Pelagic Fisheries of the Western Pacific Region

2010 Annual Report

Western Pacific Regional Fishery Management Council
Honolulu, Hawaii

Cover photo: *Longline fishing vessels docked in Saipan, CNMI (Photo by Jack Ogumoro, Council Island Coordinator)*

A report of the Western Pacific Regional Fishery Management Council

Pelagic Fisheries of the Western Pacific Region

2010 Annual Report

May 8, 2012

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 Northern Mariana Islands, 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.

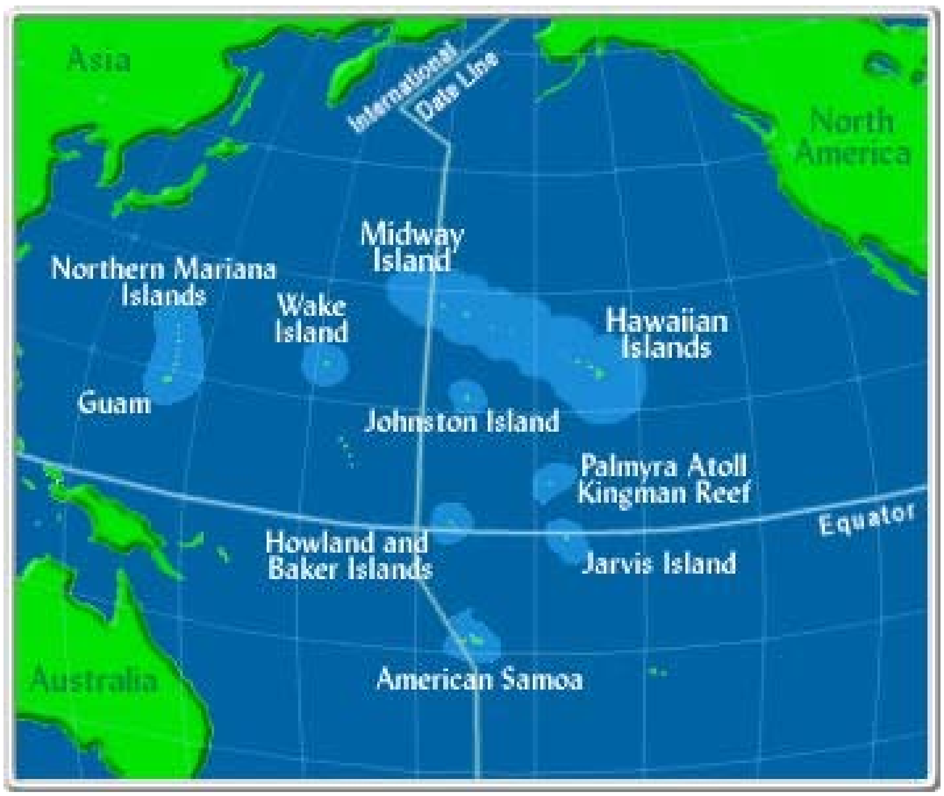


Figure 1. **Map of the Western Pacific Region**

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 PPMUS are sometimes referred to as “other PPMUS” 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 PPMUS 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 PPMUS are among the most important, if not the dominant Pacific Island fisheries.

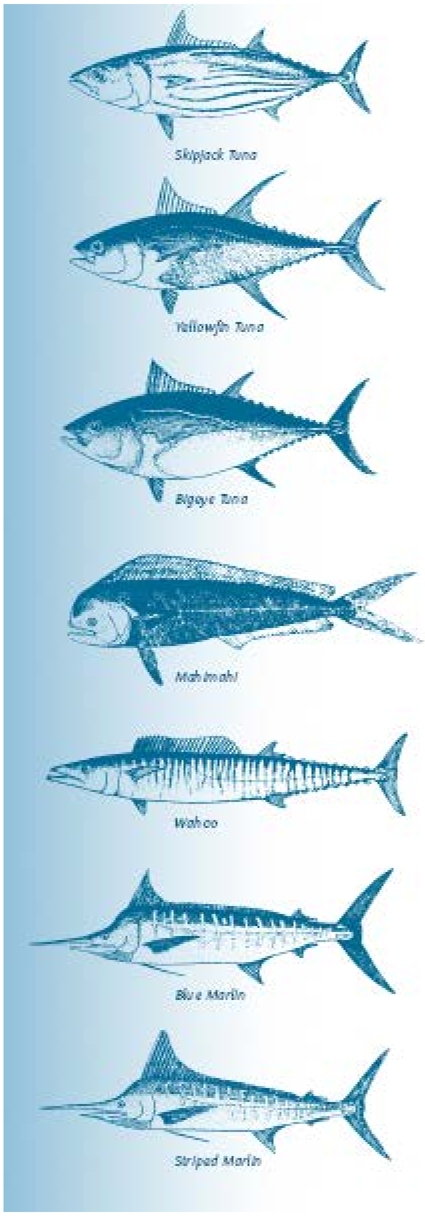
This report contains fishery performance data from each of the four island groups through 2009, interpretations of trends or important events occurring in the fisheries and recommendations. This report was prepared using reports submitted by the following agencies. The Hawaii report is an integration of State of Hawaii Division of Aquatic Resources and NMFS summaries.

- 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 2009 and persons responsible for compilation of this report are included in Appendix 1.

B. The Pelagic Species of the Western Pacific Region

The list of Management Unit Species (MUS) managed under the Pelagic FMP has been revised to exclude 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*).



The previous MUS shark listing used to include oceanic species of the families *Alopiidae*, *Carcharinidae*, *Lamnidae*, *Sphynidae*. However, this could be construed to mean all members of these four shark families, which would also include nearshore and demersal sharks. The Pelagics Plan Team recommended in 1999 revising the sharks contained in the management unit when the Council had completed a Coral Reef Ecosystem FMP (CREFMP), which would include nearshore species in the management unit. The Plan team also recommended removing dogtooth tuna as this is not a true pelagic fish, but a nearshore reef species. The CREFMP was completed in 2001 and among other measures, amended the Pelagics FMP by removing dogtooth tuna from the management unit and listed only 9 true pelagic sharks for inclusion therein (Table1).

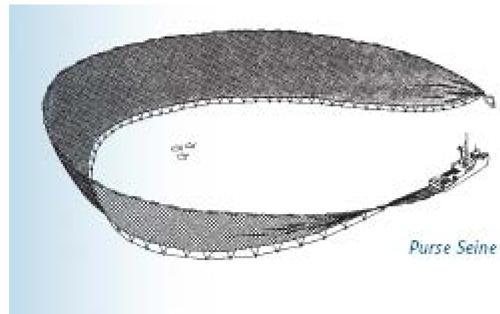
Table 1. Names of Pacific Pelagic Management Unit Species

English Common Name	Scientific Name	Samoan or AS local	Hawaiian or HI local	Chamorroan or Guam local	S. Carolinian or NMI local	N. Carolinian or NMI 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)

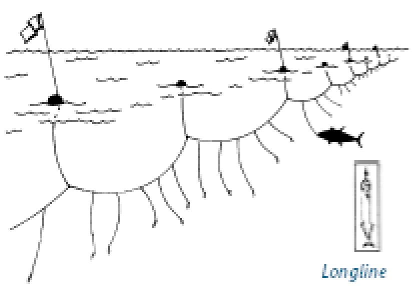
C. Pelagic Gear Types and Fisheries of the Western Pacific Region

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 87,994 mt. However, this fleet has been decreased in size from a peak in 1984 of 61 vessels to 14 vessels in 2004, but rebuilt after 2006 to between 36-38 vessels. Catches of blue marlins by this fishery are relatively small, amounting to about 40 mt.



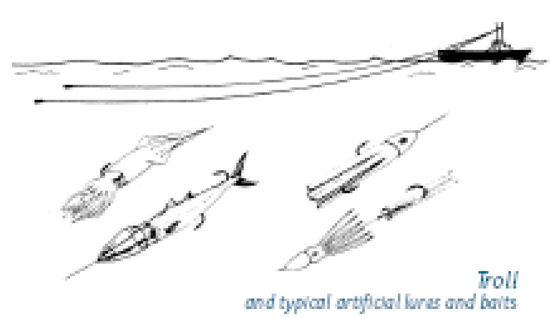
The U.S. fleet of albacore trollers, based at West Coast ports, amounts to about 500 vessels, fishing primarily in the temperate waters of the North Pacific and landing in 2003 about 17,000 mt of fish. Some vessels from this fleet also fish seasonally for albacore in the South Pacific, catching on average between 1,000 and 2,500 mt of albacore. Marlins and other billfish are negligible fraction of the catch.



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 about 127 vessels, targets a range of species, with vessels setting shallow longlines to catch swordfish or fishing deep to maximize catches of bigeye tuna.

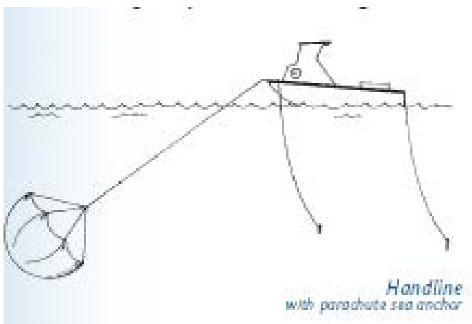
Catches by the Hawaii fleet also include yellowfin tuna, mahimahi (dolphinfish, dorado), wahoo, blue and striped marlins, opah (moonfish) and monchong (pomfret). The Hawaii fishery does not freeze its catch, which is sold to the fresh fish and sashimi markets in Hawaii, Japan, and the U.S. mainland. The American Samoa fleet of about 26 vessels, down from a peak of 62 vessels in 2001, fishes almost exclusively for albacore tuna, which is landed to two tuna canneries in American Samoa. The combined landings from the two fisheries in 2003 amounted to 14,743 mt, with about two-thirds of landings coming from the Hawaii fishery. In 2003, the combined landings of blue and striped marlins from the longline fishery amounted to 374 and 542 mt respectively.

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 3,000 mt. Part of this catch is made by charter or for-hire fishing vessels. There are 1,494 troll vessels and 156 handline vessels in Hawaii, 73 troll vessels in the Northern



Mariana Islands, 343 troll vessels in Guam, and 20 troll vessels in American Samoa. Troll and handline catches are dominated by yellowfin and bigeye tuna in Hawaii and by skipjack in Guam, the Northern Mariana Islands and American Samoa. Other commonly caught troll catches include mahimahi, wahoo, and blue marlin. About 85 percent of the troll landings are made by Hawaii vessel. In 2003, the combined catches of blue and striped marlins by these fisheries amounted to 207 and 28 mt respectively.

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 recreational fishery landings amount to about 8,000 mt annually, based on surveys of fishermen, with blue marlins catches ranging from 400 to 600 mt. Recreational or non-commercial landings from boats in Guam, American Samoa and the Northern Mariana Islands amount to about 170 mt, of which about 30 mt is blue marlin.



Tuna fisheries in the Pacific Ocean as a whole catch about 2.7 million mt of fish, with U.S. fisheries catching about 5 percent 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. More recently, 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: Most participants in the small-scale domestic longline fishery are 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 (see Figure 10) 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 deploy 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 are believed to be from Independent Samoa. The predominant catch is 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 three in 2000 to 30 by March 21, 2002 (DMWR, unpubl. data). Of these, five permits (33 percent of the vessel size class) for vessels between 50.1 ft - 70 ft and five permits (33 percent of the vessel size class) 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.

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. Three vessels that left Hawaii after the swordfish longline fishery closure are operating in the American Samoa tuna longline fishery under new ownership. It does not appear that large numbers of longliners from Hawaii are relocated in American Samoa. Instead, large vessels have participated in the American Samoa longline fishery from diverse ports and fisheries, including the US west coast (6), Gulf of Mexico (3), and foreign countries (4 now under U.S. ownership).

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. Since 1985, about 50-60 US vessels have 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.

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 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), 2% 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 2010, PPGFA played host to the 11th 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.

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 the Council's Pelagics Annual Report, based on the annual sampling of catches conducted under the auspices of WPacFIN. Boat-based recreational catches have ranged from 857 to 6,259 lb between 2006 and 2010.

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.

American Samoa has a small developing economy, dependent mainly on two primary income sources: the American Samoa Government, which receives income and capital subsidies from the Federal government and fish processing on Tutuila. These two primary income sources have given rise to a third: a services sector that derives from and complements the first two. In 2006, the latest year for which the ASG has compiled detailed labor force and employment data, the ASG employed 5894 persons (33.9 percent of total employment), followed by the two canneries (one cannery closed in 2009, but iys facilities have been acquired as a fresh fish processing facility) with 4,757 persons (26.5 percent) and the rest of the services economy with 6,744 persons (37.6 percent). As of 2006, there were 33,945 people 16 years and older in the labor force, of which 17,935, or 53%, were in employment.

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 often buy fish from the small-scale domestic longline fleet based in American Samoa, although the quantity of this fish is insignificant compared to cannery deliveries by the U.S. purse seine, U.S. albacore and foreign longline fleets. The ready market provided by the canneries is attractive to the small boat fleet, and virtually all of the albacore caught by the domestic longline fishery is sold to the canneries.

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:

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

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

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.

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.

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.

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.

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.

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.

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 300-400 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. Sailfish and sharks were also known to be caught during 2004 but these species were not encountered during offshore creel surveys.

The number of boats involved in Guam's pelagic or open ocean fishery gradually increased from about 200 vessels in 1982. There were 401 boats active in Guam's domestic pelagic fishery in 2010. 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 is 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. A second air transshipment operation that began in the mid-1990s was transporting to Europe fish that do not meet Japanese sashimi market standards, but this has since ceased operations.

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:

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

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

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.

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.

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.

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.

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.

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.

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 24 million lbs of commercial landings with a total ex-vessel value of $70 million in 2010.

The largest component of pelagic catch in 2010 was tunas. Bigeye tuna was the largest component and has increased almost seven-fold from its 1987 catch. Swordfish was the largest component of the billfish catch from 1990 through 2000, but was replaced by blue marlin in the next two years, and followed by striped marlin in 2003 due to a swordfish fishery closure between 2001-2004. Swordfish re-assumed its preeminence as the principal landed billfish when the swordfish fishery reopened after April 2004. Mahimahi was the traditionally largest component of the non-tuna and non-billfish catch but has now been succeeded by moonfish or opah.

2. Pelagic Fisheries Development

Fishermen in Hawai'i earned $71 million from their commercial harvest in 2009, landing almost 27 million pounds of finfish and shellfish. The Hawaii longline fishery is by far the most important economically, accounting for about 77 percent of the estimated ex-vessel value of the total commercial fish landings in the state. In 2009, it is estimated that the commercial seafood industry in Hawaii generated sales impacts of $629 million, income impacts of $184 million, and value-added impacts of $273 million while supporting approximately 7,300 jobs in the State of Hawaii.

Recreational fisheries are also extremely important in the State of Hawaii, economically, socially, and culturally. The total estimated recreational fisheries production in 2009 and 2010 was 17.8 and 13 million pounds respectively (see Recreational Module in this annual report). The resident angler population in 2009 was estimated 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:

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

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

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.

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.

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.

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 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.

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.

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

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.

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.

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.

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.

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.

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.

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.

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.

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

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).

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.

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 (70% of 2010 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. Over the past ten years a small 2-4 vessel longline fishing operation has operated in the CNMI but this 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:

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

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

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.

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.

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.

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).

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.

E. Pacific Remote Island Areas

Baker Island lies within the westward flowing South Equatorial Current. Baker Island also experiences an eastward flowing Equatorial Under Current 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 per cent 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. Currently the USFWS continues to manage 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 which affected the pelagic fisheries of the PRIAs:

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

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

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.

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.

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.

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.

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.

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.

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

A summary of the total pelagic landings during 2008 in the Western Pacific and the percentage change between 2009 and 2010 is shown in Table 2.

Table 2. Total pelagic landings in lbs in the Western Pacific Region in 2010

Species	American Samoa	% change	Guam	% change	CNMI	% change	Hawaii	% change
Swordfish	24,816	-9.30%					3,526,000	-11.27%
Blue marlin	98,006	6.82%	30,811	68.50%	73	35.62%	992,000	-14.26%
Striped marlin	4,954	-37.93%					376,000	-41.61%
Other billfish	338	-96.95%	1,332	78.75%	244	33.61%	324,000	9.09%
Mahimahi (dolphinfish)	18,049	-51.13%	288,427	61.23%	23,157	15.45%	1,663,000	13.28%
Wahoo	289,609	-4.72%	45,407	-116.59%	2,887	-17.39%	749,000	-0.93%
Opah (moonfish)	4,840	-24.40%					1,819,000	-4.01%
Sharks (whole wt)	3,881	56.93%					275,000	-26.47%
Albacore tuna	8,680,579	0.89%					976,000	43.32%
Bigeye tuna	392,896	11.77%					13,060,000	19.59%
Bluefin tuna							1,000	-50.00%
Skipjack tuna	247,750	-28.07%	322,482	8.44%	124,096	-4.09%	655,000	-40.51%
Yellowfin tuna	983,551	13.37%	24,599	19.16%	30,507	17.68%	2,666,000	-6.78%
Other pelagics	12,157	-10.73%	13,243	-11.75%	7,387	11.82%	1,174,000	-0.25%
Total	10,761,426	0.87%	726,301	24.26%	188,351	2.32%	28,256,000	3.48%

Note: Total Pelagic Landings are based on commercial reports and/or creel surveys. "Other pelagics" includes Dogtooth Tuna, Rainbow Runner, Barracudas, Kawakawa, Pomfrets, Oilfish, and Misc Pelagic Fish categories

IV. 2010 International and Region-wide Pelagics Plan Team Recommendations

The Pelagics Plan Team met in Honolulu, Hawaii on April 29 – 30, 2010 and made the following Region-wide recommendations

1. The PPT strongly recommends that the NMFS PIFSC conduct a stock assessment of blue marlin in collaboration with the relevant institutions and science providers for the IATTC and the WCPFC.

2. The PPT recommends that PIRO conduct the necessary administrative action to revise the common and scientific species names of the following four PMUS in the regulations implementing the Pelagics FEP:

Current common name in FEP and regulations	**Current scientific name in FEP and regulations**	**Revised common name**	**Revised scientific name**
Northern bluefin tuna	*Thunnus thynnus*	Pacific bluefin tuna	*Thunnus orientalis*
Striped marlin	*Tetrapturus audax*	Striped marlin	*Kajikia audax*
Indo-Pacific blue marlin	*Makaira mazara*	Blue marlin	*Makaira nigricans*
Black marlin	*Makaira indica*	Black marlin	*Istiompax indica*

3. For the purpose of setting Annual Catch Limit (ACLs) The PPT recommends that the 28 species or species groups (PMUS) currently in the FEP be categorized as follows:

International exception	**Ecosystem component**	**1-year life span**
Albacore tuna (*Thunnus alalunga*)	Pacific bluefin tuna (*Thunnus orientalis*)	Diamondback squid (*Thysanoteuthis rhombus*)
Bigeye tuna (*Thunnus obesus*)	Kawakawa (*Euthynnus affinis*)	Neon flying squid (*Ommastrephes bartramii*)
Yellowfin tuna (*Thunnus albacares*)	Other tuna relatives (*Auxis* spp, *Scomber* spp, *Allothunnus* spp)	Purple-back flying squid (*Sthenoteuthis oualaniensis*)

International exception	**Ecosystem component**	**1-year life span**
Skipjack tuna (*Katsuwonus pelamis*)	Black marlin (*Istiompax indica*)	
Blue marlin (*Makaira nigricans*)	Shortbill spearfish (*Tetrapturus angustirostris*)	
Striped marlin (*Kajikia audax*)	Sailfish (*Istiophorus platypterus*)	
Swordfish (*Xiphias gladius*)	Pelagic thresher shark (*Alopias pelagicus*)	
Bigeye thresher shark (*Alopius superciliosus*)	Common thresher shark (*Alopias vulpinus*)	
Shortfin mako shark (*Isurus oxyrinchus*)	Silky shark (*Carcharhinus falciformis*)	
Blue shark (Prionace glauca)	Oceanic white-tip (*Carcharhinus longimanus)*	
Mahimahi (*Coryphaena* spp)	Longfin mako shark (*Isurus paucus*)	
Wahoo (*Acanthocybium solandri*)	Salmon shark (*Lamna ditropis*)	
Moonfish (*Lampris* spp)	Other Gempylidae	
Oilfish (*Ruvettus pretiosus*) Escolar (*Lepidocybium flavobrunneum*)		
Pomfrets (*Taractichthys steindachneri*, *Eumegistus illustris*)	Other Bramidae	

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 as they land more poundage with less effort and use less gasoline per trip. Initially, alias were used for longline fishing. These 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 longer multi-day trips began joining the longline fleet soon after the alias. Monohull vessels now dominate the fleet and landings. The number of alias participating in the fishery has dropped to near zero at present. Commercial troll vessels have also declined. Federal longline logbooks were required 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 Anu'u Islands. Federal longline limited entry permits were issued in December, 2005. Albacore is the primary species caught by longliners. The bulk of this catch is sold to one of the canneries on Tutuila. A minority of the catch is sold to stores, restaurants, local residents, and given free-of-charge to family and friends, often for special occasions.

Pago Pago Harbor on the island of Tutuila is also a regional base for the trans-shipment and processing of tuna taken by domestic fleets from other South Pacific nations, distant-water 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, except for the canneries, that buy fish commercially to submit to Department of Marine and Wildlife Resources (DMWR) a copy of their purchase receipts. 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.

2010 Summary - American Samoan 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: More than 10.7 million pounds of pelagic species are estimated to have been landed in American Samoa in 2010, an increase of about 50 thousand pounds from 2009. In 2010, tuna landings increased slightly while non-tuna landings decreased. More than 10.3 millions pounds of tunas were landed, making up 96% of total landings, with albacore comprising 84% of the tuna landings and 81% of all PMUS landings. Roughly 400,000 pounds of non-tuna PMUS were landed with wahoo comprising about 63% of this total. Class D (>70 feet) longline vessels contribute most to PMUS landings in American Samoa.

Effort – In 2010, 26 vessels completed 264 trips and deployed over 13.1 million hooks in 4,533 sets. There were 43 more trips in 2010 than in 2009, a 19% increase. Commensurate with more trips, the number of sets and hooks deployed also increased compared to 2009. Two (2) more Class D vessels participated in the American Samoa longline fishery in 2010 than in 2009. In 2010, 1 Class A vessel, 3 Class C vessels, and 22 Class D vessels participated in the fishery.

Trolling CPUE - The troll fishery CPUE decreased to 20.32 pounds per hour in 2010 compared to 26 pounds per hour in 2009. However, by inspection, the 2010 trolling CPUE appears to be within normal historical variances for the fishery. Average trolling hours per vessel decreased to 308 hours in 2010 from 407 hours in 2009. Since 1998, the average (effective) number of trolling hours per vessel has shown a downward trend.

Longline CPUE – The longline CPUE increased from 21.5 fish per 1000 hooks in 2009 to 25.2 fish per 1000 hooks in 2010. In 2010, albacore, the main target species for the fishery, saw its CPUE increase to 17.4 fish per 1000 hooks compared to 14.8 fish per 1000 hooks in 2009. By inspection, this catch rate appears to fall within normal historical variances for the fishery. The 2010 non-tuna PMUS CPUE remained at 2.5 fish per 1000 hooks compared to 2009. Wahoo were the most common non-tuna species caught (1 fish per 1000 hooks).

Fish Size – Due to complications from the 2009 Tsunami, no measurements were to calculate an average weight for albacore tuna. However, in recent years, the average weight for albacore has fluctuated between 36 and 38 pounds. Limited creel survey data from the troll fleet showed yellowfin tuna size decreased in 2010 to 47-lbs compared to 67-lbs in 2009. Cannery samples showed no significant differences in the species sizes.

Revenues - The estimated revenue (Table 2) for all pelagic from longline and troll/non-longline fisheries amounts to over $10.4 millions. This is a decrease of about 2% from 2009.Tuna revenue (Fig.24) made up about 99 % of total revenue although tuna revenue decreased to $10.1 millions in 2010 from $10.3 the previous year. Albacore made up 84% of tuna revenue. For the Non-tuna the adjusted revenue increased slightly to $272 thousands from $264 thousands in 2009.

Bycatch – There were about 17,000 tuna discards and about 18,000 non-tuna PMUS discards in 2010. Bycatch, all from longliners, increased to an estimated 44,000 pounds, a 14% increased over 2009 with the number of tunas released increasing significantly in 2010. No fish were discarded in troll fishery in 2010. Tuna PMUS discards represent about 6% of the total number of tunas caught: a low number. In contrast, about 67% of non-tuna PMUS were discarded; the majority of these being sharks. Ninety-nine percent of sharks were discarded or 5,108 out 5,159. Non-PMUS pelagics had a 98 % retention rate in 2010. In total, 289,534 fish were kept and 44,311 fish were discarded by the longline fleet in 2010.

Conclusion - Longline fishing by large mono-hull vessels of more than 50 feet in length continues to dominate American Samoa's pelagic fishery. Alia longline and troll fishing fleet continues to decline. During 2010, one alia participated in the longline fishery, and one actively participated in the troll fishery full time. Adjusted revenues and pelagic landings for Tunas also decreased over the years. The number of alias that participated in other fishing methods increased. We still have to see any indicators that the alia longline fishery fleet will come back. Total landings (pounds) increased slightly in 2010 compared to 2009, and remained above the historic average. The closure of one of the canneries in 2009 appeared to have no impact on the volume of landings by the troll and longline fleets. Adjusted revenues for tuna landings ($10,181,766) showed a slight decrease compared to 2009 ($10,355,717), but remained well above the historical average ($4,622,193). Adjusted revenues for non-tuna PMUS ($272,893) increased slightly in 2010 compared to 2009 ($264,435) and were above the historical average ($214,297).

Plan Team Recommendations

2009 Recommendations

DMWR be included in any pelagic fisheries Tagging Project so American Samoa data technicians can gain experience and learn tagging techniques and documentation of findings, and to get involved in the investigation of migratory pelagic species.

WPRFMC to provide fund to build a separate dock for the American Samoa Longline fleet

Council approved funds to construct addition boat ramps at the western side of Tutuila Island and DMWR is in the process of building two ramps at the Lion's Park area and at Leone/Asili area.

Table 3. American Samoa 2010 estimated total landings of pelagic species by gear type.

Species	Longline Pounds	Troll Pounds	Other Pounds	Total Pounds
Skipjack tuna	245,572	2,043	135	247,750
Albacore tuna	8,680,579	0	0	8,680,579
Yellowfin tuna	981,258	2,052	240	983,551
Kawakawa	0	156	0	156
Bigeye tuna	392,896	0	0	392,896
Tunas (unknown)	503	26	0	529
TUNAS SUBTOTALS	10,300,808	4,276	376	10,305,460
Mahimahi	18,049	0	0	18,049
Black marlin	338	0	0	338
Blue marlin	98,006	0	0	98,006
Striped marlin	4,954	0	0	4,954
Wahoo	289,545	64	0	289,609
Sharks (all)	3,315	0	566	3,881
Swordfish	24,816	0	0	24,816
Sailfish	3,404	0	0	3,404
Spearfish	3,680	0	0	3,680
Moonfish	4,840	0	0	4,840
Oilfish	454	2	0	456
Pomfret	1,294	0	0	1,294
NON-TUNA PMUS SUBTOTALS	452,693	66	566	453,325
Barracudas	750	174	469	1,393
Rainbow runner	0	79	37	116
Dogtooth tuna	0	3	213	216
Pelagic fishes	913	0	0	913
OTHER PELAGICS SUBTOTAL	1,663	256	719	2,638
TOTAL PELAGICS	10,755,164	4,599	1,661	10,761,423

Interpretation: More than 10.7 million pounds of pelagic species were landed in American Samoa 2010. Longline fishing dominated the pelagic landings by 99.9%. Albacore landings of about 8.6 million pounds dominate total pelagic landings (81%) making up 84% of tuna species landings. Yellowfin represented about 9% of the tuna landing, bigeye about 4%, and skipjack 2% plus unknown tunas. Non-tuna PMUS landings were dominated by wahoo with about 289,600 pounds; about 64% of the total non-tuna PMUS landings.

Calculations: “Longline Pounds” total landing estimates were from the boat-creel survey for the alia longliners combined with the longline logbook data from the larger longliners. The “Troll

Pounds" category included the pelagic landings of combined troll/bottomfishing trips, as well as the landings of purely troll trips. The "Other Pounds" category included pelagic species caught with bottomfishing or spearfishing methods (not by longlining or trolling) such as barracuda, rainbow runner, and dogtooth tuna. Lastly, the "Sharks (all)" category included all species of sharks.

Table 4. American Samoa 2010 estimated commercial landings, value and average price by pelagic species.

	Longline			Troll		
Species	**Pounds**	**Value($)**	**Price/lb**	**Pounds**	**Value($)**	**Price/lb**
Skipjack tuna	245,572	$147,343	$0.60	1,963	$3,904	$1.99
Albacore tuna	8,680,579	$8,697,387	$1.00	0	$0	n/a
Yellowfin tuna	981,258	$911,471	$0.93	2,285	$5,945	$2.60
Kawakawa	0	$0.00	n/a	156	$233	$1.50
Bigeye tuna	377,652	$415,417	$1.10	0	$0.00	n/a
Tunas (unknown)	0	$0.00	n/a	26	$64	$2.50
TUNAS SUBTOTAL	**10,285,061**	**$10,171,618**	**$0.99**	**4,429**	**$10,147**	**$2.29**
Mahimahi	9,902	$24, 745	$2.50	0	$0.00	n/a
Black marlin	40	$100	$2.50	0	$0	n/a
Blue marlin	31,068	54,369	$2.00	0	$0	n/a
Striped marlin	2,752	$3,027	$1.10	0	$0	n/a
Wahoo	278,268	$167,442	$0.60	64	$90.00	$1.40
Swordfish	8,822	$13,233	$1.50	0	$0.00	n/a
Sailfish	3,077	$7,754	$2.52	0	$0.00	n/a
Spearfish	1,705	$1,961	$1.15	0	$0.00	n/a
Oilfish	0	$0.00	n/a	2	$2.00	$1.00
Pomfret	72	$162	$2.25	$0	$0	n/a
NON-TUNA PMUS SUBTOTAL	**335,705**	**$272,801**	**$0.81**	**66**	**$92**	**$1.39**
Barracuda	0	$0	n/a	410	$1,108	$2.71
Rainbow runner	0	$0	n/a	116	$319	$2.75
Dogtooth tuna	0	$0	n/a	216	$539	$2.50
OTHER PELAGICS SUBTOTAL	**0**	**$0**	**n/a**	**741**	**$1,967**	**$2.65**
PELAGICS TOTALS	**10,620,766**	**$10,444,420**	**$0.98**	**5,236**	**$12,206**	**$2.33**

Interpretation An estimate of over 10.6 million pounds of pelagic species caught by longlining and trolling/non longline had been sold in 2010, earning estimated revenues over $10.4M. Longline fishing dominated the sales revenues ($10.4M). Albacore tuna topped revenues earning $8.6M and comprised 84% of tuna revenues and 83% of all pelagic earnings. Yellowfin tuna represented about 8% tuna earnings while Bigeye and Skipjack were minor contributors. Non-tuna PMUS and other pelagics comprised less than 3% of total revenues. Longline-caught tunas averaged $0.99 per pound and non-tuna PMUS averaged $2.30 per pound.

Calculation: Estimated commercial landings, value, and price per pound calculations are the same as those described for Table 1.

Table 5. Longline Effort by American Samoan Vessels during 2010

Boats	26
Trips	264
Sets	4,533
Hooks x 1000	13,171
Lightsticks	613

Table 6. Number of fish kept, released and percent released for all American Samoa longline vessels during 2010

Species	Number Kept	Number Released	Percent Released
Tunas			
Skipjack tuna	20,282	11,202	35.6%
Albacore tuna	228,731	780	0.3%
Yellowfin tuna	20,074	3,013	13.1%
Bigeye tuna	8,823	1,687	16.1%
Tuna unknown	28	13	31.7%
Tunas subtotals	**277,938**	**16,695**	**5.7%**
Non-tuna PMUS			
Mahimahi	847	1,108	56.7%
Black marlin	3	5	62.5%
Blue marlin	726	2,250	75.6%
Striped marlin	72	254	77.9%
Wahoo	9,208	4,378	32.2%
Sharks (all)	51	5,108	99%
Swordfish	195	106	35.2%
Sailfish	51	312	86%
Spearfish	80	734	90.2%
Moonfish	101	373	78.7%
Oilfish	24	7,900	99.7%
Pomfret	147	514	77.8%
Non-tuna PMUS subtotals	**11,505**	**23,042**	**66.7%**
Other Pelagics			
Barracuda	72	298	80.5%
Rainbow runner	0	1	100%
Dogtooth tuna	19	4,275	99.6%
Other pelagic subtotals	**91**	**4,574**	**98%**
TOTAL PELAGICS	**289,534**	**44,311**	**13.3%**

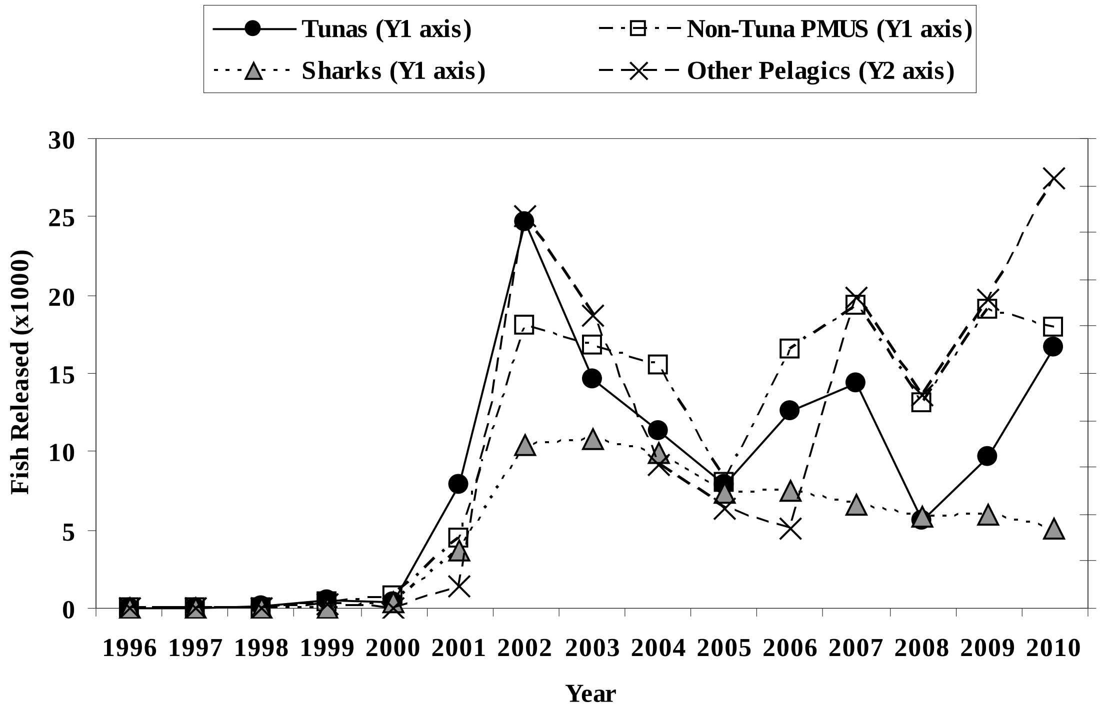
Interpretation – Table 5 lists 26 vessels landing PMUS in 2010. These vessels completed 264 fishing trips and deployed 4,533 longline sets, 13 million hooks, and 613 lightsticks in 2010. Table 5 was used to compute values describing average activity for American Samoan longline vessels. In 2010, American Samoan logline vessels averaged 10 trips, 174 sets, 500,000 hooks, and 23.6 lightsticks per vessel. On a per trip basis, longliners averaged 17.1 sets, 49,890 hooks, and 2.32 lightsticks deployed.

More than 228,000 individual albacore (Table 6) were kept by longline fishermen landing in American Samoa during 2009, representing 79 percent of landings. Over 20,000 skipjack, about 20,000 yellowfin, and roughly 8,800 bigeye tunas were kept. Over 9,200 wahoo, 847 mahimahi, 726 blue marlin, and 195 swordfish were retained in 2010. Twenty-eight (28) fish of unknown tuna species were kept and 98% of the other pelagic-species were released.

Skipjack tuna tops the release rates for tunas at 67%. Oilfish and sharks made up 56% of the non-tuna Pelagic Management Unit Species released and non-tunas and other pelagic account for 62% of all released species.
.Fish can be released for various reasons including quality, handling and storage difficulties, and marketing problems. Investigation into the reasons for releasing of 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



Interpretation - The number of fish released by American Samoan longline vessels totaled around 44,300 in 2010. Number of tunas released in 2010 increased from 9,700 in 2009 to 16,690 and it is the highest in the last seven years. For Non-tuna PMUS species it decreased to 17,900 from 19,000 in 2009. Sharks also show a slight decrease from 2009 and it continues a decreasing trend since 2003. The number of sharks released for the past three years vary slightly. Other pelagic show a slight increase in 2010 from 3290 in 2009.

Calculation: These values are sums of Longline Logbook number released data for each year. They are summed according to the species groups in Tables 1 and 2 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	17,934	5,108	4,574

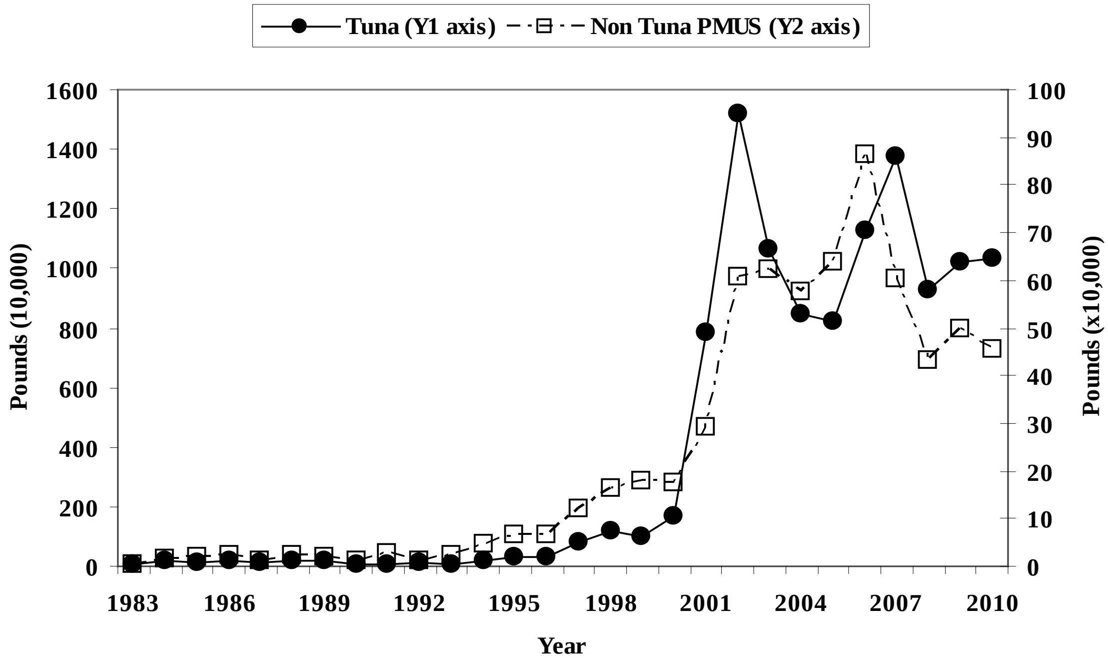
Table 7. American Samoa 2010 Trolling Bycatch

Bycatch							Interviews		
Catch	**Alive**	**Injured**	**Dead**	**Unknown**	**Total**	**%BC**	**BC**	**All**	**%BC**
448	0	0	0	0	0	0	0	50	0

Interpretation: There was no bycatch recorded for 2010 from trolling only; 50 interviews were conducted with 448 pelagic fish landed. Using fishermen's reports at the dock may not accurately reflect the number of fish returned at sea.

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 in pounds



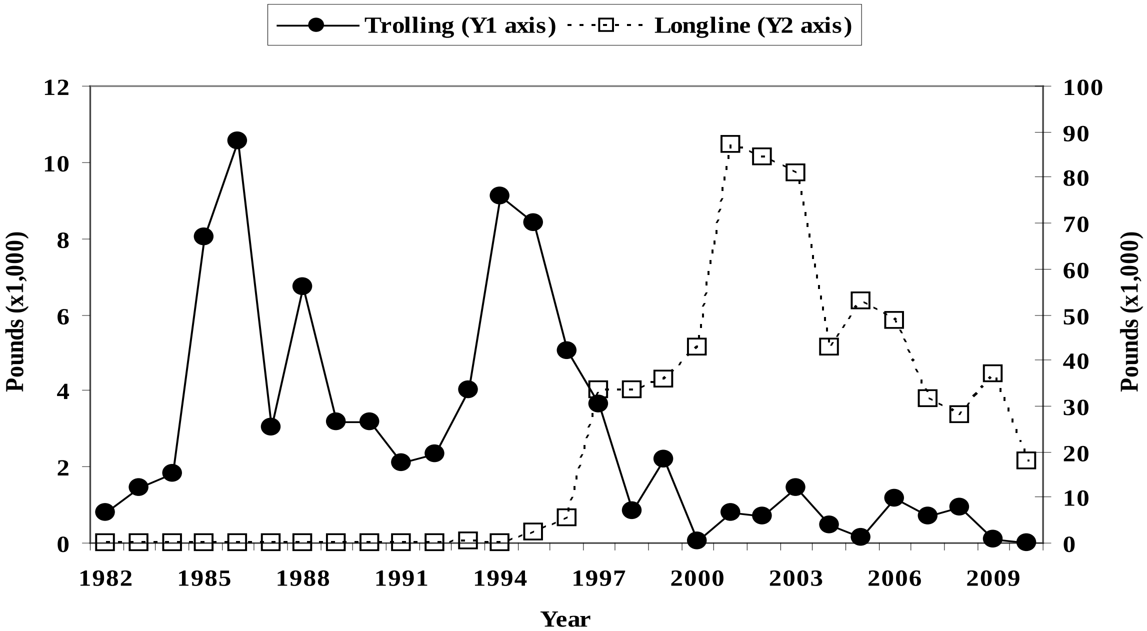
Interpretation: Total landing estimates exceeded 10 million pounds for tuna and 450 thousand pounds for non-tuna Pelagic Management Unit Species during 2010. Total landing estimates for 2009 and 2010 for tuna and non-tuna are about the same however tuna landing increased a little by 80 thousand pounds while non-tuna decreased by about 40 thousand pounds. From 2002 to 2010 total tuna landings varied from 8 millions to 15 million pounds and non-tuna from 4,000 to 8,000. The estimated 15 million pounds in 2002 is the highest recorded landings of the fishery history and 865,000 lbs in 2006 is the highest ever for non tunas.

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 1.

Table 8. American Samoa annual estimated total landings of Tuna and Non-Tuna PMUS in pounds

Year	Tuna	Non Tuna PMUS
1983	90,057	4,806
1984	198,961	15,121
1985	107,659	19,686
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	10,216,375	497,872
2010	10,305,460	453,325
Average	**3,861,368**	**227,382**
Std. Dev	**5,014,425**	**259,300**

Figure 4. American Samoa annual estimate total landings of Mahimahi by gear in pounds



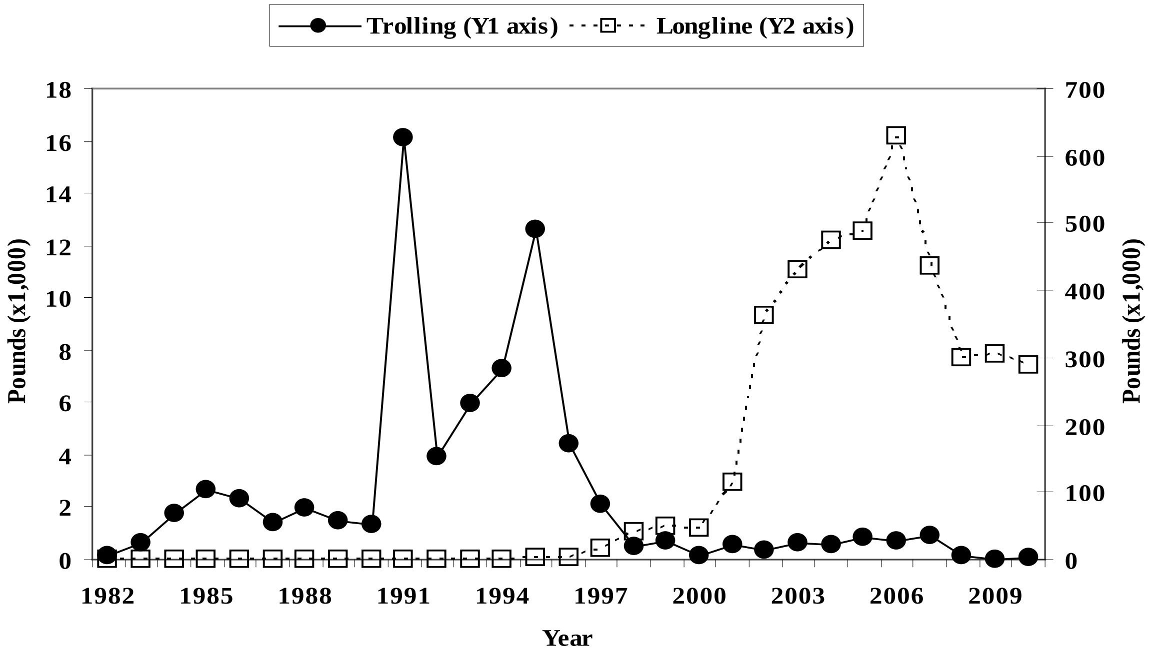
Interpretation: Estimated landings of mahimahi by longline gear decreased by about 50% to 18,000 pounds during 2010 while trolling gear shows zero landing compared to 113 landed in 2009. Mahimahi landings in 2010 by longline gear continued the declining trend since 2005. Mahimahi longline landings peaked during 2001 at 87,000 pounds and trolling at 9,000 lbs since 1994.

Calculation: The estimated total annual landings of mahimahi are listed for longline and trolling fishing methods as explained for Table 1 and Table 2.

Table 9. American Samoa annual estimate total landings of Mahimahi by gear in pounds

Year	Pounds Longline	Landed Trolling
1982	0	777
1983	0	1,443
1984	0	1,844
1985	0	8,011
1986	0	10,542
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
Average	**33,256**	**2,857**
Std. Dev	**27,417**	**2,926**

Figure 5. American Samoa annual estimated total landings of Wahoo by gear in pounds



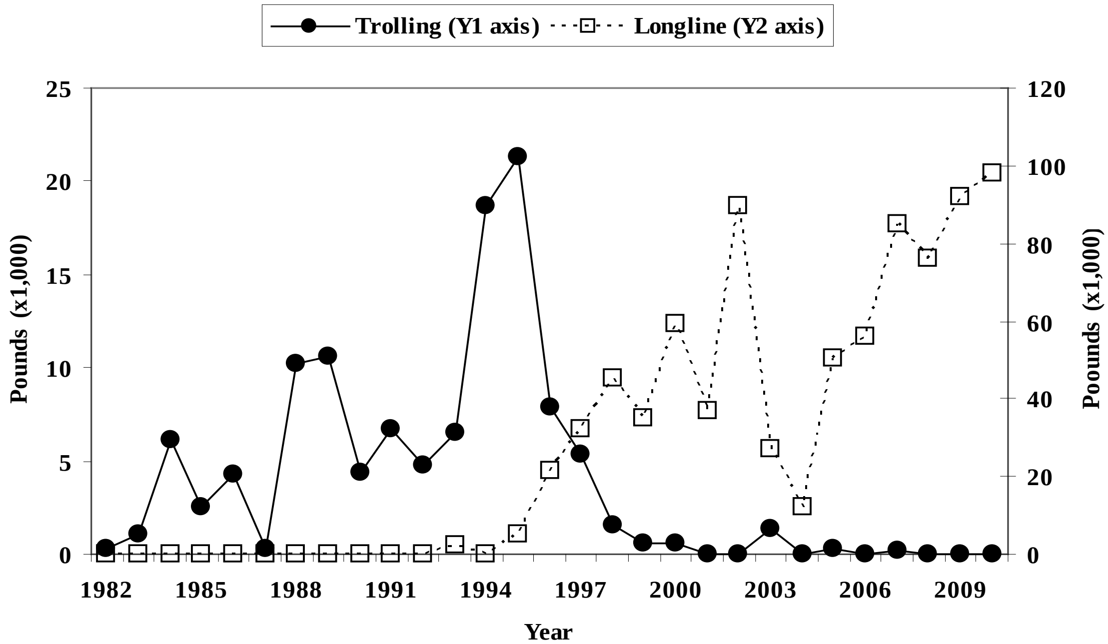
Interpretation: Estimated landings of wahoo decreased in 2010 from 2009. Total landings for both gears amount to 289,600 pounds. Longline gear dominated the wahoo landings with troll landings continuing to be negligible at 64 pounds in 2010. Peak wahoo landings occurred in 2006 decreased the subsequent year and have remained fairly stable since 2008.

Calculation*:* The estimated total annual landings of wahoo is listed for longline and trolling fishing methods as explained for Table 1 and Table 2.

Table 10. American Samoa annual estimated total landings of Wahoo by gear in pounds

Year	Pounds Longline	Landed Trolling
1982	0	114
1983	0	632
1984	0	1,777
1985	0	2,678
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
Average	**173,533**	**2,483**
Std. Dev	**204,636**	**3,696**

Figure 6. American Samoa annual estimated total landings of Blue Marlin by gear in pounds



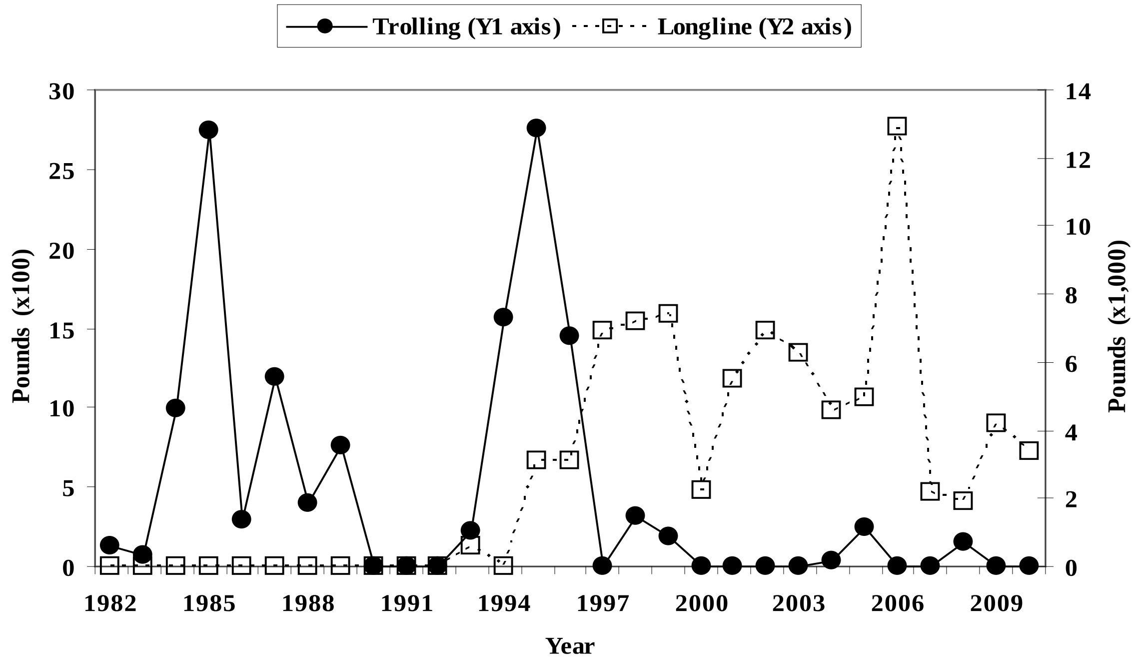
Interpretation: In 2010, estimated blue marlin landings for longline were 98,000 pounds and zero (0) pounds for the troll fishery. The estimated blue marlin troll landings have been zero (0) pounds since 2008. 2010 longline landings, 98,006 pounds, are an increase of 6% over 2009. Since 2005, blue marlin landings have shown an upward trend. The 2010 landings were the highest on record for this species.

Calculation: The estimated total annual landing of blue marlin is listed for longline and trolling fishing methods as explained for Table 1 and Table 2. The average and standard deviation for the Longline Method is calculated from 1993 onward.

Table 11. American Samoa annual estimated total landings of Blue Marlin by gear in pounds

Year	Pounds Longline	Landed Trolling
1982	0	315
1983	0	1,083
1984	0	6,097
1985	0	2,574
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	98,006	0
Average	**45,831**	**3,988**
Std. Dev	**31,300**	**5,398**

Figure 7. American Samoa annual estimated total sailfish landing in pounds by gear type



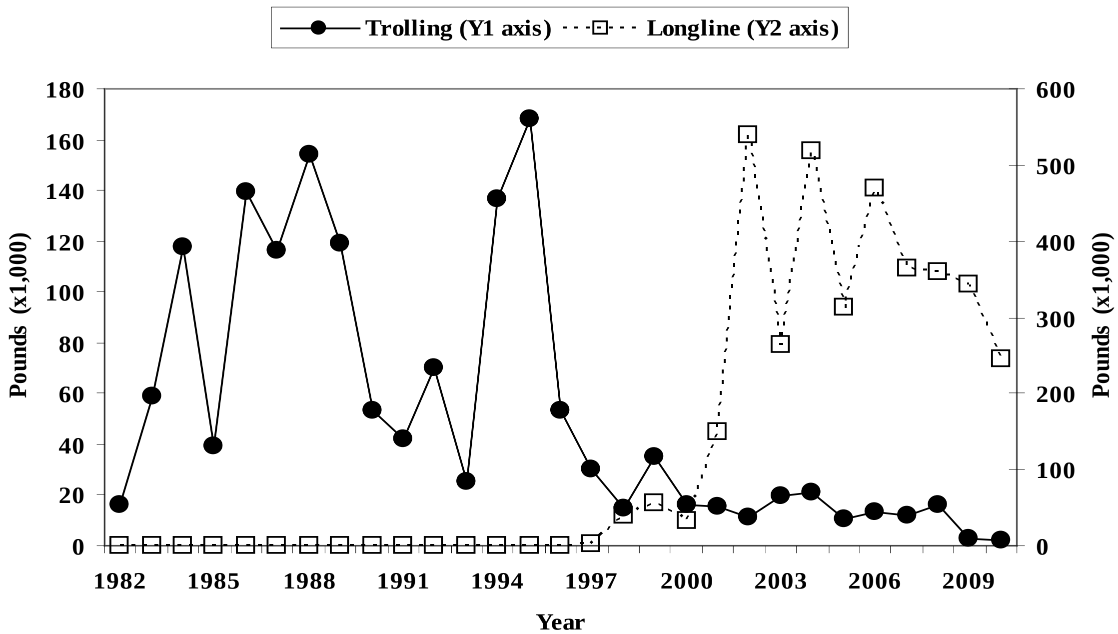
Interpretation: Estimated landings of sailfish by longline gear decreased by about 19% to 3,400 pounds in 2010. Since the peak landings (12,933 pounds) in 2006, landings have displayed inter-annual variation between 1,000 and 4,000 lbs over the previous four years. Troll landings continue to be minor with inter-annual variation between 0 and 248 pounds over the last ten years.

Calculation: The estimated total annual landings of sailfish is listed for longline and trolling fishing methods as explained for Table 1 and Table 2.

Table 12. American Samoa annual estimated total sailfish landing in pounds by gear type

Year	Pounds Longline	Landed Trolling
1982	0	127
1983	0	74
1984	0	989
1985	0	2,744
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
Average	**4,637**	**464**
Std. Dev	**2,982**	**762**

Figure 8. American Samoa annual estimated total landings of skipjack tuna in pounds by gear type



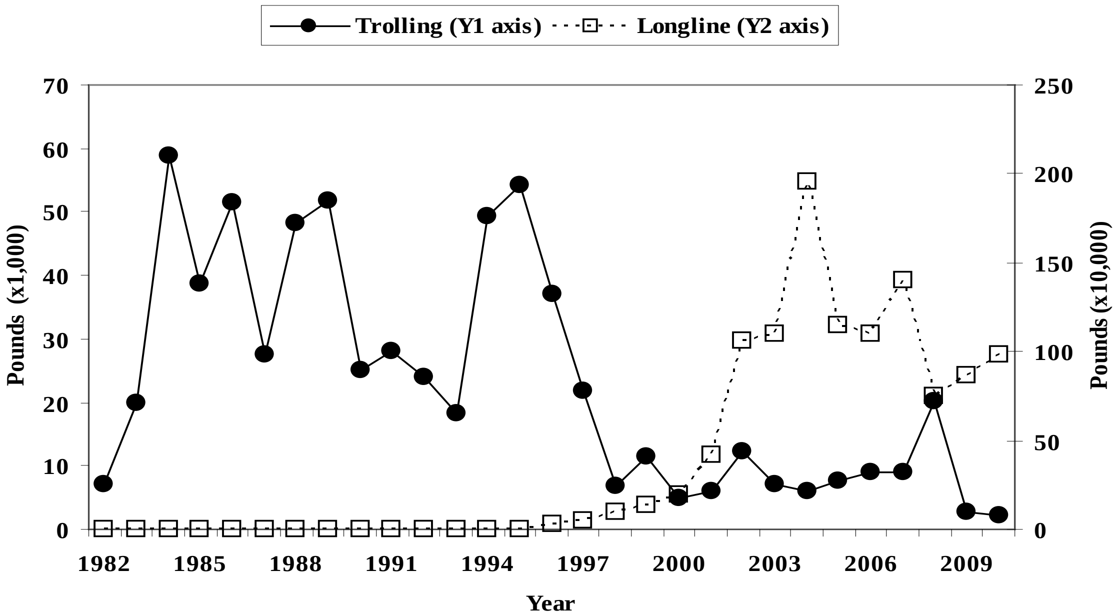
Interpretation: Estimated total landings of skipjack tuna were 247,615 pounds for both gear types combined. Longline landings of skipjack have declined since 2006 including from 2009 to 2010. Troll landings also decreased in 2010 from 2009. However, the percent change was minor compared to the decrease between 2008 (16,294 pounds) and 2009 (2,775 pounds).

Calculation: The estimated total annual landings of skipjack tuna is listed for longline and trolling fishing methods as explained for Table 1 and Table 2.

Table 13. American Samoa annual estimated total landings of skipjack tuna in pounds by gear type

Year	Pounds Longline	Landed Trolling
1982	0	15,877
1983	0	58,997
1984	0	117,693
1985	0	38,902
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
Average	**185,045**	**52,753**
Std. Dev	**191,369**	**50,444**

Figure 9. American Samoa annual estimated total landings of Yellowfin Tuna by gear in pounds



Interpretation: Total yellowfin tuna landings increased in 2010 continuing an upward trend since 2008. Yellowfin tuna longline landings increased in 2010. Yellowfin tuna longline landings peaked at 1,960,000 pounds in 2004. Estimated yellowfin tuna troll landings decreased by 700 lbs to 2050 pounds 2010.

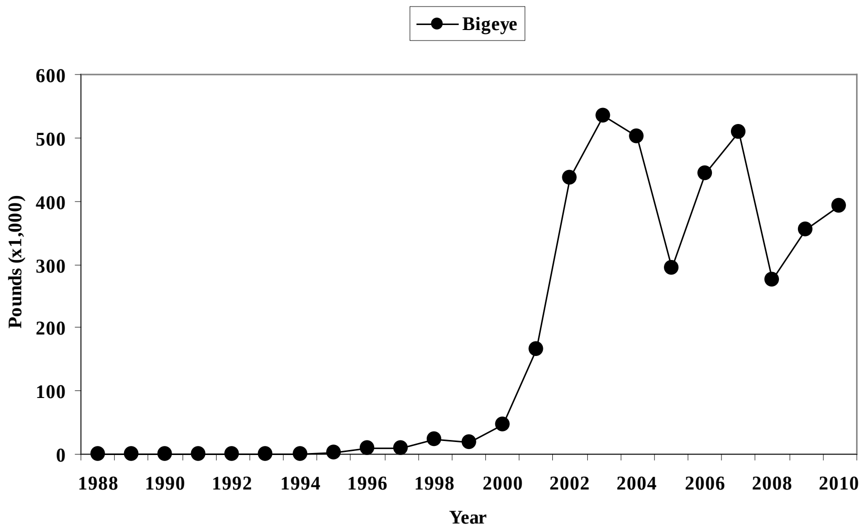
While yellowfin troll landings were, on average, high in the 1980s and 1990s, they now are secondary to longline landings. In recent times, yellowfin troll landings peaked in 2008 at 20,089, but sharply decreased in the last two years. The 2010 yellowfin troll landings were 2, 052 pounds: about 10% of the 2008 landings and the lowest on record.

Calculation: The estimated total annual landings of yellowfin tuna is listed for longline and trolling fishing methods as explained for Table 1 and Table 2.

Table 14. American Samoa annual estimated total landings of Yellowfin Tuna by gear in pounds

Year	Longline	Trolling
1982	0	7,038
1983	0	19,789
1984	0	58,704
1985	0	38,586
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
Average	**490,386**	**22,962**
Std. Dev	**575,838**	**17,776**

Figure 10. American Samoa annual estimated total landings of bigeye tuna by longlining in pounds



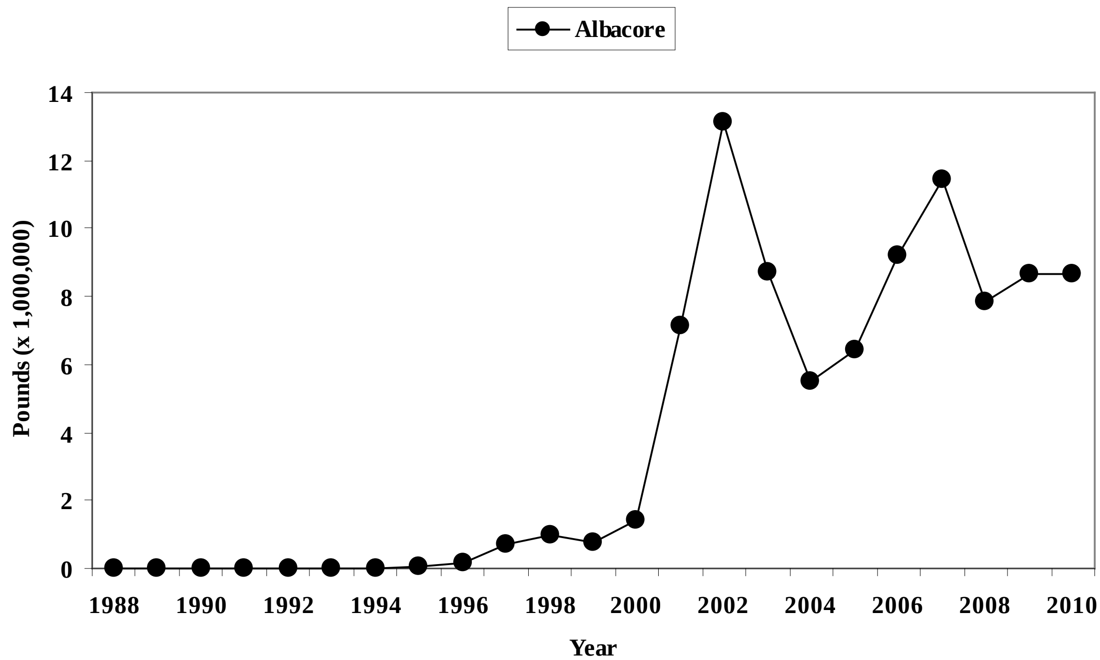
Interpretation: Bigeye tuna are usually only caught in the longline fishery in American Samoa. Estimated total longline landings of bigeye tuna increased by about 30,000 pounds (9%) in 2010, showing an increasing trend for three years. History shows the highest landing occurred in 2003 with 534 thousands plus pounds.

Estimated bigeye tuna landing in 2003 of 534,300 pounds is the highest in the 22 year history.

Calculation: The estimated total annual landings of bigeye tuna is listed for longline fishing method as explained for Table 1 and Table 2. The average and standard deviation for the Pounds caught is calculated from 1991 onward.

	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
Average	**174,621**
Std. Dev	**203,799**

Figure 11. American Samoa annual estimated total landings of albacore by longlining in pounds

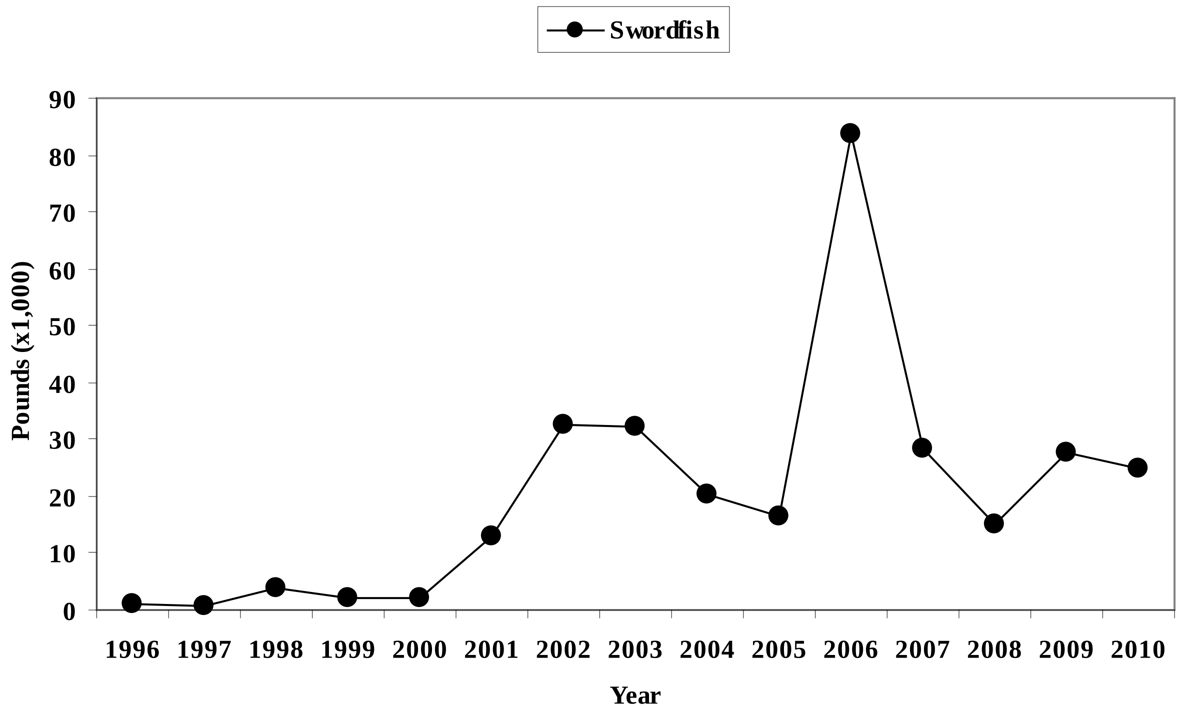


Interpretation: Albacore longline landings in 2010 increased slightly by 0.4% continuing a three-year trend. The 2002 albacore landings estimate of 13.3 million pounds is the highest ever recorded in the 23 year history of the fishery. Albacore has been the primary target species for the longline fishery since its inception.

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.

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	8,680,579
Average	**3,943,729**
Std. Dev	**4,388,156**

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

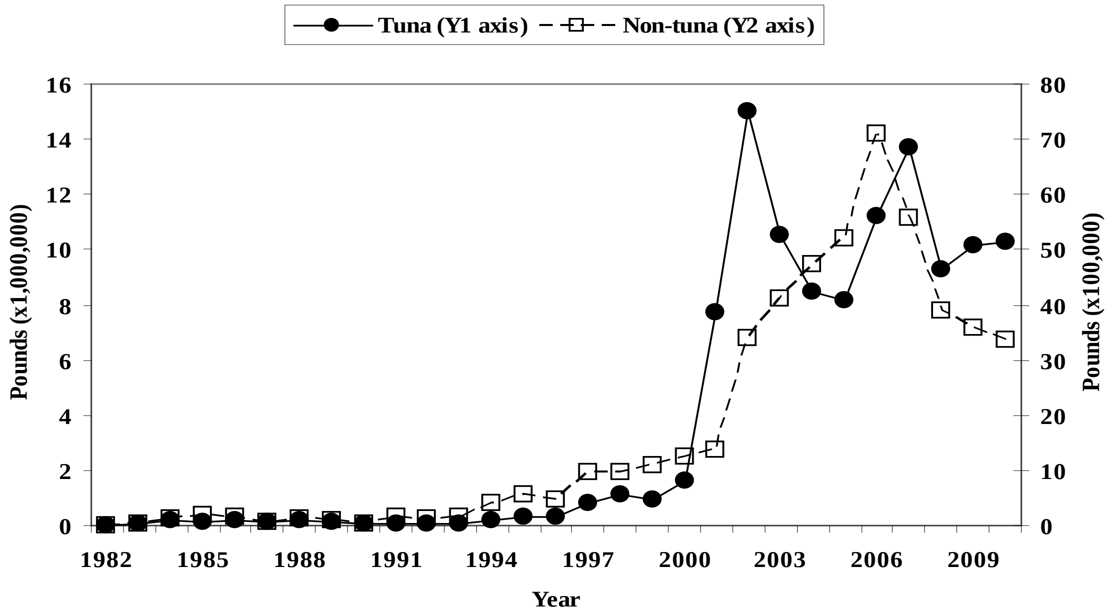


Interpretation: More than 24,000 pounds of swordfish is estimated to have landed in 2010, a drop of 10% from 2009. American Samoa longline swordfish landings peaked in 2006 and declined the next year to about current levels.

Calculation: The estimated total annual landings of swordfish are listed for longline and trolling fishing methods as explained for Table 1 and Table 2.

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
Average	**20,238**
Std. Dev	**20,384**

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



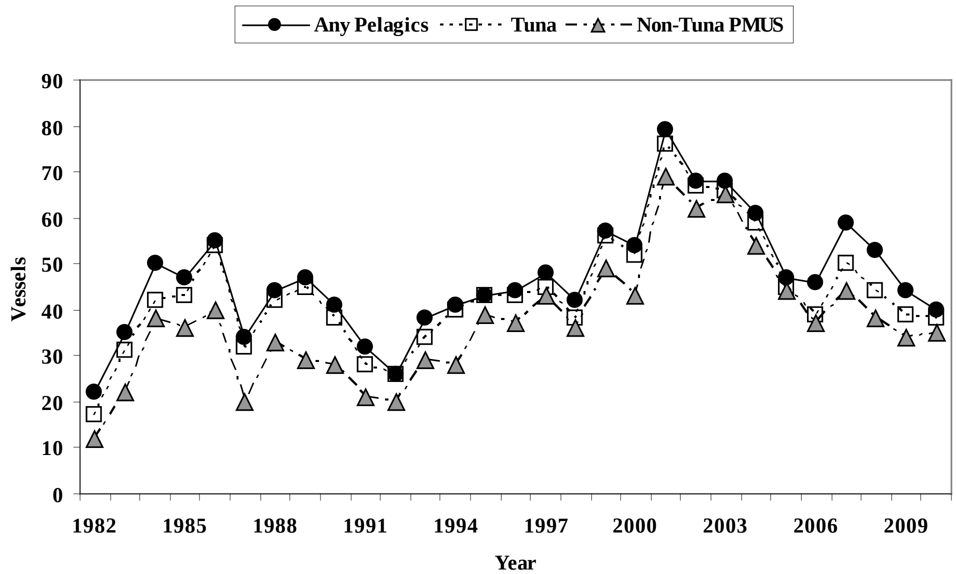
Interpretation: In 2010, the estimated total commercial landings of pelagic species amounted to more than 10.6M pounds. 2010 tuna landings (10.3M pounds) increased slightly making up 97% of commercial landings. In 2001, commercial tuna landings greatly increased with the arrival of monohull longline vessels peaking in 2002. Commercial tuna landing have since displayed a cyclical pattern. Non-tuna PMUS commercial landing also increased with the arrival of monohull vessels but have been an order of magnitude less than tuna landings. In 2010, non-tuna PMUS landings were 335,771 pounds, slightly less than the previous year. Commercial non-tuna PMUS landings peaked in 2006 at 709,015 pounds.

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 Table 2.

Table 15. American Samoa annual commercial landings of tunas and non-tuna PMUS

	Pounds Landed	
Year	Tuna	Non-Tuna
1982	22,065	1,515
1983	85,069	4,441
1984	196,100	13,458
1985	99,987	17,515
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	7,720,862	135,673
2002	14,979,562	339,587
2003	10,529,001	410,126
2004	8,449,577	473,167
2005	8,159,461	518,561
2006	11,216,937	709,015
2007	13,727,441	558,573
2008	9,251,037	388,495
2009	10,144,143	357,183
2010	10,289,490	335,771
Average	**3,827,593**	**169,579**
Std. Dev	**4,991,218**	**205,223**

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



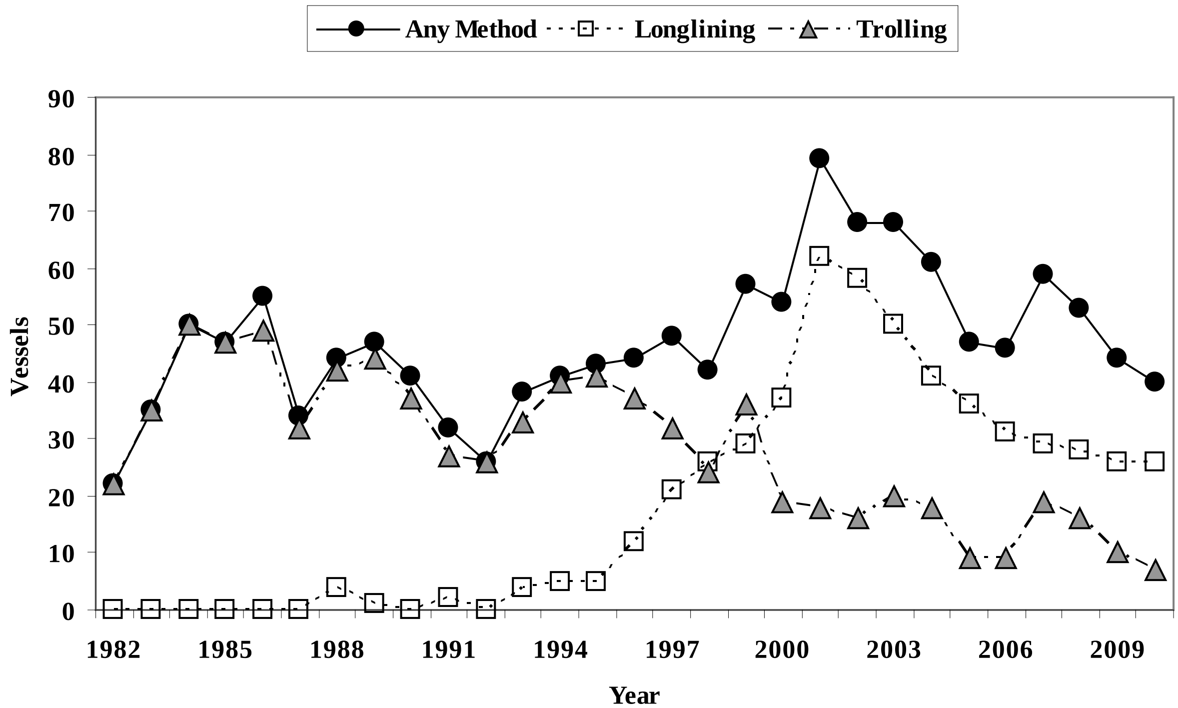
Interpretation: In 2010, 40 vessels landed pelagic species. The number of American Samoan vessels landing tuna species decreased to 38 in 2010, and the number of vessels landing non-tuna PMUS increased to 35. This continues a decreasing trend from a high of 79 boats in 2001.

Caalculation: 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 2 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 2 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 16. Number of American Samoa boats landing any pelagic species, tunas and non-tuna PMUS

	Number of Vessels Landing Pelagic Species		
Year	**Any Pelagics**	**Tuna**	**Non-Tuna PMUS**
1982	22	17	12
1983	35	31	22
1984	50	42	38
1985	47	43	36
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
Average	**47**	**44**	**37**
Std. Dev	**12**	**12**	**13**

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 using any fishing method decreased in 2010 from 44 to 40 boats: much less than the 79 vessels that were fishing in 2001. The number of longliners remained unchanged at 26 vessels which in far less than the high of 62 vessels in 2001. The smaller trolling fleet also declined from 10 vessels in 2009 to seven (7) in 2010. It is interesting to note that trolling was the primary method for catching pelagics in the 1980s and 1990s and longlining played a smaller role. This situation reversed itself in the 2000s with longliners becoming more prevalent than trollers.

