 through 2013 and less variable than the mahimahi time series.

Source and calculations: The MHI troll CPUE values originate from HDAR Commercial Fishing Report data. CPUE based on pounds per day fished was calculated from Pounds Landed of mahimahi and ono divided by the number of MHI troll Days Fished. The number of Days Fished includes days that fishers did not catch anything or days that fish were caught but not sold. The pounds per hour fished CPUE calculation was based on the Pounds Landed divided by the sum of MHI troll Hours Fished.

MHI troll mahimahi and ono CPUE (pounds per day fished)		
Year	Mahimahi	Ono (wahoo)
2003	20.3	17.8
2004	37.7	13.6
2005	20.0	14.0
2006	25.9	15.7
2007	23.3	15.5
2008	18.7	16.7
2009	23.6	14.8
2010	22.9	15.8
2011	22.8	10.7
2012	33.0	14.2
2013	24.0	14.9
Average	24.75	14.88
SD	5.72	1.85

MHI troll mahimahi and ono CPUE (pounds per hours fished)		
Year	Mahimahi	Ono (wahoo)
2003	3.4	3.0
2004	6.3	2.3
2005	3.4	2.4
2006	4.4	2.7
2007	3.9	2.6
2008	3.2	2.9
2009	4.0	2.5
2010	3.8	2.7
2011	3.8	1.8
2012	5.3	2.3
2013	3.8	2.4
Average	4.12	2.48
SD	0.92	0.34

Figure 119. Number of Main Hawaiian Islands handline fishers and days fished, 2003-2013

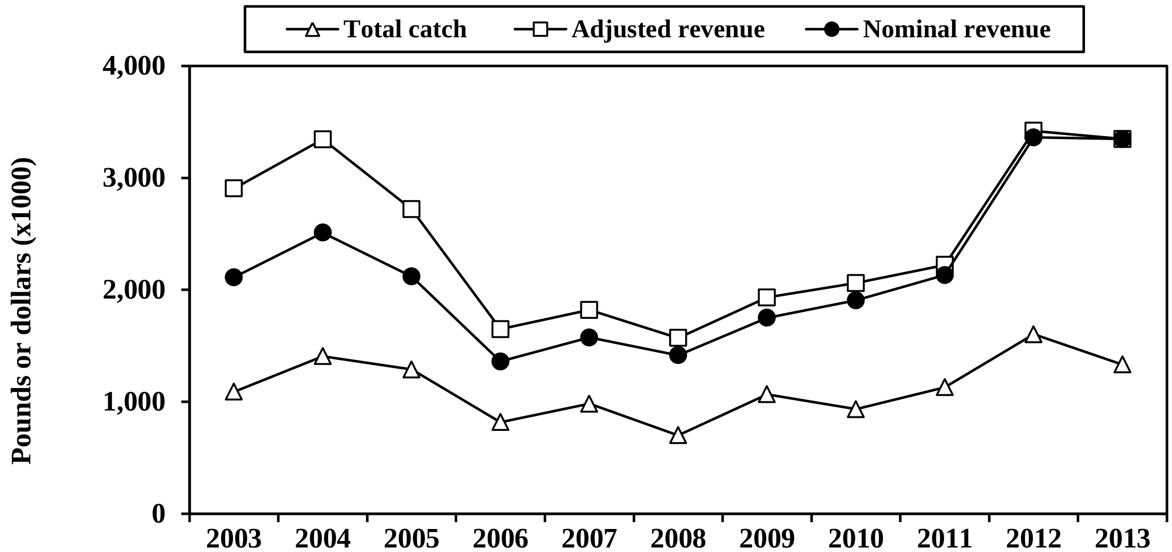


Interpretation: There were 523 MHI handline fishers that fished 5,306 days in 2013. Both measures of effort were above their respective long-term averages. MHI handline effort was lowest in 2006 and highest in 2012. Although participation and effort decreased in 2013, both indices were above their respective long-term averages. The general trend for the MHI handline fishery was increasing.

Source and calculations: The number of MHI handline fishers was based on the number of unique State of Hawaii, Division of Aquatic Resources (HDAR) Commercial Marine Licenses (CMLs) submitting Fish Reports. The number of days fished by the MHI handline fishery was calculated using the HDAR Fishing Report data. A MHI handline day fished is defined as a unique CML number fishing on a unique day for the gear types and fishing in areas defined for the MHI handline fishery at the beginning of this module. The number of days fished includes days that fishers did not catch anything or days that fish were caught but not sold.

Year	Fishers	Days fished
2003	426	4,319
2004	442	4,658
2005	428	4,710
2006	374	3,579
2007	420	3,592
2008	466	4,030
2009	543	5,049
2010	471	4,215
2011	495	5,141
2012	565	6,437
2013	523	5,306
Average	**468.5**	**4,639.6**
SD	**58.3**	**835.2**

Figure 120. Main Hawaiian Island handline landings and revenue, 2003-2013

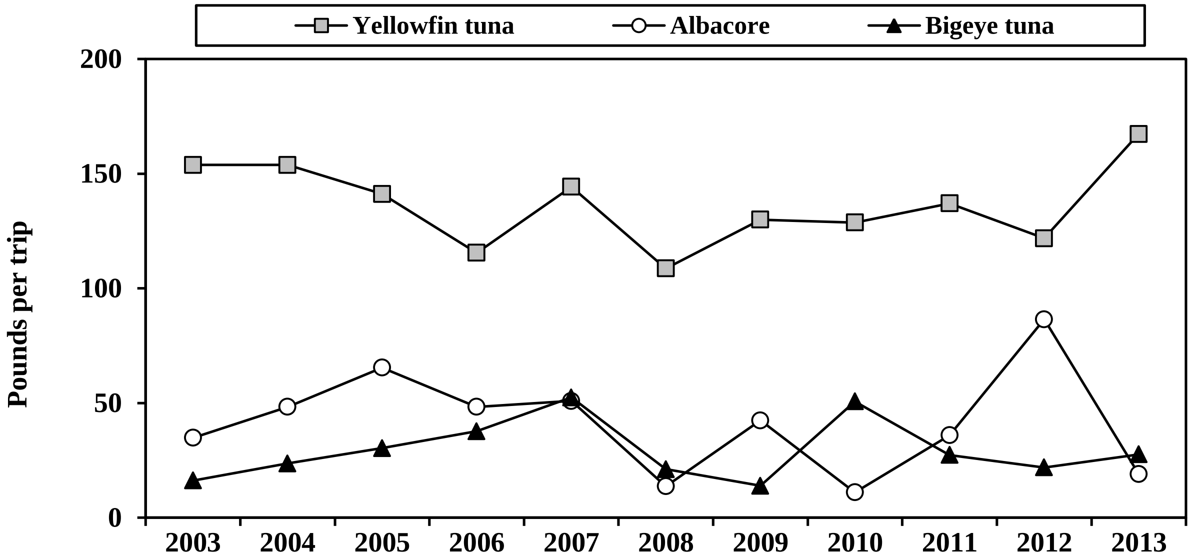


Interpretation: Total landings by the MHI handline fishery in 2013 was 1.3 million pounds, worth an estimated $3.3 million. Total landings and revenue by this fishery was above the long-term values by 1% and 36%, respectively. The recent trends for MHI handline fishery landings and revenue were increasing from 2008 through 2012.

Source and calculations: Total landings and nominal revenue for the MHI handline fishery were derived from HDAR Commercial Fishing and Marine Dealer Report data. Total landings by the MHI handline fishery was based on a sum of Pounds Landed from the Fishing Report data or an extrapolation of Pounds Bought from the non-longline Dealer Report data. Nominal revenue is a sum of the Amount Paid from the Dealer Report data for fish caught by the MHI handline fishery. The adjusted revenue is calculated by dividing the nominal revenue by the respective year Honolulu CPI and then multiplying the result by the current year (2012) Honolulu CPI.

Year	Total catch (1000 lbs)	Adjusted revenue ($1000)	Nominal revenue ($1000)	Honolulu CPI
2003	1,089	$2,905	$2,111	184.5
2004	1,407	$3,344	$2,510	190.6
2005	1,288	$2,720	$2,119	197.8
2006	818	$1,648	$1,359	209.4
2007	982	$1,821	$1,574	219.5
2008	701	$1,570	$1,415	228.9
2009	1,067	$1,932	$1,750	230.0
2010	933	$2,060	$1,906	234.9
2011	1,129	$2,222	$2,132	243.6
2012	1,602	$3,420	$3,361	249.5
2013	1,332	$3,348	$3,348	253.9
Average	**1,122.5**	**$2,453.5**	**$2,144.0**	
SD	**266.9**	**$715.0**	**$689.2**	

Figure 121. Main Hawaiian Island handline tuna CPUE, 2003-2013



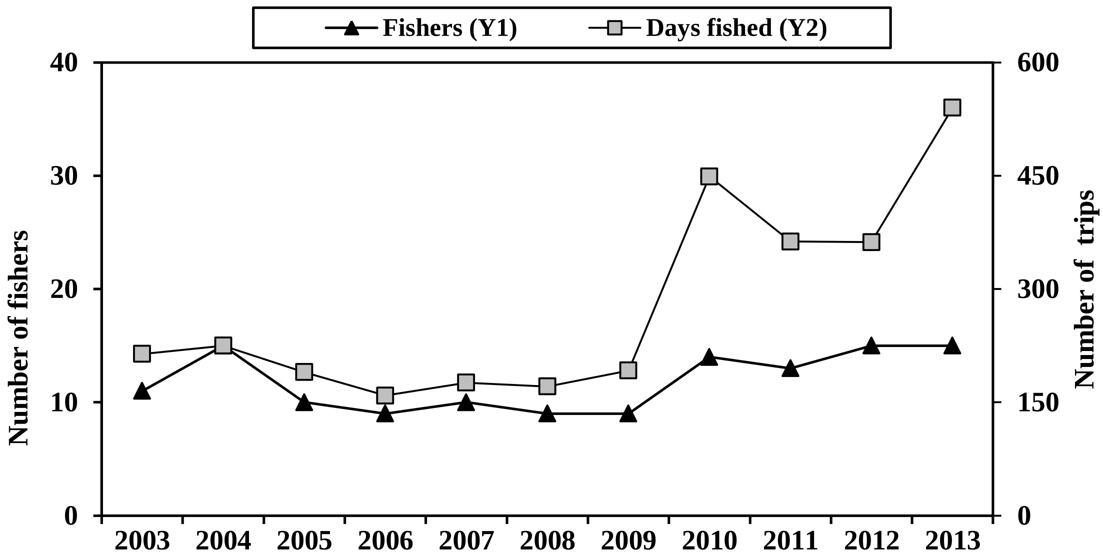
Interpretation: MHI handline CPUE for yellowfin tuna was at a record 167 pounds per day fished in 2013, 22% higher than its long-term average. Yellowfin tuna CPUE was relatively stable during the 11-year period. Albacore and bigeye tuna CPUE was substantially lower compared to yellowfin tuna. Both bigeye tuna and albacore CPUE rose in earlier years and exhibited substantial variability from 2007.

Source and calculations: The MHI handline CPUE values originate from HDAR Commercial Fishing Report data. CPUE based on pounds per day fished was calculated from Pounds Landed of yellowfin tuna, albacore, and bigeye tuna divided by the number of MHI handline Days Fished. The number of Days Fished includes days that fishers did not catch anything or days that fish were caught but not sold. The pounds per hour fished CPUE calculation was based on the Pounds Landed divided by the sum of MHI handline Hours Fished. The total MHI handline CPUE also includes skipjack tuna, kawakawa, and other tunas.

	MHI handline CPUE (pounds per day fished)			
Year	Yellowfin tuna	Albacore	Bigeye tuna	Total
2003	153.8	34.8	16.2	204.8
2004	153.8	48.3	23.6	225.7
2005	141.2	65.4	30.3	236.9
2006	115.5	48.3	37.7	201.5
2007	144.3	50.9	52.4	247.6
2008	108.7	13.7	21.1	143.5
2009	130.0	42.4	13.9	186.3
2010	128.7	11.0	50.7	190.4
2011	137.1	35.9	27.3	200.3
2012	121.8	86.5	21.9	230.2
2013	167.3	19.0	27.6	213.9
Average	**136.56**	**41.47**	**29.34**	**207.37**
SD	**17.79**	**22.50**	**12.78**	**28.80**

	MHI handline CPUE (pounds per hour fished)			
Year	Yellowfin tuna	Albacore	Bigeye tuna	Total
2003	21.5	4.9	2.3	28.7
2004	21.5	6.8	3.3	31.6
2005	20.3	9.4	4.3	34.0
2006	17.3	7.2	5.6	30.1
2007	22.5	7.9	8.2	38.6
2008	17.1	2.2	3.3	22.6
2009	19.7	6.4	2.1	28.2
2010	19.1	1.6	7.5	28.2
2011	19.8	5.2	4.0	29.0
2012	17.4	12.3	3.1	32.8
2013	23.7	2.7	3.9	30.3
Average	**19.99**	**6.05**	**4.33**	**30.37**
SD	**2.19**	**3.22**	**1.99**	**4.04**

Figure 122. Number of offshore handline fishers and days fished, 2003-2013

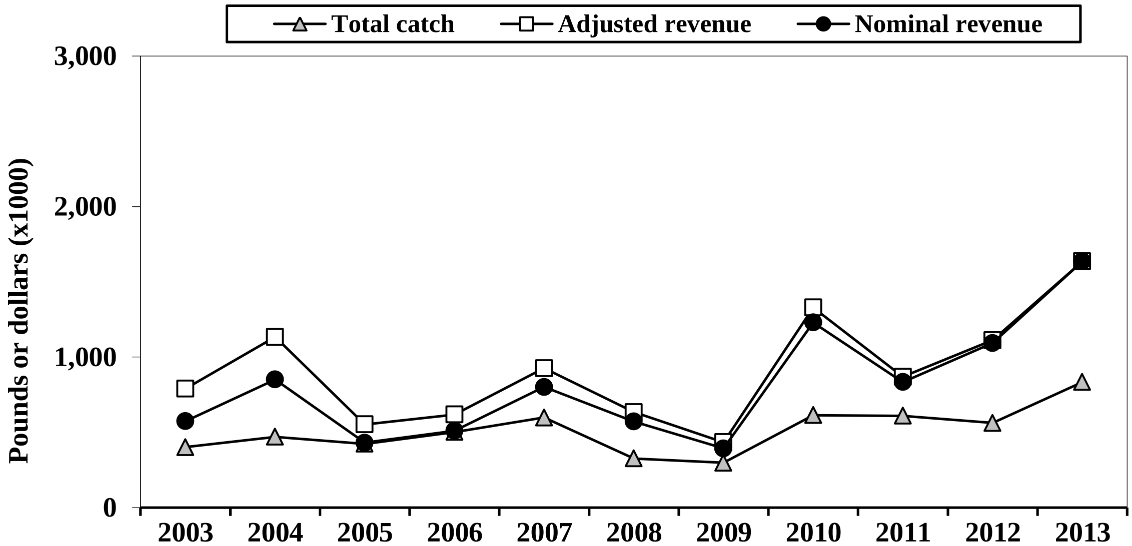


Interpretation: The offshore tuna handline fishery had 15 fishers that fished a record 540 days in 2013. The number of fishers peaked at 15 in 2002, 2004, 2012, and 2013 with a long-term average 11.8 fishers. The number of fisher and days fished was steady from 2002 through 2009 followed by a upward pattern through 2013.

Source and calculations: The number of offshore handline fishers was based on the number of unique State of Hawaii, Division of Aquatic Resources (HDAR) Commercial Marine Licenses (CMLs) submitting Fish Reports. The number of days fished by the offshore handline fishery was calculated using the HDAR Fishing Report data. An offshore handline day fished is defined as a unique CML number fishing on a unique day for the gear types and fishing in areas defined for the offshore handline fishery at the beginning of this module. The number of days fished includes days that fishers did not catch anything or days that fish were caught but not sold.

Year	Fishers	Days fished
2003	11	214
2004	15	225
2005	10	190
2006	9	159
2007	10	176
2008	9	171
2009	9	192
2010	14	449
2011	13	363
2012	15	362
2013	15	540
Average	**11.8**	**276.5**
SD	**2.6**	**130.5**

Figure 123. Offshore handline landings and revenue, 2003-2013

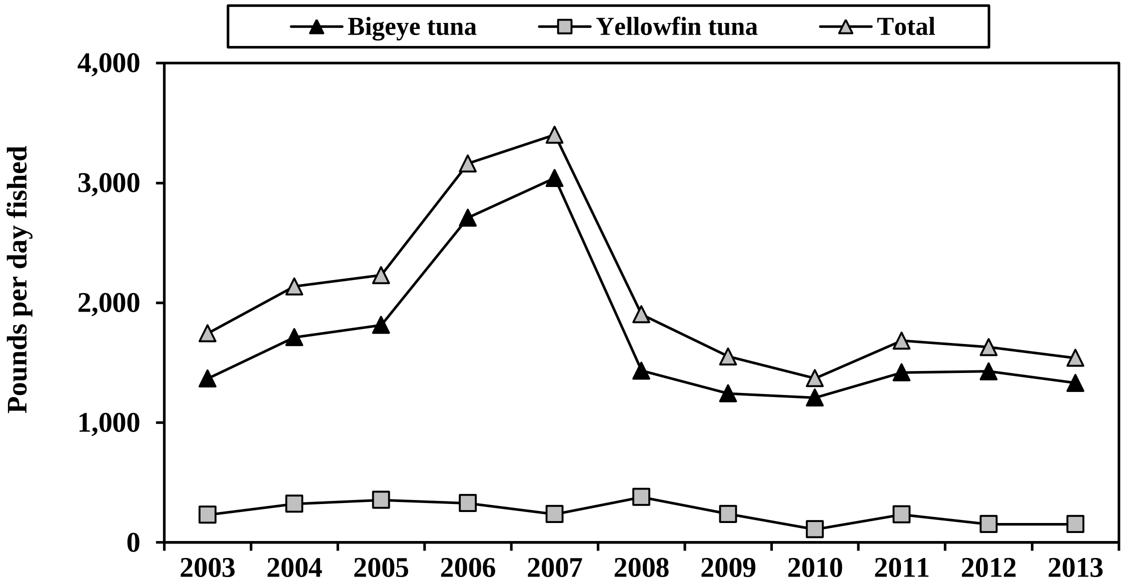


Interpretation: Total landings and revenue by the offshore handline fishery reached records of 834,000 pounds worth an estimated $1.6 million in 2013. Both catch and revenue were above their respective long-term values in 2013. The trend for both catch and revenue by the offshore handline fishery showed no trend from 2003 through 2009, then an increasing pattern through 2013.

Source and calculations: Total landings and nominal revenue for the offshore handline fishery were derived from HDAR Commercial Fishing and Marine Dealer Report data. Total landings by the offshore handline fishery were based on a sum of Pounds Landed from the Fishing Report data or an extrapolation of Pounds Bought from the non-longline Dealer Report data. Nominal revenue is a sum of the Amount Paid from the Dealer Report data for fish caught by the offshore handline fishery. The adjusted revenue is calculated by dividing the nominal revenue by the respective year Honolulu CPI and then multiplying the result by the current year (2012) Honolulu CPI.