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 2 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 2, 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 2 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 17. Number of American Samoa boats landing any pelagic species by longlining, trolling and all methods

Year	Number of Boats		
	Any Method	Longlining	Trolling
1982	22	0	22
1983	35	0	35
1984	50	0	50
1985	47	0	47
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
Average	**47**	**23**	**28**
Std. Dev	**12**	**18**	**13**

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

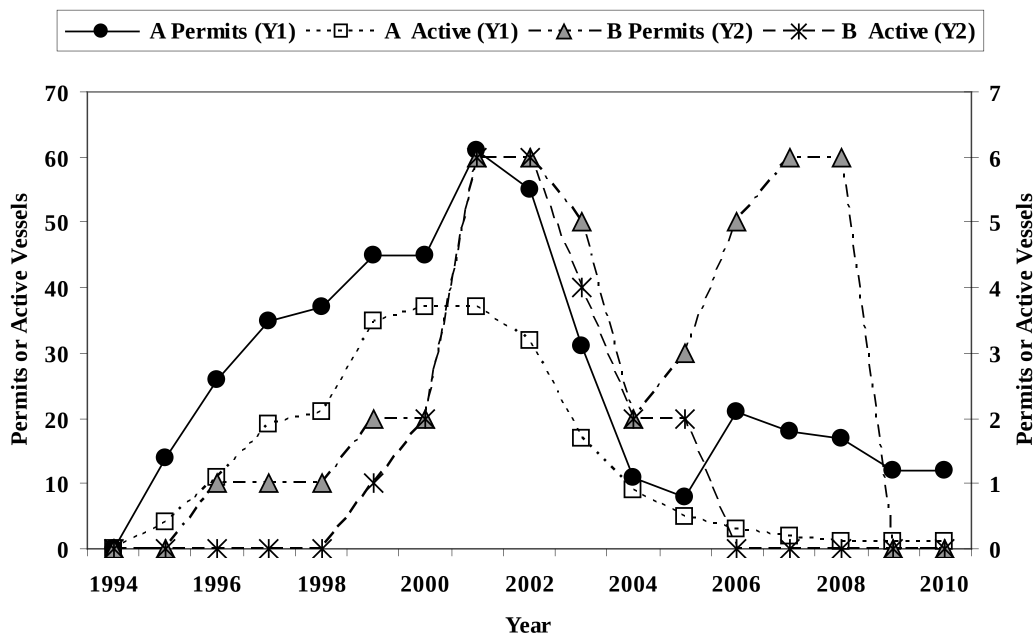
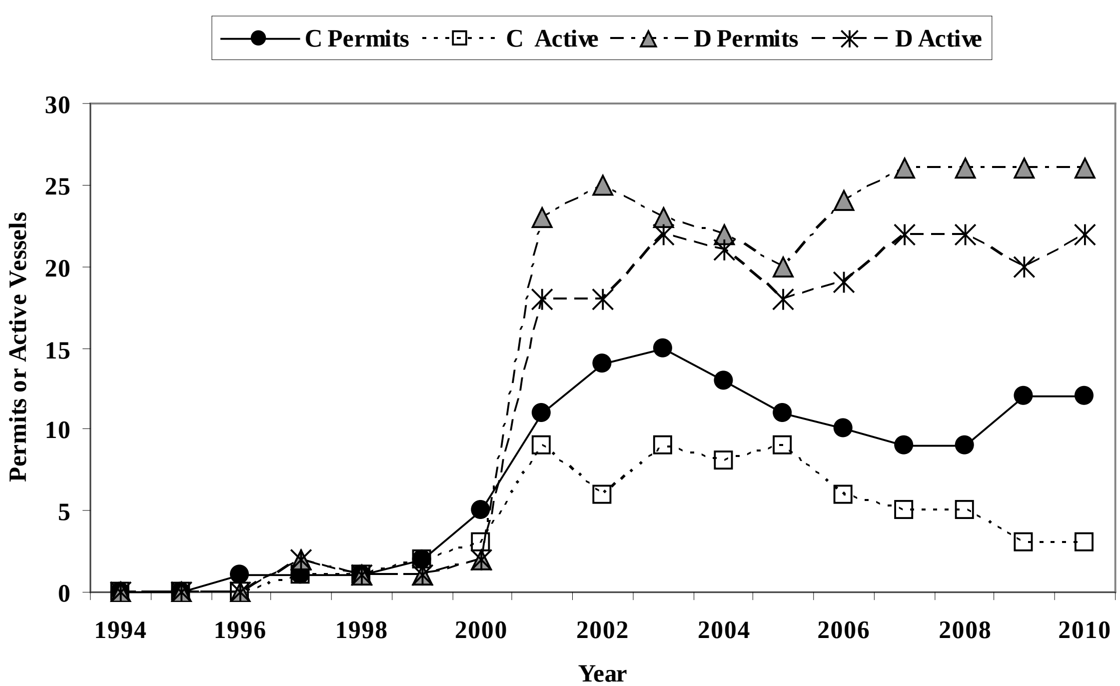


Figure 17. Number of permitted and active longline fishing vessels in the B (40.1 to 50 foot) and C(50.1 to 70 foot) size classes



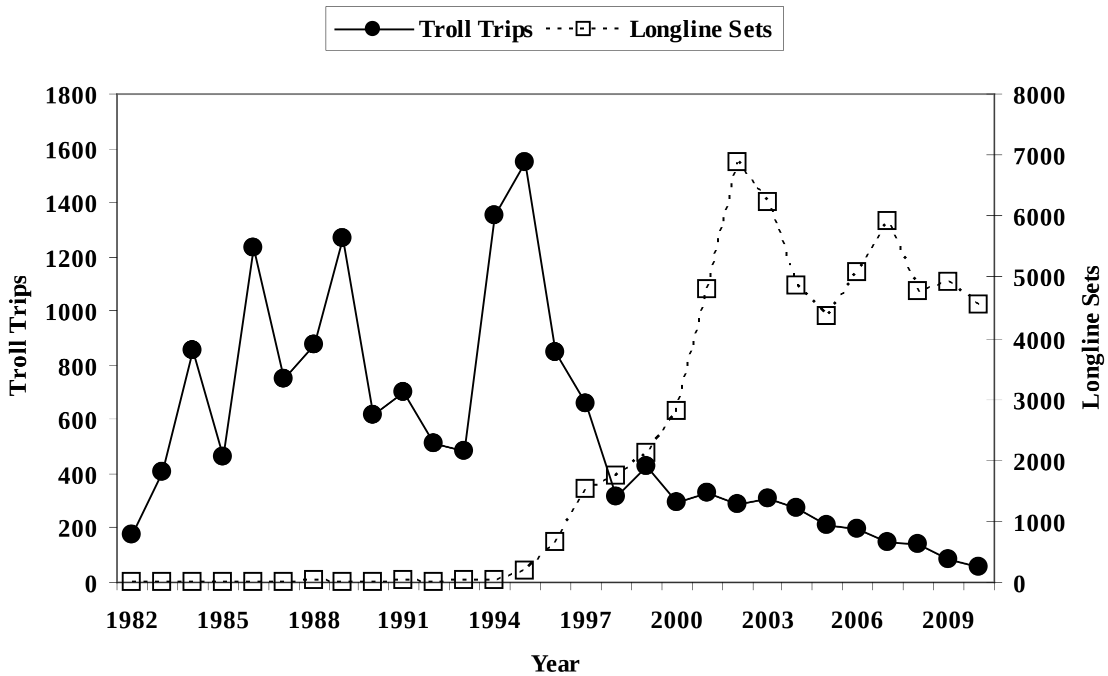
Interpretation: In 2010, only one *alia* (Class A) out of the twelve permitted vessels was active. The use of *alias* has steadily declined since 2001 when 38 *alias* were active. No Class B permits were issued in 2010 no vessels from this class were active. Three (3) out of 12 Class C permitted Class C vessels were active. The number of Class C permits issued and active vessels remained unchanged from 2009 to 2010. Class D >70ft boats dominated the American Samoa longline fishery in 2010, with 22 out of 26 permitted vessels making landings. The number of Class D permits and active vessels has remained unchanged the last four years.

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 which is around Feb. 25th. The active year of 1996 is from February 25, 1996 to February 24th 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 and the active year of 1995 is from January 1, 1995 to February 24th 1996. This causes the number of active vessels to be slightly different from other counts of longline vessel activity based on the calendar year.

	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	12	1	0	0	12	3	26	20
2010	12	1	0	0	12	3	26	22

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



Interpretation: Longline sets decreased by 378 (8%) to 4533 in 2010. Since 2001 longline sets deployed vary between 4000 and 6000. The estimated number of troll trips decreased by 28 (35%) down to 53 trips in 2010.The 2010 decrease in troll trips shows a consecutive decline since 2001.

Calculation: The number of Troll Trips is calculated by first subtracting the total longline pounds of Table 1 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 18. Data for Figure 18.

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	4,533
Average	**545**	**4,321**
Std. Dev	**398**	**1,601**

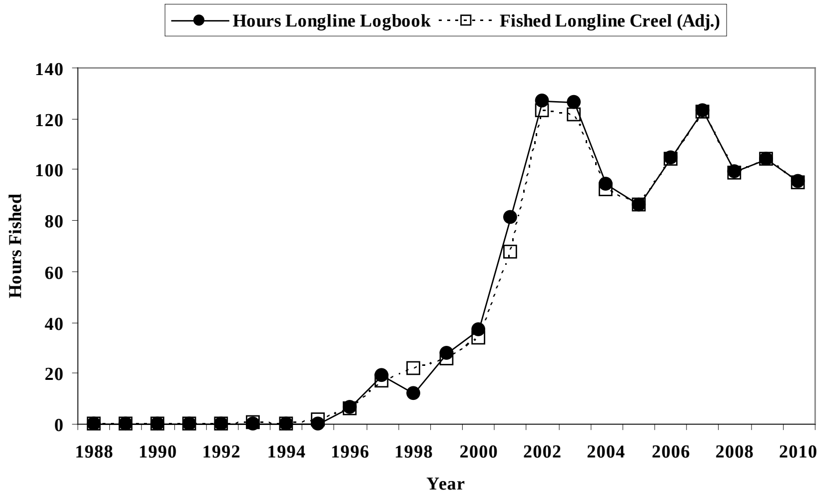
Table 19. Number of American Samoa sample days, trolling interviews, and trolling trips

Interpretation: Sample days increased by 40 to 212 in 2010 and trolling interviews also increased to 31. Trolling trips sampled increased by 6 in 2010 but a declining trend from 200 in 2003.

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.

Year	Sample Days	Trolling Interviews	Trolling Sampled	Trips Expanded
1986	156	398	523	1,077
1987	146	217	277	686
1988	152	285	379	817
1989	149	376	496	1,148
1990	157	293	321	583
1991	142	213	248	524
1992	152	206	263	503
1993	148	222	245	423
1994	138	387	567	1,273
1995	137	489	683	1,429
1996	131	377	420	754
1997	147	337	386	603
1998	150	220	227	280
1999	132	257	271	393
2000	120	212	221	263
2001	126	163	175	250
2002	120	143	169	259
2003	183	194	214	287
2004	214	198	219	252
2005	219	146	169	187
2006	207	133	156	182
2007	244	82	114	133
2008	208	90	111	132
2009	172	27	30	37
2010	212	31	36	38
Average	**162**	**228**	**277**	**501**
Std. Dev	**34**	**116**	**160**	**384**

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



Interpretation: Hours fished from both longline logs and the creel survey are about the same in 2010, however, both decreased compare to 2009. The longline hours fished from the logbooks show an 8% decrease from 103,807 hrs to 95,492 in 2010. The adjusted hours-fished from Creel survey shows a similar decrease of about 8% to 94,844. Both show hours fished peaked during 2002.

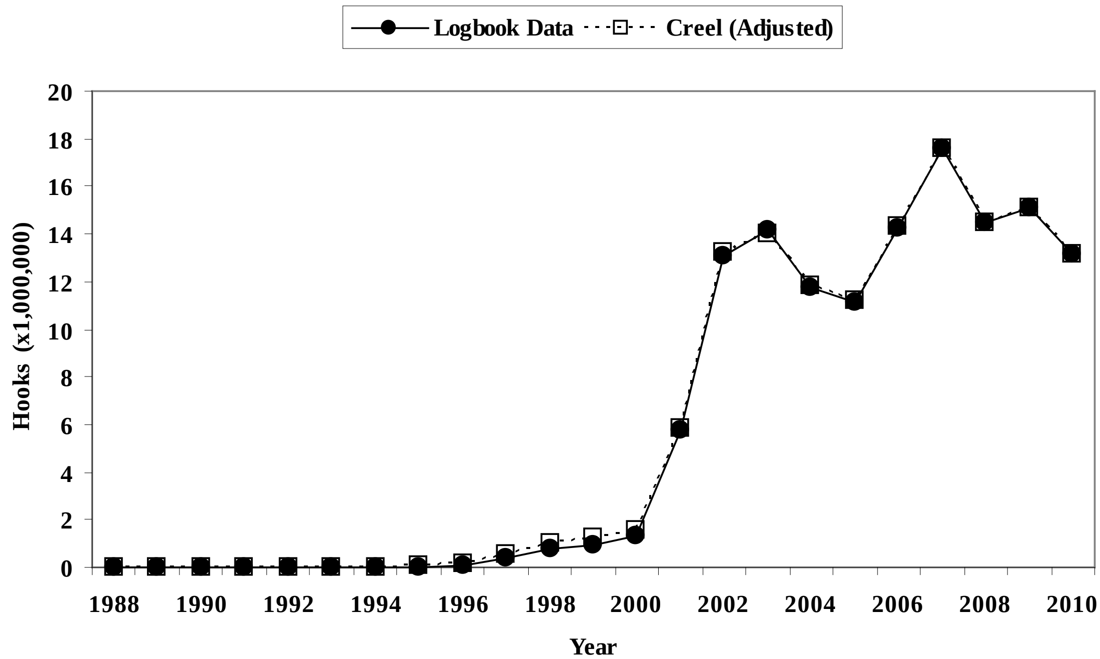
Calculation: The number of longline trip-hours using logbook data is obtained by summing the duration all of the sets entered in the longline logbook system for the given year for interviewed and non-interviewed boats. The duration of a set is defined as from beginning of set time to the end of haul time.

Prior to 1997, the number of longline trip-hours using creel survey data is the expanded number of longline fishing trip-hours from the offshore creel survey system. In 1997 and after this number is the expanded number of longline fishing trip-hours from the offshore creel survey system for interviewed vessels plus the sum of the duration of the sets entered in the longline logbook system for non-interviewed vessels. The average and standard deviation for Hours Fished from logbook data and creel data is calculated from 1996 onward for comparison.

	Hours Fished	
Year	**Longline Logbook**	**Longline Creel (Adj.)**
1988	n/a	198
1989	n/a	17
1990	n/a	0
1991	n/a	164
1992	n/a	0
1993	n/a	296
1994	n/a	161
1995	n/a	1,860
1996	6,366	5,906
1997	19,065	16,956
1998	11,984	22,012
1999	27,708	25,721
2000	36,973	33,790
2001	81,291	67,755
2002	127,023	123,194
2003	126,282	121,664
2004	94,054	91,865
2005	86,332	86,164
2006	104,320	104,132
2007	123,267	122,610
2008	99,178	98,676
2009	103,807	103,790
2010	95,492	94,844
Average	**49,702**	**48,773**
Std. Dev	**49,635**	**48,327**

The hours fished reported by the Longline Logbook system in the early years before the large boats dominated the fishery is usually larger than that reported by the adjusted Creel Survey System because the logbook hours are calculated from actual beginning of set times and end of haul times while many trips in the offshore creel survey system are entered as “8 hours”

Figure 20. Thousands of American Samoa longline hooks set from logbook and creel survey data



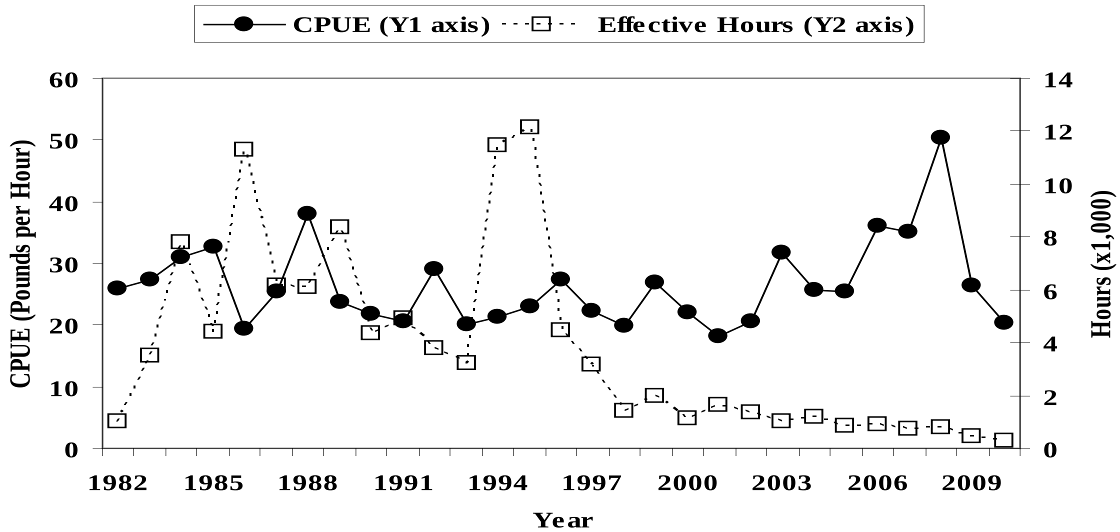
Interpretation: The number of hooks set by American Samoan longline vessels from logbooks about the same as those recorded from creel surveys, however both decreased by 13% to 13.1 millions in 2010.Since 2002, number of hooks deployed vary between11 millions and 17 millions.

Calculation: The number of longline hooks using logbook data is obtained by summing the number of hooks for sets entered in the longline logbook system for the given year for interviewed and non-interviewed boats and dividing by 1000.

Prior to 1997, the number of longline hooks using creel survey data is the expanded number of longline hooks from the offshore creel survey system. In 1997 and after this number is the expanded number of longline fishing hooks from the offshore creel survey system for interviewed vessels plus the sum of the number of hooks for the sets entered in the longline logbook system for non-interviewed vessels. The average and standard deviation for 1000's of Hooks from logbook data and creel data is calculated from 1996 onward for comparison.

	Hooks (x1000)	
Year	**Logbook Data**	**Creel (Adjusted)**
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	17,552	17,586
2008	14,444	14,464
2009	15,077	15,094
2010	13,171	13,186
Average	**5,825**	**5,881**
Std. Dev	**6,631**	**6,608**

Figure 21. American Samoa pelagic catch per hour of trolling and number of trolling hours.



Interpretation: Catch per hour of trolling in 2010 decreased by 6lbs from 26lbs in 2009. The number of troll hours decreased in 2010 by about 100hrs from 424hrs in 2009.The 2010 troll hours dropped more than 50% compared to the previous five years. Pounds-per-troll hour has generally been decreased from peak average of 50lbs in 2008. Troll hours has generally been declining over the years.

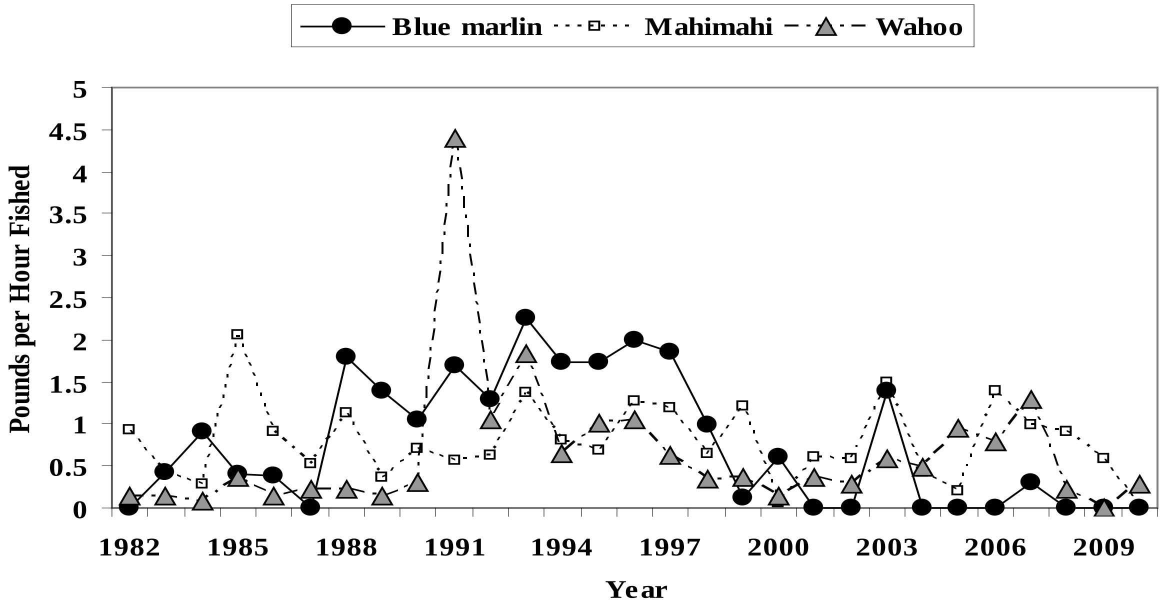
Calculation: For purely trolling trips where the number of hours was recorded, the total catch was divided by the total number of trolling hours to obtain CPUE.

The number of effective Trolling Hours is calculated by first subtracting the total longline pounds of Table 1 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 20. 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	25.7	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
Average	**26.47**	**3,791**
Std. Dev	**6.92**	**3,439**

Figure 22. American Samoa trolling CPUEs in pounds per hour fished for blue marlin, mahimahi, and wahoo



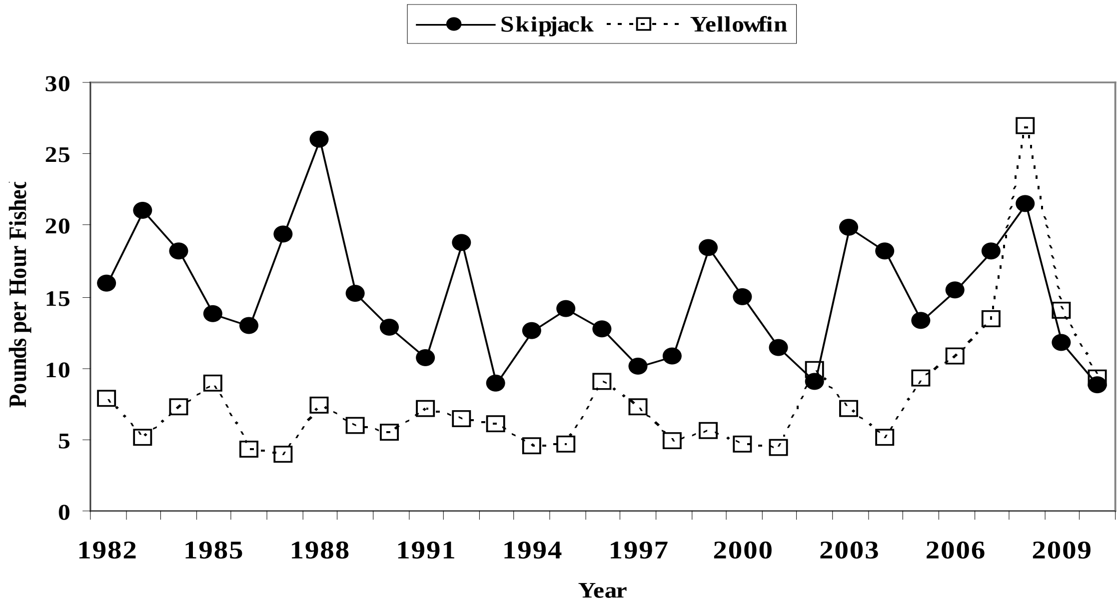
Interpretation: Pounds caught per trolling hour for blue marlin and mahi are zero for 2010. For Blue marlin this is the same as the last three consecutive years. For wahoo, it increased to 0.29 pounds from zero pounds in 2009. Pounds caught per troll hour for the three species have generally been declined over the years. The 2010 average for mahimahi is zero, marking the first time troll fishing landed no mahimahi.

Calculation: The values for each of the three species is obtained by dividing the Troll Pounds for each species in Table 1 by the expanded number of trip-hours for purely trolling trips from the offshore creel survey system.

Table 21. American Samoa trolling CPUEs in pounds per hour fished for blue marlin, mahimahi, and wahoo

Trolling CPUEs: Blue Marlin, Mahimahi, Wahoo (pounds per hour)			
Year	**Blue Marlin**	**Mahimahi**	**Wahoo**
1982	0	0.92	0.14
1983	0.43	0.43	0.15
1984	0.91	0.28	0.09
1985	0.41	2.06	0.36
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
Average	**0.77**	**0.79**	**0.64**
Std. Dev	**0.76**	**0.46**	**0.82**

Figure 23. American Samoa trolling CPUEs for skipjack and yellowfin tuna in pounds per hour fished



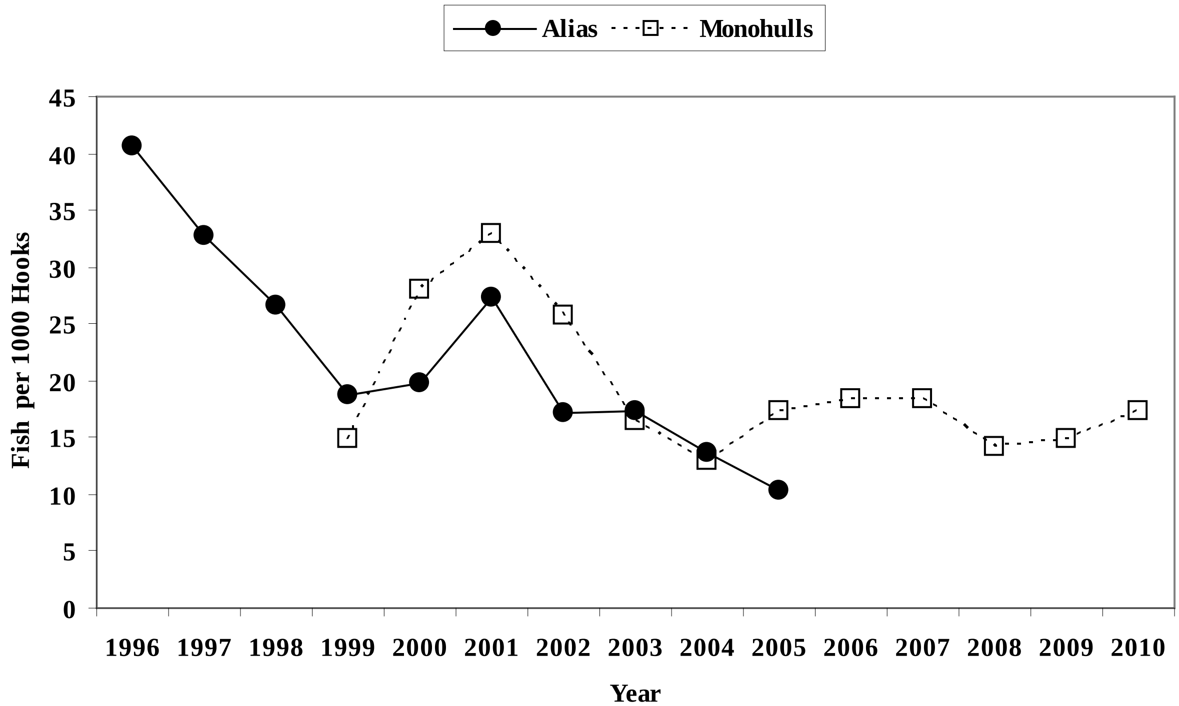
Interpretation: The 2010 total pounds for both species decreased and it is the second lowest rate per troll hour in its history. The 1993 rate is the lowest ever at 14 lbs. Estimated 2010 troll landings of skipjack per troll hour decreased by about 3 pounds to 8 ponds; and yellowfin catch rate decreased by 4lbs (36%) to 3.65 pounds. The 2010 pounds-per-troll-hour for yellowfin shows a declining trend from the 26.9lbs peak average in 2008. The highest recorded CPUE for skipjack is 26 pounds in 1988.
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 1 by the expanded number of trip-hours for purely trolling trips from the offshore creel survey system.

Table 22. American Samoa trolling CPUEs for skipjack and yellowfin tuna in pounds per hour fished

Trolling CPUE: Skipjack Tuna, Yellowfin Tuna (pound 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
Average	**14.97**	**7.78**
Std. Dev	**4.23**	**4.43**

Figure 24. American Samoa longline albacore tuna CPUE for alias and mono-hull vessels based on longline logbook data



Interpretation: Due to fishery data confidentiality, albacore information of Alias longline vessel since 2006 to 2010 is omitted. Mono-hulls landed 17.4 albacore tuna per 1000ks in 2010; an increase of about three fish from the average of 14 albacore landed in 2009. Landing is generally around 14 to 18 fish per 1000 hooks in the past five 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

Table 23. American Samoa catch/1000 hooks for two types of longline vessels from 1996 to 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**

Table 24. American Samoa catch/1000 hooks for two types of longline vessels from 2003 to 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**	**25.2**	**24.2**	**26.9**

Table 25. American Samoa catch/1000 hooks for two types of longline vessels from 2006 to 2010

Species	2006 All Vessels	2007 All Vessels	2008 All Vessels	2009 All Vessels	2010 All Vessels
Skipjack Tuna	3.2	2.3	2.4	2.3	2.4
Albacore Tuna	18.5	18.3	14.2	14.8	17.4
Yellowfin Tuna	1.6	1.9	1.0	1.1	1.8
Bigeye Tuna	1.0	0.9	0.5	0.6	0.8
TUNAS SUBTOTAL	**24.2**	**23.5**	**18.2**	**18.8**	**22.4**
Mahimahi	0.4	0.1	0.1	0.2	0.2
Blue Marlin	0.2	0.2	0.2	0.2	0.2
Wahoo	1.5	1.0	0.7	1.0	1.0
Sharks (all)	0.5	0.4	0.4	0.4	0.4
Swordfish	0.1	0.0	0.0	0.0	0.0
Spearfish	0.1	0.0	0.1	0.1	0.1
Oilfish	0.5	0.5	0.4	0.5	0.6
NON-TUNA PMUS SUBTOTAL	**3.3**	**2.4**	**2**	**2.5**	**2.5**
Other Pelagic Fishes	0.1	0.2	0.1	0.2	0.3
OTHER PELAGIC FISHES SUBTOTAL	**0.1**	**0.2**	**0.1**	**0.2**	**0.3**
TOTAL PELAGICS	**27.5**	**26**	**20.3**	**21.5**	**25.2**

Interpretation: Total pelagic catch per 1000 hooks by all longline vessels in 2010 increased slightly by 4 fish. Catch rate for tuna species also increased by 0.3 to 22.4 fish from 18.8 in 2009. Albacore tuna dominates the total tuna catch rate and it also shows an increase of 0.6 from 2009. Skipjack tuna catch decreased by 0.1 from 2.3 in 2009; Yellowfin and Bigeye tunas also show a slight increase of 0.1; Non-tuna PMUS total catch rate for 2009 and 2010 remain the same Wahoo dominates the non-tuna catch rate at 1.0 fish on top of oilfish and sharks but 2009 and 2010 catch rates are the same.
.

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 25. Albacore: average weight per fish

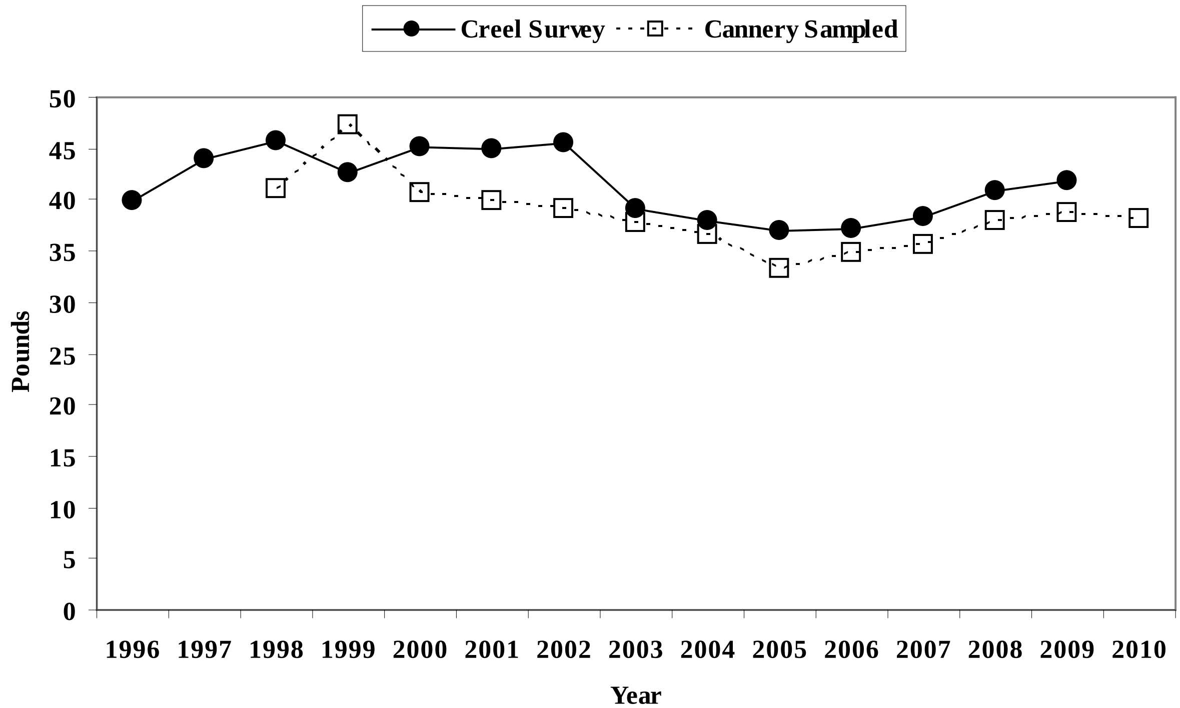


Figure 26. Average weight per fish for other cannery species (cannery-sampled)

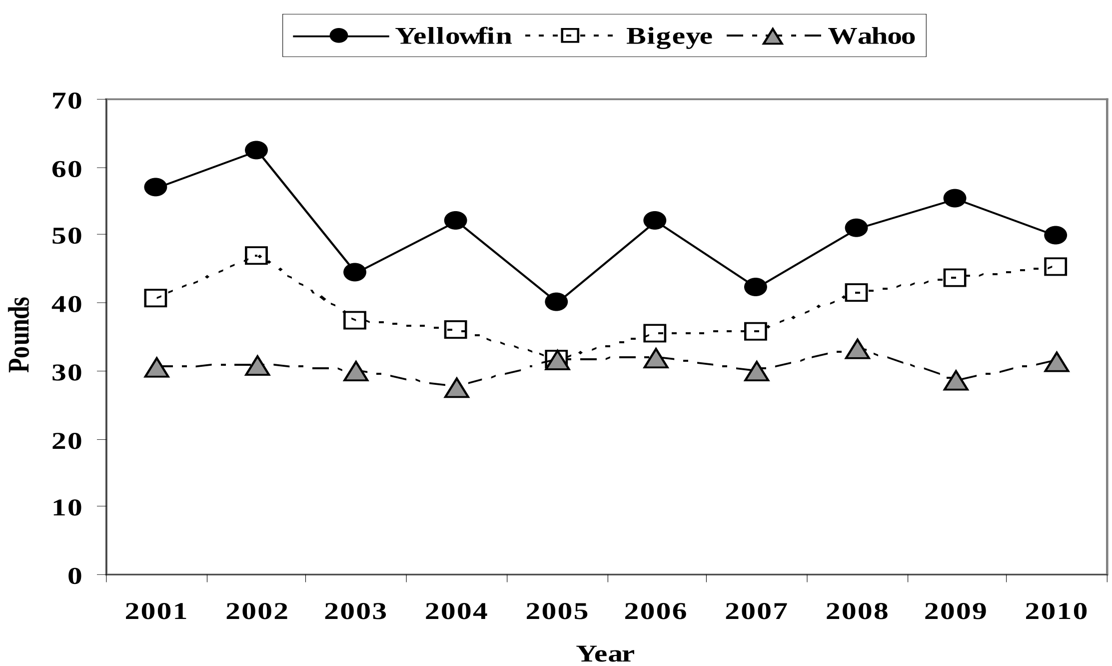


Table 26. Creel survey average weight per fish in pounds (1996-2002)

	Average Weight per Fish in Pounds						
Species	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**
Skipjack tuna	9.6	8.4	12.5	9.7	11.6	15.4	11.5
Albacore tuna	39.9	44	45.7	42.6	45.1	44.9	45.6
Yellowfin tuna	37.9	44.2	45.9	33.1	38.2	30.1	27.9
Kawakawa	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Bigeye tuna	52.3	82.8	79.2	57.1	61.1	67.7	69.4
Mahimahi	26.2	25.6	23.3	22.3	24.8	19.6	19.5
Black marlin	n/a	148.3	101.9	n/a	n/a	67.2	31.9
Blue marlin	151.8	117.7	119.9	101.9	135.7	70.9	165.7
Wahoo	44.3	38.4	26.3	27.3	31.9	29.9	28.7
Sharks (all)	112.3	96.8	69.3	38	39.5	68.8	68.5
Swordfish	150	100	212.6	12	n/a	59.4	23.4
Sailfish	88.4	70.7	67	61.8	39.1	40.4	31.8
Spearfish	n/a	n/a	n/a	46	n/a	n/a	n/a
Moonfish	70.3	33.5	57.7	30.9	102.5	78.3	n/a
Oilfish	n/a	12.7	n/a	10	n/a	23.9	n/a
Pomfret	n/a	n/a	n/a	n/a	16.5	n/a	8.2
Barracudas	13.5	14.6	15.3	11	13.1	7.5	9.1
Rainbow runner	n/a	14	17.5	6.5	n/a	n/a	12.9
Dogtooth tuna	n/a	10	n/a	n/a	n/a	15.6	40.8
Pelagic fishes (unknown)	61.8	8	45.3	n/a	n/a	n/a	n/a

Table 27. Creel survey average weight per fish (2003-2010)

	Average Weight per Fish in Pounds							
Species	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**
Skipjack tuna	8.2	7.9	8	12.5	7.4	13.5	n/a	n/a
Albacore tuna	39.1	38	37	37.2	38.3	40.9	41.8	n/a
Yellowfin tuna	17.9	35.4	32.9	19	37.5	35.4	67.3	46.6
Kawakawa	n/a	n/a	n/a	2.5	n/a	n/a	n/a	n/a
Bigeye tuna	40.8	44.1	42.7	37.1	62.2	39	n/a	n/a
Mahimahi	20.2	21.5	18.5	17.6	21.5	22.8	24.5	n/a
Black marlin	69.1	93.8	78.1	91.5	105.9	n/a	n/a	n/a
Blue marlin	87.6	50.1	117.9	175.7	136.2	84.1	n/a	n/a
Wahoo	30	28.1	29.7	29.5	33.6	31.8	17.1	n/a
Sharks (all)	62.4	71.7	n/a	47.5	65	n/a	n/a	n/a
Swordfish	106.9	40.2	25.6	28.3	115.9	n/a	n/a	n/a
Sailfish	53.3	41.2	54.2	42	65.1	56.5	n/a	n/a
Spearfish	n/a	46	n/a	n/a	n/a	n/a	n/a	n/a
Moonfish	107	71.9	101.5	117.4	97.3	n/a	n/a	n/a
Oilfish	16.3	8.5	1.9	n/a	5.9	12.9	n/a	n/a
Pomfret	n/a	8.2	2.3	1.3	8.8	n/a	n/a	n/a
Barracudas	8.7	11.3	10.5	8.2	9.6	10.5	n/a	n/a
Rainbow runner	n/a	6.9	8.8	10.1	n/a	n/a	n/a	n/a
Dogtooth tuna	n/a	16.2	n/a	n/a	n/a	n/a	n/a	n/a

Table 28. Cannery sampled average weight per fish in pounds (1998-2003)

Species	1998	1999	2000	2001	2002	2003
Skipjack	n/a	n/a	n/a	16.8	11.3	9.9
Albacore	41	47.2	40.7	39.8	39.1	37.8
Yellowfin	n/a	n/a	n/a	57	62.4	44.3
Bigeye	n/a	n/a	n/a	40.7	46.8	37.4
Mahimahi	n/a	n/a	n/a	16.2	13.5	20.7
Black marlin	n/a	n/a	n/a	36.3	n/a	n/a
Blue marlin	n/a	n/a	n/a	n/a	n/a	n/a
Wahoo	n/a	n/a	n/a	30.6	30.7	30
Swordfish	n/a	n/a	n/a	n/a	n/a	n/a
Sailfish	n/a	n/a	n/a	n/a	27.4	n/a
Moonfish	n/a	n/a	n/a	147.6	117.6	n/a
Pomfret	n/a	n/a	n/a	5.1	6.2	n/a
Rainbow Runner	n/a	n/a	n/a	n/a	9.4	n/a

Table 29. Cannery-sampled average weight per fish in pounds (2004-2010)

Species	2004	2005	2006	2007	2008	2009	2010
Skipjack	13.6	13.1	12.3	12.1	12.0	12.1	12.1
Albacore	36.5	33.2	34.8	35.6	37.9	38.7	38.1
Yellowfin	52.1	40.1	52.1	42.2	50.9	55.2	49.9
Bigeye	35.9	31.6	35.5	35.6	41.4	43.7	45.3
Mahimahi	13.0	17.2	13.4	13.5	19.1	15.1	23.7
Black marlin	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Blue marlin	n/a	45.8	n/a	n/a	n/a	n/a	n/a
Wahoo	27.4	31.7	31.9	29.9	33.2	28.5	31.4
Swordfish	72.3	n/a	90.3	n/a	n/a	n/a	n/a
Sailfish	n/a	22.9	21.7	n/a	n/a	n/a	n/a
Moonfish	n/a	95.5	34.7	n/a	n/a	n/a	n/a
Pomfret	n/a	7.8	n/a	5.4	n/a	n/a	n/a
Rainbow Runner	10.8	n/a	n/a	n/a	n/a	n/a	n/a

Interpretation: The table 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.

Albacore and skipjack average weight-per-fish show no change from 2009 to 2010 while yellowfin shows a drop by about 5 lbs in 2010 and bigeye, mahi and wahoo all increased slightly by about 3 to 5 lbs from the Cannery samples.

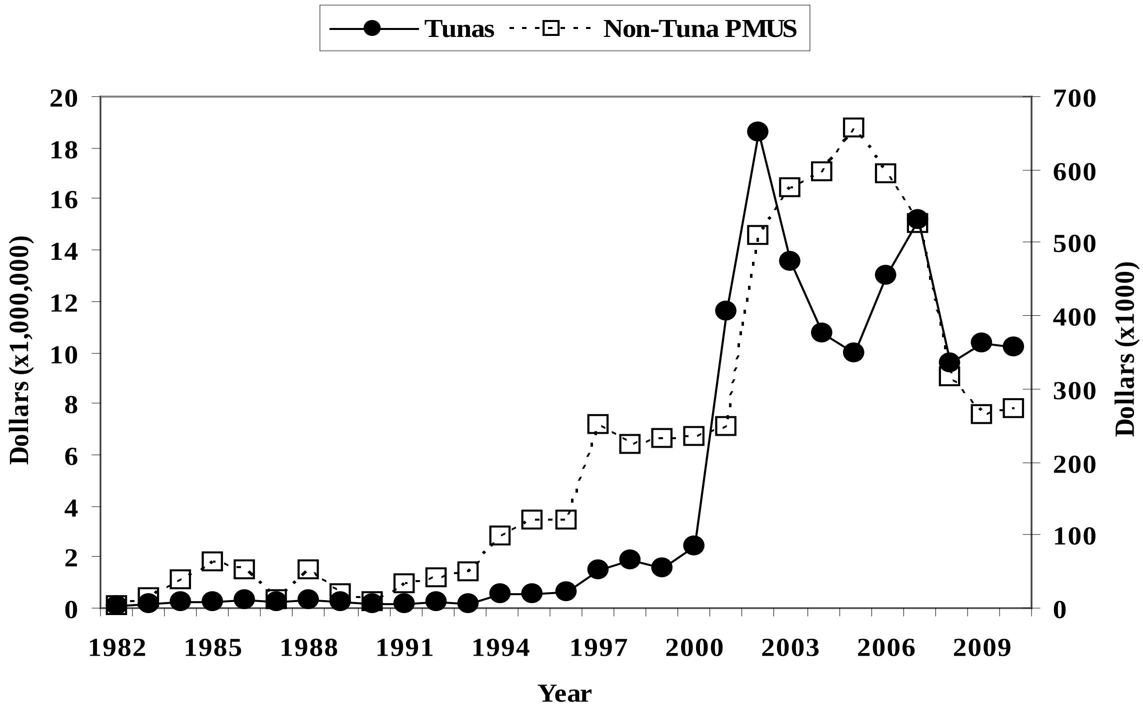
From the creel data shows a significant drop in Albacore weight from around 40 lbs 2009 to zero is noted. This is because there were no data collected through the creel survey in 2010. In the creel survey, yellowfin tuna is the only species sampled in 2010 and it recorded a decrease from 67 lbs in 2009 to 46 lbs 2010. In 2009 the Albacore, Yellowfin, Mahi and Wahoo were the only species sampled by the creel survey

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.

Figure 27. American Samoa annual inflation-adjusted revenue in 2010 dollars for tuna and non-tuna PMUS.



Interpretation: Inflation-adjusted revenues for 2010 decreased by about 2% to $10.4 millions for all pelagic landed by American Samoa vessels in 2010. The tuna adjusted revenues dropped by about 1% to $10.18 millions in 2010 and non-tuna revenue increased by about 3% to $272,893. Tuna revenues varied from $9.9 and $15.1 millions in the last five years.
The 2006 non-tuna PMUS revenue of $566,636 is the highest earning recorded in the 23 year history. The CPI recorded for 2010 is 249.4 and increase of about 9 from 2009.

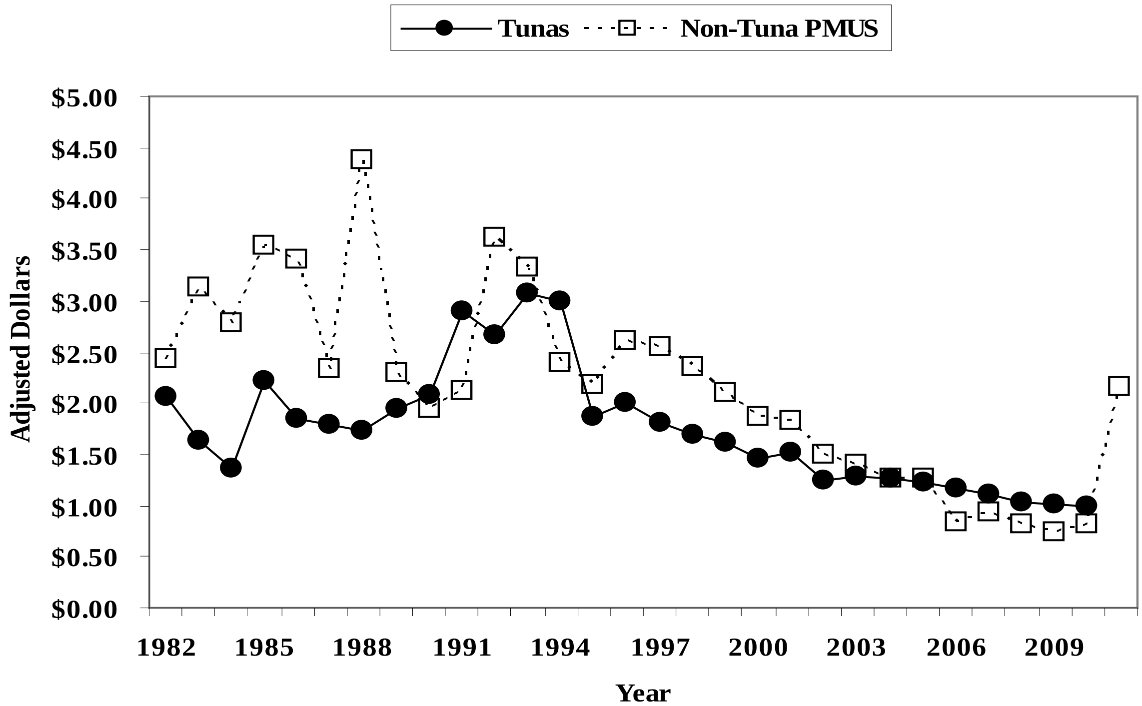
Calculation: The unadjusted revenues for Tunas and Other PPMUS were calculated by summing the values for the species in these categories as defined by Table 2. The unadjusted revenue for All Pelagics is the sum of the value for the Tuna, Other PPMUS and Miscellaneous categories as defined by Table 2.

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 30. American Samoa commercial pelagic fishing revenues in unadjusted and inflation-adjusted dollars 1982-2010 including consumer price index (CPI)

		Revenue in Dollars			
		Tunas		Non-Tuna PMUS	
Year	CPI	Unadjusted	Adjusted	Unadjusted	Adjusted
1982	100	$18,990	$45,709	$1,534	$3,692
1983	100.8	$58,561	$139,844	$5,828	$13,917
1984	102.7	$114,981	$269,515	$15,938	$37,359
1985	103.7	$95,157	$220,858	$26,800	$62,203
1986	107.1	$139,021	$312,519	$23,117	$51,968
1987	111.8	$110,012	$236,856	$5,267	$11,340
1988	115.3	$143,623	$299,885	$25,384	$53,002
1989	120.3	$110,343	$220,796	$9,338	$18,684
1990	129.6	$63,285	$117,583	$3,813	$7,084
1991	135.3	$94,344	$167,839	$17,923	$31,884
1992	140.9	$141,106	$241,150	$23,451	$40,078
1993	141.1	$80,250	$136,906	$28,181	$48,076
1994	143.8	$337,977	$565,773	$59,266	$99,211
1995	147	$319,213	$522,870	$73,194	$119,891
1996	152.5	$393,770	$621,763	$76,234	$120,373
1997	156.4	$941,063	$1,448,296	$162,262	$249,722
1998	158.4	$1,241,313	$1,886,796	$146,754	$223,065
1999	159.9	$1,016,156	$1,530,330	$153,286	$230,849
2000	166.7	$1,656,449	$2,391,912	$161,748	$233,565
2001	169.9	$8,207,830	$11,630,495	$174,817	$247,715
2002	172.1	$13,274,771	$18,571,405	$363,831	$509,000
2003	176	$9,881,723	$13,518,197	$420,052	$574,631
2004	188.5	$8,384,335	$10,706,795	$467,087	$596,469
2005	198.3	$8,206,541	$9,962,741	$539,924	$655,468
2006	204.3	$11,035,543	$12,999,870	$505,112	$595,022
2007	215.5	$13,583,240	$15,172,479	$471,426	$526,583
2008	231.5	$9,198,958	$9,566,916	$304,264	$316,435
2009	240.7	$9,995,866	$10,355,717	$255,246	$264,435
2010	249.4	$10,181,766	$10,181,766	$272,893	$272,893
Average	**156.5**	**$3,759,524**	**$4,622,192**	**$165,309**	**$214,297**
Std Dev	**42.41**	**$4,807,294**	**$5,795,702**	**$174,430**	**$208,051**

Figure 28. American Samoa average inflation-adjusted price per pound of tunas and non-tuna PMUS



Interpretation: The average price-per-pound for tuna in 2010 decreased by 3 cents from $1.02 per pound in 2009; while non-tuna PMUS price per pound increased by 7 cents from 74 cents in 2009. .Tuna price-per-pound peaked at $2.96 in 1993; and for non- tuna PMUS average peaked at $3.92 in 1988.

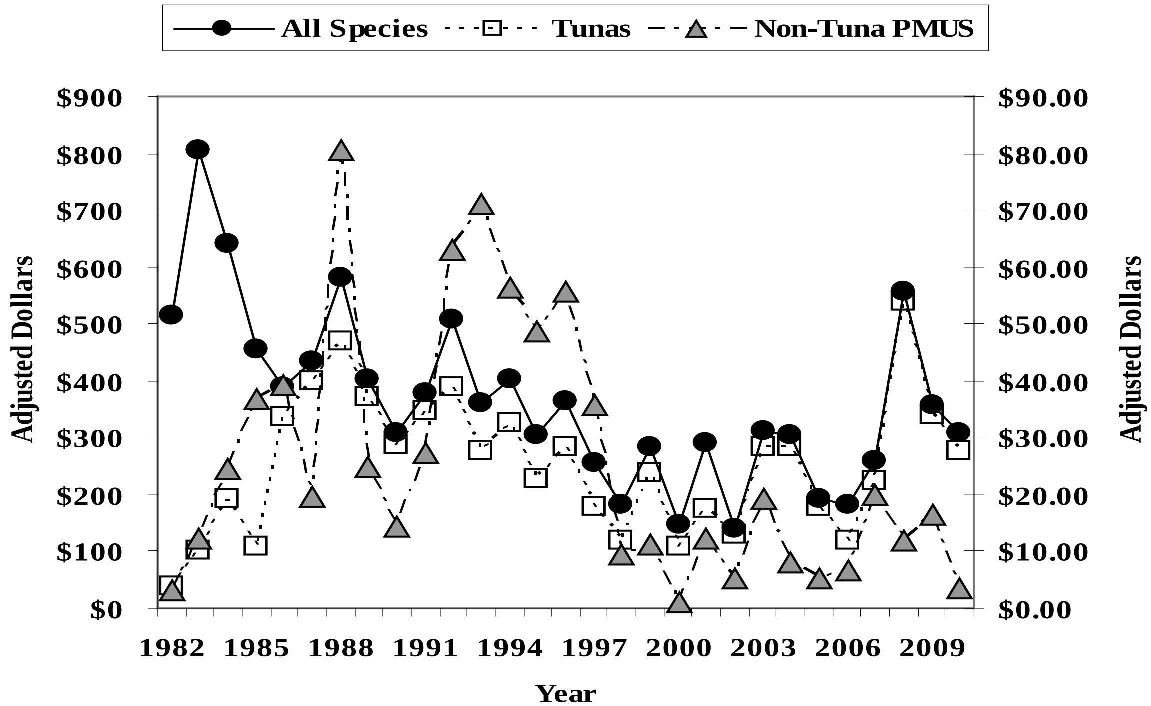
Calculation: The unadjusted price/pound for Tunas and Non-Tuna PMUS were calculated by dividing the sum of the values for the species in these categories as defined by Table 2 by the sum of their commercial landings or pounds.

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 31. Average price per pound of tuna PMUS and non-tuna PMUS in unadjusted and inflation-adjusted dollars 1982-2010

	Average Price/Pound (Dollars)			
	Tunas		Non-Tuna PMUS	
Year	**Unadjusted**	**Adjusted**	**Unadjusted**	**Adjusted**
1982	$0.86	$2.07	$1.01	$2.44
1983	$0.69	$1.64	$1.31	$3.13
1984	$0.59	$1.37	$1.18	$2.78
1985	$0.95	$2.21	$1.53	$3.55
1986	$0.82	$1.84	$1.51	$3.40
1987	$0.83	$1.79	$1.09	$2.34
1988	$0.83	$1.74	$2.10	$4.38
1989	$0.97	$1.94	$1.14	$2.29
1990	$1.12	$2.08	$1.05	$1.95
1991	$1.63	$2.89	$1.19	$2.12
1992	$1.56	$2.66	$2.12	$3.61
1993	$1.81	$3.08	$1.95	$3.32
1994	$1.79	$2.99	$1.43	$2.40
1995	$1.13	$1.86	$1.33	$2.18
1996	$1.26	$2.00	$1.65	$2.60
1997	$1.18	$1.81	$1.66	$2.55
1998	$1.11	$1.69	$1.54	$2.35
1999	$1.07	$1.62	$1.40	$2.11
2000	$1.01	$1.45	$1.30	$1.87
2001	$1.06	$1.51	$1.29	$1.83
2002	$0.89	$1.24	$1.07	$1.50
2003	$0.94	$1.28	$1.02	$1.40
2004	$0.99	$1.27	$0.99	$1.26
2005	$1.01	$1.22	$1.04	$1.26
2006	$0.98	$1.16	$0.71	$0.84
2007	$0.99	$1.11	$0.84	$0.94
2008	$0.99	$1.03	$0.78	$0.81
2009	$0.99	$1.02	$0.71	$0.74
2010	$0.99	$0.99	$0.81	$0.81
Average	**$1.07**	**$1.74**	**$1.27**	**$2.16**
Std. Dev	**$0.29**	**$0.58**	**$0.37**	**$0.94**

Figure 29. American Samoa average inflation-adjusted revenue per trolling trip landing pelagic species



Interpretation: Inflation-adjusted revenues per trolling trip for all species, tunas and non-tuna PMUS decreased in 2010. The 2010 average inflation-adjusted revenue-per-troll-trip for tunas amounts to $277, a decrease of about 19% from 2009 average. Skipjack and Yellowfin are the primary tuna landings by trollers (Table 1). Inflation-adjusted revenue-per-troll-trip for all species also decreased to $307 (14%) in 2010. Inflation-adjusted revenue-per-troll-trip for non-tuna PMUS decreased by 78% to $3.6. This is huge drop from $16.5 in 2009. The highest average per trolling trip estimates for tunas is $539 in 2008 and the highest average for non-tuna is 80.6 in1988. Mahimahi and Wahoo are the primary non-tuna PMUS landings for trollers (Table 1).

Calculation: The purely trolling interviews in the offshore creel survey system landing any of the species listed in Table 1 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 1 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 32. Commercial pelagic revenues in unadjusted and inflation-adjusted dollars per trip

	All Species		Tunas		Non-Tuna PMUS	
Year	**Adjusted**	**Unadjusted**	**Adjusted**	**Unadjusted**	**Adjusted**	**Unadjusted**
1982	$516	$214	$39	$16	$3.10	$1.30
1983	$807	$338	$103	$43	$12.40	$5.20
1984	$642	$274	$192	$82	$24.60	$10.50
1985	$455	$196	$108	$47	$36.70	$15.80
1986	$390	$173	$337	$150	$39.10	$17.40
1987	$433	$201	$398	$185	$19.60	$9.10
1988	$581	$278	$469	$225	$80.60	$38.60
1989	$404	$202	$371	$185	$25.00	$12.50
1990	$308	$166	$286	$154	$14.50	$7.80
1991	$377	$212	$347	$195	$27.40	$15.40
1992	$509	$298	$390	$228	$62.90	$36.80
1993	$360	$211	$276	$162	$71.10	$41.70
1994	$403	$241	$324	$194	$56.40	$33.70
1995	$306	$187	$228	$139	$48.60	$29.70
1996	$364	$230	$284	$180	$55.70	$35.30
1997	$255	$165	$179	$116	$35.60	$23.10
1998	$181	$119	$118	$78	$9.30	$6.10
1999	$282	$187	$237	$158	$11.10	$7.40
2000	$147	$102	$110	$76	$1.20	$0.80
2001	$292	$206	$175	$124	$12.20	$8.60
2002	$141	$101	$128	$91	$5.30	$3.80
2003	$310	$226	$285	$208	$19.20	$14.00
2004	$305	$239	$285	$223	$8.20	$6.40
2005	$192	$158	$179	$148	$5.10	$4.20
2006	$183	$155	$118	$100	$6.70	$5.70
2007	$260	$233	$225	$201	$19.90	$17.80
2008	$557	$535	$539	$518	$11.90	$11.40
2009	$358	$345	$340	$328	$16.50	$15.90
2010	$307	$307	$277	$277	$3.60	$3.60
Average	**$366**	**$224**	**$253**	**$167**	**$25.60**	**$15.20**
Std. Dev	**$151**	**$85**	**$117**	**$96**	**$21.70**	**$11.90**

B. Commonwealth of the Northern Mariana Islands

Introduction
The Northern Mariana Islands pelagic fishery occurs primarily from the island of Farallon de Medinilla in the north to the island of Rota in the south. The fishery is characterized using data from the Commercial Receipt Invoice Database. The data collection system is dependent upon first-level fresh fish purchasers to accurately record all fish purchases to species 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 voluntary and includes purchasers at some fish markets, stores, restaurants, hotels and roadside vendors ("fish-mobiles").

The current commercial purchase database collection system only documents landings on Saipan. The establishment of a data collection system for the islands of Tinian and Rota are in the process of being developed as funding allows. It is believed that the commercial purchase database accounts for about 90% of all commercial landings on Saipan. There is a subsistence fishery on Saipan where a small portion of the catch is sold to cover expenses. Fish from the subsistence fishery that are sold from door-to-door may account for up to 30% of unreported commercial sales.

Although the Saipan data collection system has been in operation since the mid-1970s, only data collected since 1983 are considered accurate enough to be used.

Creel Survey data from 2000 to the present are used in this report and serve as the basis of fishing activity analyses. These analyses are limited only to the island of Saipan. Currently, there are no creel surveys being conducted on the islands of Tinian or Rota.

Summary
Trolling is the primary fishing method in the pelagic fishery. The pelagic fleet, excluding charter boats, consists primarily of vessels less than 24 ft in length which typically cannot venture more 20 miles from Saipan.

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

The primary target and most marketable species for the pelagic fleet is skipjack tuna. In 2010, Skipjack Tuna landings comprised around 70% of all pelagic landings. Schools of skipjack tuna have historically been common in near-shore waters, providing an opportunity for large catches with minimal travel times and fuel costs. Skipjack is eagerly purchased locally, and primarily prepared as sashimi.

Yellowfin tuna and mahimahi are also very marketable species but are seasonal. During their seasonal runs, these fish are usually found close to shore and are easily caught.

According to creel survey data, 2010 tuna landings increased 45% over 2009 and comprised 80% of all pelagics landings.

In late 2007, Crystal Sea's, based on Rota, became the first longline fishing company in CNMI. However, by 2009, Crystal Seas was renamed Pacific Seafood's and relocated its operations to Saipan. There are currently four licensed longline fishing vessels stationed in the CNMI. Federal log book data is being collected and submitted to NMFS. This report did not include any data or landings from longline vessels.

Table 33. CNMI Creel Survey - 2010 pelagic species composition

Species	Total Landings (Lbs)	Non-Charter	Charter
Skipjack Tuna	369,998	364,171	5,827
Yellowfin Tuna	31,457	31,457	0
Kawakawa	32,451	30,387	2,064
Tuna PMUS	**433,906**	**426,015**	**7,891**
Mahimahi	73,914	73,914	0
Wahoo	13,487	13,487	0
Blue Marlin	0	0	0
Sailfish	3,236	3,236	0
Shortbill Spearfish	0	0	0
Non-tuna PMUS	**90,637**	**90,637**	**0**
Dogtooth Tuna	6,843	6,843	0
Rainbow Runner	11,245	11,245	0
Barracudas	504	504	0
Yellowtail Barracuda	0	0	0
Non-PMUS Pelagics	**18,592**	**18,592**	**0**
Total Pelagics	**543,135**	**535,244**	**7,891**

Interpretation: Tunas represented almost 80% of the total pelagics catch in CNMI. Non-tuna PMUS, predominately mahimahi, comprised about 17% of the catch, while non-PMUS pelagics made up the minority of the catch at around 3%. Skipjack tuna continued to dominate the pelagic landings, comprising around 70% of the catch. Mahimahi, about 14% of the catch, is seasonal with peak catch usually from February through April. Yellowfin tuna, about 6% of the catch, is seasonally caught from April to September. The overall pelagic catch increased by 42% in 2010 compared to 2009.

Source: The Division of Fish and Wildlife (DFW) boat-based creel survey.

Calculations: 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.

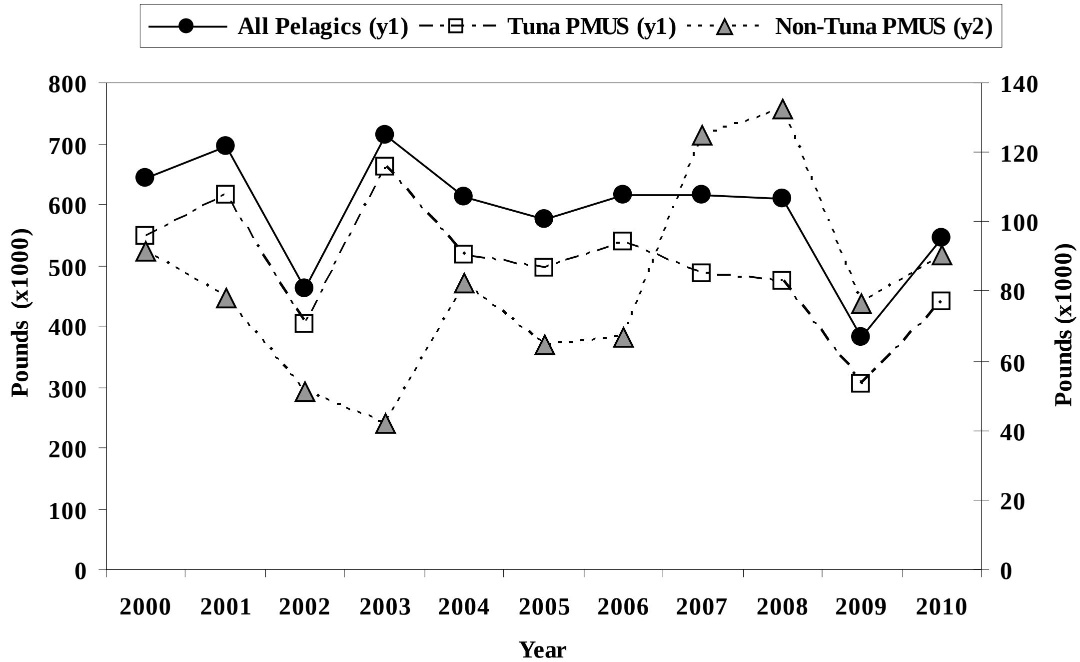
Table 34. CNMI 2010 commercial pelagic trolling landings, revenues and price

Species	Landing (Lbs)	Value ($)	Avg. Price ($/Lb)
Skipjack Tuna	124,096	215,946	1.74
Yellowfin Tuna	30,507	59,913	1.96
Saba (kawakawa)	268	428	1.60
Tuna PMUS	**154,871**	**276,286**	**1.78**
Mahimahi	23,157	43,562	1.88
Wahoo	2,887	5,693	1.97
Blue Marlin	73	147	2.00
Sailfish	544	817	1.50
Sickle Pomfret (w/woman)	317	1,307	4.13
Non-tuna PMUS	**26,978**	**51,525**	**1.91**
Dogtooth Tuna	5,822	10,586	1.82
Rainbow Runner	679	1,449	2.13
Non-PMUS Pelagics	**6,502**	**12,034**	**1.85**
Total Pelagics	**188,351**	**339,846**	**1.80**

Interpretation: In 2010 Skipjack tuna continued to dominate the pelagic landings, comprising around 66% of the (commercially receipted) industry's pelagic catch. Though it is the majority of pelagic landings, skipjack landings decreased 7% in 2010. In 2010, yellowfin tuna and mahimahi ranked second and third in total landings. Mahimahi landings increased 16% and yellowfin landings increased 15% in 2010. 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 2010 total pelagic recorded catch sold decreased by 1% over 2009.

The highest average price of identified pelagic species was $4.13/lb for Sickle Pomfret. The lowest priced species is sailfish which sold at an average price of $1.50/lb. Skipjack tuna sold at an average price of $1.74/lb. The main target in the CNMI pelagic fishery is skipjack tuna.

Figure 30. Annual CNMI estimated total landings



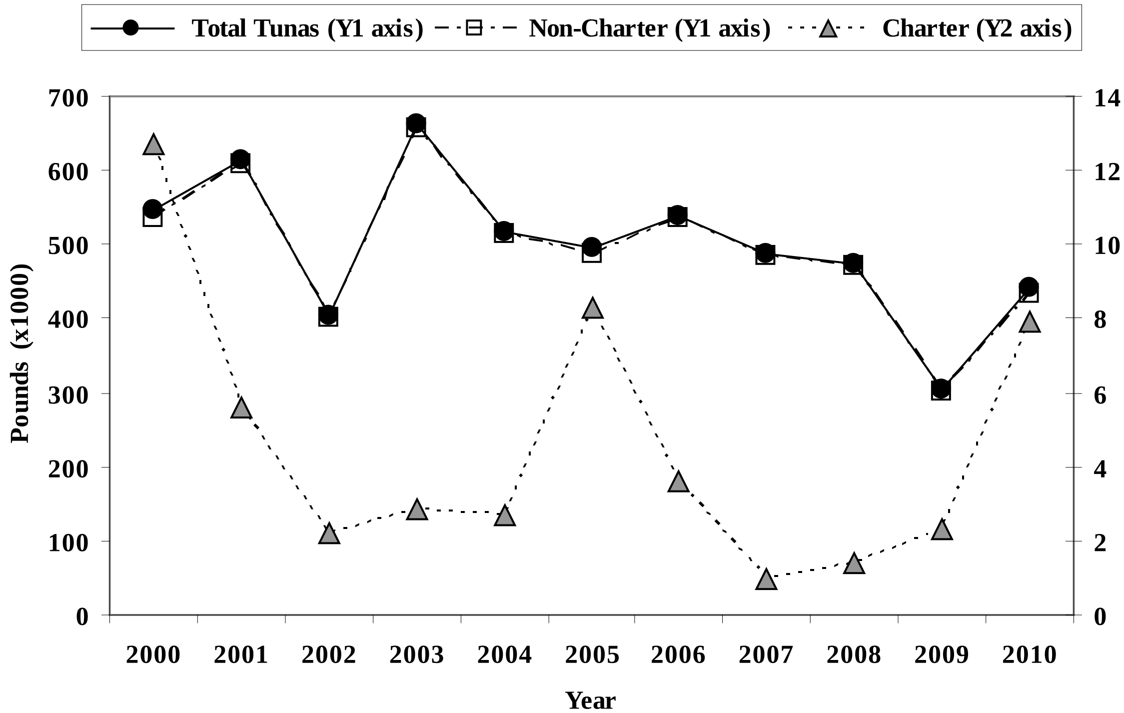
Interpretation: Creel survey landings declined in 2002 possibly due to several typhoons hitting the Mariana Islands. Subsequent landings of pelagic species were relatively stable until 2009 when landings of Tuna PMUS decreased 36% compared to 2008. In 2009, there were fewer fishing trips and they were shorter.

Total pelagics landings increased by 42% in 2010 over 2009 landings, although they were lower than most years prior. 2010 non-tuna PMUS landings increased by 19% compared to the 2009 catch. 2010 Tuna PMUS landings increased 45% over 2009 tuna landings. Tuna PMUS comprises around 80% of total pelagic landings.

Estimated Pelagics Landings, All Species (lbs)			
Year	**All Pelagics**	**Tuna PMUS**	**Non-Tuna PMUS**
2000	644,324	547,441	91,536
2001	695,382	614,330	78,164
2002	461,332	403,062	51,064
2003	714,407	660,987	41,910
2004	612,112	517,661	82,625
2005	576,312	494,493	64,661
2005	614,002	539,455	66,757
2007	615,267	486,000	124,996
2008	608,809	472,703	132,312
2009	381,380	303,522	76,308
2010	543,134	440,748	90,636
Average	587,860	498,218	81,906
Standard Deviation	92,443	93,203	26,441

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 31. CNMI estimated tuna landings



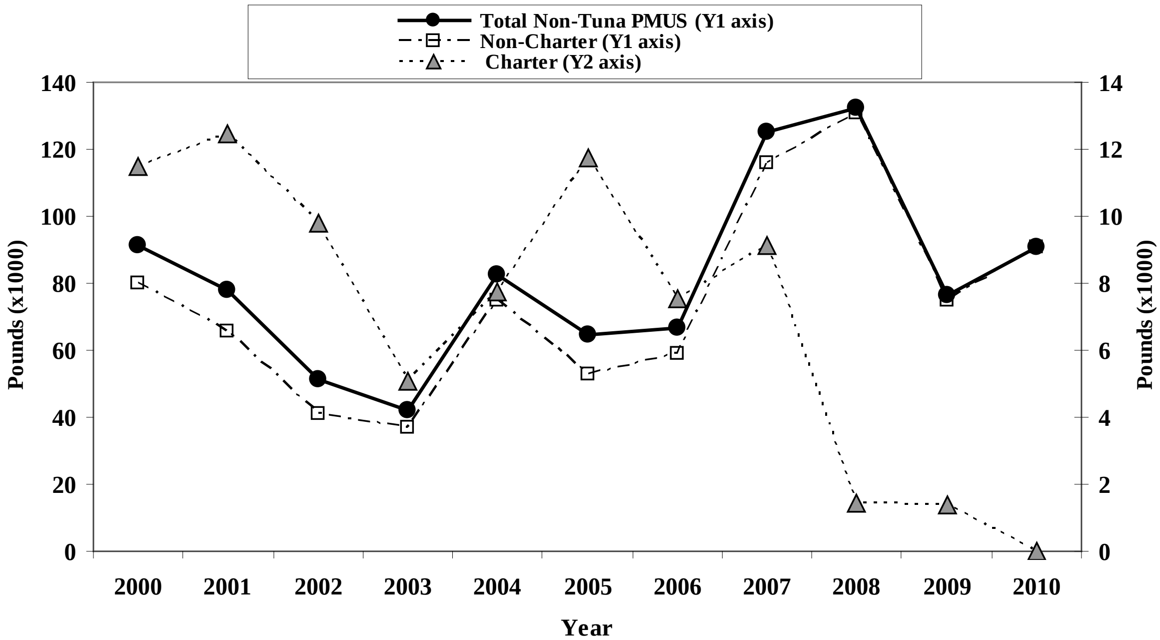
Interpretation: Total landings over the time series indicate that 98% of all Tuna PMUS are landed by Non-Charter vessels. 2010 tuna landings increased 45% over 2009. Historically, tuna landings have been fairly stable

Source: The Division of Fish and Wildlife (DFW) boat-based creel survey.

Calculations: 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.

	Estimated Tuna Landings (lbs)		
Year	**Total Tunas**	**Non-charter**	**Charter**
2000	547,441	534,708	12,733
2001	614,330	608,705	5,625
2002	403,062	400,848	2,214
2003	660,987	658,123	2,863
2004	517,661	514,985	2,676
2005	494,493	486,196	8,297
2006	539,455	535,838	3,617
2007	486,000	485,025	975
2008	472,703	471,294	1,408
2009	303,522	301,207	2,315
2010	440,748	432,858	7,891
Average	498,218	493,617	4,601
Standard Deviation	93,203	92,531	3,485

Figure 32. Annual CNMI estimated non-tuna PMUS landings



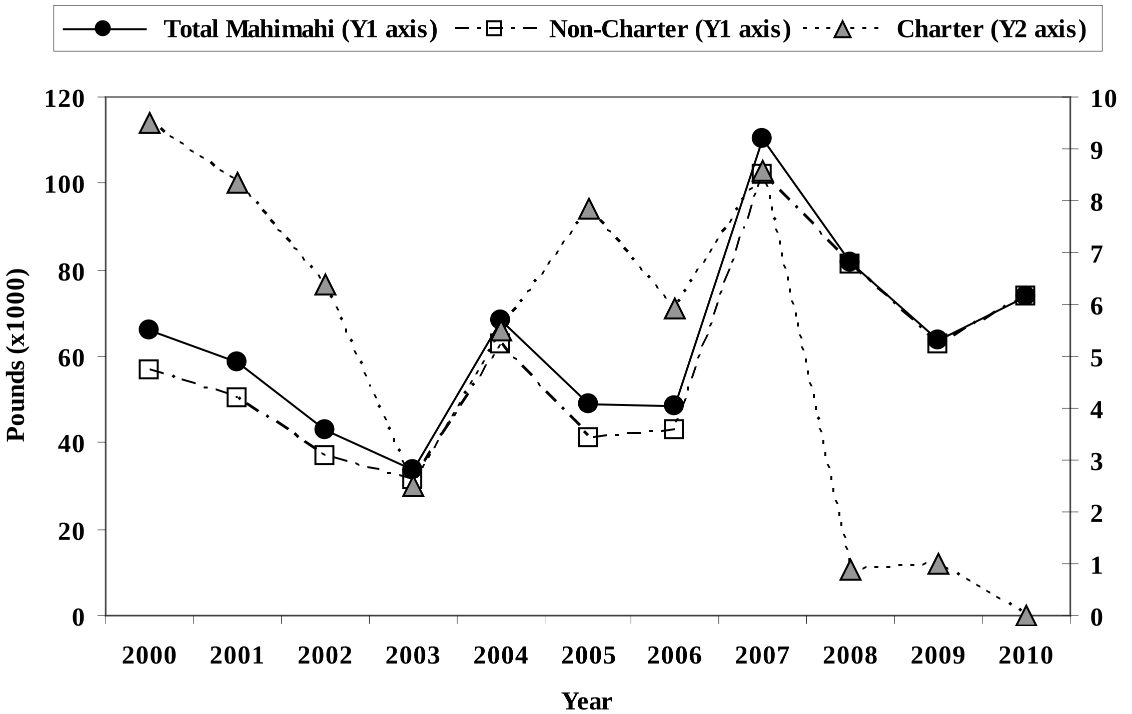
Interpretation: 2010 non-tuna PMUS landings increased over 2009 landings by 19% and were above the 11 year average. This increase is mostly due to larger mahimahi and wahoo landings. As with tunas, the vast majority of non-tuna PMUS are caught by the non-charter sector of the fishery.

Source: The Division of Fish and Wildlife (DFW) boat-based creel survey.

Calculations: 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	41,910	36,827	5,084
2004	82,625	74,885	7,740
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	90,636	90,636	0
Average	81,906	74,825	7,081
Standard Deviation	26,441	27,764	4,277

Figure 33. Annual CNMI estimated mahimahi landings



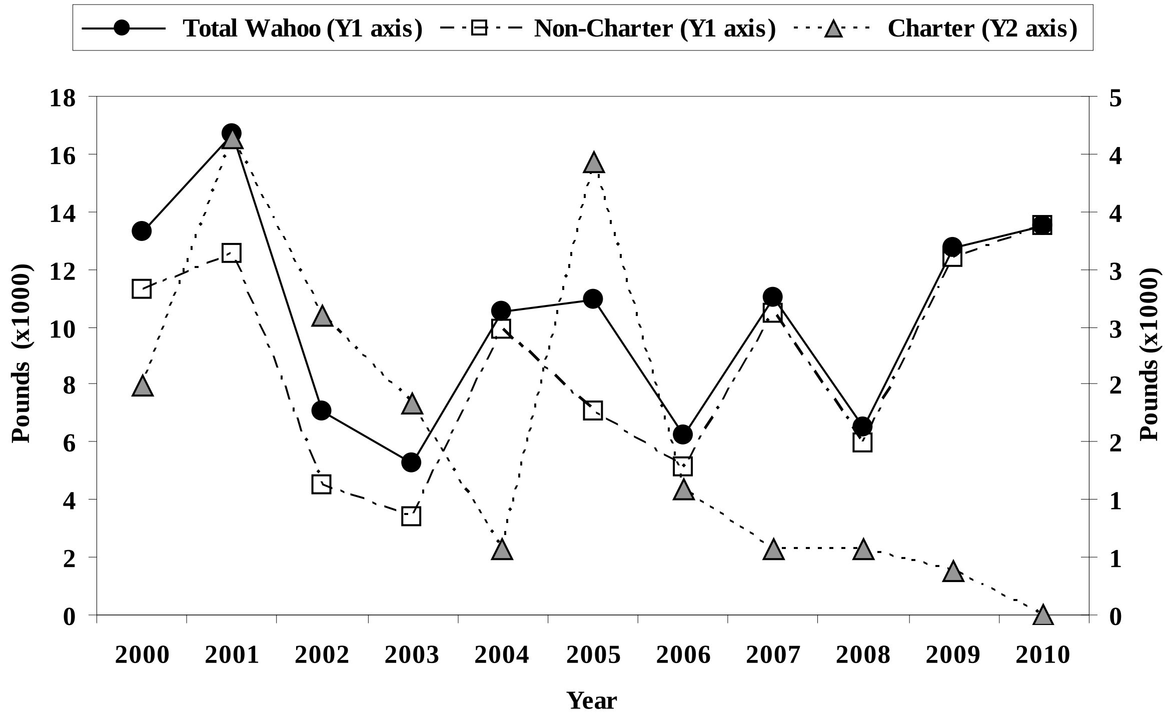
Interpretation: Over the last 11 years, mahimahi landings have fluctuated annually, usually in two-year cycles. 2010 landings increased by 16% over 2009 landings and were above the 11-average by roughly the same margin. The bulk of mahimahi landings are from Non-Charter vessels. Although mahimahi is a favorite target by Charter boats, the decreasing number of tourist arrival into Saipan has deeply impacted the Charter fishing industry.

Source: The Division of Fish and Wildlife (DFW) boat-based creel survey.

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	33,855	31,338	2,517
2004	68,394	62,902	5,492
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	73,914	73,914	0
Average	63,413	58,282	5,131
Standard Deviation	20,052	20,196	3,291

Calculations: 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 34. Annual CNMI Estimated Wahoo Landings

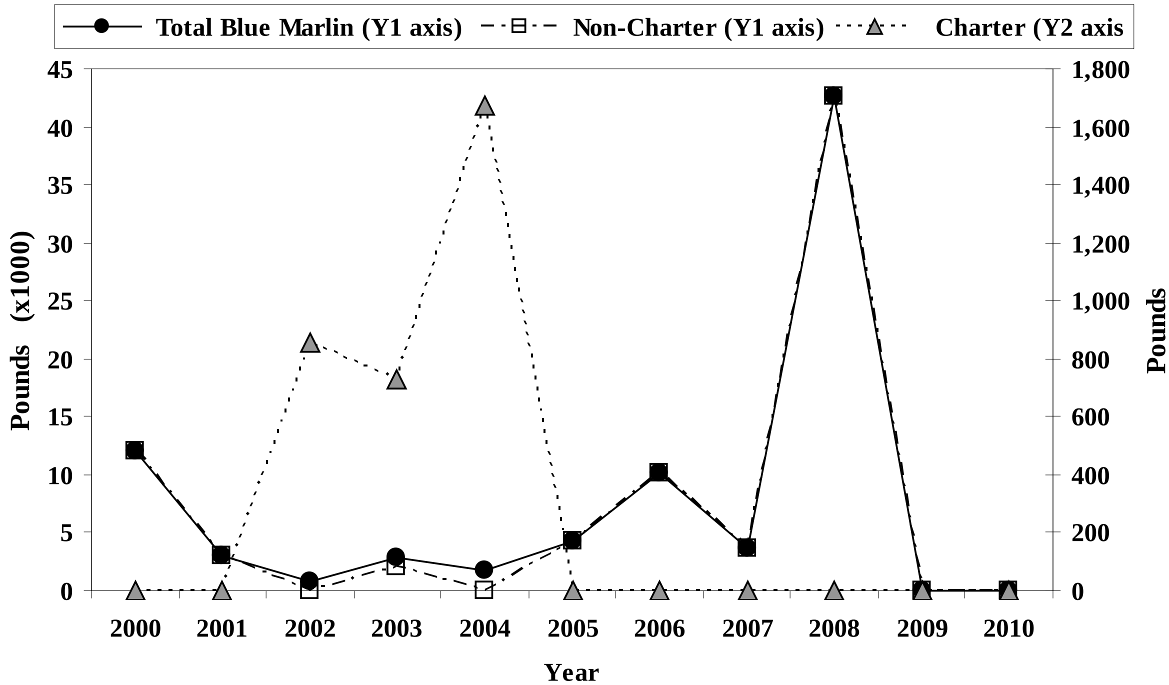


Interpretation: Wahoo landings have fluctuated yearly with the majority of landings being made by Non-Charter vessels. 2010 wahoo landings increased 6% over 2009 landings and 30% higher than the 11-year average. There were no wahoo landings recorded during creel survey sample days of Charter boats in 2010.

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	5,255	3,417	1,837
2004	10,501	9,924	577
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	13,487	13,487	0
Average	10,338	8,730	1,608
Standard Deviation	3,480	3,449	1,366

Source: The Division of Fish and Wildlife (DFW) boat-based creel survey.
Calculations: 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 35. Annual CNMI Estimated Blue Marlin Landings



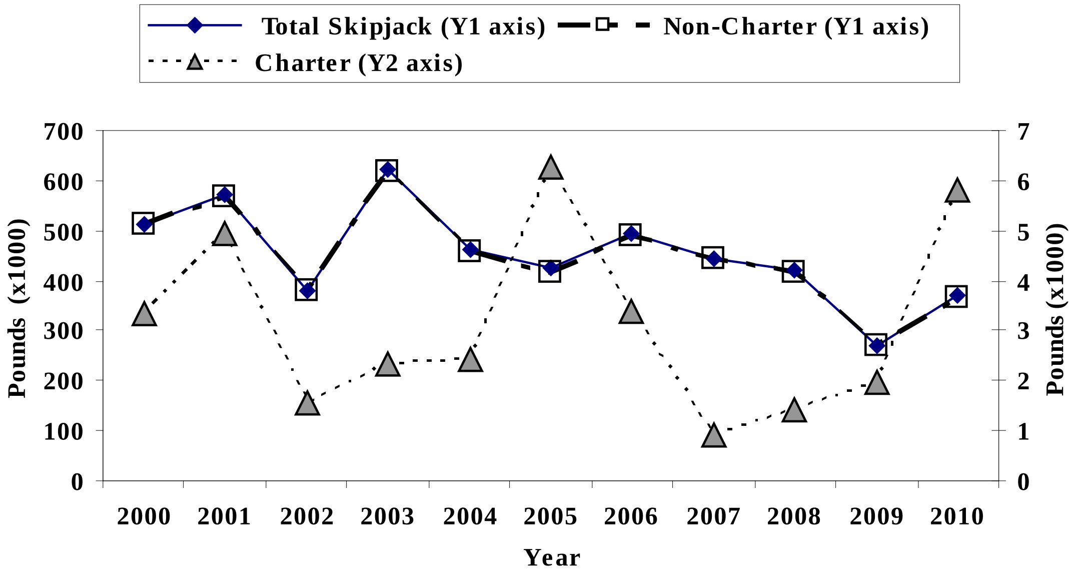
Interpretation: Blue marlin is rarely targeted by non-charter vessels. Charter vessels would prefer to land blue marlin but seldom do. Non-charter fishermen find it difficult to find a market for this species. Additionally, non-charter vessels are usually smaller in size (between 15 to 18 feet in length) making it difficult to pull these large fish aboard. No blue marlin landings were recorded in creel survey samples for non-charter or charter vessels in 2009 or 2010.

Source: The Division of Fish and Wildlife (DFW) boat-based creel survey.

Calculations: 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.

	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	2,800	2,071	729
2004	1,671	0	1,671
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
Average	7,357	7,061	296
Standard Deviation	11,744	11,898	530

Figure 36. Annual CNMI estimated skipjack tuna landings



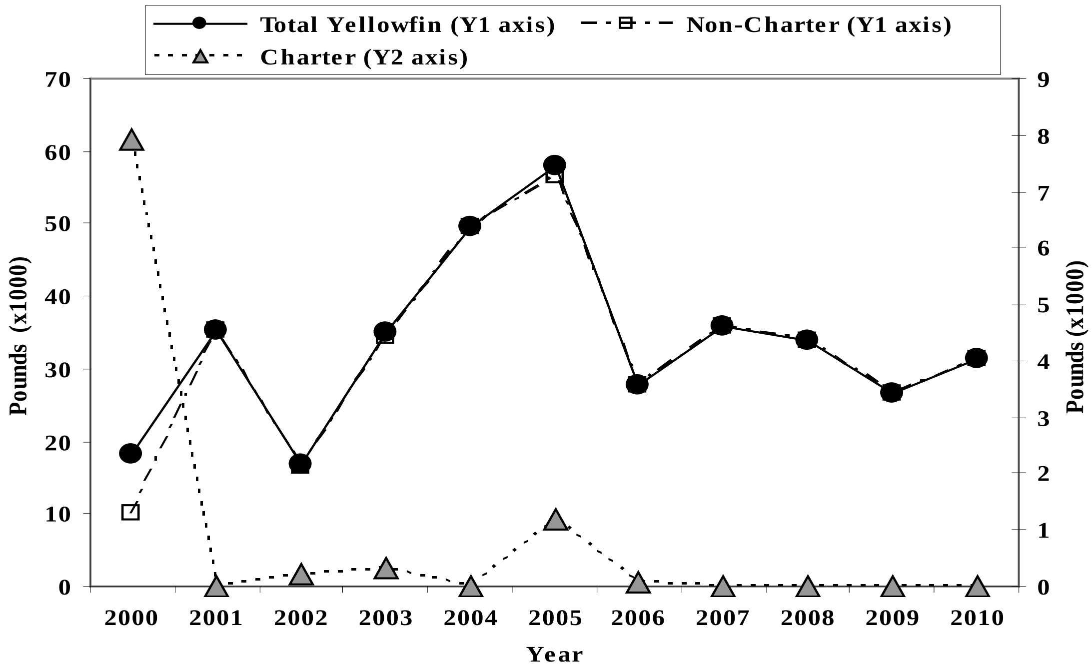
Interpretation: Nearly 80% of all pelagic landings in CNMI are skipjack tuna, and 98% of these are from non-charter vessels. A drop in 2002 landings is probably attributable to several typhoons hitting the Mariana Islands that year. Skipjack landings spiked in 2003, possibly due to increased fishing effort. Landings declined from 2007 through 2009. The sharp decline between 2008 and 2009 probably reflects a general contraction of the CNMI economy and an increase in fuel prices. 2010 landings increased by 37% over 2009, however, they are still below the 11-year average.

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	621,460	619,130	2,330
2004	459,997	457,576	2,421
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	369,998	364,171	5,827
Average	**452,260**	**449,137**	**3,123**
Standard Deviation	**93,358**	**93,181**	**1,745**

Source: The Division of Fish and Wildlife (DFW) boat-based creel survey.

Calculations: 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 Skipjack Tuna, Charter and Non-Charter separately are summed across all methods to obtain the numbers plotted above.

Figure 37. Annual CNMI estimated yellowfin landings



Interpretation: In 2010, yellowfin tuna was only 6% of all pelagics landings. Since 2006, yellowfin landings have been fairly steady with little variation from year to year. 2010 yellowfin landings were typical for the 2006-2010 time periods. The 2010 landings were slightly below the 11-year average.

Source: The Division of Fish and Wildlife (DFW) boat-based creel survey.

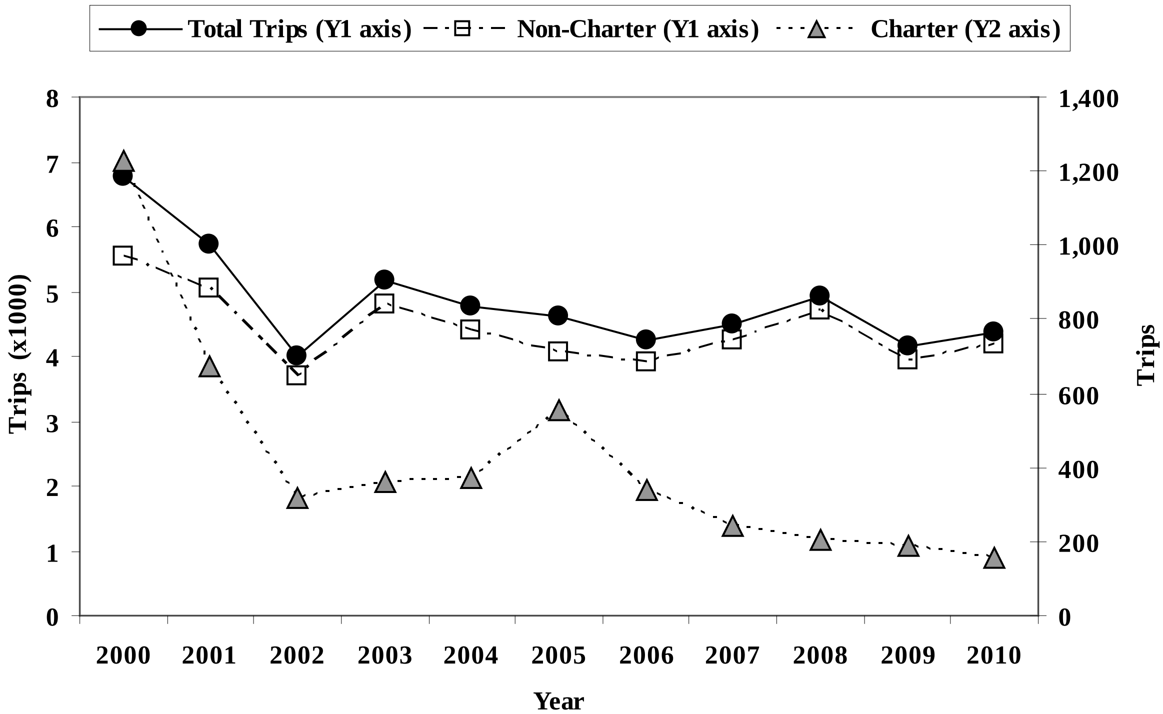
Calculations: A 365-day (366 days during leap years) annual expansion is run for each calendar year of survey data to produce catch and effort estimates for the pelagic fishery to avoid over-estimating seasonal pelagic species. Percent species composition is calculated by weight for the sampled catch 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.

	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	34,896	34,568	327
2004	49,631	49,631	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	31,457	31,457	0
Average	33,458	32,576	882
Standard Deviation	11,550	12,491	2,253

Table 35. 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	119	3	115	113	2
2011	73	110	105	5	105	100	5

Figure 38. CNMI estimated number of trips



Interpretation: The total number of trolling trips has slightly decreased since 2000: the start of the boat-based creel survey. This slight decline is partly due to the downturn in economic activity in CNMI, rising fuel costs, and fishermen leaving the fishery. Atypically, the total number of trolling trips in 2010 increased by 5% from 2009. This increase is from the non-charter sector which grew by 6% from 2009. Charter trips decreased by 17% in 2010 compared to 2009.

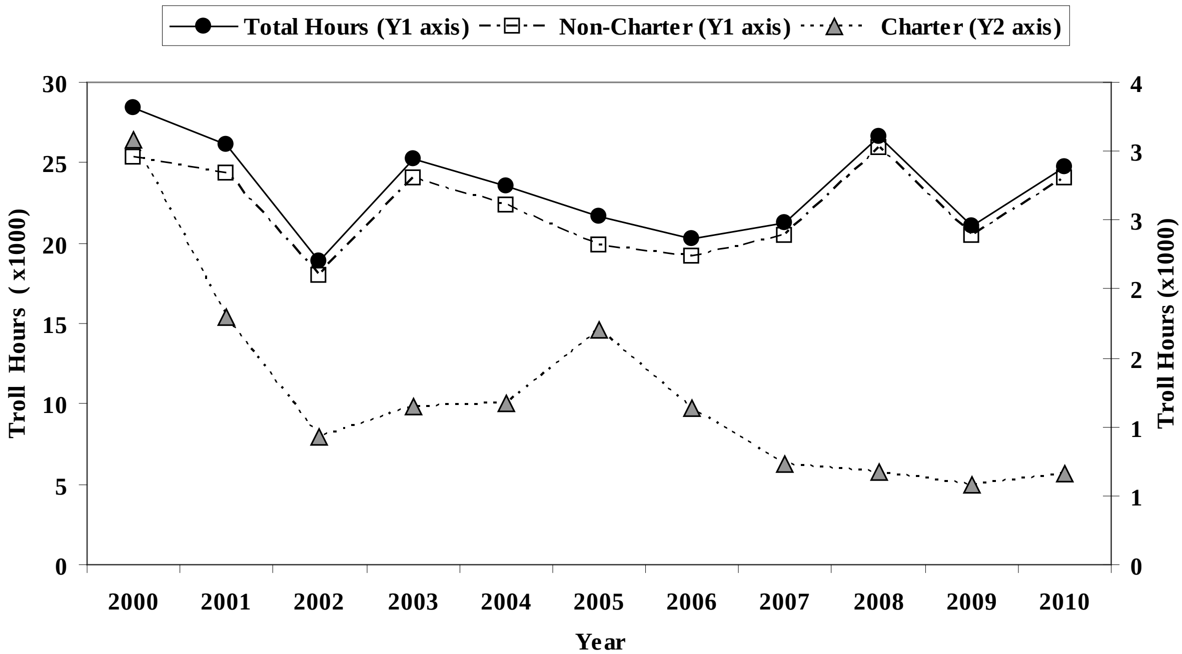
Source: The Division of Fish and Wildlife (DFW) boat-based creel survey.

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	5,167	4,804	363
2004	4,783	4,412	371
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	4,355	4,197	158
Average	4,835	4,414	422
Standard Deviation	768	530	295

Calculations: 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 39. CNMI estimated number of trolling hours



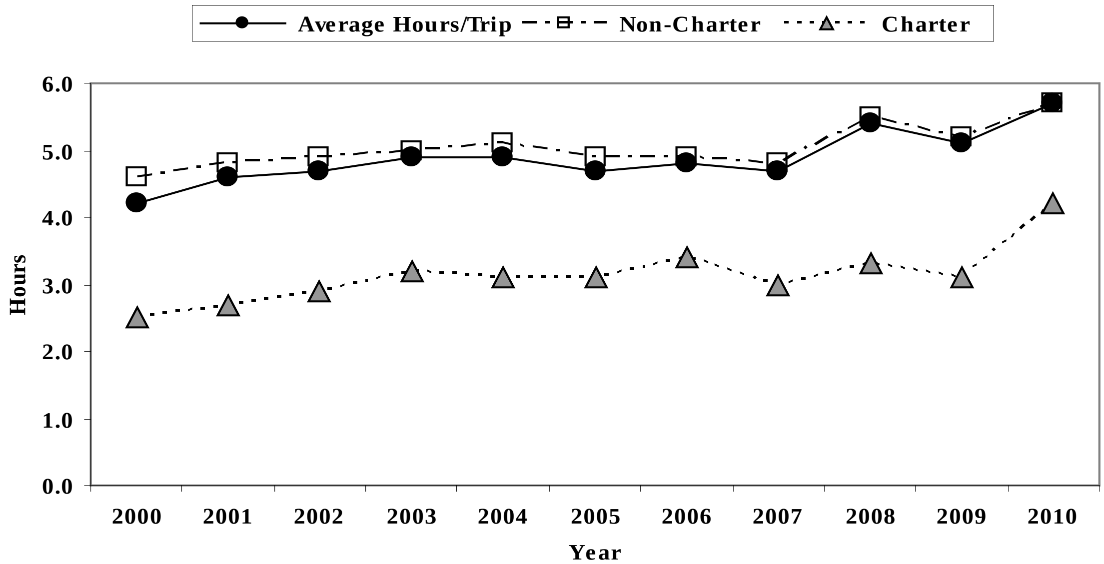
Interpretation: Total trolling hours for non-charter boats in 2010 increased 18% over 2009 and were 8% greater than the 11-year average. Charter trolling hours increased in 2010 by 13% over 2009, but were still below the 11-year average.

Source: The Division of Fish and Wildlife (DFW) boat-based creel survey.

Calculations: 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	25,224	24,078	1,146
2004	23,541	22,375	1,166
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	24,738	24,076	662
Average	23,435	22,198	1,237
Standard Deviation	2,895	2,602	698

Figure 40. CNMI estimated average troll trip length



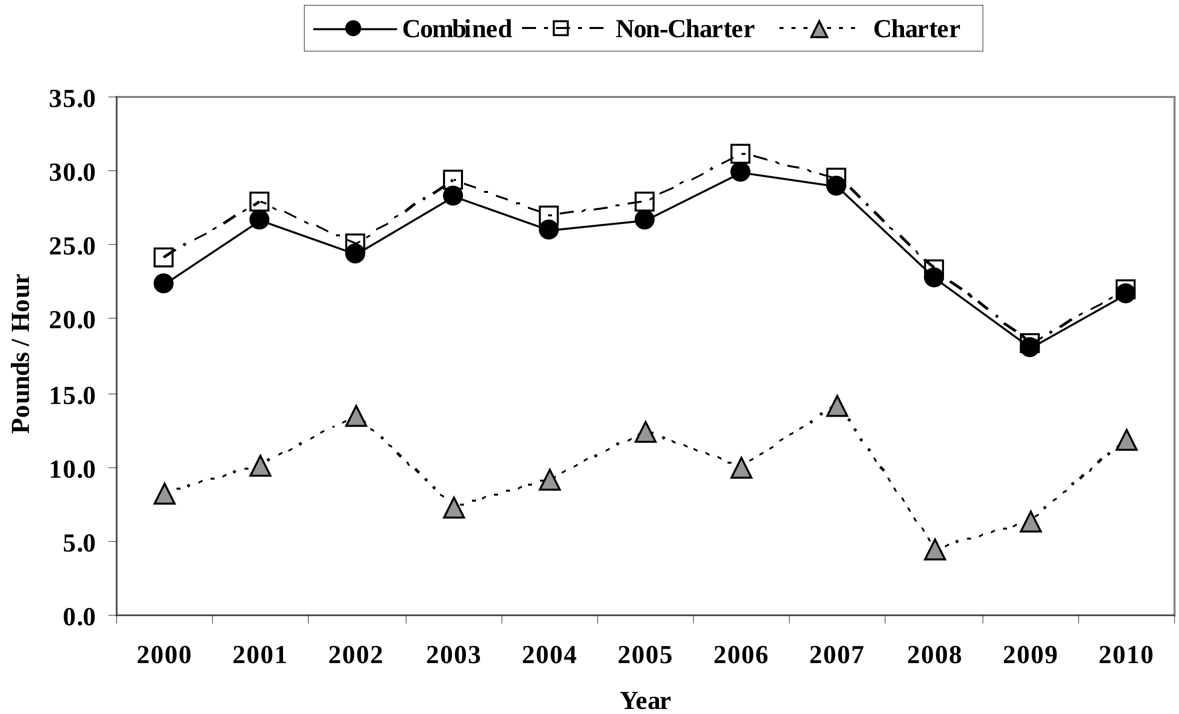
Interpretation: The overall average trolling hours/trips have increased over the 10 year time series. The average trip length increased in 2010 by 12% compared to 2009 and 16% over the 11-year average. Non-charter boat trip length was about 10% greater than the previous year, about a half hour per trip, and it is the highest per-trip average on record. The increase in per-trip effort is probably explained by fishermen fishing longer to meet market demands as fewer vessels participated in the fishery. The average number of hours per trip in the charter sector increased by 35% over the previous year and were well above the 11-year average.

Source: The Division of Fish and Wildlife (DFW) boat-based creel survey.

Calculations: 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.

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	5.7	4.2
Average	4.9	5.0	3.1
Standard Deviation	0.4	0.3	0.4

Figure 41. CNMI troll CPUE (pounds/hour): all pelagic species



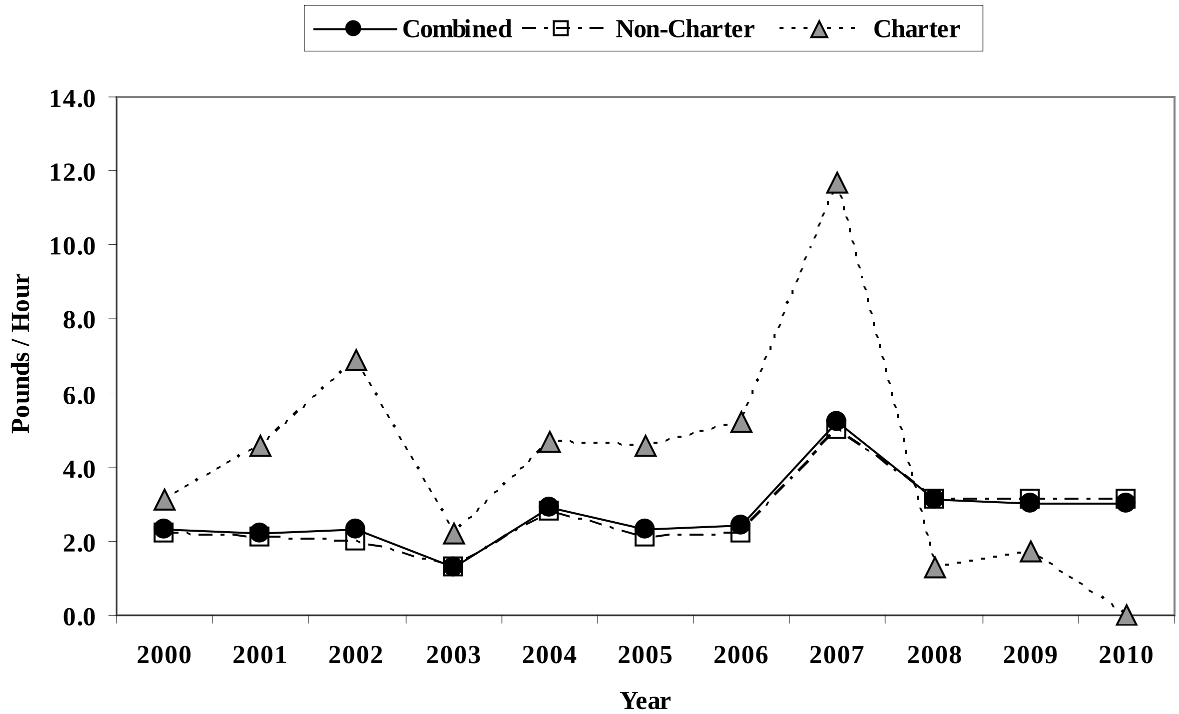
Interpretation: Annual fluctuations in trolling CPUE may be associated with weather patterns affecting local environmental conditions and productivity. Non-charter vessels account for about 98% of total landings. The non-charter fleet is generally made up of smaller vessels targeting skipjack. These smaller vessels are more fuel-efficient than larger vessels and are more economically practical for a small-scale fishery. On the down-side, smaller boats cannot fish in rougher weather, and this reduces the number of possible fishing days for them. The 2010 overall CPUE, in pounds per hour, for all pelagics increased 21% compared to 2009. In 2010, CPUEs for non-charter and charter vessels increased by 20% and 89%, respectively, compared to 2009.

Calculations: 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.

Source: The Division of Fish and Wildlife (DFW) boat-based creel survey.

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	7.3
2004	26.0	26.9	9.2
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	21.7	22.0	11.9
Average	25.1	25.9	9.8
Standard Deviation	3.4	3.6	2.9

Figure 42. CNMI troll CPUE (pounds/hour): mahimahi



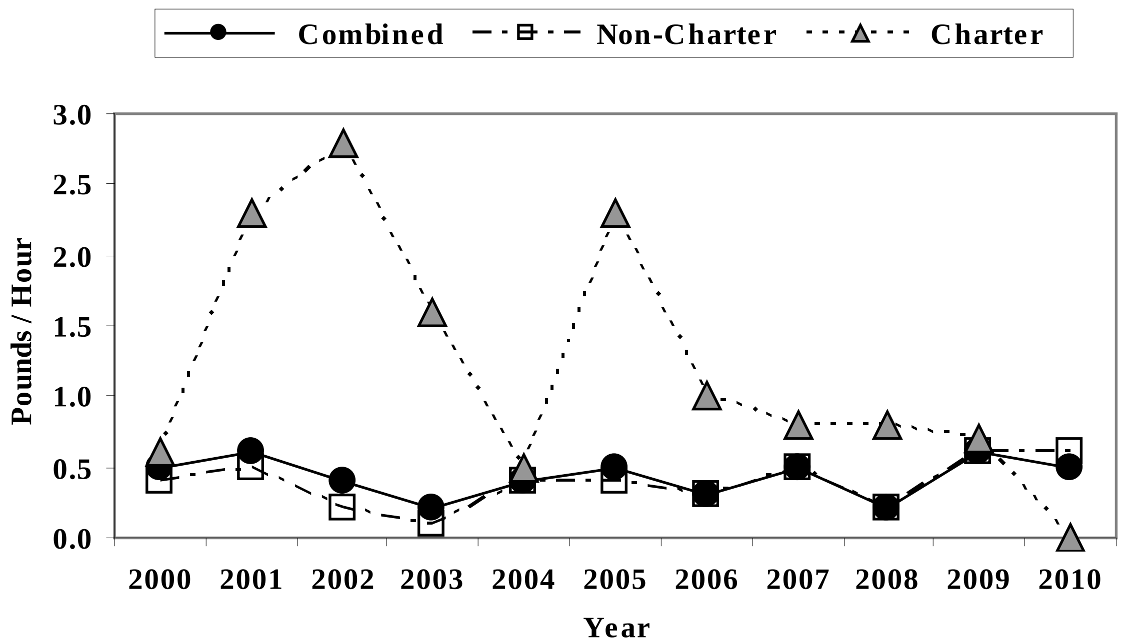
Interpretation: Mahimahi landings fluctuate annually and are high variable, possibly due to seasonal abundance. Mahimahi is not very marketable on Saipan, and fishermen do not target this species. Therefore, true CPUEs, in pounds per hour, may be influenced by fishing practices especially retention of the species and some bias may exist in the creel survey samples. The estimated 2010 total CPUE for mahimahi remained was similar to 2009, about 3 pounds per hour. There were no mahimahi landings in the charter vessel creel survey sample.

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	1.3	1.3	2.2
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
Average	2.7	2.6	4.2
Standard Deviation	0.9	0.9	3.1

Source: The Division of Fish and Wildlife (DFW) boat-based creel survey.

Calculations: 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).

Figure 43. CNMI troll CPUE (pounds/hour): wahoo



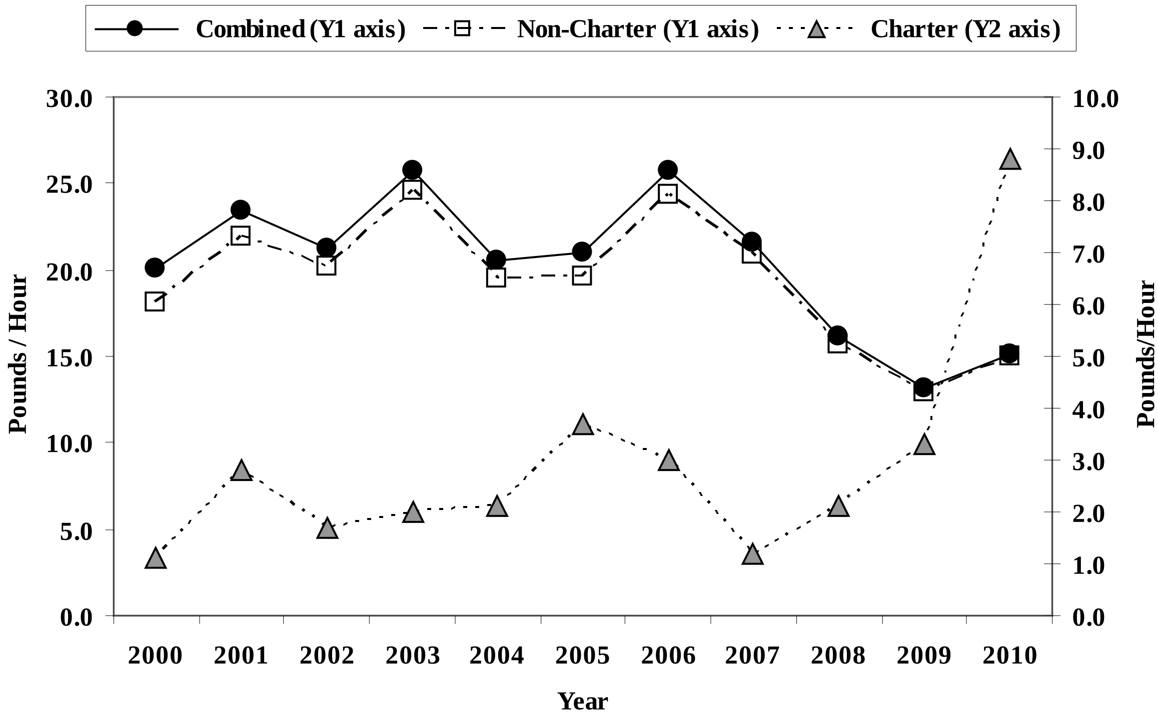
Interpretation: Wide fluctuations in annual wahoo charter CPUEs, in pounds per hour fished, are believed to be due to variations in local abundance. There were no recorded landings of wahoo by charter vessels during creel survey sample days. The 2010 CPUE for non-charter boats was the same as in 2009 (0.6 pounds per hour).

Source: The Division of Fish and Wildlife (DFW) boat-based creel survey.

Calculations: 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).

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	1.6
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	0.5	0.6	0.0
Average	0.4	0.4	1.2
Standard Deviation	0.1	0.2	0.9

Figure 44. CNMI troll CPUE (pounds/hour): skipjack tuna



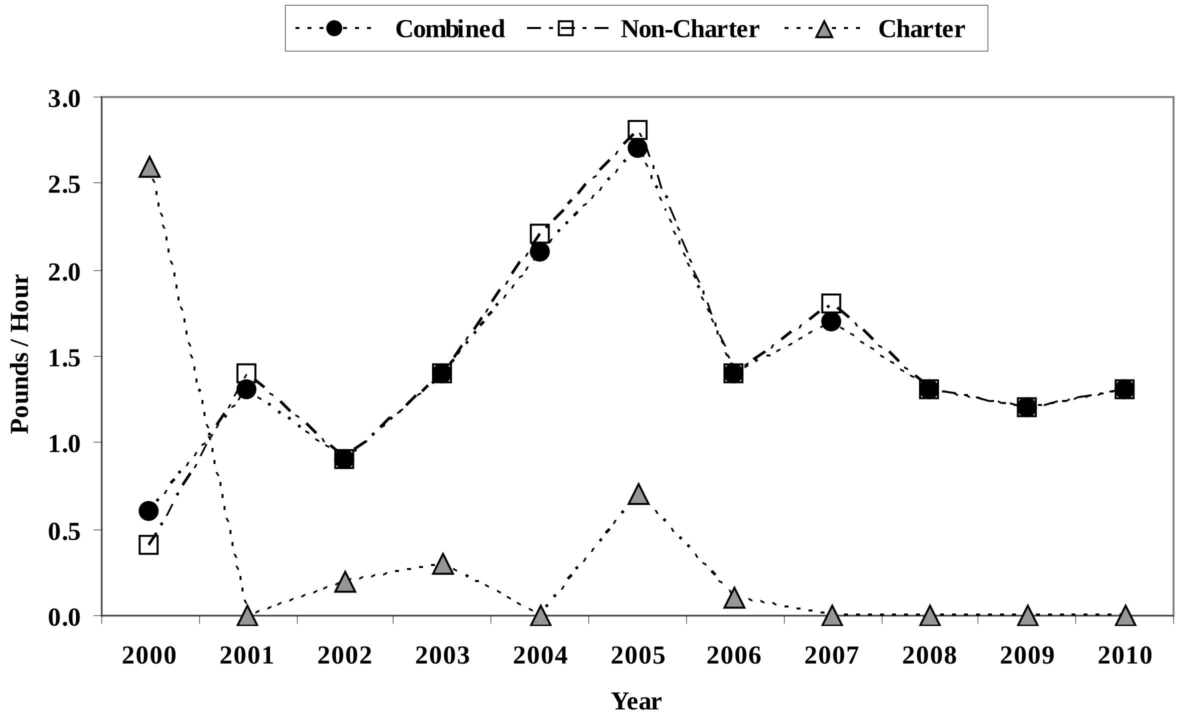
Interpretation: Skipjack tuna is the primary target species in CNMI pelagic fisheries. Annual fluctuations in CPUE, in pounds per hour fished, may be due to variations in annual abundance and sea conditions. Poor sea conditions not only reduce the number of fishing days, but may also hinder fishing efficiency causing a decline in CPUE. Additionally, many experienced fishermen have left the fishery due to higher trip costs. Fewer experienced fishermen (highliners) will also reduce CPUEs. The 2010 overall CPUE increased 16% over 2009. Non-charter boat CPUE increased 15% but was still below the 11-year average. Charter vessel catch rates also increased in 2010 from 3.3 lbs/hr to 8.8 lbs/hr, a 166% increase.

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	2.0
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	15.0	15.1	8.8
Average	19.3	20.3	2.9
Standard Deviation	3.5	3.9	2.0

Source: The Division of Fish and Wildlife (DFW) boat-based creel survey.

Calculations: 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 45. CNMI troll CPUE (pounds/hour): yellowfin tuna



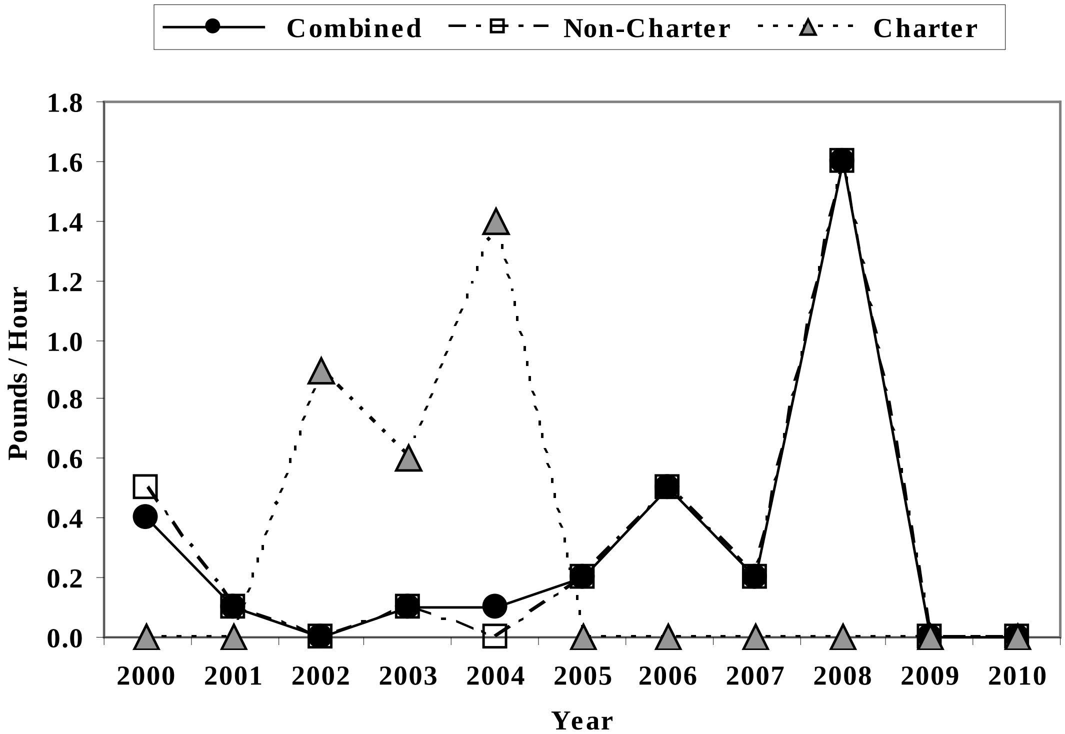
Interpretation: Annual fluctuations in yellowfin tuna CPUE, in pounds per hour fished, as with mahimahi and wahoo, is probably tied to local annual abundance, weather, and yellowfin's seasonal occurrence in CNMI. The overall 2010 yellowfin CPUE increased slightly by 8% compared to 2009. Yellowfin were not present in the charter vessel creel survey sample in 2010.

Source: The Division of Fish and Wildlife (DFW) boat-based creel survey.

Calculations: 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).)

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	1.3	1.3	0.0
Average	1.4	1.5	0.4
Standard Deviation	0.5	0.6	0.7

Figure 46. CNMI Troll CPUE (pounds per hour): Blue Marlin



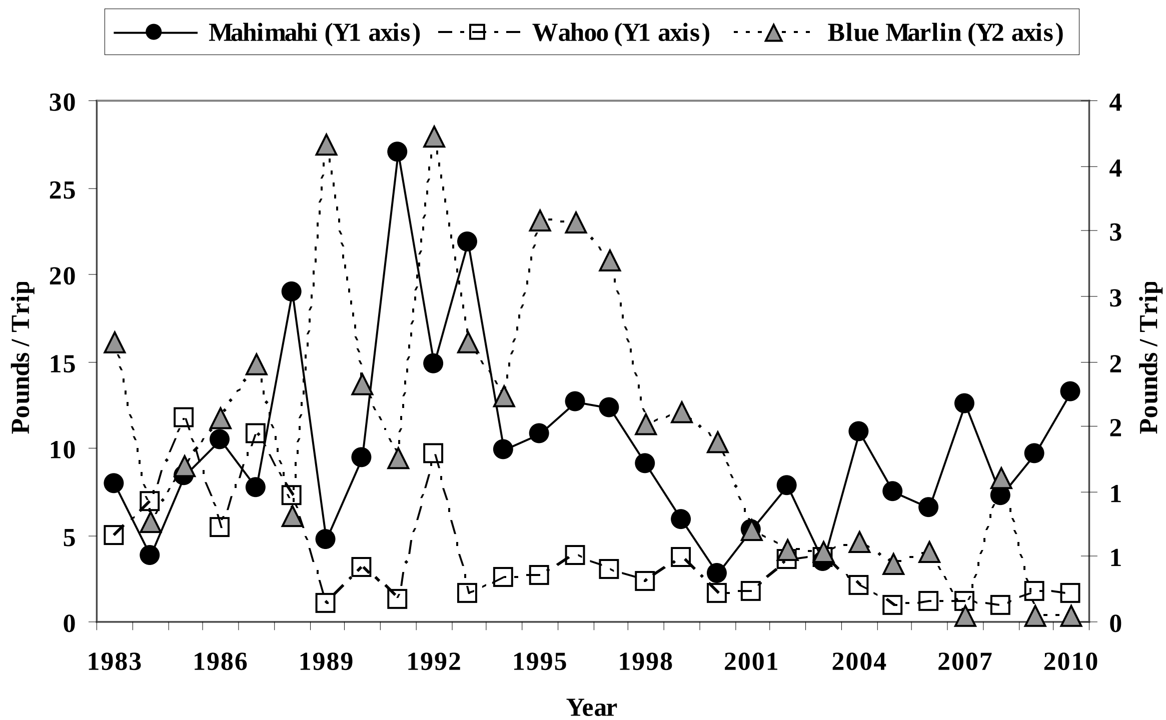
Interpretation: Non-charter vessels do no target blue marlin, because the market for this species is extremely small and they are dangerous to land due to their large size. However, they are targeted during fishing tournaments. Charter vessels do target blue marlin, but the catch is small and varies annually. There were no blue marlins present in either non-charter or charter creel survey samples in 2010.

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	0.6
2004	0.1	0.0	1.4
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
Average	0.3	0.3	0.3
Standard Deviation	0.4	0.5	0.5

Source: The Division of Fish and Wildlife (DFW) boat-based creel survey.

Calculations: 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).

Figure 47. CNMI trolling landings per trip based on commercial receipt invoices for mahimahi, wahoo, and blue marlin (pounds/trip)



Interpretation: The 2010 per-trip mahimahi CPUE (13.17 pounds per trip) was above the 28-year average of 10.09 pounds per trip. Per-trip CPUE is likely influenced by marketability and local abundance. As stated above, mahimahi is not a desirable species for the local market and retention rates may be low for this species. Actual total catch of mahimahi, therefore, may be under-represented by extrapolating from sales invoices. Mahimahi landings on a per-trip basis were highest in the early 1990's and dropped off towards the end of the decade. Over the course of the decade, mahimahi per-trip landings show annual variability, but seem to be trending upwards.

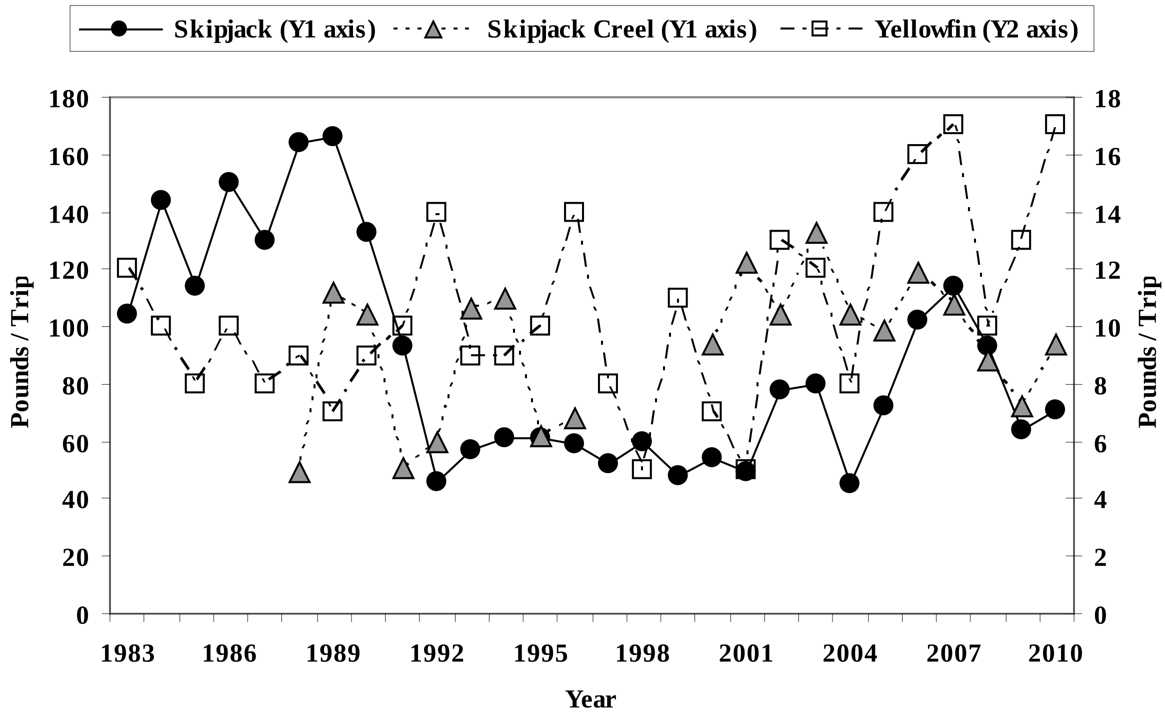
The 2010 per-trip CPUE (1.64 pounds per trip) was below the 28-year average of 3.64 pounds per trip. Per-trip landings of wahoo were highest in the 1980s, but dropped off at the beginning of the 1990s and have since ranged annually between roughly 0.5-3.6 pounds per trip. Wahoo is a desirable fish and landings may simply reflect local abundance.

Being an apex predator, blue marlin abundance is, in general, relatively low compared to other species. This combined with low marketability and the safety issues associated with handling large fish in small boats, per-trip landings of this species are generally low. While blue marlins are targeted in tournaments, they are rarely sold to vendors participating in the Commercial Purchase Data Collection Program, and do not show up in the Commercial Purchase Program Database. With the exception of 2008, blue marlin landings in the 2000's were well below one (1) pound per trip. The 2010 per-trip blue marlin CPUE (0.04 pounds per trip) was well below the 28-year average of 1.46 pounds per trip.

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.

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
Average	10.09	3.64	1.46
Standard Deviation	5.38	2.98	1.04

Figure 48. CNMI troll landings per trip based on commercial receipt invoices for skipjack tuna, yellowfin tuna, and skipjack tuna (Creel Survey) (pounds/trip)



Interpretation: Per-trip landings of skipjack displayed a great deal of variability in the 1980s and 1990s. Commercial receipt information and creel survey data showed little agreement over the time period. No explanation has been made to explain the disparity between the two monitoring methods. Zero years for the creel survey indicate years when the creel survey was not conducted. At the beginning of the 2000's, creel survey landings per trip estimates were generally higher than landings per trip estimates from commercial receipt data. In the latter part of the decade, the two monitoring systems have yielded similar results. Per-trip landings for skipjack were highest in the latter 1980s peaking at an estimated166 pounds per trip. In last decade, creel survey estimates for skipjack landings have been between 72-122 pounds per trip. Commercial Purchase Program Data estimated landings over the last decade have been between 49-114 pounds per trip. 2010 Commercial Purchase Program Data per-trip landing estimates (71 pounds per trip) for skipjack are below the historic average of 88 pounds per trip. Creel Survey estimated per-trip landings for skipjack were 94 pounds per trip which is above the historic average for estimates based on Creel Survey data.

Yellowfin tuna per-trip landings have remained relatively stable over the last 28 years averaging around 11 pounds per trip. The 2010 per-trip estimate for yellowfin tuna was 17 pounds per trip which is above the 28-year estimated average.

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.

CPUE: Skipjack, Yellowfin, and Skipjack (Creel) (pounds/trip)

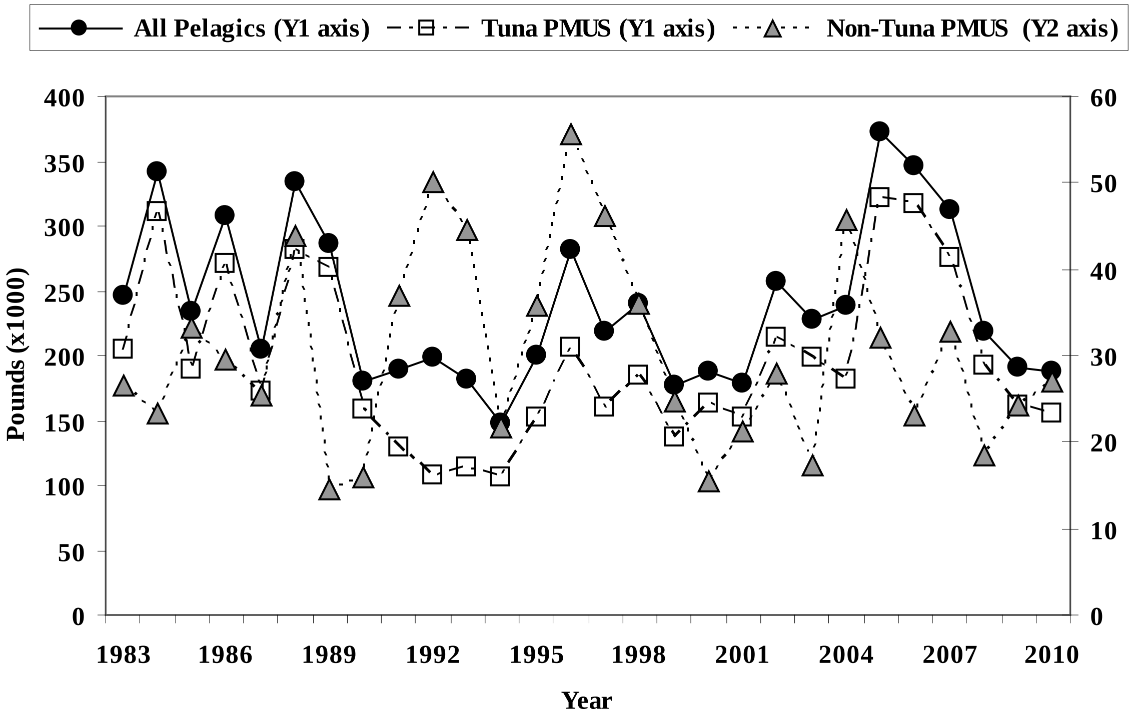
Year	Skipjack	Yellowfin	Skipjack Creel
1983	104	12	0
1984	144	10	0
1985	114	8	0
1986	150	10	0
1987	130	8	0
1988	164	9	49
1989	166	7	112
1990	133	9	104
1991	93	10	51
1992	46	14	60
1993	57	9	106
1994	61	9	110
1995	61	10	62
1996	59	14	68
1997	52	8	0
1998	60	5	0
1999	48	11	0
2000	54	7	94
2001	49	5	122
2002	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	94
Average	88	11	66
Standard Deviation	37	3	47

Table 36. CNMI consumer price indices (CPI), CPI adjustment factors, and commercial receipt invoice coverage

Year	CPI	CPI Adjusted Factor	Percent Data Coverage
1983	140.90	2.49	80.00
1984	153.20	2.29	80.00
1985	159.30	2.20	80.00
1986	163.50	2.15	80.00
1987	170.70	2.06	80.00
1988	179.60	1.95	80.00
1989	190.20	1.85	80.00
1990	199.33	1.76	80.00
1991	214.93	1.63	80.00
1992	232.90	1.51	80.00
1993	243.18	1.44	80.00
1994	250.00	1.40	80.00
1995	254.48	1.38	80.00
1996	261.98	1.34	80.00
1997	264.95	1.32	80.00
1998	264.18	1.33	80.00
1999	267.80	1.31	80.00
2000	273.23	1.28	80.00
2001	271.01	1.30	80.00
2002	271.55	1.29	80.00
2003	268.92	1.31	80.00
2004	271.28	1.29	55.00
2005	271.90	1.29	55.00
2006	285.96	1.23	55.00
2007	301.72	1.16	65.00
2008	320.39	1.10	65.00
2009	325.20	1.08	55.00
2010	351.05	1.00	45.00

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 estimated total commercial landings



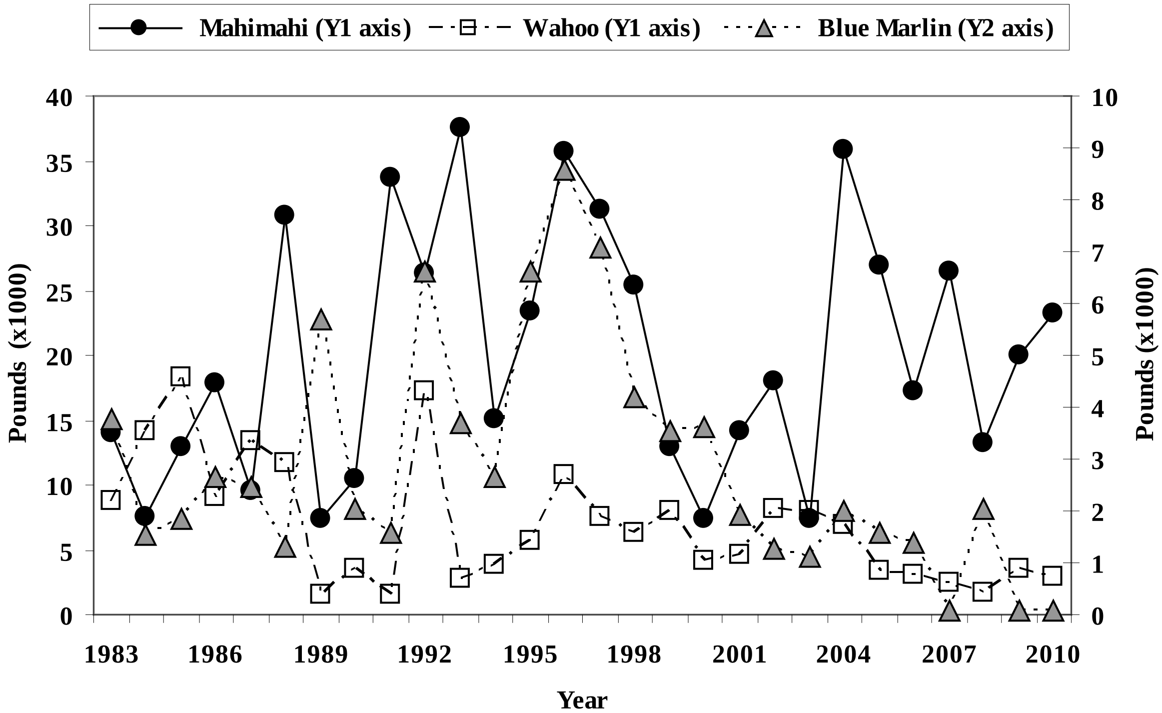
Interpretation: Annual total commercial landings of all pelagics have oscillated over the times series. Landings peaked in 2005 (372,375 pounds) and have decreased in subsequent years including 2010 (188,351 pounds). However, by inspection 2010 landings are, by no means, the lowest on record and seem to continue the oscillating pattern seen in Figure 49. Tuna PMUS commercial landings declined by about 4% 2010 compare to 2009 commercial landings. This decrease, all in commercial skipjack landings, accounts for the slight decrease in 2010 commercial landings compared to 2009. Non-PMUS have always been a minor component of overall commercial landings and have shown relatively small oscillations over the time series. Non-tuna PMUS commercial landings in 2010 increased by about 2,700 pounds over 2009 commercial landings.

Table 37. CNMI estimated total commercial landings

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

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
Average	238,953	195,843	30,333
Standard Deviation	60,173	62,795	11,011

Figure 50. CNMI estimated commercial landings: mahimahi, wahoo, and blue marlin



Interpretation: 2010 mahimahi commercial landings were 16% above the 28-year average. Commercial mahimahi landings have fluctuated greatly over the time series. This fluctuation probably reflects mahimahi's secondary status to skipjack in desirability and variability in local abundance due in environmental factors.

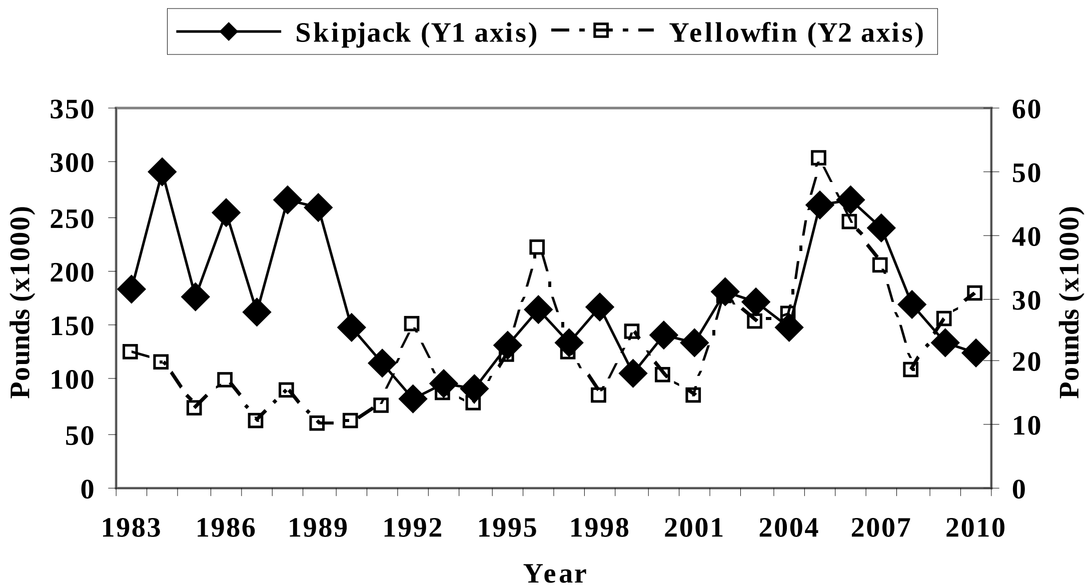
Commercial wahoo landings in 2010 were 58% below the mean landings for the 28-year time series, however, they did not vary appreciably from commercial landings over the last six years. Commercial wahoo catches in recent years have remained well the levels seen in the early to mid-1980s.

While a favorite of the charter fleet and recreational fishers participating in tournaments, blue marlins are rarely targeted or sold commercially. Therefore, they rarely appear in the Commercial Purchase database. The 73 pounds landed in 2010 probably represents a single fish.

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.

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
Average	20,040	6,887	2,895
Standard Deviation	9,463	4,594	2,185

Figure 51. CNMI estimated commercial landings: skipjack tuna and yellowfin tuna



Interpretation: Commercial landings of skipjack tuna in 2010 (124,096 pounds) were about 28% below the historical average (171,349 pounds). Skipjack make up the bulk of pelagics landings in CNMI, but have commercial landing records have shown a great deal of variability over the 28-year time series. This variability and recent decline landings, as tracked by the commercial receipt invoices, may reflect the recent downturn in the local economy (i.e. people not buying as much fish) and a possible lack participation in the voluntary Commercial Purchase Information Program.

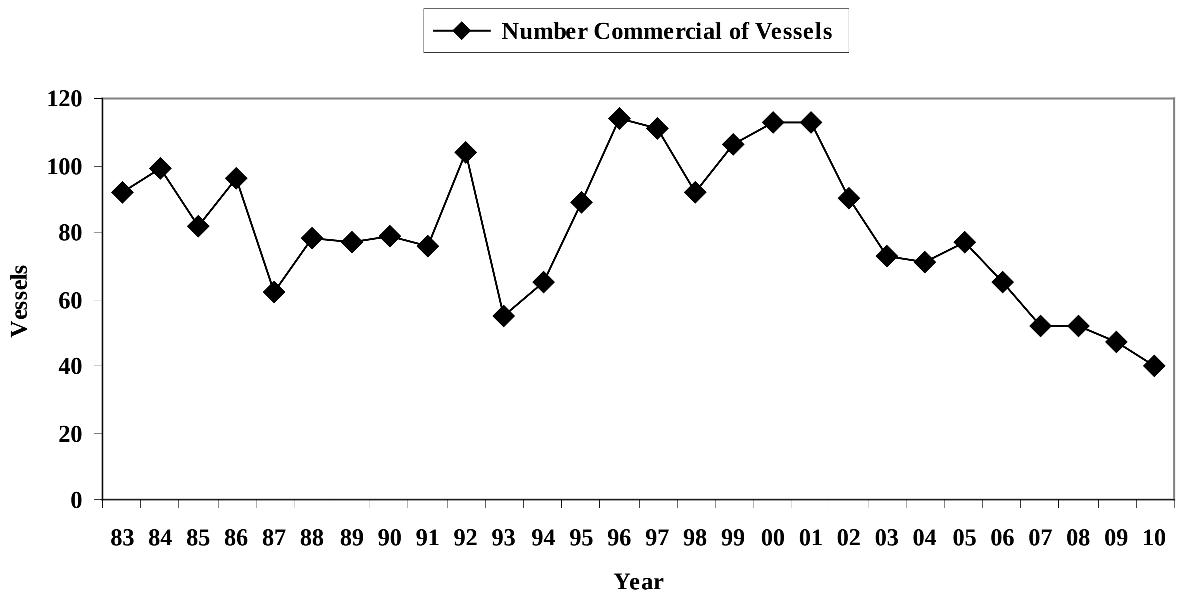
Commercial landings of yellowfin tuna (30,507 pounds) in 2010 were 37% greater than the 28-year average (22,265 pounds). Increases in commercial yellowfin landings in from 2002-2007 were largely due to fish sold by: 1)bottomfish fishermen operating in the northern islands, 2) a single longline vessel entering the fishery, and 3) one vessel using short longlines (less than a mile) all landing fish during this time period. Although more highly prized than skipjack, yellowfin tuna is not as common in near-shore waters where they are seasonal. The average fish size tends to be smaller when compared with yellowfin tuna from other geographic areas.

Table 38. CNMI estimated commercial landings: skipjack tuna and yellowfin tuna

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

	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
Average	171,349	22,265
Standard Deviation	58,759	10,117

Figure 52. CNMI number of commercial vessels



Interpretation: In 2010, 40 vessels commercially landed fish. This is well below the 28-year average of 81 vessels and the high of 114 vessels doing so in 1996. In fact, the commercial fleet has been contracting since 2001. The decline in the number of vessels commercially landing fish seems to have been caused by rising fuel prices, declining prices for skipjack tuna, and a downturn in CNMI's economy.

The number of vessels making commercial pelagic landings was relatively constant from 1988-91 compared to earlier years, but a record high number was recorded for 1992. Part of the increase in 1992 was attributable to the influx of new fishing boats as a result of money obtained by leasing property. In addition, it was discovered that some fishermen were using several different boats, thus artificially inflating the total number of boats making pelagic landings.

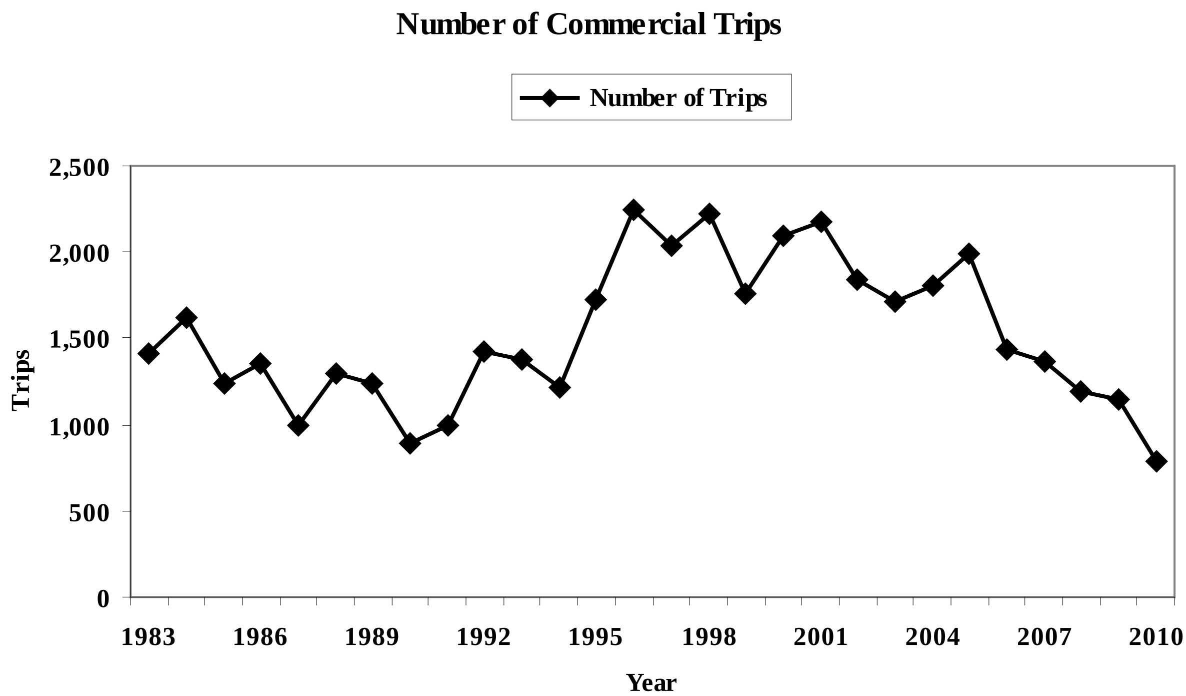
Many of the 1992's "new" fishermen, with their new boats, are believed to have left the fishery during 1993. It has been suggested that the increase from 1994 to 1997 might be due to the re-entry of repaired and refurbished boats from the 1992 fleet.

Table 39. CNMI number of commercial vessels

CNMI Pelagic Commercial Vessels	
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
Average	81
Standard Deviation	21

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

Figure 53. Number of fishing trips commercially landing pelagic species



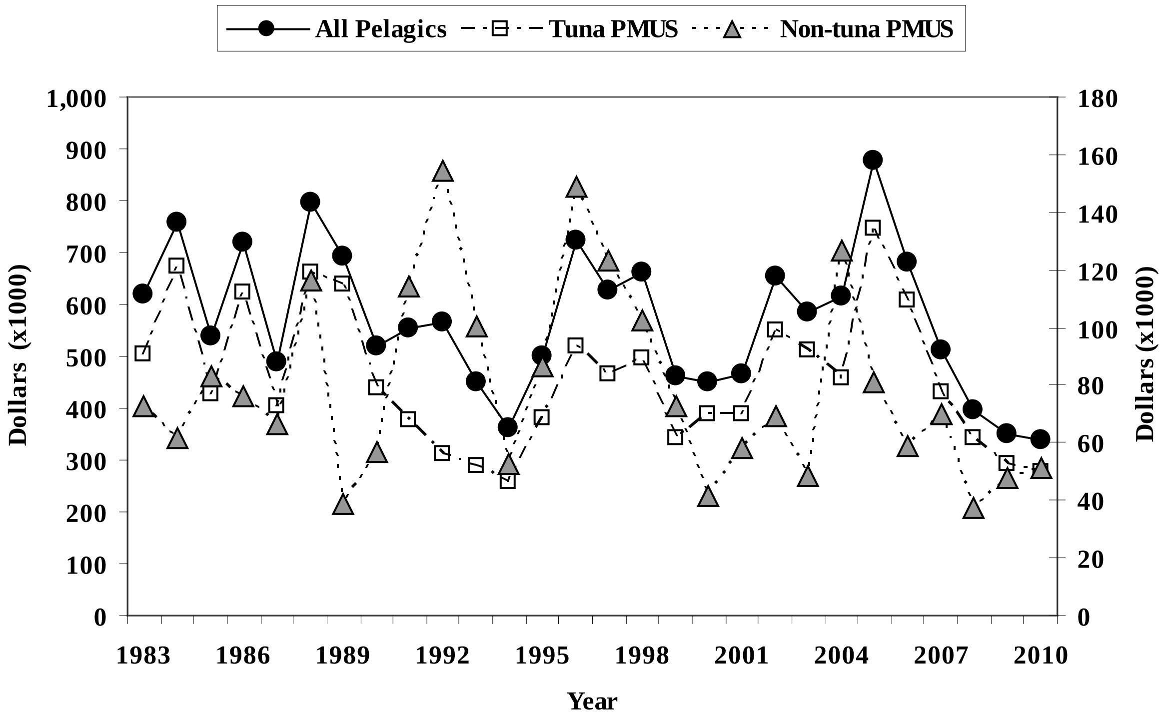
Interpretation: There were 791 fishing trips selling pelagic species in 2010. This is the fewest number on record, and it is only 52% of the 28-year average. This assessment is based on the Commercial Purchase Program information. The number of commercial pelagic trip seems to be decreasing due to several reasons. First, fuel prices began rising in 2006 and have continued to rise leading to increased overhead costs. Additionally, market demand for pelagics seems to have decreased possibly due to a sluggish economy in CNMI. Finally, available information may not be giving an accurate picture of the state of the commercial fishery due to the voluntary nature of the commercial receipt program. CNMI is currently trying to pass legislative mandatory reporting requirements to bolster the data collection program.

Table 40. Number of fishing trips commercially landing 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
Average	1,521
Standard Deviation	411

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.

Figure 54. CNMI annual adjusted commercial revenues from pelagic species



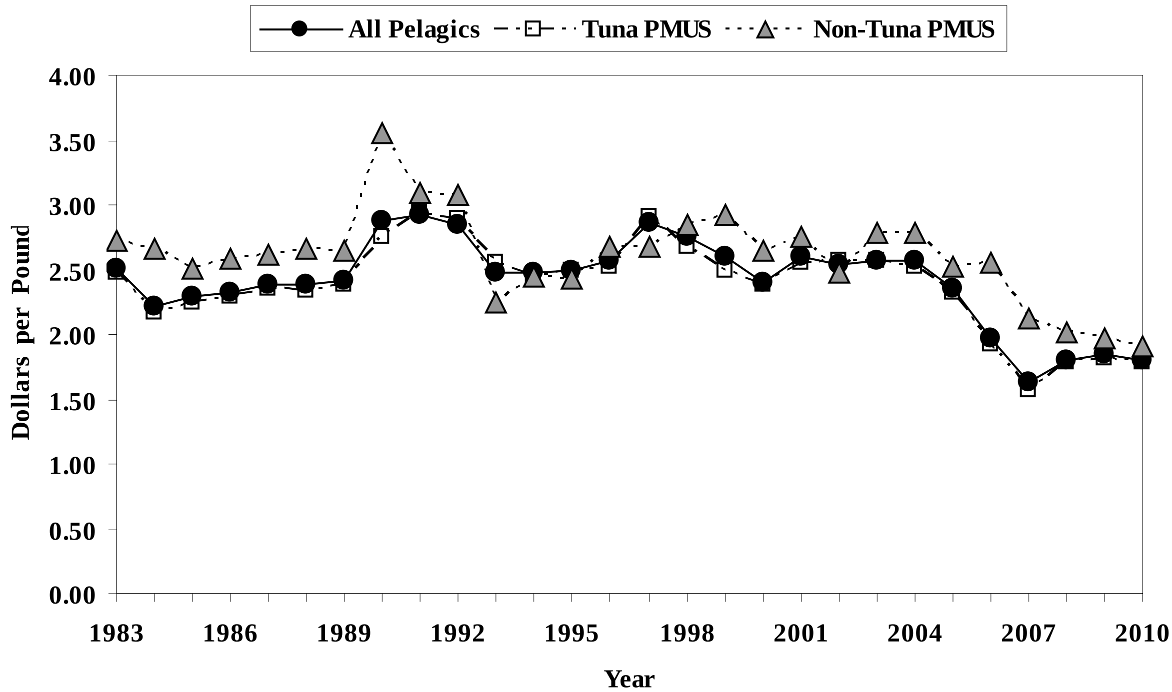
Interpretation: The adjusted commercial revenues for pelagic species tracks closely with the adjusted revenues for tuna PMUS as tuna make up the vast majority of the catch. Adjusted revenues for pelagic species, in aggregate, have declined over the last six (6) years. Estimated adjusted revenues for all pelagic species in 2010 ($339,846) was below the average estimated adjusted revenues for pelagics over the 28-year time series ($569,551). This decline is largely tied to the drop in estimated adjusted revenues from the sale of tuna PMUS. Estimated tuna PMUS revenues ($276,286) were well below the historical estimated adjusted revenues for tuna PMUS ($457,275). In contrast to tunas, 2010 non-tuna PMUS revenues ($51,525) actually increased from 2009 ($47,854), however, this is still below the historical average of $79,213. According to vendors, the declines in adjusted revenue are due to reduced demand for troll-caught species.

Table 41. CNMI commercial revenues from pelagic species

	All Pelagics		Tuna PMUS		Non-tuna PMUS	
Year	**Unadjusted**	**Adjusted**	**Unadjusted**	**Adjusted**	**Unadjusted**	**Adjusted**
1983	248,387	618,484	202,800	504,972	29,059	72,357
1984	330,254	756,282	294,077	673,436	27,044	61,931
1985	244,171	537,176	193,920	426,624	37,882	83,340
1986	333,766	717,597	289,681	622,814	35,488	76,299
1987	237,687	489,635	195,793	403,334	32,344	66,629
1988	409,075	797,696	338,348	659,779	59,701	116,417
1989	373,927	691,765	345,839	639,802	20,917	38,696
1990	293,993	517,428	248,144	436,733	32,102	56,500
1991	338,643	551,988	232,077	378,286	70,235	114,483
1992	374,977	566,215	206,950	312,495	102,133	154,221
1993	311,342	448,332	201,350	289,944	69,592	100,212
1994	259,470	363,258	185,381	259,533	37,818	52,945
1995	361,511	498,885	275,080	379,610	62,920	86,830
1996	539,628	723,102	388,691	520,846	110,939	148,658
1997	474,509	626,352	351,492	463,969	93,306	123,164
1998	496,652	660,547	372,142	494,949	77,011	102,425
1999	351,062	459,891	261,394	342,426	55,404	72,579
2000	350,468	448,599	302,473	387,165	32,186	41,198
2001	358,656	466,253	300,154	390,200	44,987	58,483
2002	506,302	653,130	425,961	549,490	53,468	68,974
2003	447,647	586,418	390,100	511,031	36,764	48,161
2004	476,543	614,740	356,110	459,382	98,417	126,958
2005	678,773	875,617	578,914	746,799	62,759	80,959
2006	554,373	681,879	492,762	606,097	48,026	59,072
2007	439,953	510,345	372,573	432,185	60,137	69,759
2008	359,427	395,370	310,855	341,941	33,954	37,349
2009	324,637	350,608	271,832	293,579	44,309	47,854
2010	339,846	339,846	276,286	276,286	51,525	51,525
Average	386,274	569,551	309,328	457,275	54,301	79,213
Standard Deviation	103,083	136,466	92,259	130,151	23,895	32,011

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.

Figure 55. CNMI average inflation-adjusted price for commercially landed pelagic species (dollars per pound)



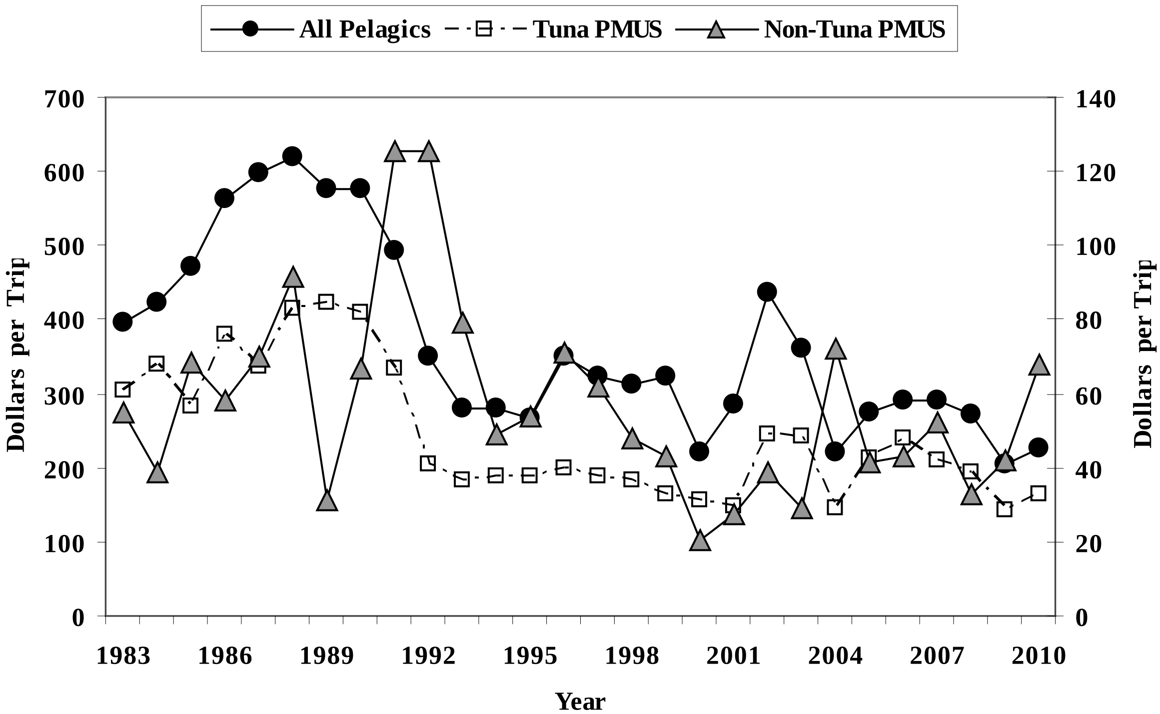
Interpretation: In 2010, inflation adjusted per-pound prices for pelagics were similar across the board. Tuna PMUS averaged $1.78 per pound (adjusted) while non-tuna PMUS averaged $1.90 per pound (adjusted). Both adjusted prices are well below the historical adjusted averages of $2.38 per pound for tunas and $2.60 per pound for non-tuna PMUS. The 2010 average adjusted price for all pelagics, in aggregate, was $1.80 per pound which also below the historical average ($2.41 per pound). The drop in adjusted prices for pelagics is attributed to reduced demand.

Table 42. CNMI average adjusted price for commercially landed species

Year	All Pelagics		Tuna PMUS		Non-Tuna PMUS	
	Unadjusted	Adjusted	Unadjusted	Adjusted	Unadjusted	Adjusted
1983	1.01	2.51	0.99	2.47	1.09	2.73
1984	0.97	2.22	0.95	2.17	1.16	2.66
1985	1.04	2.29	1.02	2.25	1.14	2.51
1986	1.09	2.33	1.07	2.30	1.20	2.58
1987	1.16	2.39	1.14	2.35	1.27	2.62
1988	1.22	2.38	1.20	2.34	1.36	2.66
1989	1.30	2.41	1.29	2.39	1.43	2.65
1990	1.63	2.87	1.57	2.76	2.01	3.55
1991	1.80	2.93	1.80	2.94	1.90	3.10
1992	1.88	2.84	1.91	2.89	2.04	3.07
1993	1.72	2.47	1.78	2.56	1.56	2.25
1994	1.76	2.47	1.75	2.45	1.75	2.44
1995	1.81	2.49	1.80	2.49	1.76	2.43
1996	1.92	2.57	1.88	2.53	1.99	2.67
1997	2.17	2.86	2.20	2.91	2.03	2.67
1998	2.07	2.75	2.02	2.68	2.14	2.85
1999	1.98	2.60	1.91	2.50	2.24	2.93
2000	1.87	2.40	1.86	2.38	2.07	2.65
2001	2.00	2.60	1.97	2.56	2.12	2.76
2002	1.97	2.54	1.99	2.57	1.92	2.47
2003	1.96	2.57	1.96	2.57	2.12	2.78
2004	1.99	2.57	1.96	2.53	2.15	2.78
2005	1.82	2.35	1.80	2.33	1.95	2.52
2006	1.60	1.97	1.56	1.92	2.08	2.56
2007	1.41	1.63	1.35	1.57	1.84	2.13
2008	1.64	1.80	1.61	1.78	1.84	2.02
2009	1.70	1.84	1.68	1.81	1.82	1.97
2010	1.80	1.80	1.78	1.78	1.91	1.91
Average	1.65	2.41	1.64	2.38	1.78	2.60
Standard Deviation	0.35	0.33	0.36	0.34	0.35	0.34

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 CNMI Consumer Price Index (CPI) as the basis by which calculations of previous years' prices are made.

Figure 56. CNMI per-trip adjusted revenues for commercially sold pelagic species



Interpretation: In contrast to prices and overall revenues, per-trip adjusted revenues for pelagics, tuna PMUS and non-tuna PMUS, actually increased in 2010 compared to 2009. The 2010 per-trip estimate adjusted revenue for all pelagics in aggregate was $227.00 per trip. The historical average per-trip figure for the same category is $367.26. On average, tuna PMUS brought $164.00 per trip (adjusted) in 2010 compared with $243.43 (adjusted) for the historical average. Estimated non-tuna PMUS per-trip adjusted revenues were $68.00 per trip which is higher than the 28-year average of $57.29 per trip. The recent decline in per-trip revenues is attributed to lower market demand for tuna species. Non-tuna PMUS per-trip revenues have been fairly stable in recent years.