Year	Total catch (1000 lbs)	Adjusted revenue ($1000)	Nominal revenue ($1000)	Honolulu CPI
2003	402	$790	$574	184.5
2004	470	$1,134	$851	190.6
2005	424	$553	$431	197.8
2006	502	$618	$510	209.4
2007	598	$927	$801	219.5
2008	326	$634	$572	228.9
2009	298	$434	$393	230.0
2010	614	$1,329	$1,230	234.9
2011	610	$869	$834	243.6
2012	562	$1,113	$1,094	249.5
2013	834	$1,636	$1,636	253.9
Average	**512.7**	**$912.5**	**$811.4**	
SD	**153.5**	**$364.1**	**$382.3**	

Figure 124. Offshore handline CPUE of bigeye and yellowfin tuna, 2003-2013



Interpretation: Offshore handline CPUE was 1,539 pounds in 2013, lower compared to 2012 and substantially below its long-term average. CPUE for bigeye tuna, yellowfin tuna and mahimahi all were lower in 2013. Since bigeye tuna is the largest component of the offshore handline fishery, its CPUE contributes substantially to the overall CPUE. In general, bigeye tuna CPUE rose and peaked in 2007, dropped the following year and remained about the same from 2008 through 2013. Yellowfin tuna and mahimahi CPUEs were somewhat lower in the latter part of the time series.

Source and calculations: The offshore handline CPUE values originate from HDAR Commercial Fishing Report data. CPUE based on pounds per day fished was calculated from Pounds Landed of bigeye tuna, yellowfin tuna and mahimahi divided by the number of offshore handline Days Fished. The number of Days Fished includes days that fishers did not catch anything or days that fish were caught but not sold. The pounds per hour fished CPUE calculation was based on the Pounds Landed divided by the sum of offshore handline Hours Fished. The total offshore handline CPUE also includes skipjack tuna, kawakawa, and other tunas.

	Offshore handline CPUE (pounds per day fished)			
Year	**Bigeye tuna**	**Yellowfin tuna**	**Mahimahi**	**Total**
2003	1,367	231	61	1,744
2004	1,712	322	61	2,136
2005	1,814	355	40	2,230
2006	2,710	328	52	3,162
2007	3,041	236	34	3,402
2008	1,433	379	55	1,903
2009	1,243	238	39	1,552
2010	1,208	110	32	1,370
2011	1,418	233	18	1,684
2012	1,428	152	36	1,630
2013	1,331	152	22	1,539
Average	**1,700.5**	**248.7**	**40.9**	**2,032.0**
SD	**612.7**	**88.7**	**14.7**	**670.7**

Table 91. Average weight by species for the troll and handline landings, 2003-2013

	Tunas				Billfish			Other PMUS	
Year	**Albacore**	**Bigeye tuna**	**Skipjack tuna**	**Yellowfin tuna**	**Blue marlin**	**Striped marlin**	**Swordfish**	**Mahimahi**	**Ono (wahoo)**
2003	46	20	6	30	185	49	118	16	22
2004	43	36	6	27	207	60	142	18	23
2005	48	29	5	23	183	74	102	15	23
2006	47	27	8	29	209	69	128	16	23
2007	49	31	4	35	267	89	133	16	24
2008	51	35	6	26	205	67	158	15	26
2009	46	30	7	30	231	84	184	14	24
2010	49	32	5	30	257	107	123	14	26
2011	45	27	8	32	222	50	132	13	27
2012	49	22	5	32	270	56	126	12	25
2013	46	27	9	37	266	61	157	12	24
Average	**47.1**	**28.7**	**6.3**	**30.1**	**227.4**	**69.6**	**136.6**	**14.7**	**24.2**
SD	**2.2**	**4.9**	**1.6**	**4.0**	**32.8**	**17.8**	**22.6**	**1.8**	**1.5**

Interpretation: The mean weight for albacore, bigeye tuna, mahimahi, and ono caught on troll and handline gear in 2013 was close to their respective long-term average weights. The mean weight for skipjack tuna, blue marlin and swordfish were much higher in 2013 compared to their respective long-term averages. Mean weight of striped marlin was below its long-term mean weight. Swordfish and blue marlin had the largest mean weight of all species caught by the troll and handline fishery. There was no trend in mean weight for most species although the average weight for swordfish appeared to be on an upward trend while mahimahi was smaller in the latter part of the time period.

Source and calculations: The average weights were calculated from HDAR Commercial Marine Dealer data. The mean weight of fish was based on the total of pounds bought divided by the total number bought. Landings by the troll and handline fishery were usually landed whole. If fish were processed prior to sale, e.g., headed and gutted, gilled and gutted, a conversion factor was applied to convert it to an estimated whole weight.

E. International

Introduction

The U.S Pacific Island Exclusive Economic Zones managed by the Council are surrounded by large and diverse fisheries targeting pelagic species. The International Module contains reported catches of pelagic species in the entire Pacific Ocean by fleets of Pacific Island nations and distant water fishing nations (DWFN) and information for a Stock Assessment and Fishery Evaluation (SAFE) report that includes the most recent assessment information in relation to status determination criteria. Fishery trends in the entire Pacific Ocean are illustrated for the purse seine, longline and pole-and-line fisheries. A table lists the U.S. longline landings as submitted to the Western and Central Pacific Fisheries Commission (WCPFC) and Inter-American Tropical Tuna Commission (IATTC).

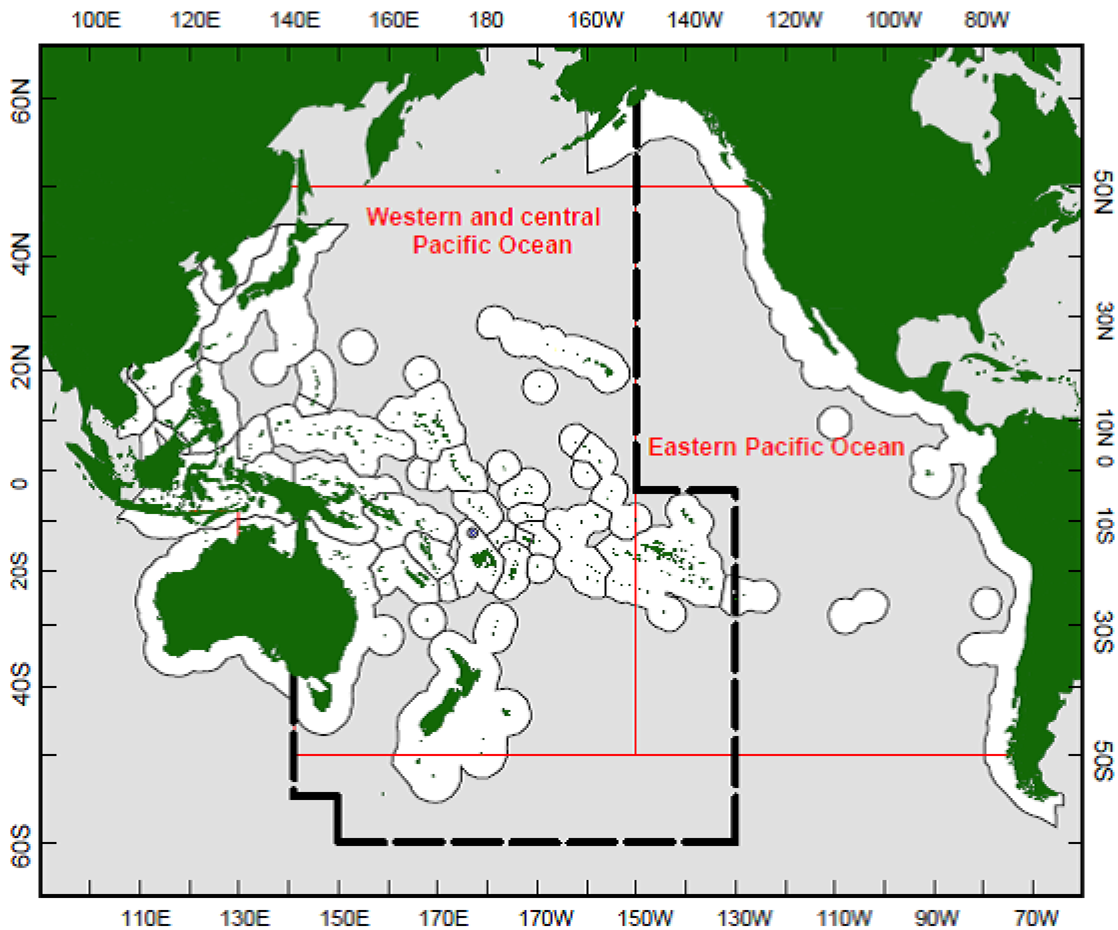


Figure 125. The western and central Pacific Ocean (WCPO), the eastern Pacific Ocean (EPO) and the WCPFC Convention Area (WCP–CA in dashed lines)

1. The 2013 purse-seine fishery in the WCPFC Convention Area (WCP-CA)
Source: WCPFC-SC10-2014 GN-WP-01

Vessels: The majority of the historic WCP–CA purse seine catch has come from the four main Distant Water Fishing Nation (DWFN) fleets – Japan, Korea, Chinese-Taipei and USA, which numbered 163 vessels in 1992, declined to a low of 111 vessels in 2006 before increasing again to 142 vessels in 2013. The Pacific Islands fleets have gradually increased in numbers over the past two decades to a level of 95 vessels in 2013. The remainder of the purse seine fishery includes several fleets which entered the WCPFC tropical fishery in the 2000s (e.g. China, Ecuador, El Salvador, New Zealand and Spain). The total number of purse seine vessels was relatively stable over the period 1990-2006 (in the range of around 180–220 vessels), but over the last seven years, the number of vessels has gradually increased, attaining a level of 297 vessels in 2013.

Catch: The provisional **2013 purse-seine catch of 1,898,090 mt** was the highest catch on record and more than 60,000 mt higher than the previous record in 2012 (1,836,295 mt). The 2013 purse-seine skipjack catch (1,455,786 mt; 77% of total catch) was also the highest on record (about 50,000 mt higher than the previous record in 2009). The 2013 purse-seine catch estimate for yellowfin tuna (355,960 mt) was the fifth highest on record and estimated at only 19% of the total catch, was considered a relatively poor catch year. The provisional catch estimate for bigeye tuna for 2013 (82,151 mt) was clearly highest on record and will be refined as further observer data for 2013 have been received and processed. The record high bigeye tuna catch in 2013 coincides with a continuation of high effort levels and elevated bigeye tuna catch rates for all set types.

Fleet Distribution: The purse seine catch distribution in tropical areas of the WCP–CA is strongly influenced by El Nino–Southern Oscillation Index (ENSO) events. At the start of 2006, a weak La Niña-state presided, but soon dissipated and a weak El Niño event then presided over the remainder of 2006. During the first half of 2007, the WCP–CA was in an ENSO-neutral state, but then moved into a prolonged La Niña state, which persisted throughout 2008 and into 2009. There was a transition in the middle of 2009 to an El Niño period which then presided into the first quarter of 2010. Conditions in the WCP-CA then switched back to a strong La Niña state over the latter months of 2010 and into the first half of 2011. It weakened, and then strengthened toward the end of 2011. The beginning of 2012 experienced a return to neutral ENSO conditions and other than relatively weak El Nino-type readings in the middle of the year, 2012 was essentially characterized as a neutral ENSO period. Weak-moderate La Niña conditions were experienced during 2013.

Table 92. Total reported purse seine catch (metric tonnes) of skipjack, yellowfin and bigeye tuna in the Pacific Ocean, 1994-2013

Year	Skipjack	Yellowfin	Bigeye	Total
1994	782,021	445,750	71,183	1,298,954
1995	826,856	431,935	78,458	1,337,249
1996	778,960	429,776	103,947	1,312,683
1997	751,563	560,711	142,509	1,454,783
1998	973,693	652,492	119,428	1,745,613
1999	1,006,791	607,843	117,056	1,731,690
2000	999,474	588,922	145,262	1,733,658
2001	933,776	696,410	114,216	1,744,402
2002	1,131,802	680,919	117,401	1,930,122
2003	1,216,740	702,910	96,698	2,016,348
2004	1,205,323	598,496	139,376	1,943,195
2005	1,331,121	638,258	126,902	2,096,281
2006	1,461,661	471,611	143,328	2,076,600
2007	1,502,242	497,471	113,285	2,112,998
2008	1,553,519	607,740	131,415	2,292,674
2009	1,678,425	554,006	134,706	2,367,137
2010	1,485,512	593,741	113,649	2,192,902
2011	1,482,618	506,653	129,895	2,119,166
2012	1,702,525	566,286	130,946	2,399,757
2013	1,779,264	568,819	120,676	2,468,759
Average	**1,229,194**	**570,037**	**119,517**	**1,918,749**
STD Deviation	**337,187**	**84,441**	**20,152**	**364,835**

Source: SPC 2014

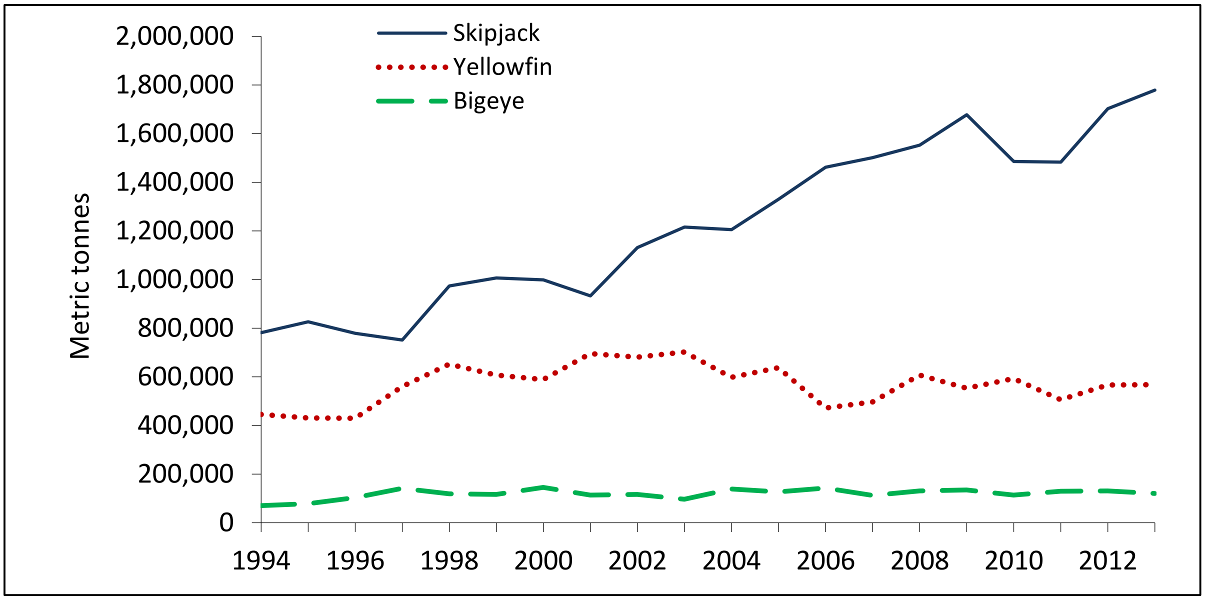


Figure 126. Total purse seine catch of skipjack and yellowfin tuna in the Pacific Ocean, 1993-2013
Source: SPC 2014

2. The 2013 longline fishery in the WCP-CA

Source: WCPFC-SC10-2014 GN-WP-01

Vessels: The total number of vessels involved in the fishery has generally fluctuated between 3,000 and 6,000 for the last 30 years. The fishery involves two main types of operation:

- **Large** (typically >250 GRT) **distant-water** freezer vessels which undertake long voyages (months) and operate over large areas of the region. These vessels may target either tropical (yellowfin, bigeye tuna) or subtropical (albacore tuna) species.
- **Smaller** (typically <100 GRT) **offshore** vessels which are usually **domestically-based**, undertaking trips less than one month, with ice or chill capacity, and serving fresh or air-freight sashimi markets, or albacore canneries.

The following broad categories of longline fishery, based on type of operation, area fished and target species, are currently active in the WCP–CA:

- **South Pacific offshore albacore fishery** comprises Pacific-Islands domestic "offshore" vessels, such as those from American Samoa, Cook Islands, Fiji, French Polynesia, New Caledonia, Samoa, Solomon Islands, Tonga and Vanuatu; these fleets mainly operate in subtropical waters, with albacore the main species taken. Two new entrants, Tuvalu and Wallis& Futuna, joined this category during 2011.
- **Tropical offshore bigeye/yellowfin-target fishery** includes "offshore" sashimi longliners from Chinese-Taipei based in Micronesia, Guam, Philippines and Chinese-Taipei; mainland Chinese vessels based in Micronesia; and domestic fleets based in Indonesia, Micronesian countries, Philippines, PNG, the Solomon Islands and Vietnam.
- **Tropical distant-water bigeye/yellowfin-target fishery** comprises "distant-water" vessels from Japan, Korea, Chinese-Taipei, mainland China and Vanuatu. These vessels primarily operate in the eastern tropical waters of the WCP–CA, targeting bigeye and yellowfin tuna for the frozen sashimi market. The Portuguese fleet (one vessel) started fishing in 2011.
- **South Pacific distant-water albacore fishery** comprises "distant-water" vessels from Chinese-Taipei, mainland China and Vanuatu operating in the south Pacific, generally below 20°S, targeting albacore tuna destined for canneries.
- **Domestic fisheries in the sub-tropical and temperate WCP–CA** comprise vessels targeting different species within the same fleet depending on market, season and/or area. These fleets include the domestic fisheries of Australia, Japan, New Zealand and Hawaii. For example, the Hawaii longline fleet has a component that targets swordfish and another that targets bigeye tuna.
- **South Pacific distant-water swordfish fishery** is a relatively new fishery and comprises "distant-water" vessels from Spain.
- **North Pacific distant-water albacore and swordfish fisheries** mainly comprise "distant-water" vessels from Japan (swordfish and albacore), Chinese-Taipei (albacore only) and Vanuatu (albacore only).

Catch: The provisional WCP–CA longline catch (230,073 mt) for 2013 was the lowest catch since 1999. The WCP–CA albacore longline catch (100,666 mt – 47%) for 2013 was the second highest on record, only 2,000 mt lower than the record (103,466 mt in 2010). The provisional bigeye catch (62,641 mt – 29%) for 2013 was the lowest since 1996. The yellowfin catch for

2013 (65,499 mt – 30%) was the lowest since 1991. A significant change in the WCP–CA longline fishery over the past 10 years has been the growth of the Pacific Islands domestic albacore fishery, which has risen from taking 33% of the total south Pacific albacore longline catch in 1998 to accounting for around 50-60% of the catch in recent years. The combined national fleets (including chartered vessels) mainly active in the Pacific Islands domestic albacore fishery have numbered more than 450 (mainly small "offshore") vessels in recent years and catches are now at a similar level as the distant-water longline vessels active in the WCP–CA.

The distant-water fleet dynamics continue to evolve in recent years, with catches down from record levels in the mid-2000s initially due to a reduction in vessel numbers, although vessel numbers for some fleets appear to be on the rise again in recent years, but with variations in areas fished and target species. The Japanese distant-water and offshore longline fleets have experienced a substantial decline in both bigeye catches (from 20,725 mt in 2004 to 6,382 mt in 2013) and vessel numbers (366 in 2004 to 142 in 2013). The Chinese-Taipei distant-water longline fleet bigeye catch declined from 16,888 mt in 2004 to 5,129 mt (in 2013), mainly related to a substantial drop in vessel numbers (137 vessels in 2004 reduced to 82 vessels in 2013). The Korean distant-water longline fleet also experienced declines in bigeye and yellowfin catches over the past decade in line with a reduction in vessel numbers – from 184 vessels active in 2002 reduced to 108 vessels in 2008, but back to 125 vessels in 2013.