Table 43. 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	395.91	122.00	303.78	22.00	54.78
1984	185.00	423.65	148.00	338.92	17.00	38.93
1985	214.00	470.80	128.00	281.60	31.00	68.20
1986	262.00	563.30	176.00	378.40	27.00	58.05
1987	290.00	597.40	163.00	335.78	34.00	70.04
1988	318.00	620.10	213.00	415.35	47.00	91.65
1989	312.00	577.20	228.00	421.80	17.00	31.45
1990	327.00	575.52	233.00	410.08	38.00	66.88
1991	302.00	492.26	204.00	332.52	77.00	125.51
1992	231.00	348.81	135.00	203.85	83.00	125.33
1993	195.00	280.80	128.00	184.32	55.00	79.20
1994	200.00	280.00	135.00	189.00	35.00	49.00
1995	193.00	266.34	136.00	187.68	39.00	53.82
1996	261.00	349.74	148.00	198.32	53.00	71.02
1997	245.00	323.40	143.00	188.76	47.00	62.04
1998	234.00	311.22	138.00	183.54	36.00	47.88
1999	246.00	322.26	125.00	163.75	33.00	43.23
2000	172.00	220.16	121.00	154.88	16.00	20.48
2001	219.00	284.70	113.00	146.90	21.00	27.30
2002	339.00	437.31	189.00	243.81	30.00	38.70
2003	275.00	360.25	185.00	242.35	22.00	28.82
2004	172.00	221.88	112.00	144.48	56.00	72.24
2005	213.00	274.77	165.00	212.85	32.00	41.28
2006	236.00	290.28	195.00	239.85	35.00	43.05
2007	251.00	291.16	182.00	211.12	45.00	52.20
2008	248.00	272.80	177.00	194.70	30.00	33.00
2009	189.00	204.12	133.00	143.64	39.00	42.12
2010	227.00	227.00	164.00	164.00	68.00	68.00
Average	239.82	367.26	158.54	243.43	38.75	57.29
Standard Deviation	48.84	124.81	34.21	86.96	16.95	25.33

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 44. Trolling Bycatch Summary: Non-charter Based on the Interview Catch Data in Year 2000-2010
Method: Trolling

Species	Released	Dead/Injured	Combined	Total Caught	Percent Bycatch
Mahimahi	4	0	4	2,783	0.14%
Yellowfin Tuna	0	1	1	1,884	0.05%
Skipjack Tuna	1	0	1	39,421	>0.01%
Total PMUS	5	1	6	44,088	>0.01%
All Pelagics	5	1	6	44,844	>0.01%

Interpretation: It is believed that bycatch in CNMI pelagic fisheries is very low (almost non-existent). The above table summarizes the reported bycatch in the non-charter sector of the pelagic fishery from 2000-2010. Only three (3) trips out of 1,777 (0.17%) reported bycatch.

No charter vessels reported bycatch during this time period.

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 29-year time series (1982-2010). Linear regression of total catches shows a slightly increasing trend during this time period. Total pelagic landings in 2010 were approximately 726,299 pounds, an increase of .8% compared to 2009. 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 catch species include rainbow runner (*Elagatis bipinnulatus*), kawakawa (*Euthynnus affinis*), dogtooth tuna (*Gymnosarda unicolor*), double-lined mackerel *(Grammatorcynus bilineatus*), and oilfish (*Ruvettus pretiosus*). Sailfish and sharks were also caught in 2010. However, these species were not encountered during offshore creel surveys and total catch estimates for these species could not be incorporated into this year's report. While sailfish are generally kept, sharks are usually discarded as bycatch. In addition to the above pelagic species, approximately half a dozen other species were landed in 2010.

The estimated annual landings of pelagic species vary widely from year to year. In 2010, aggregated landings of all pelagics increased .8%, tuna PMUS decreased 10%, and non-tuna PMUS increased more than 17%.

The number of boats involved in Guam's pelagic or open ocean fishery gradually increased from 193 in 1983 to 469 in 1998 then decreased until 2001. From 2002 to 2010, the fleet increased to 432 vessels. In 2010, there were 17% more vessels participating in Guam pelagic fisheries than in 2009. Most fishing boats are less than 10 meters (33 feet) in length and are usually owner-operated by fishermen for whom fishing is a secondary occupation. Most fishermen sell a portion of their catch at one time or another, and distinguishing between recreational, subsistence, and commercial fishers is difficult. A small, but significant, segment of the pelagic group is made up of marina-berthed charter boats that are operated by full-time captains and crews.

The number of trolling trips increased by 7% and hours spent trolling increased by 2%. In 2010, more boats fished more often and had longer trips. This may explain higher total catches for the year. Trolling catch rates (pounds per hour fished) showed a slight decrease compared to 2009, and total CPUE was down 1.5%. Mahimahi catches greatly increased, while skipjack, yellowfin and wahoo all showed decreased. Marlin CPUE was virtually unchanged from 2009.

According to commercial landings data, commercial landings and revenues increased in 2010 compared to 2009. Total adjusted revenues increased 59%. However, the adjusted average price for all pelagics decreased 2.3%, with tuna PMUS prices decreasing 5.3%, and non-tuna PMUS decreasing 1%. Overall adjusted revenue per trolling trip increased 18.9% for all pelagics, decreasing 61% for tuna PMUS, and increasing 42% for non-tuna PMUS. Commercial landings have shown a decreasing trend over the past nine years. While the adjusted average price of pelagic species decreased last year, the number of boats in the fishery increased. A majority of troll fishermen do not rely on fishing as their primary source of income.

In early 2010, U.S. military exercises greatly restricted access to favorite fishing areas south of the Guam including Galvez Bank, Santa Rosa Bank, and White Tuna Bank. From 1982-2009, DAWR surveys recorded more than 2020 trolling and bottom fishing trips to these southern banks. During 2010, 41 Notices to Mariners were issued for a total of 76 days were issued due to military exercises eliminating access to these areas for 1/5 of the year. Additional unannounced area closures caused by military exercises occurred throughout the year. Due to their spontaneous and unrecorded nature, there is no way to quantify to what extent *ad hoc* exercises restricted pelagic fishing around Guam.

The shortage of staff biologists has been significant in the past several years. DAWR staff biologists continue to oversee several projects simultaneously, but all staff members are trained to identify commonly caught fish to help ensure accurate data collection. New staff members are mentored by biologists and senior technicians in the field before conducting creel surveys on their own.

In March and April, 2010, DAWR deployed six (6) fish aggregating devices (FADs). These were the first FADs deployed in nearly two years. DAWR has received five more systems, and is awaiting good weather conditions to deploy the remaining five (5). This will bring the number of deployed FADs up to 13. DAWR plans to deploy a total of 14 FADs.

For more information, the WESPAC website is www.wpcouncil.org.

Recommendations

2010 Recommendations

1. Streamline the procurement process to facilitate the redeployment of FADS.
2. Streamline the hiring process to facilitate filling biologist positions in the DAWR office.
3. Encourage commercial vendors to participate in the commercial receipts program.

Table 45. Guam 2010 creel survey - pelagic species composition

	Total Landing (Lbs)	Non-Charter	Charter
Tuna PMUS			
Skipjack Tuna	322,482	313,227	9,255
Yellowfin Tuna	24,599	23,756	843
Kawakawa	1,297	1,223	74
Albacore	0	0	0
Bigeye Tuna	0	0	0
Other Tuna PMUS	0	0	0
Tuna PMUS Total	**348,378**	**338,206**	**10,172**
Non-Tuna PMUS			
Mahimahi	288,427	252,168	36,259
Wahoo	45,407	42,505	2,902
Blue Marlin	30,811	19,607	11,204
Black Marlin	0	0	0
Striped Marlin	0	0	0
Sailfish	1,332	1,332	0
Shortbill Spearfish	0	0	0
Swordfish	0	0	0
Oceanic Sharks	0	0	0
Pomfrets	0	0	0
Oilfish	0	0	0
Moonfish	0	0	0
Misc. Longline Fish	0	0	0
Non-Tuna PMUS Total	**365,977**	**315,612**	**50,365**
Non-PMUS Pelagics			
Dogtooth Tuna	1,779	1,691	88
Rainbow Runner	2,897	2,594	303
Barracudas	7,270	7,247	23
Oceanic Sharks	0	0	0
Misc. Troll Fish	0	0	0
Non-Specific Bottomfish Total	**365,977**	**315,612**	**50,365**
Total Pelagics	**726,301**	**665,350**	**60,951**

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 46. 2010 average commercial price of pelagic species

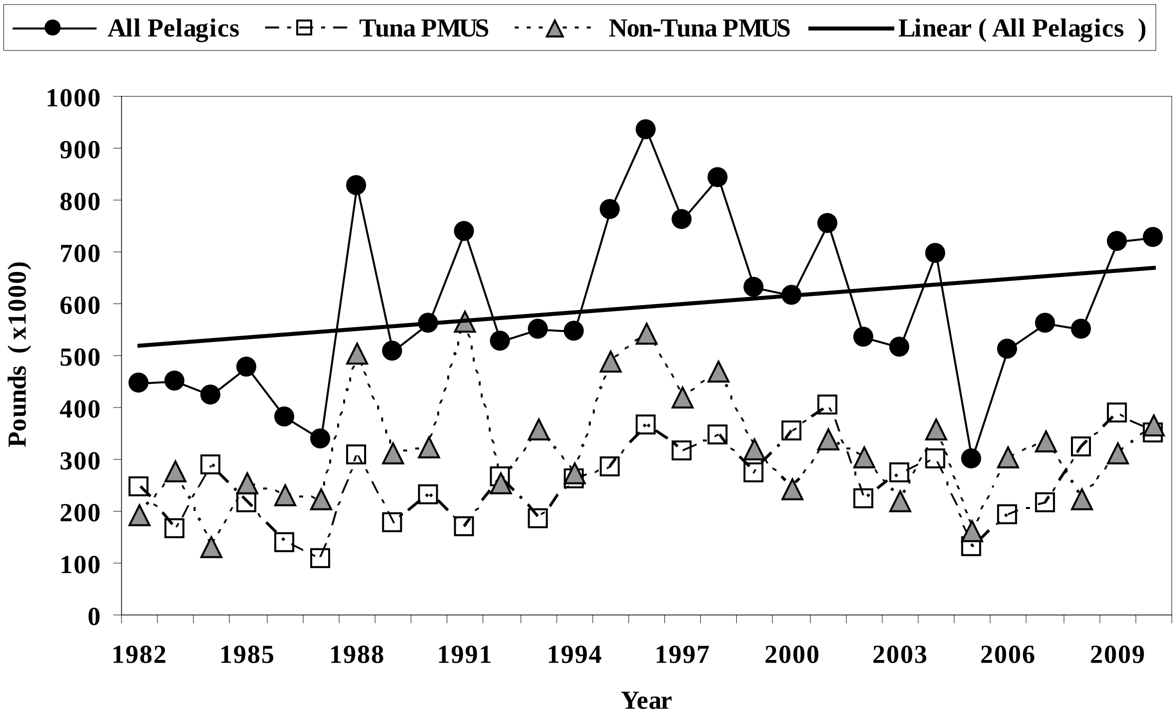
	Average Price ($/Lb)
Tuna PMUS	
Bonita/skipjack Tuna	1.95
Yellowfin Tuna	2.03
Tuna PMUS Average	**1.99**
Non-Tuna PMUS	
Mahi / Dolphinfish	2.19
Wahoo	2.20
Marlin	1.46
Sailfish	1.59
Spearfish	1.50
Monchong	2.28
Non-Tuna PMUS Average	**1.87**
Non-PMUS Pelagics	
Dogtooth Tuna	1.53
Rainbow Runner	2.05
Barracuda	2.03
Non-Specific Bottomfish Average	**1.87**
Pelagics Average	**1.89**

Source: The WPacFIN-sponsored commercial landings system.

Table 47. Annual consumer price indices (CPI), CPI adjustment factors and estimated percentage of commercial data sampled

Year	CPI	CPI Adjustment factor	Estimated % Commercial Data Sampled
1980	134.0	5.74	75%
1981	161.4	4.76	80%
1982	169.7	4.53	85%
1983	175.6	4.38	90%
1984	190.9	4.03	90%
1985	198.3	3.88	90%
1986	203.7	3.77	90%
1987	212.7	3.61	80%
1988	223.8	3.43	50%
1989	248.2	3.10	55%
1990	238.5	2.71	75%
1991	312.5	2.46	80%
1992	344.2	2.23	80%
1993	372.9	2.05	75%
1994	436.0	1.76	60%
1995	459.2	1.67	60%
1996	482.0	1.59	70%
1997	491.3	1.56	80%
1998	488.2	1.57	80%
1999	497.2	1.55	80%
2000	507.1	1.52	85%
2001	500.0	1.54	85%
2002	503.2	1.53	85%
2003	517.0	1.49	85%
2004	548.5	1.40	85%
2005	590.5	1.30	80%
2006	658.9	1.17	80%
2007	703.5	1.09	*
2008	733.7	1.05	*
2009	749.2	1.03	*
2010	768.5	1.00	*

Figure 57. 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. Since 2005, the annual total pelagic landings have been rising. Factors relating to this cycle may have to do with the biology of the fish or be weather related. There is also anecdotal evidence from the average fishermen that pelagic fish are not caught consistently year round around Guam.

Compared with 2009, total pelagic and non-tuna PMUS increased .8% and 17.5% respectively, while tuna landings decreased 10%. Non-tuna PMUS catch was slightly above the 29 year average, while the tuna PMUS and total catch were well above the 29 year average. Generally, skipjack tuna are consistently caught year round, with the other major pelagic species being more seasonal.

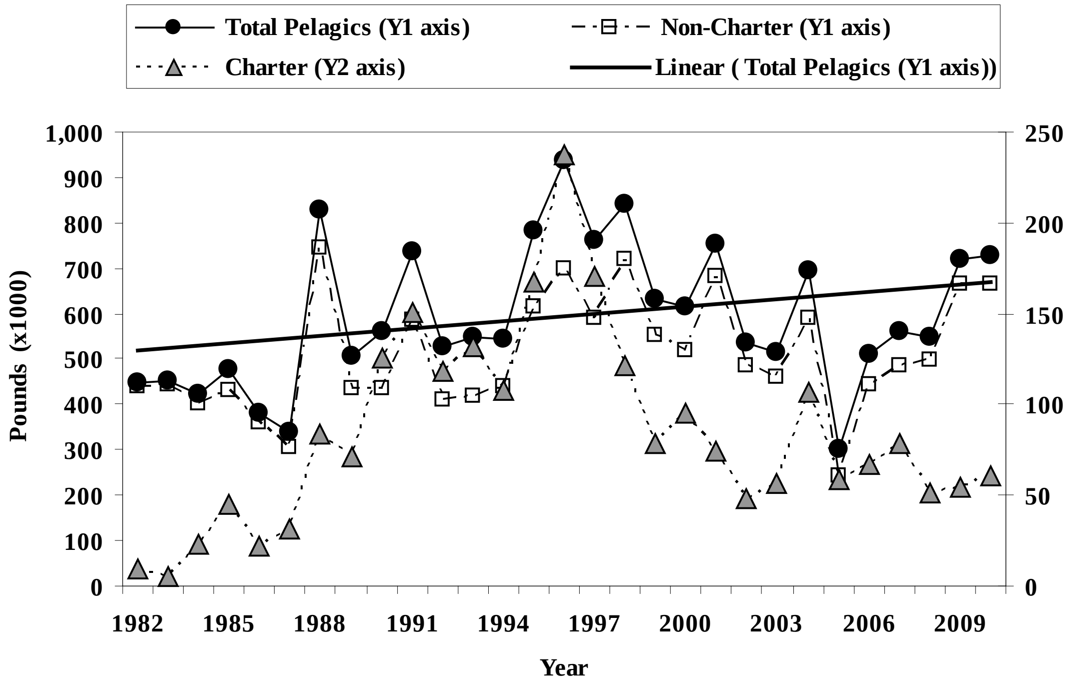
Source: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel survey.

Calculation: 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 48. Guam estimated total pelagics landings: all pelagics landings, tuna PMUS landings, and non-tuna PMUS landings

Year	All Pelagics	Tuna PMUS	Non-Tuna PUMS
1982	447,432	245,400	192,129
1983	450,823	166,105	277,179
1984	424,299	288,634	130,027
1985	477,073	215,686	252,707
1986	381,495	139,099	230,814
1987	338,354	108,729	222,521
1988	827,260	309,571	502,803
1989	505,811	177,158	310,755
1990	559,773	230,559	321,935
1991	737,653	168,669	566,242
1992	528,215	264,362	255,471
1993	548,295	184,394	357,787
1994	545,917	262,181	273,167
1995	781,389	283,055	489,757
1996	935,837	364,929	541,317
1997	759,936	316,552	420,967
1998	841,681	346,634	469,976
1999	632,319	271,359	320,529
2000	614,709	355,581	242,558
2001	754,999	403,691	336,571
2002	534,878	223,805	302,339
2003	514,820	273,029	217,440
2004	694,746	299,495	357,169
2005	301,487	129,489	159,929
2006	510,608	192,247	303,297
2007	562,513	214,014	334,599
2008	550,081	322,053	223,406
2009	719,892	387,751	311,412
2010	726,299	350,156	365,976
Average	**593,400**	**258,427**	**320,372**
Standard Deviation	**155,923**	**78,946**	**109,037**

Figure 58. 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. Compared to 2009, 2010 total pelagic landings increased .8%, non-charter landings were virtually unchanged, while charter landings increased 12%. Non-charter boats landed 91.6% of all pelagics in 2009.

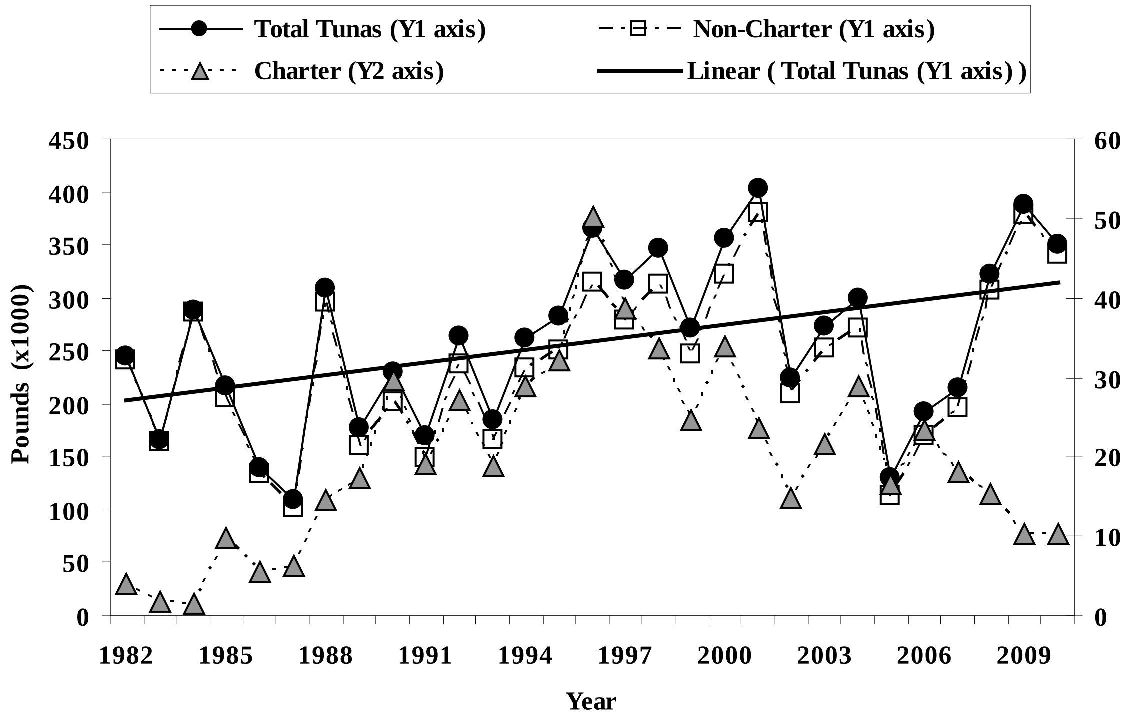
Source: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel survey data.

Calculation: 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 49. Guam annual estimated landings: total pelagics, non-charter landings, and charter landings

Year	Total Pelagics	Non-Charter	Charter
1982	447,432	438,297	9,135
1983	450,823	445,116	5,707
1984	424,299	401,687	22,612
1985	477,073	432,202	44,871
1986	381,495	359,020	22,475
1987	338,354	307,342	31,013
1988	827,260	743,415	83,845
1989	505,811	434,832	70,979
1990	559,773	434,361	125,412
1991	737,653	586,914	150,739
1992	528,215	409,548	118,667
1993	548,295	416,340	131,955
1994	545,917	438,677	107,239
1995	781,389	614,137	167,251
1996	935,837	698,544	237,293
1997	759,936	589,089	170,847
1998	841,681	719,841	121,840
1999	632,319	553,487	78,831
2000	614,709	519,677	95,032
2001	754,999	680,436	74,563
2002	534,878	486,790	48,087
2003	514,820	458,746	56,074
2004	694,746	588,217	106,529
2005	301,487	242,520	58,968
2006	510,608	443,504	67,104
2007	562,513	484,230	78,284
2008	550,081	499,137	50,945
2009	719,892	665,842	54,050
2010	726,299	665,350	60,949
Average	**593,400**	**508,872**	**84,527**
Standard Deviation	**155,923**	**124,409**	**52,418**

Figure 59. Guam annual tuna PMUS landings: total tuna PMUS landings, non-charter Tuna landings, charter tuna landings



Interpretation: As with the other pelagic landings, tuna landings appear to be cyclic over the time series with multi-year high periods punctuated by inter-annual variation. Non-charter boats account for the bulk of the total tuna catch, up to 95% in the 1980's. The proportion of non-charter caught tunas decreased as charter boat activity increased from the late 1980's until the mid-1990's. In 2010, 97% of tuna were caught by non-charter boats. In 2010, both total tuna and non-charter landings decreased by 10% each. In 2010, charter tuna landings increased by .8% compared to 2009. The 2010 estimated tuna PMUS landings were 35% higher than the 29-year average.

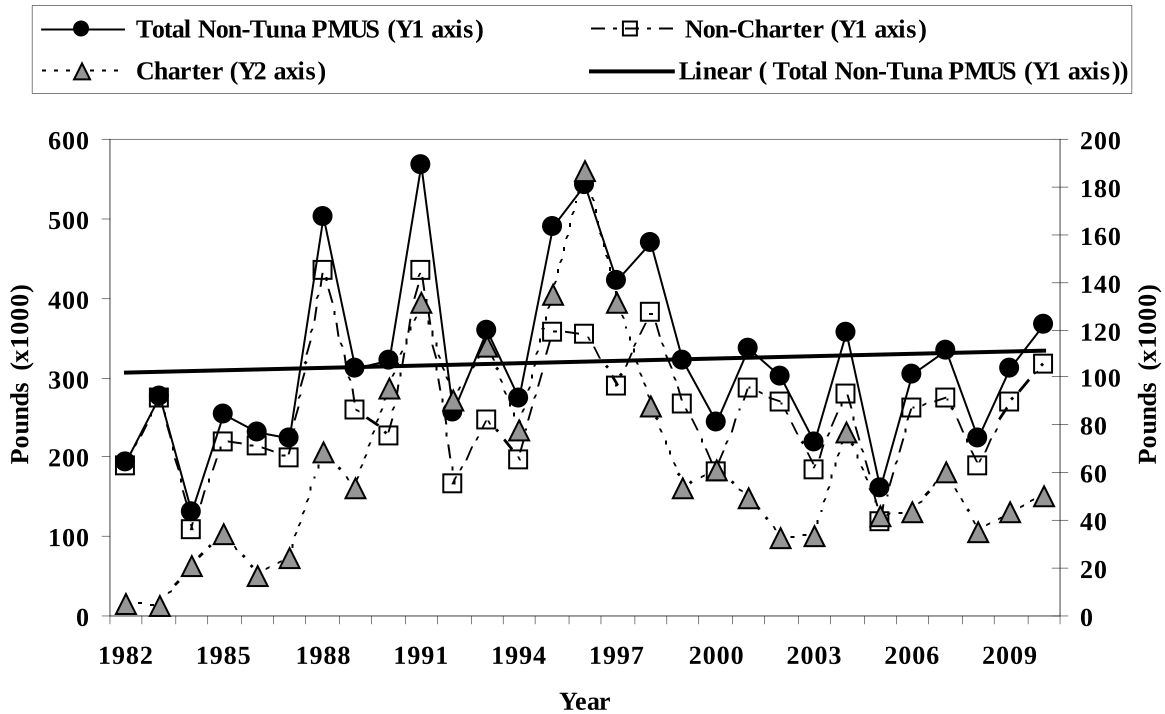
Source: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program, expanded with the assistance of NMFS.

Calculation: 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 50. Guam annual tuna PMUS landings: total tuna PMUS landings, non-charter landings, charter landings

Year	Total Tunas	Non-Charter	Charter
1982	245,400	241,410	3,990
1983	166,105	164,377	1,729
1984	288,634	287,078	1,556
1985	215,686	205,965	9,721
1986	139,099	133,618	5,480
1987	108,729	102,529	6,199
1988	309,571	294,961	14,610
1989	177,158	159,766	17,392
1990	230,559	201,046	29,512
1991	168,669	149,568	19,100
1992	264,362	237,210	27,152
1993	184,394	165,609	18,786
1994	262,181	233,223	28,959
1995	283,055	250,837	32,218
1996	364,929	314,719	50,210
1997	316,552	277,987	38,566
1998	346,634	313,004	33,630
1999	271,359	246,794	24,565
2000	355,581	321,642	33,939
2001	403,691	379,991	23,701
2002	223,805	208,925	14,880
2003	273,029	251,484	21,545
2004	299,495	270,647	28,848
2005	129,489	113,040	16,450
2006	192,247	168,788	23,459
2007	214,014	196,056	17,958
2008	322,053	306,682	15,371
2009	387,751	377,579	10,172
2010	350,156	339,897	10,259
Average	**258,427**	**238,429**	**19,999**
Standard Deviation	**78,946**	**74,573**	**11,548**

Figure 60. Guam estimated landings: total non-tuna PMUS landings, non-charter landings, and charter landings



Interpretation: Over the time series, the estimated non-tuna PMUS landings showed a general increase between 1984 and 1996, corresponding with an increase in boats entering the fishery. Up until the mid-1980's, non-charter boats accounted for up to 90% of the non-tuna PMUS species. This proportion decreased in the late 1980's when charter fishing activity, associated with an increase in tourism, increased. Charter non-tuna PMUS harvest began gradually decreasing after 1996 due to a downturn in tourism. Non-charter non-tuna PMUS landings also began decreasing after 1996, but exhibit year to year fluctuations. In 2010, total non-tuna PMUS and non-charter non-tuna PMUS increased 17.5% and 17.9% respectively when compared with 2009. Charter non-tuna PMUS increased 14.8%. Non-charter boats accounted for 84% of non-tuna PMUS catch in 2010.

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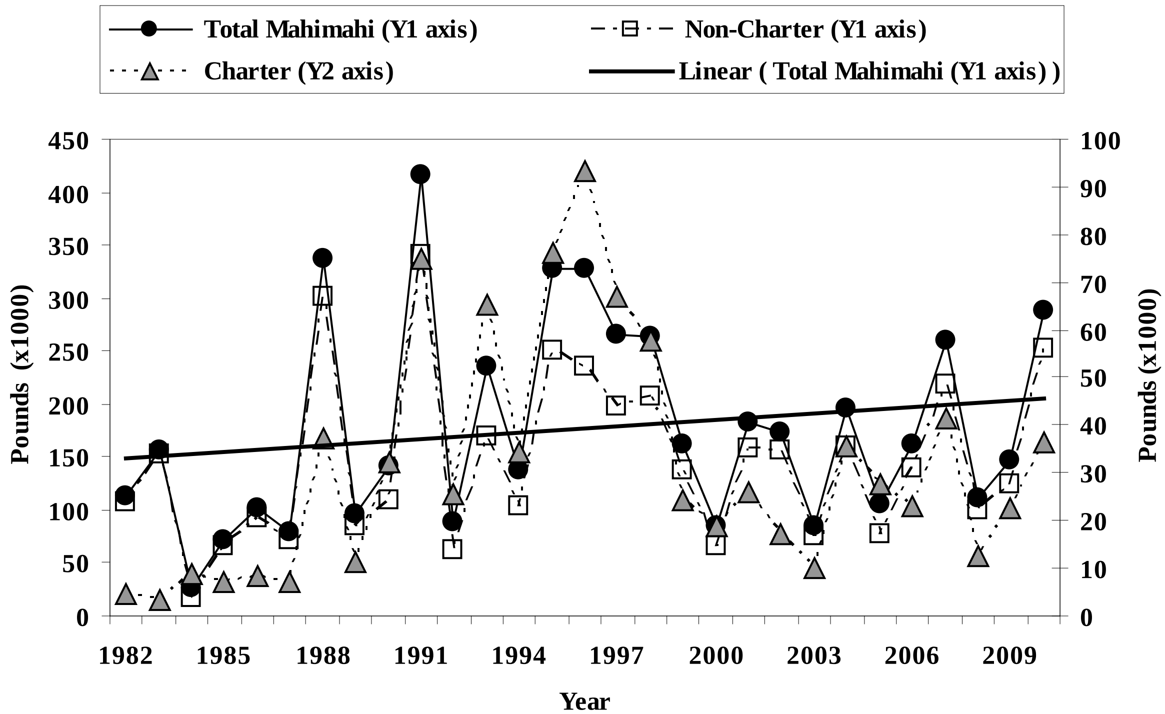
Source: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program, expanded with the assistance of NMFS.

Calculation: 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 51. Guam annual estimated landings: total non-tuna PMUS, non-charter vessels, and charter vessels in pounds

Year	Total Non-Tuna PMUS	Non-Charter	Charter
1982	192,129	187,341	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	321,935	226,558	95,378
1991	566,242	434,832	131,410
1992	255,471	165,097	90,374
1993	357,787	245,139	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	469,976	382,281	87,695
1999	320,529	267,112	53,417
2000	242,558	181,863	60,695
2001	336,571	286,816	49,756
2002	302,339	269,555	32,784
2003	217,440	183,667	33,773
2004	357,169	279,872	77,297
2005	159,929	118,429	41,500
2006	303,297	259,979	43,318
2007	334,599	274,675	59,924
2008	223,406	187,958	35,449
2009	311,412	267,565	43,847
2010	365,976	315,612	50,364
Average	**320,372**	**256,296**	**64,075**
Standard Deviation	**109,037**	**80,219**	**42,478**

Figure 61. Guam annual estimated mahimahi landings: total mahimahi landings, non-charter landings, and charter landings



Interpretation: Historically, mahimahi catches have shown wide inter-annual variation. Non-charter trips account for the bulk of the mahimahi catch, with charter activity harvesting proportionally more beginning in the late 1980’s as tourist arrivals to Guam increased. A drop in charter catch corresponds to decreasing tourist arrivals in the late 1990’s. In 2010, total mahimahi landing increased 97% compared to 2009. Within the two subcategories, 2010 non-charter landings rose 103% and 2010 charter landings increased by 60% compared to 2009. All three categories are well above the 29-year average.

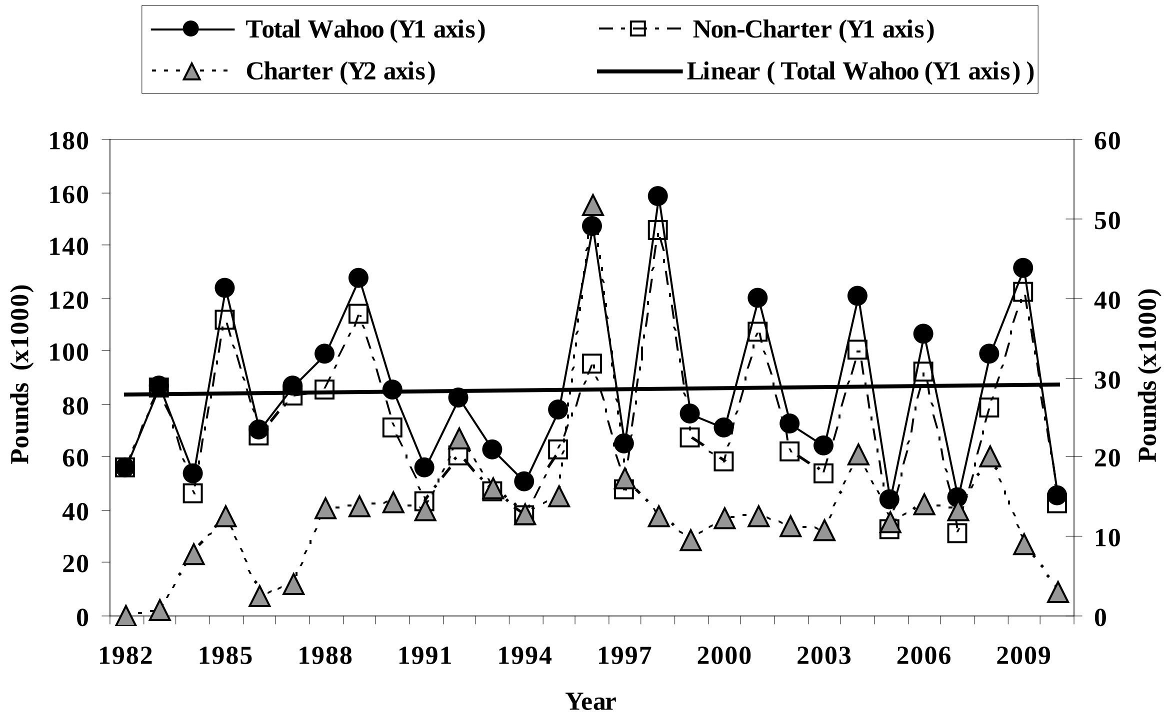
Source: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program and its associated computerized data expansion system files, expanded with the assistance of NMFS.

Calculation: Totals by species are summed across all fishing methods as described in Figures 57 to 60.

Table 52. Guam annual estimated mahimahi landings: total mahimahi, non-charter landings, and charter landings in pounds

Year	Total Mahimahi	Non-Charter	Charter
1982	112,181	107,480	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	108,370	32,259
1991	415,944	341,139	74,805
1992	87,942	62,274	25,668
1993	234,979	169,662	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	264,421	206,592	57,830
1999	161,936	137,811	24,126
2000	85,561	66,575	18,986
2001	183,278	157,293	25,986
2002	173,130	156,172	16,958
2003	84,739	74,766	9,973
2004	195,935	160,543	35,392
2005	105,715	77,931	27,784
2006	162,512	139,365	23,147
2007	259,828	218,521	41,307
2008	111,811	99,331	12,480
2009	146,649	124,061	22,588
2010	288,426	252,168	36,259
Average	**177,357**	**146,002**	**31,355**
Standard Deviation	**95,643**	**76,679**	**23,895**

Figure 62. Guam annual estimated wahoo landings: total wahoo landings, non-charter landings, and charter landings



Interpretation: Over the time series, wahoo landings vary widely from year to year. It is thought that the annual landings reflect local abundance in a given year. Until 1987, non-charter landings accounted for over 95% of the total catch. In 1988, charter catches increased with an uptick in tourism peaking in 1996 with 35% of the total catch that year. Compared to 2009, total and non-charter harvest of wahoo both decreased about 65% each. 2010 charter landings were 68% less than in 2009. Non-charter boats harvested 93% of the total wahoo harvest. The total wahoo catch was 47% below the 29 year average.

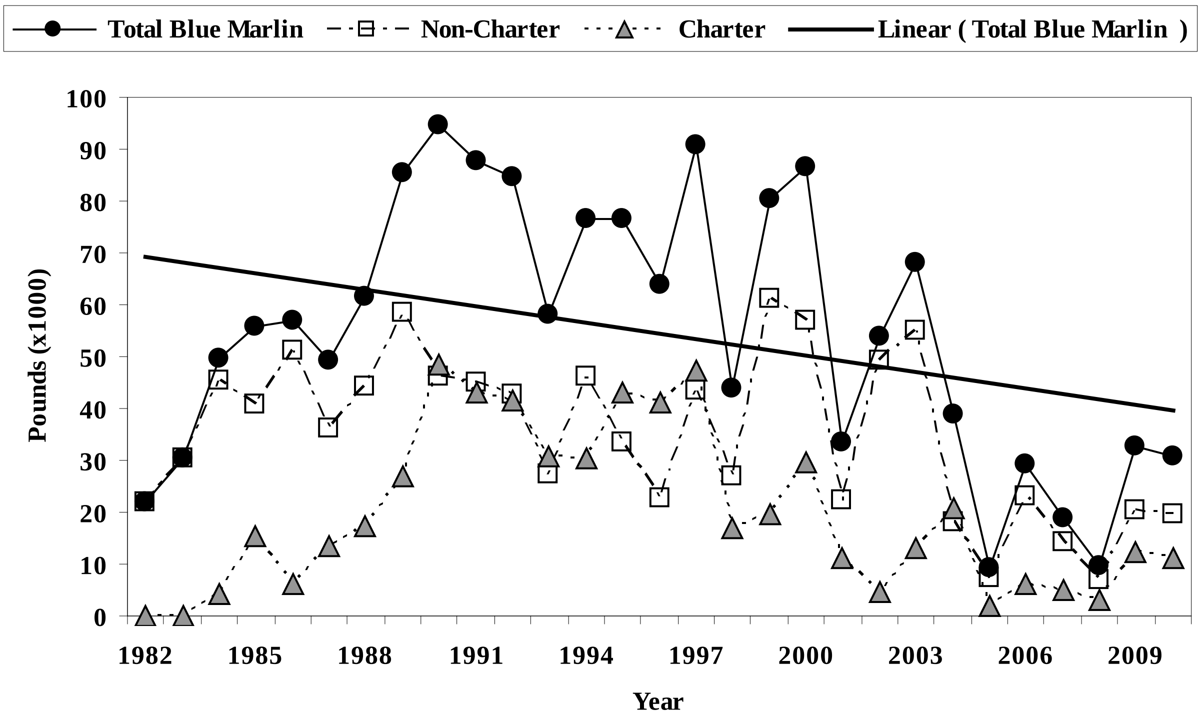
Source: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program and its associated computerized data expansion system files, expanded with the assistance of NMFS.

Calculation: Totals by species are summed across all fishing methods as described in Figures 57 to 60.

Table 53. Guam annual estimated wahoo landings: total wahoo landings, non-charter landings, and charter landings in pounds

Year	Total Wahoo	Non-Charter	Charter
1982	55,993	55,906	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	85,108	70,710	14,398
1991	55,926	42,633	13,293
1992	82,446	60,003	22,444
1993	62,550	46,532	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	158,194	145,659	12,535
1999	76,338	66,673	9,665
2000	70,433	58,157	12,277
2001	119,765	107,150	12,616
2002	72,643	61,386	11,257
2003	64,266	53,505	10,761
2004	120,266	99,941	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	130,733	121,698	9,035
2010	45,407	42,505	2,902
Average	**85,481**	**72,423**	**13,058**
Standard Deviation	**31,389**	**28,678**	**9,089**

Figure 63. Guam annual estimated blue marlin landings: total blue marlin landings, non-charter landings, charter landings



Interpretation: During the 1980's, non-charter boats accounted for the bulk of the blue marlin catch. In the early 1990's, the charter-based share of the marlin catch began increasing, peaking at 64% of the blue marlin landings in 1996. Charter vessels during this time period actively targeted blue marlin and more charter trips were made. Subsequent decreases in blue marlin charter landing are associated with a downturn in tourism. In 2010, blue marlin catch decreased across the board compared to 2009. Total catch was down 6%, non-charter catch was down 4%, and charter catch was down 9% Charter blue marlin catch accounted for 36% of the total blue marlin harvest. Blue marlin landings were below the 29-year average in all categories.

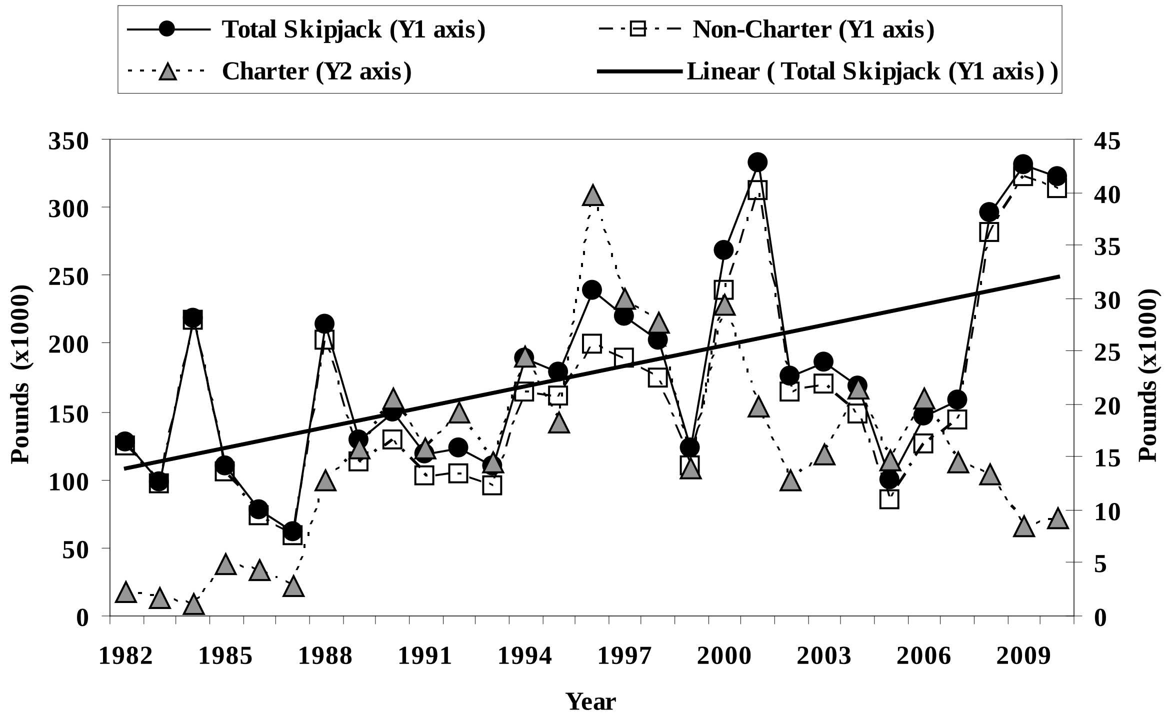
Source: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program and its associated computerized data expansion system files, expanded with the assistance of NMFS.

Calculation: Totals by species are summed across all fishing methods as described in Figures 57 to 60.

Table 54. Guam annual estimated blue marlin landings: total blue marlin landings, non-charter landings, charter landings

Year	Total Blue Marlin	Non-Charter	Charter
1982	21,845	21,845	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	46,344	48,455
1991	87,869	44,899	42,970
1992	84,498	42,810	41,688
1993	57,992	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	44,026	27,009	17,017
1999	80,537	61,032	19,505
2000	86,424	56,992	29,432
2001	33,302	22,148	11,154
2002	53,761	49,191	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	32,605	20,411	12,194
2010	30,811	19,607	11,204
Average	**54,475**	**35,041**	**19,434**
Standard Deviation	**25,210**	**15,313**	**15,274**

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



Interpretation: Skipjack tuna catch has fluctuated over the reporting period, peaking in 2001. The reason for the large skipjack catch in 2001 is not clear, but is likely tied to local abundance. The drop in skipjack tuna catches the following year is likely an effect of two super typhoons making landfall and disrupting fishing operations. Total skipjack tuna landings and non-charter landings decreased in 2010 compared to 2009 by 2.5% and 3%, respectively. 2010 charter landings increased by 10%. 2010 total catch was 81% above the 29-year average.

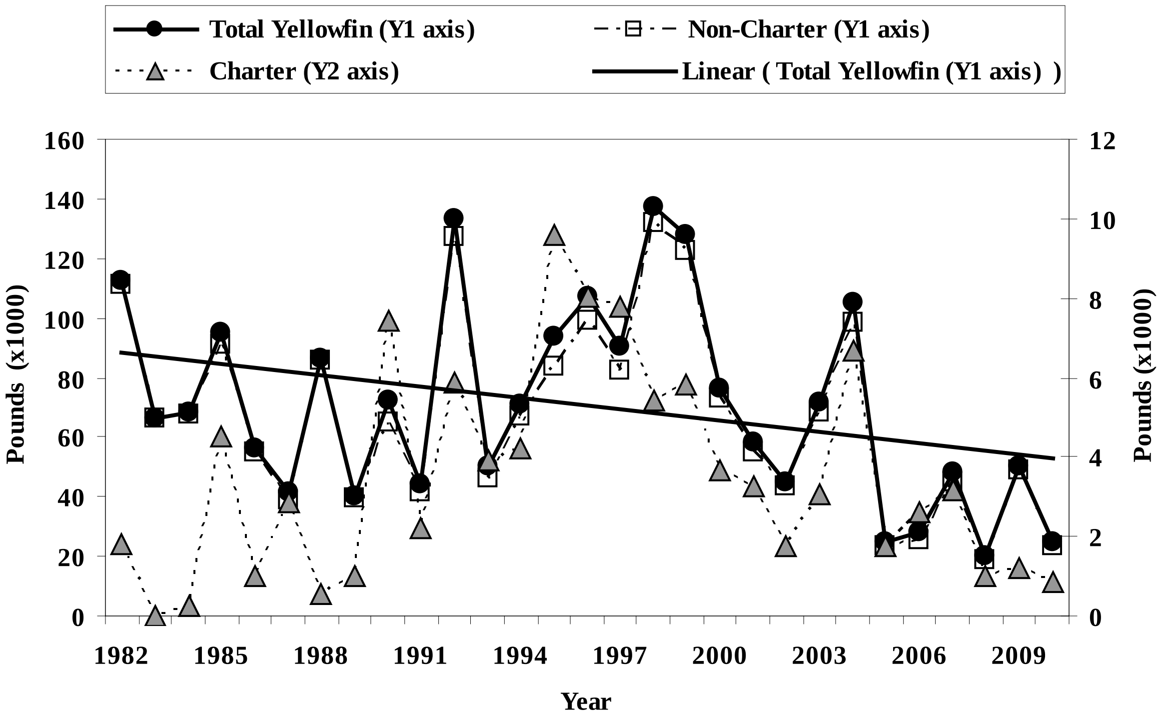
Source: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program and its associated computerized data expansion system files, expanded with the assistance of NMFS.

Calculation: Totals by species are summed across all fishing methods as described in Figures 57 to 60.

Table 55. Guam annual estimated skipjack tuna landings: total skipjack landings, non-charter skipjack landings, and charter skipjack landings

Year	Total Skipjack	Non-Charter	Charter
1982	126,825	124,649	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	149,502	128,910	20,592
1991	118,708	102,845	15,862
1992	123,373	104,117	19,257
1993	109,582	95,081	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	201,659	173,892	27,767
1999	123,538	109,696	13,841
2000	267,699	238,330	29,368
2001	331,768	312,001	19,767
2002	176,356	163,504	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	295,250	281,827	13,423
2009	331,063	322,682	8,381
2010	322,482	313,227	9,255
Average	**178,302**	**162,802**	**15,500**
Standard Deviation	**74,499**	**72,171**	**9,151**

Figure 65. Guam annual estimated yellowfin tuna landings: total yellowfin landings, non-charter landings, and charter landings



Interpretation: The overall yellowfin landings show wide fluctuations during the 29-year time series, although the total and non-charter estimated landings showed a significant decrease from 1998 to 2002. Charter landings of yellowfin tuna peaked in 1985, 1990, and 1995, and then showed a general decrease until 2002. Yellowfin tuna catch was down across the board in 2010 compared to 2009: total catch decreased 51%, non-charter catch decreased 52%, and charter catch decreased 31%. Non-charter boats harvested 95% of the total yearly catch of yellowfin. All three categories are well below their 29-year averages.

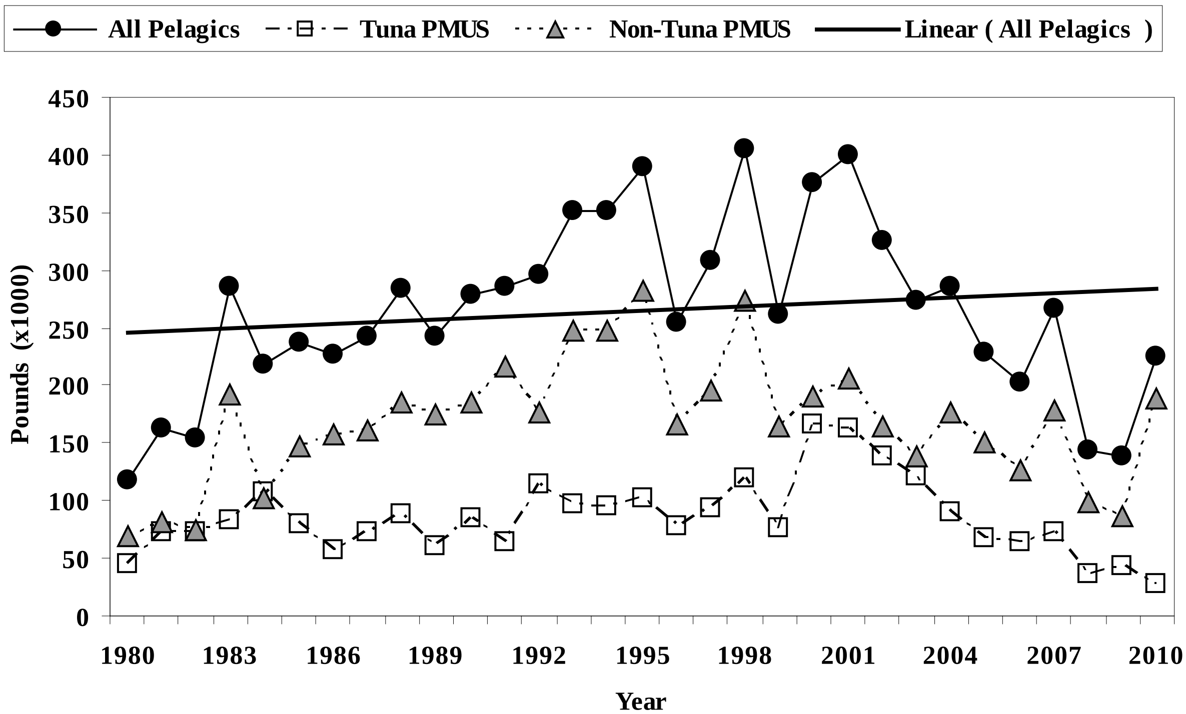
Source: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program and its associated computerized data expansion system files, expanded with the assistance of NMFS.

Calculation: Totals by species are summed across all fishing methods for all years except 1992-93 as described in Figure 57.

Table 56. Guam annual estimated yellowfin tuna landings: total yellowfin landings, non-charter landings, and charter landings

Year	Total Yellowfin	Non-Charter	Charter
1982	112,794	110,981	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	64,942	7,452
1991	44,034	41,822	2,212
1992	133,170	127,311	5,859
1993	50,350	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	137,422	132,020	5,402
1999	128,026	122,204	5,822
2000	76,651	72,967	3,684
2001	57,929	54,668	3,261
2002	45,089	43,336	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	50,279	49,065	1,214
2010	24,599	23,756	843
Average	**70,538**	**67,044**	**3,618**
Standard Deviation	**32,801**	**31,324**	**2,533**

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



Interpretation: Pelagic commercial landings generally increased during the first 20 years in the 29-year time series. Over the last 15 years commercial landings have shown a general decline. However, the 2010 total commercial catch increased 62% over 2009, but it is still 15% below the 29-year average.

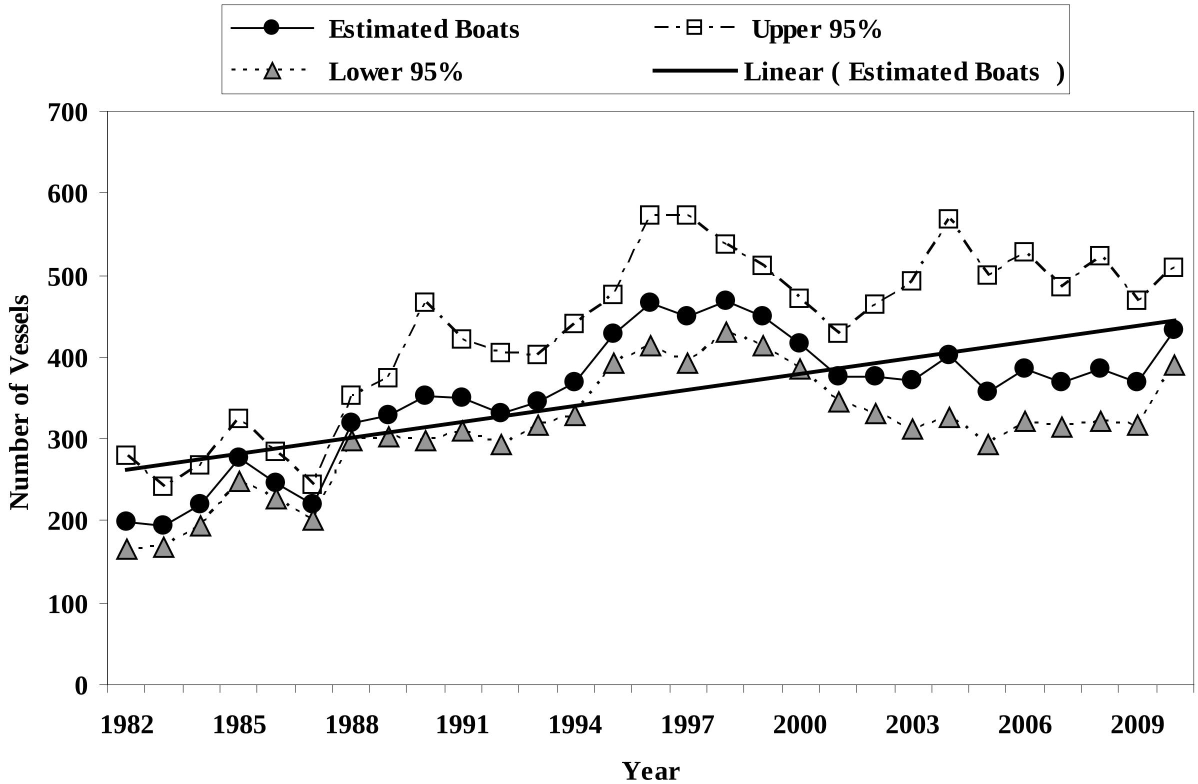
Source: The WPACFIN-sponsored commercial landings system.

Calculation: 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 57. 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	225,545	27,434	188,949
Average	**265,172**	**85,548**	**167,928**
Standard Deviation	**75,427**	**32,431**	**53,627**

Figure 67. 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. This may be an artifact of the addition of two marinas into the sampling program. Over the last decade the number of boats has fluctuated between about 350 and 400 vessels participating the fishery annually. 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. In 2010, the number of boats was 432, an increase of 17% from 2009.

Source: 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.

Calculation: 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 2010 trolling boat log was converted and processed through a boat estimator model 1,000 times.

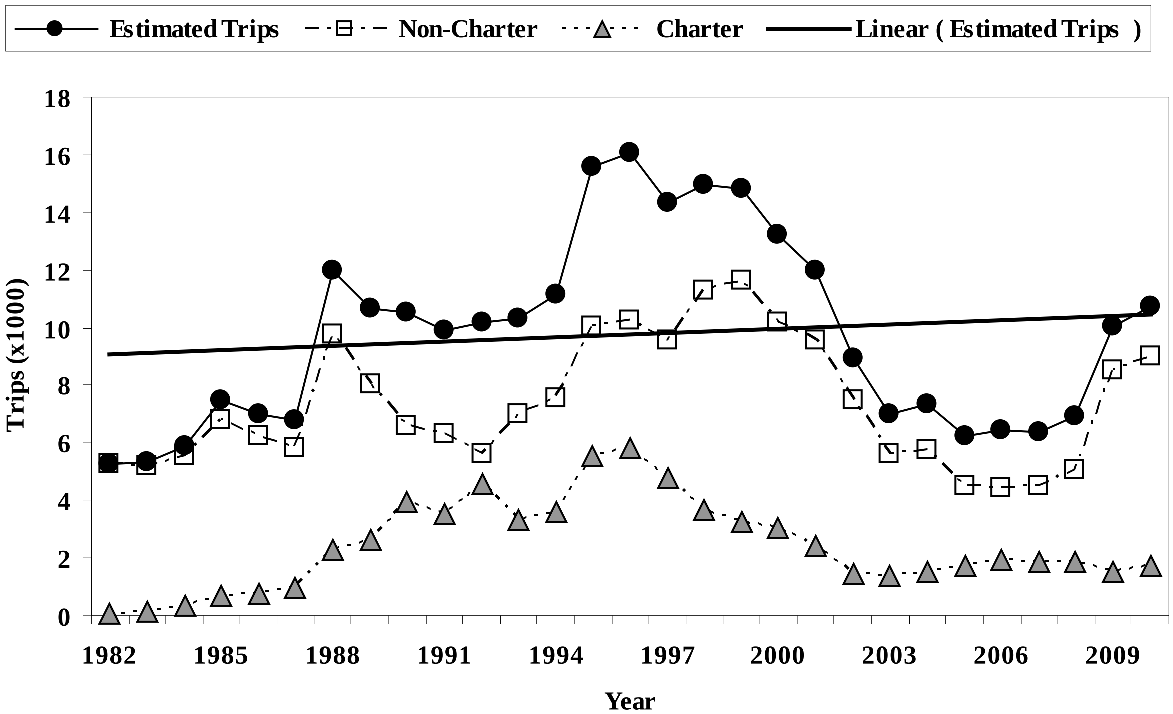
Table 58. Guam estimated number of trolling vessels

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

Table 59. Boat-based survey statistics: raw data

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	642
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	93	1100	670

Figure 68. Guam estimated number of trolling trips



Interpretation: Non-charter and charter troll trips generally increased for the first 15 years of the 29-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 tourism from Asia, and increased maintenance, repair, and fuel costs combined with declining inflation-adjusted fish prices. In 2010, the total number of troll trips increased by 7%, and the number of non-charter trips increased by 5.7%. The number of charter trips increased by 13.7%. The increase in non-charter trips may be attributed to greater local abundance of PMUS, especially skipjack. The number of total trips in 2010 is 9% above the 29-year average.

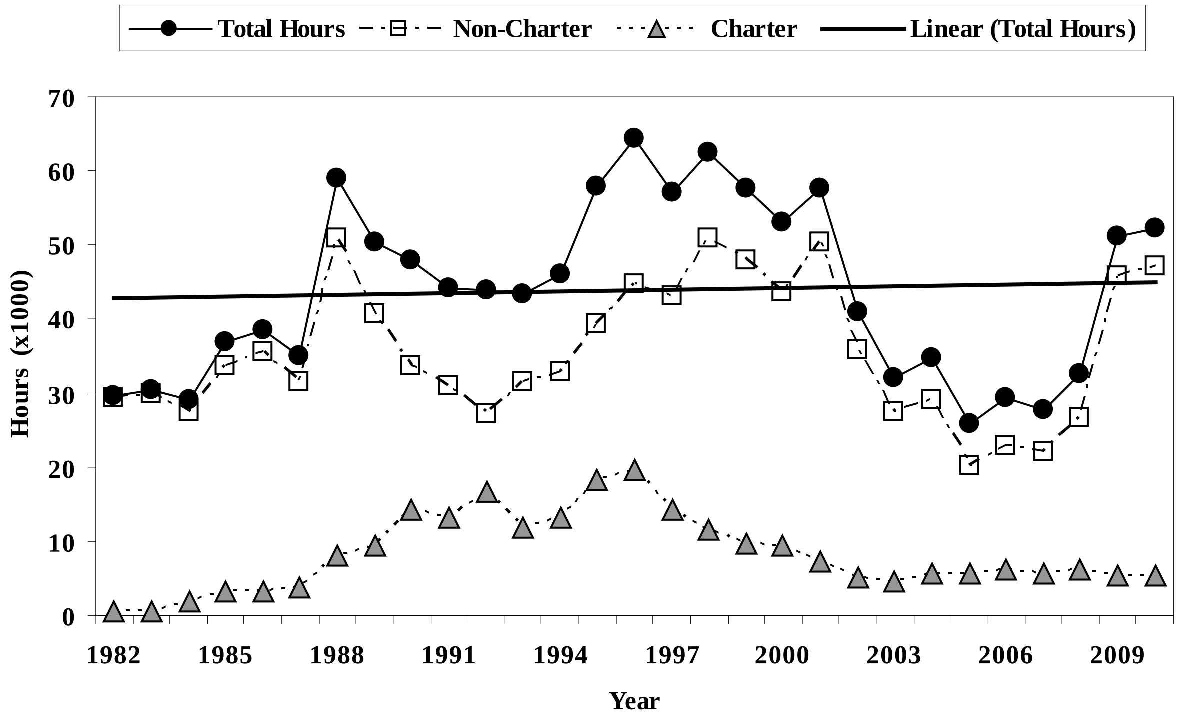
Source: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program and its associated computerized data expansion system files.

Calculation: 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 60. 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	10,714	8,978	1,736
Average	9,767	7,340	2,427
Standard Deviation	3,252	2,147	1,529

Figure 69. Guam estimated number of trolling hours



Interpretation: Trolling hours remained relatively high during the 1990s, but slumped through most of the 2000s. In the late 2000s, trolling hours began increasing, but have never reached the levels seen in the 1990s. 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, non-charter trolling activity dropped off dramatically. Since 2005, the number of hours trolling has generally been increasing. In 2010, total troll hours and non-charter troll hours both increased by 2% each, while charter troll hours increased by 1.6%. The increase in hours trolling may be attributed to the lack of FADs, causing fishermen to make longer trips to fishing areas. The 2010 total number of troll hours is 19.4% above the 29-year average.

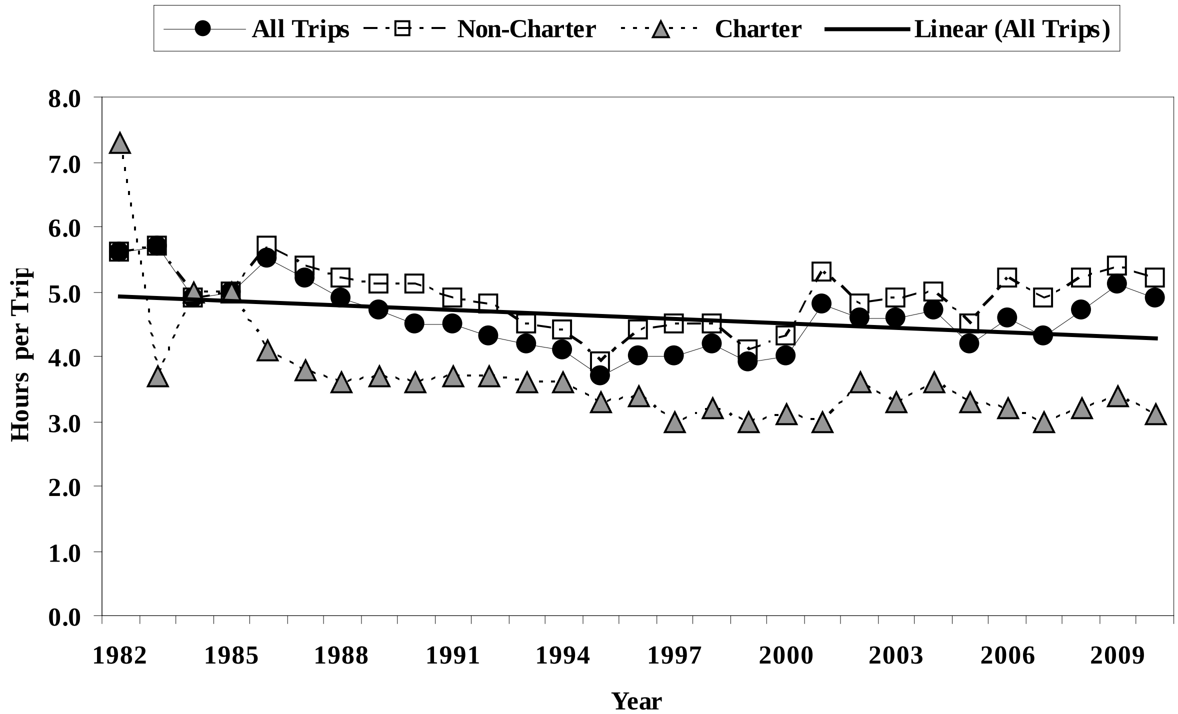
Source: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program and its associated computerized data expansion system files.

Calculation: 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 61. 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	52,333	46,990	5,344
Average	**43,825**	**35,566**	**8,259**
Standard Deviation	**11,645**	**9,063**	**5,112**

Figure 70. Guam estimated trip length (hours per trip)



Interpretation: In 2010, the length of the average trolling trip decreased slightly from 2009. The redeployment of fish aggregating devices (FADs) are still used by both charter and non-charter boats, 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 29-year time series. In 2010, total trip length, non-charter trip length, and charter trip length all decreased. The 2010 average number of hours trolling per trip is down 4% compared to 2009, but 6% higher than the 29-year average.

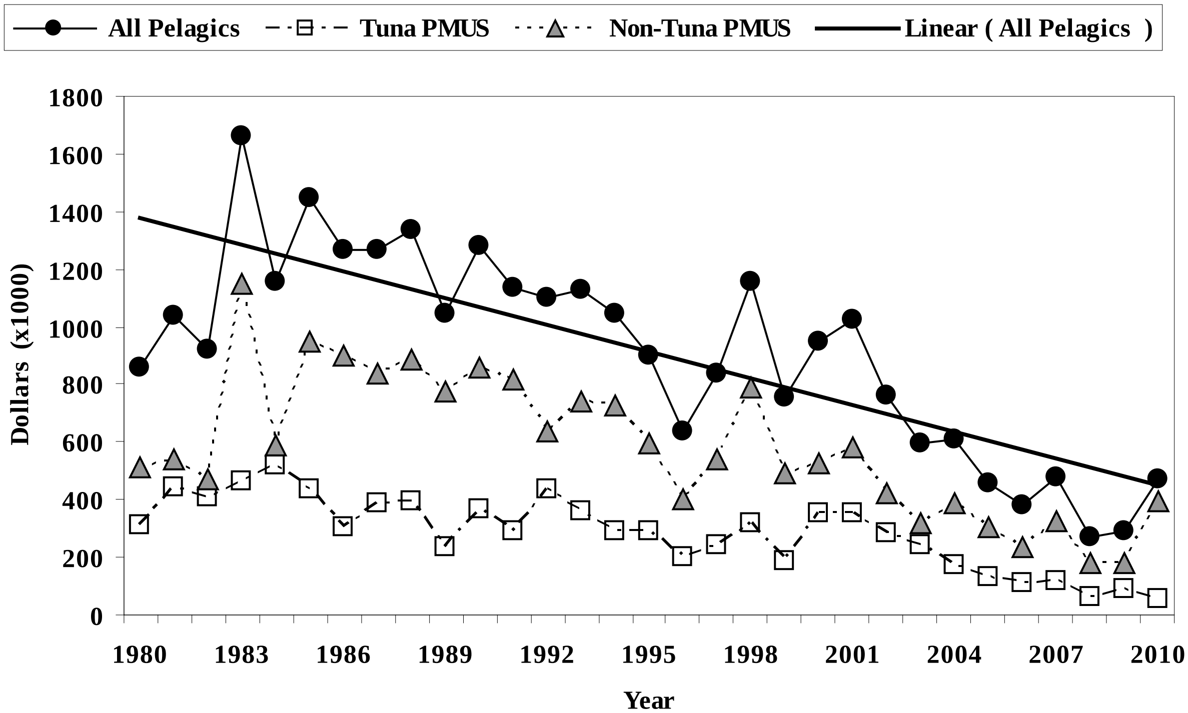
Source: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program and its associated computerized data expansion system files.

Calculation: 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 62. 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	5.2	3.1
Average	**4.6**	**4.9**	**3.7**
Standard Deviation	**0.5**	**0.5**	**0.8**

Figure 71. Guam estimated annual commercial revenues in inflation-adjusted dollars: all pelagics, tuna PMUS, and non-tuna PMUS



Interpretation: The 2010 total estimated inflation-adjusted commercial revenues ($467,841) increased 59% compared to 2009 total revenues. 2010 tuna PMUS revenues in inflation-adjusted dollars ($54,061) decreased 41% compared to 2009. 2010 non-tuna PMUS revenues in inflation-adjusted dollars ($392,682) were 117% greater than 2009 revenues. Overall, commercial revenues have shown a gradual decrease since the early 1980's. A large drop occurring after 2003 can partly be attributed to a change in government policy (see introduction). Revenues for all pelagic, tuna PMUS, and non-tuna PMUS were all below their 29-year averages.

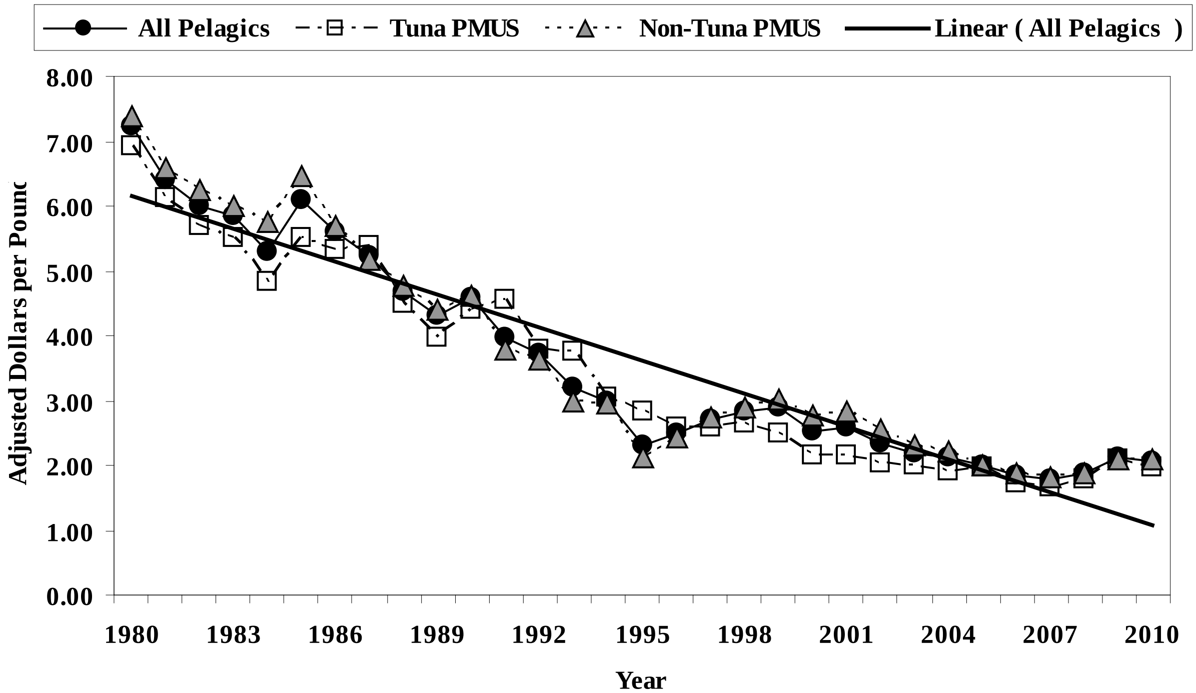
Source: The WPACFIN-sponsored commercial landings system.

Calculation: 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, as in figure 5. Inflation-adjusted total revenue per trip is derived from the Guam Annual Consumer Price Index (CPI).

Table 63. 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	149,124	855,225	54,353	311,712	88,775	509,127
1981	218,384	1,039,946	92,914	442,459	113,212	539,117
1982	203,847	923,225	90,719	410,866	103,459	468,565
1983	380,231	1,664,269	105,308	460,934	262,817	1,150,350
1984	286,490	1,153,409	129,389	520,921	146,339	589,163
1985	373,796	1,448,832	112,286	435,219	244,423	947,384
1986	334,955	1,263,786	81,299	306,742	237,826	897,318
1987	350,828	1,267,541	107,642	388,911	231,451	836,231
1988	388,630	1,334,554	115,243	395,745	258,203	886,671
1989	337,586	1,045,166	76,865	237,975	249,421	772,206
1990	471,241	1,277,536	136,321	369,566	316,491	858,007
1991	462,191	1,136,527	119,640	294,195	333,096	819,083
1992	492,707	1,100,216	195,547	436,655	284,546	635,392
1993	547,835	1,129,089	175,360	361,418	358,592	739,058
1994	593,838	1,046,937	165,296	291,416	411,832	726,059
1995	537,889	900,426	173,629	290,656	356,256	596,373
1996	398,375	635,010	127,375	203,036	254,063	404,977
1997	534,352	835,727	154,819	242,137	344,972	539,536
1998	733,101	1,153,901	201,639	317,379	502,801	791,409
1999	489,605	756,929	122,023	188,648	319,342	493,703
2000	626,803	950,233	234,735	355,859	349,312	529,557
2001	667,648	1,026,174	228,652	351,438	379,174	582,790
2002	500,777	764,686	184,705	282,045	274,929	419,817
2003	399,989	594,783	163,423	243,010	214,143	318,431
2004	432,735	606,262	122,098	171,059	277,544	388,840
2005	353,131	459,423	100,720	131,037	232,336	302,269
2006	324,686	378,583	94,040	109,651	202,560	236,185
2007	437,861	478,582	109,201	119,357	296,385	323,949
2008	260,474	272,716	61,360	64,244	174,973	183,197
2009	286,514	293,964	88,918	91,230	176,071	180,649
2010	467,841	467,841	54,061	54,061	392,682	392,682
Average	**420,757**	**911,661**	**128,374**	**286,438**	**270,582**	**582,519**
Standard Deviation	**134,314**	**346,597**	**47,684**	**124,036**	**93,235**	**240,398**

Figure 72. Guam annual estimated average price of pelagics in inflation-adjusted dollars per pound: 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, prices leveled out and began to rise slightly. In 2010, prices were virtually unchanged compared to 2009, with the adjusted price for all pelagics increasing 2.3%, 3% for tuna PMUS, and 1% for non-tuna PMUS species. All three categories are well below their 29-year averages. Locally caught pelagic fish continues to have to compete with cheaper pelagic fish caught by longliners. These are value-added products sold at several supermarkets and roadside vendors.

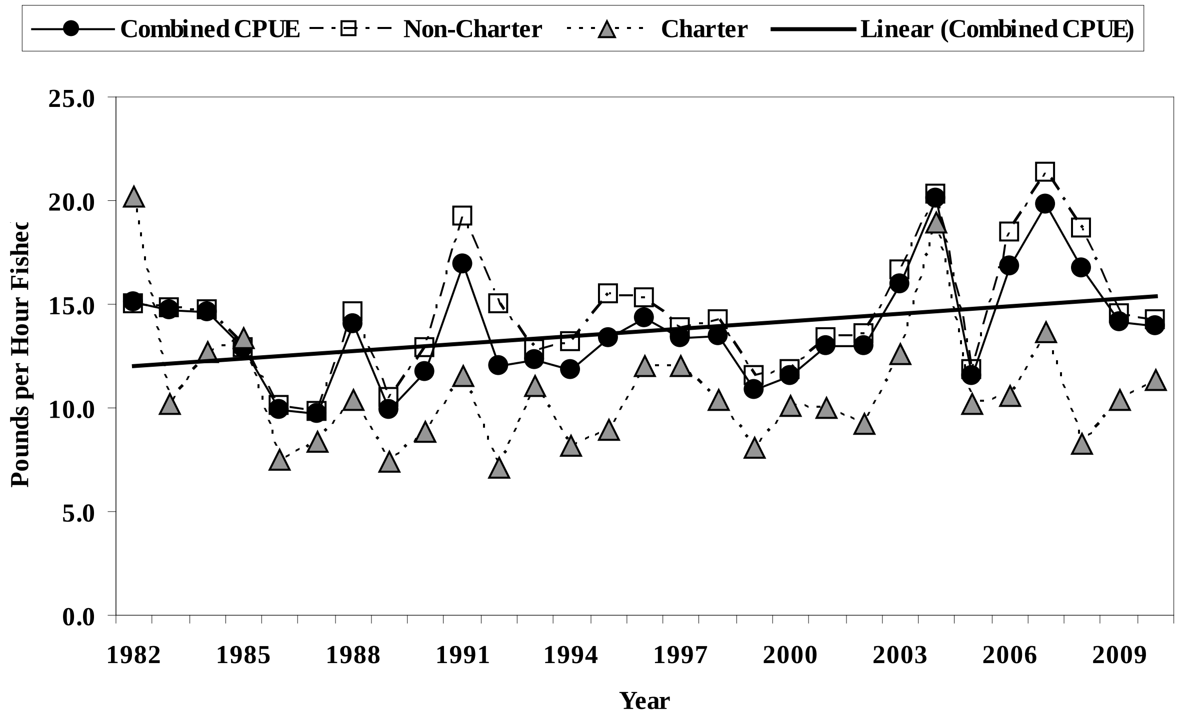
Source: The WPACFIN-sponsored commercial landings system.

Calculation: 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 64. Guam annual estimated average price of pelagics in inflation-adjusted dollars per pound: 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	7.23	1.21	6.92	1.29	7.37
1981	1.35	6.41	1.29	6.13	1.38	6.59
1982	1.33	6.01	1.25	5.68	1.38	6.26
1983	1.33	5.84	1.26	5.50	1.37	6.00
1984	1.31	5.29	1.20	4.84	1.43	5.75
1985	1.57	6.10	1.42	5.51	1.67	6.47
1986	1.48	5.59	1.41	5.32	1.51	5.70
1987	1.45	5.23	1.49	5.40	1.43	5.17
1988	1.37	4.69	1.31	4.49	1.39	4.78
1989	1.39	4.31	1.28	3.98	1.42	4.40
1990	1.69	4.58	1.62	4.39	1.70	4.61
1991	1.62	3.98	1.85	4.55	1.54	3.78
1992	1.66	3.71	1.70	3.80	1.62	3.62
1993	1.56	3.21	1.82	3.75	1.45	2.98
1994	1.69	2.98	1.73	3.06	1.67	2.94
1995	1.38	2.31	1.70	2.84	1.26	2.11
1996	1.56	2.49	1.62	2.58	1.52	2.43
1997	1.74	2.72	1.65	2.58	1.76	2.75
1998	1.81	2.84	1.68	2.64	1.84	2.90
1999	1.88	2.90	1.62	2.50	1.95	3.01
2000	1.67	2.53	1.41	2.15	1.83	2.78
2001	1.67	2.57	1.40	2.15	1.84	2.83
2002	1.54	2.35	1.33	2.03	1.67	2.55
2003	1.47	2.18	1.35	2.00	1.55	2.30
2004	1.52	2.12	1.36	1.91	1.58	2.21
2005	1.54	2.01	1.51	1.96	1.54	2.00
2006	1.60	1.86	1.48	1.72	1.61	1.88
2007	1.64	1.79	1.51	1.65	1.66	1.81
2008	1.81	1.89	1.70	1.78	1.78	1.87
2009	2.06	2.12	2.03	2.08	2.05	2.10
2010	2.07	2.07	1.97	1.97	2.08	2.08
Average	**1.58**	**3.61**	**1.52**	**3.48**	**1.61**	**3.68**
Standard Deviation	**0.20**	**1.61**	**0.22**	**1.55**	**0.21**	**1.67**

Figure 73. Guam trolling CPUE in pounds per hour fished



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 identify species-specific effort, disproportionately targeting one species effects catch rates for another species. For instance, charter boats targeting blue marlin during the summer months may have lower catch rates for wahoo than a vessel indiscriminately fishing for any species. In 2010, CPUEs, in pounds per hour fished, decreased 1.4% for charter and non-charter vessels combined and 2% for non-charter vessels alone. Charter vessel catch rates increased by 8%. Charter catch rates have generally been lower than catch rates of non-charter boats. Limited search and fishing time and selectively targeting certain species (e.g. blue marlin) may be responsible for the lower charter CPUEs.

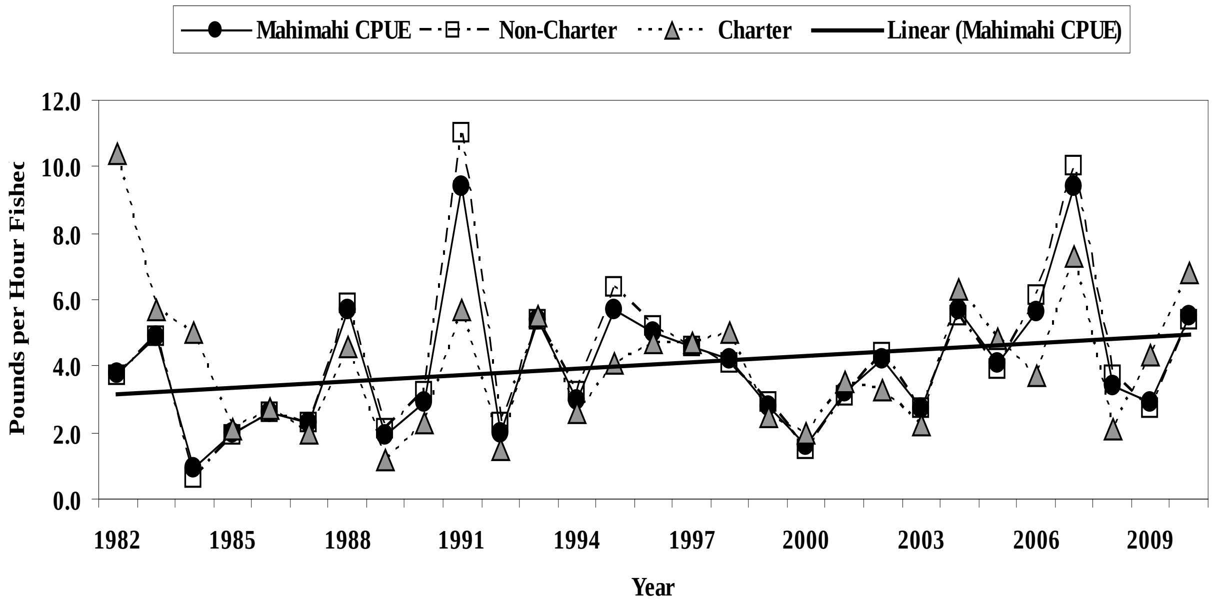
Source: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program and its associated computerized data expansion system files.

Calculation: 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 65. Guam trolling CPUE in pounds per hour fished

Year	Catch Rate	Non-Charter	Charter
1982	15.1	15.0	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	13.9	14.2	11.3
Average	**13.7**	**14.5**	**10.8**
Standard Deviation	**2.6**	**2.9**	**3.0**

Figure 74. Guam trolling CPUE in pounds per hour fished: mahimahi



Interpretation: The wide fluctuations in mahimahi CPUE values are probably due to the high variability in the year-to-year abundance and availability of the stocks. It is difficult to determine how much time fishermen target individual species and this may lead to biases that preclude estimating CPUEs indicative of catch rates if a particular species was solely targeted. In 2010, the catch rate for total CPUE, in pounds per hour fished, increased by 89%, non-charter mahimahi CPUE increased 100%, and charter CPUE increased by 58%. Total mahimahi CPUE is 37.5% above the 29-year average.

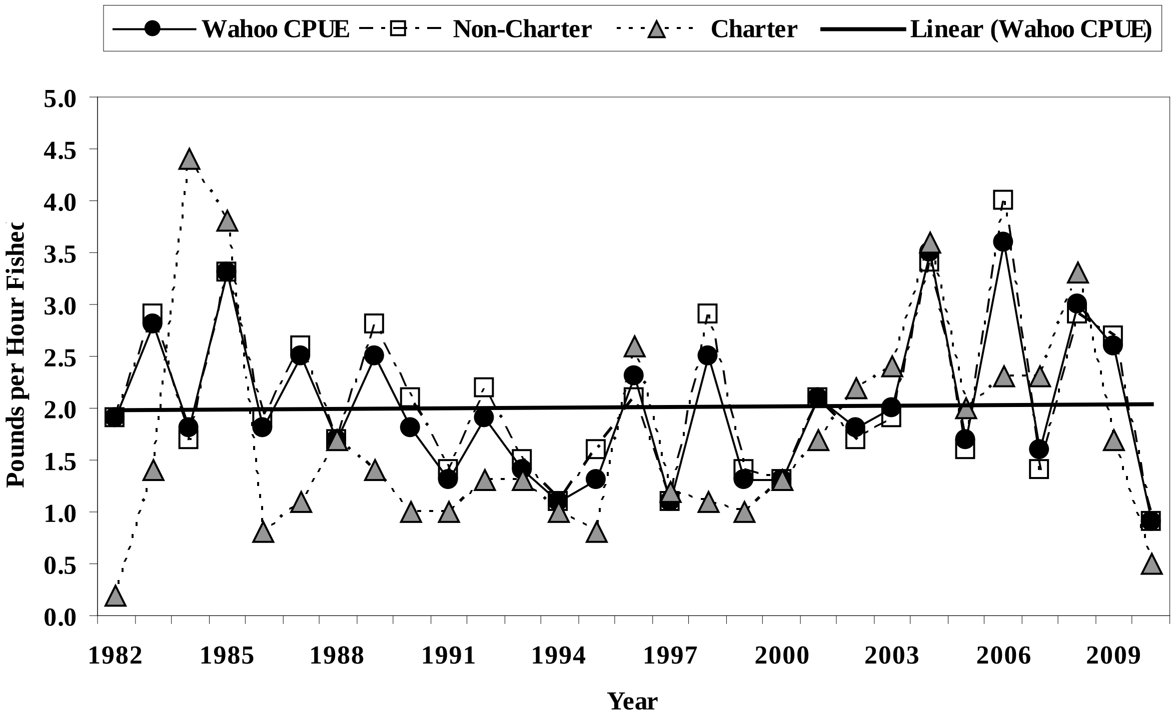
Source: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program and its associated computerized data expansion system files.

Calculation: 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 66. Guam trolling CPUE in pounds per hour fished: mahmahi

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	5.5	5.4	6.8
Average	**4.0**	**4.2**	**4.1**
Standard Deviation	**2.0**	**2.3**	**2.0**

Figure 75. Guam trolling CPUE in pounds per Hour fished: wahoo



Interpretation: The wide fluctuations in CPUE are probably due to the high variability in the year-to-year abundance and availability of the stocks. It is difficult to determine how much time fishermen target individual species and this may lead to biases that preclude estimating CPUEs indicative of catch rates if a particular species was solely targeted. In 2010, all three categories declined. Total wahoo CPUE decreased by 65%, non-charter CPUE decreased by 67%, and charter CPUE decreased by 71%. Total CPUE is 55% below the 29-year average.

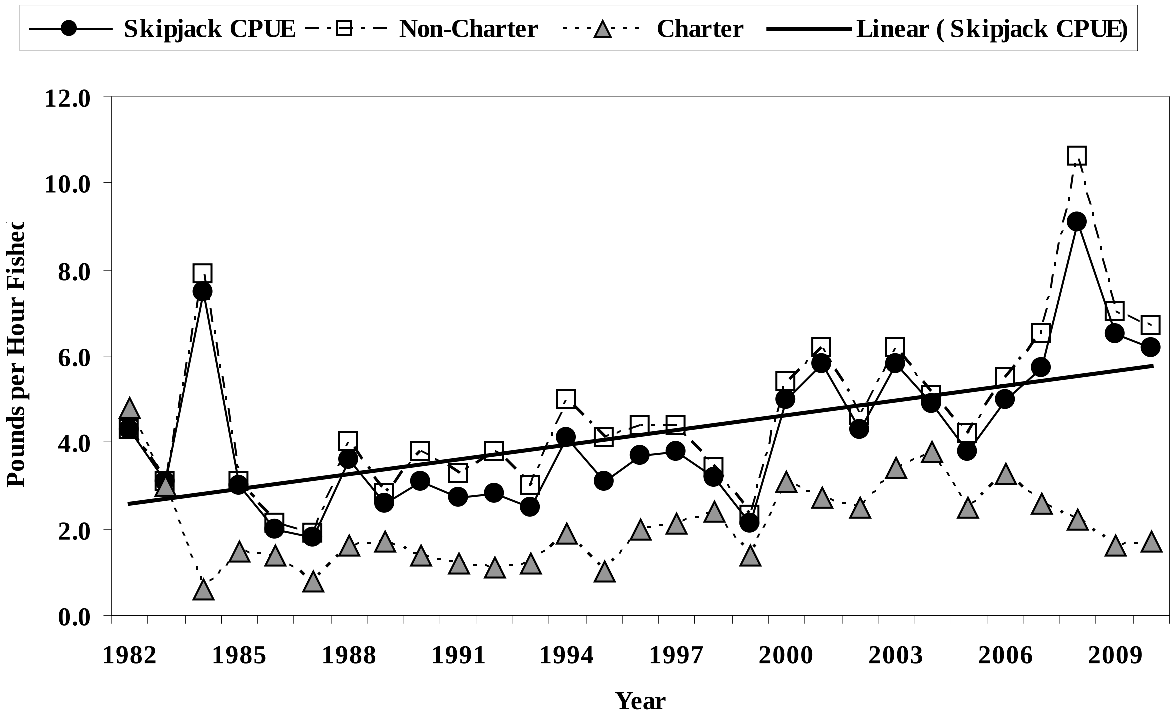
Source: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program and its associated computerized data expansion system files.

Calculation: 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 67. Guam trolling CPUE in pounds per hour fished: 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	0.9	0.9	0.5
Average	**2.0**	**2.1**	**1.7**
Standard Deviation	**0.7**	**0.8**	**1.0**

Figure 76. Guam trolling CPUE in pounds per hour fished: skipjack tuna



Interpretation: The wide fluctuations in CPUE for skipjack tuna are probably due to the high variability in year-to-year abundance and availability of the stocks. Skipjack tuna caught all year, but local abundance may vary as this is a highly migratory species. It is difficult to determine how much time fishermen target individual species and this may lead to biases that preclude estimating CPUEs indicative of catch rates if a particular species was solely targeted. In 2010, the catch rates for total and non-charter decreased by 5% and 4.3%, respectively. Charter rates increased 6% in 2010. Total CPUE was above the 29-year average.

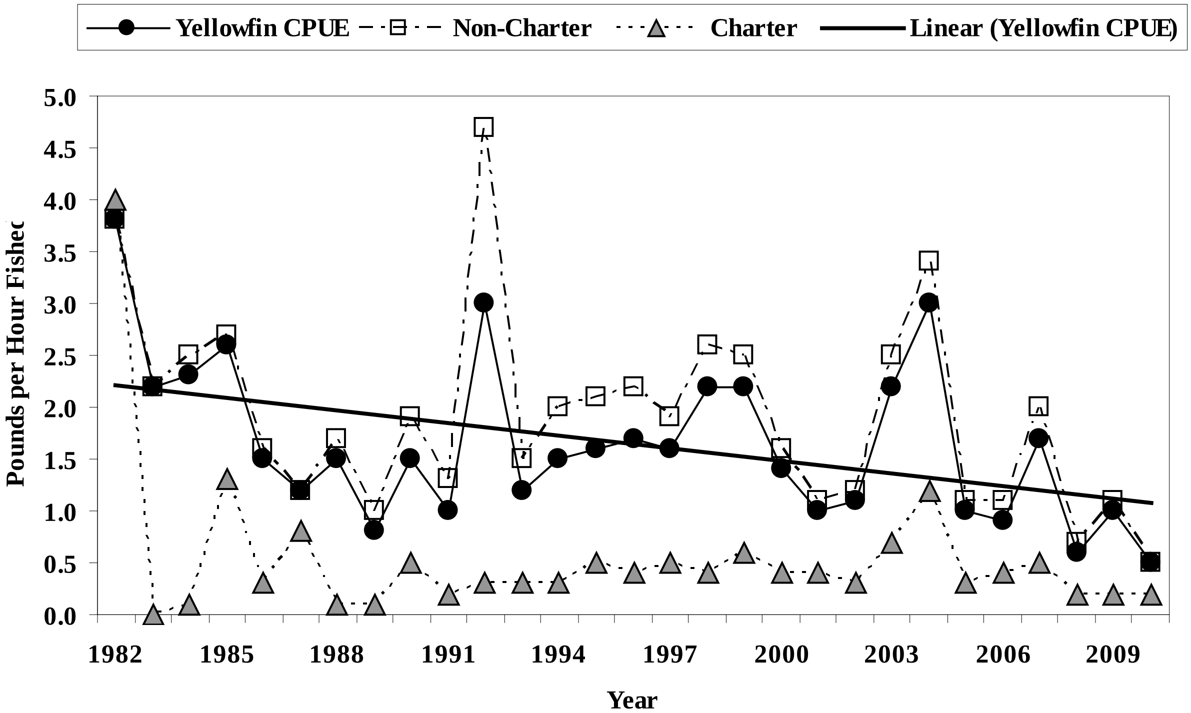
Source: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program and its associated computerized data expansion system files, expanded with the assistance of NMFS.

Calculation: 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 68. Guam trolling CPUE in pounds per hour fished: 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	6.5	7.0	1.6
2010	6.2	6.7	1.7
Average	**4.2**	**4.6**	**2.1**
Standard Deviation	**1.7**	**1.9**	**1.0**

Figure 77. Guam trolling CPUE in pounds per hour fished: 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 difficult to determine how much time fishermen target individual species and this may lead to biases that preclude estimating CPUEs indicative of catch rates if a particular species was solely targeted. Additionally, because yellowfin are highly migratory inconsistent inter-annual CPUEs would be expected. In 2010, the yellowfin total CPUE decreased by 50%, non-charter CPUE decreased by 55%, and charter CPUE remained unchanged compared to 2009. All three categories are below their 29-year averages.

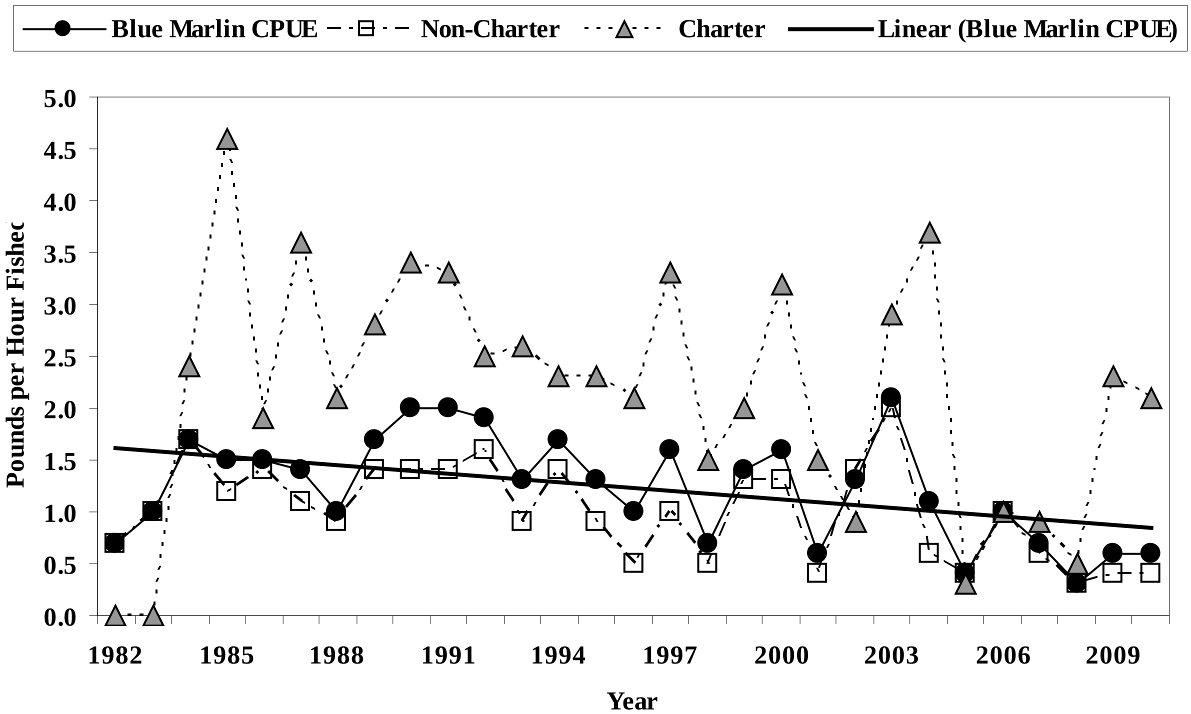
Source: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program and its associated computerized data expansion system files, expanded with the assistance of NMFS.

Calculation: 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 69. Guam trolling CPUE in pounds per hour fished: yellowfin tuna

Year	Total Yellowfin	Non-Charter	Charter
1982	3.8	3.8	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	1.6	0.4
2001	1.0	1.1	0.4
2002	1.1	1.2	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	1.0	1.1	0.2
2010	0.5	0.5	0.2
Average	**1.6**	**1.9**	**0.5**
Standard Deviation	**0.8**	**0.9**	**0.7**

Figure 78. Guam trolling CPUE in pounds per hour fished: 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. It is difficult to determine how much time fishermen target individual species and this may lead to biases that preclude estimating CPUEs indicative of catch rates if a particular species was solely targeted. Because blue marlin is a prized sport fish, charter vessels target it. Therefore, blue marlin charters CPUEs are usually higher than non-charter blue marlin CPUEs. The 2010 blue marlin catch rates were virtually unchanged from 2009. Total blue marlin CPUE is 50% below the 29-year average
.

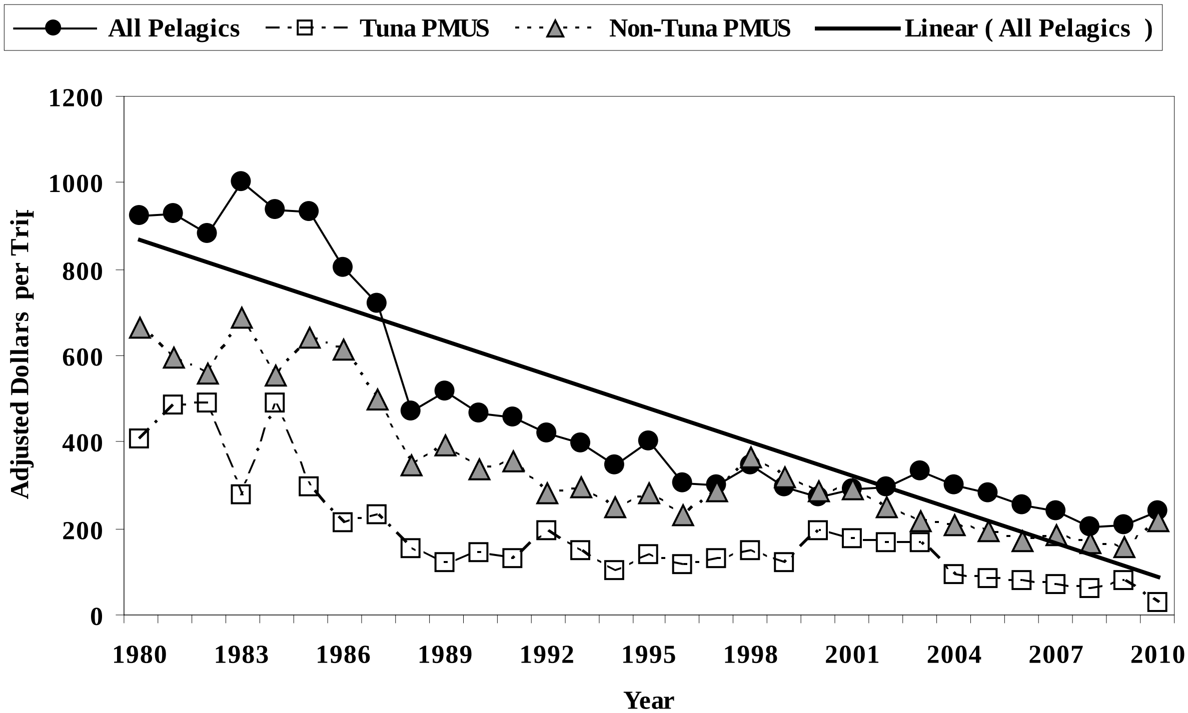
Source: The Division of Aquatic and Wildlife Resources (DAWR) offshore creel sampling program and its associated computerized data expansion system files, expanded with the assistance of NMFS.

Calculation: 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 70. Guam trolling CPUE in pounds per hour fished: 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
Average	**1.2**	**1.0**	**2.3**
Standard Deviation	**0.5**	**0.5**	**1.0**

Figure 79. 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 past 9 years. In 2010, the adjusted revenue per trip increased for all pelagics by 16%. Tuna PMUS revenues decreased by 62%, and non-tuna PMUS increased by 38%. 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 a reliable market exists for members of the local fishermen's cooperative which provides additional income. The commercial data is given with the warning that this only a partial year worth of data. The loss of the primary vendor providing commercial data reduces the reliability of this data

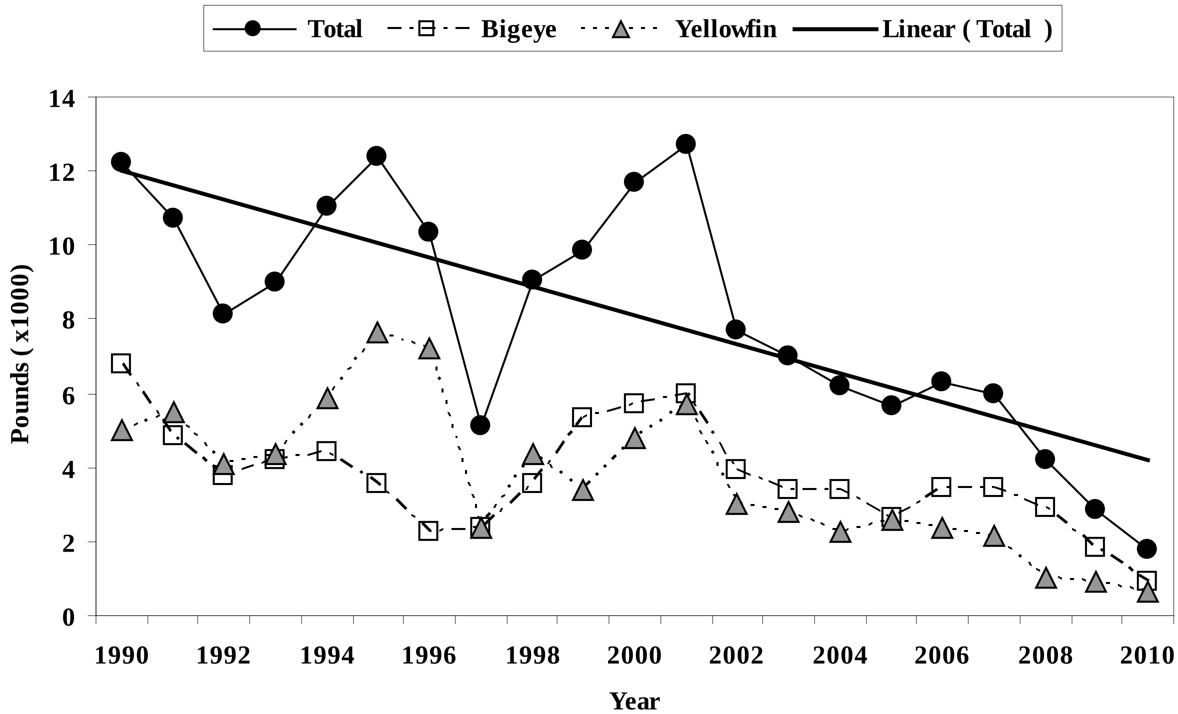
Source: The WPacFIN-sponsored commercial landings system.

Calculation: 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 71. 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	925.11	71.14	407.99	116.20	666.41
1981	195.29	929.97	102.24	486.87	124.58	593.25
1982	194.29	879.94	108.45	491.17	123.68	560.15
1983	229.26	1003.47	62.81	274.92	156.75	686.09
1984	233.01	938.10	121.56	489.40	137.48	553.49
1985	240.34	931.56	76.21	295.39	165.90	643.03
1986	212.25	800.82	55.68	210.08	162.89	614.58
1987	199.18	719.64	64.07	231.48	137.77	497.76
1988	137.30	471.49	44.98	154.46	100.78	346.08
1989	166.79	516.38	38.89	120.40	126.20	390.72
1990	172.68	468.14	53.19	144.20	123.50	334.81
1991	185.96	457.28	51.79	127.35	144.20	354.59
1992	188.33	420.54	86.72	193.65	126.18	281.76
1993	191.92	395.55	70.60	145.51	144.36	297.53
1994	197.09	347.47	56.32	99.29	140.32	247.38
1995	239.79	401.41	82.55	138.19	169.38	283.54
1996	191.10	304.61	72.55	115.64	144.71	230.67
1997	192.95	301.77	82.74	129.41	184.35	288.32
1998	221.01	347.87	92.81	146.08	231.44	364.29
1999	190.05	293.82	78.35	121.13	205.04	316.99
2000	179.42	272.00	127.01	192.55	189.00	286.52
2001	188.68	290.00	113.92	175.10	188.92	290.37
2002	193.42	295.35	109.41	167.07	162.85	248.67
2003	223.73	332.69	110.95	164.98	145.38	216.18
2004	215.10	301.36	65.56	91.85	149.03	208.79
2005	216.34	281.46	64.62	84.07	149.05	193.91
2006	219.47	255.90	68.83	80.26	148.26	172.87
2007	221.40	241.99	61.56	67.29	167.09	182.63
2008	196.13	205.35	55.86	58.49	159.29	166.78
2009	202.16	207.42	76.76	78.76	152.00	155.95
2010	240.35	240.35	29.76	29.76	216.16	216.16
Average	**201.16**	**476.74**	**76.06**	**184.28**	**154.60**	**351.30**
Standard Deviation	**23.97**	**259.03**	**24.33**	**124.57**	**29.10**	**161.41**

Figure 80. Guam annual longline landings



Interpretation: Annual landings, from a primarily foreign longline fishing fleet, have ranged from a low of 2,874 metric tons in 2009 to a high of 12,627 metric tons in 2001. These vessels fish primarily outside Guam's EEZ, but transship 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. Compared with 2009, the 2010 total longline landings decreased 38%, bigeye landings decreased 48%, and yellowfin landings decreased 30%. The 2010 totals were the lowest in the 21-year data set, and total catch was 66% below the 20 year average. The lower numbers are due to a reduction in the number of agents reporting sales.

Source: The Bureau of Statistics and Plans.

Calculation: Pre-1990 data was extracted directly from transshipment agents' files. Beginning in 1990, a mandatory data submission program was implemented.

Table 72. Guam annual longline landings

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
Average	**12,198**	**6,793**	**5,011**
Standard Deviation	**10,707**	**4,824**	**5,505**

Table 73. 2010 Guam trolling bycatch data

	Number Released				
	Number Alive	Released Dead/Injured	Both	Total Caught	Percent Bycatch
Non-Charter	0	0	0	6,085	0
Charter	0	0	0	567	0
Combined	0	0	0	6,652	0

Table 74. Trolling bycatch: summary

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	0	91	0
2005	3	0	3	2,631	.11	3	n/a	n/a
2006	2	1	3	3,478	.09	3	413	.7
2007	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
2008	1	0	1	3,495	.02	1	98	1.02
2009	2	1	3	3,478	.08	3	604	.05
2010	0	0	0	6,085	0	0	670	0

*"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 that is landed by fishermen is kept regardless of size and species. Bycatch for this fishery are sharks, shark-bitten pelagics, small pelagics, or other pelagic species. In 2010, bycatch was not encountered by Fisheries staff when interviewing trollers.

Source: The DAWR creel survey data for boat based methods.

Calculations: Bycatch is obtained directly from trolling interviews where bycatch was voluntarily reported. The number of bycatch reported is from unexpanded data.

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. These pelagic fisheries landed an estimated 28.3 million pounds worth about $79.3 million (ex-vessel revenue) in 2010. The longline fishery was the largest of all commercial pelagic fisheries in Hawaii and represented 84% of the total commercial pelagic landings and 88% of the ex-vessel revenue. The MHI troll accounted for 10% and 7% of the landings and revenue, respectively. The MHI handline, aku (skipjack tuna) boat, offshore handline and other gear types made up the remainder.

The target species for the Hawaii fisheries are tunas and billfishes, but a variety of other pelagic species are also landed with some regularity. The largest component of the pelagic landings was tunas, which comprised 61% of the total in 2010. Bigeye tuna alone accounted for 75% of the tunas and 46% of all pelagic landings. Billfish landings made up 18% of the total landings in 2010. Swordfish was the largest of these, at 68% of the billfish and 12% of the total landings. Landings of other pelagic management unit species (PMUS) represented 19% of the total landings in 2010 with moonfish being the largest component at 33% of other pelagics and 7% 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 four data sources: The State of Hawaii's Division of Aquatic Resources (HDAR) Commercial Fish Catch data, HDAR Commercial Marine Dealer (Dealer) data, the National Marine Fisheries Service (NMFS) Pacific Islands Fisheries Science Center's (PIFSC) longline logbook data, and joint NMFS and HDAR Market Sample (Market Sample) data.[1] Landings and revenue were calculated for each Hawaii pelagic fishery. The data sources and estimation procedures are described below.

The Hawaii-based Longline Fishery*:* The Market Sample data were used to estimate catch and revenue for the longline fishery from 1987 to 1991. Market Sample data was collected on five of six business days a week to approximate a coverage rate of about 80%. The Market Sample data were extrapolated to represent a full coverage rate.

The federal longline logbook system was implemented in December 1990 and served as the source of the data used to determine fish catches. Due to limited manpower, the Market Sampling data collection program was reduced to two business days in 1991 for a coverage rate of about 33%. The number of fish kept from the longline logbook data was multiplied by the average weight per fish from the market sample data to estimate total landings. The estimated landings were then multiplied by the average price per pound from the market sampling data to estimate total revenue.

A system to submit Dealer data electronically was implemented in 1999; the first complete year of fish dealer data was 2000. The Dealer data coverage of the longline landings and revenue was near complete and replaced the Market Sample data as the data source for average weight and average price.

[1] Ito, Russell Y. and Machado, Walter A. 2001. Annual report of the Hawaii-based longline fishery for 2000. Southwest Fisheries Science Center administrative report H-01-07.

The longline purchases in the Dealer data was identified and separated out by matching specific vessel names and HDAR Commercial Marine License (CML) numbers. The estimation procedure for longline landings and revenue was done by multiplying the total number of each species kept from the Federal longline logbook data based on its date of landing by the corresponding average weight of fish from Dealer data. The result was “Pounds Landed” for each species. This procedure was repeated on a monthly basis and summed over the year to get annual totals. There were exceptions though. When the sum of “Pounds Bought” for individual species from the Dealer data was greater than the calculation for “Pounds Landed”, “Pounds Bought” was used as the final estimate for landings.

Aku Boat: This fishery includes pelagic species caught by the aku boat or pole-and-line method (HDAR gear code 1) for skipjack tuna in all HDAR statistical areas. Aku boat fishing vessel names and CML numbers were matched up with the corresponding vessel names and CMLs in the Dealer data. The landings and revenue summaries were produced by summing “Pounds Bought” and “Amount Paid” in the Dealer data. Aku boat landings were also summed from the Aku Boat Fishing report to yield “Pounds Landed”. When the total of “Pounds Landed” from the Aku Boat Fishing data was greater than the “Pounds Bought” from the Dealer data, “Pounds Landed” was used as the catch. Contrarily, if “Pounds Bought” was greater than “Pounds Landed”, the total from “Pounds Bought” was used as the catch. “Pounds Landed” was typically greater than Pounds Bought.

MHI Troll Fishery: The MHI troll fishery includes pelagic species 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, Molokai, Oahu, Kauai and Niihau.

MHI Handline Fishery: The MHI handline fishery includes pelagic species 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 pelagic species 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: Even though this category is not mentioned specifically in this report, the catch is included in the overall total. It represents pelagic species caught by methods or in areas other than those methods mentioned above. Catch and revenue from this category is primarily composed of pelagic species caught by trolling in areas outside of the MHI (the distant water albacore troll fishery) or pelagic species 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 Commercial Fish Catch data collected and submitted by the aforementioned fishers, and Dealer data collected and submitted by seafood dealers. “Pounds Landed” from HDAR Commercial Fish Catch 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 Dealer data.

Catch in the Dealer data, referred to as “Pounds Bought”, by each fishery was not clearly differentiated; however, “Pounds Sold” by the longline and aku boat fisheries were identified by CML numbers or vessel names and excluded. The remaining “Pounds Bought” was presumed to be from the MHI troll, MHI handline, offshore handline fisheries or other gear category. “Pounds Bought” from this subset of the 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 Dealer data. The fishery specific allocation was then compared to the “Pounds Landed” from the HDAR Commercial Fish Catch total. The greater value of “Pounds Bought” from the Dealer data or the “Pounds Landed” from the HDAR Commercial Fish catch data was used as the catch. This process was repeated on a monthly basis.

Detailed data were not available for recreational fishers because they are not required to file catch reports (if they sell no fish during the year). In addition, there is no comprehensive creel survey of Hawaii anglers. JIMAR research reports describe aspects of the relationship between commercial and recreational pelagic fishing, but accurate estimates of total recreational participation and catch remain absent.[2] The NMFS Marine Recreational Fisheries Statistical Survey (MRFSS) has reinitiated operations in Hawaii after a 20-year absence with the first full year of field surveys in 2002. The combined telephone-creel intercept survey is being conducted in collaboration with the HDAR. In the interim, a summary of what is known about recreational fisheries, including preliminary estimates of recreational catch are included in Appendix 6.

This module was prepared by Russell Ito of NMFS. Summaries from NMFS longline logbooks were provided by Frederick Dowdell of NMFS. 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 from JIMAR. Information on HDAR CMLs was provided by Reginald Kokubun, HDAR.

Hawaii Division of Aquatic Resources Commercial Marine License information

Any fisherman who takes marine species for commercial purposes is required by the State of Hawaii to have a Commercial Marine License (CML) and submit a monthly catch report to HDAR. An exception to this rule is that 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.

A total of 3,347 fishermen were licensed in 2010, including 1,903 (57%) who indicated that their primary fishing method and gear were intended to catch pelagic fish. Most licenses that indicated pelagic fishing as their primary method were issued to trollers (68%) and longline fishermen (20%). The remainder was issued to ika-shibi and palu-ahi (handline) (10%) and aku boat fishers (1%).

[2] Hamilton, Marcia S and Stephen W. Huffman, 1997. Cost-earnings study of Hawaii’s small boat fishery, 1995-96. University of Hawaii SOEST 97-06/JIMAR 97-314. 102 p.
McConnell, Kenneth E. and Timothy C. Haab, 2001. Small boat fishing in Hawaii: choice and economic values. University of Hawaii SOEST 01-01, JIMAR 01-336, 62 p.

Table 75. Number of Hawaii commercial marine licenses (CMLs) in 2009 and 2010

Primary Fishing Method		Number of licensees	
		2009	**2010**
Trolling		1,352	1,302
Longline		467	390
Ika Shibi & Palu Ahi		176	197
Aku Boat (Pole and Line)		28	14
Total Pelagic		2,023	1,903
Total All Methods		3,404	3,347

2010 Plan Team Recommendations:

Table 76. Hawaii commercial pelagic landings, revenue, and average price by species, 2009-2010

Species	2009 Pounds landed (x 1000)	2009 Ex-vessel revenue ($1000)	2009 Average price ($/lb)	2010 Pounds landed (x 1000)	2010 Ex-vessel revenue ($1000)	2010 Average price ($/lb)
Tuna PMUS						
Albacore	681	$1,093	$1.68	976	$1,308	$1.42
Bigeye tuna	10,921	$40,189	$3.74	13,060	$50,860	$3.89
Bluefin tuna	2	$0	--	1	$0	--
Skipjack tuna	1,101	$1,033	$1.45	655	$549	$1.83
Yellowfin tuna	2,860	$6,376	$2.58	2,666	$7,006	$2.91
Tuna PMUS subtotal	**15,564**	**$48,691**	**$3.34**	**17,358**	**$59,723**	**$3.58**
Billfish PMUS						
Swordfish	3,974	$7,410	$1.93	3,526	$7,302	$2.32
Blue marlin	1,157	$1,218	$1.18	992	$1,124	$1.28
Striped marlin	644	$966	$1.50	376	$632	$1.85
Other marlins	297	$301	$1.07	324	$412	$1.35
Billfish PMUS subtota	**6,072**	**$9,896**	**$1.71**	**5,219**	**$9,470**	**$1.63**
Other PMUS						
Mahimahi	1,468	$2,900	$2.26	1,663	$3,303	$2.18
Ono (wahoo)	756	$1,702	$2.82	749	$1,746	$2.91
Opah (moonfish)	1,895	$2,446	$1.30	1,819	$2,583	$1.42
Oilfish	544	$719	$1.32	581	$783	$1.35
Pomfrets	633	$1,409	$2.25	593	$1,549	$2.61
Sharks (whole weight)	374	$142	$0.48	275	$113	$0.50
Other PMUS subtotal	**5,670**	**$9,319**	**$1.78**	**5,477**	**$10,077**	**$1.89**
Other pelagics	45	$29	$1.17	71	$73	$1.64
Total pelagics	**27,352**	**$67,935**	**$2.65**	**28,329**	**$79,343**	**$2.96**

Interpretation: The total commercial pelagic landings in 2010 was 28.3 million pounds or up 4% from 2009: an increase of 1.0 million pounds from the previous year. Tunas represented 61% of the total landings. Bigeye tuna landings were 13.1 million pounds in 2010, up 2.1 million pounds from the previous year. Bigeye tuna was the largest component of the landings (46%). Swordfish (12%) was the next largest, followed by yellowfin tuna (9%).

Total Hawaii commercial ex-vessel revenue ($79.3 million) increased by 17% in 2010. Tunas comprised 75% of this total. Bigeye tuna alone accounted for 64% of the total revenue at $50.9 million. Yellowfin tuna revenue increased 10% to $7.0 million. Billfish revenue ($9.5 million) was slightly lower compared to 2009. Swordfish was the second highest contributor to total revenue at $7.3 million. Revenue of other PMUS species increased 8% in 2010. The total pelagic fish price increased 12% in 2010. Average prices for tuna and other PMUS in increased by 7% and 6%, respectively, while the average price for billfish decreased by 5% in 2010.

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

"Other Billfish" includes unclassified billfish, sailfish, spearfish and black marlin. "Sharks" includes unclassified sharks, hammerhead sharks, mako sharks, thresher sharks, tiger sharks, blue sharks and white-tipped sharks. "Other Pelagics" includes unclassified tunas, kawakawa, sting rays, barracudas, flying fish, oilfish, sunfish, frigate mackerel and pomfrets.

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 77. Hawaii commercial pelagic landings, revenue, and average price by fishery, 2009-2010

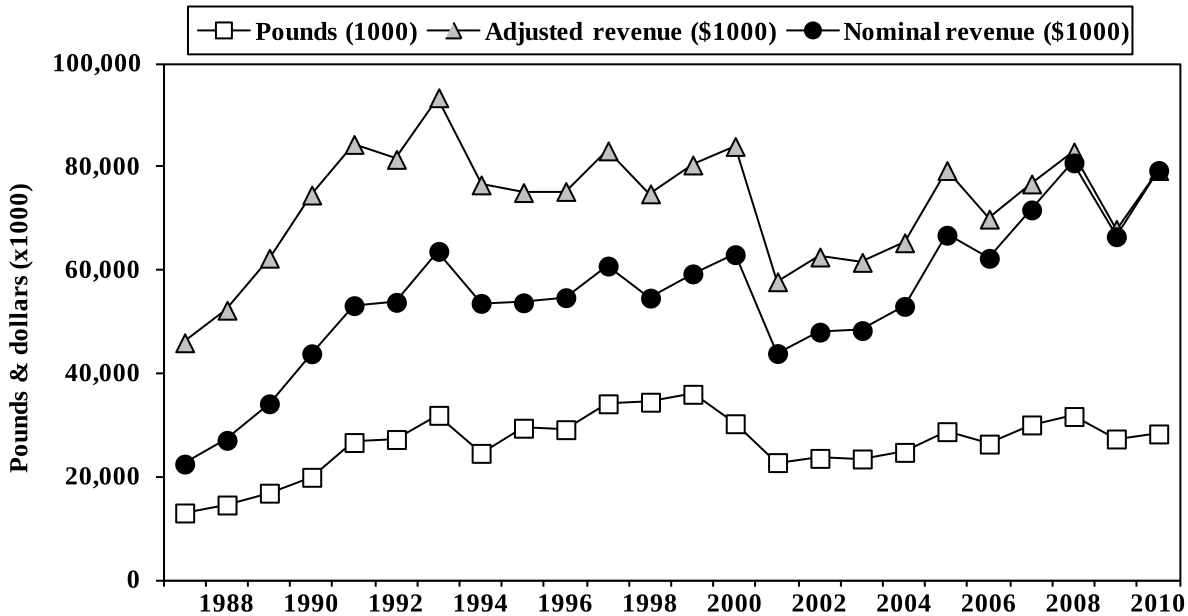
	2009			2010		
Fishery	Pounds landed (x1000)	Ex-vessel revenue ($1000)	Average price ($/lb)	Pounds landed (x1000)	Ex-vessel revenue ($1000)	Average price ($/lb)
Longline	22,360	$59,689	$2.73	23,736	$70,093	$3.05
MHI trolling	2,964	$5,130	$2.45	2,813	$5,562	$2.60
MHI handline	1,064	$1,783	$2.06	898	$1,878	$2.39
Offshore handline	290	$398	$2.14	578	$1,187	$2.09
Aku boat	511	$693	$1.36	--	--	--
Other gear	162	$241	$2.15	304	$621	$2.21
Total	**27,352**	**$67,935**	**$2.65**	**28,329**	**$79,343**	**$2.96**

Interpretation: The longline fishery is the largest commercial fishery in Hawaii. Longline landings and revenue were 23.7 million pounds worth $70.1 million in 2010, respectively. Longline landings increased by 1.4 million pounds and revenue rose by $10.4 million. The average price for the longline fishery was higher in 2010. The MHI troll fishery is the second largest commercial fishery. It produced 2.8 million pounds worth $5.6 million in 2010. MHI troll landings and revenue decreased slightly from the previous year. The MHI handline fishery produced 900,000 pounds of pelagic landings worth $1.9 million while the offshore handline fishery landings increased to 578,000 pounds worth $1.2 million in 2010. Landings and revenue for the aku boat fishery were not available.

Source and Calculations: NMFS longline logbook and HDAR Commercial Marine Dealer data were used to produce longline catch, revenue, and average price estimates. The MHI troll, MHI handline, offshore handline, and other gear catch, revenue, and average price estimates were produced from HDAR Commercial Fish Catch and Marine Dealer data.

The catch and revenue for each fishery for each year is the sum of the catch and revenue for each of the species in that fishery for that year. 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 fishery where pounds sold is equal to or less than the total catch for each fishery.

Figure 81. Hawaii total commercial landings and revenue, 1987-2010

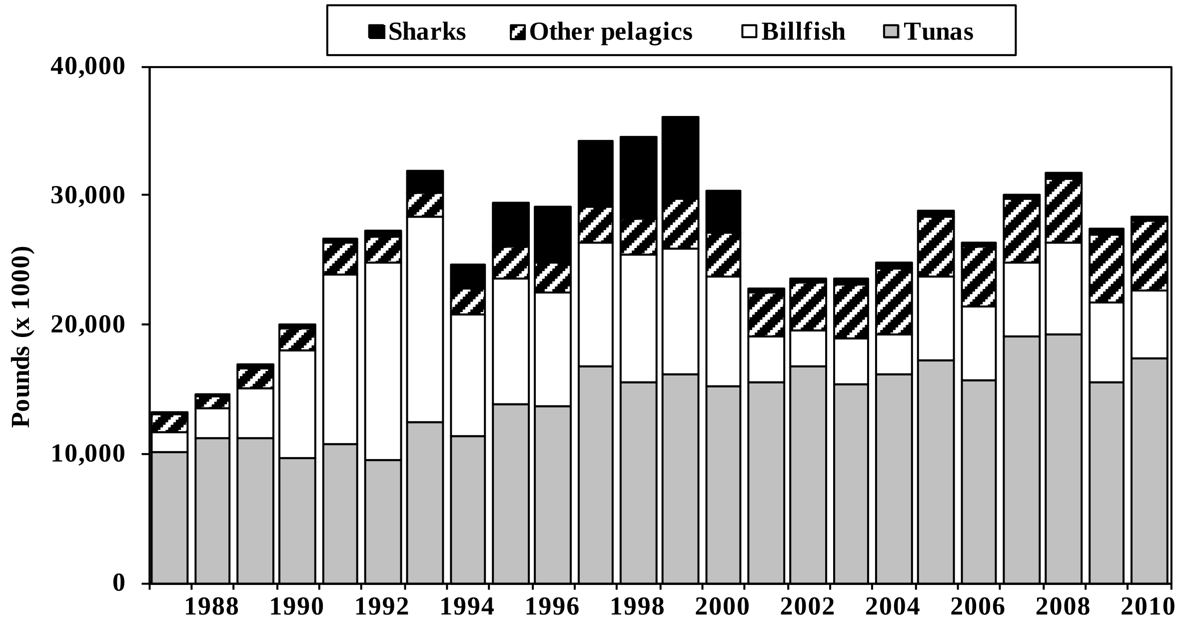


<u>Interpretation</u>: The landings and revenue increased by 1.0 million pounds and $11.4 million in 2010, respectively. Both commercial landings and revenue were above their respective long-term averages in 2010. Gear and species specific changes over the 24-year period are explained in greater detail in the following figures and tables.

<u>Source and Calculations:</u> 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 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	Pounds (1000)	Nominal revenue ($1000)	Adjusted revenue ($1000)	Honolulu CPI
1987	13,025	$22,493	$45,984	114.9
1988	14,569	$27,090	$52,288	121.7
1989	16,860	$34,166	$62,359	128.7
1990	19,933	$43,850	$74,586	138.1
1991	26,664	$53,170	$84,389	148.0
1992	27,253	$53,810	$81,496	155.1
1993	31,931	$63,680	$93,432	160.1
1994	24,569	$53,610	$76,553	164.5
1995	29,437	$53,720	$75,067	168.1
1996	29,156	$54,710	$75,286	170.7
1997	34,165	$60,840	$83,137	171.9
1998	34,472	$54,628	$74,823	171.5
1999	36,004	$59,320	$80,405	173.3
2000	30,306	$63,043	$83,998	176.3
2001	22,778	$43,896	$57,798	178.4
2002	23,594	$48,040	$62,588	180.3
2003	23,482	$48,343	$61,549	184.5
2004	24,759	$53,023	$65,347	190.6
2005	28,768	$66,809	$79,340	197.8
2006	26,365	$62,333	$69,924	209.4
2007	30,073	$71,707	$76,738	219.5
2008	31,705	$80,813	$82,931	228.9
2009	27,352	$66,518	$67,935	230.0
2010	28,329	$79,343	$79,343	234.9
Average	**26,400.8**	**53,896.2**	**72,519.7**	
SD	**6,092.3**	**13,582.5**	**11,500.5**	

Figure 82. Hawaii commercial tuna, billfish, shark, and other PMUS landings, 1987-2010



Interpretation: Hawaii's pelagic landings increased 4% in 2010. The increase was attributed to tuna landings, which was up 12% from 2009. Billfish landings decreased by 14% while other pelagics and shark landings remained about the same as the previous year. The tuna landings were composed predominantly of bigeye tuna and billfish landings was primarily attributable to swordfish. In general, the landings and species composition have remained about the same during the past 10 years.

Source and Calculations: The landings values are obtained by adding the landings values for species in the pelagic species groups defined below and all of the longline and non-longline fisheries for each year.

Tunas: Albacore, Bigeye tuna, Bluefin tuna, Kawakawa, Skipjack tuna, Yellowfin tuna, & Unclassified tuna

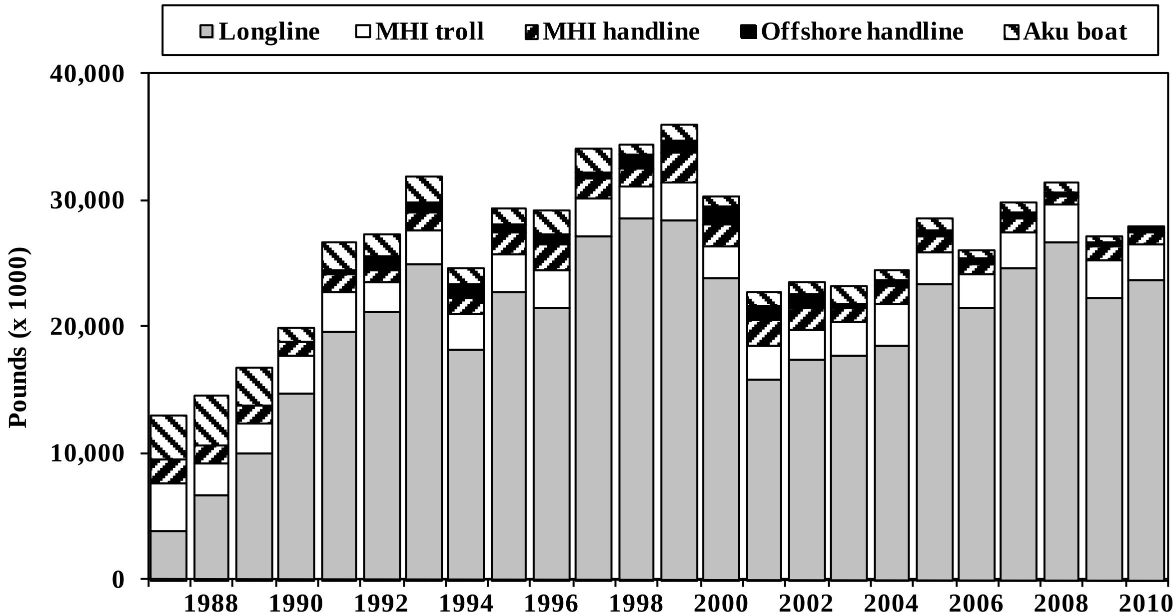
Billfishes: Blue marlin, Black marlin, Sailfish, Spearfish, Striped marlin, Swordfish, & Unclassified billfish

Other pelagics: Barracuda, Beltfish, Flying fish, Frigate mackeral, Mahimahi, Moonfish, Oilfish, Pomfret, Stingrays, Sunfish, & Wahoo

Sharks: Blue sharks, Hammerhead sharks, Mako sharks, Thresher sharks, Tiger sharks, Oceanic white-tip sharks, & Unclassified sharks

	Hawaii pelagic landings (1000 pounds)				
Year	**Tunas**	**Billfish**	**Other pelagics**	**Sharks**	**Total**
1987	10,130	1,558	1,294	43	13,025
1988	11,197	2,301	978	94	14,570
1989	11,223	3,880	1,553	203	16,860
1990	9,726	8,278	1,707	222	19,933
1991	10,794	13,129	2,423	318	26,664
1992	9,461	15,355	2,026	410	27,252
1993	12,417	15,928	1,850	1,736	31,931
1994	11,309	9,526	1,977	1,757	24,570
1995	13,820	9,723	2,426	3,468	29,437
1996	13,685	8,796	2,349	4,327	29,157
1997	16,813	9,492	2,850	5,010	34,165
1998	15,556	9,923	2,782	6,212	34,473
1999	16,145	9,758	3,828	6,273	36,005
2000	15,159	8,546	3,340	3,261	30,306
2001	15,561	3,469	3,414	333	22,778
2002	16,773	2,728	3,727	366	23,594
2003	15,387	3,470	4,266	358	23,482
2004	16,159	3,019	5,162	419	24,759
2005	17,276	6,404	4,695	393	28,768
2006	15,725	5,663	4,640	337	26,365
2007	19,136	5,657	4,863	418	30,073
2008	19,275	7,067	4,945	416	31,705
2009	15,588	6,072	5,317	374	27,352
2010	17,403	5,219	5,432	275	28,329
Average	**14,274.5**	**7,380.1**	**3,148.4**	**1,597.7**	**26,401.0**
SD	**2,948.6**	**4,002.4**	**1,360.1**	**2,061.4**	**6,092.4**

Figure 83. Total commercial pelagic landings by gear type 1987-2010



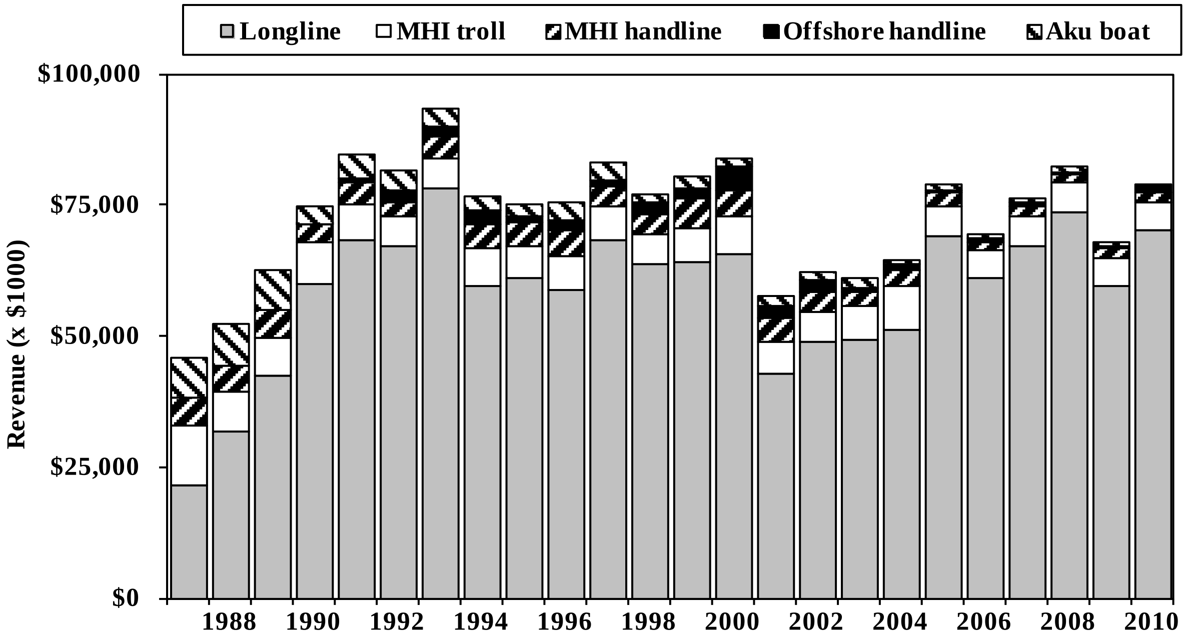
Interpretation: Hawaii commercial pelagic landings in 2010 increased by 4% and were composed primarily of landings by the longline fishery. Total landings increased largely due to higher landings by the longline fishery whose landings increased 6% in 2010. Landings by the MHI troll and MHI handline fisheries, the next two largest fisheries in Hawaii, decreased slightly in 2010. MHI troll landings were relatively constant since 1987 while MHI handline landings were lower than its long-term average six of the past seven years. The offshore handline fishery grew in the early 1990s with landings leveling off from 2003. In contrast, aku boat landings have declined from the late 1980s due to attrition of an aging fleet.

Source and Calculations: The landings values are obtained by adding the landings values of all species of each fishery for each year. The total column is greater than the sum of the the other five fisheries as it includes contributions from the "Other Gear"

	Hawaii pelagic total landings (1000 pounds)					
Year	Longline	MHI troll	MHI handline	Offshore handline	Aku boat	Total
1987	3,893	3,709	1,914	-	3,503	13,025
1988	6,713	2,445	1,471	-	3,940	14,569
1989	9,966	2,401	1,487	-	2,962	16,860
1990	14,790	2,901	1,060	68	1,116	19,933
1991	19,608	3,102	1,477	331	2,146	26,664
1992	21,190	2,394	946	987	1,735	27,253
1993	25,005	2,578	1,532	679	2,137	31,931
1994	18,138	2,810	1,287	1,175	1,159	24,569
1995	22,733	2,966	1,733	714	1,291	29,437
1996	21,564	2,994	1,962	793	1,844	29,156
1997	27,160	3,016	1,479	563	1,947	34,165
1998	28,655	2,471	1,368	1,134	845	34,472
1999	28,377	3,013	2,414	888	1,312	36,004
2000	23,791	2,563	1,718	1,476	708	30,306
2001	15,800	2,737	2,070	1,093	994	22,778
2002	17,392	2,388	1,699	1,059	936	23,594
2003	17,653	2,699	1,092	402	1,378	23,482
2004	18,495	3,379	1,406	485	656	24,759
2005	23,324	2,607	1,290	424	932	28,768
2006	21,531	2,592	809	503	661	26,365
2007	24,700	2,837	982	599	653	30,073
2008	26,697	2,974	697	325	703	31,705
2009	22,360	2,964	1,064	290	511	27,352
2010	23,736	2,813	898	578	--	28,329
Average	**19,979.8**	**2,806.1**	**1,432.9**	**608.1**	**1,481.3**	**26,400.8**
SD	**6,511.0**	**330.7**	**423.7**	**417.0**	**937.9**	**6,092.3**

fishery.

Figure 84. Total commercial pelagic ex-vessel revenue by gear type 1987-2010

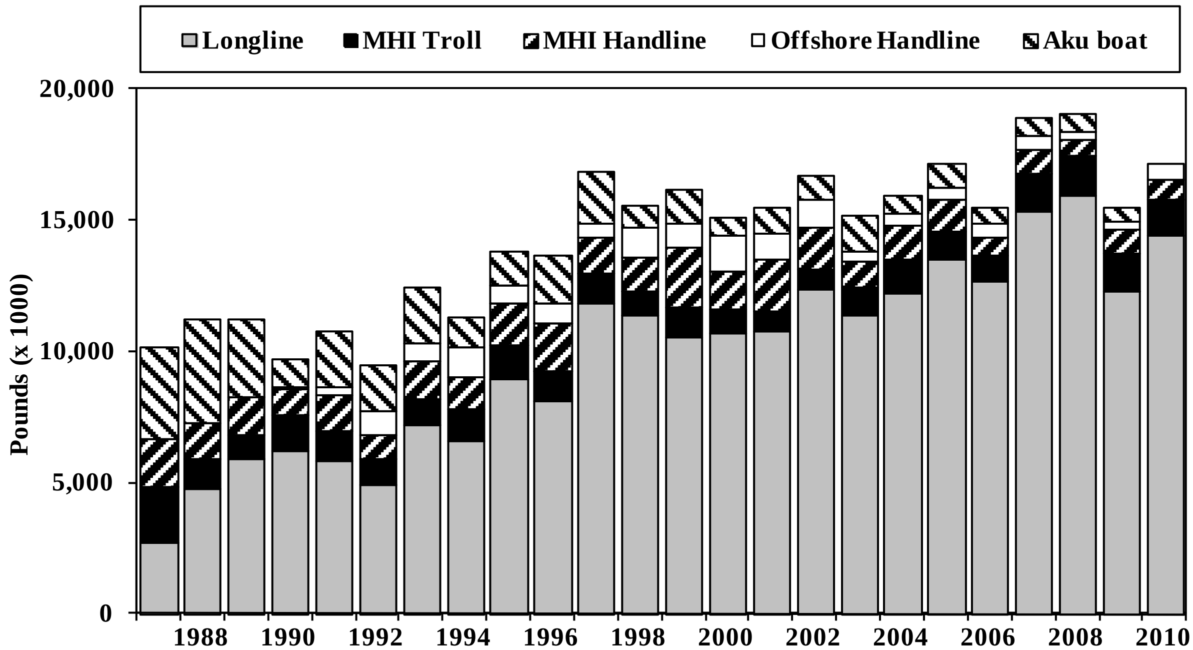


Interpretation: Ex-vessel revenue from Hawaii's pelagic fisheries increased 17% in 2010 with almost all fisheries generating higher revenue. The longline fishery was, by far, the largest revenue generating fishery followed by the MHI troll and MHI handline fisheries. Revenue by the offshore handline fishery grew substantially in 2010 increasing by almost three-fold. The aku boat fishery was the only exception to higher revenue. With only two vessels active in 2010, revenue was not available for this fishery.

Source and Calculations: The ex-vessel revenue values were obtained by adding the revenue for all species of each fishery for each year. Ex-vessel revenue was then adjusted for inflation using the Honolulu Consumer Price Index (CPI). The total column is greater than the sum of the the other five fisheries as it includes contributions from the "Other Gear" fishery.

	Hawaii pelagic total revenue ($1000)					
Year	Longline	MHI troll	MHI handline	Offshore handline	Aku boat	Total
1987	$21,628	$11,318	$5,328	-	$7,668	$45,986
1988	$31,790	$7,479	$5,123	-	$7,842	$52,234
1989	$42,342	$7,116	$5,333	-	$7,567	$62,359
1990	$60,059	$7,644	$3,545	$165	$3,186	$74,606
1991	$68,140	$7,137	$4,019	$846	$4,295	$84,469
1992	$67,224	$5,698	$2,656	$2,237	$3,658	$81,509
1993	$78,298	$5,599	$4,290	$1,651	$3,543	$93,394
1994	$59,672	$6,993	$4,477	$2,780	$2,620	$76,542
1995	$60,971	$6,248	$4,386	$1,347	$2,166	$75,148
1996	$58,759	$6,399	$5,049	$1,792	$3,287	$75,296
1997	$68,396	$6,131	$4,160	$1,108	$3,270	$83,065
1998	$63,839	$5,494	$3,779	$2,323	$1,515	$77,001
1999	$64,229	$6,350	$5,830	$1,702	$2,269	$80,405
2000	$65,618	$7,311	$4,927	$4,428	$1,556	$83,998
2001	$42,785	$6,023	$4,618	$2,314	$1,843	$57,798
2002	$48,817	$5,861	$3,792	$2,144	$1,642	$62,588
2003	$49,152	$6,632	$2,688	$731	$1,698	$61,548
2004	$51,015	$8,385	$3,093	$1,049	$1,063	$65,346
2005	$68,915	$5,833	$2,516	$512	$1,278	$79,340
2006	$61,006	$5,411	$1,498	$571	$987	$69,924
2007	$67,134	$5,800	$1,687	$857	$718	$76,738
2008	$73,738	$5,595	$1,442	$593	$889	$82,931
2009	$59,689	$5,130	$1,783	$398	$693	$67,935
2010	$70,093	$5,562	$1,878	$1,187	--	$79,343
Average	**$57,965.9**	**$6,590.8**	**$3,739.9**	**$1,284.7**	**$2,837.2**	**$72,615.6**
SD	**$13,510.1**	**$1,326.3**	**$1,337.3**	**$1,083.2**	**$2,178.2**	**$11,532.5**

Figure 85. Hawaii commercial tuna landings by gear type, 1987-2010.



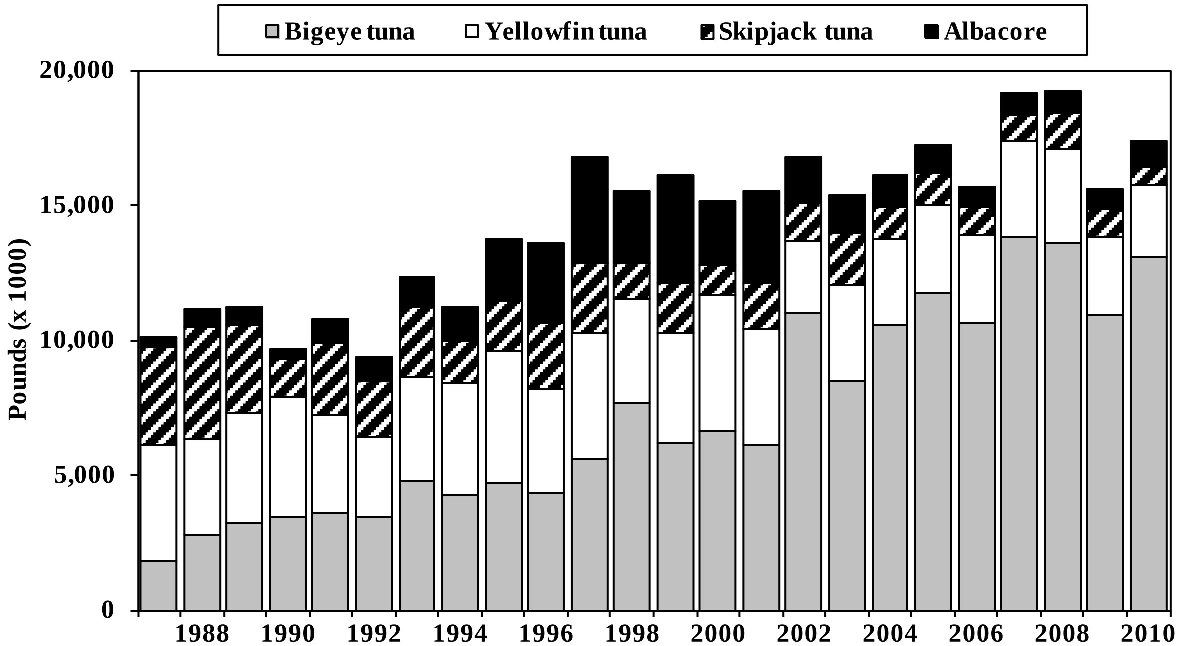
Interpretation: Longline gear was the largest single contributor to Hawaii commercial tuna landings since 1988 and reached a record level in 2008 then decreased to 14.4 million pounds in 2010. Tuna landings by the MHI troll fishery were highest in 1987, dropped the following year, and remained around its long-term average thereafter. Landings by the MHI handline fishery peaked in 1999, dropped to a record low in 2008 and increased to 786,000 pounds in 2010. Offshore handline tuna landings have been low since 2003. The aku boat fishery was on a declining trend with only 2 vessels active in 2010. Landings for this fishery were not available.

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 catch statistics for the longline fishery were derived from NMFS longline logbook, Joint NMFS and HDAR Market Sample, and HDAR Commercial Marine Dealer data. The HDAR Commercial Fish Catch and Marine Dealer data were used to calculate landings for other gear types.

Hawaii tuna landings by gear type (1000 pounds)

Year	Longline	MHI Troll	MHI Handline	Offshore Handline	Aku boat	Total
1987	2,705	2,136	1,782	-	3,501	10,130
1988	4,725	1,141	1,395	-	3,936	11,197
1989	5,921	904	1,393	-	2,961	11,223
1990	6,162	1,401	981	66	1,116	9,726
1991	5,797	1,145	1,380	326	2,146	10,794
1992	4,908	980	885	966	1,721	9,461
1993	7,205	964	1,458	656	2,134	12,417
1994	6,540	1,240	1,213	1,157	1,158	11,309
1995	8,898	1,295	1,642	694	1,291	13,820
1996	8,074	1,146	1,845	776	1,844	13,685
1997	11,826	1,107	1,384	554	1,942	16,813
1998	11,359	933	1,298	1,121	845	15,556
1999	10,529	1,135	2,302	867	1,312	16,145
2000	10,700	878	1,441	1,397	707	15,158
2001	10,730	799	1,942	1,045	993	15,561
2002	12,348	804	1,599	1,010	934	16,773
2003	11,337	1,088	1,023	382	1,374	15,385
2004	12,197	1,316	1,286	462	654	16,158
2005	13,464	1,117	1,204	413	931	17,276
2006	12,641	979	739	485	661	15,722
2007	15,354	1,384	930	578	652	19,135
2008	15,962	1,463	603	310	702	19,276
2009	12,287	1,421	966	277	509	15,594
2010	14,397	1,377	786	563	--	17,403
Average	**9,637.8**	**1,164.2**	**1,334.4**	**677.1**	**1,479.3**	**14,274.5**
SD	**3,597.5**	**289.1**	**405.5**	**353.8**	**937.2**	**2,948.5**

Figure 86. Species composition of the tuna landings by gear type, 1987-2010

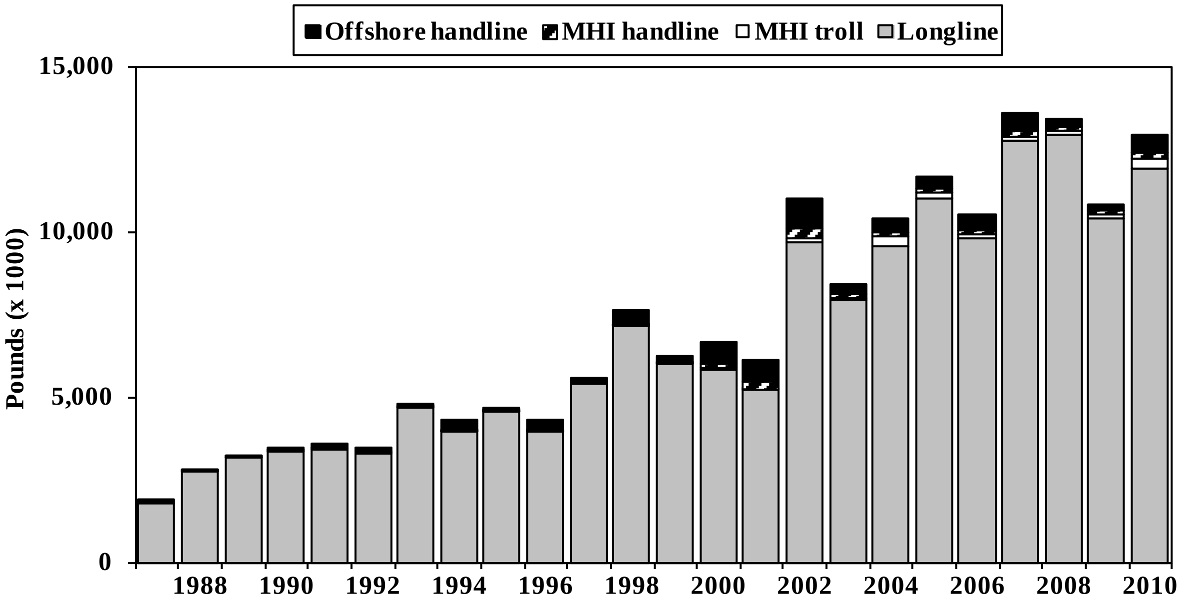


Interpretation: Bigeye tuna was the largest component of the tuna landings and reached a record level in 2007 and was 13.1 million pounds in 2010. Yellowfin tuna was the second largest component of the tuna landings with landings peaking at 5.0 million pounds in 2000 decreasing to 2.7 million pounds in 2010. Skipjack tuna landings decreased to a record low 655,000 pounds in 2010. Albacore landings grew rapidly peaking in 1999 and declined thereafter dropping to less than 1 million pounds in the past five years.

Source and Calculations: The tuna landing statistics were derived from NMFS longline logbook, Joint NMFS and HDAR Market Sample, HDAR Commercial Fish Catch, and Marine Dealer data. The tuna landings were composed of albacore, bigeye tuna, bluefin tuna, kawakawa, skipjack tuna, and yellowfin tuna.

	Hawaii tuna landings (1000 pounds)				
Year	Bigeye tuna	Yellowfin tuna	Skipjack tuna	Albacore	Total
1987	1,813	4,316	3,633	344	10,130
1988	2,770	3,551	4,156	695	11,197
1989	3,208	4,064	3,298	626	11,223
1990	3,425	4,460	1,389	422	9,726
1991	3,573	3,661	2,691	846	10,794
1992	3,456	2,943	2,099	854	9,461
1993	4,768	3,872	2,546	1,122	12,417
1994	4,280	4,106	1,553	1,293	11,309
1995	4,667	4,940	1,814	2,328	13,820
1996	4,330	3,851	2,426	3,020	13,685
1997	5,595	4,628	2,608	3,920	16,813
1998	7,641	3,896	1,326	2,645	15,556
1999	6,212	4,012	1,909	3,979	16,145
2000	6,642	5,040	1,127	2,331	15,161
2001	6,124	4,306	1,694	3,421	15,561
2002	10,970	2,665	1,443	1,668	16,773
2003	8,518	3,484	1,989	1,348	15,387
2004	10,566	3,174	1,182	1,168	16,159
2005	11,760	3,247	1,189	1,047	17,276
2006	10,647	3,242	1,045	766	15,725
2007	13,788	3,550	1,011	769	19,136
2008	13,570	3,536	1,279	874	19,275
2009	10,921	2,860	1,101	681	15,588
2010	13,060	2,666	655	976	17,403
Average	6,923.6	3,800.2	1,935.2	1,572.4	14,274.6
SD	3,670.2	637.3	879.6	1,128.4	2,948.6

Figure 87. Hawaii bigeye tuna landings by gear type, 1987-2010

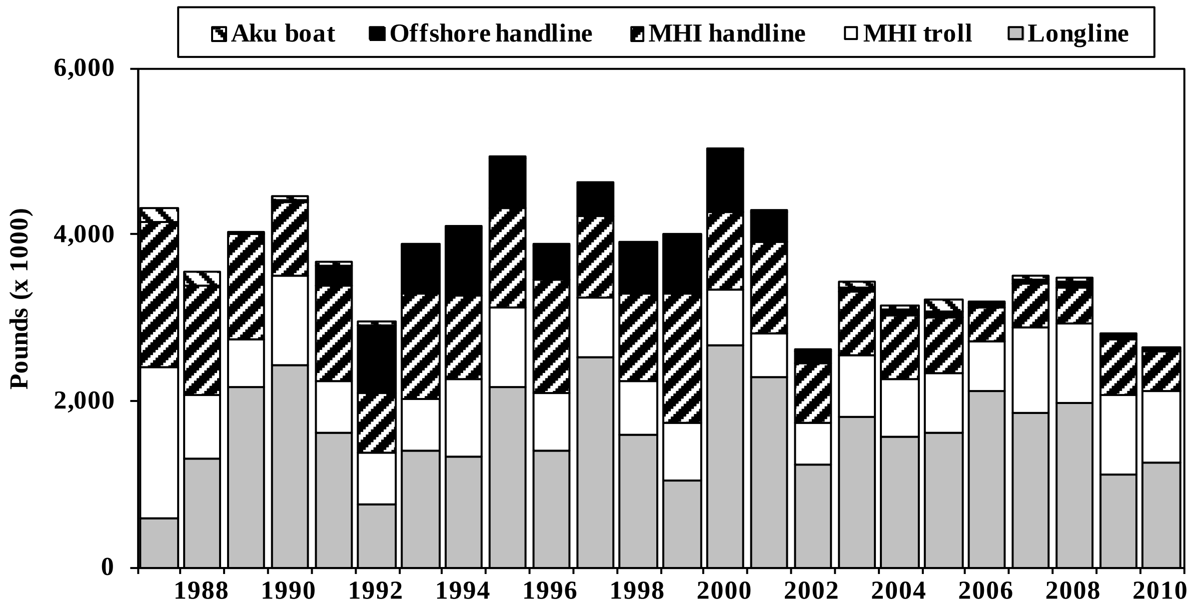


Interpretation: Annual bigeye tuna landings increased more than seven-fold over the 24-year period peaking at a record 13.8 million pounds in 2007. Longline landings of bigeye tuna was 13.1 million pounds in 2010. The longline fishery typically produces over 90% of the bigeye tuna. The offshore handline fishery was the second largest producer of bigeye tuna in Hawaii accounting for 4% of the total in 2010. Combined MHI troll and MHI handline landings of bigeye tuna yielded 4% of the total.

Source and Calculations: Bigeye tuna catch statistics were derived from NMFS longline logbook, Joint NMFS and HDAR Market Sample, HDAR Commercial Fish Catch, and Marine Dealer data. The gear types summarized for catches of bigeye tuna included the longline, MHI troll, MHI handline, and offshore handline fisheries. The total column also contains small bigeye tuna catches by the aku boat fishery and other gear category.

	Hawaii bigeye tuna landings (1000 pounds)				
Year	Longline	MHI troll	MHI handline	Offshore handline	Total
1987	1,796	11	6	-	1,813
1988	2,732	10	28	-	2,770
1989	3,178	11	19	-	3,208
1990	3,338	15	41	31	3,425
1991	3,423	11	45	94	3,573
1992	3,277	9	19	151	3,456
1993	4,677	4	2	85	4,768
1994	3,940	6	10	324	4,280
1995	4,522	10	33	102	4,667
1996	3,940	4	11	375	4,330
1997	5,399	6	52	138	5,595
1998	7,113	5	15	508	7,641
1999	5,995	7	46	164	6,212
2000	5,836	15	141	650	6,642
2001	5,193	23	226	660	6,124
2002	9,676	86	353	850	10,971
2003	7,922	82	75	316	8,517
2004	9,544	328	125	385	10,566
2005	10,977	188	143	345	11,760
2006	9,765	154	135	431	10,645
2007	12,741	140	188	535	13,788
2008	12,909	163	82	245	13,572
2009	10,409	131	70	230	10,925
2010	11,894	284	224	518	13,060
Average	**6,447.9**	**61.7**	**81.1**	**330.9**	**6,923.8**
SD	**3,363.4**	**84.8**	**86.0**	**222.7**	**3,670.5**

Figure 88. Hawaii yellowfin tuna landings by gear type, 1987-2010

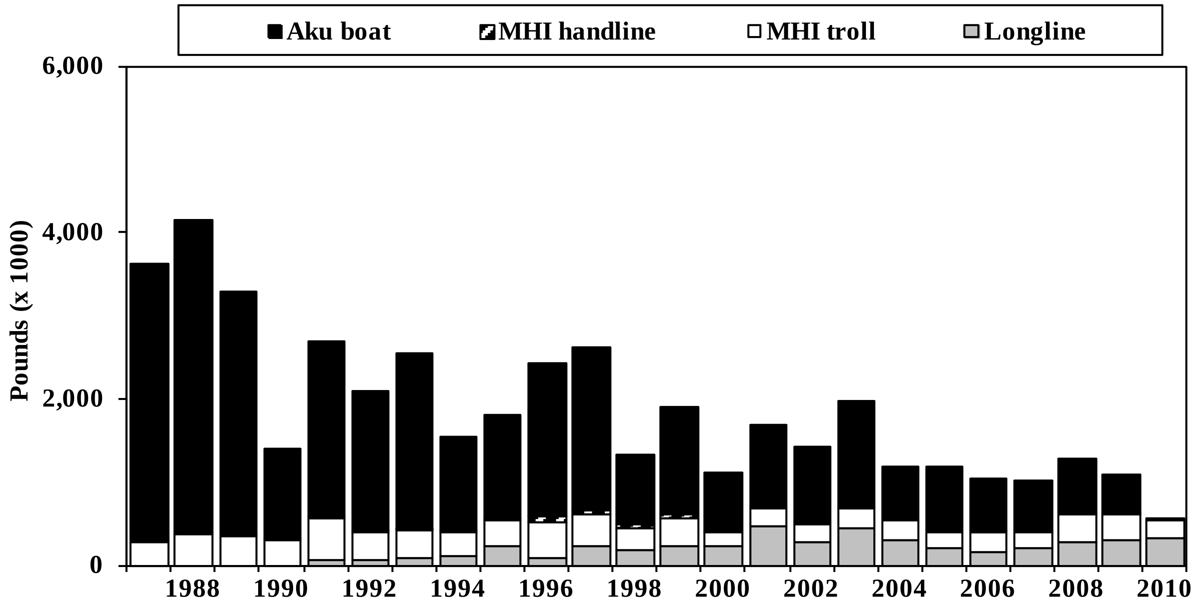


Interpretation: Annual landings of yellowfin tuna were low during the past nine years. The longline fishery typically had the highest yellowfin tuna landings. The MHI troll fishery was usually the second largest producer of yellowfin tuna followed by the MHI handline and offshore handline fisheries, respectively. The aku boat fishery had small landings of yellowfin tuna. This species is usually caught by the aku boat fishery when fishing for skipjack tuna is poor. Yellowfin tuna landings by all fisheries were below their respective long-term averages in 2010.

Source and Calculations: Yellowfin tuna catch statistics were derived from NMFS longline logbook, Joint NMFS and HDAR Market Sample, HDAR Commercial Fish Catch, and Marine Dealer data. The gear types summarized for catches of yellowfin tuna included the longline, MHI troll, MHI handline, offshore handline, and aku boat fisheries. The total column also contains small catches of yellowfin tuna from the other gear category.