Fleet Distribution: Effort by the **large-vessel, distant-water fleets** of Japan, Korea and Chinese-Taipei account for most of the effort but there has been some reduction in vessel numbers in some fleets over the past decade. Effort is widespread as sectors of these fleets target bigeye and yellowfin for the frozen sashimi market in central and eastern tropical waters, and albacore for canning in the more temperate waters. Activity by the **foreign-offshore fleets** from Japan, mainland China and Chinese-Taipei is restricted to tropical waters, targeting bigeye and yellowfin for the fresh sashimi market; these fleets have limited overlap with the distant-water fleets. The substantial "**offshore**" effort in the west of the region is primarily by the Indonesian and Chinese-Taipei **domestic fleets** targeting yellowfin and bigeye. The growth in **domestic fleets** in the South Pacific over the past decade has been noted; the most prominent fleets in this category are the Cook Islands, Samoan, Fijian, French Polynesian and Vanuatu fleets.

Table 93. Total reported longline catch (metric tonnes) of PMUS in the Pacific Ocean

Year	Albacore	Yellowfin	Bigeye	Striped Marlin	Black Marlin	Blue Marlin	Swordfish	Total
1994	65,823	106,893	139,698	9,585	2,100	24,636	22,047	370,782
1995	63,456	105,793	117,103	10,438	1,493	25,332	20,209	343,824
1996	66,146	104,842	96,914	9,052	1,045	18,122	22,248	318,369
1997	83,022	100,217	113,835	9,483	1,118	18,459	28,755	354,889
1998	92,020	91,446	122,819	10,638	1,713	21,305	29,099	369,040
1999	82,722	80,202	105,098	8,503	2,021	18,264	28,108	324,918
2000	82,257	114,751	113,577	6,153	1,401	17,431	30,144	365,714
2001	90,599	119,387	135,585	6,740	1,621	19,779	34,293	408,004
2002	102,322	116,612	156,912	6,533	1,873	19,007	36,487	439,746
2003	89,644	116,187	130,821	7,268	2,104	28,208	38,397	412,629
2004	87,199	119,895	131,468	6,502	2,334	25,630	37,437	410,465
2005	92,925	90,259	111,683	5,836	2,785	23,533	28,763	355,784
2006	93,613	82,755	110,588	5,655	2,473	20,246	31,854	347,184
2007	88,271	79,010	104,546	5,059	1,821	18,493	34,470	331,670
2008	87,435	82,521	100,070	4,928	1,868	18,028	34,746	329,596
2009	109,440	97,213	104,817	4,161	2,071	18,682	35,308	371,692
2010	114,974	89,669	95,920	4,977	2,251	21,082	35,733	364,606
2011	98,422	88,149	97,054	6,385	1,925	19,138	38,422	349,495
2012	120,612	86,944	102,769	6,085	2,001	17,930	39,020	375,361
2013	115,286	68,651	83,386	5,313	2,057	15,656	37,730	328,079
Average	**91,309**	**97,070**	**113,733**	**6,965**	**1,904**	**20,448**	**32,164**	**363,592**
STD Dev	**15,944**	**15,341**	**17,882**	**1,962**	**427**	**3,315**	**5,797**	**32,957**

Source: SPC 2014 and I-ATTC 2014

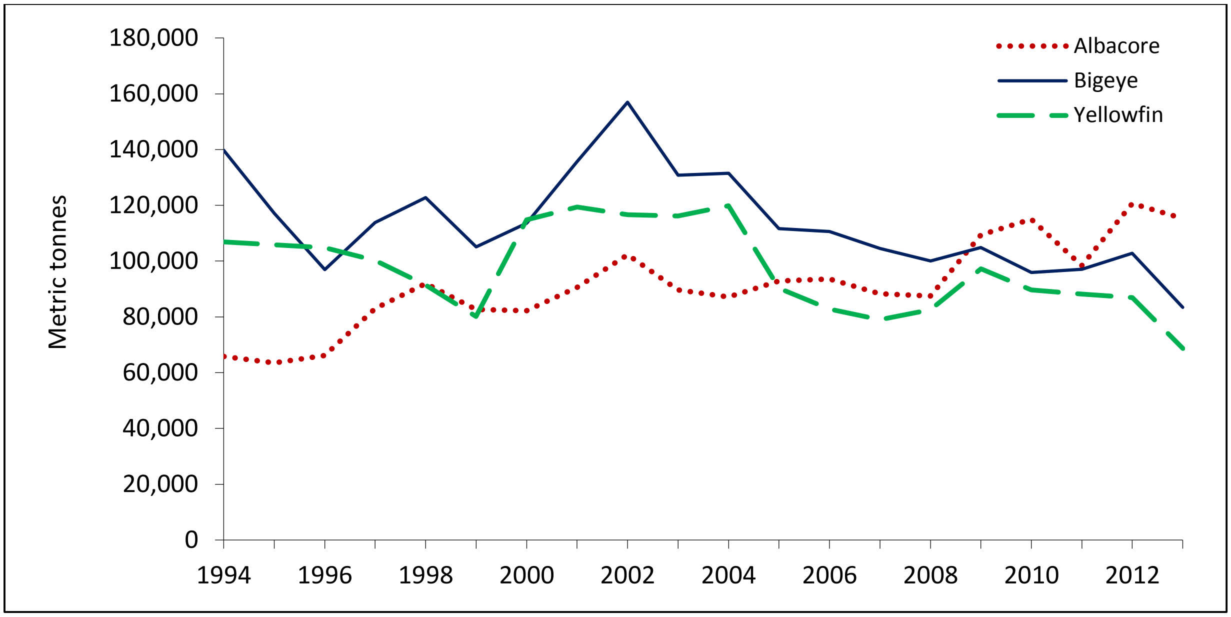


Figure 127. Reported longline tuna catches in the Pacific Ocean
Source: SPC 2014 and I-ATTC 2014

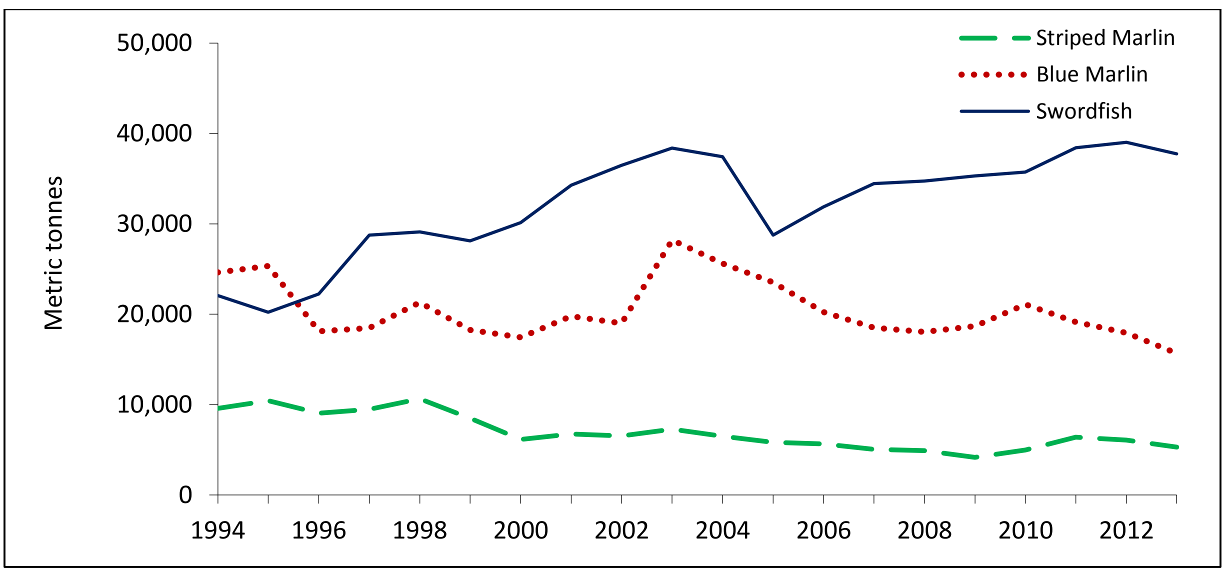


Figure 128. Reported longline billfish catches in the Pacific Ocean
Source: SPC and I-ATTC

3. The 2013 pole-and-line fishery in the WCP-CA
Source: WCPFC-SC10-2014 GN-WP-01

Vessels: The pole-and-line fleet was composed of less than 200 vessels in the 2013 fishery, which excludes vessels in the Indonesia domestic fishery.

Catch: The provisional 2013 pole-and-line catch (221,022 mt) was the lowest annual catch since the late-1960s and continued the trend in declining catches for three decades. Skipjack tends to account for the majority of the catch (~70-83% in recent years, but typically more than 85% of the total catch in tropical areas); albacore (8–20% in recent years) is taken by the Japanese coastal and offshore fleets in the temperate waters of the north Pacific. Yellowfin tuna (5–16%) and a small component of bigeye tuna (1–4%) make up the remainder of the catch.

There are only five pole-and-line fleets active in the WCPO (French Polynesia, Japan, Indonesian, Kiribati and Solomon Islands). Japanese distant-water and offshore fleets (112,529 mt in 2013) and the Indonesian fleets (106,705 mt in 2013) account for nearly all of the WCP–CA pole-and-line catch (99% in 2013). The catches by the Japanese distant-water and offshore fleets in recent years have been the lowest for several decades and this is no doubt related to the continued reduction in vessel numbers (in 2013 reduced to only 79 vessels, the lowest on record). The Solomon Islands fleet recovered from low catch levels experienced in the early 2000s (only 2,773 mt in 2000 due to civil unrest) to reach a level of 10,448 mt in 2003. This fleet ceased operating in 2009, but resumed fishing in 2011 and harvested 1,198 mt in 2013.

Fleet Distribution: The WCP–CA pole-and-line fishery has several components:

- The year-round tropical skipjack fishery, mainly involving the domestic fleets of Indonesia, Solomon Islands and French Polynesia, and the distant water fleet of Japan;
- Seasonal sub-tropical skipjack fisheries in the home waters of Japan, Australia, Hawaii, and Fiji;
- A seasonal albacore/skipjack fishery east of Japan (largely an extension of the Japan home-water fishery).

Table 94. Total reported pole-and-line catch (metric tonnes) of skipjack in the Pacific Ocean

Year	Catch
1994	212,876
1995	252,997
1996	245,041
1997	240,259
1998	268,456
1999	257,374
2000	264,638
2001	213,116
2002	208,104
2003	238,817
2004	250,464
2005	218,015
2006	208,655
2007	212,996
2008	218,571
2009	200,843
2010	222,995
2011	206,566
2012	170,537
2013	161,218
Average	**223,627**
STD deviation	**28,805**

Source: SPC 2014

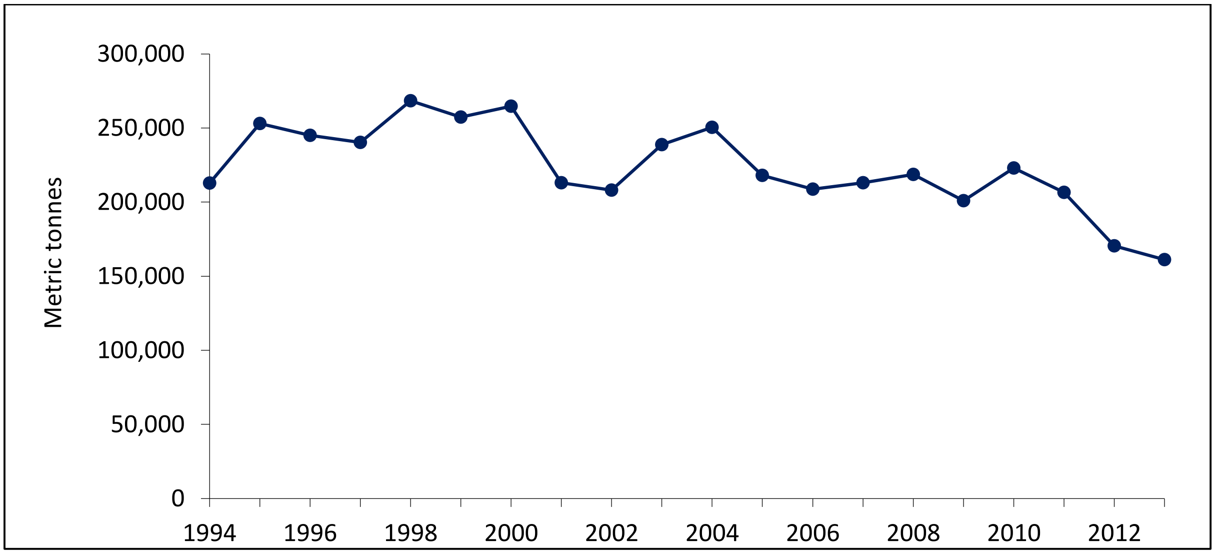


Figure 129. Reported pole-and-line catch (metric tons) of skipjack in the Pacific Ocean
Source: SPC 2014

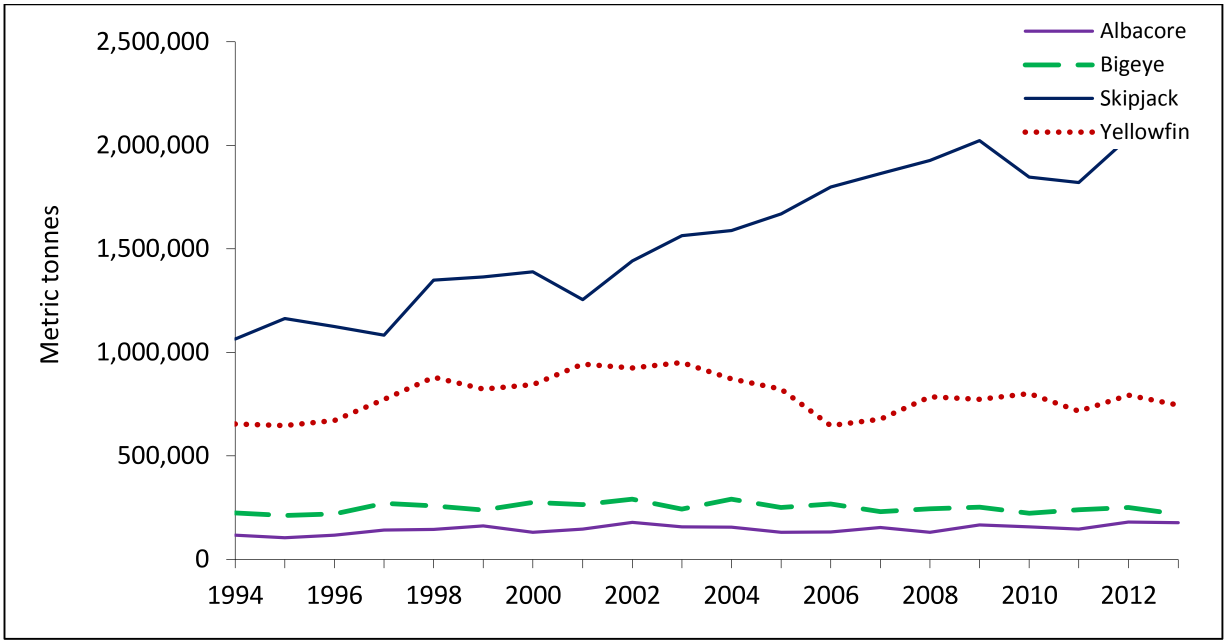


Figure 130. Estimated total annual catch of tuna species in the Pacific Ocean
Source: SPC 2014

Table 95. Estimated annual catch (metric tonnes) of tuna species in the Pacific Ocean

Year	Albacore	Bigeye	Skipjack	Yellowfin	Total
1994	116,152	224,599	1,064,972	654,647	2,060,370
1995	104,959	211,442	1,162,854	646,666	2,125,921
1996	116,957	219,777	1,124,731	670,493	2,131,958
1997	141,576	270,598	1,082,660	772,554	2,267,388
1998	144,737	258,470	1,348,485	879,812	2,631,504
1999	161,818	237,463	1,365,049	822,359	2,586,689
2000	130,802	275,872	1,389,322	844,030	2,640,026
2001	145,397	264,879	1,254,625	943,723	2,608,624
2002	178,525	289,983	1,442,259	925,295	2,836,062
2003	157,013	242,289	1,563,620	950,521	2,913,443
2004	155,658	291,079	1,587,918	871,301	2,905,956
2005	130,043	249,890	1,669,297	822,550	2,871,780
2006	132,205	268,044	1,799,159	645,774	2,845,182
2007	153,235	229,746	1,864,281	677,549	2,924,811
2008	130,995	245,007	1,927,777	785,226	3,089,005
2009	167,015	252,554	2,022,852	773,502	3,215,923
2010	157,515	222,506	1,846,385	801,128	3,027,534
2011	146,550	239,338	1,820,490	715,939	2,922,317
2012	179,703	250,953	2,036,541	792,911	3,260,108
2013	177,705	218,336	2,077,974	745,915	3,219,930
Average	**146,428**	**248,141**	**1,572,563**	**787,095**	**2,754,227**
STD deviation	**21,310**	**23,515**	**339,752**	**97,869**	**368,857**

Source: SPC 2014

4. Stock status and WPRFMC reference points

This section contains a brief review of the stock status for several pelagic species and the status of these stocks in relation to WPRFMC reference points. Stock assessments are presented annually at the Scientific Committee (SC) of the WCPFC and at the International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean (ISC). In August 2014, the SC reviewed assessment s for WCPO skipjack, yellowfin and bigeye tuna and the ISC assessments. Recent stock status for various species are summarized from the SC species summary statements (http://www.wcpfc.int/node/19472) and http://www.wcpfc.int/node/18871 which also contains additional information on recent developments in the fishery, sizes of fish and trends in catch per unit effort (CPUE), recruitment, biomass and fishing mortality. In July 2014, the 14th meeting of the ISC reviewed an assessment for Pacific bluefin tuna, blue shark, North Pacific albacore and swordfish and summary statements from the meeting are available (http://isc.ac.affrc.go.jp/reports/isc/isc14_reports.html).

Amendment 10 of the WPRFMC Pelagic FMP provided new specifications of overfishing criteria and control rules that trigger Council action based on the status of pelagic stocks. Amendment 10 defined Maximum Sustainable Yield (MSY) as a control rule that specifies the relationship of Fishing Mortality (*F*) to Biomass (*B*) and other indicators of productive capacity under a MSY harvest policy. Because fisheries must be managed to achieve optimum yield, not MSY, the MSY control rule is a benchmark control rule rather than an operational one. However, the MSY control rule is useful for specifying the "objective and measurable criteria for identifying when the fishery to which the plan applies is overfished" that are required under the MSA. The National Standard Guidelines (50 CFR 600.310) refer to these criteria as "status determination criteria" and state that they must include two limit reference points, or thresholds: one for *F* that identifies when overfishing is occurring and a second for *B* or its proxy that indicates when the stock is overfished (Figure 131). The status determination criterion for *F* is the maximum fishing mortality threshold (MFMT). Minimum stock size threshold (MSST) is the criterion for *B*. If fishing mortality exceeds the MFMT for a period of one year or more, overfishing is occurring. If stock biomass falls below MSST in a given year, the stock or stock complex is overfished. A Council must take remedial action in the form of a new FMP, an FMP amendment, or proposed regulations when it has been determined by the Secretary of Commerce that overfishing is occurring, a stock or stock complex is overfished, either of the two thresholds is being approached, or existing remedial action to end previously identified overfishing has not resulted in adequate progress.