	Hawaii yellowfin tuna landings (1000 pounds)					
Year	**Longline**	**MHI troll**	**MHI handline**	**Offshore handline**	**Aku boat**	**Total**
1987	575	1,828	1,734	-	173	4,316
1988	1,309	764	1,310	-	168	3,551
1989	2,174	559	1,266	-	21	4,064
1990	2,421	1,089	876	35	39	4,460
1991	1,617	615	1,154	232	44	3,661
1992	763	606	722	816	36	2,943
1993	1,392	616	1,283	571	10	3,872
1994	1,336	914	1,003	834	19	4,106
1995	2,159	949	1,207	591	34	4,940
1996	1,389	707	1,352	401	2	3,851
1997	2,515	712	986	415	0	4,628
1998	1,592	636	1,052	613	3	3,896
1999	1,042	687	1,559	703	21	4,012
2000	2,656	671	938	739	2	5,039
2001	2,277	542	1,078	379	4	4,306
2002	1,235	500	711	151	6	2,664
2003	1,815	732	752	53	73	3,484
2004	1,564	690	770	75	38	3,175
2005	1,624	708	664	67	149	3,247
2006	2,123	590	414	52	6	3,243
2007	1,856	1,033	517	42	50	3,549
2008	1,982	942	437	65	50	3,538
2009	1,118	961	653	46	37	2,861
2010	1,254	854	483	39	--	2,666
Average	**1,675.4**	**784.8**	**975.6**	**344.0**	**42.8**	**3,800.3**
SD	**555.9**	**280.8**	**350.6**	**295.9**	**51.6**	**637.1**

Figure 89. Hawaii skipjack tuna landings by gear type, 1987-2010

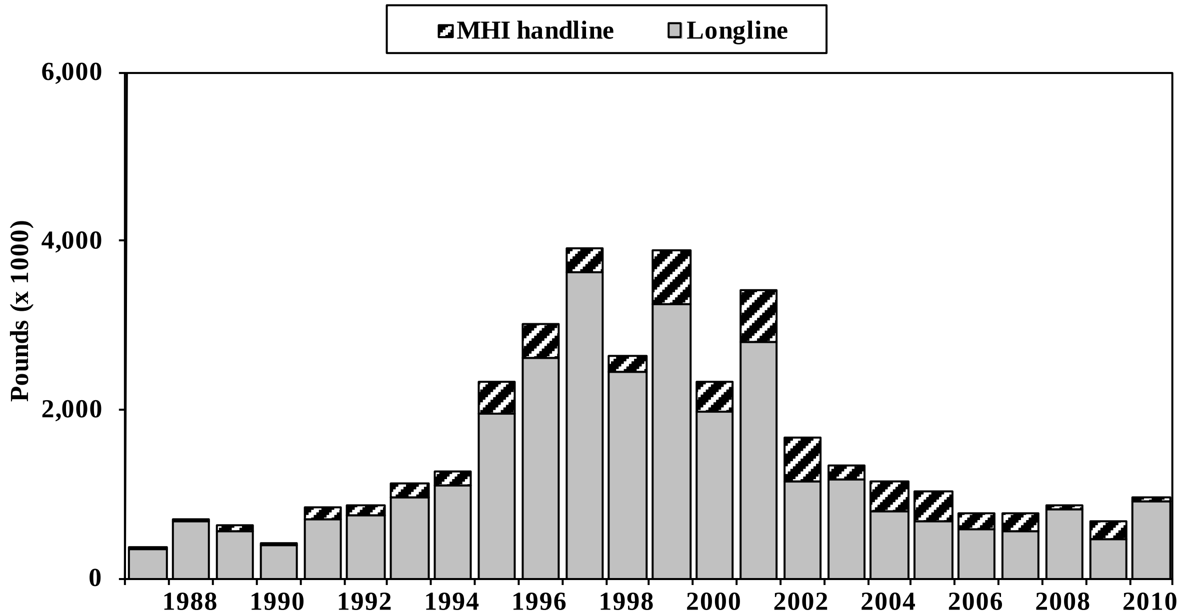


Interpretation: Skipjack tuna landings were on a declining trend with landings in 2010 at a record low. Since the aku boat fishery accounted for most of the skipjack tuna landings, the main source of overall decline was from this fishery. Since there were only two aku boat vessels active in 2010, landings by this fishery were not available. The decline in skipjack tuna landings was not apparent or as apparent in other fisheries. Skipjack tuna landings by the longline fishery were on an increasing trend while landings by the MHI troll and handline fisheries showed no apparent trend.

Source and Calculations: Skipjack tuna catch statistics were derived from NMFS longline logbook, Joint NMFS and HDAR Market Sample, HDAR Commercial Fish Catch, and Marine Dealer data. The gear types summarized for catches of skipjack tuna included the longline, MHI troll, MHI handline, and aku boat fisheries. The total column also contains small catches of skipjack tuna from the other gear category.

	Hawaii skipjack tuna landings (1000 pounds)				
Year	Longline	MHI troll	MHI handline	Aku boat	Total
1987	3	277	25	3,328	3,633
1988	8	351	29	3,768	4,156
1989	22	318	20	2,938	3,298
1990	12	278	26	1,073	1,398
1991	66	504	19	2,102	2,691
1992	49	347	21	1,682	2,099
1993	79	332	14	2,121	2,546
1994	116	283	21	1,133	1,553
1995	223	318	17	1,256	1,814
1996	91	424	69	1,842	2,426
1997	234	376	56	1,942	2,608
1998	168	278	38	842	1,326
1999	219	347	52	1,291	1,909
2000	221	181	14	704	1,127
2001	455	215	30	988	1,694
2002	282	203	20	927	1,443
2003	438	237	16	1,292	1,989
2004	294	247	23	615	1,182
2005	197	191	21	779	1,189
2006	162	221	11	648	1,045
2007	202	192	15	600	1,011
2008	263	346	20	645	1,279
2009	298	306	24	471	1,101
2010	330	209	13	--	655
Average	**178.3**	**294.4**	**26.1**	**1,434.3**	**1,935.5**
SD	**128.3**	**80.3**	**14.6**	**912.0**	**879.4**

Figure 90. Hawaii albacore landings by gear type, 1987-2010

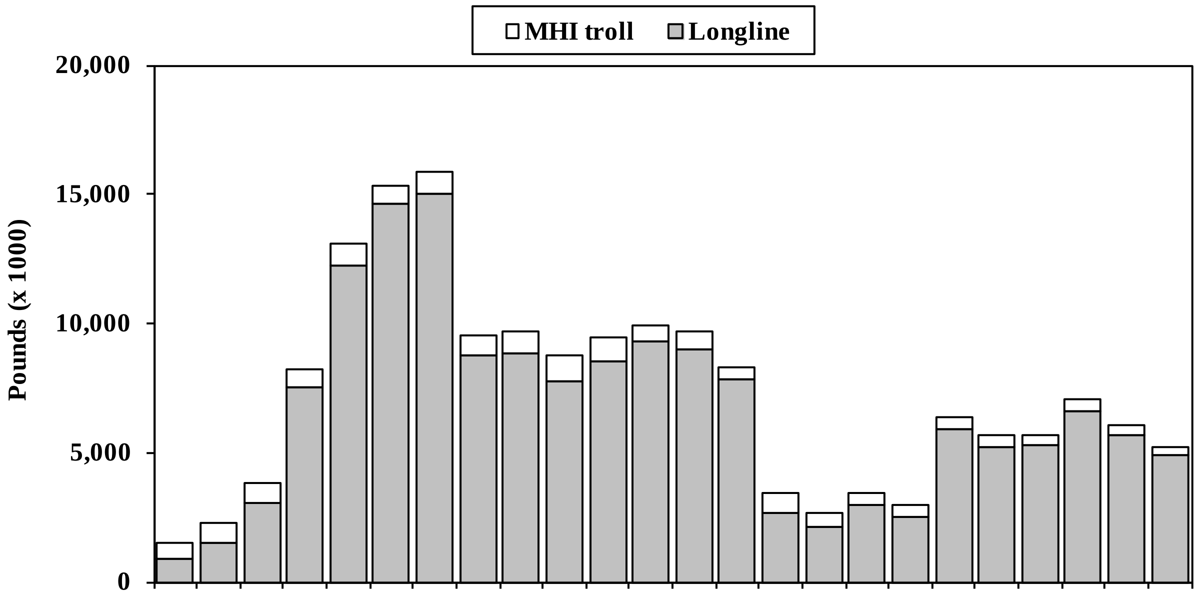


Interpretation: Albacore landings increased more than 11-fold from 1987 to 1999 and was on a declining trend thereafter. Although albacore landings increased 43% in 2010, it was still only 38% compared to the long-term average. The longline and MHI handline fisheries, account for almost all of the albacore landings and were responsible for the overall decline. Longline landings of albacore peaked in 1997 and declined thereafter. Albacore landings by the MHI handline fishery were relatively small but increased from 1987 peaking at 642,000 pounds in 1999, then decreased thereafter. Albacore landings by the MHI handline fishery were below the long-term average for the past 5 years. On rare occasions, the MHI troll fishery has encountered short "runs" of albacore but those landings were negligible in comparison.

Source and Calculations: Albacore catch statistics were derived from NMFS longline logbook, Joint NMFS and HDAR Market Sample, HDAR Commercial Fish Catch, and Marine Dealer Data. The gear types summarized for catches of albacore included the longline, MHI troll, and MHI handline fisheries.

	Hawaii albacore landings (1000 pounds)			
Year	Longline	MHI troll	MHI handline	Total
1987	331	1	12	344
1988	676	1	18	695
1989	547	1	78	626
1990	390	1	31	422
1991	687	2	157	846
1992	735	3	116	854
1993	965	3	154	1,122
1994	1,095	22	176	1,293
1995	1,938	10	380	2,328
1996	2,606	5	409	3,020
1997	3,626	7	287	3,920
1998	2,450	4	191	2,645
1999	3,250	87	642	3,979
2000	1,979	5	347	2,331
2001	2,803	13	605	3,421
2002	1,145	9	511	1,668
2003	1,160	10	176	1,348
2004	791	7	351	1,168
2005	662	14	370	1,046
2006	587	2	177	766
2007	554	7	208	769
2008	808	3	62	875
2009	460	7	214	682
2010	916	4	51	976
Average	**1,315.0**	**9.7**	**246.6**	**1,572.5**
SD	**992.2**	**17.6**	**179.3**	**1,128.4**

Figure 91. Hawaii commercial billfish landings by gear type, 1987-2010

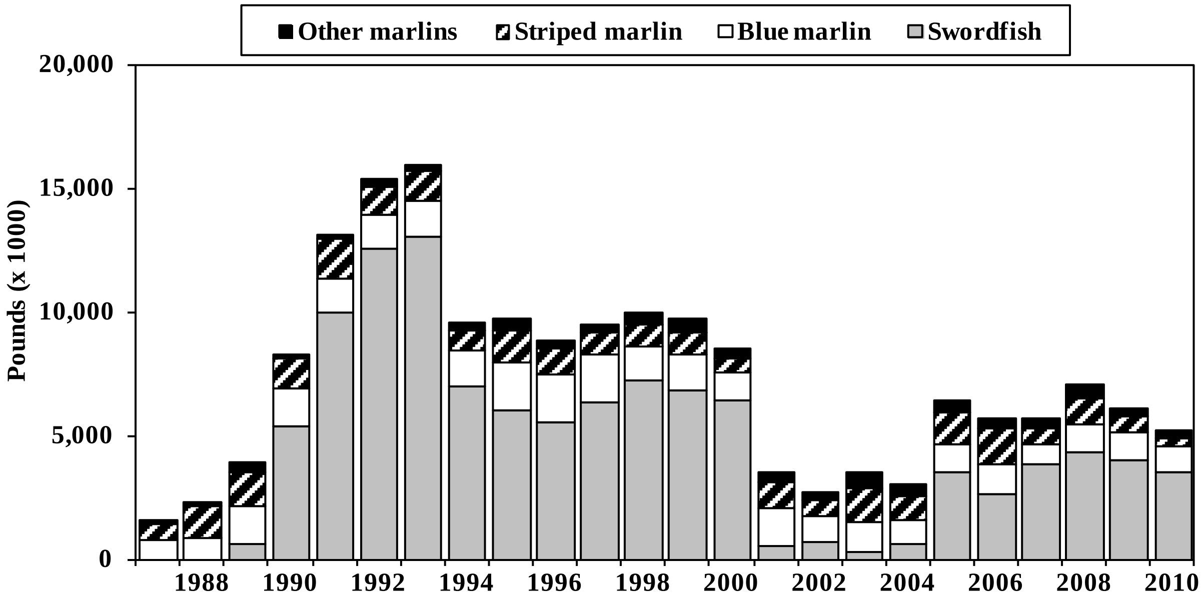


Interpretation: Two major factors affected billfish landings since 1987. The first was the growth of the longline fishery for swordfish in the early 1990s. The second was a series of management decisions that were intended to minimized longline interactions with sea turtles. These decisions strongly affected the amount of swordfish-targeted effort and the associated landings. In contrast, billfish landings by the MHI troll fishery and the MHI handline fishery were relatively small. The longline fishery accounted for majority of the billfish landings throughout the 24-year period. Billfish landings by the MHI troll fishery were below the long-term average for the past 9 years.

Source and Calculations: The billfish catch statistics were derived from NMFS longline logbook, Joint NMFS and HDAR Market Sample, HDAR Commercial Fish Catch, and Marine Dealer data. Billfish landings were calculated for the longline, MHI troll, and MHI handline. The total column also contains small catches of billfish from the offshore handline and other gear category. The billfish group was composed of swordfish, blue marlin, striped marlin, spearfish, sailfish, black marlin, and unclassified billfish.

	Hawaii billfish landings (1000 lbs)			
Year	Longline	MHI troll	MHI handline	Total
1987	862	666	30	1,558
1988	1,537	736	28	2,301
1989	3,043	805	32	3,880
1990	7,519	732	27	8,278
1991	12,208	890	31	13,129
1992	14,656	683	16	15,355
1993	15,034	870	24	15,928
1994	8,737	770	19	9,526
1995	8,837	856	30	9,723
1996	7,723	1,042	31	8,796
1997	8,517	935	40	9,492
1998	9,277	626	20	9,923
1999	8,958	769	31	9,758
2000	7,828	506	201	8,546
2001	2,630	780	51	3,469
2002	2,160	535	26	2,728
2003	2,954	491	18	3,470
2004	2,472	481	23	3,019
2005	5,909	475	17	6,404
2006	5,248	397	13	5,663
2007	5,322	316	14	5,657
2008	6,594	449	17	7,067
2009	5,650	405	14	6,072
2010	4,880	324	12	5,219
Average	**6,681.5**	**661.6**	**32.7**	**7,380.1**
SD	**3,924.1**	**197.8**	**37.8**	**4,002.5**

Figure 92. Species composition of the billfish landings, 1987-2010

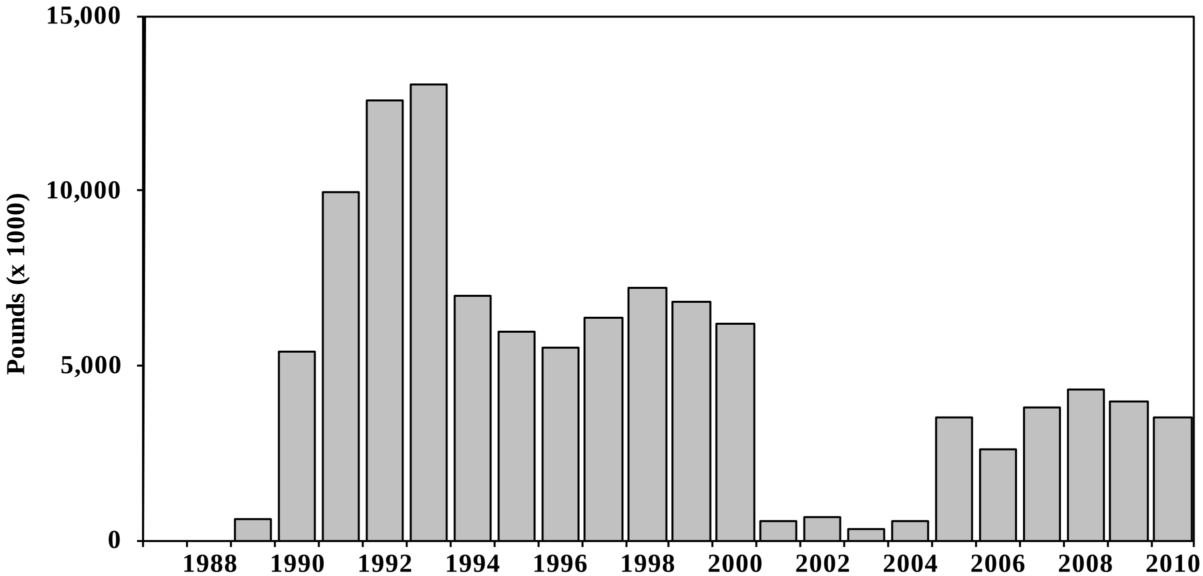


Interpretation: From 1987 through 1989, billfish landings consisted mostly of marlins and small landings of swordfish. However, in 1990 the billfish composition changed and total landings more than doubled as longline vessels began targeting swordfish. Swordfish landings continued to dominate billfish landings from 1990 through 2000 despite a 46% decrease in 1994. Swordfish landings dropped 91% in 2001 from regulatory actions and remained low through 2004. Swordfish reestablished itself as the dominant component of the billfish landings from 2005 through 2010 when targeting of swordfish was once again allowed under a new suite of regulations. Blue marlin composed 18% of the billfish landings with landings peaking in 1995-1997. Striped marlin landings peaked in 1991, declined through 2000, recovered close to its long-term average in 2003-2006 and 2008, but were at a record low in 2010.

Source and Calculations: The billfish catch statistics were derived from NMFS longline logbook, Joint NMFS and HDAR Market Sample, HDAR Commercial Fish Catch, and Marine Dealer data and was calculated for each species. The gear types summarized for each species was composed longline, MHI troll, MHI handline, offshore handline, aku boat, and other gear.

	Hawaii billfish landings (1000 lbs)				
Year	**Swordfish**	**Blue marlin**	**Striped marlin**	**Other marlins**	**Total**
1987	60	687	667	144	1,558
1988	65	812	1,230	194	2,301
1989	635	1,502	1,403	340	3,880
1990	5,383	1,484	1,246	164	8,278
1991	9,953	1,417	1,552	208	13,129
1992	12,569	1,339	1,098	349	15,355
1993	13,036	1,434	1,191	266	15,928
1994	7,010	1,454	796	267	9,526
1995	5,994	1,952	1,313	464	9,723
1996	5,529	1,931	1,044	292	8,796
1997	6,368	1,908	861	354	9,492
1998	7,208	1,403	891	421	9,923
1999	6,855	1,432	866	605	9,758
2000	6,414	1,146	548	438	8,546
2001	562	1,527	1,001	380	3,469
2002	703	1,050	615	360	2,728
2003	316	1,176	1,373	606	3,470
2004	599	993	937	491	3,019
2005	3,539	1,135	1,221	509	6,404
2006	2,581	1,225	1,439	419	5,663
2007	3,796	846	637	379	5,657
2008	4,316	1,161	1,023	567	7,067
2009	3,974	1,157	644	297	6,072
2010	3,526	992	376	324	5,219
Average	**4,672.4**	**1,311.8**	**1,025.9**	**370.1**	**7,380.1**
SD	**3,812.7**	**336.3**	**294.7**	**132.8**	**4,002.4**

Figure 93. Hawaii swordfish landings, 1987-2010

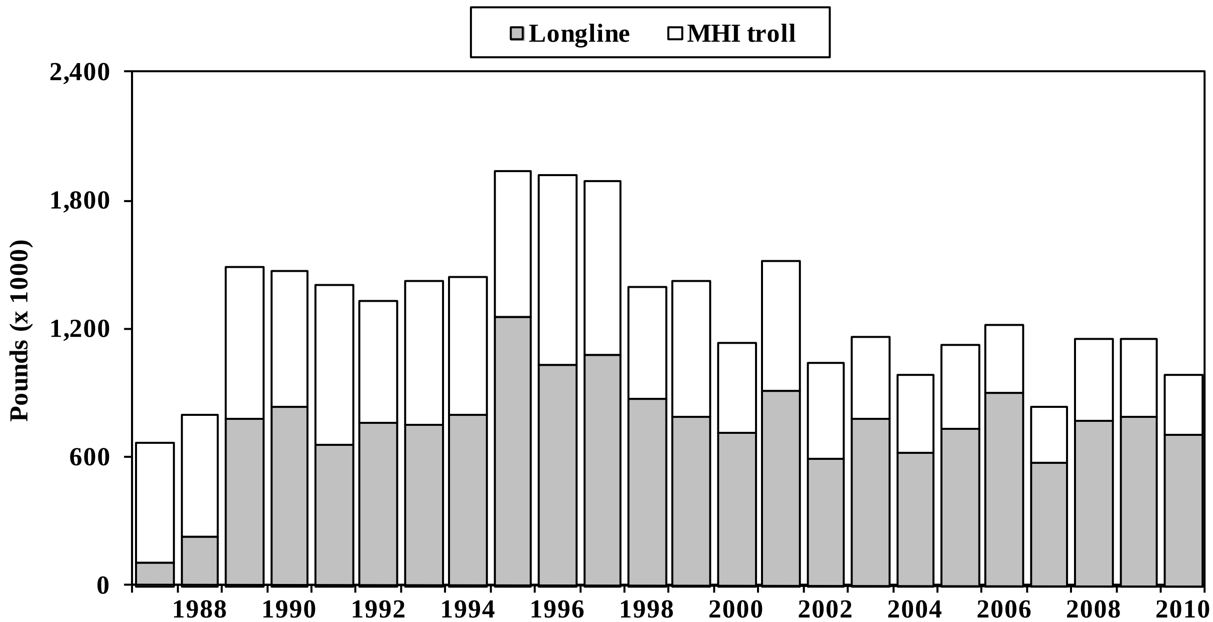


Interpretation: The trend in swordfish landings reflected both an increase in the number of vessels in the longline fishery and widespread targeting of swordfish by the fishery. Swordfish landings rose rapidly, peaking in 1993, and fell dramatically the following year. Landings remained relatively steady up to 2000 but dropped dramatically again as a result of increased regulations prohibiting targeting swordfish by the longline fishery. Although the longline fishery for swordfish reopened under a new set of regulations in April 2004, landings remained low in that year. Swordfish landings then increased in 2005 as longline fishers became more proficient using techniques mandated under the new requirements. Swordfish landings from 2005 through 2010 remained relatively stable albeit lower compared to landings during 1994 through 2000. Swordfish landings by the MHI handline fishery were negligible.

Source and Calculations: Swordfish catch statistics were derived from NMFS longline logbook, Joint NMFS and HDAR Market Sample, HDAR Commercial Fish Catch, and Marine Dealer data. The gear types summarized for catches of swordfish included the longline, MHI troll, and MHI handline fisheries. The total column also contains small swordfish catches by the other gear category.

	Swordfish landings (1000 lbs)			
Year	**Longline**	**MHI troll**	**MHI handline**	**Total**
1987	52	1	7	60
1988	52	2	11	65
1989	619	2	14	635
1990	5,372	1	10	5,383
1991	9,939	1	13	9,953
1992	12,566	0	3	12,569
1993	13,027	0	9	13,036
1994	7,002	1	7	7,010
1995	5,981	1	12	5,994
1996	5,517	1	11	5,529
1997	6,352	1	15	6,368
1998	7,193	1	14	7,208
1999	6,835	1	19	6,855
2000	6,215	5	193	6,414
2001	519	4	39	562
2002	681	3	19	703
2003	301	1	12	316
2004	549	0	16	599
2005	3,527	1	10	3,538
2006	2,573	1	8	2,581
2007	3,781	2	12	3,796
2008	4,299	1	14	4,316
2009	3,960	1	12	3,974
2010	3,516	1	9	3,526
Average	**4,648.3**	**1.4**	**20.9**	**4,672.4**
SD	**3,813.8**	**1.2**	**38.1**	**3,812.7**

Figure 94. Hawaii blue marlin landings by gear type, 1987-2010



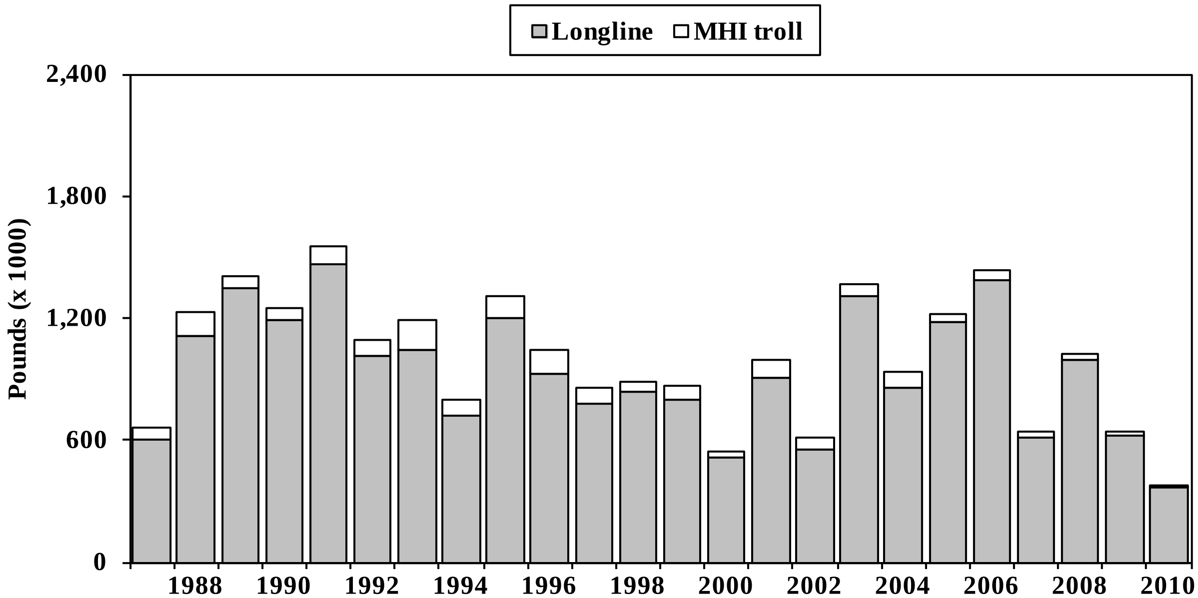
<u>**Interpretation:**</u> Blue marlin landings rose in the late 1980s, peaked in the mid 1990s and were below the long-term average during the past 9 years. Landings also exhibited more inter-annual variability from 2000. The troll fishery accounted for the largest proportion of blue marlin landings in the 1980s but was replaced by the longline fishery as the largest fishery for this species in the 1990s. Blue marlin landings by both the longline fishery and MHI troll fisheries declined from the mid-1990s.

<u>**Source and Calculations:**</u> Blue marlin catch statistics were derived from NMFS longline logbook, Joint NMFS and HDAR Market Sample, HDAR Commercial Fish Catch, and Marine Dealer data. The gear types summarized for catches of blue marlin included the longline, MHI troll, and MHI handline fisheries. The total column also contains small catches of blue marlin by the offshore handline fishery and other gear category.

Blue marlin catches by the longline fishery are nominal estimates that do not account for misidentification problems. The misidentification problems is currently being studied in a Pelagic Fisheries Research Program (PFRP) project (see PFRP newsletter 7(10), 1-4). The general pattern is blue marlin are over-reported in longline logbooks. The reason is striped marlin is often misidentified as blue marlin. Thus, the nominal longline blue marlin estimates for are probably inflated.

	Blue marlin landings (1000 lbs)			
Year	**Longline**	**MHI troll**	**MHI handline**	**Total**
1987	112	557	18	687
1988	225	575	12	812
1989	784	704	14	1,502
1990	834	638	12	1,484
1991	654	749	14	1,417
1992	765	565	9	1,339
1993	748	675	11	1,434
1994	798	648	8	1,454
1995	1,257	684	11	1,952
1996	1,030	885	16	1,931
1997	1,074	814	20	1,908
1998	870	527	6	1,403
1999	787	635	10	1,432
2000	711	422	5	1,146
2001	909	608	5	1,527
2002	593	446	6	1,050
2003	777	390	5	1,176
2004	623	360	5	993
2005	731	395	6	1,135
2006	897	320	4	1,225
2007	577	263	2	846
2008	766	388	3	1,161
2009	790	364	2	1,157
2010	702	287	2	992
Average	**752.7**	**548.4**	**8.9**	**1,311.8**
SD	**241.3**	**167.6**	**5.1**	**336.3**

Figure 95. Hawaii striped marlin landings by gear type, 1987-2010



Interpretation: Striped marlin landings increased rapidly in the late 1980s then declined in the 1990s, and exhibited substantial inter-annual variability from 2000. Striped marlin landings were at a record low level in 2010. Striped marlin was landed primarily by the longline fishery and the overall decline of this species is attributed to lower landings by this fishery. The MHI troll fishery was the second largest producer of striped marlin in Hawaii but contributed only 7%, on average, to the total for this species. Striped marlin landings by the MHI troll fishery also declined over the 24-year period.

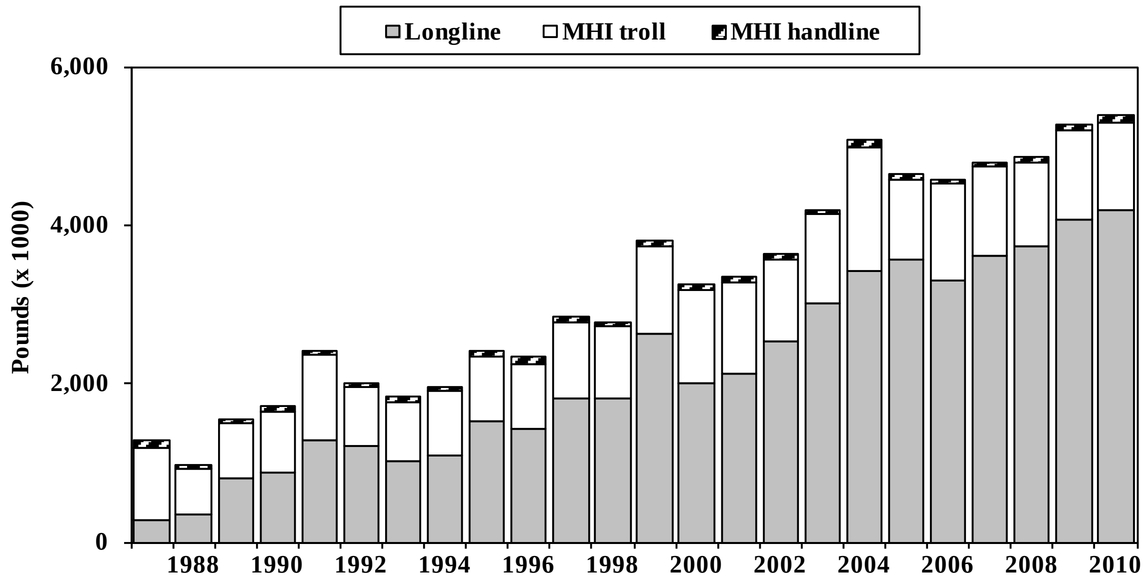
Source and Calculations: Striped marlin catch statistics were derived from NMFS longline logbook, Joint NMFS and HDAR Market Sample, HDAR Commercial Fish Catch, and Marine Dealer data. The gear types summarized for catches of striped marlin included the longline, MHI troll, and MHI handline fisheries. The total column also contains small striped marlin catches by the offshore handline fishery and other gear category.

Striped marlin catches by the longline fishery are nominal estimates which do not account for misidentification problems. The misidentification problems is currently being studied in a Pelagic Fisheries Research Program (PFRP) project (see PFRP

	Striped marlin landings (1000 lbs)			
Year	Longline	MHI troll	MHI handline	Total
1987	599	66	2	667
1988	1,110	118	2	1,230
1989	1,350	52	1	1,403
1990	1,186	59	1	1,246
1991	1,462	89	1	1,552
1992	1,013	83	2	1,098
1993	1,039	150	2	1,191
1994	719	76	1	796
1995	1,198	114	1	1,313
1996	923	119	2	1,044
1997	775	83	3	861
1998	834	57	0	891
1999	803	62	1	866
2000	517	30	1	548
2001	902	93	5	1,001
2002	550	65	1	615
2003	1,308	63	1	1,373
2004	858	74	2	937
2005	1,177	44	0	1,221
2006	1,390	47	0	1,439
2007	609	28	0	637
2008	993	30	0	1,023
2009	622	22	0	644
2010	365	11	0	376
Average	**953.8**	**70.6**	**1.2**	**1,025.9**
SD	**284.2**	**32.8**	**1.1**	**294.7**

newsletter 7(10), 1-4). The results of this study have shown that striped marlin underreported in longline logbooks because they are often misidentified as blue marlin. Thus, the nominal striped marlin landing estimates for the longline fishery are negatively biased. Thus, the longline landings presented in this report are a conservative estimate.

Figure 96. Hawaii commercial landings of other PMUS by gear type, 1987-2010

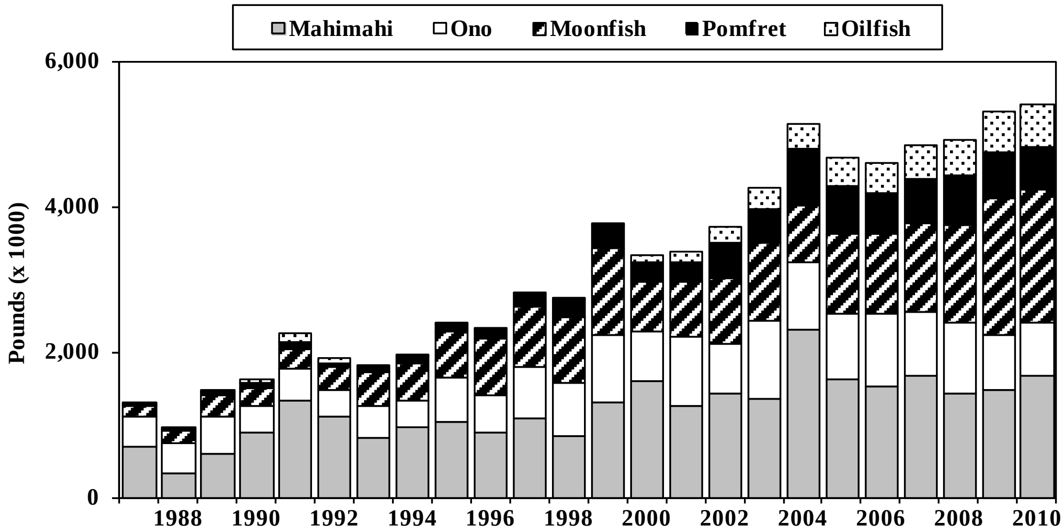


Interpretation: The landings of other pelagic PMUS were considerably greater than the long-term average. The increase in other PMUS landings was attributed primarily to the longline fishery. The MHI troll fishery was the second largest contributor to other PMUS landings and was above its long-term average for the past 12 years. The other PMUS landings by the MHI handline and offshore handline fisheries were relatively low.

Source and Calculations: Other pelagic PMUS catch statistics were derived from NMFS longline logbook, Joint NMFS and HDAR Market Sample, HDAR Commercial Fish Catch, and Marine Dealer data and was calculated for each gear type. The other pelagic PMUS species include mahimahi, moonfish, oilfish, pomfret, and wahoo (wahoo).

	Landings of other PMUS by gear type (1000 lbs)					
Year	Longline	MHI troll	MHI handline	Offshore handline	Aku boat	Total
1987	283	907	102	-	2	1,294
1988	357	569	48	-	4	978
1989	799	691	62	-	1	1,553
1990	887	768	52	0	0	1,707
1991	1,285	1,067	66	5	0	2,423
1992	1,216	731	46	21	14	2,027
1993	1,030	744	50	23	3	1,850
1994	1,104	800	55	18	0	1,977
1995	1,530	815	61	20	0	2,426
1996	1,440	806	85	17	0	2,348
1997	1,807	974	55	9	5	2,850
1998	1,807	912	49	13	0	2,781
1999	2,618	1,109	82	20	0	3,829
2000	2,013	1,174	70	69	1	3,340
2001	2,114	1,155	73	41	1	3,414
2002	2,525	1,045	71	44	1	3,727
2003	3,010	1,119	51	18	3	4,266
2004	3,412	1,580	95	22	2	5,162
2005	3,563	1,014	68	10	1	4,695
2006	3,309	1,213	56	14	0	4,640
2007	3,613	1,137	35	19	0	4,863
2008	3,731	1,061	75	15	1	4,945
2009	4,058	1,137	80	12	2	5,317
2010	4,192	1,109	95	13	--	5,432
Average	**2,065.7**	**979.4**	**64.7**	**20.5**	**1.8**	**3,148.4**
SD	**1,155.7**	**223.9**	**16.8**	**15.3**	**3.0**	**1,360.0**

Figure 97. Species composition of other PMUS landings, 1987-2010

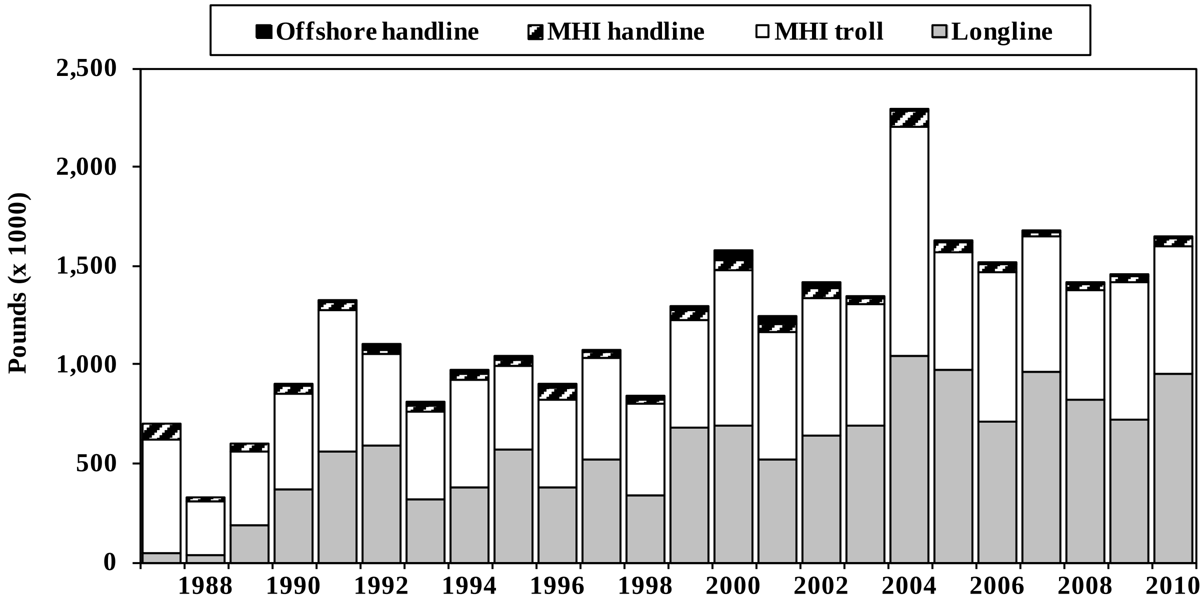


Interpretation: Mahimahi was typically the largest component of other PMUS landings although moonfish landings exceeded mahimahi landings in 2009 and 2010. Mahimahi landings were above the long-term average for the past twelve years. Wahoo landings increased gradually and were consistently above its long-term average from 1997. Moonfish, pomfret, and oilfish increased at the highest rates during the 24-year period due to increased landings by the longline fishery.

Source and Calculations: The other pelagic PMUS catch statistics were derived from NMFS longline logbook, Joint NMFS and HDAR Market Sample, HDAR Commercial Fish Catch, and Marine Dealer data and was calculated for each species. The gear types summarized for each species include catches from the longline, MHI troll, MHI handline, offshore handline, aku boat fisheries, and other gear category.

	Landings of other PMUS by species (1000 lbs)					
Year	Mahimahi	Ono	Moonfish	Pomfret	Oilfish	Total
1987	704	400	152	23	2	1,294
1988	332	406	182	18	3	978
1989	597	522	274	63	24	1,553
1990	894	353	253	66	52	1,707
1991	1,322	456	270	75	130	2,423
1992	1,112	365	320	37	85	2,026
1993	814	450	454	92	0	1,850
1994	974	351	524	85	4	1,977
1995	1,044	606	629	93	10	2,426
1996	899	514	760	121	11	2,349
1997	1,077	715	823	178	15	2,850
1998	839	725	922	225	26	2,782
1999	1,293	929	1,210	313	29	3,828
2000	1,587	682	685	277	93	3,340
2001	1,253	945	769	276	142	3,414
2002	1,418	686	910	492	202	3,727
2003	1,363	1,053	1,091	459	278	4,266
2004	2,311	919	783	769	344	5,162
2005	1,629	897	1,094	658	386	4,695
2006	1,525	1,005	1,082	583	414	4,640
2007	1,682	856	1,223	618	458	4,863
2008	1,434	976	1,336	677	491	4,945
2009	1,468	756	1,895	633	544	5,317
2010	1,663	749	1,819	593	581	5,432
Average	**1,198.7**	**676.9**	**767.0**	**297.0**	**162.7**	**3,148.4**
SD	**429.5**	**237.1**	**437.8**	**253.8**	**185.0**	**1,360.1**

Figure 98. Hawaii mahimahi landings by gear type, 1987-2010

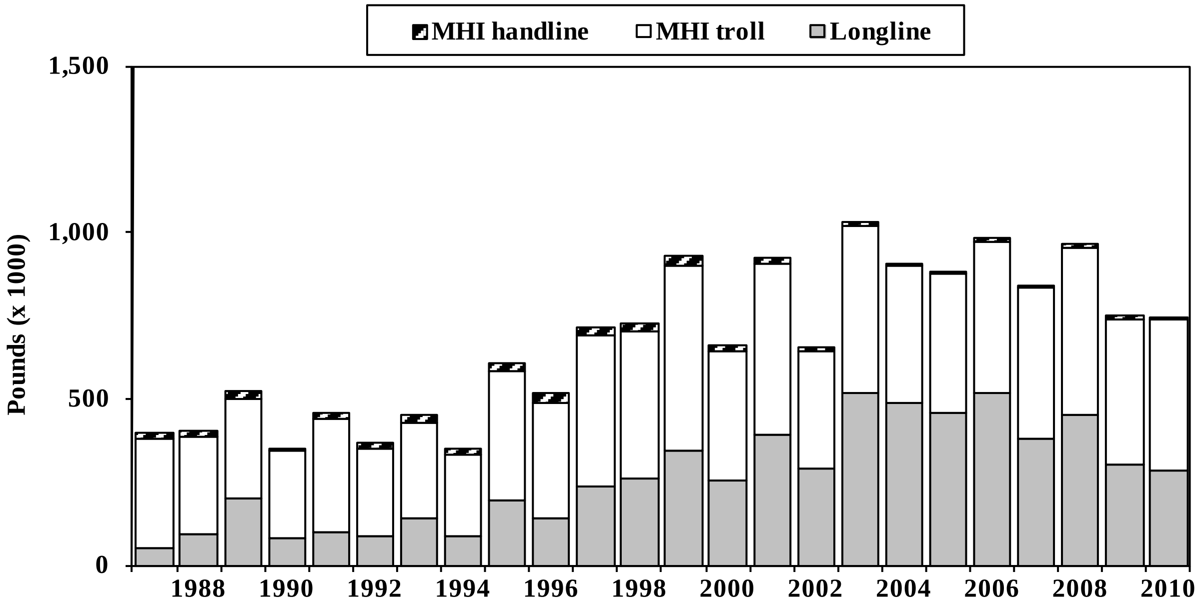


Interpretation: Mahimahi landings grew gradually throughout the 24-year period peaking in 2004 at 2.3 million pounds with record landings by both the longline and troll fisheries. Mahimahi landings were 1.7 million pounds in 2010. Ninety-six percent of mahimahi landings were attributable to the MHI troll and longline fisheries in 2010. Mahimahi landings by the longline fishery were above its long-term average during the past nine years. The MHI handline, offshore handline, and aku boat landings of mahimahi were low in comparison to the longline and troll fisheries.

Source and Calculations: Mahimahi catch statistics were derived from NMFS longline logbook, Joint NMFS and HDAR Market Sample, HDAR Commercial Fish Catch, and Marine Dealer data. The gear types summarized for catches of mahimahi included the longline, MHI troll, MHI handline, offshore handline, and aku boat fisheries. The total column also contains small mahimahi catches by the other gear category.

	Mahimahi landings (1000 lbs)					
Year	Longline	MHI troll	MHI handline	Offshore handline	Aku boat	Total
1987	45	579	78	-	2	704
1988	39	264	25	-	4	332
1989	183	379	34	-	1	597
1990	366	491	37	0	0	894
1991	555	718	44	5	0	1,322
1992	593	461	24	21	14	1,112
1993	316	444	27	23	3	814
1994	377	546	33	18	0	974
1995	570	419	35	20	0	1,044
1996	375	451	56	17	0	899
1997	518	517	27	9	5	1,077
1998	336	464	26	13	0	839
1999	679	545	49	20	0	1,293
2000	694	786	48	54	1	1,587
2001	523	637	47	35	1	1,253
2002	645	694	48	26	1	1,418
2003	686	619	31	14	3	1,363
2004	1,041	1,166	72	14	2	2,311
2005	972	595	47	8	1	1,629
2006	714	754	38	8	0	1,525
2007	966	681	21	6	1	1,682
2008	821	558	31	9	1	1,434
2009	720	696	34	7	2	1,468
2010	949	651	39	11	--	1,663
Average	**553.7**	**585.4**	**39.6**	**14.2**	**1.8**	**1,198.7**
SD	**272.7**	**180.8**	**14.7**	**12.6**	**3.0**	**429.5**

Figure 99. Hawaii Wahoo (Ono) landings by gear type, 1987-2010

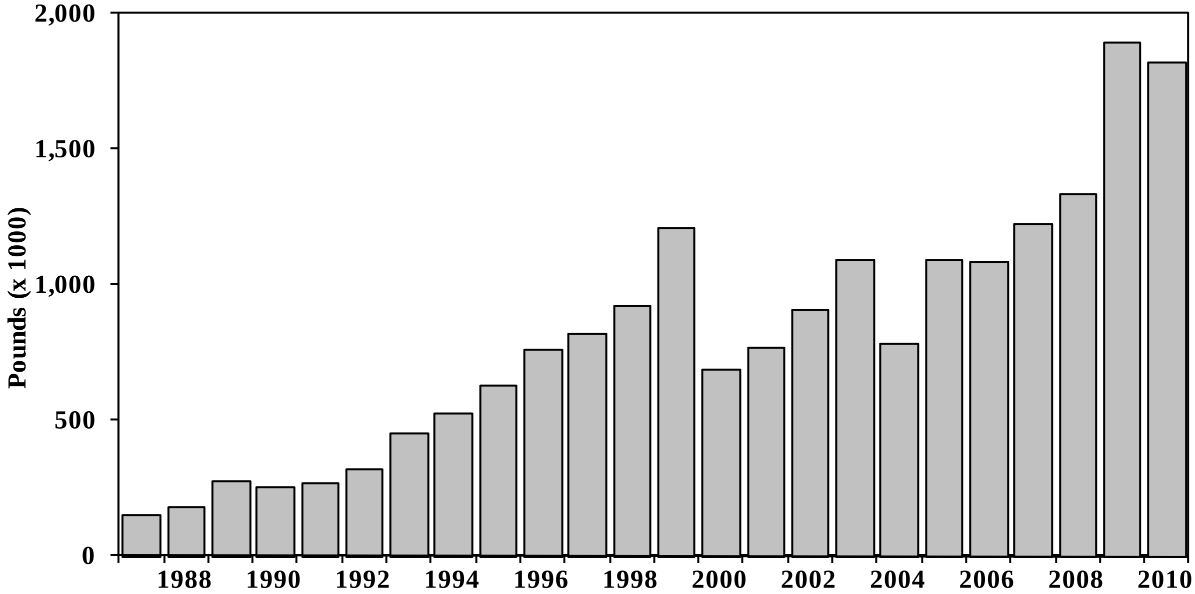


Interpretation: Wahoo landings grew slowly from the mid-1990s peaking at 1.1 million pounds in 2003. They decreased gradually to 749,000 pounds in 2010. The longline and MHI troll fisheries accounted for 98% of the wahoo landings in 2010. The MHI troll fishery typically contributed the greatest fraction of these landings and was followed by the longline fishery.

Source and Calculations: Wahoo catch statistics were derived from NMFS longline logbook, Joint NMFS and HDAR Market Sample, HDAR Commercial Fish Catch, and Marine Dealer data. The gear types summarized for catches of wahoo included the longline, MHI troll, and MHI handline fisheries. The total column also contains small wahoo catches by the other gear category.

	Ono landings (1000 lbs)			
Year	Longline	MHI troll	MHI handline	Total
1987	53	324	23	400
1988	90	298	18	406
1989	202	298	22	522
1990	80	262	11	353
1991	101	337	18	456
1992	85	262	18	365
1993	142	286	22	450
1994	87	245	19	351
1995	195	388	23	606
1996	140	347	27	514
1997	239	451	25	715
1998	262	442	21	725
1999	343	558	28	929
2000	256	386	18	682
2001	390	516	18	945
2002	292	350	15	686
2003	519	498	13	1,053
2004	486	412	8	919
2005	458	416	10	897
2006	514	458	10	1,005
2007	381	454	7	856
2008	454	500	11	976
2009	301	439	12	756
2010	281	455	10	749
Average	**263.9**	**388.2**	**17.3**	**676.9**
SD	**154.7**	**90.1**	**6.2**	**237.1**

Figure 100. Hawaii moonfish landings, 1987-2010

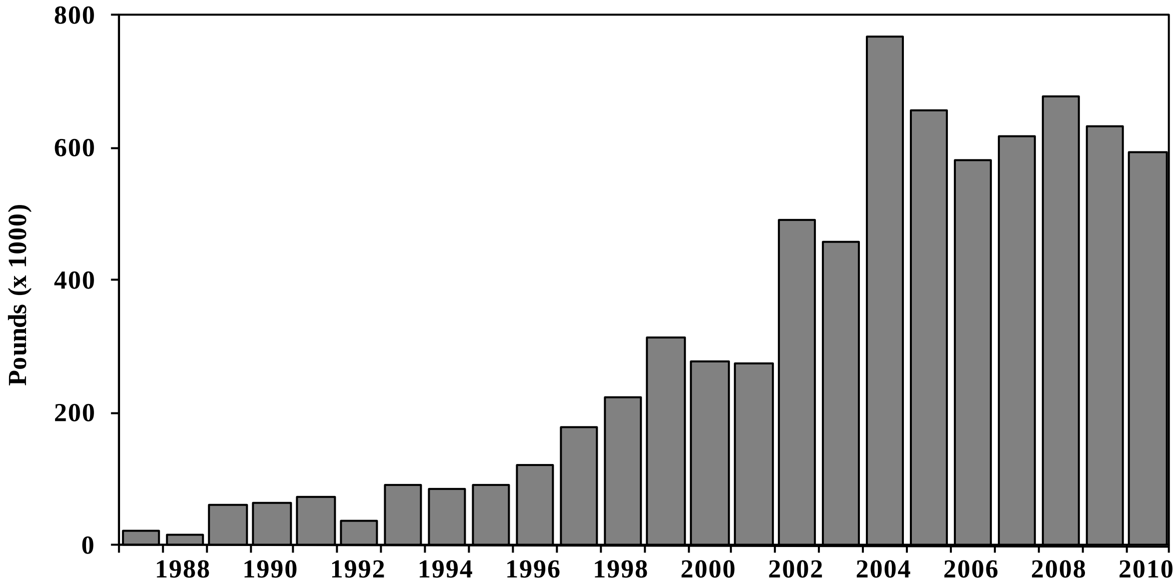


Interpretation: Moonfish are unique among the PMUS because they are caught exclusively by the longline fishery. Moonfish landings rose consistently from 1990 through 1999. Moonfish landings reached a record 1.9 million pounds in 2009 and decreased slightly in 2010. Moonfish appear to have 3 cycles where there several consecutive years of increasing landings followed by a drop during the past 11 years.

Source and Calculations: Moonfish catch statistics were derived from NMFS longline logbook, Joint NMFS and HDAR Market Sample, and HDAR Commercial Marine Dealer data.

	Moonfish landings (1000 lbs)	
Year	**Longline**	**Total**
1987	152	152
1988	182	182
1989	274	274
1990	253	253
1991	270	270
1992	320	320
1993	454	454
1994	524	524
1995	629	629
1996	760	760
1997	823	823
1998	922	922
1999	1,210	1,210
2000	685	685
2001	768	768
2002	910	910
2003	1,091	1,091
2004	783	783
2005	1,093	1,094
2006	1,082	1,082
2007	1,223	1,223
2008	1,336	1,336
2009	1,895	1,895
2010	1,819	1,819
Average	**766.9**	**767.0**
SD	**437.8**	**437.8**

Figure 101. Hawaii pomfret landings, 1987-2010

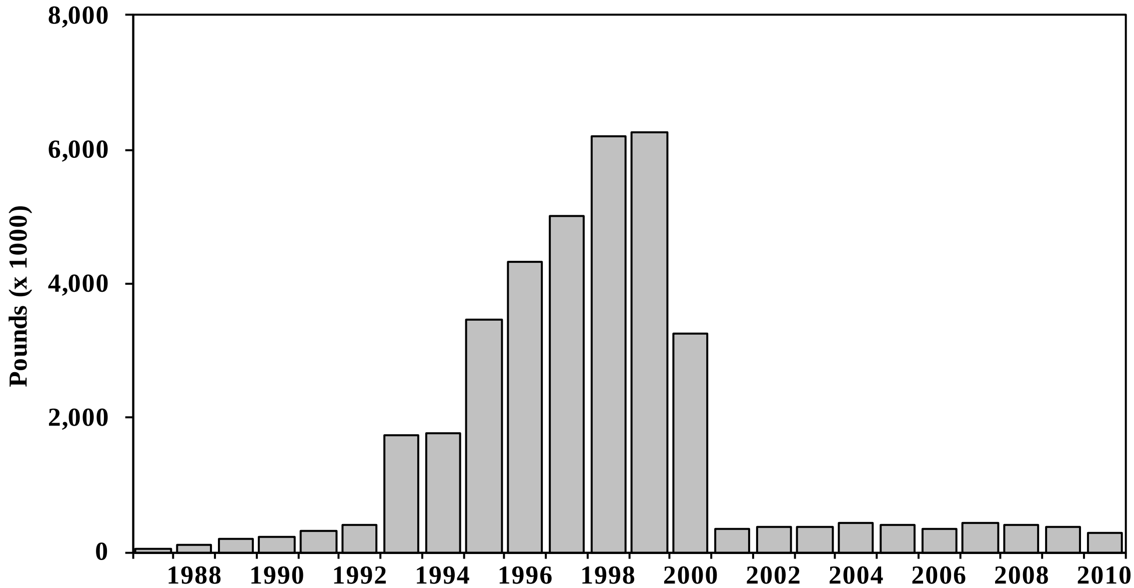


Interpretation: Landings of pomfrets come primarily from the longline fishery. Pomfret landings rose rapidly from 1995 peaking at 735,000 pounds in 2004. Landings decreased the following year and remained stable thereafter. Pomfret landings were 593,000 pounds in 2010, almost twice as high as its long-term average annual landings.

Source and Calculations: Pomfret catch statistics were derived from NMFS longline logbook and HDAR Commercial Fish Catch, and Marine Dealer data. The gear types summarized for catches of pomfrets included the longline, MHI troll, and MHI handline fisheries. The total column also contains small landings of pomfret by the other gear category.

	Pomfret landings (1000 lbs)			
Year	Longline	MHI handline	Offshore handline	Total
1987	23	0	-	23
1988	18	0	-	18
1989	49	0	-	63
1990	66	0	0	66
1991	75	0	0	75
1992	37	0	0	37
1993	92	0	0	92
1994	85	0	0	85
1995	93	0	0	93
1996	121	0	0	121
1997	178	0	0	178
1998	225	0	0	225
1999	313	0	0	313
2000	272	3	0	277
2001	268	6	0	276
2002	463	6	14	492
2003	416	6	0	459
2004	735	14	5	769
2005	632	9	1	658
2006	558	8	3	583
2007	572	6	11	618
2008	612	32	3	677
2009	583	32	4	632
2010	543	42	1	593
Average	**282.0**	**5.3**	**1.8**	**297.0**
SD	**236.5**	**9.3**	**3.7**	**253.8**

Figure 102. Hawaii shark landings, 1987-2010

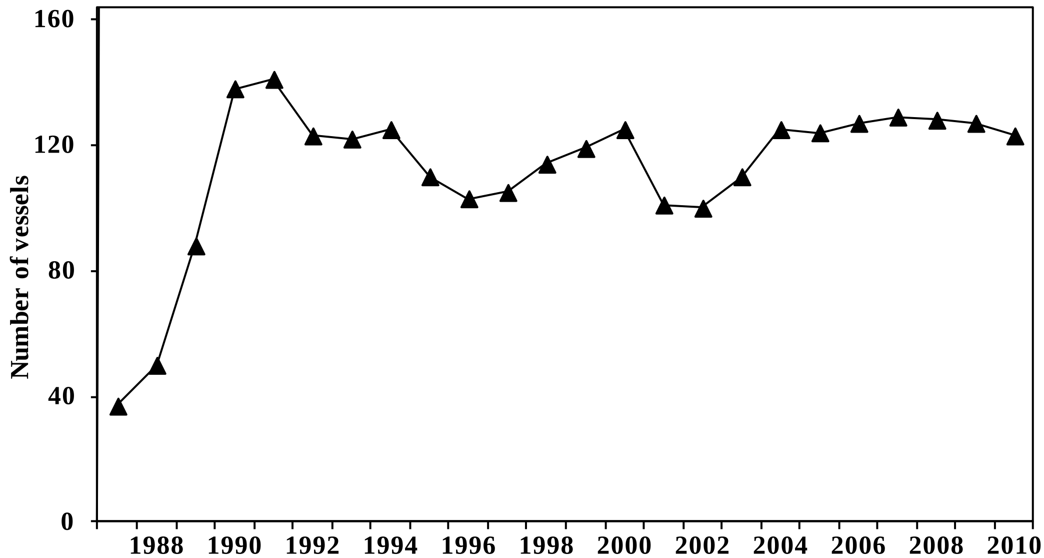


Interpretation: Sharks were landed almost exclusively by the longline fishery. Shark landings increased dramatically from 1987 to a peak of 6.3 million pounds in 1999. Sharks were landed headed and gutted in the late 1980's but a market for shark fins began in the early 1990's. Finning sharks then became widespread throughout the longline fishery. Shark landings dropped by 47% in 2000 in response to a state law that prohibited finning. This was followed by the federal Shark Finning Prohibition Act which was passed shortly after. These regulatory measures caused a 90% decline in shark landings observed in 2001 with landings remaining low through 2010. Shark landings consisted primarily of shortfin mako and thresher sharks marketed as a fresh product in steak form.

Source and Calculations: Shark catches (in number of fish) were derived from NMFS longline logbook and extrapolated to weight by using the mean weight calculated from the Market sample or HDAR Commercial Marine Dealer data. When the practice of finning sharks was allowed (typically blue and other shark species) their carcasses were discarded at sea. These fish still represented a kept and landed fish. Blue sharks and species of sharks other than shortfin mako and thresher sharks were not landed. Therefore, no average weight could be calculated from the Market sample or Dealer data. Blue and other shark species were extrapolated by multiplying the number of sharks finned by an average weight from the observer data as a crude method to estimate shark biomass

	Shark landings (1000 lbs)	
Year	**Longline**	**Total**
1987	43	43
1988	94	94
1989	203	203
1990	222	222
1991	318	318
1992	410	410
1993	1,736	1,736
1994	1,757	1,757
1995	3,468	3,468
1996	4,327	4,327
1997	5,010	5,010
1998	6,212	6,212
1999	6,272	6,273
2000	3,243	3,253
2001	326	333
2002	359	366
2003	353	358
2004	414	419
2005	389	393
2006	333	337
2007	410	418
2008	409	416
2009	367	374
2010	267	275
Average	**1,594.6**	**1,597.4**
SD	**2,062.1**	**2,061.1**

Figure 103. Number of Hawaii-based longline vessels, 1987-2010



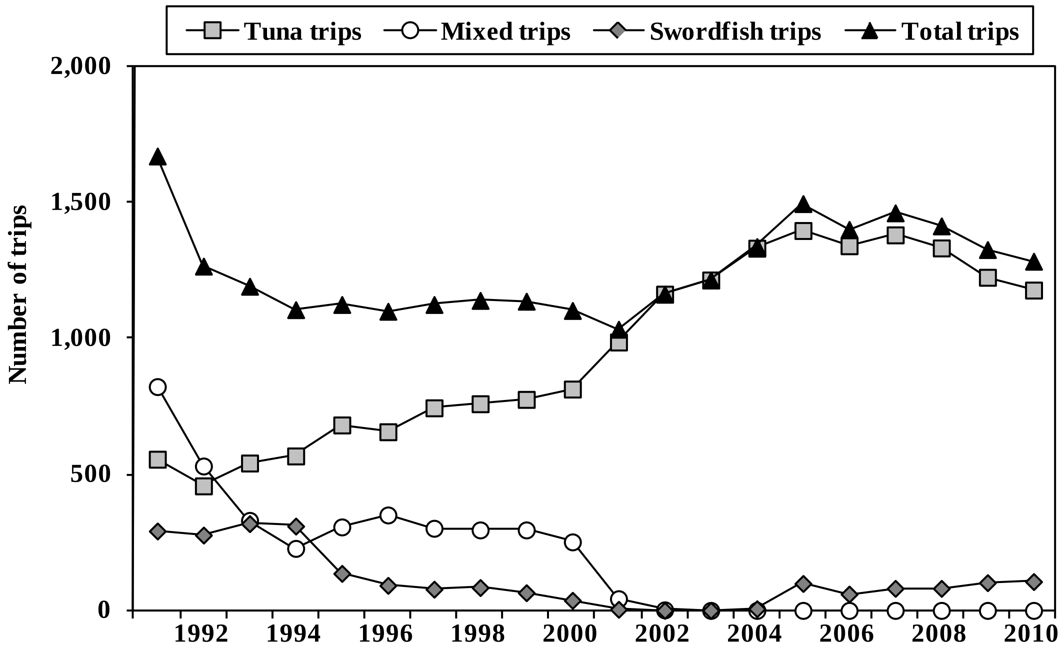
Interpretation: There were 123 active Hawaii-based longline vessels in 2010, four less than the previous year. One hundred twenty-one (121) longline vessels set their gear deep to target tunas, two (2) vessels set their gear shallow to target swordfish exclusively throughout the year, while 26 vessels of the 121 vessels targeting tuna switched between setting their gear deep to target tunas and setting shallow to target swordfish during 2010.

The shallow-set sector of the Hawaii-based longline fishery for swordfish was reopened April 2004 under a new set of regulations intended to reduce the number of sea turtle interactions. The California-based longline fishery targeting swordfish was closed at the same time. The increase in vessels during 2003 and 2004 is due to California-based vessels migrating back to Hawaii.

Source and Calculations: The number of Hawaii-based longline vessels was compiled by counting the number of unique permit numbers from the NMFS marketing monitoring data from 1987-1990 and the NMFS longline logbook data from 1991-2010 based on date of landing.

Year	Vessels
1987	37
1988	50
1989	88
1990	138
1991	141
1992	123
1993	122
1994	125
1995	110
1996	103
1997	105
1998	114
1999	119
2000	125
2001	101
2002	100
2003	110
2004	125
2005	124
2006	127
2007	129
2008	128
2009	127
2010	123
Average	**111.8**
SD	**25.1**

Figure 104. Number of trips by the Hawaii-based longline fishery, 1991-2010

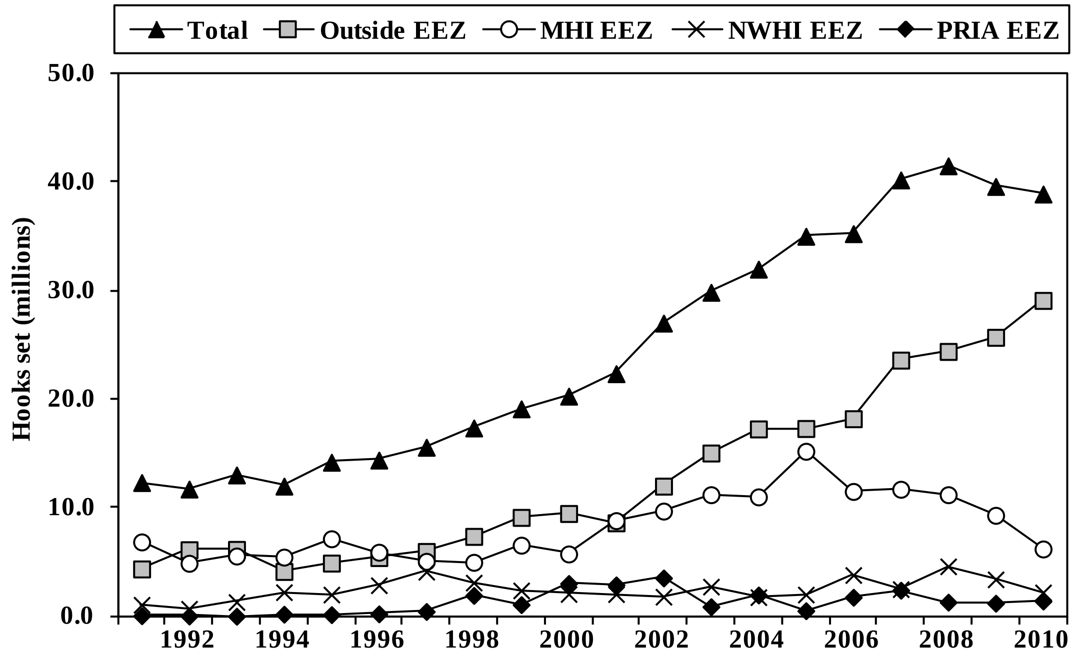


Interpretation: The Hawaii-based longline fleet made 1,284 trips in 2010. Although the total number of trips declined for the third year in a row, it was above the long-term average in 2010. A majority of the trips were deep-set tuna targeted trips with the remainder shallow-set swordfish targeted trips. Since the swordfish closure in 2001, the shallow-set sector made a record 106 swordfish trips in 2010.

Source and Calculations: The number of trips was compiled from NMFS federal longline logbook data collected from 1991 to 2010. The trip summary was based on landing date. The trip type was determined by an interview with the vessel captain or assigned by Fishery Monitoring Branch (FMB) staff on the basis of gear characteristics, fishing techniques and locations, catch composition and past targeting strategy.

	Hawaii longline trip activity			
Year	Total trips	Tuna trips	Mixed trips	Swordfish trips
1991	1,671	556	823	292
1992	1,266	458	531	277
1993	1,192	542	331	319
1994	1,106	568	228	310
1995	1,125	682	307	136
1996	1,100	657	351	92
1997	1,125	745	302	78
1998	1,140	760	296	84
1999	1,137	776	296	65
2000	1,103	814	252	37
2001	1,034	987	43	4
2002	1,163	1,163	2	0
2003	1,215	1,215	0	0
2004	1,338	1,332	0	6
2005	1,496	1,397	0	99
2006	1,401	1,341	0	60
2007	1,462	1,381	0	81
2008	1,414	1,333	0	81
2009	1,327	1,225	0	102
2010	1,284	1,178	0	106
Average	**1,253.4**	**943.8**	**198.0**	**111.7**
SD	**170.9**	**334.8**	**226.7**	**106.8**

Figure 105. Number of hooks set by the Hawaii-based longline fishery, 1991-2010

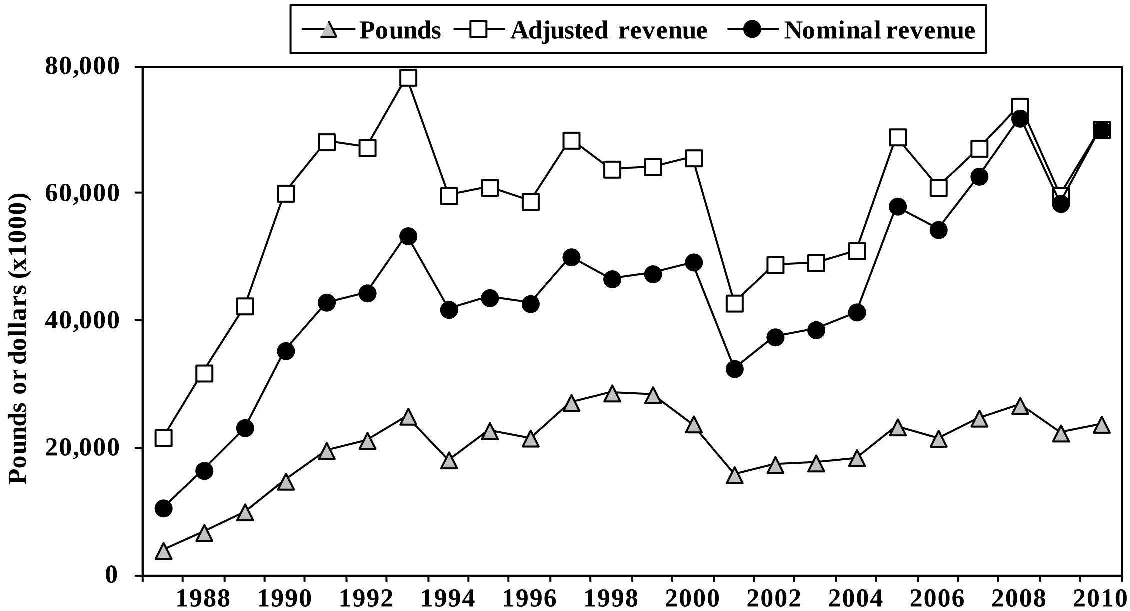


Interpretation: The total number of hooks set by the Hawaii-based longline fishery increased steadily from 11.7 million hooks in 1994, peaked at a record 41.5 million hooks in 2008 then decreased to 38.9 million in 2010. Much of the increase is due to the shift in effort from swordfish and mixed target to tuna. Tuna sets typically set more hooks per day than swordfish and mixed target set types. Most of the hooks set were in the areas outside the EEZ (75%) followed by hooks set in the MHI EEZ (16%), the NWHI EEZ (6%) and the EEZ of Pacific Remote Island Areas (PRIAs) (3%)..

Source and Calculations: Number of hooks set was compiled from NMFS federal longline logbook data collected from 1991 to 2010. The summary of hooks set was based on date of haul.

	Number of hooks set by area (milions)				
Year	Outside EEZ	MHI EEZ	NWHI EEZ	PRIA EEZ	Total
1991	4.4	6.9	1.1	0.1	12.3
1992	6.1	4.9	0.7	0.0	11.7
1993	6.2	5.6	1.3	0.0	13.0
1994	4.1	5.5	2.2	0.2	12.0
1995	4.9	7.1	2.0	0.2	14.2
1996	5.4	5.9	2.9	0.2	14.4
1997	6.0	5.1	4.1	0.4	15.6
1998	7.4	5.0	3.1	1.9	17.4
1999	9.1	6.6	2.4	1.1	19.1
2000	9.5	5.7	2.1	3.0	20.3
2001	8.6	8.8	2.0	2.9	22.4
2002	12.0	9.7	1.8	3.5	27.0
2003	15.0	11.2	2.7	0.9	29.9
2004	17.3	11.0	1.8	2.0	32.0
2005	17.3	15.2	2.0	0.5	35.0
2006	18.2	11.5	3.8	1.8	35.3
2007	23.6	11.7	2.5	2.4	40.2
2008	24.4	11.2	4.6	1.3	41.5
2009	25.7	9.3	3.4	1.2	39.6
2010	29.1	6.2	2.2	1.4	38.9
Average	**11.85**	**8.30**	**2.44**	**1.24**	**23.83**
SD	**7.25**	**3.02**	**1.02**	**1.13**	**10.70**

Figure 106. Hawaii longline landings and revenue, 1987-2010



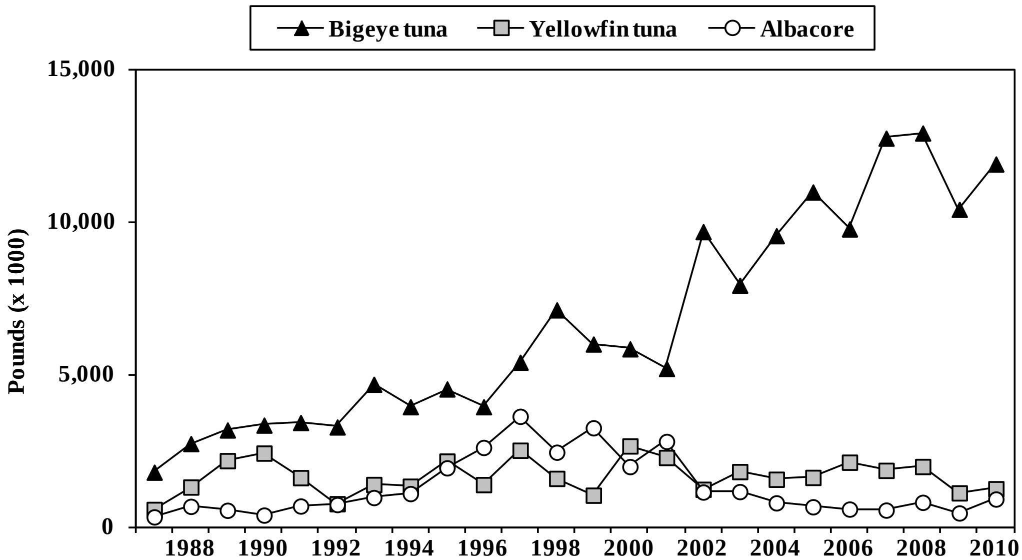
Interpretation: Hawaii longline landings were 23.7 million pounds in 2010 and have been trending upwards since 2001. Inflation adjusted revenue also trended higher during the same period reaching $70.1 million in 2010. Both landings and revenue have been above than their respective long-term averages since 2005. The table to the side shows revenue in thousands of dollars.

Source and Calculations: Longline catch and nominal ex-vessel revenue estimates were compiled from NMFS logbook and market sample or HDAR Commercial Marine Dealer data.

Total catch and revenue estimates were calculated by extrapolating NMFS market sample data from 1987-1990, combining the number of fish from the federal logbook with the average weight per fish and average price per pound from the Market Sample data during 1991-1999, and the HDAR Dealer data from 2000 to 2010. The adjusted revenue was calculated by multiplying nominal revenue by the Honolulu CPI for the current year and then dividing by the Honolulu CPI.

Year	Pounds	Adjusted revenue	Nominal revenue	Honolulu CPI
1987	3,893	$21,628	$10,579	114.9
1988	6,713	$31,790	$16,470	121.7
1989	9,966	$42,342	$23,199	128.7
1990	14,790	$60,059	$35,309	138.1
1991	19,608	$68,140	$42,932	148.0
1992	21,190	$67,224	$44,387	155.1
1993	25,005	$78,298	$53,365	160.1
1994	18,138	$59,672	$41,788	164.5
1995	22,733	$60,971	$43,632	168.1
1996	21,564	$58,759	$42,700	170.7
1997	27,160	$68,396	$50,052	171.9
1998	28,655	$63,839	$46,609	171.5
1999	28,377	$64,229	$47,386	173.3
2000	23,791	$65,617	$49,248	176.3
2001	15,800	$42,785	$32,494	178.4
2002	17,392	$48,817	$37,470	180.3
2003	17,653	$49,152	$38,606	184.5
2004	18,495	$51,015	$41,394	190.6
2005	23,324	$68,914	$58,030	197.8
2006	21,531	$60,961	$54,343	209.4
2007	24,700	$67,133	$62,732	219.5
2008	26,697	$73,738	$71,855	228.9
2009	22,360	$59,689	$58,444	230.0
2010	23,736	$70,093	$70,093	234.9
Average	**19,979.8**	**57,963.8**	**43,609.7**	
SD	**6,511.0**	**13,509.5**	**14,154.8**	

Figure 107. Hawaii longline tuna landings, 1987-2010



Interpretation: The three major tuna species landed by the Hawaii-based longline fishery are bigeye tuna, yellowfin tuna, and albacore. Landings of bigeye tuna were 11.9 million pounds in 2010, down from their peak of 12.9 million pounds in 2008. Bigeye was the largest component of the longline landings and made up 82% of all tuna landings. The trend for bigeye tuna landings was increasing. Yellowfin tuna landings increased slightly to 1.3 million pounds in 2010 but they were still below their long-term average. Albacore landings doubled from the previous year in 2010 but they were still 29% below their long-term average and substantially below their peak in 1997. The longline fishery also landed small amounts of skipjack tuna and bluefin tuna.

Source and Calculations: The longline tuna catch estimates were derived from NMFS longline logbook, Market Sample, and Marine Dealer data. Longline tuna catches were estimated by either extrapolating the NMFS market sample data (1987-1990) or multiplying the number of fish from the logbook data by the average weight from the Sample or HDAR Dealer data (1991-2010).

	Hawaii longline tuna landings (1000 lbs)					
Year	Bigeye tuna	Yellowfin tuna	Albacore	Skipjack tuna	Bluefin tuna	Total
1987	1,796	575	331	3	0	2,705
1988	2,732	1,309	676	8	0	4,725
1989	3,178	2,174	547	22	0	5,921
1990	3,338	2,421	390	12	1	6,162
1991	3,423	1,617	687	66	4	5,797
1992	3,277	763	735	49	84	4,908
1993	4,677	1,392	965	79	92	7,205
1994	3,940	1,336	1,095	116	53	6,540
1995	4,522	2,159	1,938	223	56	8,898
1996	3,940	1,389	2,606	91	48	8,074
1997	5,399	2,515	3,626	234	52	11,826
1998	7,113	1,592	2,450	168	36	11,359
1999	5,995	1,042	3,250	219	23	10,529
2000	5,836	2,656	1,979	221	7	10,700
2001	5,193	2,277	2,803	455	2	10,730
2002	9,676	1,235	1,145	282	2	12,348
2003	7,922	1,815	1,160	438	1	11,337
2004	9,544	1,564	791	294	1	12,197
2005	10,977	1,624	662	197	1	13,464
2006	9,765	2,123	587	162	1	12,641
2007	12,741	1,856	554	202	0	15,354
2008	12,909	1,982	808	263	1	15,962
2009	10,409	1,118	460	298	2	12,287
2010	11,894	1,254	916	330	1	14,397
Average	**6,674.8**	**1,657.8**	**1,298.4**	**184.7**	**19.5**	**9,836.1**
SD	**3,472.2**	**550.5**	**973.8**	**129.2**	**28.9**	**3,650.1**

Figure 108. Hawaii longline billfish landings, 1987-2010

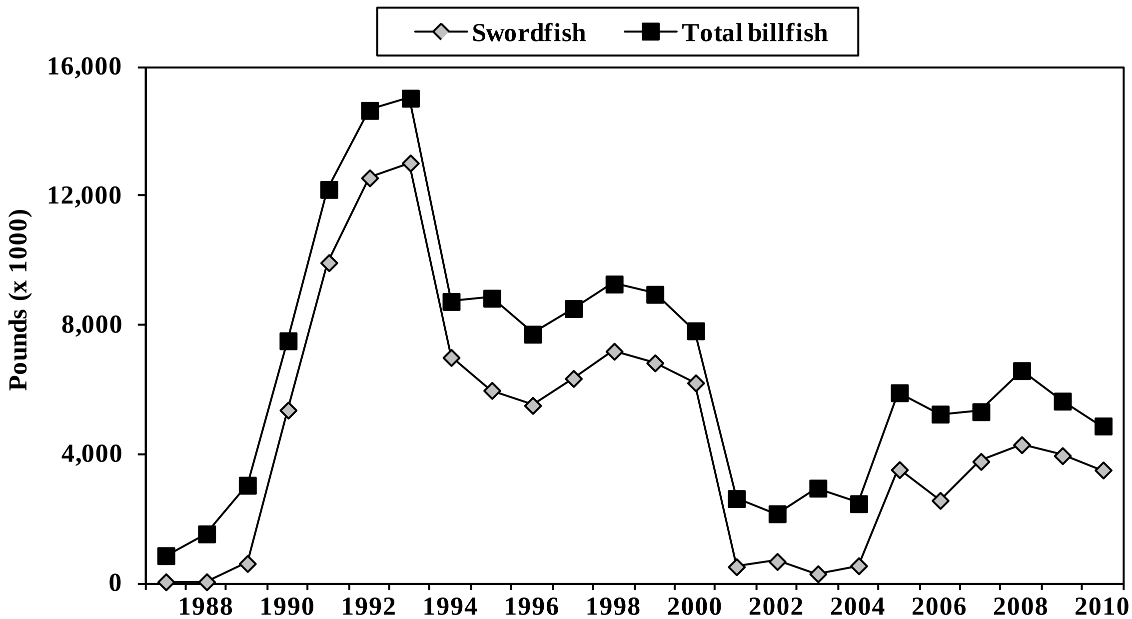
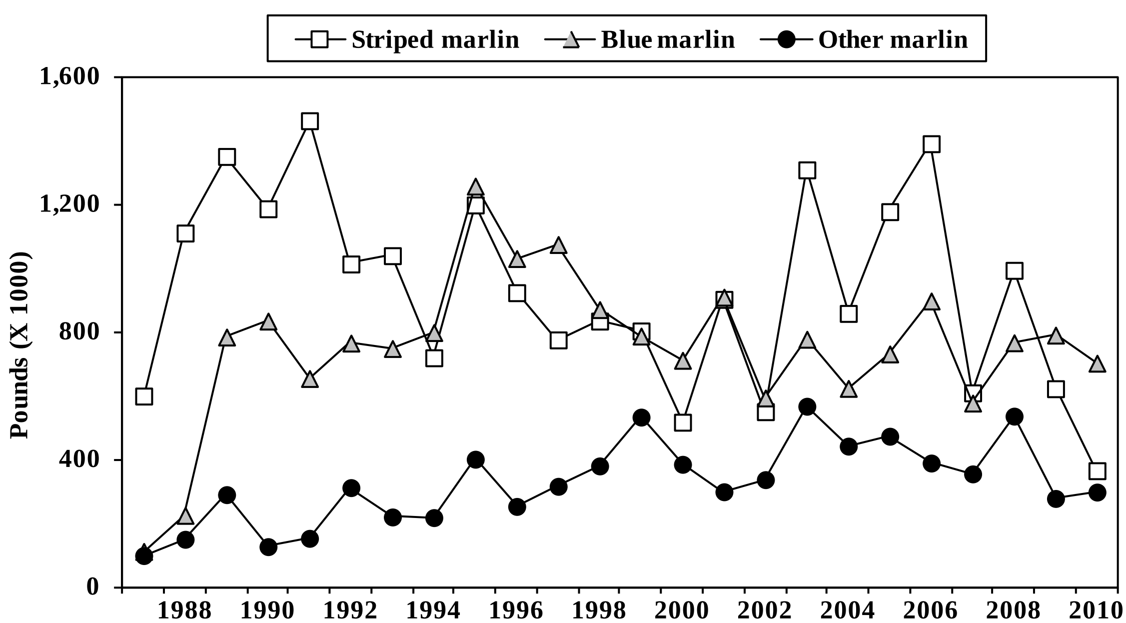


Figure 109. Hawaii longline marlin landings, 1987-2010



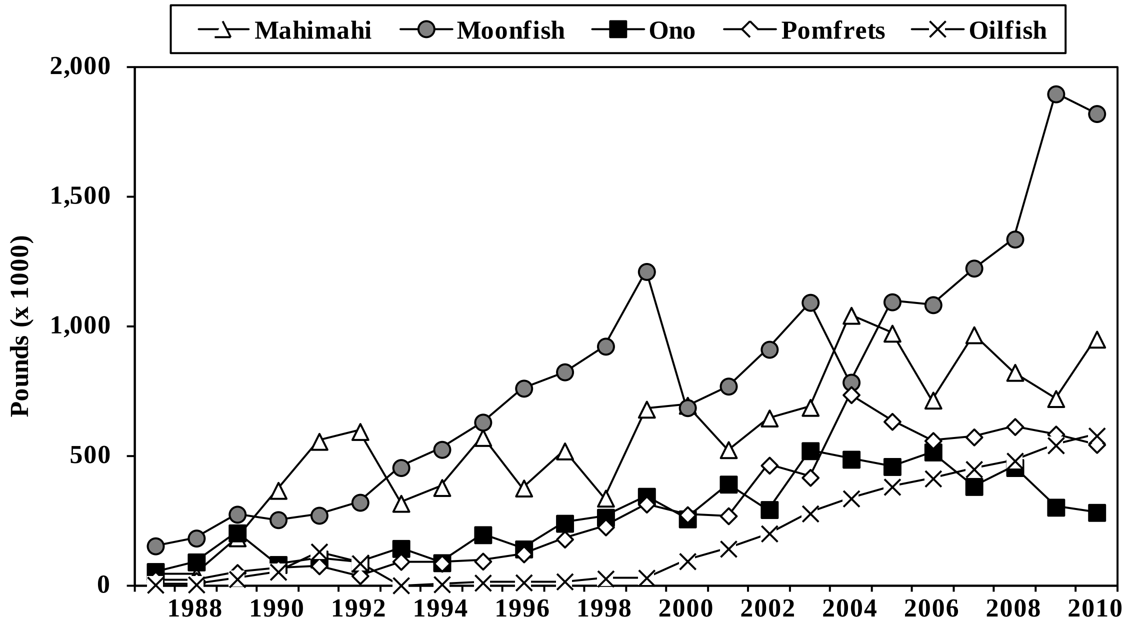
Interpretation: Billfish landings were 4.9 million pounds in 2010, 27% below the long-term average. The decrease observed in 2010 was attributable mainly to lower swordfish and striped marlin landings. The swordfish-targeted longline fishery target was able to operate throughout the entire year because the fishery managed to keep the number of loggerhead and leather back sea turtle interactions below the allowable levels. Swordfish landings by the shallow-set sector of the Hawaii longline fishery in 2010 were significantly higher than those landed during 2001-2004 when this sector of the longline fishery was closed.

Marlins are caught incidentally by the longline fishery and are retained because they sell for a moderate market price. Striped marlin and blue marlin are the largest component of the marlin landings. Striped marlin landings were at a record low in 2010: down by 62% compared to the long-term average. Blue marlin landings declined moderately in 2010 and were only 7 % below the long-term average.

	Hawaii longline billfish landings (1000 lbs)				
Year	Swordfish	Striped marlin	Blue marlin	Other marlin	Total billfish
1987	52	599	112	99	862
1988	52	1,110	225	150	1,537
1989	619	1,350	784	290	3,043
1990	5,372	1,186	834	127	7,519
1991	9,939	1,462	654	153	12,208
1992	12,566	1,013	765	312	14,656
1993	13,027	1,039	748	220	15,034
1994	7,002	719	798	218	8,737
1995	5,981	1,198	1,257	401	8,837
1996	5,517	923	1,030	253	7,723
1997	6,352	775	1,074	316	8,517
1998	7,193	834	870	380	9,277
1999	6,835	803	787	533	8,958
2000	6,215	517	711	385	7,828
2001	519	902	909	299	2,630
2002	681	550	593	337	2,160
2003	301	1,308	777	567	2,954
2004	549	858	623	442	2,472
2005	3,527	1,177	731	473	5,909
2006	2,573	1,390	897	389	5,248
2007	3,781	609	577	355	5,322
2008	4,299	993	766	536	6,594
2009	3,960	622	790	278	5,650
2010	3,516	365	702	298	4,880
Average	**4,648.3**	**953.8**	**752.7**	**326.7**	**6,681.5**
SD	**3,813.8**	**284.2**	**241.3**	**131.8**	**3,924.1**

Source and Calculations: The longline billfish catch estimates were derived from NMFS longline logbook, Market Sample, and HDAR Dealer data. Longline billfish catches were estimated by either extrapolating the NMFS Market Sample data to an estimated full coverage (1987-1991) or multiplying the number of fish from the logbook data by the average weight from the Market Sample or HDAR Dealer data (1992-2010).

Figure 110. Hawaii longline landings of other PMUS, 1987-2010



Interpretation: Longline landings of other pelagic PMUS show an increasing trend with landings at a record 4.2 million pounds in more than double their the long-term average. Moonfish was the dominant component in this category at 1.8 million pounds followed by mahimahi. Oilfish have displayed an increasing trend since 1999. Pomfret landings peaked in 2004 and remained level while wahoo (ono) landings were at their highest level between 2003 and 2006 and declined thereafter.

Source and Calculations: Estimates of longline catch of other pelagic species were derived from NMFS longline logbook, Market Sample, and HDAR Dealer data. Catch of other pelagic species were estimated by either extrapolating the NMFS Market Sample data to an estimated full coverage (1987-1990) or multiplying the number of fish from the logbook data by the average weight from the Market Sample or HDAR Dealer data (1991-2010).

	Hawaii longline landings of other pelagic PMUS (1000 lbs)					
Year	**Mahimahi**	**Moonfish**	**Ono**	**Pomfrets**	**Oilfish**	**Total**
1987	45	152	53	23	2	283
1988	39	182	90	18	3	357
1989	183	274	202	49	24	799
1990	366	253	80	66	52	887
1991	555	270	101	75	130	1,285
1992	593	320	85	37	85	1,216
1993	316	454	142	92	0	1,030
1994	377	524	87	85	4	1,104
1995	570	629	195	93	10	1,530
1996	375	760	140	121	11	1,440
1997	518	823	239	178	15	1,807
1998	336	922	262	225	26	1,807
1999	679	1,210	343	313	29	2,618
2000	694	685	256	272	93	2,013
2001	523	768	390	268	141	2,114
2002	645	910	292	463	200	2,525
2003	686	1,091	519	416	277	3,010
2004	1,041	783	486	735	335	3,412
2005	972	1,093	458	632	380	3,563
2006	714	1,082	514	558	412	3,309
2007	966	1,223	381	572	448	3,613
2008	821	1,335	454	612	480	3,731
2009	720	1,895	301	583	540	4,058
2010	949	1,819	281	543	577	4,192
Average	**553.7**	**766.9**	**263.9**	**282.0**	**160.7**	**2,065.7**
SD	**272.7**	**437.7**	**154.7**	**236.5**	**182.1**	**1,155.7**

Figure 111. Hawaii longline blue and total shark landings, 1987-2010

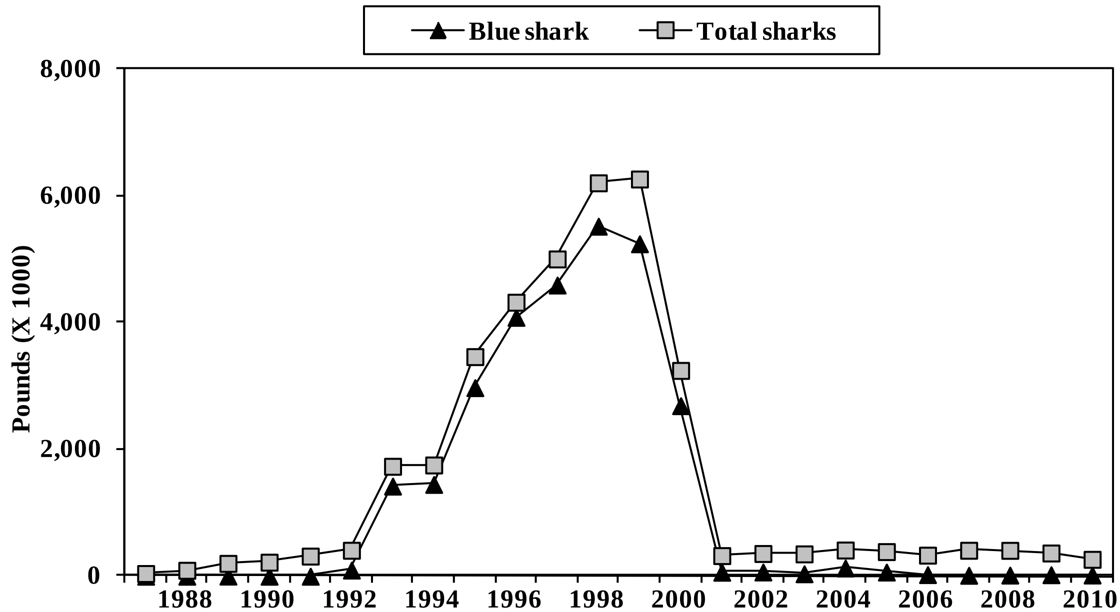
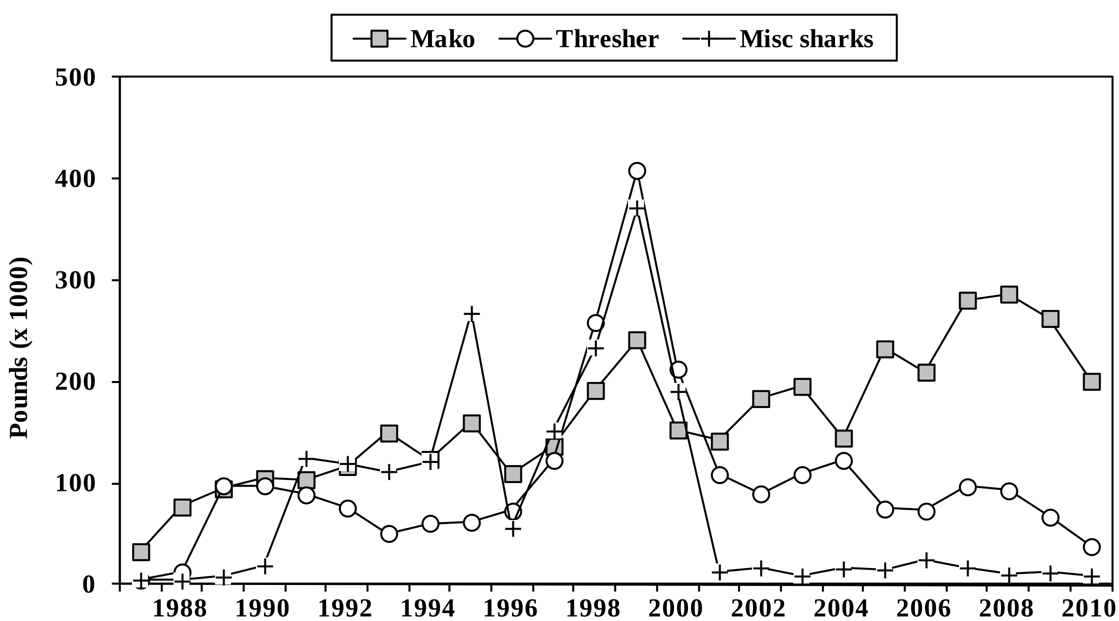


Figure 112. Hawaii longline mako, thresher and other shark landings, 1987-2010



Interpretation: Shark landings in 2010 were 82% below the long-term average. Shark landings have been low since 2001 due to State and Federal laws which prohibited the practice of finning and landing sharks without the associated carcass. Blue shark and other sharks were retained for fins only so landings dropped significantly when laws prohibiting the practice took effect. Mako and thresher sharks were retained for their flesh and had landings substantially lower and less variable compared to blue shark.

Source and Calculations: Catch statistics for sharks were derived from NMFS longline logbook, Market Sample, and HDAR Dealer data. Shark catch landed whole was estimated by multiplying the number of fish from the logbook data by the average weight from the Market Sample or HDAR Dealer data. When finning sharks was allowed, finned shark catches were also extrapolated to whole weight by multiplying the number of sharks finned by an average weight from the observer data.

	Hawaii longline shark landings (1000 lbs)				
Year	Blue shark	Mako	Thresher	Misc sharks	Total sharks
1987	0	33	5	5	43
1988	0	77	13	4	94
1989	2	95	98	8	203
1990	0	105	98	19	222
1991	0	104	89	125	318
1992	97	117	76	120	410
1993	1,423	150	51	112	1,736
1994	1,450	124	61	122	1,757
1995	2,978	160	62	268	3,468
1996	4,088	110	73	56	4,327
1997	4,598	137	123	152	5,010
1998	5,527	192	259	234	6,212
1999	5,249	242	409	372	6,272
2000	2,693	153	213	191	3,250
2001	63	142	109	13	326
2002	67	184	90	17	359
2003	39	196	109	9	353
2004	130	145	123	16	414
2005	66	233	75	15	389
2006	26	210	73	25	333
2007	15	281	97	17	410
2008	18	287	93	10	409
2009	24	263	67	12	367
2010	19	201	38	9	267
Average	**1,241.4**	**162.6**	**107.2**	**83.6**	**1,594.9**
SD	**1,916.4**	**67.1**	**85.2**	**101.6**	**2,062.3**

Table 78. Hawaii-based longline catch (number of fish) by area, 1991-2010

	Tunas			Billfishes				Other Pelagic PMUS			
Year	Bigeye tuna	Yellowfin tuna	Albacore	Swordfish	Blue marlin	Striped marlin	Other billfish	Mahimahi	Ono (wahoo)	Moonfish	Sharks
Main Hawaiian Islands EEZ											
1991	**22,517**	**7,150**	5,763	13,598	**2,881**	**18,117**	**8,197**	17,672	**1,885**	**2,569**	13,295
1992	**22,982**	**3,846**	3,979	7,102	**2,761**	**9,838**	**3,368**	13,313	**1,194**	**2,387**	11,748
1993	**25,031**	**8,895**	6,496	4,388	**2,720**	**10,426**	**3,440**	9,366	**2,641**	**3,261**	12,955
1994	**27,022**	**6,815**	10,833	2,842	**3,344**	**6,494**	**3,213**	**17,660**	**1,332**	**3,626**	14,455
1995	**31,899**	**13,018**	18,271	5,239	**4,168**	**12,472**	**6,900**	**30,417**	2,658	**4,022**	22,557
1996	**29,803**	**7,715**	19,259	4,634	**3,556**	**7,124**	**3,404**	**11,676**	1,527	**3,094**	19,418
1997	21,397	10,982	19,025	4,873	**4,085**	**4,193**	**3,662**	11,660	2,525	**2,847**	16,476
1998	26,723	4,678	12,482	4,721	1,698	**4,856**	**4,254**	7,664	2,305	**3,585**	14,685
1999	29,328	4,838	23,805	2,357	1,709	**5,617**	6,702	11,660	2,579	5,168	17,469
2000	21,654	5,247	5,964	2,530	1,557	2,446	3,492	17,628	1,202	2,752	16,590
2001	**36,928**	5,671	10,448	1,027	2,134	**7,651**	**4,018**	**21,608**	3,223	**3,404**	16,086
2002	51,177	2,465	2,707	752	873	**3,449**	3,761	21,374	1,345	3,373	14,828
2003	39,907	10,058	2,593	1,422	1,742	**12,247**	**8,292**	25,255	4,751	3,454	25,876
2004	49,152	8,847	3,031	1,166	1,135	**6,665**	5,372	26,631	3,204	2,707	25,022
2005	52,856	**13,762**	4,606	2,464	1,594	**6,953**	**7,796**	**40,170**	5,473	4,228	27,277
2006	32,799	6,731	1,598	916	1,547	7,479	3,881	16,869	4,130	3,298	17,824
2007	43,887	6,127	1,236	1,926	636	2,406	3,250	21,602	2,863	2,947	16,725
2008	34,807	**13,090**	1,303	1,210	991	3,397	4,917	14,791	2,562	2,456	13,188
2009	23,829	2,616	490	2,587	602	1,952	1,846	9,566	1,255	2,478	11,096
2010	15,897	3,196	1,571	1,393	435	705	1,462	7,018	1,039	1,354	9,258
Northwestern Hawaiian Islands EEZ											
1991	4,473	1,375	481	9,472	342	3,845	1,082	2,003	134	70	10,604
1992	2,624	396	311	5,228	244	1,776	330	2,321	77	187	9,042
1993	7,760	2,019	1,413	9,565	509	2,861	754	2,279	198	398	17,507
1994	10,726	2,015	5,592	9,752	554	2,679	719	3,037	227	707	28,346
1995	9,011	3,630	5,097	8,400	1,379	5,076	1,557	5,836	902	810	19,915
1996	15,409	2,451	12,738	3,987	1,114	4,184	1,651	1,995	659	2,388	16,539
1997	**30,168**	5,139	17,118	5,148	1,519	4,109	2,250	6,321	1,789	2,877	17,921
1998	16,629	2,713	6,802	10,611	1,208	5,757	2,927	3,527	761	1,862	20,152
1999	9,672	1,581	6,261	6,182	1,053	3,515	2,400	4,316	763	1,431	15,070
2000	7,615	1,380	2,663	6,676	415	2,294	1,082	6,413	224	699	11,233
2001	8,521	1,169	3,648	373	761	2,528	882	3,923	783	1,030	5,478
2002	9,492	806	1,897	109	295	1,352	1,339	3,485	313	882	4,950
2003	8,929	2,522	2,286	259	1,035	4,703	2,597	3,559	1,596	1,372	11,871
2004	8,918	932	708	203	265	1,292	938	3,866	469	662	6,854
2005	6,709	2,030	1,041	6,030	512	2,187	1,044	5,697	620	865	11,524
2006	20,383	4,162	1,005	256	480	3,291	1,660	4,005	1,322	1,291	12,865
2007	11,390	1,973	966	2,385	161	1,212	737	3,011	476	927	7,416
2008	18,378	8,062	1,271	2,700	913	3,939	2,622	7,041	1,590	1,384	9,135
2009	11,350	1,779	1,781	2,152	262	1,262	713	1,709	490	1,034	6,008
2010	7,158	1,290	2,281	2,776	155	466	389	926	448	1,059	4,630

Table78. (Continued) Hawaii-based longline catch (number of fish) by area, 1991-2010

	Tunas			Billfishes				Other Pelagic PMUS			
Year	Bigeye tuna	Yellowfin tuna	Albacore	Swordfish	Blue marlin	Striped marlin	Other billfish	Mahimahi	Ono (wahoo)	Moonfish	Sharks
Pacific Remote Island Areas EEZ											
1991	374	439	30	25	17	60	45	84	21	0	237
1992	70	42	0	16	7	1	7	6	8	0	223
1993	4	1	0	0	0	3	1	6	3	0	7
1994	1,127	1,649	151	53	37	173	55	37	77	24	705
1995	460	583	296	21	94	121	94	252	206	5	895
1996	766	1,184	1,612	17	86	192	93	49	155	57	756
1997	2,070	1,932	4,054	33	194	255	293	591	328	206	1,503
1998	17,742	6,330	3,784	174	308	307	450	831	1,127	258	5,892
1999	4,514	**5,737**	1,575	102	315	438	619	542	1,499	179	3,463
2000	7,483	**21,788**	8,766	234	766	733	910	1,202	1,916	448	8,307
2001	5,566	**20,778**	9,529	224	1,072	1,049	684	1,708	2,151	279	5,199
2002	18,110	**12,826**	6,342	532	778	1,015	765	957	2,429	377	7,660
2003	2,106	2,392	2,202	83	443	572	490	842	1,058	117	2,606
2004	9,813	4,587	2,661	253	426	618	533	1,049	1,344	288	4,860
2005	1,428	1,714	1,089	64	143	161	163	316	569	46	962
2006	6,698	7,353	2,359	134	614	520	528	1,126	1,486	311	3,499
2007	14,509	3,257	1,432	248	426	383	567	870	1,677	137	4,452
2008	5,987	2,247	2,422	120	310	293	608	1,535	1,122	127	2,676
2009	3,985	1,922	1,073	138	291	206	438	348	552	159	3,513
2010	7,447	1,584	779	165	334	129	231	332	628	132	3,485
Outside EEZ											
1991	13,559	4,305	**7,777**	**43,194**	1,008	6,730	3,511	**19,766**	695	440	**47,047**
1992	18,228	3,595	**15,523**	**61,968**	1,506	4,434	1,963	**41,044**	1,169	719	**73,884**
1993	22,008	5,147	**22,551**	**65,601**	1,895	4,920	1,486	**14,367**	1,600	856	**124,139**
1994	9,227	3,037	**14,553**	**30,698**	742	1,946	1,130	12,283	877	733	**71,150**
1995	18,577	6,419	**22,125**	**23,758**	3,125	4,885	3,207	23,374	**2,801**	1,314	**58,154**
1996	17,597	6,236	**23,720**	**29,621**	1,929	4,250	2,624	9,591	**2,120**	1,776	**64,279**
1997	26,140	**10,992**	**30,887**	**29,568**	2,457	4,080	2,806	**30,747**	**3,640**	2,314	**49,938**
1998	**37,777**	**8,017**	**25,765**	**28,270**	**2,127**	3,427	3,885	**10,161**	**4,088**	3,479	**59,208**
1999	**36,960**	4,817	**35,752**	**29,600**	**1,851**	4,868	**7,375**	**27,862**	**5,438**	**5,628**	**51,797**
2000	**37,828**	9,933	**21,649**	**27,668**	**1,770**	**2,455**	**3,485**	**32,601**	**4,402**	**3,046**	**42,968**
2001	27,712	9,460	**27,841**	**2,545**	**2,440**	5,209	3,413	17,715	**7,117**	3,068	**20,149**
2002	**62,017**	4,278	**9,643**	**2,275**	**2,025**	3,076	**4,076**	**22,407**	**4,791**	**4,658**	**23,197**
2003	**56,292**	**12,958**	**13,783**	**1,780**	**2,439**	8,437	7,092	**25,742**	**10,991**	**6,955**	**29,193**
2004	**74,231**	**11,541**	**10,941**	**3,569**	**3,020**	6,589	**7,743**	**35,065**	**10,593**	**4,905**	**38,288**
2005	**68,365**	11,468	**6,901**	**15,796**	**2,072**	6,493	6,207	31,779	**9,505**	**8,193**	**35,944**
2006	**58,785**	**12,324**	**6,460**	**15,279**	**3,063**	**9,728**	**6,372**	**30,615**	**10,197**	**7,909**	**34,316**
2007	**89,650**	**14,923**	**7,210**	**19,714**	**2,068**	**4,206**	**5,999**	**57,398**	**7,540**	**10,360**	**47,170**
2008	**93,170**	11,131	**11,657**	**19,961**	**2,011**	**6,786**	**7,790**	**43,882**	**8,969**	**11,158**	**37,536**
2009	**79,887**	**7,097**	**6,819**	**16,965**	**3,118**	**4,545**	**6,394**	**52,079**	**6,539**	**17,691**	**40,133**
2010	**106,027**	**7,731**	**15,920**	**15,288**	**2,533**	**2,616**	**6,803**	**85,845**	**6,683**	**17,059**	**53,357**

Table78. (Continued) Hawaii-based longline catch (number of fish) by area, 1991-2010

	Tunas			Billfishes				Other Pelagic PMUS			
Year	Bigeye tuna	Yellowfin tuna	Albacore	Swordfish	Blue marlin	Striped marlin	Other billfish	Mahimahi	Ono (wahoo)	Moonfish	Sharks
Total catch											
1991	40,923	13,269	14,051	66,289	4,248	28,752	12,835	39,525	2,735	3,079	71,183
1992	43,904	7,879	19,813	74,314	4,518	16,049	5,668	56,684	2,448	3,293	94,897
1993	54,803	16,062	30,460	79,554	5,124	18,210	5,681	26,018	4,442	4,515	154,608
1994	48,102	13,516	31,129	43,345	4,677	11,292	5,117	33,017	2,513	5,090	114,656
1995	59,947	23,650	45,789	37,418	8,766	22,554	11,758	59,879	6,567	6,151	101,521
1996	63,575	17,586	57,329	38,259	6,685	15,750	7,772	23,311	4,461	7,315	100,992
1997	79,775	29,045	71,084	39,622	8,255	12,637	9,011	49,319	8,282	8,244	85,838
1998	98,871	21,738	48,833	43,776	5,341	14,347	11,516	22,183	8,281	9,184	99,937
1999	80,474	16,973	67,393	38,241	4,928	14,438	17,096	44,380	10,279	12,406	87,799
2000	74,580	38,348	39,042	37,108	4,508	7,928	8,969	57,844	7,744	6,945	79,098
2001	78,727	37,078	51,466	4,169	6,407	16,437	8,997	44,954	13,274	7,781	46,912
2002	140,796	20,375	20,589	3,668	3,971	8,892	9,941	48,223	8,878	9,290	50,635
2003	107,234	27,930	20,864	3,544	5,659	25,959	18,471	55,398	18,396	11,898	69,546
2004	142,114	25,907	17,341	5,191	4,846	15,164	14,586	66,611	15,610	8,562	75,024
2005	129,358	28,974	13,637	24,354	4,321	15,794	15,210	77,962	16,167	13,332	75,707
2006	118,665	30,570	11,422	16,585	5,704	21,018	12,441	52,615	17,135	12,809	68,504
2007	159,436	26,280	10,844	24,273	3,291	8,207	10,553	82,881	12,556	14,371	75,763
2008	152,342	34,530	16,653	23,991	4,225	14,415	15,937	67,249	14,243	15,125	62,535
2009	119,051	13,414	10,163	21,842	4,273	7,965	9,391	63,702	8,836	21,362	60,750
2010	136,529	13,801	20,551	19,622	3,457	3,916	8,885	94,121	8,798	19,604	70,730

Interpretation: The bolded numbers in Table 5 show the area with the highest catch for a particular species. Longline catches of albacore, swordfish, and sharks were highest outside of the U.S. EEZ. Bigeye tuna, blue marlin, striped marlin, moonfish, and ono (wahoo) catches were highest in the MHI EEZ in the early years but shifted to areas outside of the U.S. EEZ in more recent times. Yellowfin tuna catches were highest in the MHI EEZ during 1991-1996, switched to the PRIA EEZ in 1999-2002 and were typically highest outside of the U.S. EEZ thereafter. The highest catches for mahimahi were outside of the EEZ and the MHI EEZ.

Source and Calculations: Catches (number of fish) by area were compiled from NMFS federal longline logbook data collected from 1991 to the current year. The catch tables (based on date of haul) were summaries of fish kept and released. The bolded numbers were the areas where the catch for that species was highest for the year.

Table 79. Average weight in pounds of fish landed by the Hawaii-based longline fishery, 1987-2010

Year	Tunas				
	Bigeye tuna	Yellowfin tuna	Albacore	Skipjack tuna	Bluefin Tuna
1987	77	82	63	18	-
1988	83	103	60	19	-
1989	77	104	62	19	-
1990	81	122	61	21	638
1991	85	118	52	20	185
1992	77	99	45	17	192
1993	88	93	44	17	203
1994	81	97	41	18	190
1995	79	95	51	18	271
1996	64	80	53	17	223
1997	71	89	55	20	239
1998	74	76	55	20	177
1999	75	62	52	20	202
2000	79	67	54	17	166
2001	68	62	55	18	190
2002	71	62	56	16	151
2003	77	67	56	19	273
2004	69	62	46	16	207
2005	88	58	50	15	238
2006	84	68	51	12	-
2007	82	73	54	15	-
2008	86	57	52	17	-
2009	84	77	47	18	-
2010	88	89	47	18	-
Average	**78.3**	**81.4**	**52.8**	**17.7**	**234.1**
SD	**6.6**	**19.4**	**5.7**	**2.1**	**113.1**

Year	Billfish					
	Swordfish	Striped marlin	Blue marlin	Spearfish	Sailfish	Black marlin
1987	129	66	161	34	52	208
1988	119	57	157	31	51	151
1989	130	62	165	31	55	191
1990	152	62	199	35	55	204
1991	153	58	173	32	51	184
1992	178	66	175	34	45	155
1993	171	64	157	34	49	136
1994	163	64	171	33	55	167
1995	171	58	156	33	47	72
1996	157	58	154	31	40	-
1997	163	66	134	31	46	190
1998	176	60	165	32	43	167
1999	188	55	164	29	45	131
2000	180	62	157	35	57	150
2001	146	48	142	31	48	151
2002	146	55	150	33	59	222
2003	141	49	145	31	56	150
2004	137	53	132	30	39	185
2005	164	72	175	31	40	196
2006	167	64	158	30	50	186
2007	174	74	176	33	48	192
2008	198	67	183	33	60	249
2009	194	68	185	28	44	-
2010	191	93	195	31	56	-
Average	**160.7**	**61.2**	**162.3**	**32.0**	**49.3**	**173.2**
SD	**21.1**	**6.6**	**16.2**	**1.8**	**6.1**	**37.5**

Table 79. (Continued) Average weight in pounds of fish landed by the Hawaii-based fishery, 1987-2010

	Other PMUS					Sharks	
Year	Mahimahi	Ono (Wahoo)	Moonfish	Pomfrets	Oilfish	Mako shark	Thresher shark
1987	21	33	111	15	20	124	97
1988	20	32	108	18	22	137	122
1989	23	35	104	18	23	161	158
1990	19	36	98	18	22	162	167
1991	15	32	97	17	23	135	180
1992	11	35	98	16	22	144	176
1993	13	33	101	16	21	147	199
1994	12	34	103	17	13	153	164
1995	10	31	101	16	23	178	172
1996	17	31	105	15	-	177	156
1997	13	30	103	17	-	161	160
1998	16	32	101	15	-	177	171
1999	16	34	98	14	-	177	202
2000	14	33	100	14	18	168	166
2001	12	29	99	13	16	175	166
2002	14	33	98	13	17	182	166
2003	13	29	93	12	16	184	196
2004	16	31	92	11	16	173	169
2005	13	28	83	13	17	177	202
2006	14	30	85	13	17	176	193
2007	12	31	86	15	16	189	190
2008	12	32	89	14	15	184	205
2009	12	33	90	15	15	186	192
2010	10	32	91	14	15	198	185
Average	**14.7**	**32.0**	**97.5**	**15.0**	**18.5**	**166.4**	**172.6**
SD	**3.4**	**2.1**	**7.3**	**2.0**	**3.3**	**18.3**	**25.5**

Interpretation: Longline fishing effort can cover a large area within a trip. The data on individual fish from the market data cannot be directly linked to the exact area of capture. Therefore, the average weight by location was referenced in general terms.

The three main tuna species, bigeye tuna, yellowfin tuna, and albacore, exhibited changes throughout 1987-2010. The average weight of bigeye tuna showed small change over the 24-year period, ranging from 64 pounds to 88 pounds. Bigeye tuna average weight was more than 80 pounds for the past six years and was 88 pounds in 2010. Yellowfin tuna average weight showed the most variation ranging from 57 pounds to 122 pounds. The average weight of yellowfin tuna was more than 100 pounds in earlier years, decreased to less than 80 pounds from 1998, and increased to 89 pounds in 2010. This probably reflects a trend of increasing effort in the EEZ of Kingman Reef and Palmyra Atoll where relatively small yellowfin tuna are caught. The average weight of albacore was 60 pounds or more from 1987 through 1990 then decreased to less than 50 pounds due to longliners targeting swordfish and catching small albacore far north of the Hawaiian Islands, then increased above 50 pounds as a greater proportion of longline effort shifted back to target tunas. However, albacore mean weight has dropped below 50 pounds in 2004, 2009, and 2010.

Swordfish landed by tuna-targeted trips were smaller than from swordfish-targeted trips. Average weight for swordfish was lowest in the late 1980s when the longline fishery targeted tunas only. The average weight increased in the early 1990s with as the number of swordfish-target trips grew. Average weight peaked at 188 pounds in 1999 and was about the same in the following year. Swordfish-directed effort (shallow-set longlining) was restricted or prohibited from 2001 through the earlier part of 2004. As a result, almost all the longline effort was directed towards targeting tuna (deep-set longline) and swordfish average weight dropped below 150 pounds during that time. Swordfish average weight increased to more than 160 pounds from 2005 when the longline fishery was allowed to target swordfish once again and was above 190 pounds during the past three years.

Average weight of blue marlin varied substantially and ranged from 132 pounds in 2004 to 199 pounds in 1990. Blue marlin mean weight was above its long-term mean weight from 2007 and was 195 pounds in 2010. Average weight of striped marlin show very little variation from 1987 through 2000. Striped marlin average weight was at a record low of 48 pounds in 2001 and increased to a record high of 93 pounds in 2010.

Source and Calculations: Average weight of the longline landings was summarized from the NMFS and HDAR Market Sampling data from 1987 to 1999. The average weight was calculated from the State Commercial Marine Dealer data identified as landed by longline fishing during 2000 to 2010. Swordfish and sharks were landed headed and gutted. In December of 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 and sharks that were retained for fins only were not represented in these size summaries.

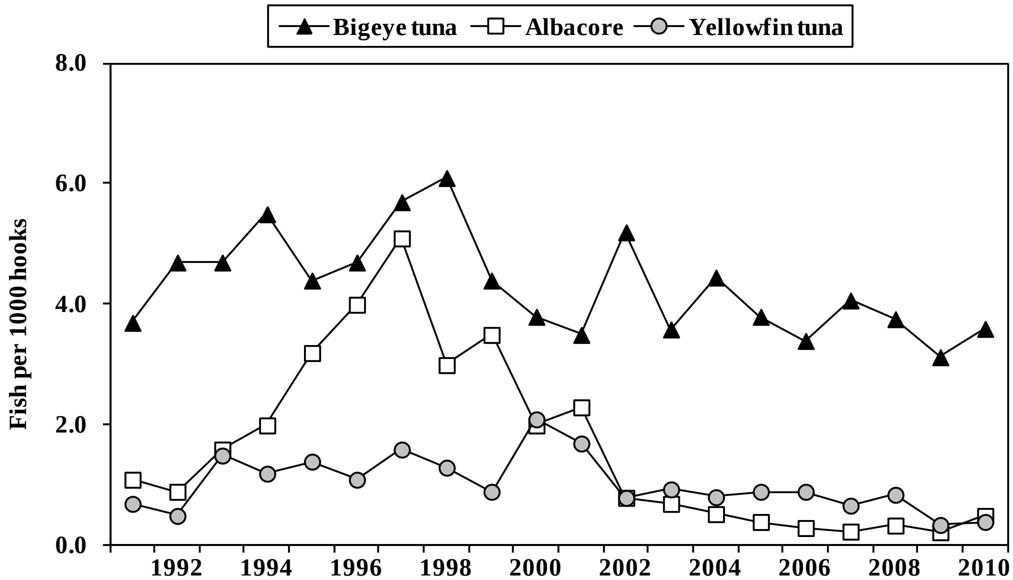
Table 80. Bycatch, retained catch, and total catch for the Hawaii-based longline fishery, 2010

Interpretation: Bycatch of the Hawaii-based longline fishery was measured in number of fish released. The total bycatch for all species combined was 16% in 2010. Tunas, which are the primary target species of the longline fleet, had a low bycatch rate (2%). The number of bigeye tuna released was highest for all tuna species although the bycatch rate was relatively low (1.6%). Swordfish had a bycatch rate of 6% in 2010. Although marlins and other miscellaneous pelagic catch are not targeted, these species are highly marketable and also have low rates of discard (0.8% and 2%, respectively). Ninety-eight percent of the sharks caught by the longline fishery were released. Blue shark and other sharks are not marketable and, therefore, a high percentage of those species were discarded. In contrast, a relatively higher proportion of shortfin mako and thresher sharks were kept since there was a market for their flesh.

Source and Calculations: Longline bycatch totals and percentages were compiled from NMFS longline logbook data. Longline catch was summarized on date of haul.

	Number released	Percent released	Kept	Caught
Tuna				
Albacore	956	4.6	19,730	20,686
Bigeye tuna	2,212	1.6	135,009	137,221
Bluefin tuna	0	0.0	4	4
Skipjack tuna	537	2.9	18,211	18,748
Yellowfin tuna	207	1.5	13,595	13,802
Other tuna	14	25.0	42	56
Billfish				
Blue marlin	33	1.0	3,427	3,460
Spearfish	49	0.6	8,396	8,445
Striped marlin	30	0.8	3,899	3,929
Other marlin	12	2.5	465	477
Swordfish	1,213	6.1	18,830	20,043
Other pelagic fish				
Mahimahi	2,382	2.5	92,514	94,896
Moonfish	218	1.1	19,522	19,740
Oilfish	883	2.6	33,293	34,176
Pomfret	258	0.7	37,532	37,790
Wahoo	40	0.5	8,768	8,808
Miscellaneous fish	2,278	61.2	1,447	3,725
Total (non-shark)	**11,322**	**2.7**	**414,684**	**426,006**
Sharks				
Blue shark	58,613	99.7	190	58,803
Mako shark	2,890	73.7	1,031	3,921
Thresher shark	6,124	96.4	226	6,350
Other sharks	1,900	96.5	68	1,968
Total sharks	**69,527**	**97.9**	**1,515**	**71,042**

Figure 113. Hawaii longline CPUE for major tunas on tuna trips, 1991-2010



Interpretation: Tuna-target trips always had the highest catch-per-unit-effort (CPUE) for bigeye tuna, which is the primary target species. Bigeye tuna CPUE was consistently higher than those for albacore or yellowfin tuna. Bigeye tuna CPUE peaked at 6.1 fish per 1000 hooks in 1998, declined to a record low of 3.1 fish per 1000 hooks in 2009, and increased slightly in 2010. Bigeye tuna CPUE was usually highest in the MHI EEZ.

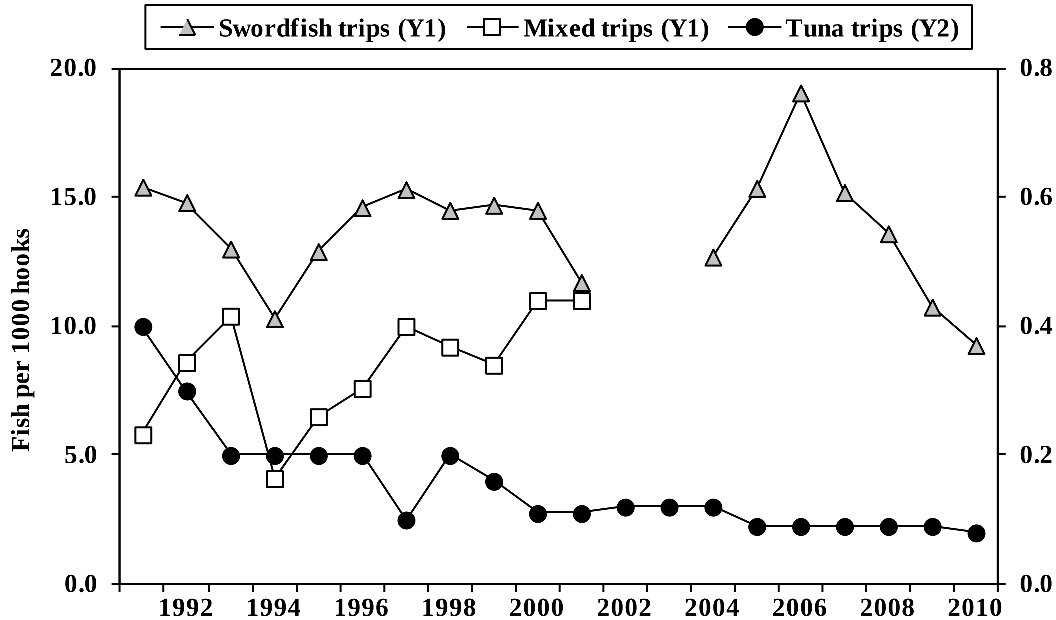
Albacore generally sells for a substantially lower price than bigeye tuna, so it is seldom targeted or is caught incidentally. Albacore CPUE rose rapidly in the early 1990s, peaked in 1997, then declined to a record low of 0.2 fish per 1000 hooks in 2007 and 2009. Albacore CPUE is usually higher outside of the U.S. EEZ.

CPUE for yellowfin tuna peaked at 2.1 fish per 1000 hooks in 2000, declined just below 1 fish per 1000 hooks two years later and remained low thereafter. Yellowfin tuna CPUE was a record lows of 0.4 fish per 1000 hooks in 2009 and 2010. High yellowfin tuna CPUEs were observed in the EEZ of Kingman Reef and Palmyra Atoll.

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. Trip target information was collected from an interview with the longline captain or, if the captain could not be contacted, NMFS staff categorized the trip based on the vessel's fishing history and gear configuration.

	Tuna trip CPUE (fish per 1000 hooks)		
Year	**Bigeye tuna**	**Albacore**	**Yellowfin tuna**
1991	3.7	1.1	0.7
1992	4.7	0.9	0.5
1993	4.7	1.6	1.5
1994	5.5	2.0	1.2
1995	4.4	3.2	1.4
1996	4.7	4.0	1.1
1997	5.7	5.1	1.6
1998	6.1	3.0	1.3
1999	4.4	3.5	0.9
2000	3.8	2.0	2.1
2001	3.5	2.3	1.7
2002	5.2	0.8	0.8
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	0.9
2009	3.1	0.2	0.4
2010	3.6	0.5	0.4
Average	**4.35**	**1.70**	**1.06**
SD	**0.83**	**1.46**	**0.44**

Figure 114. Hawaii longline swordfish CPUE by trip type, 1991-2010



Interpretation: Swordfish-targeted trips had the highest swordfish CPUE of all trip types. Swordfish CPUE on swordfish target trips declined to a low in 1994 but returned to typical swordfish catch rates the subsequent year up through 2000. Swordfish target effort was drastically reduced in 2001 and prohibited in 2002 and 2003 due to sea turtle conservation measures; it was then reopened under a new set of regulations in April 2004. A few swordfish trips were made before the end of the year and had a comparable swordfish CPUE. In 2005, the first complete year since its reopening, the swordfish fishery managed to equal a record CPUE of 15.3 fish per 1000 hooks previously attained in 1997. The swordfish fishery was closed in March 2006 due to reaching the limit of 17 loggerhead turtle interaction but attained a record CPUE of 19 and has since declined to 9.3 fish per 1000 hooks in 2010

Tuna-target trips had significantly lower swordfish CPUEs compared to the swordfish targeted trips. Swordfish CPUE was 40 to 200 times lower on tuna-target trips when compared to swordfish-target trips.

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. Trip target information was collected from an interview with the longline captain or, if the captain could not be contacted, NMFS staff categorized the trip based on the vessel's fishing history and gear configuration.

	Swordfish CPUE (fish per 1000 hooks)		
Year	**Swordfish trips**	**Mixed trips**	**Tuna trips**
1991	15.4	5.8	0.4
1992	14.8	8.6	0.3
1993	13.0	10.4	0.2
1994	10.3	4.1	0.2
1995	12.9	6.5	0.2
1996	14.6	7.6	0.2
1997	15.3	10.0	0.1
1998	14.5	9.2	0.2
1999	14.7	8.5	0.2
2000	14.5	11.0	0.1
2001	11.7	11.0	0.1
2002	-	-	0.1
2003	-	-	0.1
2004	12.7	-	0.1
2005	15.4	-	0.1
2006	19.1	-	0.1
2007	15.2	-	0.1
2008	13.6	-	0.1
2009	10.8	-	0.1
2010	9.3		0.1
Average	**14.02**	**8.43**	**0.16**
SD	**2.06**	**2.24**	**0.08**

Figure 115. Longline blue marlin CPUE by trip type, 1992-2009

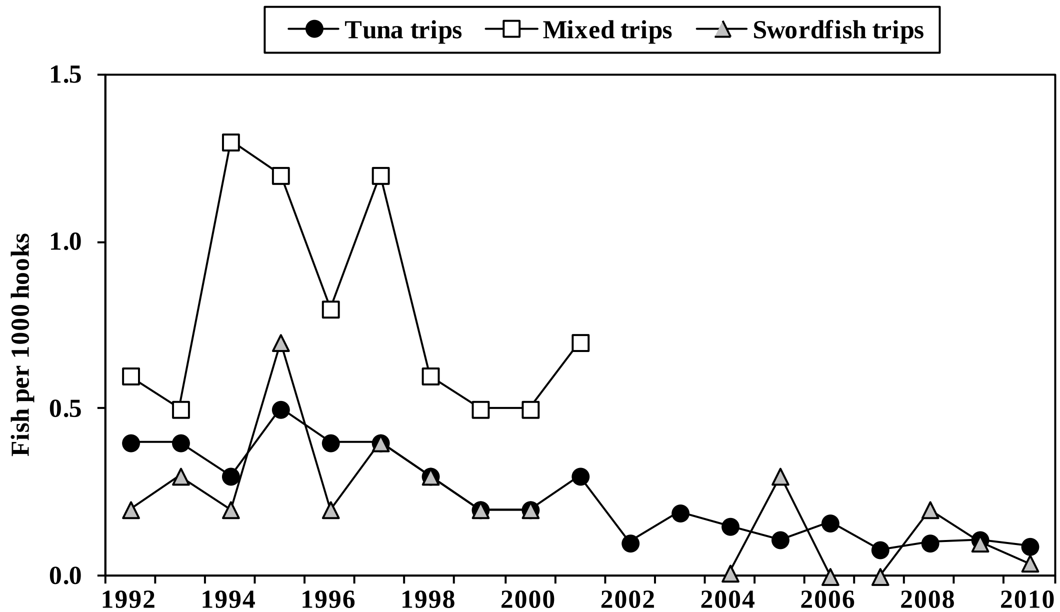
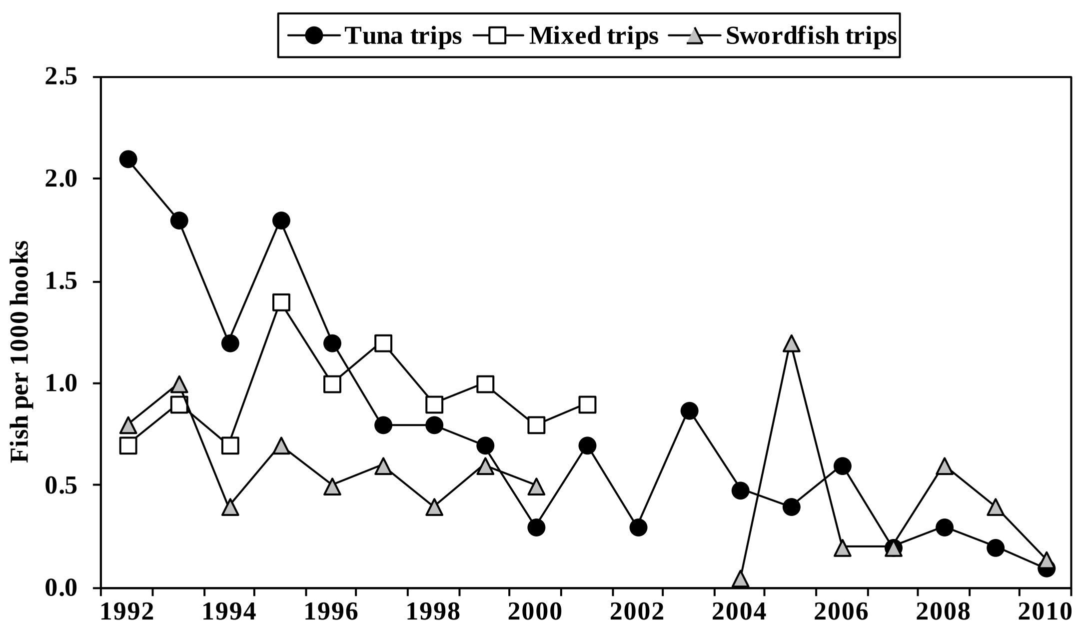


Figure 116. Longline striped marlin CPUE by trip type, 1992-2009



Interpretation: Blue marlin and striped 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 were differences in marlin CPUE among trip types. Blue marlin CPUE was higher on mixed-target trips. The highest blue marlin CPUE on mixed trips, however, tuna-target trips is the only continuous time series of all trip types. Blue marlin CPUE appeared to trend downward for tuna- and swordfish- targeted trips. Striped marlin CPUE was higher on tuna-target trips in the early to mid-1990s and converged with catch rates of swordfish and mixed trips and remained low thereafter. CPUE for striped marlin was lower in the recent years of this time series.

	Blue marlin			Striped marlin		
Year	**Tuna trips**	**Mixed trips**	**Swordfish trips**	**Tuna trips**	**Mixed trips**	**Swordfish trips**
1991	**Poor species identification precluded quantification in 1991**					
1992	0.4	0.6	0.2	2.1	0.7	0.8
1993	0.4	0.5	0.3	1.8	0.9	1.0
1994	0.3	1.3	0.2	1.2	0.7	0.4
1995	0.5	1.2	0.7	1.8	1.4	0.7
1996	0.4	0.8	0.2	1.2	1.0	0.5
1997	0.4	1.2	0.4	0.8	1.2	0.6
1998	0.3	0.6	0.3	0.8	0.9	0.4
1999	0.2	0.5	0.2	0.7	1.0	0.6
2000	0.2	0.5	0.2	0.3	0.8	0.5
2001	0.3	0.7	-	0.7	0.9	-
2002	0.1	-	-	0.3	-	-
2003	0.2	-	-	0.9	-	-
2004	0.2	-	0.0	0.5	-	0.1
2005	0.1	-	0.3	0.4	-	1.2
2006	0.2	-	0.0	0.6	-	0.2
2007	0.1	-	0.0	0.2	-	0.2
2008	0.1	-	0.2	0.3	-	0.6
2009	0.1	-	0.1	0.2	-	0.4
2010	0.1	-	0.0	0.1	-	0.1
Average	**0.24**	**0.79**	**0.22**	**0.82**	**0.95**	**0.54**
SD	**0.13**	**0.32**	**0.18**	**0.58**	**0.22**	**0.30**

Source and Calculation: Longline CPUE was compiled from NMFS longline logbook data and summarized on date of haul. CPUE was based on number of blue or striped marlin caught (kept + released) divided by the number of hooks set for each trip type. Trip target information was collected from an interview with the longline captain or, if the captain could not be contacted, NMFS staff categorized the trip based on the vessel's fishing history and gear configuration.

Figure 117. Hawaii longline mahimahi CPUE by trip type, 1991-2010

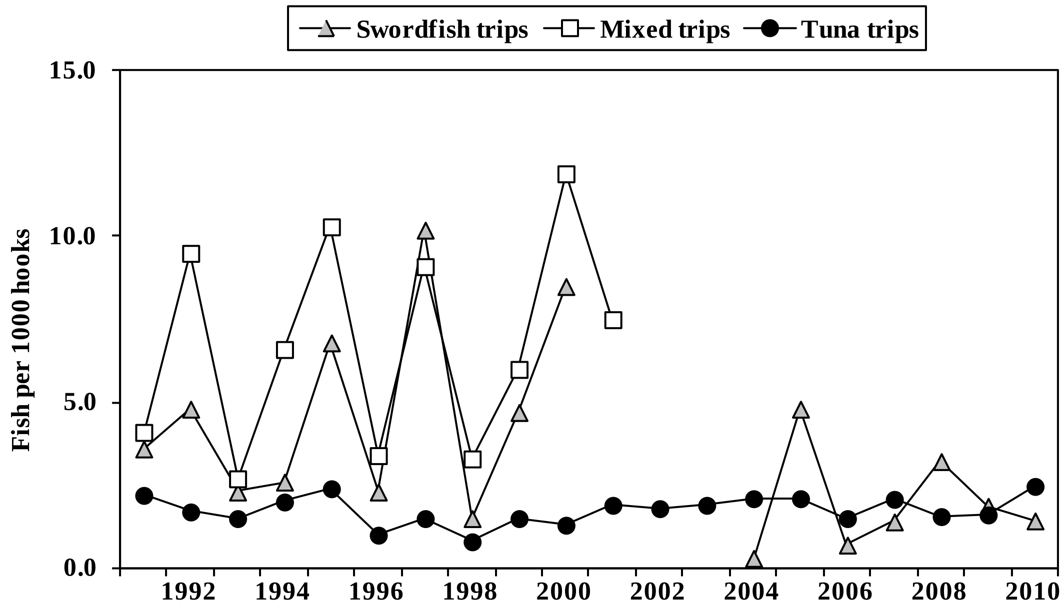
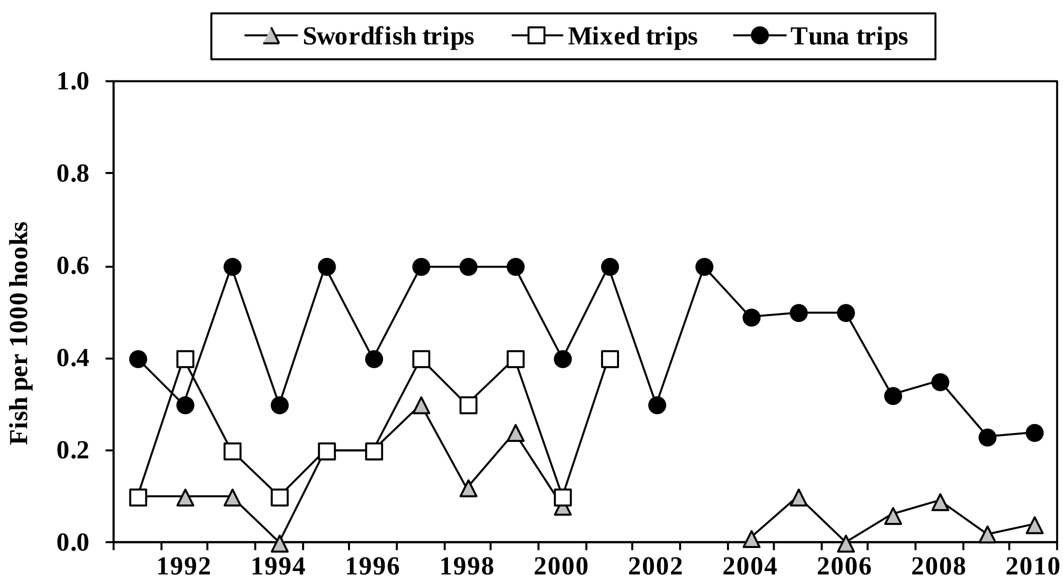


Figure 118. Hawaii longline ono (wahoo) CPUE by trip type, 1991-2010



Interpretation: Mahimahi and ono were caught incidentally by the longline fishery. There were substantial differences in mahimahi CPUE among trip types. Swordfish- and mixed-target trips showed considerably higher mahimahi CPUE with substantially more annual variation compared to tuna-targeted trips (Fig. 34a). The highest mahimahi CPUE was by mixed trips at 11.9 fish per 1000 hooks in 2000. Ono CPUE was consistently higher on tuna trips (Fig. 34b). Ono CPUE has trended down from 2003 with a record low CPUE in 2009.

	Mahimahi			Ono		
Year	Tuna trips	Mixed trips	Swordfish trips	Tuna trips	Mixed trips	Swordfish trips
1991	2.2	4.1	3.6	0.4	0.1	0.1
1992	1.7	9.5	4.8	0.3	0.4	0.1
1993	1.5	2.7	2.3	0.6	0.2	0.1
1994	2.0	6.6	2.6	0.3	0.1	0.0
1995	2.4	10.3	6.8	0.6	0.2	0.2
1996	1.0	3.4	2.3	0.4	0.2	0.2
1997	1.5	9.1	10.2	0.6	0.4	0.3
1998	0.8	3.3	1.5	0.6	0.3	0.1
1999	1.5	6.0	4.7	0.6	0.4	0.2
2000	1.3	11.9	8.5	0.4	0.1	0.1
2001	1.9	7.5	-	0.6	0.4	-
2002	1.8	-	-	0.3	-	-
2003	1.9	-	-	0.6	-	-
2004	2.1	-	0.3	0.5	-	0.0
2005	2.1	-	4.8	0.5	-	0.1
2006	1.5	-	0.7	0.5	-	0.0
2007	2.1	-	1.4	0.3	-	0.1
2008	1.6	-	3.2	0.4	-	0.1
2009	1.6	-	1.9	0.2	-	0.0
2010	2.5	-	1.4	0.2	-	0.0
Average	**1.71**	**6.76**	**3.72**	**0.46**	**0.25**	**0.11**
SD	**0.41**	**3.16**	**2.80**	**0.13**	**0.13**	**0.09**

Source and Calculation: Longline CPUE was compiled from NMFS longline logbook data and summarized on date of haul. CPUE was based on number of mahimahi or ono caught (kept + released) divided by the number of hooks set for each trip type. Trip target information was collected from an interview with the longline captain or, if the captain could not be contacted, NMFS staff categorized the trip based on the vessel's fishing history and gear configuration.

Figure 119. Hawaii longline moonfish CPUE by trip type, 1991-2010

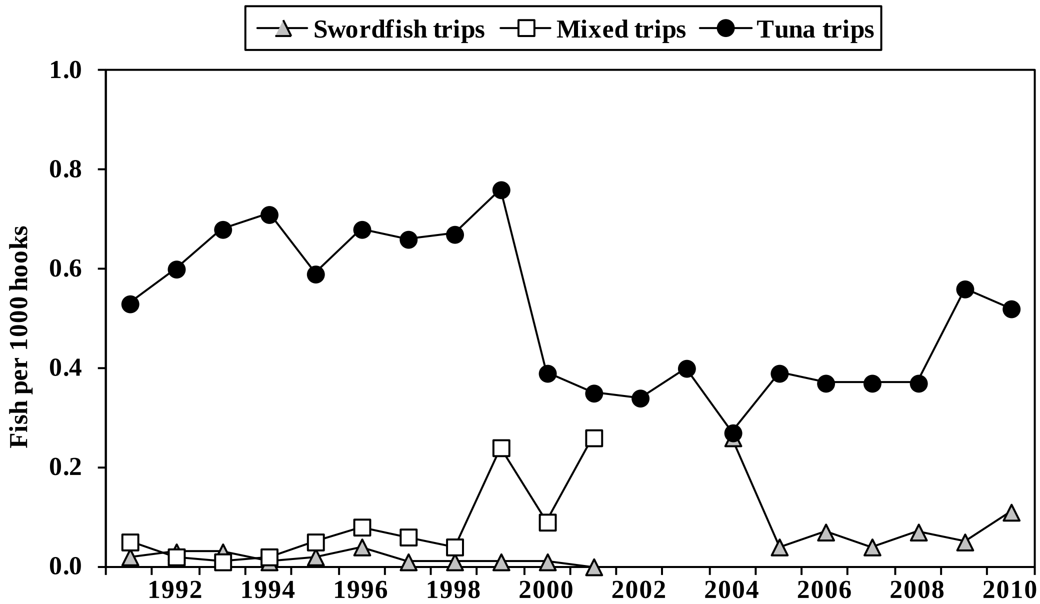
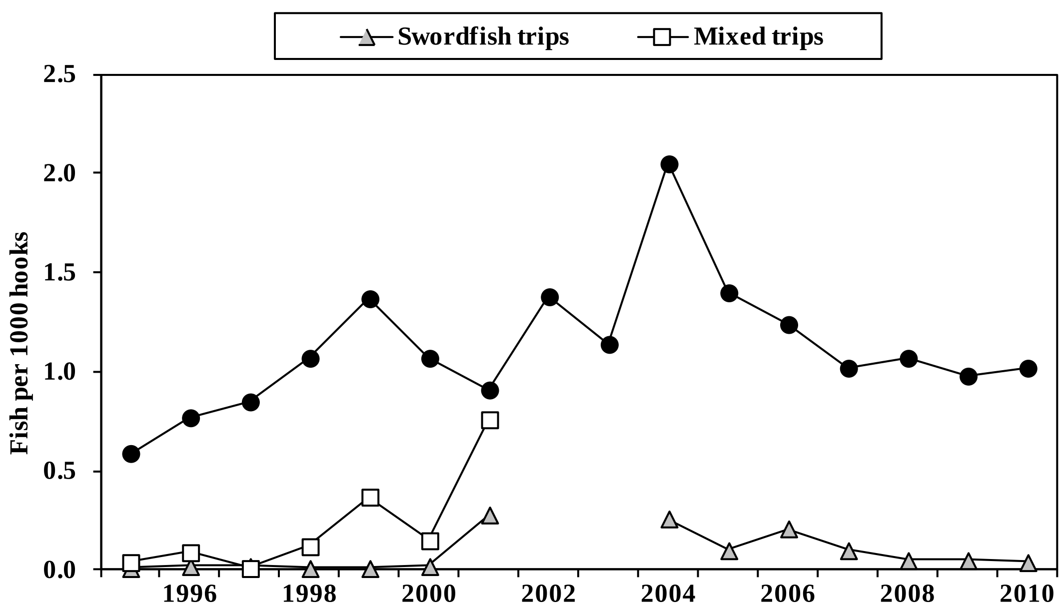


Figure 120. Hawaii longline pomfret CPUE by trip type, 1994-2010.

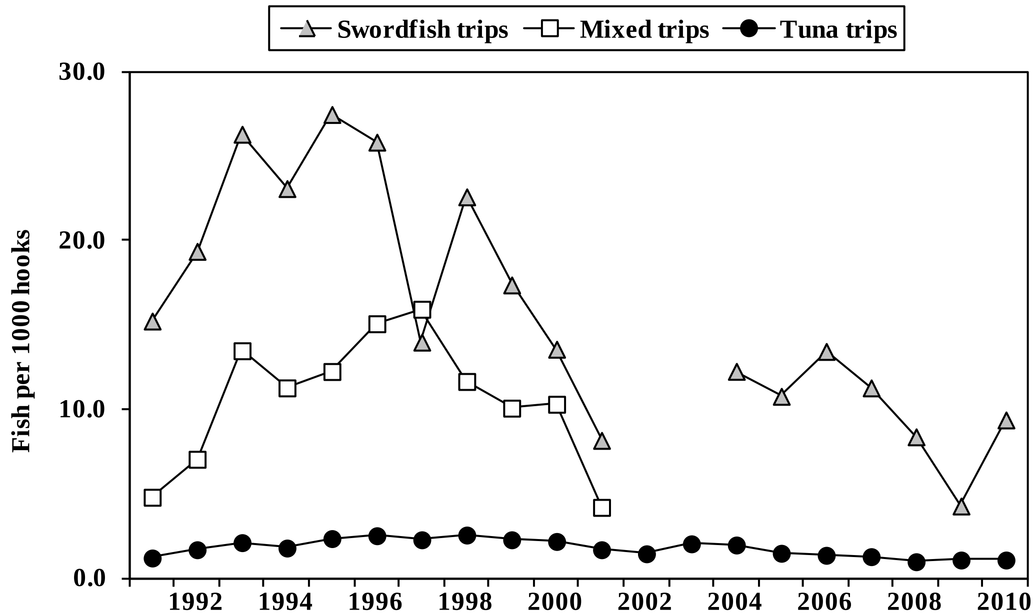


Interpretation: Moonfish and pomfrets were caught incidentally by the longline fishery. There were substantial differences in moonfish and pomfret CPUEs among the different trip types. CPUEs for both moonfish and pomfret were higher on tuna-target trips. Moonfish CPUE during 2000-2008 appear to be about half compared to the period 1993-1999. Moonfish CPUE increased slightly in 2009 and 2010. Pomfret CPUE on tuna trips showed a increasing trend peaking in 2004. The CPUE declined the following year and has remained relatively constant through 2010.

	Moonfish			Pomfret		
Year	Tuna trips	Mixed trips	Swordfish trips	Tuna trips	Mixed trips	Swordfish trips
1991	0.5	0.1	0.0	-	-	-
1992	0.6	0.0	0.0	-	-	-
1993	0.7	0.0	0.0	-	-	-
1994	0.7	0.0	0.0	-	-	-
1995	0.6	0.1	0.0	0.6	0.0	0.0
1996	0.7	0.1	0.0	0.8	0.1	0.0
1997	0.7	0.1	0.0	0.9	0.0	0.0
1998	0.7	0.0	0.0	1.1	0.1	0.0
1999	0.8	0.2	0.0	1.4	0.4	0.0
2000	0.4	0.1	0.0	1.1	0.2	0.0
2001	0.4	0.3	0.0	0.9	0.8	0.3
2002	0.3	-	-	1.4	-	-
2003	0.4	-	-	1.1	-	-
2004	0.3	-	0.3	2.1	-	0.3
2005	0.4	-	0.0	1.4	-	0.1
2006	0.4	-	0.1	1.2	-	0.2
2007	0.4	-	0.0	1.0	-	0.1
2008	0.4	-	0.1	1.1	-	0.1
2009	0.6	-	0.1	1.0	-	0.1
2010	0.5	-	0.1	1.0	-	0.0
Average	**0.51**	**0.08**	**0.04**	**1.13**	**0.22**	**0.09**
SD	**0.16**	**0.09**	**0.06**	**0.34**	**0.27**	**0.10**

Source and Calculation: Longline CPUE was compiled from NMFS longline logbook data and summarized on date of haul. CPUE was based on number of moonfish or pomfrets caught (kept + released) divided by the number of hooks set for each trip type. Trip target information was collected from an interview with the longline captain or, if the captain could not be contacted, NMFS staff categorized the trip based on the vessel's fishing history and gear configuration.

Figure 121. Hawaii longline blue shark CPUE by trip type, 1991-2010

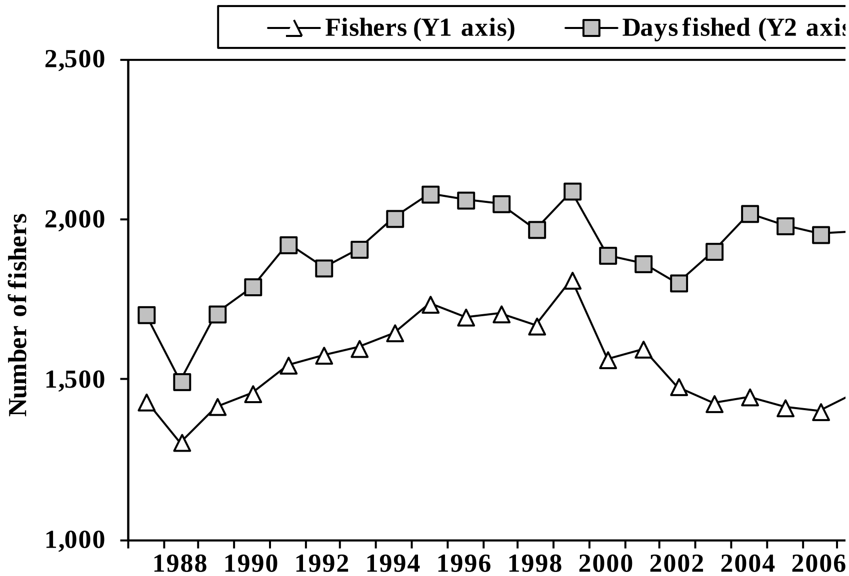


Interpretation: Blue sharks are caught incidentally by the longline fishery. The blue shark CPUE on swordfish-targeted trips is about 8-fold higher compared to CPUE on tuna-targeted trips. Blue shark CPUE on swordfish targeted trips peaked at 27.5 fish per 1000 hooks in 1995 and declined to 8.2 fish per 1000 hooks in 2001. The swordfish fishery was closed in 2002 then reopened in 2004 under new restrictions to reduce sea turtle bycatch, e.g., use of circle hooks, night setting, mackerel-like bait may. These restrictions may have contributed to lower blue shark CPUE in recent years. Blue shark CPUE was stable during 2004 through 2007 then declined to a record low 4.3 fish per 1000 hooks in 2009 and increased to 9.4 fish per 1000 hooks in 2010.

Source and Calculation: The longline blue shark CPUE was compiled from federal daily longline logbooks and summarized based on date of haul. CPUE was based on number of blue sharks caught (kept + released) divided by the number of hooks set. Trip target information was collected from an interview with the longline captain or, if the captain could not be contacted, NMFS staff categorized the trip based on the vessels' fishing history and gear configuration.

	Blue shark CPUE (fish per 1000 hooks)		
Year	**Swordfish trips**	**Mixed trips**	**Tuna trips**
1991	15.3	4.8	1.2
1992	19.4	7.1	1.7
1993	26.3	13.5	2.1
1994	23.1	11.3	1.8
1995	27.5	12.3	2.4
1996	25.9	15.1	2.5
1997	14.0	16.0	2.3
1998	22.6	11.7	2.6
1999	17.4	10.1	2.3
2000	13.6	10.3	2.2
2001	8.2	4.2	1.7
2002	-	-	1.5
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	4.3	-	1.1
2010	9.4	-	1.1
Average	**16.11**	**10.58**	**1.79**
SD	**6.98**	**3.86**	**0.51**

Figure 122. Number of Main Hawaiian Islands troll fishers and number of days fished, 1987-2010.



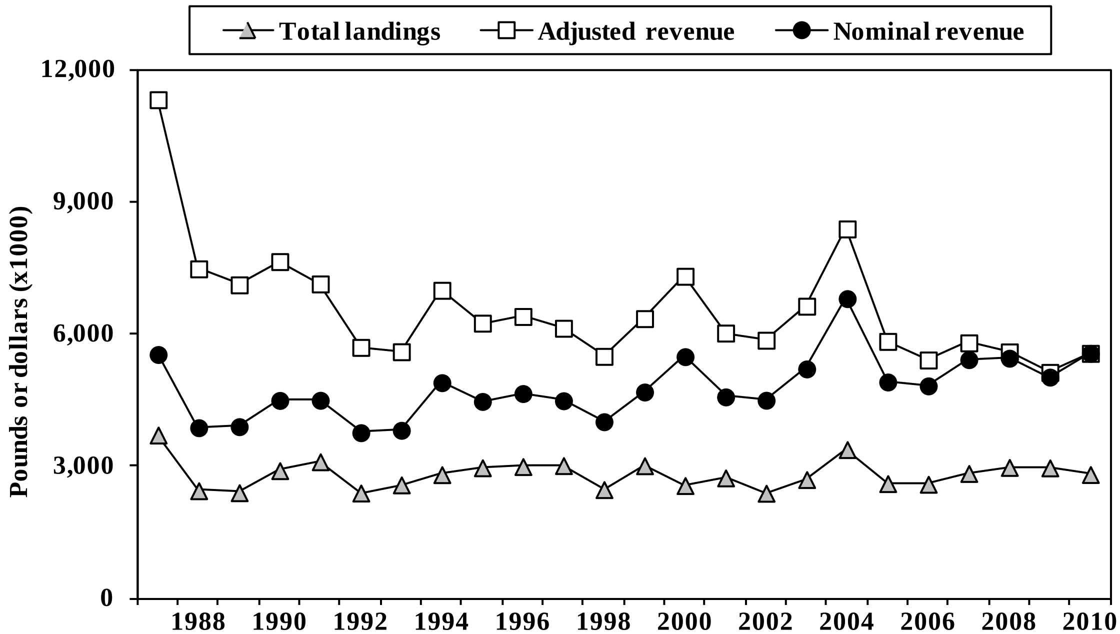
Interpretation: The Main Hawaiian Islands (MHI) troll fishers rose from 1988, peaked in 1999, decreased the following year and remained relatively unchanged up to 2008 with participation close to the long-term average in 2010. The pattern for number of days fished by the MHI troll fishery was similar to that of the number of fishers except during 2002 through 2007 where days fished was proportionally high compared to the number of fishers participating in this fishery.

Year	Fishers	Days fished
1987	1,432	24,092
1988	1,306	19,912
1989	1,418	24,132
1990	1,458	25,830
1991	1,547	28,452
1992	1,578	27,003
1993	1,599	28,170
1994	1,648	30,093
1995	1,737	31,611
1996	1,697	31,238
1997	1,707	31,015
1998	1,669	29,406
1999	1,812	31,801
2000	1,564	27,796
2001	1,597	27,271
2002	1,480	26,070
2003	1,427	28,041
2004	1,448	30,404
2005	1,414	29,637
2006	1,402	29,088
2007	1,460	29,272
2008	1,544	29,980
2009	1,668	28,604
2010	1,560	28,686
Average	**1,548.3**	**28,213.8**
SD	**129.9**	**2,810.7**

Source and Calculations: The State of Hawaii, Division of Aquatic Resources (HDAR) issued Commercial Marine Licenses (CMLs) based on the State Fiscal Year (FY); July 1st of one year through June 30th of the following year. A different CML number was issued every FY to each fisher up until 1993. Up to 1993, the number of fishers was counted as number of unique names of fishermen submitting Commercial Fishing Reports rather than unique CMLs to avoid double counting fishers within a calendar year. Beginning in FY 1994, the State began reissuing the same CML number to individual commercial fishers that reapplied for a CML. From this time the number of MHI troll fishers was counted based on number of unique 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 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.

Figure 123. Main Hawaiian Islands troll landings and revenue, 1987-2010.

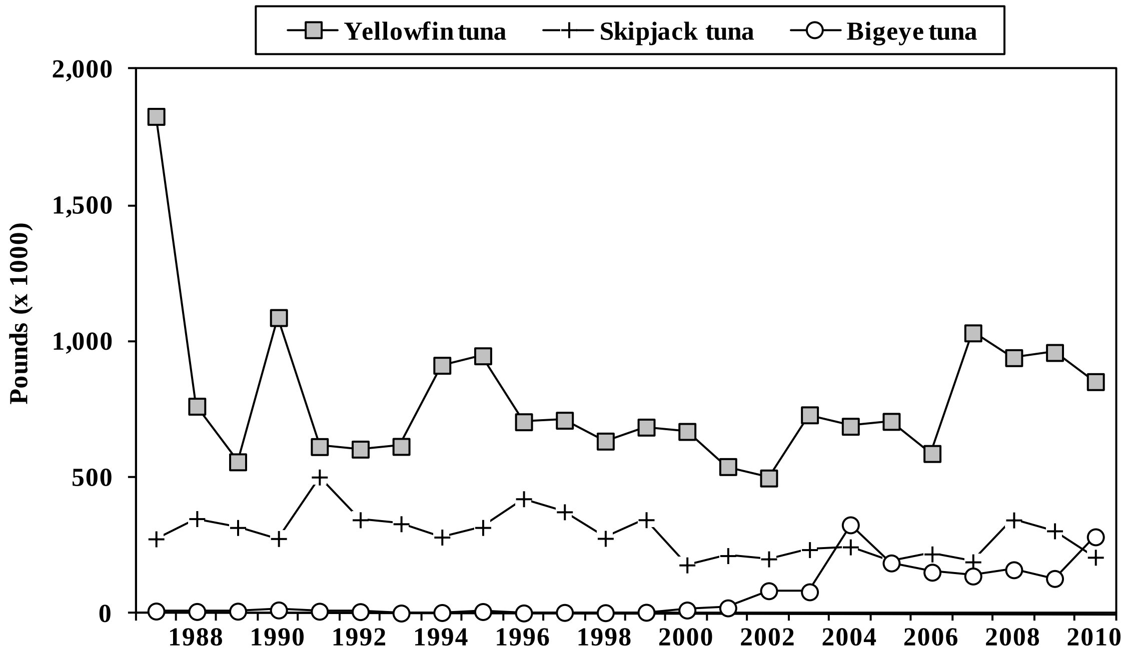


Interpretation: The total landings by the MHI troll fishery in 2010 was 2.8 million pounds worth an estimated $5.5 million. Total landings were close to its long-term average but adjusted revenue was 16% below its long-term average. Landings ranged from 2.4 million pounds to 3.7 million pounds from 1987-2010. Adjusted revenue varied substantially from $5.1 million in 2010 to $11.3 million in 1987.

Source and Calculations: Total landings and nominal revenue for the MHI troll fishery were derived from HDAR Commercial Fishing and Marine Dealer Report data. The total landings and nominal revenue values were obtained by adding the landings and revenue values for all species 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 (2010) Honolulu CPI.

Year	Total landings (1000 lbs)	Adjusted revenue ($1000)	Nominal revenue ($1000)	Honolulu CPI
1987	3,709	$11,318	$5,536	114.9
1988	2,445	$7,479	$3,875	121.7
1989	2,401	$7,116	$3,899	128.7
1990	2,901	$7,644	$4,494	138.1
1991	3,102	$7,137	$4,497	148.0
1992	2,394	$5,698	$3,762	155.1
1993	2,578	$5,599	$3,816	160.1
1994	2,810	$6,993	$4,897	164.5
1995	2,966	$6,248	$4,471	168.1
1996	2,994	$6,399	$4,650	170.7
1997	3,016	$6,131	$4,487	171.9
1998	2,471	$5,494	$4,011	171.5
1999	3,013	$6,350	$4,685	173.3
2000	2,563	$7,311	$5,487	176.3
2001	2,737	$6,023	$4,574	178.4
2002	2,388	$5,860	$4,498	180.3
2003	2,699	$6,632	$5,209	184.5
2004	3,379	$8,385	$6,804	190.6
2005	2,607	$5,833	$4,912	197.8
2006	2,592	$5,411	$4,824	209.4
2007	2,837	$5,800	$5,420	219.5
2008	2,974	$5,595	$5,452	228.9
2009	2,964	$5,130	$5,023	230.0
2010	2,813	$5,562	$5,562	234.9
Average	**2,806.1**	**$6,590.7**	**$4,751.4**	
SD	**330.7**	**$1,326.3**	**$704.8**	

Figure 124. Main Hawaiian Islands troll tuna landings, 1987-2010.