Table 96. Schedule of completed stock assessments for WPRFMC PMUS

Albacore Tuna (S. Pacific)	2012	Swordfish (N. Pacific)	2014
Albacore Tuna (N. Pacific)	2014	Wahoo	
Other tuna relatives (Auxis sp., (allothunnus sp., Scomber sp.)		Yellowfin Tuna (WCPO)	2014
		Kawakawa	
Bigeye Tuna (WCPO)	2014	Bluefin Tuna (Pacific)	2014
Black Marlin		Common Thresher Shark	
Blue Marlin	2013	Pelagic Thresher Shark	
Mahimahi		Bigeye Thresher Shark	
Oilfishes		Shortfin Mako Shark	
Opah		Longfin Mako Shark	
Pomfrets		Blue Shark (N. Pacific)	2014
Sailfish		Silky Shark	2013
Shortbill Spearfish		Oceanic Whitetip Shark	2012
Skipjack Tuna (WCPO)	2014	Salmon Shark	
Striped Marlin (N. Pacific)	2012	Squid	

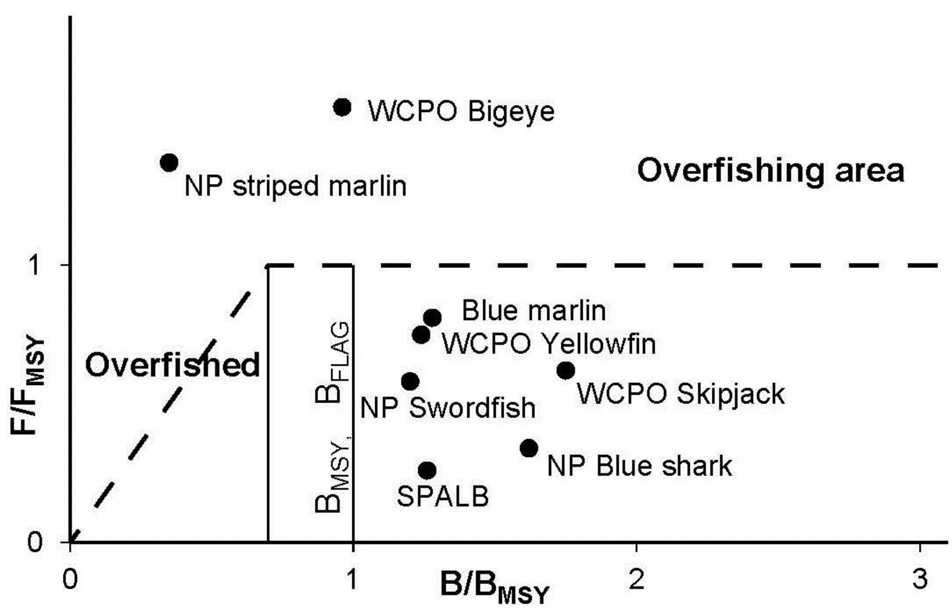


Figure 131. Specification of fishing mortality and biomass reference points in the WPRFMC Pelagics FMP and current stock status in the western-central (WCPO) and eastern Pacific Ocean (EPO)

Skipjack tuna in the WCP-CA

Stock Assessment: Harley et al. 2014

Stock status: The 2014 stock assessment indicates that for the skipjack stock in the WCP-CA overfishing is not occurring ($F_{current}$ / F_{MSY} < 1), that the stock is not in an overfished state ($B_{current}$ / B_{MSY} > 1), and that exploitation is modest relative to the stock's biological potential.

Management advice and implications: Recent catches are slightly above the estimated MSY of 1,618,800 mt. The assessment continues to show that the stock is currently only moderately exploited ($F_{current}/F_{MSY} = 0.61$) and fishing mortality levels are sustainable. However, the continuing increase in fishing mortality and decline in stock size are recognized.

SC10 advised the WCPFC that there is concern that high catches in the equatorial region could result in range contractions of the stocks, thus reducing skipjack tuna availability to high latitude fisheries.

Fishing is having a significant impact on stock size, especially in the western equatorial region and can be expected to affect catch rates. The stock distribution is also influenced by changes in oceanographic conditions associated with El Niño and La Niña events, which impact on catch rates and stock size. Additional purse-seine effort will yield only modest gains in long-term skipjack tuna catches and may result in a corresponding increase in fishing mortality for bigeye and yellowfin tunas. The management of total effort in the WCPO should recognize this.

The spawning biomass is now around the mid-point of the range of candidate TRPs of 40%, 50% and 60% of unfished spawning stock biomass that WCPFC10 has asked SC10 to consider for skipjack tuna. SC10 recommends that the Commission take action to avoid further increases in fishing mortality and to keep the skipjack tuna stock around the current levels, with tighter purse-seine control rules and advocates for the adoption of TRPs and harvest control rules.

SC10 recommended that the Commission consider the results of updated projections at WCPFC11, including the evaluation of the potential impacts of CMM 2013-01 in order to determine whether the CMM will achieve its objectives, including impacts of the skipjack tuna fishery on bigeye and yellowfin tunas.

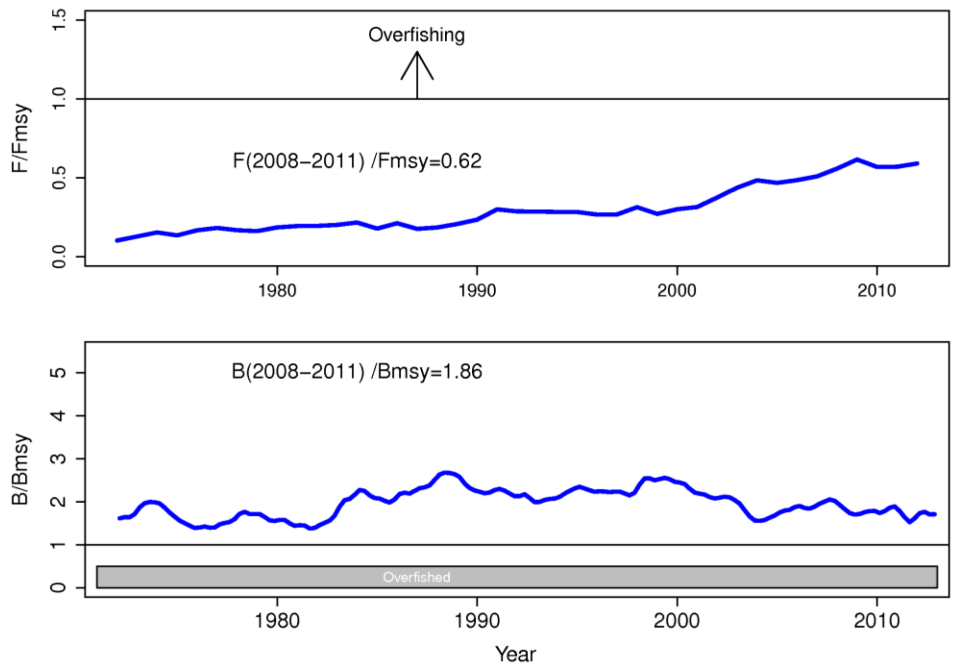


Figure 132. Ratios of F/F$_{MSY}$ (top) and B/B$_{MSY}$ (bottom) for skipjack tuna in the WCP-CA
The horizontal line at 1.0 in the F/FMSY figure indicates an overfishing reference point. The shaded area in the B/BMSY figure indicates an overfished reference point.

Yellowfin tuna in the WCP-CA

Stock Assessment: Davies et al. 2014

Stock status: The 2014 stock assessment indicates that for the yellowfin stock in the WCP-CA overfishing is not occurring ($F_{current}$ / F_{MSY} < 1), that the stock is not in an overfished state ($B_{current}$ / B_{MSY} > 1) (Figure 133, Table 97).

Management advice and implications: The WCPO yellowfin tuna spawning biomass is above the biomass-based LRP that WCPFC adopted, $0.2SB_{F=0}$, and overall fishing mortality appears to be below F_{MSY}. It is highly likely that the stock is not experiencing overfishing and is not in an overfished state.

Latest (2012) catches (612,797 mt [SC10-GW-WP-01]) of WCPO yellowfin tuna marginally exceed MSY (586,400 mt).

Future status under status quo projections (assuming 2012 conditions) depends on assumptions on future recruitment. When spawner-recruitment relationship conditions are assumed, spawning biomass is predicted to increase and the stock is exceptionally unlikely (0%) to become overfished ($SB_{2032}<0.2SB_{F=0}$) or to fall below SB_{MSY}, or to become subject to overfishing ($F>F_{MSY}$). If recent (2002–2011) actual recruitments are assumed, spawning biomass will remain relatively constant, and the stock is exceptionally unlikely (0%) to become overfished or to become subject to overfishing, and it was very unlikely (2%) that the spawning biomass would fall below SB_{MSY}.

SC also noted that levels of fishing mortality and depletion differ between regions, and that fishery impact was highest in the tropical region (Regions 3, 4, 7 and 8 in the stock assessment model). WCPFC could consider measures to reduce fishing mortality from fisheries that take juveniles, with the goal to increase to maximum fishery yields and reduce any further impacts on the spawning potential for this stock in the tropical regions.

WCPFC could consider a spatial management approach in reducing fishing mortality for yellowfin tuna.

SC recommended that the catch of WCPO yellowfin tuna should not be increased from 2012 levels, which exceeded MSY, and measures should be implemented to maintain current spawning biomass levels until the Commission can agree on an appropriate target reference point (TRP).

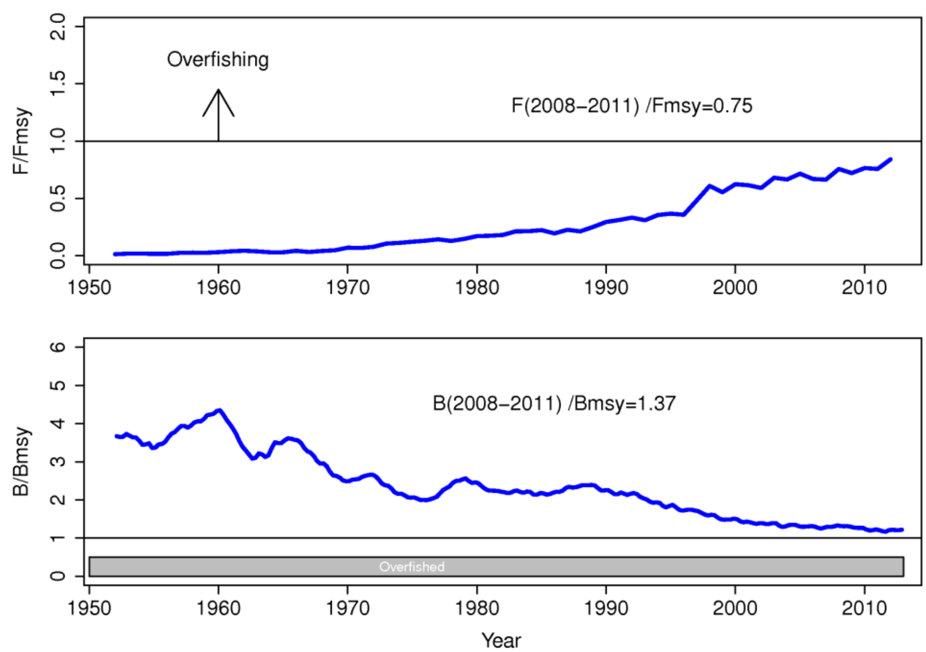


Figure 133. Ratios of F/F$_{MSY}$ (top) and B/B$_{MSY}$ (bottom) for yellowfin tuna in the WCP-CA
The horizontal line at 1.0 in the F/F$_{MSY}$ figure indicates an overfishing reference point. The shaded area in the B/B$_{MSY}$ figure indicates an overfished reference point (MSST)

Bigeye tuna in the WCP-CA

Stock Assessment: Rice et al. 2014

Stock status: The 2014 stock assessment indicates that for the bigeye stock in the WCP-CA, the latest (2012) estimates of spawning stock biomass are below both the level that will support MSY (SB_{latest}/SB_{MSY} = 0.77 for the base case and range from 0.62 to 0.96 across the four models) and the newly adopted LRP of $0.2SB_{F=0}$ ($SB_{latest}/SB_{F=0}$ = 0.16 for the base case and range from 0.14 to 0.18).

Management advice and implications: SC10 noted that the spawning biomass of WCPO bigeye tuna breached the biomass LRP in 2012 and that the stock was overfished. Rebuilding spawning biomass to be above the biomass LRP will require a reduction in fishing mortality.

SC10 recommended that fishing mortality on WCPO bigeye tuna be reduced. A 36% reduction in fishing mortality from the average levels for 2008–2011 would be expected to return the fishing mortality rate to F_{MSY}. This reduction of at least 36% should also allow the stock to rebuild above the LRP over a period of time. This recommended level of reduction in fishing mortality could also be stated as a minimum 33% reduction from the 2004 level of fishing mortality, or a minimum 26% reduction from the average 2001–2004 level of fishing mortality.

Future status quo projections (assuming 2012 conditions) depend on assumptions on future recruitment. When spawner-recruitment relationship conditions are assumed, spawning biomass continues to decline and the stock is very likely (94%) to remain below the LRP based on projections through 2032 ($SB_{2032}<0.2SB_{F=0}$). If recent (2002–2011) actual recruitments are assumed, spawning biomass increases and it is unlikely (13%) to remain below the LRP. Under both recruitment assumptions, it was virtually certain (100%) that the stock would remain subject to overfishing ($F>F_{MSY}$).

Overfishing and the increase in juvenile bigeye tuna catches have resulted in a considerable reduction in the potential yield of the WCPO bigeye tuna stock. The loss in yield per recruit due to excess harvesting of juvenile fish is substantial. SC10 concluded that MSY levels would increase if the mortality of juvenile bigeye tuna was reduced.

Fishing mortality varies spatially within the Convention Area, with high mortality in the tropical Pacific Ocean. WCPFC could consider a spatial management approach in reducing fishing mortality for bigeye tuna.

Considering the unavailability of operational longline data for the assessment from some key fleets, SC10 recommended that all operational data, including high seas data, should be available for future stock assessments. The current lack of operational data for some fleets, and in particular the lack of operational longline data on the high seas, has hampered the 2014 assessment in a number of ways (e.g. the construction of abundance indices), and consequently, has hindered SC from achieving "best practice" in the 2014 stock assessment.

SC10 noted that arrangements are being developed between CCMs and SPC to facilitate the availability of operational data for the Pacific-wide bigeye tuna stock assessment scheduled for 2015.

SC10 recommended that the Commission consider the results of updated projections at WCPFC11, including an evaluation of the potential impacts of CMM 2013-01, to determine whether the CMM will achieve its objectives and allow the bigeye tuna stock to rebuild above the LRP.

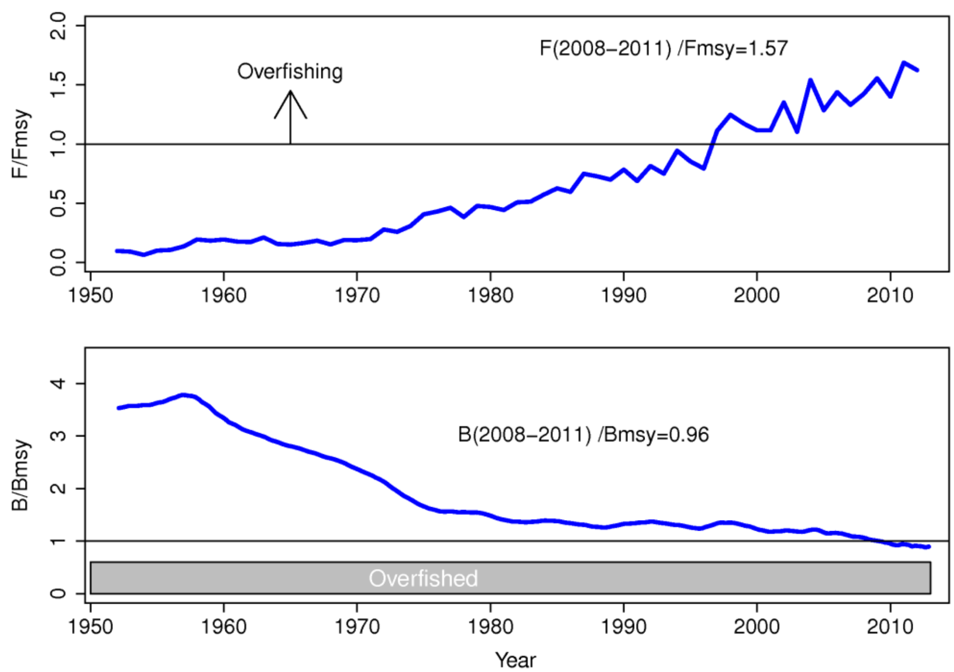


Figure 134. Ratios of F/F$_{MSY}$ F (top) and B/B$_{MSY}$ (bottom) for bigeye tuna in the WCP-CA The horizontal line at 1.0 in the F/F$_{MSY}$ figure indicates an overfishing reference point. The shaded area in the B/BMSY figure indicates an overfished reference point.

South Pacific albacore tuna

Stock assessment: Hoyle et al. 2012

Stock status: The 2012 assessment results are generally similar to, but more optimistic than those of the 2009 and 2011 assessments. The key conclusions, based on the median of the grid senstivities, are that overfishing is not occurring and the stock is not in an overfished state. Spawning potential depletion levels of albacore were moderate at ~37%. However, SC8 noted that depletion levels of the exploitable biomass is estimated between about 10% and 60%, depending on the fishery, having increased sharply in recent years.

Management implications: The South Pacific albacore stock is currently not overfished and overfishing is not occurring. Current biomass is sufficient to support current levels of catch. However, for several years the SC has noted that any increases in catch or effort are likely to lead to declines in catch rates in some regions, especially for longline catches of adult albacore, with associated impacts on vessel profitability. SC8 further noted that vessel activity must be managed, as per the requirements of CMM 2010-05. Given the recent expansion of the fishery and recent declines in exploitable biomass available to longline fisheries, and given the importance of maintaining catch rates, the SC recommends that longline fishing mortality be reduced if the Commission wishes to maintain economically viable catch rates.

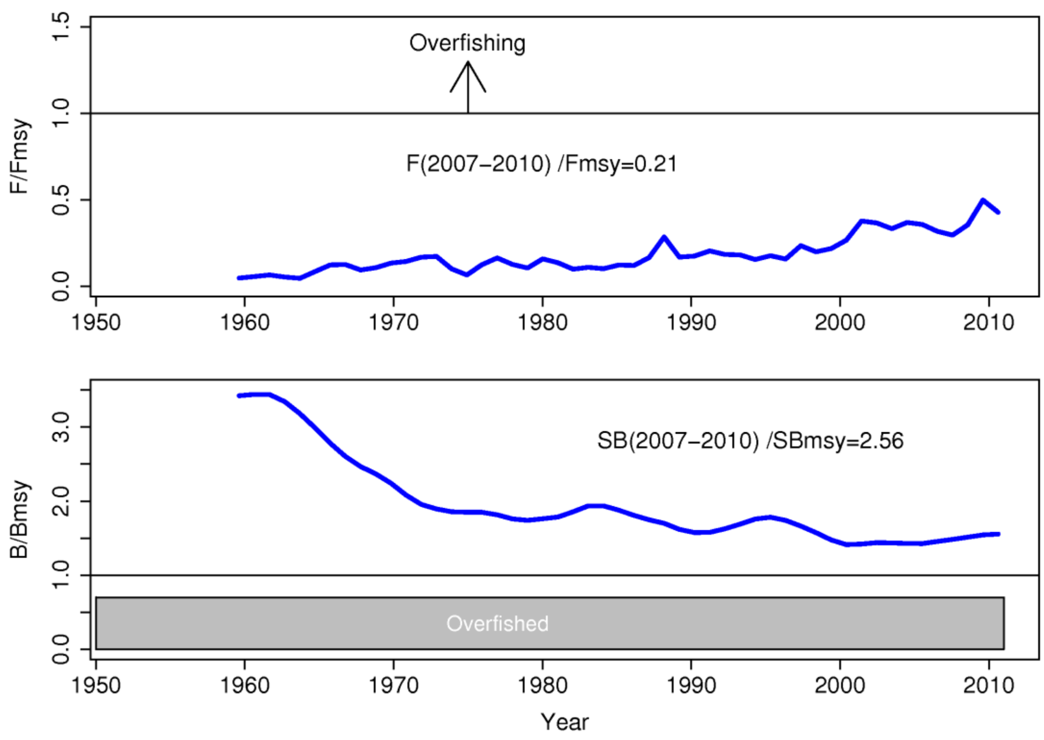


Figure 135. Ratios of F/F$_{MSY}$ (top) and B/B$_{MSY}$ (bottom) for South Pacific albacore
The horizontal line at 1.0 in the F/F$_{MSY}$ figure indicates an overfishing reference point. The shaded area in the B/B$_{MSY}$ figure indicates an overfished reference point

North Pacific albacore tuna

Stock assessment: ISC Albacore Working Group 2014

Stock status: Because the calculated Fishing mortalities for 2010-2012 relative to most candidate reference points, except *FMED* and *F50%,* are below 1.0, NPALB is not experiencing overfishing. Although no biomass-based reference points have been developed for this stock, there is little evidence from this assessment that fishing has reduced SSB below reasonable candidate biomass-based reference points, so the ALBWG concludes that the stock is likely not in an overfished condition at present.

Management implications: The current exploitation level ($F_{2010–2012}$) is estimated to be below that of $F_{2002–2004}$, which led to the implementation of conservation and management measures (CMMs) for the North Pacific albacore stock in the EPO (IATTC Resolution C-05-02 supplemented by Resolution C-13-03) and the WCNPO (WCPFC CMM 2005-03). Assuming average historical recruitment and fishing at a constant current F, median female SSB is expected to remain relatively stable between the 25^{th} and median historical percentiles over both the short- and long-term, with a 13% probability that female SSB falls below the SSB-ATHL threshold during a 25-year projection period. In contrast, if a low recruitment scenario is assumed, then median female SSB declines under both harvest scenarios (constant $F_{2010–2012}$, constant $F_{2002–2004}$) and the probability that it falls below the SSB-ATHL threshold in the 25-year projection period increases to 65% as calculated by the ALBWG and noted above. The high recruitment scenario is more optimistic, with median future SSB increasing above the historical median SSB and the estimated probability of falling below the SSB-ATHL threshold is correspondingly low at 3%.

North Pacific Swordfish (Western and Central North Pacific Ocean)

Stock assessment: ISC Billfish Working Group 2014

Stock status: In the North Pacific, the swordfish (*Xiphias gladius*) population comprises of two stocks, separated by a diagonal boundary extending from Baja, California, to the equator. These are the western and central North Pacific Ocean stock (WCNPO), distributed in the western and central Pacific, and the eastern Pacific Ocean stock (EPO), distributed in the eastern Pacific.

Exploitable biomass of WCNPO swordfish fluctuated at or above B_{MSY} throughout the assessment time horizon and has remained high in recent years and harvest rate fluctuated at or below H_{MSY}. Trends in exploitable biomass and harvest rate from the current assessment are very similar to those from the 2009 assessment. In recent years, catches and harvest rates of WCNPO swordfish have had a declining trend, with exploitable biomass fluctuating around 70,000 mt, since 2007. The Kobe plot showed that the WCNPO swordfish stock does not appear to have been overfished or to have experienced overfishing throughout most of the assessment time horizon of 1951–2012. For the current status, results indicated it was very unlikely that the WCNPO swordfish population biomass was below B_{MSY} in 2012 (Pr($B_{2012} < B_{MSY}$)=14%). Similarly, it was extremely unlikely that the swordfish population was being fished in excess of

H_{MSY} in 2012 ($Pr(H_{2012} > H_{MSY}) < 1\%$). Retrospective analyses indicated that there was no retrospective pattern in the estimates of exploitable biomass and harvest rate.

Management implications: Management advice and implications: Based on the assessment update, the WCNPO stock is not currently overfished and is not experiencing overfishing. The WCNPO stock is not fully exploited.

Pacific bluefin tuna

Stock assessment: ISC Pacific Bluefin Tuna Working Group 2014

Stock status: Using the updated stock assessment, the 2012 SSB was 26,324 mt and slightly higher than that estimated for 2010 (25,476 mt).

Across sensitivity runs in the update stock assessment, estimates of recruitment were considered robust. The recruitment level in 2012 was estimated to be relatively low (the 8th lowest in 61 years), and the average recruitment level for the last five years may have been below the historical average level. Estimated age-specific fishing mortalities on the stock in the period 2009–2011 relative to 2002–2004 (the base period for WCPFC Conservation and Management Measure 2010-04) increased by 19%, 4%, 12%, 31%, 60%, 51% and 21% for ages 0-6, respectively, and decreased by 35% for age-7+.

Although no target or LRPs have been established for the PBF stock under the auspices of WCPFC and IATTC, the current F average over 2009–2011 exceeds all target and limit biological reference points (BRPs) commonly used by fisheries managers except for F_{loss}, and the ratio of SSB in 2012 relative to unfished SSB (depletion ratio) is less than 6%. In summary, based on reference point ratios, overfishing is occurring and the stock is overfished.

Management implications: The current (2012) PBF biomass level is near historically low levels and experiencing high exploitation rates above all biological reference points except for F_{loss}. Based on projection results, the recently adopted WCPFC CMM (2013-09) and IATTC resolution for 2014 (C-13-02), if continued into the future, are not expected to increase SSB if recent low recruitment continues.

In relation to the projections requested by NC9, only scenario 6, the strictest one, results in an increase in SSB even if the current low recruitment continues. Given the result of scenario 6, further substantial reductions in fishing mortality and juvenile catch over the whole range of juvenile ages should be considered to reduce the risk of SSB falling below its historically lowest level.

If the low recruitment of recent years continues the risk of SSB falling below its historically lowest level observed would increase. This risk can be reduced with implementation of more conservative management measures.

Based on the results of future projections requested at NC9, unless the historical average level (1952–2011) of recruitment is realized, an increase of SSB cannot be expected under the current

WCPFC and IATTC conservation and management measures, even under full implementation (scenario 1).

If the specifications of the harvest control rules used in the projections were modified to include a definition of juveniles that is more consistent with the maturity ogive used in the stock assessment, projection results could be different; for example, rebuilding may be faster. While no projection with a consistent definition of juvenile in any harvest scenario was conducted, any proposed reductions in juvenile catch should consider all non-mature individuals.

Given the low level of SSB, uncertainty in future recruitment, and importance of recruitment in influencing stock biomass, monitoring of recruitment should be strengthened to allow the trend of recruitment to be understood in a timely manner.

Western and Central Pacific striped marlin in the North Pacific (WCNPSTR)

Stock assessment: ISC Billfish Working Group 2012

Stock status: The WCNPSTR stock is overfished and experiencing overfishing (ISC 2014). The current (2010) spawning biomass is 65% below SB_{MSY} = 2,713 mt and the current fishing mortality (2007-2009) exceeds F_{MSY} = 0.61 by 24%. Reducing fishing mortality would likely increase spawning stock biomass and may improve the chances of higher recruitment. Given the current pessimistic status of the stock, SC8 recommends that the Commission strengthen the existing CMM to ensure the recovery of NPSR based on information provided by ISC.

Pacific blue marlin

Stock assessment: ISC Billfish Working Group 2013

Stock status: Estimates of total stock biomass show a long-term decline. Current fishing mortality on the stock (average F, ages 2 and older) averaged F = 0.26 during 2009–2011 and was below FMSY (FMSY [age-2+] = 0.32). The predicted value of the spawning potential ratio (SPR, the predicted spawning output at current F as a fraction of unfished spawning output) is currently SPR2009–2011 = 23%. The overall trends in SSB and recruitment indicate a long-term decline in SSB and suggest a fluctuating pattern without trend for recruitment. Pacific blue marlin SSB decreased to the MSY level in the mid-2000s, and since then has increased slightly.

Management implications: Based on the results of the stock assessment, the stock is not currently overfished and is not experiencing overfishing. The stock is nearly fully exploited. Stock biomass has declined since the 1970s and has been stable since the mid-2000s with a slight recent increase. The fishing mortality rate should not be increased from the 2009–2011 level to avoid overfishing

Oceanic white-tip shark in the WCP-CA

Stock assessment: Rice and Harley 2012

Stock status: Spawning biomass, total biomass and recruitment all exhibit a declining trend since 1995 (the first year of the assessment). Current spawning biomass is low and is estimated to be at 15% of SB_{MSY}. Fishing mortality from the non-target longline fishery has an increasing trend since 1995 while the fishing mortality from the targeted longline fishery and the purse seine fisheries has varied without trend. Current fishing mortality is high and is estimated to be over 6 times greater than F_{MSY}. The key conclusions are that overfishing is occurring and the stock is in an overfished state relative to MSY-based reference points ($SB_{current}/SB_{MSY}$ 0.153 (0.082-0.409)) and depletion based reference points ($SB_{current}/SB_{zero}$ 0.065 (0.034-0.173)). This conclusion is robust to uncertainties in key model assumptions.

Management implications: Despite the data limitations going into the assessment, and the wide range of uncertainties considered, all of the accepted model runs indicate that the WCPO oceanic whitetip shark stock is currently overfished and overfishing is occurring relative to commonly used MSY-based reference points and depletion-based reference points. Management measures to reduce fishing mortality and to rebuild spawning biomass have been agreed to under CMM 2011-04, but mitigation to avoid capture is recommended.

Silky shark in the WCP-CA

Stock assessment: Rice and Harley 2013

Stock status: Silky shark is a low productivity species and this low productivity is reflected in the low estimated value for F_{MSY} (F_{MSY} = 0.08) and high estimated value for SB_{MSY}/SB_0 = 0.39. These directly impact on conclusions about overfishing and the overfished status of the stock. Estimated fishing mortality has increased to levels far in excess of F_{MSY} ($F_{current}/F_{MSY}$ = 4.32) and across nearly all plausible model runs undertaken, estimated F values were much higher than F_{MSY} (the 5th and 95th quantiles are 2.49 and 7.45, respectively). Based on these results SC9 concluded that overfishing is occurring. Estimated SSB has declined to levels below SB_{MSY} ($SB_{current}/SB_{MSY}$ = 0.72) and for the majority of the model runs undertaken, $SB_{current}$ is less than SB_{MSY} (the 5th and 95th quantiles are 0.51 and 1.02, respectively). Based on the distribution of the relative current spawning biomass SC9 concluded that it is highly likely that the stock is in an overfished state

Management implications: Current catches are higher than the maximum sustainable yield (MSY) (7,123 mt vs. MSY = 2,937 mt), further catches at current levels of fishing mortality would continue to deplete the stock below SB_{MSY}. Current (2005–2008 average) and latest (2009) catches are significantly greater than the forecast catch in 2010 under F_{MSY} conditions (approximately 600 mt). The greatest impact on the stock is attributed to bycatch from the longline fishery in the tropical and subtropical areas, but there are also significant impacts from the associated purse-seine fishery that catches predominantly juvenile sharks. The Commission should consider measures directed at bycatch mitigation as well as measures directed at targeted catch, such as from shark lines, to improve the status of the silky shark population. Existing observer data may provide some information on which measures would be the most effective

North Pacific blue shark

Stock assessment: ISC Shark Working Group 2014; Rice et al. 2014

Stock status: The ISC Shark Working Group used two stock assessment approaches to examine the status of blue shark (*Prionace glauca*) in the North Pacific Ocean: a Bayesian surplus production (BSP) model; and an age-based statistical catch-at-length model. These efforts provide an updated assessment of North Pacific blue shark based on the 2013 Shark Working Group assessment. SC10 chose reference case models from the BSP (JEJL_Ref), and the Stock Synthesis-based analyses to represent the stock status of North Pacific blue shark.

Based on the trajectory of the reference case of the BSP model (BSP), the ratio of B_{2011}/B_{MSY} was estimated to be 1.65. Stock biomass of blue shark in 2011 (B_{2011}) was estimated to be 622,000 mt. Median annual fishing mortality in 2011 (F_{2011}) was approximately 32% of F_{MSY}. Based on the trajectory of the Stock Synthesis reference case model, female spawning stock biomass of blue shark in 2011 (SSB_{2011}) was estimated to be 449,930 mt the ratio of SSB_{2011}/SSB_{MSY} was estimated to be 1.621. The estimate of F_{2011} was approximately 34% of F_{MSY}. TRPs and LRPs have not yet been established for pelagic sharks in the Pacific. Relative to MSY, the reference case and the majority of models run with input parameter values considered most probable based on the biology of blue sharks support the conclusion that the North Pacific blue shark stock is likely not overfished ($B_{2011}>B_{MSY}$) and overfishing is likely not occurring ($F_{2011}<F_{MSY}$). While the results of the sensitivity runs varied depending on the input assumptions, a few parameters were most influential on the results. These included the CPUE series selected as well as the shape parameters for the BSP models and the equilibrium initial catch and form of the LFSR relationship for the Stock Synthesis models. SC10 noted that there are substantial uncertainties in a number of inputs to the assessments, such as the time series for estimated catch, the quality (observer versus logbook) and time spans of abundance indices, the size composition data and many life history parameters such as growth and maturity schedules. These uncertainties are considered to be considerably greater than those for the main tuna target species. However, SC10 notes that this is the best available scientific information.

Management implications: Future projections of the reference case models show that median BSH biomass in the North Pacific will remain above B_{MSY} under the catch harvest policies examined (status quo, +20%, -20%). Similarly, future projections under different fishing mortality (F) harvest policies (*status quo*, +20%, -20%) show that median BSH biomass in the North Pacific will likely remain above B_{MSY}.

The North Pacific blue shark stock is likely not experiencing overfishing and likely not to be in an overfished condition. For a range of sensitivity runs (such as the lower range of productivity assumptions, which were considered less plausible) the probability of the stock being overfished or undergoing overfishing was increased. Based on the future projections, the stock is likely above the level required to sustain recent catches. However, SC10 noted that there is substantial uncertainty in the model results and the Commission should be cautious in interpreting the results.

SC10 noted that there is significant and substantial uncertainty associated with the level of current fishing mortality from the target fishery for blue shark and the ongoing sustainability of this stock. SC10, therefore, recommends that all targeted shark fisheries be required to submit management plans with robust catch limits to the Commission by WCPFC12.

Given the uncertainties regarding the estimated catch and choice of input parameters for the assessment, SC10 recommended that the catch and fishing effort on blue shark should be carefully monitored. Attaining the required 5% longline observer coverage, as well as continued research into the fisheries, biology and ecology of blue shark in the North Pacific are recommended to make improvements prior to the next assessment.

Table 97. Estimates of stock status in relation to overfishing and overfished reference points for WPRFMC PMUS

Stock	Overfishing reference point	Is overfishing occurring?	Approaching overfishing (2 yr)	Overfished reference point	Is the stock overfished?	Approaching overfished (2 yr)	Assessment results	Natural mortality[1]	MSST
Skipjack Tuna (WCPO)	F/FMSY=0.62	No	No	$SB_{2011}/SB_{MSY}=1.81$ $SB_{2011}/SB_{F=0}=0.48$ $B_{2011}/B_{MSY}=1.75$	No	No	Harley et al. 2014	>0.5 yr^{-1}	0.5 B_{MSY}
Yellowfin Tuna (WCPO)	F/FMSY=0.72	No	No	$SB_{2012}/SB_{MSY}=1.24$ $SB_{2012}/SB_{F=0}=0.42$ $B_{2011}/B_{MSY}=1.25$	No	No	Davies et al. 2014	0.8-1.6 yr^{-1}	0.5 B_{MSY}
Albacore Tuna (S. Pacific)	F/FMSY=0.21	No	No	$SB_{2007-2010}/SB_{MSY}=2.56$ $SB_{2007-2010}/SB_{F=0}=0.63$	No	No	Hoyle et al. 2012	0.4 yr^{-1}	0.7 SB_{MSY}
Albacore Tuna (N. Pacific)	72% of F_{ATHL}	No	No		No	No	ISC 2011	0.4 yr^{-1}	0.6 B_{MSY}
Bigeye Tuna (WCPO)	F/FMSY=1.57	Yes	Not applicable	$SB_{2012}/SB_{MSY}=0.77$ $SB_{2012}/SB_{F=0}=0.16$ $B_{2011}/B_{MSY}=0.96$	No	No	Rice et al. 2014	0.4 yr^{-1}	0.6 B_{MSY}
Pacific Bluefin Tuna	F/FMSY=	Yes	Not applicable		Yes	Not applicable	ISC 2014	0.25-1.6 yr^{-1}	~0.72 B_{MSY}
Blue Marlin (Pacific)	F/FMSY=0.81	No	Unknown	$SB/SB_{MSY}=1.28$	No	Unknown	ISC 2013	0.22-0.42 yr^{-1}	~0.7 B_{MSY}
Swordfish (WC N. Pacific)	F/FMSY=0.58	No	Unknown	$SB/SB_{MSY}=1.20$	No	Unknown	ISC 2014	0.3 yr^{-1}	0.7 B_{MSY}
Striped Marlin WC (N. Pacific)	F/FMSY=1.37	Yes	Not applicable	$SB/SB_{MSY}=0.35$	Yes	Not applicable	ISC 2012	0.4 yr^{-1}	0.6 SB_{MSY}
Blue Shark (N. Pacific)[2]	F/FMSY=0.34	No	Unknown	$SB_{2011}/SB_{MSY}=1.62$	No	Unknown	Rice et al. 2014	0.2 yr^{-1}	0.8 B_{MSY}
Oceanic white-tip shark (WCPO)	F/FMSY=6.69	Yes	Not applicable	$SB/SB_{MSY}=0.15$	Yes	Not applicable	Rice and Harley 2012	0.18 yr^{-1}	0.82 B_{MSY}

Stock	Overfishing reference point	Is overfishing occurring?	Approaching overfishing (2 yr)	Overfished reference point	Is the stock overfished?	Approaching overfished (2 yr)	Assessment results	Natural mortality[1]	MSST
Silky shark (WCPO)	F/FMSY=4.32	Yes	Not applicable	SB/SB_{MSY}=0.72	Yes	Not applicable	Rice and Harley 2013	0.18 yr^{-1}	0.82 B_{MSY}
Other Billfishes		Unknown		Unknown				Unknown	
Other Pelagic Sharks		Unknown		Unknown				Unknown	
Other PMUS		Unknown		Unknown				Unknown	

Table 98. U.S. and CNMI longline landings (mt) in the North Pacific Ocean as reported to WCPFC and IATTC, 2009-2013

	U.S. in North Pacific Ocean					CNMI in North Pacific Ocean				
	2013	2012	2011	2010	2009	2013	2012	2011	2010	2009
Vessels	133	127	128	123	127	113				
Species										
Albacore, North Pacific	272	480	497	324	177	23				
Albacore, South Pacific	0	0								
Bigeye tuna	3,612	3,660	3,565	3,577	3,741	501				
Pacific bluefin tuna	0	0	0	0	1					
Skipjack tuna	181	115	158	114	116	25				
Yellowfin tuna	546	576	738	462	429	92				
Other tuna	0	0	0	0	0	0				
TOTAL TUNA	**4,612**	**4,831**	**4,958**	**4,477**	**4,464**	**640**				
Black marlin	1	1	1	0	0	0				
Blue marlin	283	226	290	238	333	20				
Sailfish	7	5	10	9	10	3				
Spearfish	132	111	169	79	97	34				
Striped marlin, North Pacific	256	209	263	124	234	45				
Striped marlin, South Pacific	0	0				0				
Other marlins	1	1	1	1	0	0				
Swordfish, North Pacific	545	862	837	1,013	1,243	8				
Swordfish, South Pacific	0	0				0				
TOTAL BILLFISH	**1,224**	**1,414**	**1,570**	**1,464**	**1,917**	**109**				
Blue shark	1	12	9	6	9	0				
Mako shark	30	42	43	63	102	3				
Thresher	4	9	15	16	28	0				
Other sharks	0	0	2	3	6	0				
Oceanic whitetip shark	0	1								
Silky shark	0	0								
Hammerhead shark	0	0								
Tiger shark										
Porbeagle										
TOTAL SHARKS	**35**	**64**	**69**	**87**	**144**	**3**				
Mahimahi	240	288	291	230	265	9				
Moonfish	373	356	309	356	485	37				
Oilfish	166	169	178	164	194	26				
Pomfret	309	215	115	169	202	26				
Wahoo	153	117	124	101	116	17				
Other fish	9	8	20	10	8	0				
TOTAL OTHER	**1,250**	**1,154**	**1,036**	**1,031**	**1,269**	**116**				
GEAR TOTAL	**7,121**	**7,463**	**7,632**	**7,058**	**7,794**	**869**				

1) US longline catch is the sum of the Hawaii-based and California-based fisheries
2) US longline catch estimates originate from the PIFSC for Hawaii and American Samoa fisheries and from the SWFSC for California.

Table 99. American Samoa landings (mt) in the North Pacific and South Pacific Ocean as reported to WCPFC and IATTC, 2009-2013

	American Samoa in North Pacific Ocean					American Samoa in South Pacific Ocean				
	2013	**2012**	**2011**	**2010**	**2009**	**2013**	**2012**	**2011**	**2010**	**2009**
Vessels	15	115	114	11	10	22	25	24	26	26
Species										
Albacore, North Pacific	13	115	113	48	4					
Albacore, South Pacific						2,100	3,147	2,291	3,943	3,903
Bigeye tuna	276	1,338	1,086	507	156	84	164	178	178	161
Pacific bluefin tuna						2	7	2	3	1
Skipjack tuna	9	123	34	18	5	65	251	108	110	152
Yellowfin tuna	29	272	144	53	15	383	348	555	445	386
Other tuna	0			0		0				
TOTAL TUNA	**327**	**1,849**	**1,376**	**625**	**179**	**2,634**	**3,916**	**3,135**	**4,679**	**4,603**
Black marlin	0	0	0	0		0	2	1	0	0
Blue marlin	18	50	45	23	7	30	36	40	45	42
Sailfish	1	3	2	1	0	2	1	4	2	2
Spearfish	9	35	35	9	2	1	1	5	2	3
Striped marlin, North Pacific	20	54	68	13	5					
Striped marlin, South Pacific						3	7	3	2	4
Other marlins	0	0								
Swordfish, North Pacific	17	38	22	20	5					
Swordfish, South Pacific						10	14	12	11	13
TOTAL BILLFISH	**65**	**180**	**171**	**66**	**19**	**47**	**62**	**64**	**62**	**63**
Blue shark	0	2	2	0		1	3	2	1	1
Mako shark	5	8	8	5	1	0	0	0	0	0
Thresher	0	3	3	0	0	0	0	0		0
Other sharks	0	0	0	0		0	0	1	1	0
Oceanic whitetip shark						0	0			
Silky shark						0	0			
Hammerhead shark										
Tiger shark										
Porbeagle										
TOTAL SHARKS	**5**	**14**	**14**	**6**	**1**	**1**	**4**	**4**	**2**	**1**
Mahimahi	27	52	52	23	7	19	11	11	9	17
Moonfish	36	86	84	42	22	2	3	3	2	3
Oilfish	17	59	55	20	7	1	0	1	0	3
Pomfret	19	56	33	19	10					
Wahoo	14	39	23	11	4	87	85	123	133	140
Other fish	0	1	0	0	0	0	0	1	1	0
TOTAL OTHER	**113**	**292**	**248**	**115**	**51**	**108**	**99**	**137**	**145**	**163**
GEAR TOTAL	**509**	**2,335**	**1,809**	**812**	**251**	**2,790**	**4,081**	**3,341**	**4,888**	**4,830**

Note: American Samoa Nom. P. Bluefin assumed O. tuna

Table 100. Total landings of US longline catch (mt) in the WCPFC statistical area, 2009-2013

	Total U.S. Longline Landings				
	2013	2012	2011	2010	2009
Vessels	155	153	152	146	151
Species					
Albacore, North Pacific	307	595	610	371	181
Albacore, South Pacific	2,100	3,147	2,291	3,943	3,903
Bigeye tuna	4,472	5,162	4,829	4,261	4,059
Pacific bluefin tuna	3	7	2	3	2
Skipjack tuna	280	490	300	242	272
Yellowfin tuna	1,051	1,196	1,437	960	829
Other tuna	0	0	0	0	0
TOTAL TUNA	**8,213**	**10,596**	**9,469**	**9,781**	**9,246**
Black marlin	1	3	2	1	0
Blue marlin	352	313	375	306	382
Sailfish	12	9	15	11	12
Spearfish	176	147	209	89	102
Striped marlin, North Pacific	321	263	331	137	239
Striped marlin, South Pacific	3	7	3	2	4
Other marlins	1	1	1	1	0
Swordfish, North Pacific	569	900	859	1,033	1,248
Swordfish, South Pacific	10	14	12	11	13
TOTAL BILLFISH	**1,445**	**1,656**	**1,805**	**1,592**	**1,999**
Blue shark	2	18	14	7	9
Mako shark	38	50	51	68	103
Thresher	5	13	18	16	29
Other sharks	0	1	3	3	6
Oceanic whitetip shark	0	1			
Silky shark	0	0			
Hammerhead shark	0	0			
Tiger shark					
Porbeagle					
TOTAL SHARKS	**44**	**82**	**87**	**95**	**147**
Mahimahi	295	351	353	262	289
Moonfish	448	445	396	400	510
Oilfish	210	228	233	185	203
Pomfret	353	270	148	188	213
Wahoo	270	241	270	246	260
Other fish	10	9	21	11	8
TOTAL OTHER	**1,587**	**1,545**	**1,421**	**1,291**	**1,484**
GEAR TOTAL	**11,289**	**13,879**	**12,782**	**12,758**	**12,875**

Table 101. U.S. longline landings in the North Pacific and Eastern Pacific Oceans as reported to WCPFC and IATTC, 2009-2013

	U.S. (ISC)					All U.S. vessels in the EPO				
	2013	**2012**	**2011**	**2010**	**2009**	**2013**	**2012**	**2011**	**2010**	**2009**
Vessels	136	129	129	125	128	120	102	112	118	103
Species										
Albacore, North Pacific	326	660	708	421	203	19	65	98	49	22
Albacore, South Pacific	0	0	0	0	0	0	0	0	0	0
Bigeye tuna	6,444	5,873	5,701	5,440	4,628	2,056	875	1,050	1,356	730
Pacific bluefin tuna	1	0	0	0	1	0	0	0	0	0
Skipjack tuna	226	245	207	153	136	10	7	15	21	15
Yellowfin tuna	711	887	937	568	527	44	39	55	54	84
Other tuna	0	0	0	0	0	0	0	0	0	0
TOTAL TUNA	**7,708**	**7,667**	**7,552**	**6,582**	**5,494**	**2,129**	**986**	**1,218**	**1,481**	**851**
Black marlin	1	1	1	1	1	0	0	0	0	0
Blue marlin	384	298	373	306	360	62	21	38	45	20
Sailfish	12	9	13	11	10	1	1	2	1	1
Spearfish	212	163	234	118	113	38	17	31	31	14
Striped marlin, North Pacific	391	282	362	165	258	71	19	31	28	19
Striped marlin, South Pacific	0	0	0	0	0	0	0	0	0	0
Other marlins	1	1	1	1	0	0	0	0	0	0
Swordfish, North Pacific	1,285	1,395	1,623	1,676	1,817	715	495	764	642	569
Swordfish, South Pacific	0	0	0	0	0	0	0	0	0	0
TOTAL BILLFISH	**2,285**	**2,148**	**2,608**	**2,278**	**2,559**	**887**	**554**	**867**	**747**	**623**
Blue shark	1	16	13	7	9	0	1	2	1	1
Mako shark	51	68	68	94	120	13	19	18	26	17
Thresher	5	14	19	18	30	0	1	1	1	1
Other sharks	0	1	2	3	6	0	0	0	1	0
Oceanic whitetip shark										
Silky shark										
Hammerhead shark										
Tiger shark										
Porbeagle										
TOTAL SHARKS	**57**	**98**	**103**	**122**	**165**	**14**	**21**	**20**	**30**	**19**
Mahimahi	404	427	418	439	330	128	86	76	186	58
Moonfish	958	741	757	824	887	513	299	364	426	380
Oilfish	255	257	272	237	226	46	29	40	53	25
Pomfret	461	312	181	239	255	108	42	33	51	42
Wahoo	211	168	161	128	134	27	11	14	15	14
Other fish	10	9	21	12	8	0	0	0	2	0
TOTAL OTHER	**2,299**	**1,914**	**1,810**	**1,878**	**1,840**	**821**	**468**	**527**	**733**	**519**
GEAR TOTAL	**12,350**	**11,827**	**12,073**	**10,861**	**10,058**	**3,851**	**2,029**	**2,632**	**2,990**	**2,013**

Table 102. U.S. longline landings by vessel length in the Eastern Pacific Ocean as reported to WCPFC and IATTC, 2009-2013

	U.S. vessels greater than 24 meters					U.S. vessels less than 24 meters				
	2013	2012	2011	2010	2009	2013	2012	2011	2010	2009
Vessels	30	29	28	30	26	90	73	84	88	77
Species										
Albacore, North Pacific	6	19	46	21	7	13	46	53	28	15
Albacore, South Pacific	0	0				0				
Bigeye tuna	592	309	337	407	199	1,463	565	713	950	531
Pacific bluefin tuna	0	0			0	0				0
Skipjack tuna	3	2	6	6	4	8	5	9	15	12
Yellowfin tuna	25	23	26	25	64	19	16	29	29	19
Other tuna	0	0	0	0	0	0				0
TOTAL TUNA	**626**	**353**	**414**	**459**	**274**	**1503**	**633**	**804**	**1022**	**577**
Black marlin	0	0			0	0	0	0	0	
Blue marlin	14	4	13	12	6	48	17	25	33	14
Sailfish	0	0	1	0	0	1	1	2	1	0
Spearfish	9	5	9	7	3	29	12	22	24	11
Striped marlin, North Pacific	19	6	11	7	6	52	14	20	21	13
Striped marlin, South Pacific	0	0				0				
Other marlins	0	0				0		0	0	0
Swordfish, North Pacific	291	217	330	314	334	424	279	435	328	235
Swordfish, South Pacific	0	0				0				
TOTAL BILLFISH	**334**	**232**	**364**	**341**	**350**	**553**	**322**	**503**	**406**	**273**
Blue shark	0	0	1	0	0	0	1	1	1	0
Mako shark	7	11	8	10	8	6	7	10	16	9
Thresher	0	1	0	1		0	1	1	1	1
Other sharks	0	0		0	0				1	
Oceanic whitetip shark										
Silky shark										
Hammerhead shark										
Tiger shark										
Porbeagle										
TOTAL SHARKS	**7**	**12**	**9**	**11**	**9**	**7**	**9**	**11**	**19**	**11**
Mahimahi	34	30	25	40	14	94	57	50	145	44
Moonfish	146	99	104	112	81	367	200	261	313	299
Oilfish	13	10	16	18	10	33	19	24	35	15
Pomfret	30	10	7	13	9	78	31	26	37	33
Wahoo	8	4	4	4	4	19	8	9	11	10
Other fish	0	0	0	0	0	0	0	0	2	0
TOTAL OTHER	**231**	**153**	**156**	**188**	**119**	**590**	**315**	**371**	**544**	**400**
GEAR TOTAL	**1,198**	**750**	**943**	**1,000**	**752**	**2,653**	**1,279**	**1,689**	**1,991**	**1,261**

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F. Marine Recreational Fisheries of the Western Pacific Region

Introduction

Fishing, either for subsistence or recreation, continues to be an important activity throughout the Western Pacific Region in the four major populated island areas of the Western Pacific Region, Hawaii, American Samoa, Guam and the Commonwealth of the Northern Mariana Islands (CNMI). Fish consumption in Micronesia and Polynesia typically averages about 130 lb/per capita/yr (Dalzell et al. 1996) and even in more culturally diverse Hawaii, fish consumption is almost three times the US national average at about 42 lb/person/yr (Dalzell & Paty 1996).

Recreational fisheries in the Western Pacific Region

In Hawaii, recreational shoreline fishing was more popular than boat fishing up to and after WW II. Boat fishing during this period referred primarily to fishing from traditional canoes (Glazier 1999). All fishing was greatly constrained during WW II through time and area restrictions, which effectively stopped commercial fishing and confined recreational fishing to inshore areas (Brock 1947). Following WWII, the advent of better fishing equipment and new small boat hulls and marine inboard and outboard engines led to a growth in small vessel-based recreational fishing.

A major period of expansion of small vessel recreational fishing occurred between the late 1950s and early 1970s, through the introduction of fiberglass technology to Hawaii and the further refinement of marine inboard and outboard engines (Figure 136). By the early 1960s, there were an estimated 5,300 small boats in the territory being used for recreational fishing. By the 1980s, the number of recreational or pleasure craft had risen to almost 13,000 vessels and to about 15,000 vessels in the 1990s. There are presently about 30 fishing clubs in Hawaii and a variety of different recreational fishing tournaments organized both by clubs and independent tournament organizers. Hawaii also hosts between 150 and 200 boat-based fishing tournaments, about 30 of which are considered major international competitions, with over 20 boats and entry fees of $100. This level of interest in recreational fishing is sufficient to support a local fishing magazine, Hawaii Fishing News, which besides articles of interest to recreational fishermen, includes a monthly roundup of the fishing activity and conditions at the major small boat harbors in the State.

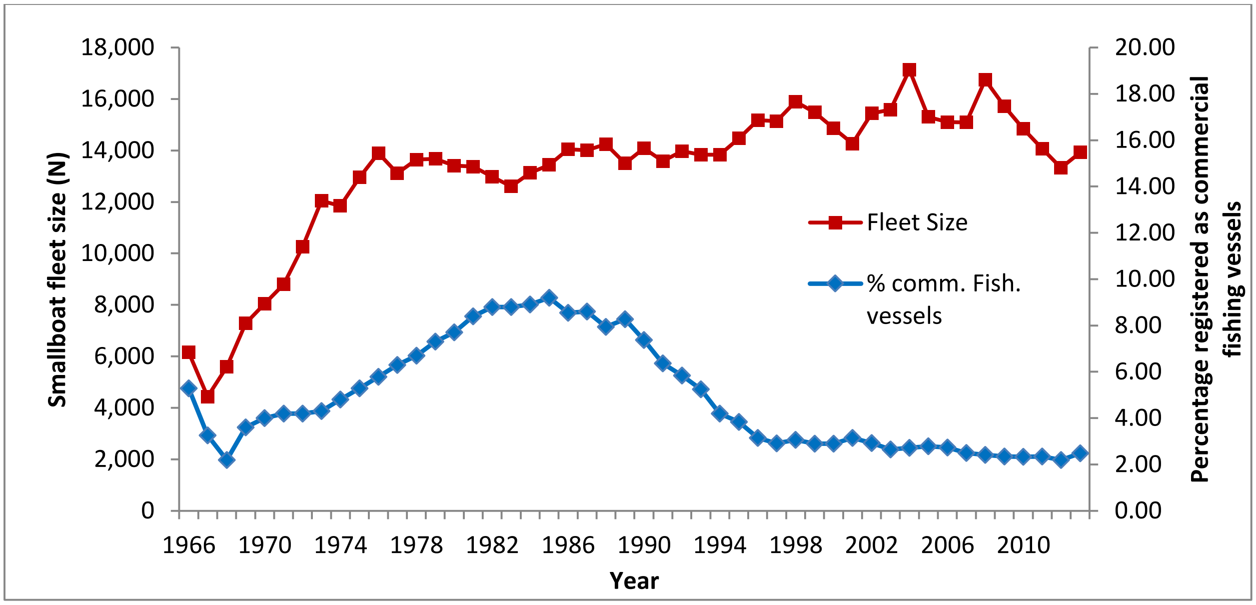

Figure 136. Annual number of small vessel fleet registrations in Hawaii, 1966-2012: total fleet size and percentage of vessels being registered for commercial fishing
(Source: Hawaii Division of Boating and Ocean Resources)

Elsewhere in the region, recreational fishing is less structured. In Guam, fishing clubs have been founded along ethnic lines by Japanese and Korean residents. These clubs had memberships of 10-15 people, along with their families. Four such clubs were founded in Guam during the past 20 years, but none lasted for more than a 2-3 years (Gerry Davis, NMFS PIRO pers. comm.). There was also a Guam Boating Association comprising mostly fishermen, with several hundred members. This organization functioned as a fishing club for about 10 years and then disbanded. Some school groups and the Boy Scouts have formed fishing clubs focused on rod and reel fishing, and there is still one spear-fishing club that has only a handful of members, but appears to still be active. There are also some limited fishing tournaments on Guam, including a fishing derby for children organized by the local Aquatic and Wildlife Resources Division. There are few fishing clubs in the in the Northern Mariana Islands. The Saipan Sportfishing Association (SSA) has been in existence for at least 16 years, and is the sponsor of the annual Saipan International Fishing Tournament, which is usually held in August or September.

A recent innovation in the Mariana Islands is the publication of a free quarterly magazine, Mariana Fishing Magazine, which covers recreational fishing in both Guam and the CNMI.

Levine and Allen (2009) provide an overview of fisheries in American Samoa, including subsistence and recreational fisheries. Citing a survey conducted in American Samoa by Kilarski *et al.* (2006), Levine and Allen noted that approximately half of the respondents stated that they fished for recreation, with 71 percent of these individuals fishing once a week or less. Fishermen also fished infrequently for cultural purposes, although cultural, subsistence, and recreational fishing categories were difficult to distinguish as one fishing outing could be motivated by all three reasons.

Boat-based recreational fishing in American Samoa has been influenced primarily by the fortunes of fishing clubs and fishing tournaments. Tournament fishing for pelagic species began in American Samoa in the 1970s, and between 1974 and 1998, a total of 64 fishing tournaments were held in American Samoa (Tulafono 2001). Most of the boats that participated were alia catamarans and small skiffs. Catches from tournaments were often sold, as most of the entrants are local small-scale commercial fishermen. In 1996, three days of tournament fishing contributed about one percent of the total domestic landings. Typically, 7 to 14 local boats carrying a total of 55 to 70 fishermen participated in each tournament, which were held two to five times per year (Craig et al. 1993).

The majority of tournament participants operated 28-foot alia, the same vessels that engage in the small-scale longline fishery. With more emphasis on commercial longline fishing since 1996, interest in the tournaments waned (Tulafono 2001) and pelagic fishing effort shifted markedly from trolling to longlining. Catch-and-release recreational fishing is virtually unknown in American Samoa. Landing fish to meet cultural obligations is so important that releasing fish would generally be considered a failure to meet these obligations (Tulafono 2001). Nevertheless, some pelagic fishermen who fish for subsistence release fish that are surplus to their subsistence needs.

More recently, recreational fishing has undergone a renaissance in American Samoa through the establishment of the Pago Pago Game Fishing Association (PPGFA), which was founded by a group of recreational anglers in 2003. The motivation to form the PPGFA was the desire to host regular fishing competitions. There are about 15 recreational fishing vessels ranging from 10 ft single engine dinghies to 35 ft twin diesel engine cabin cruisers. The PPGFA has annually hosted international tournaments in each of the past five years with fishermen from neighboring Samoa and Cook Islands attending. The recreational vessels use anchored fish aggregating devices (FADs) extensively, and on tournaments venture to the various outer banks which include the South Bank (35 miles), North East Bank (40 miles NE), South East bank (37 miles SE), Two Percent Bank (40 miles), and East Bank (24 miles East). Several recreational fishermen have aspirations to become charter vessels and are in the process of obtaining captains (6 pack) licenses. In 2011, PPGFA played host to the 12th Steinlager I'a Lapo'a Game Fishing Tournament, which was a qualifying event for the International Game Fish Association’s Offshore World Championship in Cabo San Lucas, Mexico.

There is no full-time regular charter fishery in American Samoa similar to those in Hawaii or Guam. However, Pago Pago Marine Charters, which is concerned primarily with industrial work such as underwater welding, construction, and salvage, also includes for-hire fishing among the services it offers.

There is also some recreational fishing activity at some of the Pacific Remote Island Areas (PRIAs), namely at Midway, Wake and Palmyra Islands. There are no resident populations at Howland & Baker, Johnston and Jarvis Islands and fishing activity at these locations is likely minimal. There was a tourist facility at Midway until 2002, which operated a charter boat fishery targeting primarily pelagic fish at Midway Atoll. The company operated five vessels for charter fishing at Midway: three 22-26 ft catamarans for lagoon and nearshore fishing operations and two 38 ft sportfishing vessels used for blue water trolling. In addition, there were approximately seven small vessels maintained and used by Midway residents for recreational fishing. Of this total, three vessels engaged primarily in offshore trolling for PMUS including yellowfin tuna, whaoo and marlin. All vessels fishing at Midway were required to file a float plan prior to a fishing trip and complete the “Midway Sports Fishing Boat Trip Log” upon completion of each trip. The US Fish and Wildlife Service was responsible for compiling these catch data.

At Palmyra Atoll, an island privately owned by The Nature Conservancy, a 22 ft catamaran is used for offshore trolling and four small boats operated within the lagoon used for bonefish angling. There are several craft used for recreational fishing at the military base on Wake Island including two landing craft and two small vessels.

Recreational catches
Estimates of recreational pelagic fish catch for the Western Pacific are given in Table 103. The data for Guam, CNMI, and American Samoa are based on the proportion of catches landed for sale and catches retained and not sold, in all landings sampled by creel surveys in each area. The ratio of unsold to sold catch in the samples was used in conjunction with the total catch estimate expanded from the creel survey data. This was adjusted downwards based on the creel surveys by the ratio of landings by vessels retaining 100% of their catch to the total unsold catch. This accounts for that fraction of the catch not sold by commercial fishing vessels. The volume of fish landed by vessels retaining all their catch was labeled the nominal recreational catch.

The estimates for American Samoa are almost certainly under-estimates due to the creel surveys not picking up the activities of sports-fishermen belonging to the Pago Pago Yacht Club. Most of their activities are conducted on the weekend, when the creel survey mounted by DMWR is inactive. A special survey is being undertaken by DMWR staff to capture this recreational fishing activity.

The recreational catch for Hawaii is generated from the Hawaii Marine Recreational Fisheries Statistical Survey, which is a collaborative effort between the State of Hawaii’s Division of Aquatic Resources and the National Marine Fisheries Service (NMFS) Office of Science and Technology. This survey is part of the NMFS Marine Fisheries Recreational Statistical Survey (MRFSS) which has been modified following a review by the National Academy of Science in 2006 under the auspices of the Marine Recreational Improvement Program (MRIP).

Table 103. Estimated boat-based recreational pelagic fish catches in the four principal island groups of the Western Pacific Region in 2013

Location	Total catch (lbs)	Unsold catch (lb)	Nominal recreational catch (lb)	Recr. catch as % of total catch	Recr. fishing trips
American Samoa	6,111,388	569	558	0.009%	9
Guam	238,194	91,110	82,277	34.5%	3,958
Hawaii	46,773,572	NA	12,330,638	26.3%	297,137
CNMI	230,893	16,273	14,715	6.4%	1,911

Charter vessel sports-fishing
Table 104 through Table 108 present summaries of the charter vessel sportsfishing in the Western Pacific. Charter fishing in Hawaii is more focused on catching blue marlin, which in 2004 formed about 50 % of the total annual charter vessel catch by weight, but in 2013 only formed about 20% of the charter vessel catch and was superseded by yellowfin and mahmahi. Although commercial troll vessels take blue marlin, this species only forms about 6% of their catch, with the majority of the target species being yellowfin, mahimahi, and wahoo (

Table 105). Unlike other parts of the US, there is little recreational fishery interest in catching sharks in Hawaii.

Guam has a charter fishing sector, which unlike Hawaii, caters for both pelagic and bottomfish fishing. Until recently, the troll charter fishery was expanding, but over the past few years, the number of vessels involved and level of fishing has decreased in response to lower tourist volume from Japan due to the ongoing economic recession. Nonetheless, although compromising about 5% of Guam's commercial troll fleet, the Guam troll charter industry accounts for 6.2% of the troll catch, and 47% and 19% of the Guam blue marlin and mahimahi catch respectively (see Guam module in this volume).

Charter fishing in CNMI is limited, with about ten boats operating on Saipan, and a few vessels on Tinian conducting occasional fishing charters. No dad were collected for charter vessels in CNMI during 2013. In American Samoa, tourism is not a significant component of the economy, and hence there is little charter fishing activity. As noted previously, there are few vessels suitable for charter-type operations (Tulafono 2001).

Table 104. Estimated catches by pelagic charter fishing vessels in Guam, Hawaii and CNMI in 2013

Location	Catch (lb)	Effort (trips)	CPUE (lb/trip)	Principal species
Guam	49,106	920	53.4	Mahimahi, Blue marlin, Skipjack
Hawaii	474,542	5,328	89.1	Yellowfin, Mahimahi, Blue marlin

Charter vessel fishing in the Western Pacific Region has elements of both recreational and commercial fishing. The primary motivation for charter patrons is recreational fishing, with the possibility of catching large game fish such as blue marlin. The charter vessel skipper and crew receive compensation in the form of the patron's fee, but are also able to dispose of fish on local markets, as is the case in Hawaii. The catch composition of charter vessel catch versus conventional commercial trolling in Hawaii reflects the different targeting in the two fisheries. Blue marlins are among the dominant catch of charter vessels in Hawaii (

Table 105), along with yellowfin and mahimahi. In Guam, blue marlin are also a dominant feature in charter catches, though the single largest catch is mahimahi (Table 106).

Table 105. Comparison of species composition of landings made by Hawaii pelagic charter vessels versus commercial troll vessels, 2013

	Charter		Commercial troll	
Species	**Landings (lb)**	**Percent**	**Landings (lb)**	**Percent**
Yellowfin tuna	159,540	33.68%	872,534	36.85%
Mahimahi	114,987	24.27%	446,167	18.85%
Blue marlin	97,953	20.68%	175,246	7.40%
Ono	38,322	8.09%	348,274	14.71%
Aku	37,513	7.92%	254,652	10.76%
Spearfish	12,023	2.54%	11,635	0.49%
Striped marlin	6,352	1.34%	10,812	0.46%
Bigeye tuna	3,882	0.82%	213,354	9.01%
Black marlin	1,481	0.31%	5,376	0.23%
Kawakawa	1,215	0.26%	6,158	0.26%
Uku	489	0.10%	11,135	0.47%
White ulua			3,196	0.13%
Tombo			2,976	0.13%
Others	696	0.15%	6,009	0.25%
Total	**473,756**	**100.00%**	**2,367,523**	**100.00%**

Table 106. Comparison of species composition of landings made by Guam pelagic charter vessels versus commercial troll vessels, 2013

	Charter		Commercial	
Species	**Landings (lb)**	**Percent**	**Landings (lb)**	**Percent**
Mahimahi	31,616	64.38%	133,418	18.05%
Blue Marlin	7,550	15.37%	8,625	1.17%
Skipjack Tuna	7,167	14.59%	493,838	66.80%
Wahoo	2,773	5.65%	48,479	6.56%
Yellowfin Tuna	0	0.00%	52,745	7.13%
Others	0	0.00%	2,220	0.30%
Total	**49,106**	**100.00%**	**739,325**	**100.00%**

In Hawaii there is considerable variation in charter vessel catches between the various islands (Table 107), with the largest charter vessel fishery based on the islands of Hawaii and Oahu, in terms of catch. The Hawaii catch may be biased downwards due to the widespread practice of catch and release of billfish. Charter trips on Hawaii are form nearly 40% of the total charter activity in the State of Hawaii.

Table 107. Charter vessel catches in Hawaii by island, 2013

Island	**Catch (lb)**	**Percent**	**Trips**	**Percent**	**CPUE (lb/trip)**

Hawaii	157,895	33.28%	1,981	37.18%	79.70
Kauai	73,452	15.48%	807	15.15%	91.02
Maui County*	82,003	17.28%	1,055	19.80%	77.73
Oahu	161,102	33.96%	1,485	27.87%	108.49
Total	**474,452**	**100.00%**	**5,328**	**100.00%**	**89.05**

* DAR confidentiality protocols prevent reporting charter vessel activity for Molokai and Lanai separately, and these are aggregated with data for Maui, reported collectively as Maui County

Most charter vessel fishing on the island of Hawaii is conducted from Kona's small boat harbor at Honokohau, and about 30% of the charter vessel catch is comprised of blue marlin (Table 108). Blue marlin used to amount to about two-thirds of the catch, but this number has fallen considerably with the spread of a stronger catch and release ethic for billfish by charter vessel operators at Honokohau. Elsewhere, yellowfin, mahimahi and wahoo tend to dominate charter vessel landings.

Table 108. Composition of charter vessel catches in the Main Hawaiian Islands, 2013

Hawaii	Landings (lb)	Percent	Kauai	Landings (lb)	Percent
Yellowfin tuna	59,751	37.84%	Yellowfin tuna	30,685	41.78%
Blue marlin	45,930	29.09%	Aku	20,440	27.83%
Mahimahi	17,678	11.20%	Mahimahi	8,611	11.72%
Ono	15,145	9.59%	Blue marlin	6,654	9.06%
Spearfish	8,630	5.47%	Ono	6,433	8.76%
Aku	3,994	2.53%	Spearfish	465	0.63%
Striped marlin	2,910	1.84%	Kawakawa	164	0.22%
Bigeye tuna	2,249	1.42%	Yellowfin tuna	30,685	41.78%
Black marlin	1,481	0.94%			
Uku	89	0.06%			
Kamanu	40	0.03%			
Kaku	0	0.00%			
Total	**157,895**	**100.00%**	**Total**	**73,452**	**100.00%**

Maui	Landings (lb)	Percent	Kauai	Landings (lb)	Percent
Mahimahi	38,294	46.70%	Mahimahi	50,404	31.29%
Yellowfin tuna	18,913	23.06%	Yellowfin tuna	50,191	31.15%
Blue marlin	11,015	13.43%	Blue marlin	34,354	21.32%
Ono	8,785	10.71%	Aku	11,720	7.27%
Bigeye tuna	1,633	1.99%	Ono	7,960	4.94%
Aku	1,360	1.66%	Striped marlin	3,150	1.96%
S.N. spearfish	1,023	1.25%	S.N. spearfish	1,905	1.18%
Uku	400	0.49%	Kawakawa	981	0.61%
Striped marlin	292	0.36%	Sailfish	321	0.20%
Kamanu	167	0.20%	Kaku	116	0.07%
Kawakawa	70	0.09%			
Kaku	52	0.06%			
Total	**82,003**	**100.00%**	**Total**	**161,102**	**100.00%**

Recreational Fishing Data Collection in Hawaii

Recreational fish catches in Hawaii are monitored through the Hawaii Marine Recreational Fishing Survey (HMRFS), a collaborative project of the NMFS Office of Science and Technology and the Hawaii Division of Aquatic Resources. This project is a segment of the nationwide Marine Recreational Fisheries Statistical Survey (MRFSS), which has been used by NMFS to estimate recreational catches in most of the coastal states of the US.

The MRFSS program uses a triple survey approach that has been developed over the 20+ years of its history. For each two-month survey period (wave) a random sample of households is called by telephone to determine how many have conducted any fishing in the ocean, their mode of fishing (private boat, rental boat, charter boat, or shoreline), what methods were used, and how much effort (number of trips and hours) was expended. Concurrently, surveyors are sent out to boat launch ramps, small boat harbors, and shoreline fishing sites to interview fishermen to fill out intercept survey forms. The intercept survey collects data on fishing area, fishing methods, trip/effort, species caught, and lengths and weights of fish. The sites are randomly selected, but stratified by fishing pressure so that the sites with the highest pressures are likely to be surveyed more often. In addition the charter boat operators are surveyed by a separate survey. This additional survey of the charter fleet serves the same function as the random digit dialing household survey and is necessary because out of town fishers that charter vessels would not be covered by randomly calling the Hawaiian populace. The telephone and charter survey data are used to estimate total statewide fishing effort and the intercept surveys provide detailed catch and trip information. Data from the three surveys are combined and expanded to yield statewide estimates of total effort and catch by species, mode, and county.

NMFS and HDAR contributed joint funding for intercept surveys and charter boat surveys on the islands of Oahu, Hawaii, and Maui. NMFS also funded the Random Digit Dialing household telephone survey via a national contractor beginning in January 2001. The HMRFS project commenced in July 2001 but took until 2003 until annual results were first reported from this initiative.

In 2006, the MRFSS survey was reviewed by the National Research Council of the National Academy of Sciences (NRC 2006). The reviewers were critical of the statistical methods employed to generate expansions of the survey data to annual recreational catch estimates for each state. Consequently, NMFS conducted an overhaul of the MRFSS survey to respond to the NRC criticisms. As such, readers of this report should understand that there is uncertainty surrounding the various expansions from the HMRFS survey and figures reported here may change as new methods are implemented to conduct the expansions from survey data.

Table 109 provides summaries of the recreational boat and shoreline fish catch between 2003 and 2012 for pelagic fish.

Table 109. Recreational pelagic fish catches in Hawaii between 2003 and 2013

Year	Shore catch (lb)	Vessel catch (lb)	Total (lb)
2003	422,439	14,906,148	15,328,587
2004	120,779	12,210,682	12,331,461
2005	229,059	11,564,698	11,793,758
2006	258,802	11,830,852	12,089,654
2007	114,832	13,956,644	14,071,475
2008	56,937	21,802,388	21,859,325
2009	66,635	17,071,414	17,138,049
2010	14,469	11,754,054	11,768,523
2011	14,216	10,574,696	10,588,912
2012	NA	12,330,638	12,330,638
2013	0	14,245,945	14,245,945

Source: HDAR HMFRS and NMFS PIFSC

Figures 137-141 summarize aspects of the boat-based recreational fishery landings for six major pelagic fish species in Hawaii (blue marlin, striped marlin, mahimahi, skipjack, yellowfin and wahoo) between 2003 and 2013. Figure 141 shows the bimonthly distribution of boat-based fishing effort over the same time period. Skipjack tuna are the most commonly recreationally caught pelagic fish (Figure 137) followed by yellowfin tuna, mahimahi and wahoo. In terms of weight, however, yellowfin tuna dominates recreational pelagic fish catches (Figure 138).

Although blue marlin numbers in the catch are small compared to other species, the much greater average weight (Figure 139) means that it can comprise a significant fraction of the recreational catch by weight. Average weights for most species tended to be relatively similar between years for mahimahi, skipjack and wahoo, but may vary considerable between years for blue marlin, striped marlin and yellowfin tuna. This is also reflected in the nominal catch rate (lbs/trip) in Figure 140, where yellowfin catch rate was high in 2003, declined in 2004 and 2005, and then increased with peaks in 2009 and 2011. The distribution of fishing recreational fishing effort shows that boat based activity is highest in the summer and fall when the weather is at its most clement in Hawaii (Figure 141).

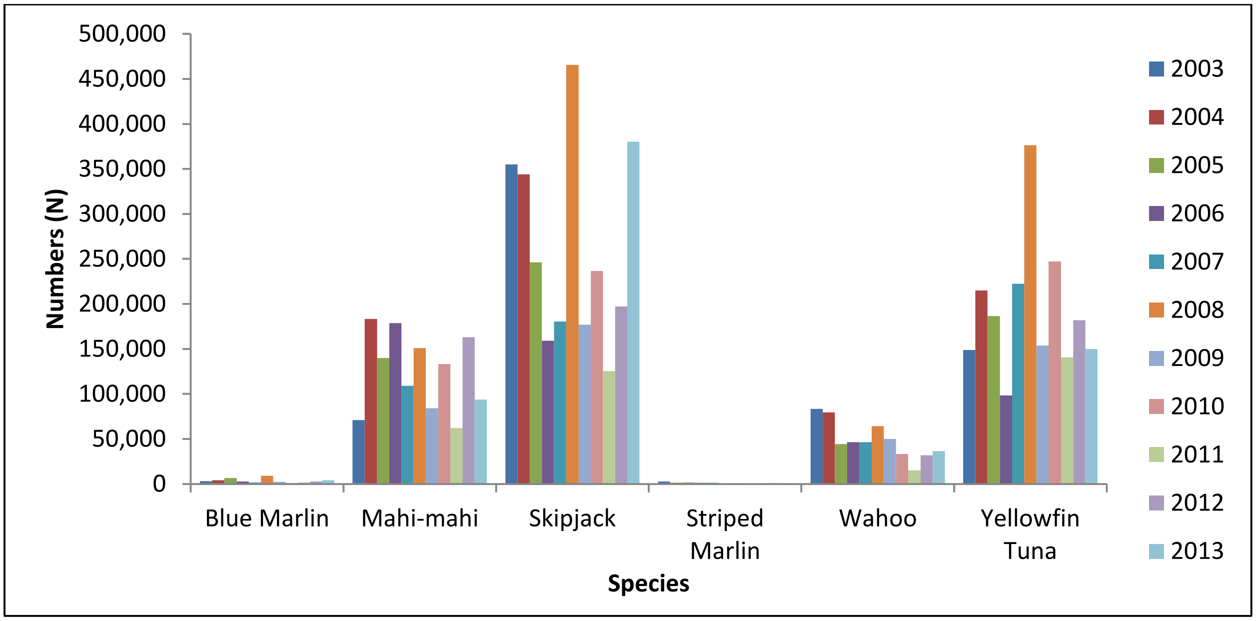

Figure 137. Annual recreational fishery landings by number for six major pelagic species from 2003-2013

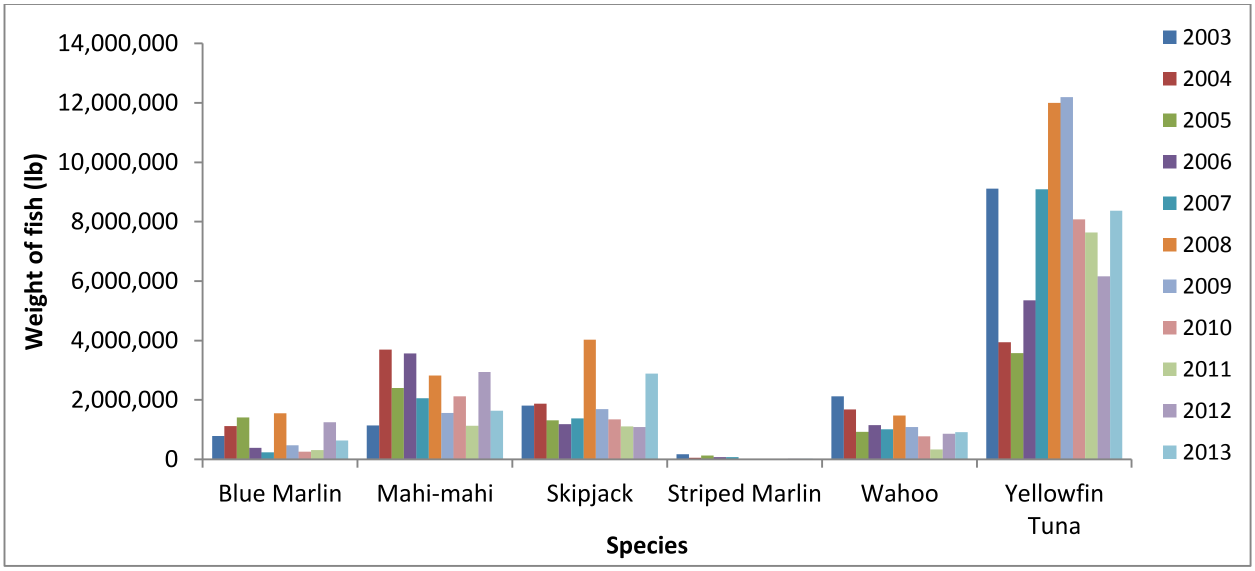

Figure 138. Annual recreational fishery landings by weight for six major pelagic fish species in Hawaii, 2003-2013

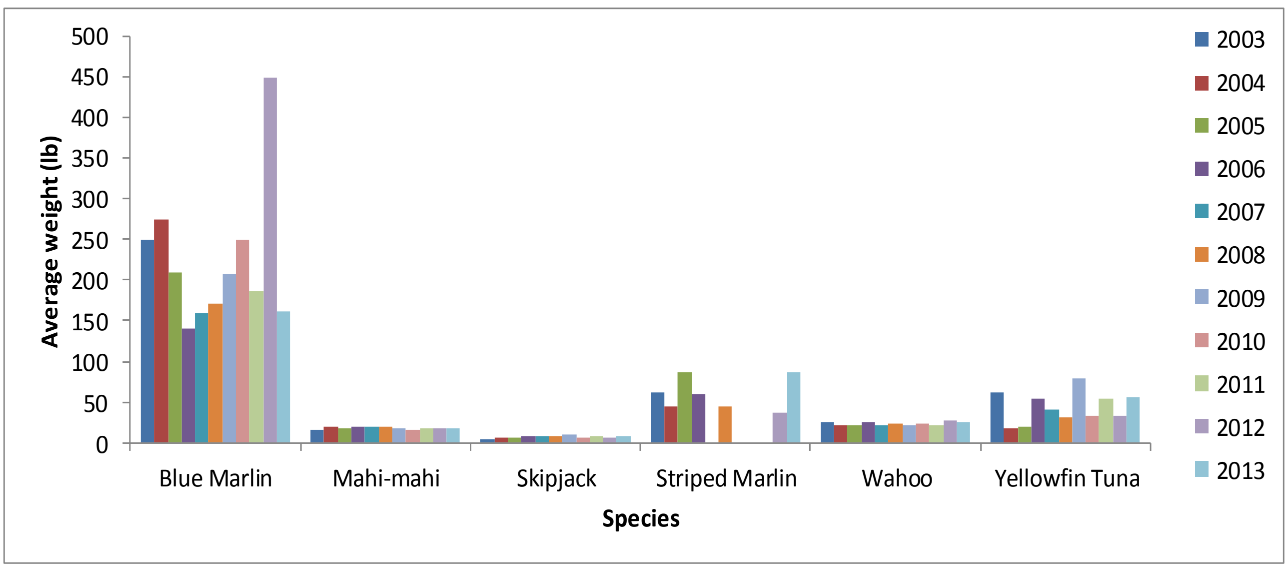

Figure 139. Average weight for six major pelagic fish species caught by recreational fishing in Hawaii, 2003-2013

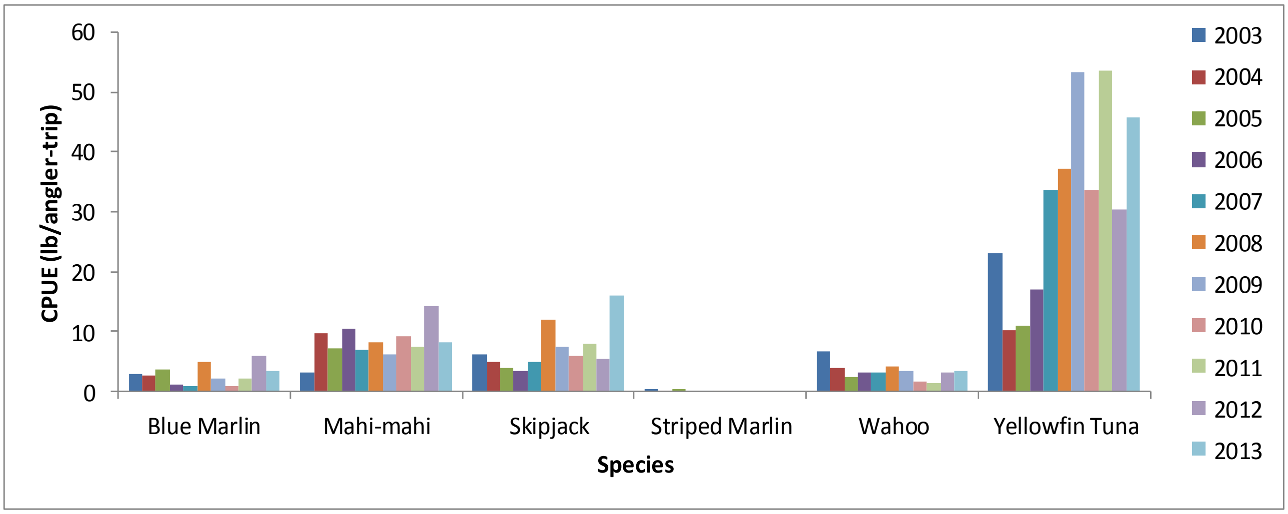

Figure 140. Annual recreational catch per unit effort (lbs per trip) for six major pelagic species in Hawaii, 2003-2013

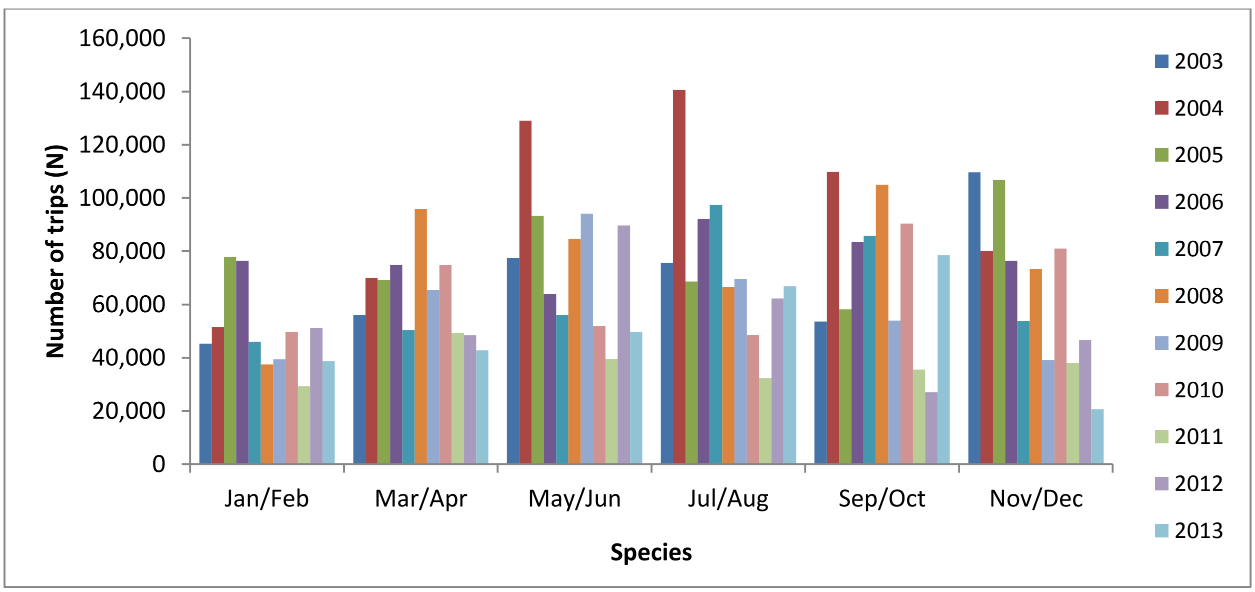

Figure 141. Boat fishing trip estimates (number of angler trips, 2003-2013)

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Appendix 1: 2013 Pelagic Plan Team Members

Pelagics

Mr. Paul Bartram	Akala Products Inc.
Mr. Keith Bigelow (CHAIR)	NMFS Pacific Islands Fisheries Science Center
Dr. Christofer Boggs	NMFS Pacific Islands Fisheries Science Center
Mr. Michael Fujimoto	Hawaii Division of Aquatic Resources
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Mr. Ray Roberto	CNMI Division of Fish and Wildlife
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Ex-officio Members of All Plan Teams

Mr. Michael Quach	NMFS Pacific Islands Fisheries Science Center
Mr. Justin Hospital	NMFS Pacific Islands Fisheries Science Center

Appendix 2: Glossary of Terms and List of Acronyms

TERM	DEFINITION
Alia	Samoan fishing catamaran, about 30 feet long, constructed of aluminum or wood with fiberglass. Used for various fisheries including trolling, longline, and bottomfishing
Bycatch	Fish caught in a fishery but discarded or released, except in a recreational fisheries catch and release program.
Commercial	Commercial fishing, where the catch is intended to be sold, bartered, or traded**.**
Guam	A U.S. territory in the Marianas Archipelago. South of and adjacent to the Commonwealth of Northern Marianas Islands.
Hawaii	U.S. state. See MHI, NWHI. Composed of the islands, atolls and reefs of the Hawaiian Archipelago from Hawai'i to Kure Atoll, except Midway Islands. Capitol - Honolulu.
Ika-shibi	Hawaiian term for night tuna handline fishing method. Fishing for tuna using baited handlines at night with a nightlight and chumming to attract squid and tuna.
Incidental Catch	Fish caught that are retained in whole or part, though not necessarily the targeted species. Examples include monchong, opah and sharks.
Interaction	Catch of protected species, which is required to be released. Examples: Hawaiian monk seals, marine turtles and albatrosses.
Logbook	Journal kept by fishing vessels for each fishing trip; records catch data, including bycatch and incidental catch. Required in the federally regulated longline and crustacean fisheries in the Hawaiian EEZ**.**
Longline	Fishing method utilizing a horizontal mainline stretching from several hundred yards to many miles in length, suspended for the surface by floats, to which droppers with baited hooks are attached.
Longliner	Fishing vessel specifically adapted to use the longline fishing method.
Palu-ahi	Hawaiian term for day tuna handline fishing. Fishing for tuna using baited handlines and chumming with cut bait in a chum bag or wrapped around a stone. Also, drop-stone, make-dog, etc.
Pelagic	The pelagic habitat is the upper layer of the water column from the surface to the thermocline. The pelagic species include all commercially targeted highly migratory species such as tuns, billfish and some incidental-catch species such as sharks, as well as coastal pelagic species such as akule and opelu.
Pole-and-Line	Fishing for tuna using poles and fixed leaders with barbless lures and chumming with live baitfish. Poles can be operated manually or mechanically. Also, fishing vessels called baitboats or aku-boats (Hawaii).
Protected	Refers to species which are protected by federal legislation such as the Endangered Species Act, Marine Mammal Protection Act, and Migratory Bird Treaty Act. Examples: Black-footed and Laysan albatrosses, marine turtles, dolphins.
Purse seine	Fishing for tuna by surrounding schools of fish with a very large net and trapping them by closing the bottom of the net.
Recreational	Recreational fishing for sport or pleasure, where the catch is not sold, bartered or traded.
Sanctuary	Protected area. Commercial/recreational fishing may be restricted.

Secretary	When capitalized and used in reference to fisheries within the U.S. EEZs, it refers to the U. S. Secretary of Commerce.
Small pelagics	Species such as akule (big-eye scad - *Selar* spp.) And opelu (mackerel scad - *Decapterus* spp). These fish occur mainly in shallow inshore waters but may also be found in deeper offshore waters. Not part of the PMUS.
Trolling	Fishing by towing lines with lures or live-bait from a moving vessel.

Acronym	**Meaning**
AP	Advisory Panel. Appointed industry/government/educational representatives functioning in an advisory capacity to the Council.
AS	American Samoa. Includes the islands of Tutuila, Manua, Rose and Swains Atolls.
ASDPW	Department of Public Works, American Samoa. Also, DPW.
ASG	American Samoa Government
CNMI	Commonwealth of the Northern Mariana Islands. Also, Northern Mariana Islands, Northern Marianas, and NMI. Includes the islands of Saipan, Tinian, Rota, and many others in the Marianas Archipelago.
CPUE	Catch-Per-Unit-Effort. A standard fisheries index usually expressed as numbers of fish caught per unit of gear per unit of time, eg., number of fish per hook per line-hour or number of fish per 1,000 hooks. The term catch rate is sometimes used when data are insufficiently detailed to calculate an accurate CPUE.
DAWR	Division of Aquatic & Wildlife Resources, Territory of Guam.
DBEDT	Department of Business, Economic Development & Tourism, State of Hawaii.
DFW	Division of Fish & Wildlife, Northern Mariana Islands.
DLNR	Department of Land & Natural Resources, State of Hawaii. Parent agency for Division of Aquatic Resources (HDAR).
DMWR	Department of Marine & Wildlife Resources, American Samoa. Also, MWR.
DOC	Department of Commerce. In this annual report, it refers to the American Samoa Government.
EEZ	Exclusive Economic Zone, refers to the sovereign waters of a nation, recognized internationally under the United Nations Convention on the Law of the Sea as extending out 200 nautical miles from shore. Within the U.S., the EEZ typically is between three and 200 nautical miles from shore.
ESA	Endangered Species Act. An Act of Congress passed in 1966 that establishes a federal program to protect species of animals whose survival is threatened by habitat destruction, overutilization, disease etc.
FAD	Fish Aggregating Device; a raft or pontoon, usually tethered, and under which, pelagic fish will concentrate.
FDCC	Fishery Data Coordinating Committee, WPRFMC.
FEP	Fisheries Ecosystem Plan
FFA	Forum Fisheries Agency. An agency of the South Pacific Forum, which comprises the independent island states of the South Pacific, Australia and New Zealand. The FFA formed to negotiated access agreements between FFA member countries and distant water fishing nations such as Japan and the USA.
FMP	Fishery Management Plan.
HDAR	Hawaii Division of Aquatic Resources. Also, DAR.
HIMB	Hawaii Institute of Marine Biology, University of Hawaii.
HMRFS	Hawaii Marine Recreational Fishing Survey
HURL	Hawaii Undersea Research Lab.
JIMAR	Joint Institute of Marine and Atmospheric Research, University of Hawaii.

IATTC	Inter-American Tropical Tuna Commission.
Lbs	Pounds
MFCMA	Magnuson Fishery Conservation and Management Act of 1976. Also, Magnuson-Stevens Fishery Conservation and Management Act of 1996. Sustainable Fisheries Act. (Also, MSA)
MHI	Main Hawaiian Islands (comprising the islands of Hawai'i, Mau'i, Lana'i, Moloka'i, Kaho'olawe, O'ahu, Kauai', Ni'ihau and Ka'ula).
MRFSS	Marine Recreational Fishing Statistical Survey
MSY	Maximum Sustainable Yield.
mt	Metric tonnes
MUS	Management Unit Species
NMFS	National Marine Fisheries Service, National Oceanic and Atmospheric Administration, Department of Commerce. Also NOAA Fisheries.
NOAA	National Oceanic and Atmospheric Administration, U.S. Department of Commerce.
NWHI	Northwestern Hawaiian Islands. All islands in the Hawaiian Archipelago, other than the Main Hawaiian Islands (MHI).
OFP	Oceanic Fisheries Program of the South Pacific Commission.
OY	Optimum Yield.
PIFSC	Pacific Islands Fisheries Science Center
PIRO	Pacific Islands Regional Office, National Marine Fisheries Service. Also, NMFS PIRO.
PFRP	Pacific Pelagic Fisheries Research Program, JIMAR, University of Hawaii. Also PPFRP.
PMUS	Pacific Pelagic Management Unit Species. Also, PPMUS. Species managed under the Pelagics FMP.
PPGFA	Pago Pago Game Fishing Association
PT or PPT	Pelagic Plan Team. Advisory body to the Council composed of scientists and fishermen who monitor and manage the fisheries under the jurisdiction of the Pelagics FMP.
SAFE	Stock Assessment and Fishery Evaluation, NMFS.
SPC	South Pacific Commission. A technical assistance organization comprising the independent island states of the tropical Pacific Ocean, dependant territories and the metropolitan countries of Australia, New Zealand, USA, France and Britain.
SPR	Spawning Potential Ratio. A term for a method to measure the effects of fishing pressure on a stock by expressing the spawning potential of the fished biomass as a percentage of the unfished virgin spawning biomass. Stocks are deemed to be overfished when the SPR<20%.
SSC	Scientific & Statistical Committee, an advisory body to the Council comprising experts in fisheries, marine biology, oceanography, etc.
USCG	U.S. Coast Guard, 14th District, Department of Transportation.
USFWS	U.S. Fish & Wildlife Service, Department of Interior. Also, FWS.
VMS	Vessel Monitoring System. A satellite based system for locating and tracking fishing vessels. Fishing vessels carry a transponder which can be located by overhead satellites. Two-way communication is also possible via most VMS systems.

WPacFIN Western Pacific Fishery Information Network, NMFS.

WPRFMC Also, the Council. Western Pacific Regional Fishery Management Council. One of eight nationwide fishery management bodies created by the Magnuson Fisheries Conservation and Management Act pf 1976 to develop and manage domestic fisheries in the U.S. EEZ. Composed of American Samoa, Guam, Hawaii, and Commonwealth of Northern Mariana Islands.