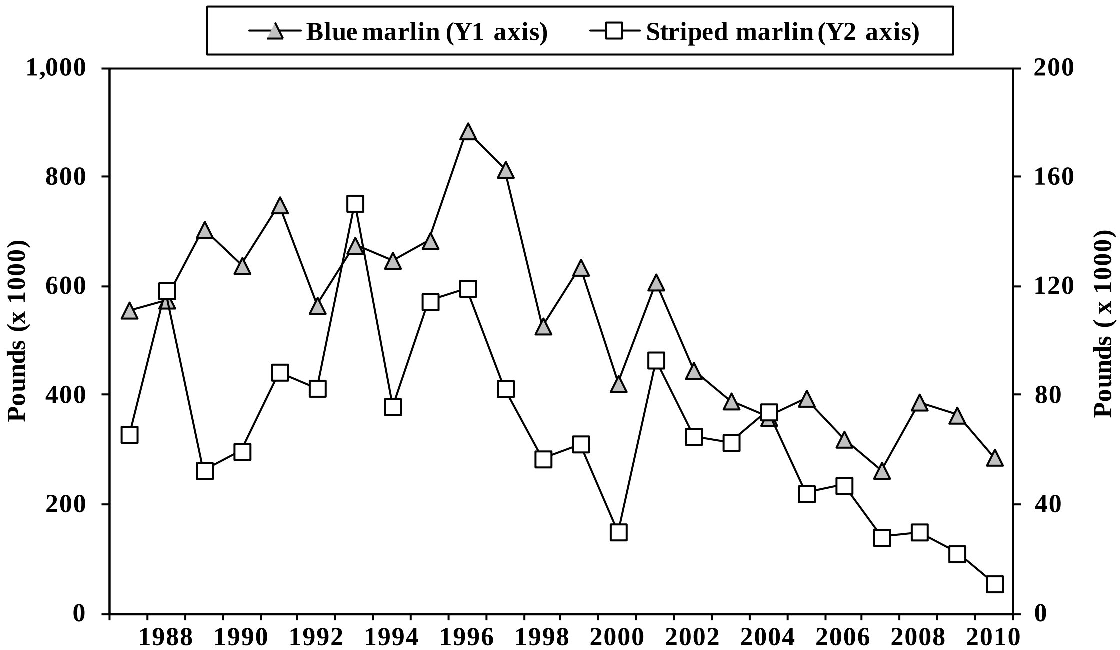


Interpretation: The MHI troll tuna landings were composed predominantly of yellowfin tuna. Yellowfin tuna landings dropped in 1987, remained relatively stable until 2006, and have been above the long-term average the last four years of the time series. Skipjack tuna was the second largest component of the MHI troll landings. Skipjack tuna landings were relatively stable. Small quantities of bigeye tuna, albacore, and other tunas were also landed by this fishery.

Source and Calculations: The tuna landings statistics for the MHI troll fishery were derived from HDAR Commercial Fishing and Marine Dealer Report data. The MHI troll fishery tuna landings was calculated by totaling tuna caught by species and includes kawakawa and unclassified tunas in the other tunas category.

	MHI troll tuna landings (1000 pounds)					
Year	Yellowfin tuna	Skipjack tuna	Bigeye tuna	Albacore	Other tunas	Total tunas
1987	1,828	277	11	1	19	2,136
1988	764	351	10	1	16	1,141
1989	559	318	11	1	14	904
1990	1,089	278	15	1	18	1,401
1991	615	504	11	2	13	1,145
1992	606	347	9	3	15	980
1993	616	332	4	3	9	964
1994	914	283	6	22	15	1,240
1995	949	318	10	10	9	1,295
1996	707	424	4	5	6	1,146
1997	712	376	6	7	6	1,107
1998	636	278	5	4	10	933
1999	687	347	7	87	7	1,135
2000	671	181	15	5	6	878
2001	542	215	23	13	5	799
2002	500	203	86	9	6	804
2003	732	237	82	10	27	1,088
2004	690	247	328	7	45	1,316
2005	708	191	188	14	15	1,117
2006	590	221	154	2	12	979
2007	1,033	192	140	7	11	1,384
2008	942	346	163	3	8	1,463
2009	961	306	131	7	16	1,421
2010	854	209	284	4	27	1,377
Average	**784.8**	**294.4**	**61.7**	**9.7**	**13.4**	**1,164.2**
SD	**280.8**	**80.3**	**84.8**	**17.6**	**8.7**	**289.1**

Figure 125. Main Hawaiian Islands troll billfish landings, 1987-2010.

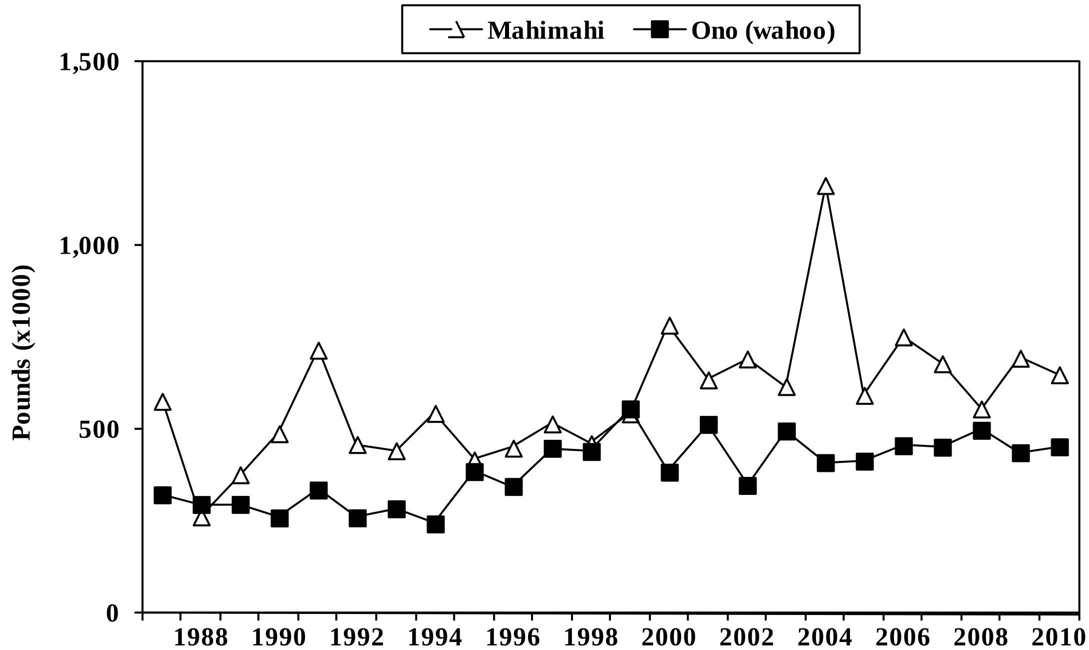


Interpretation: Billfish landings by the MHI troll fishery in 2010 were 324,000 pounds, 51% below the long-term average. Landings of billfish by the MHI troll fishery consisted primarily of blue marlin. Blue marlin landings peaked at 885,000 pounds in 1996 and decreased thereafter. Striped marlin landings in this fishery were at a record low 11,000 pounds in 2010. Both blue marlin and striped marlin were on a decreasing trend from the mid-1990s. The MHI troll fishery also had small landings of other billfish, e.g., spearfish, sailfish, swordfish, and black marlin.

Source and Calculations: The billfish landings statistics for the MHI troll fishery were derived from HDAR Commercial Fishing and Marine Dealer Report data. Billfish landings by the MHI troll fishery was calculated by totaling billfish landings by species and include black marlin, sailfish, spearfish and unclassified billfish in the other billfish category.

	MHI troll billfish landings (1000 pounds)				
Year	Blue marlin	Striped marlin	Other billfish	Swordfish	Total billfishes
1987	557	66	42	1	666
1988	575	118	41	2	736
1989	704	52	47	2	805
1990	638	59	33	1	732
1991	749	89	52	1	890
1992	565	83	35	0	683
1993	675	150	44	0	870
1994	648	76	46	1	770
1995	684	114	57	1	856
1996	885	119	37	1	1,042
1997	814	83	36	1	935
1998	527	57	41	1	626
1999	635	62	71	1	769
2000	422	30	49	5	506
2001	608	93	75	4	780
2002	446	65	22	3	535
2003	390	63	37	1	491
2004	360	74	46	0	481
2005	395	44	35	1	475
2006	320	47	29	1	397
2007	263	28	23	2	316
2008	388	30	29	1	449
2009	364	22	18	1	405
2010	287	11	26	1	324
Average	**548.4**	**70.6**	**41.0**	**1.4**	**661.6**
SD	**167.6**	**32.8**	**13.9**	**1.2**	**197.8**

Figure 126. Main Hawaiian Islands troll landings of other pelagic PMUS, 1987-2010.

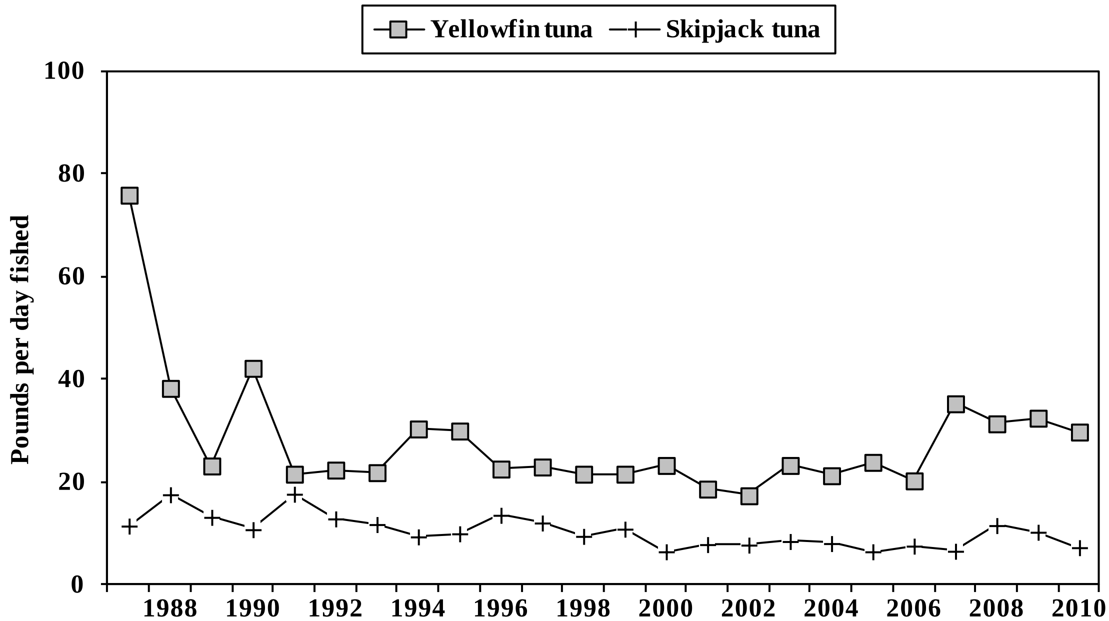


Interpretation: Landings of "other pelagic" species by the MHI troll fishery in 2010 was 1.1 million pounds, 13% above the long-term average. Mahimahi and ono comprised majority of these landings. Both mahimahi and ono landings in 2010 were above their long term average by 11% and 17%, respectively and both species were on slightly increasing trends.

Source and Calculations: The other pelagic catch statistics for the MHI troll fishery were derived from HDAR Commercial Fishing and Dealer data. Other pelagic landings by the MHI troll fishery were calculated by totaling other pelagic landings by species. The total other pelagic column is the sum of the two dominant pelagic species plus miscellaneous pelagic species, which include barracuda, flying fish, and frigate mackerel.

	MHI troll other pelagic landings (1000 pounds)			
Year	Mahimahi	Ono (wahoo)	Misc pelagics	Total other pelagics
1987	579	324	3	907
1988	264	298	6	569
1989	379	298	14	691
1990	491	262	16	768
1991	718	337	12	1,067
1992	461	262	8	731
1993	444	286	13	744
1994	546	245	9	800
1995	419	388	8	815
1996	451	347	7	806
1997	517	451	5	974
1998	464	442	6	912
1999	545	558	6	1,109
2000	786	386	7	1,179
2001	637	516	6	1,159
2002	694	350	4	1,048
2003	619	498	3	1,120
2004	1,166	412	3	1,581
2005	595	416	4	1,015
2006	754	458	3	1,215
2007	681	454	3	1,138
2008	558	500	4	1,062
2009	696	439	4	1,139
2010	651	455	6	1,111
Average	**585.4**	**388.2**	**6.7**	**980.3**
SD	**180.8**	**90.1**	**3.8**	**224.6**

Figure 127. Main Hawaiian Islands troll tuna landings in pounds per day fished, 1987-2010.



Interpretation: MHI troll yellowfin tuna CPUE was consistently higher than skipjack tuna CPUE. Yellowfin tuna peaked at 76 pounds per day in 1987, dropped to 23 pounds per day in 1989 and remained close to that level from 1991 through 2006. Yellowfin tuna CPUE was higher than the long-term average for the past four years with CPUE at 30 pounds per day in 2010. Skipjack tuna CPUE was 7 pounds per day in 2010.

Source and Calculations: These numbers are the landings of yellowfin tuna and skipjack tuna by the MHI troll fishery during each year divided by the number of MHI troll days fished (Figure 37) during that year. For the smaller table the landings are divided by the number of MHI troll hours fished. The landings values used here are the actual pounds landed from the (HDAR) commercial fish landings data. They are not replaced by pounds sold from the HDAR fish dealer data when the pounds sold is greater than the pounds landed in 2000 and later.

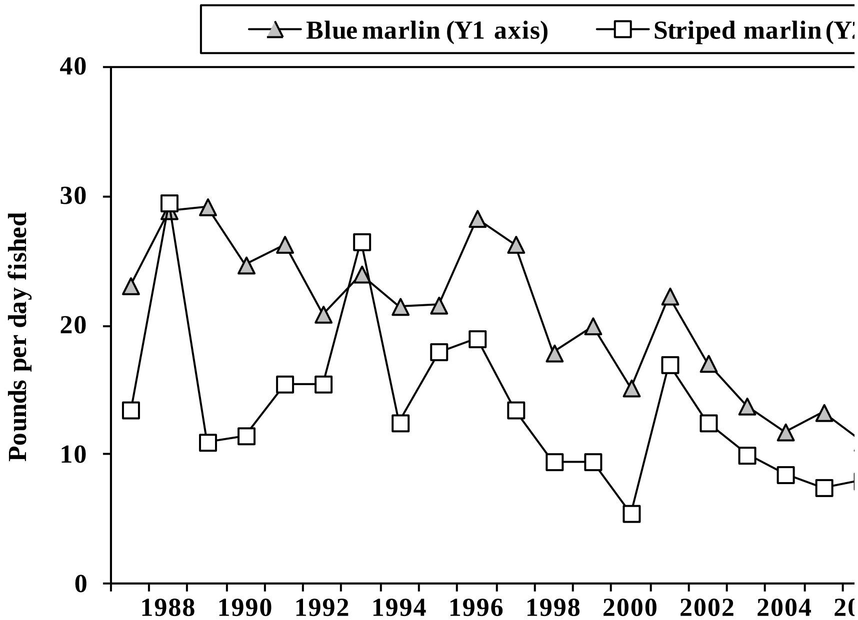
MHI troll tuna CPUE (pounds per hours fished)

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
Average	**4.54**	**1.43**
SD	**1.02**	**0.33**

MHI troll tuna CPUE (pounds per day fished)

Year	Yellowfin tuna	Skipjack tuna
1987	75.9	11.5
1988	38.3	17.6
1989	23.2	13.2
1990	42.2	10.8
1991	21.6	17.7
1992	22.4	12.9
1993	21.9	11.8
1994	30.4	9.4
1995	30.0	10.0
1996	22.6	13.6
1997	23.0	12.1
1998	21.6	9.5
1999	21.6	10.9
2000	23.3	6.5
2001	18.7	7.9
2002	17.4	7.8
2003	23.3	8.5
2004	21.3	8.1
2005	23.9	6.5
2006	20.3	7.6
2007	35.3	6.6
2008	31.4	11.6
2009	32.5	10.3
2010	29.8	7.3
Average	**27.92**	**10.54**
SD	**12.30**	**3.12**

Figure 128. Main Hawaiian Island troll marlin landings per day fished, 1987-2010.



Interpretation: CPUE for blue marlin (Y1 axis) was substantially higher compared to the CPUE for striped marlin (Y2 axis). CPUEs for both blue marlin and striped marlin in 2010 was below their long-term averages by 49% and 84%, respectively. Blue marlin and striped marlin CPUEs were both at or below their long-term average for the past nine years. The CPUEs for both blue marlin and striped marlin appear to be on a downward trend.

Source and Calculations: The MHI troll CPUE (pounds per day fished) were calculated from the HDAR Fishing Report data. MHI troll blue marlin and striped marlin landings from the Fishing Report data was divided by the MHI troll the number of days fished in Figure 37. For the smaller table the landings are divided by the number of MHI Troll Hours Fished. The number of days fished includes days that fishers did not catch anything or days that fish were caught but not sold.

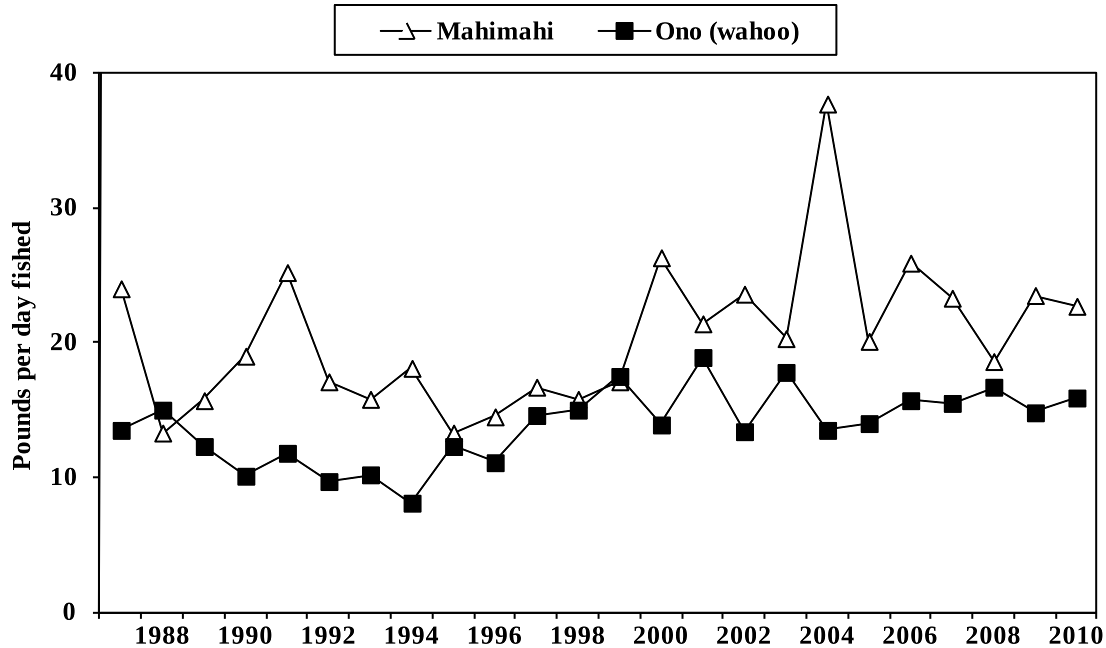
MHI troll marlin CPUE (pounds per hours fished)

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		
Average	2.04	0.23
SD	0.28	0.08

MHI troll marlin CPUE (pounds per day fished)

Year	Blue marlin	Striped marlin
1987	23.1	2.7
1988	28.9	5.9
1989	29.2	2.2
1990	24.7	2.3
1991	26.3	3.1
1992	20.9	3.1
1993	24.0	5.3
1994	21.5	2.5
1995	21.6	3.6
1996	28.3	3.8
1997	26.3	2.7
1998	17.9	1.9
1999	20.0	1.9
2000	15.2	1.1
2001	22.3	3.4
2002	17.1	2.5
2003	13.8	2.0
2004	11.8	1.7
2005	13.3	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
Average	19.63	2.50
SD	6.27	1.31

Figure 129. Main Hawaiian Island troll mahimahi and wahoo (ono) landings per day/hour fished, 1987-2010.



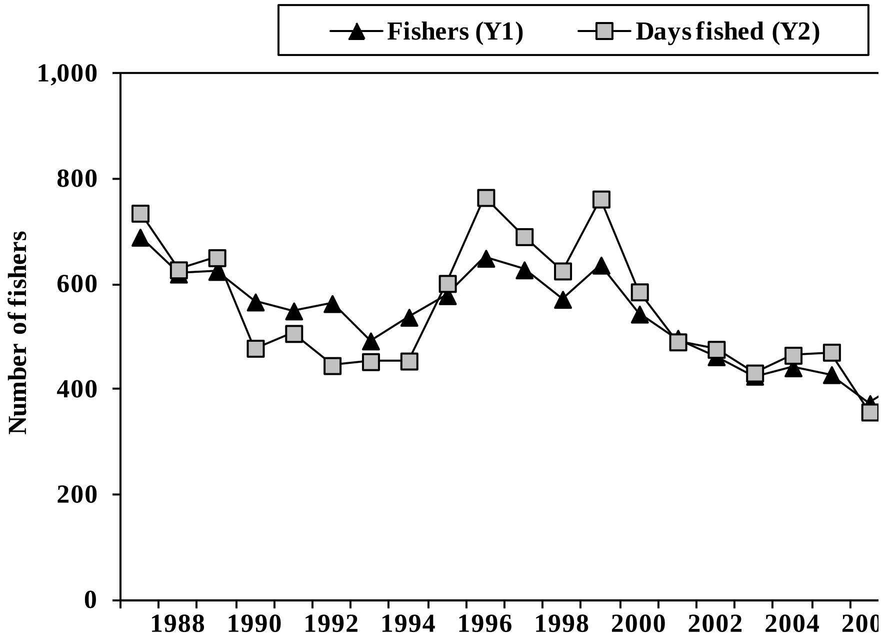
Interpretation: Mahimahi CPUE for the MHI troll fishery was slightly higher and more variable than that for wahoo (ono). The CPUEs for both mahimahi and ono in 2009 were both above their long-term average by 12% and 16%, respectively. CPUEs for both species have been on a gradual upward trend since the mid-1990s.

Source and Calculations: The MHI troll CPUE (pounds per day fished) were calculated from the HDAR Fishing Report data. MHI troll mahimahi and ono landings from the Fishing Report data was divided by the MHI troll the number of days fished in Figure 37. For the smaller table the landings are divided by the number of MHI Troll Hours Fished. The number of days fished includes days that fishers did not catch anything or days that fish were caught but not sold.

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
Average	4.08	2.61
SD	1.06	0.26

MHI troll mahimahi and ono CPUE (pounds per day fished)		
Year	Mahimahi	Ono (wahoo)
1987	24.0	13.5
1988	13.3	15.0
1989	15.7	12.3
1990	19.0	10.1
1991	25.2	11.8
1992	17.1	9.7
1993	15.8	10.2
1994	18.1	8.1
1995	13.3	12.3
1996	14.5	11.1
1997	16.7	14.6
1998	15.8	15.0
1999	17.1	17.5
2000	26.3	13.9
2001	21.4	18.9
2002	23.6	13.4
2003	20.3	17.8
2004	37.7	13.5
2005	20.1	14.0
2006	25.9	15.7
2007	23.3	15.5
2008	18.6	16.7
2009	23.5	14.8
2010	22.7	15.9
Average	20.27	13.71
SD	5.54	2.76

Figure 130. Number of Main Hawaiian Islands handline fishers and number of days fished, 1987-2010.



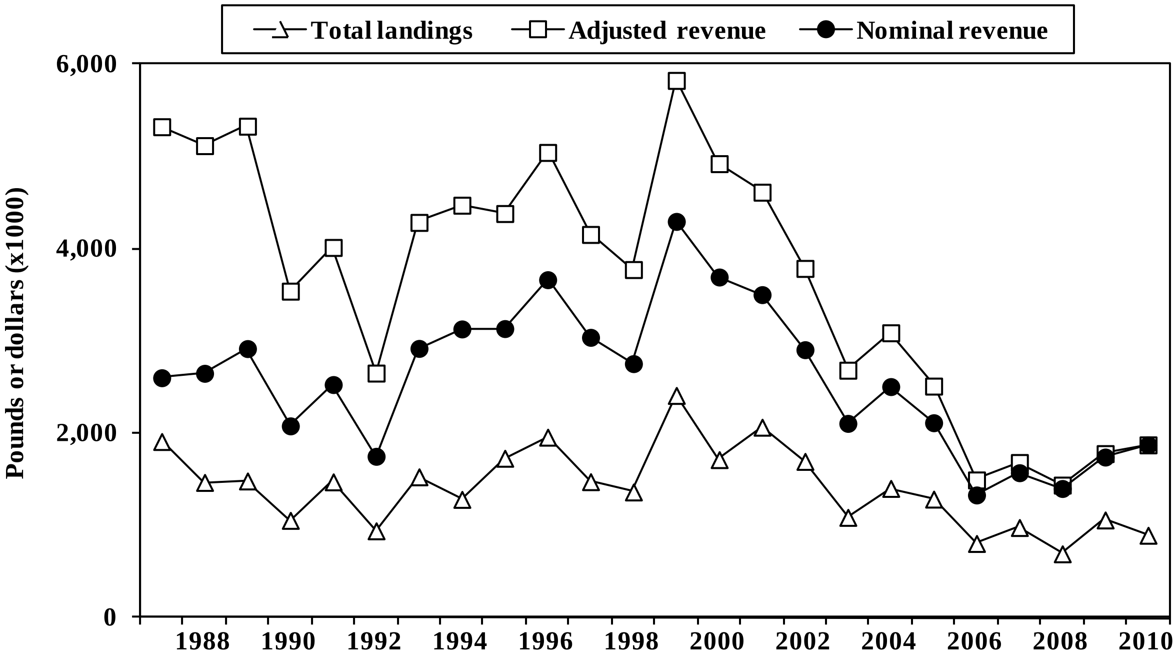
Interpretation: There were 459 MHI handline fishers that fished 3,987 days in 2010. Both the number of fishers and number of days fished were well below their respective long-term averages. The MHI handline effort peaked in the mid 1990s and shown a declining trend although the effort in 2010 is the first decline in the past four years.

Source and Calculations: The State of Hawaii, Division of Aquatic Resources (HDAR) issued Commercial Marine Licenses (CMLs) based on the State Fiscal Year (FY); July 1st of one year through June 30th of the following year. A different CML number was issued every FY to each fisher up until 1993. Up to 1993, the number of fishers was counted as number of unique names of fishermen submitting Commercial Fishing Reports rather than unique CMLs to avoid double counting fishers within a calendar year. Beginning in FY 1994, the State began reissuing the same CML number to individual commercial fishers that reapplied for a CML. From this time the number of MHI handline fishers was counted based on number of unique 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 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
1987	690	7,356
1988	620	6,280
1989	625	6,511
1990	567	4,791
1991	550	5,072
1992	564	4,462
1993	493	4,537
1994	538	4,548
1995	579	6,022
1996	650	7,655
1997	628	6,911
1998	572	6,259
1999	637	7,625
2000	544	5,862
2001	498	4,912
2002	463	4,770
2003	426	4,320
2004	442	4,658
2005	429	4,716
2006	374	3,580
2007	419	3,586
2008	467	4,024
2009	545	5,060
2010	459	3,987
Average	535.7	5,370.3
SD	85.6	1,238.3

Figure 131. Main Hawaiian Island handline landings and revenue, 1987-2010.

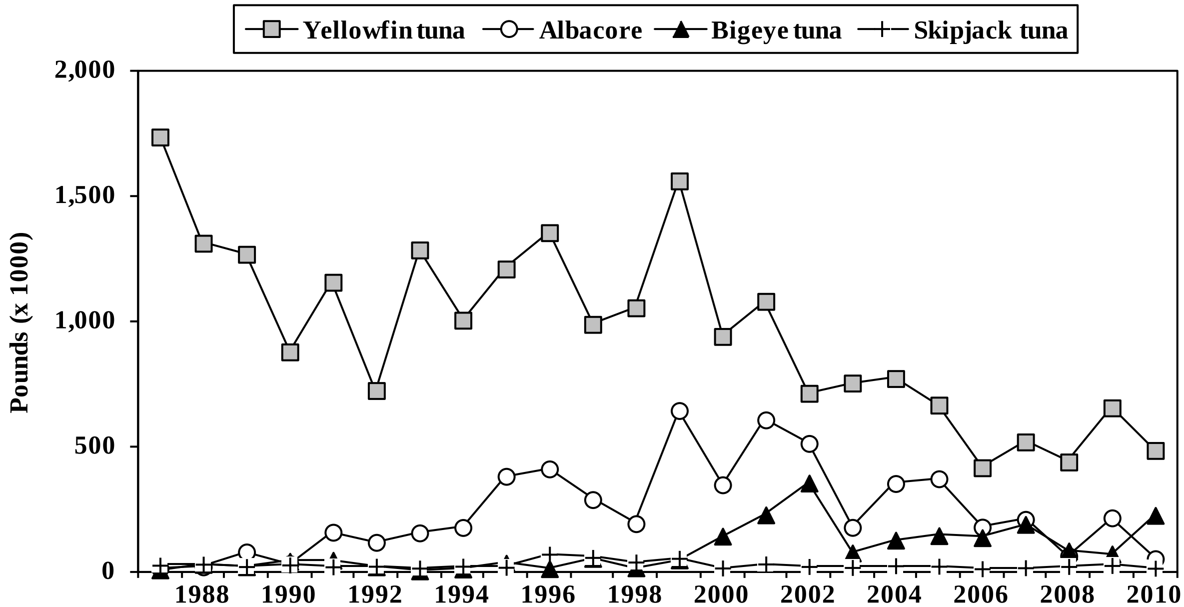


Interpretation: Total landings by the MHI handline fishery in 2010 were 898,000 pounds, worth an estimated $1.9 million. Total landings and revenue by this fishery was below the long-term values by 63% and 50%, respectively. The recent pattern for MHI handline fishery landings and revenue was similar to the trip activity, which consisted of a decreasing trend from its peak in 1999.

Source and Calculations: Total landings and nominal revenue for the MHI handline fishery were derived from HDAR Commercial Fishing and Marine Dealer Report data. The total landings and nominal revenue values were obtained by adding the landings and revenue values for all species 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 (2010) Honolulu CPI.

Year	Total landings (1000 lbs)	Adjusted revenue ($1000)	Nominal revenue ($1000)	Honolulu CPI
1987	1,914	$5,328	$2,606	114.9
1988	1,471	$5,123	$2,654	121.7
1989	1,487	$5,333	$2,922	128.7
1990	1,060	$3,545	$2,084	138.1
1991	1,477	$4,019	$2,532	148.0
1992	946	$2,656	$1,754	155.1
1993	1,532	$4,290	$2,924	160.1
1994	1,287	$4,477	$3,135	164.5
1995	1,733	$4,386	$3,139	168.1
1996	1,962	$5,049	$3,669	170.7
1997	1,479	$4,160	$3,044	171.9
1998	1,368	$3,779	$2,759	171.5
1999	2,414	$5,830	$4,301	173.3
2000	1,718	$4,927	$3,698	176.3
2001	2,070	$4,618	$3,507	178.4
2002	1,699	$3,791	$2,910	180.3
2003	1,092	$2,688	$2,111	184.5
2004	1,406	$3,093	$2,510	190.6
2005	1,290	$2,515	$2,118	197.8
2006	809	$1,498	$1,335	209.4
2007	982	$1,687	$1,576	219.5
2008	697	$1,442	$1,405	228.9
2009	1,064	$1,783	$1,746	230.0
2010	898	$1,878	$1,878	234.9
Average	**1,432.9**	**3,739.8**	**2,627.8**	
SD	**423.7**	**1,337.3**	**781.2**	

Figure 132. Main Hawaiian Island handline tuna landings, 1987-2010.

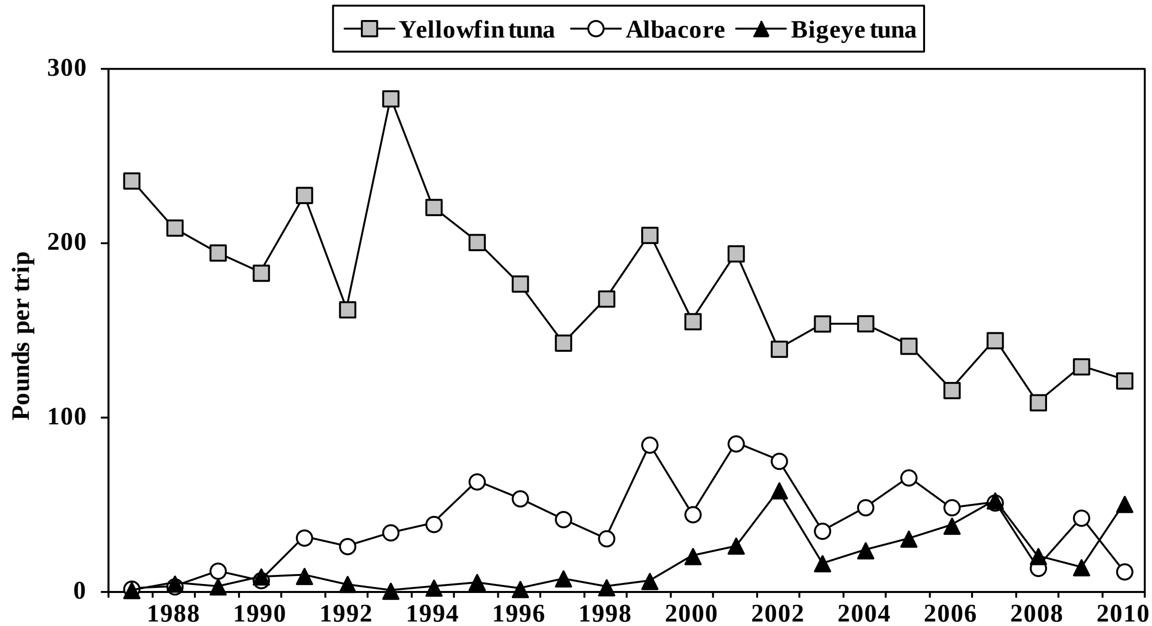


Interpretation: MHI handline tuna landings in 2010 were 768,000 pounds, 59% below the long-term average. The largest component of tuna landings by the MHI handline fishery was yellowfin tuna, followed by albacore tuna and bigeye tuna. Yellowfin tuna albacore tuna landings by MHI handline fishery were on a downward trend, whereas, bigeye tuna rose from 1998, peaked in 2002 and varied thereafter.

Source and Calculations: The tuna landing statistics for the MHI handline fishery were derived from HDAR Commercial Fishing and Dealer Report data. The MHI handline fishery tuna landings were calculated by totaling tuna landings by species and includes kawakawa and unclassified tunas in the other tunas category.

	MHI handline tuna landings (1000 lbs)					
Year	Yellowfin tuna	Albacore	Bigeye tuna	Skipjack tuna	Other tunas	Total
1987	1,734	12	6	25	5	1,782
1988	1,310	18	28	29	9	1,395
1989	1,266	78	19	20	11	1,393
1990	876	31	41	26	7	981
1991	1,154	157	45	19	6	1,380
1992	722	116	19	21	7	885
1993	1,283	154	2	14	5	1,458
1994	1,003	176	10	21	3	1,213
1995	1,207	380	33	17	6	1,642
1996	1,352	409	11	69	4	1,845
1997	986	287	52	56	3	1,384
1998	1,052	191	15	38	3	1,298
1999	1,559	642	46	52	2	2,302
2000	938	346	141	14	3	1,441
2001	1,078	605	226	30	4	1,942
2002	711	511	353	20	3	1,599
2003	752	176	74	16	4	1,023
2004	770	351	125	23	17	1,286
2005	664	370	143	21	5	1,204
2006	414	177	135	11	2	739
2007	517	208	188	15	2	930
2008	437	62	82	20	3	603
2009	653	214	70	24	6	966
2010	483	51	224	13	15	786
Average	**975.6**	**238.4**	**87.0**	**25.5**	**5.6**	**1,334.4**
SD	**350.6**	**179.8**	**89.1**	**14.5**	**3.9**	**405.5**

Figure 133. Main Hawaiian Island handline tuna landings per day/hour fished, 1987-2010.



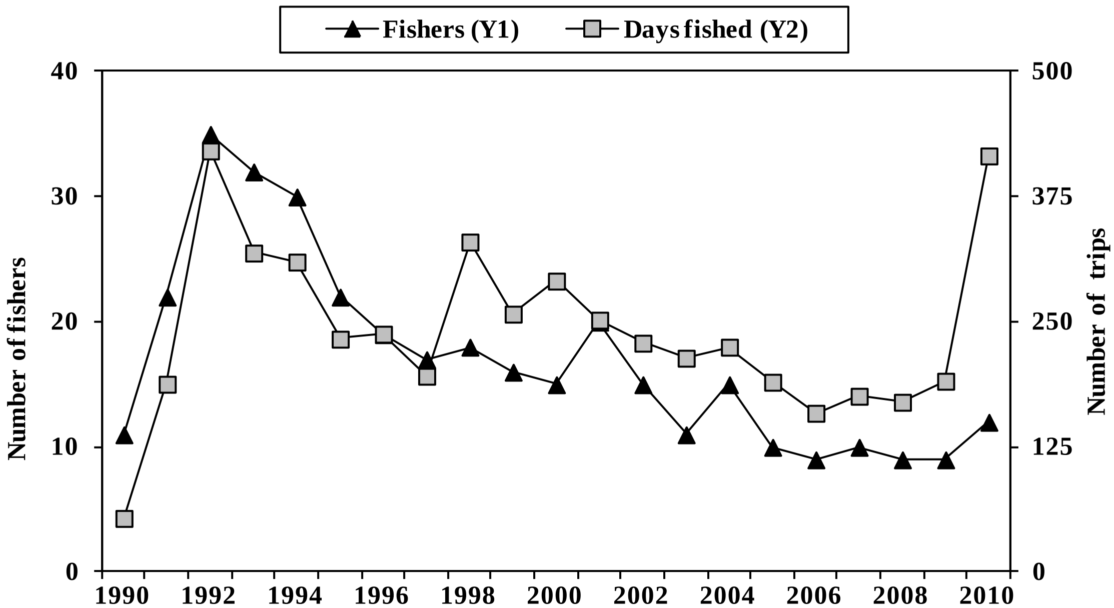
Interpretation: MHI handline CPUE (pounds per day fished) was 21% below the long-term average in 2010. Yellowfin tuna CPUE, the dominant component of the handline landings, was on a downward trend. Albacore CPUE varied substantially in the past four years. Bigeye tuna CPUE increased in 2010 and approached peak CPUEs observed 2002 and 2007.

Source and Calculations: The MHI handline CPUE (pounds per day fished) were calculated from the HDAR Fishing Report data. MHI handline yellowfin and skipjack tuna landings from the Fishing Report data was divided by the MHI handline number of days fished in Figure 45. The small table is the MHI handline yellowfin and skipjack tuna landings from the Fishing Report data divided by the MHI handline hours fished. The number of days fished includes days that fishers did not catch anything or days that fish were caught but not sold. The total CPUE was greater than the sum of the three dominant tuna species because it includes skipjack tuna, kawakawa, and other tunas.

Year	MHI handline landings (pounds per hour fished) Yellowfin tuna	Albacore	Bigeye tuna	Total
2003	21.5	4.9	2.3	29.3
2004	21.5	6.8	3.3	32.8
2005	20.2	9.4	4.4	34.8
2006	17.3	7.2	5.6	30.6
2007	22.5	8.0	8.2	39.4
2008	17.0	2.1	3.2	23.2
2009	19.6	6.4	2.1	28.9
2010	18.2	1.7	7.5	28.1
Average	**19.94**	**5.81**	**4.58**	**30.89**
SD	**2.13**	**2.74**	**2.32**	**4.85**

Year	MHI handline landings per trip (pounds) Yellowfin tuna	Albacore	Bigeye tuna	Total
1987	235.7	1.6	0.8	242.3
1988	208.7	2.9	4.5	222.1
1989	194.4	11.9	2.9	214.0
1990	182.8	6.5	8.6	204.8
1991	227.4	30.9	8.9	272.1
1992	161.8	26.0	4.3	198.3
1993	282.8	33.9	0.4	321.4
1994	220.5	38.7	2.2	266.7
1995	200.4	63.1	5.4	272.7
1996	176.6	53.4	1.4	241.0
1997	142.7	41.5	7.5	200.3
1998	168.0	30.5	2.4	207.4
1999	204.5	84.2	6.0	301.9
2000	155.0	44.3	20.3	222.4
2001	193.9	84.9	26.3	312.0
2002	139.2	74.9	58.0	276.9
2003	153.7	34.8	16.2	209.5
2004	153.8	48.3	23.6	234.3
2005	140.9	65.4	30.3	242.0
2006	115.5	48.3	37.7	205.2
2007	144.1	51.0	52.2	252.4
2008	108.5	13.5	20.3	148.0
2009	129.1	42.3	13.9	191.0
2010	121.0	11.5	50.2	186.9
Average	**175.65**	**40.56**	**15.40**	**237.33**
SD	**42.43**	**24.05**	**16.29**	**42.52**

Figure 134. Number of offshore handline fishers and days fished, 1990-2010.



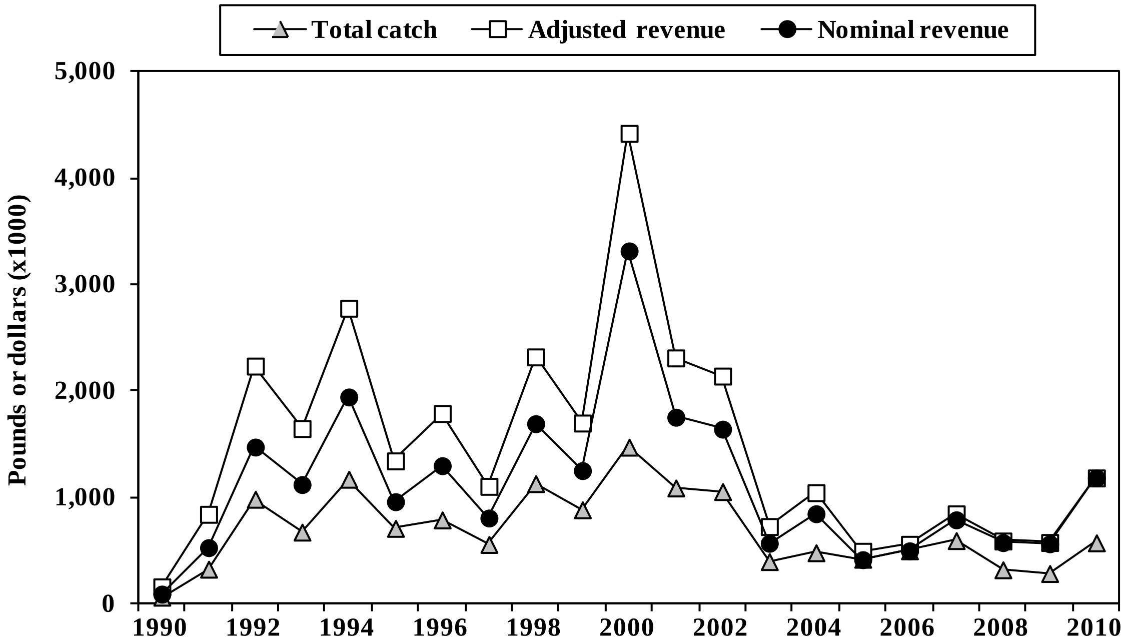
Interpretation: The offshore tuna handline fishery had 12 fishers that fished 416 days in 2010, 33% more fishers and more than double the number of days fished than the previous year, respectively. Both number of fishers and days fished peaked in 1992 and declined into the late 1990s.

Source and Calculations: The State of Hawaii, Division of Aquatic Resources (HDAR) issued Commercial Marine Licenses (CMLs) based on the State Fiscal Year (FY); July 1st of one year through June 30th of the following year. A different CML number was issued every FY to each fisher up until 1993. Up to 1993, the number of fishers was counted as number of unique names of fishermen submitting Commercial Fish Reports rather than unique CMLs to avoid double counting fishers within a calendar year. Beginning in FY 1994, the State began reissuing the same CML number to individual commercial fishers that reapplied for a CML. From this time the number of offshore handline fishers was counted based on number of unique CMLs submitting Fishing 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 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
1990	11	54
1991	22	188
1992	35	421
1993	32	319
1994	30	310
1995	22	233
1996	19	238
1997	17	196
1998	18	330
1999	16	258
2000	15	291
2001	20	252
2002	15	229
2003	11	214
2004	15	225
2005	10	190
2006	9	159
2007	10	176
2008	9	170
2009	9	191
2010	12	416
Average	17.3	232.2
SD	7.8	77.7

Figure 135. Offshore handline landings and revenue, 1990-2010.

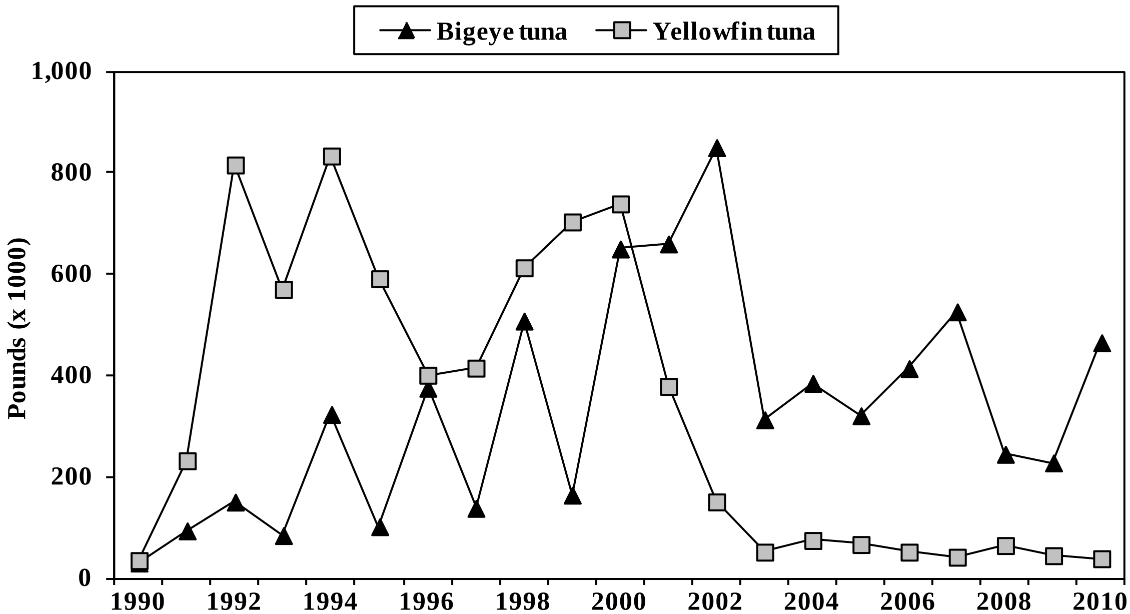


Interpretation: Total landings and revenue by the offshore handline fishery was 578,000 pounds worth an estimated $1.2 million in 2010. Total landings and revenue by this fishery almost doubled from the previous year but were still below the long-term values. The recent trend for landings and revenue by the offshore handline fishery was one that showed a steep decline from 2000 to 2003 and remained low through 2010.

Source and Calculations: Total landings and nominal revenue for the offshore handline fishery were derived from HDAR Commercial Fishing and Marine Dealer Report data. The total landings and nominal revenue values were obtained by adding the landings and revenue values for all species 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 (2010) Honolulu CPI.

Year	Total landings (1000 lbs)	Adjusted revenue ($1000)	Nominal revenue ($1000)	Honolulu CPI
1990	68	$165	$97	138.1
1991	331	$846	$533	148.0
1992	987	$2,237	$1,477	155.1
1993	679	$1,651	$1,125	160.1
1994	1,175	$2,780	$1,947	164.5
1995	714	$1,347	$964	168.1
1996	793	$1,792	$1,302	170.7
1997	563	$1,108	$811	171.9
1998	1,134	$2,323	$1,696	171.5
1999	888	$1,702	$1,256	173.3
2000	1,476	$4,421	$3,318	176.3
2001	1,093	$2,313	$1,757	178.4
2002	1,059	$2,143	$1,645	180.3
2003	402	$731	$574	184.5
2004	485	$1,049	$851	190.6
2005	424	$499	$420	197.8
2006	503	$564	$503	209.4
2007	599	$850	$794	219.5
2008	325	$595	$580	228.9
2009	290	$581	$569	230.0
2010	578	$1,187	$1,187	234.9
Average	**720.9**	**$1,532.4**	**$1,139.5**	
SD	**363.1**	**$1,024.6**	**$739.8**	

Figure 136. Offshore handline landings, 1990-2010.



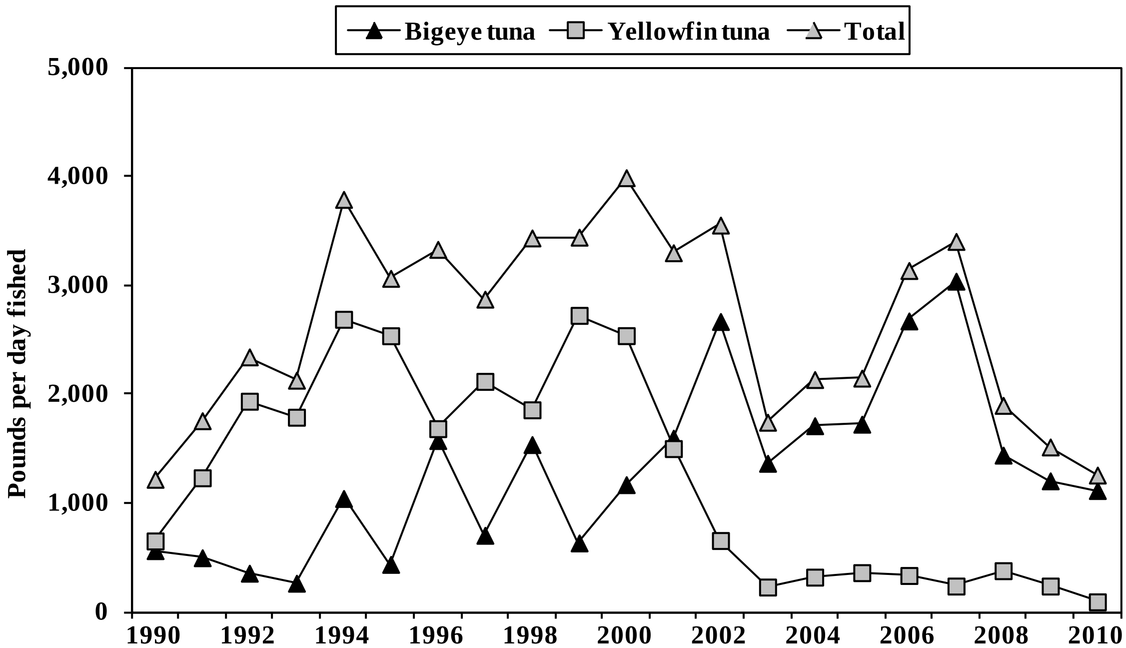
Interpretation: Bigeye tuna was the largest component of the offshore handline landings (89%) followed by yellowfin tuna (7%), and small landings of mahimahi. Yellowfin tuna was the largest component of the landings until 2001 when it was replaced by bigeye tuna. This may reflect better species identification by fishermen (small bigeye tuna and yellowfin tuna can be very difficult to distinguish). In general, bigeye tuna landings had wide inter-annual fluctuation in the 1990s, a steep decline in 2003, and somewhat stable landings thereafter.

Most of the tunas landed by the offshore handline fishery are smaller in size than the MHI handline fishery. The yellowfin tuna landings reported in the HDAR commercial fish landings data may actually be bigeye tuna. Therefore, the total tuna landings by the offshore handline fishery may be more accurate than the landings for individual species. HDAR is making an effort to help educate fishermen and fish dealers to correctly ID small tunas.

Source and Calculations: The landings statistics for the offshore tuna handline fishery were derived from HDAR Commercial Fishing and Marine Dealer Report data. The offshore tuna handline fishery landings were calculated by totaling landings by species.

	Offshore handline landings (1000 pounds)			
Year	Bigeye tuna	Yellowfin tuna	Mahimahi	Total
1990	31	35	0	68
1991	94	232	5	331
1992	151	816	21	987
1993	85	571	23	679
1994	324	834	18	1,175
1995	102	591	20	714
1996	375	401	17	793
1997	138	415	9	563
1998	508	613	13	1,134
1999	164	703	20	888
2000	650	739	54	1,476
2001	660	379	35	1,093
2002	850	151	26	1,059
2003	316	53	14	402
2004	385	75	14	485
2005	345	67	8	424
2006	432	52	8	503
2007	535	42	6	599
2008	245	65	9	325
2009	230	46	7	290
2010	518	39	11	578
Average	**331.0**	**344.0**	**16.4**	**699.3**
SD	**222.7**	**295.9**	**12.2**	**366.3**

Figure 137. Offshore handline landings per day fished, 1990-2010.



Interpretation: Offshore handline CPUE was 1,259 pounds in 2010, below its long-term average. Bigeye tuna CPUE in 2010 was 15% below its long-term average. Yellowfin tuna and mahimahi CPUE was also below their long-term averages. In general, the recent CPUE trend for all species in the offshore handline fishery tuna CPUE was that of a decrease.

The total landings per trip by the offshore handline fishery may be more accurate than the catch for individual species due to misidentification of tunas in this fishery.

Source and Calculations: The offshore handline CPUE (pounds per day fished) were calculated from the HDAR Fishing Report data. Offshore handline landings from the Fishing Report data was divided by the offshore handline the number of days fished in Figure 49. The total landings were greater than the sum of the three dominant species because it included skipjack tuna, kawakawa, and other pelagic species.

	Offshore handline landings (pounds per day fished)			
Year	**Bigeye tuna**	**Yellowfin tuna**	**Mahimahi**	**Total**
1990	565	654	1	1,220
1991	500	1,234	24	1,758
1992	358	1,937	49	2,344
1993	266	1,790	73	2,130
1994	1,044	2,689	57	3,790
1995	439	2,538	87	3,065
1996	1,576	1,685	70	3,331
1997	706	2,119	48	2,874
1998	1,539	1,858	39	3,436
1999	636	2,725	79	3,443
2000	1,171	2,539	169	3,989
2001	1,598	1,502	130	3,300
2002	2,669	658	98	3,554
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	1,442	381	52	1,899
2009	1,206	240	39	1,517
2010	1,117	95	26	1,259
Average	**1,318.0**	**1,301.1**	**63.2**	**2,716.2**
SD	**805.6**	**938.0**	**37.4**	**837.3**

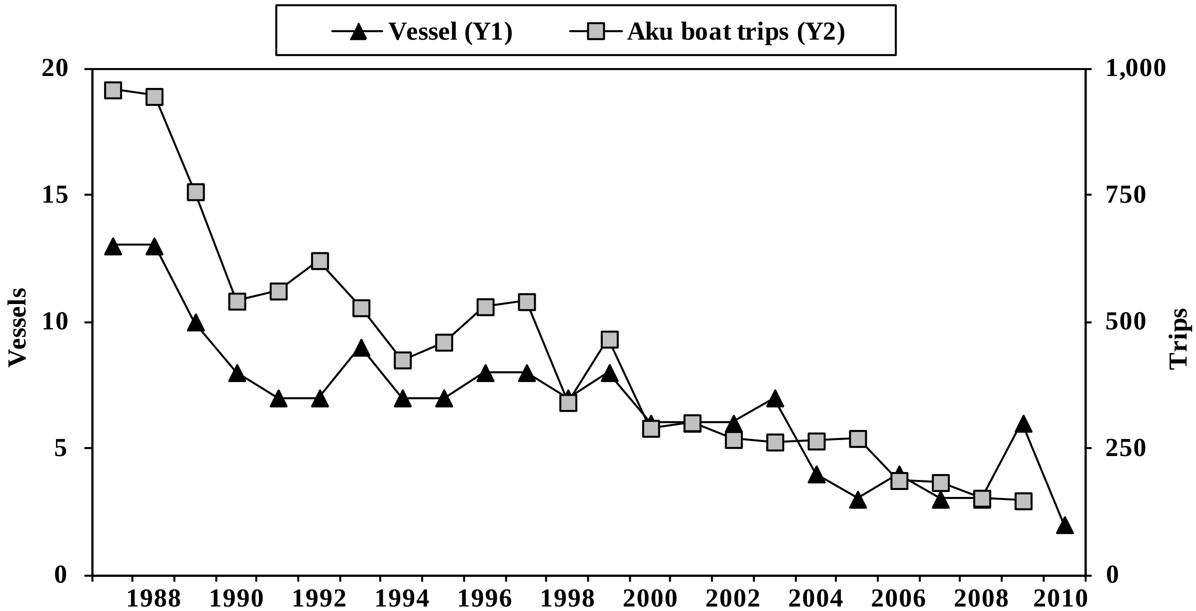
Table 81. Average weight by species for the troll and handline landings, 1987-2010.

	Tunas				Billfish			Other PMUS	
Year	Albacore	Bigeye tuna	Skipjack tuna	Yellowfin tuna	Blue marlin	Striped marlin	Swordfish	Mahimahi	Ono (wahoo)
1987	33	13	7	26	209	65	125	20	23
1988	57	33	7	27	178	64	115	18	24
1989	49	24	11	40	180	73	104	20	25
1990	52	25	6	35	246	71	93	19	24
1991	51	28	8	32	194	62	111	15	22
1992	52	24	6	26	213	69	73	13	25
1993	52	20	7	41	179	66	138	14	23
1994	50	22	8	35	228	66	94	14	26
1995	20	15	7	28	200	60	106	15	24
1996	41	21	11	40	192	65	87	16	22
1997	40	19	11	34	175	68	96	16	21
1998	21	21	6	28	224	64	82	18	25
1999	48	24	7	31	210	55	88	18	27
2000	48	28	11	48	238	61	177	15	25
2001	42	21	11	41	181	50	150	15	24
2002	38	30	10	42	224	42	152	16	26
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	107	15	23
2006	47	27	8	29	210	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	33	7	29	230	84	181	14	24
2010	49	32	5	30	258	106	123	14	26
Average	**44.7**	**25.4**	**7.5**	**32.6**	**209.0**	**66.6**	**120.1**	**16.1**	**24.0**
SD	**9.1**	**6.2**	**2.2**	**6.5**	**24.5**	**13.1**	**29.4**	**2.0**	**1.5**

Interpretation: Except for mean weight for billfish, the average weight for fish landed by troll and handline gear in 2010 was about the same compared to the previous year. The 2010 mean weights for blue marlin and striped marlin were higher than their respective long-term average weight. The mean weight for swordfish decreased 32% from the previous year but was close to its long-term average weight. Blue marlin had the highest mean weight of all species landed by the troll and handline fishery at 258 pounds.

Source and Calculations: The average weights were calculated from HDAR commercial fish catch reports. Total weight landed was divided by the total number landed. Landings by the troll and handline fishery is usually landed whole, however, average weight calculations were based on reported weight and may include landings that were processed, i.e., headed and gutted, gilled and gutted.

Figure 138. Hawaii aku boat (pole and line) vessel and trip activity, 1987-2010.

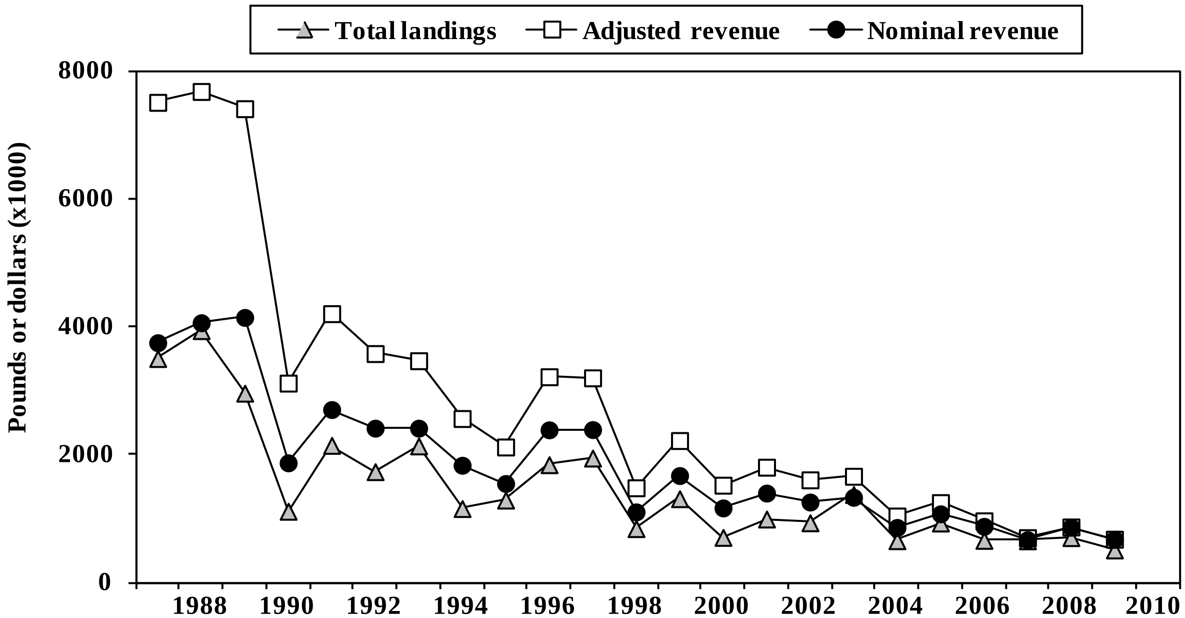


Interpretation: The vessel and trip activity of the aku boat fishery in 2010. However, this fishery has been in decline over the 24-year period with only two aku boat vessels fishing in 2010. The steep decline occurred in the 1980s and was attributed primarily to the closure of the tuna cannery. Attrition of vessels, many which were built in the 1940s, and poor skipjack tuna landings also contributed to the long-term decline in this fishery.

Source and Calculations: The number of aku boat vessels and trips were counted from HDAR Commercial Aku Boat Report data. The number of aku boat vessels was determined by counting the number of unique vessel names. A unique combination of HDAR Commercial Marine License numbers, landing month and day was used to calculate an aku boat trip. The total number of aku boat trips included zero landing trips.

Year	Vessels	Aku boat trips
1987	13	958
1988	13	945
1989	10	757
1990	8	541
1991	7	561
1992	7	621
1993	9	528
1994	7	425
1995	7	460
1996	8	530
1997	8	540
1998	7	341
1999	8	466
2000	6	290
2001	6	301
2002	6	268
2003	7	263
2004	4	265
2005	3	270
2006	4	187
2007	3	183
2008	3	152
2009	6	147
2010	2	---
Average	**7.0**	**447.8**
SD	**2.7**	**228.1**

Figure 139. Hawaii aku boat (pole and line) landings and revenue, 1987-2010.

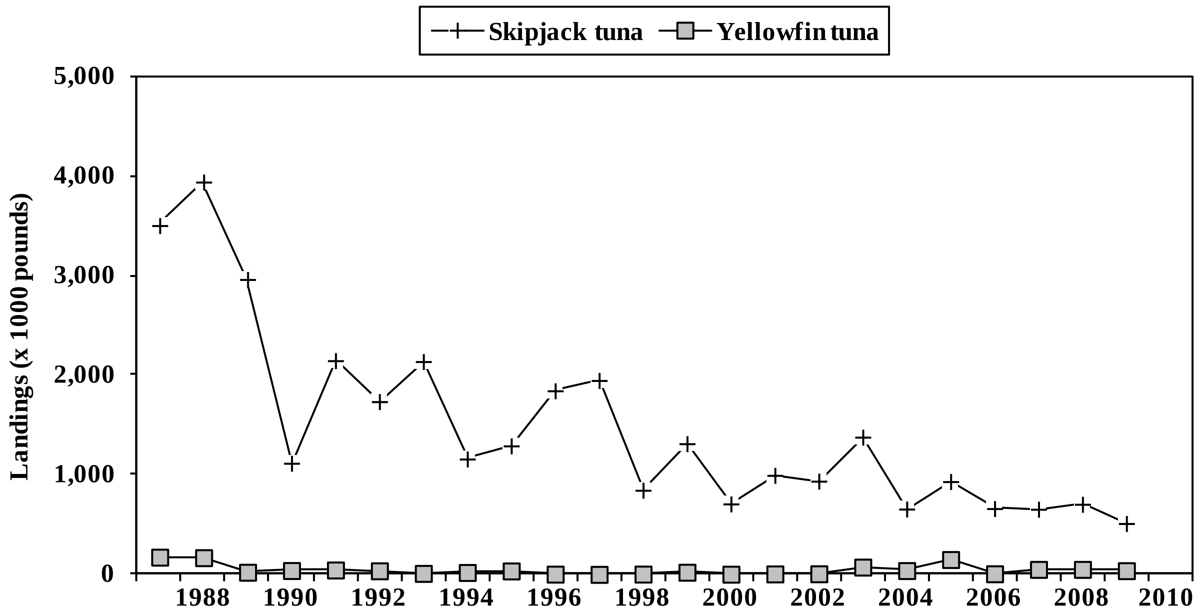


Interpretation: Aku boat landings were not available in 2010. However, the trends for total landings and revenue were similar to the number of aku boat vessels and trip activity. Aku boat landings and revenue peaked in 1988, then decreased sharply in 1990, and have continued to decline slowly since.

Source and Calculations: Total landings and nominal revenue for the aku boat fishery were derived from HDAR Commercial Aku Boat Report data. The total landings and nominal revenue values were obtained by adding the landings and revenue values for all species caught by the aku boat fishery. The adjusted revenue is calculated by dividing the nominal revenue by the Honolulu CPI then multiplying the result by the current Honolulu CPI.

Year	Total landings (1000 lbs)	Adjusted revenue ($1000)	Nominal revenue ($1000)	Honolulu CPI
1987	3,503	$7,668	$3,751	114.9
1988	3,940	$7,842	$4,063	121.7
1989	2,962	$7,567	$4,146	128.7
1990	1,116	$3,186	$1,873	138.1
1991	2,146	$4,295	$2,706	148.0
1992	1,735	$3,658	$2,415	155.1
1993	2,137	$3,543	$2,415	160.1
1994	1,159	$2,620	$1,835	164.5
1995	1,291	$2,166	$1,550	168.1
1996	1,844	$3,287	$2,389	170.7
1997	1,947	$3,270	$2,393	171.9
1998	845	$1,515	$1,106	171.5
1999	1,312	$2,269	$1,674	173.3
2000	708	$1,556	$1,168	176.3
2001	994	$1,843	$1,400	178.4
2002	936	$1,642	$1,260	180.3
2003	1,378	$1,698	$1,334	184.5
2004	656	$1,064	$863	190.6
2005	932	$1,278	$1,076	197.8
2006	661	$987	$880	209.4
2007	653	$718	$671	219.5
2008	703	$889	$866	228.9
2009	511	$693	$679	230.0
2010	---	---	---	234.9
Average	**1,481.3**	**2,837.2**	**1,848.4**	
SD	**937.9**	**2,178.2**	**1,043.2**	

Figure 140. Hawaii aku boat (pole and line) fishery landings, 1987-2010.

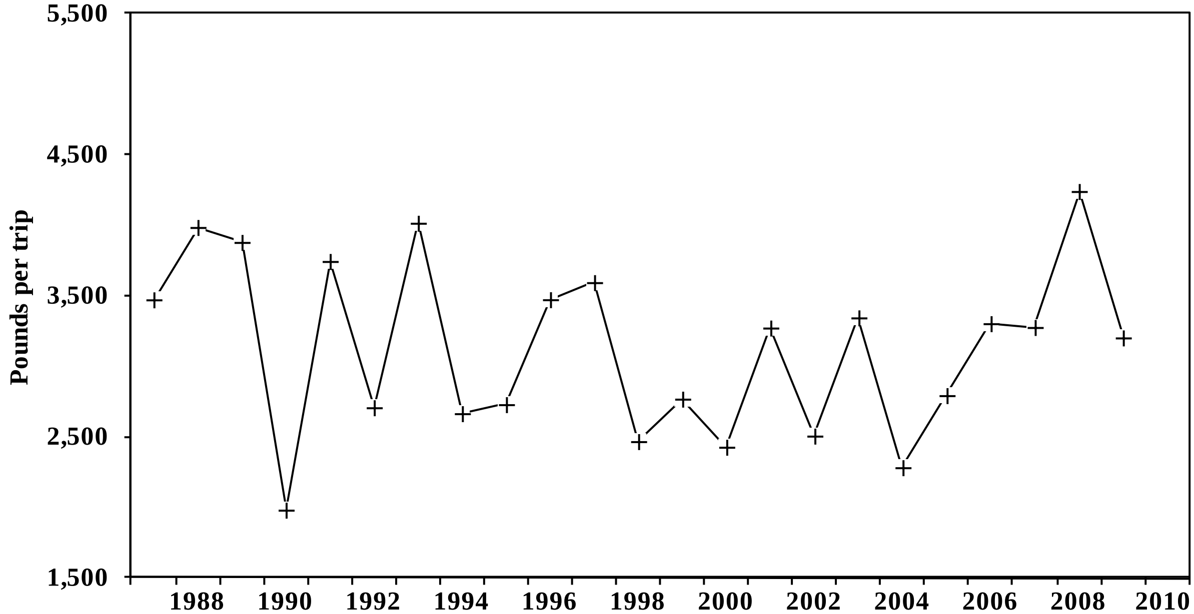


Interpretation: Total aku boat landings in 2010 were not available. However, the aku boat fishery landings consisted primarily of skipjack tuna. There were small landings of yellowfin tuna also. Skipjack tuna landings varied annually with an overall downward trend. Part of the reason for the decline in landings from this fishery was the closure of the tuna cannery in 1985. After the closure of the cannery, the aku boat fishery was left with only the fresh fish market.

Source and Calculations: The landing statistics for the aku boat fishery were derived from HDAR Commercial Aku Boat Report data. The aku boat landings were calculated by totaling catch by species.

	Aku boat landings (x 1000 pounds)				
Year	**Skipjack tuna**	**Yellowfin tuna**	**Other tunas**	**Mahimahi**	**Total**
1987	3,328	173	0	2	3,503
1988	3,768	168	0	4	3,940
1989	2,938	21	2	1	2,962
1990	1,073	39	4	0	1,116
1991	2,102	44	1	0	2,146
1992	1,682	36	4	14	1,735
1993	2,121	10	3	3	2,137
1994	1,133	19	6	0	1,159
1995	1,256	34	0	0	1,291
1996	1,842	2	0	0	1,844
1997	1,942	0	0	5	1,947
1998	842	3	0	0	845
1999	1,291	21	0	0	1,312
2000	704	2	1	1	708
2001	988	4	1	1	994
2002	927	6	2	1	936
2003	1,292	73	10	3	1,378
2004	615	38	1	2	656
2005	779	149	3	1	932
2006	648	6	7	0	661
2007	600	50	3	1	653
2008	645	50	8	1	703
2009	471	37	1	2	511
2010	---	---	---	---	---
Average	**1,434.3**	**42.8**	**2.4**	**1.8**	**1,481.3**
SD	**912.0**	**51.6**	**2.8**	**3.0**	**937.9**

Figure 141. Hawaii aku boat (pole and line) fishery total landings per trip, 1987-2010.



Interpretation: The CPUE for skipjack tuna in the aku boat fishery was not available in 2010. However, the aku boat skipjack tuna landings per trip varied substantially throughout 1987-2009.

Source and Calculations: Aku boat CPUE was measured as pounds per trip. The aku boat fishery CPUE statistics were derived from the HDAR Commercial Aku Boat Report data and measured as landings (in pounds) per trip. Landings per trip was calculated by dividing the pounds by the total number of aku boat trips. The calculation for aku boat CPUE included zero landing trips.

	Aku boat CPUE (pounds per trip)	
Year	Skipjack tuna	Total catch
1987	3,474	3,657
1988	3,987	4,169
1989	3,881	3,913
1990	1,983	2,063
1991	3,746	3,826
1992	2,709	2,794
1993	4,017	4,047
1994	2,667	2,727
1995	2,731	2,806
1996	3,475	3,479
1997	3,596	3,606
1998	2,469	2,478
1999	2,770	2,815
2000	2,429	2,436
2001	3,274	3,291
2002	2,508	2,521
2003	3,346	3,445
2004	2,284	2,403
2005	2,795	3,351
2006	3,305	3,372
2007	3,278	3,514
2008	4,242	4,260
2009	3,204	3,459
2010	---	---
Average	**3,134.8**	**3,226.0**
SD	**633.0**	**637.0**

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. The spatial distribution of catch is illustrated in 2008 for the purse seine fishery and 2004 for longline and pole-and-line fisheries. 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).

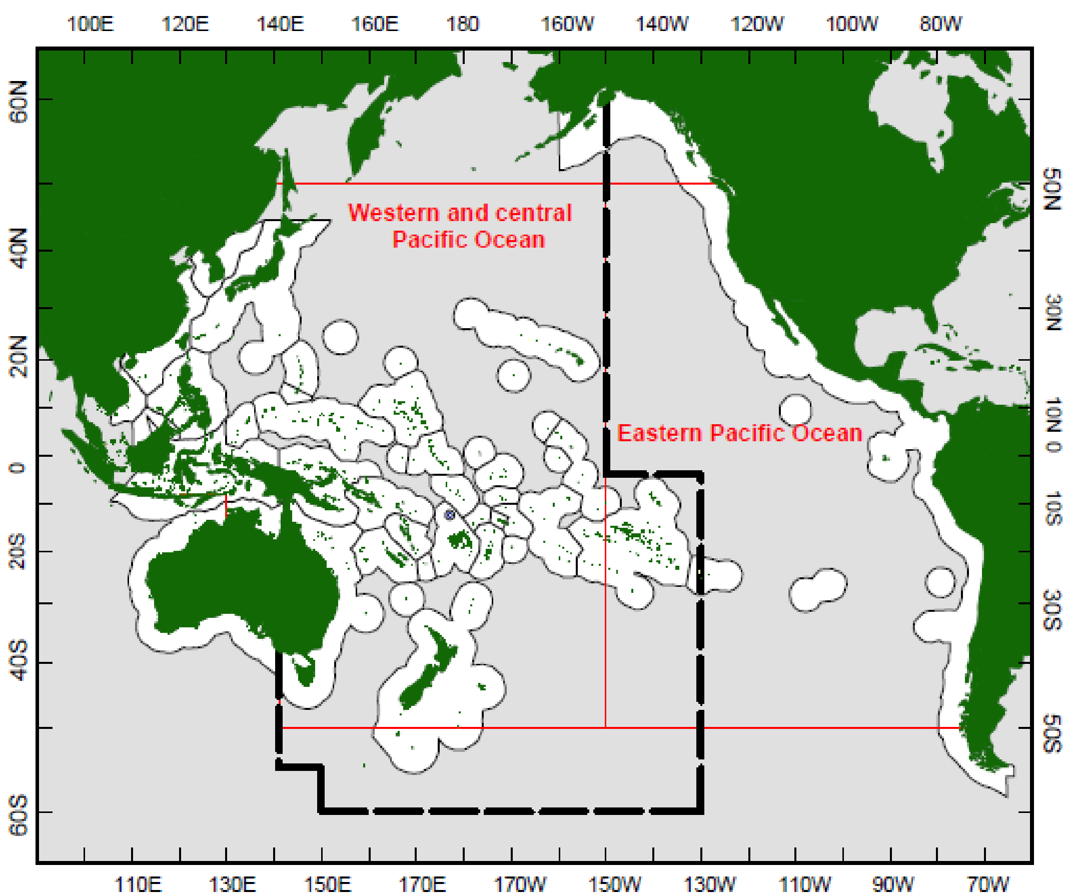


Figure 142. The western and central Pacific Ocean (WCPO), the eastern Pacific Ocean (EPO) and the WCPFC Convention Area (WCP–CA in dashed lines)

1. The 2010 purse-seine fishery in the WCPFC Convention Area (WCP-CA)

Vessels: The combined-fleet 2010 total catch and effort was the highest ever. The Chinese-Taipei fleet had been the highest producer in the tropical purse seine fishery until 2004, when it was surpassed by the combined Pacific Islands purse seine fleets fishing under the FSM Arrangement; from 2006-2007, the Korean and FSM Arrangement fleets were the highest producers. There was a hiatus in the FSM Arrangement fleet development in 2008 (when some vessels reflagged to the US purse-seine fleet) but catch/effort has since picked up again in 2009/2010. The fleet sizes and effort by the Japanese and Korean purse seine fleets have been relatively stable for most of this time series. Several Chinese-Taipei vessels reflagged in 2002, dropping the fleet from 41 to 34 vessels. Fleet numbers have been stable since. The increase in annual catch by the FSM Arrangement fleet until 2005 corresponded to an increase in vessel numbers, and coincidently, mirrors the decline in US purse seine catch, vessel numbers and effort over this period. However, the US purse-seine fleet commenced a significant rebuilding phase in late 2007, with vessel numbers more than doubling in comparison to recent years, but still below the fleet size in the early-mid 1990s. The increase in vessel numbers in the US purse seine fleet is reflected in the sharp increase in their catch and effort since 2007, which is now in line with the other major purse seine fleets. The total number of Pacific-island domestic vessels has gradually increased over the past two decades, attaining its highest level in 2010 (78 vessels).

Catch: The provisional **2010 purse-seine catch of 1,820,844 mt** was the third highest on record for this fishery, at more than 80,000 mt lower than the record attained in 2009. The 2010 purse-seine skipjack catch (1,476,819 mt) was the second highest on record, but significantly lower (130,000 mt) than the record catch in 2009; the proportion of skipjack tuna in the logsheet-reported total catch (81%) was in line with the average for recent years. The 2010 purse-seine catch of yellowfin tuna (300,339 mt – 16%) rebounded (by 54,000 mt) from the relatively low catch of 2009, but was still significantly lower than the record catch taken in 2008 (391,152 mt). The provisional catch estimate for bigeye tuna for 2010 (43,389 mt) was the third highest on record but may be revised once all observer data for 2010 have been received and processed.

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. During 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 part of 2010. Conditions in the WCP-CA then switched back to a strong La Niña state over the latter months of 2010, and this has persisted into the 1st quarter of 2011. In line with the prevailing ENSO conditions, fishing activity during the first part of 2010 extended further eastwards compared to recent years (2007-2008) when the La Niña conditions generally restricted activities to waters of the PNG, FSM and Solomon Islands, but fishing activities were then restricted to the west in the latter months of 2010.

Table 82. Total reported purse seine catch (metric tons) of skipjack, yellowfin and bigeye tuna in the Pacific Ocean. Source: SPC

Year	Skipjack	Yellowfin	Bigeye	Total
1968	67,311	93,548	4,819	165,678
1969	51,051	117,541	1,148	169,740
1970	54,917	147,259	2,991	205,167
1971	108,015	114,128	5,100	227,333
1972	47,808	174,336	4,681	226,825
1973	58,321	209,116	4,267	271,704
1974	90,134	208,982	2,869	301,985
1975	133,369	196,055	8,063	337,487
1976	147,206	230,496	19,236	396,938
1977	119,309	200,366	13,833	333,508
1978	205,879	172,772	21,908	400,559
1979	192,701	198,004	15,714	406,419
1980	206,400	176,243	26,186	408,829
1981	215,052	216,032	24,891	455,975
1982	264,893	182,750	23,220	470,863
1983	352,766	197,497	31,251	581,514
1984	363,699	258,495	35,399	657,593
1985	315,782	324,507	29,774	670,063
1986	387,606	374,238	29,907	791,751
1987	431,343	392,712	33,087	857,142
1988	497,917	425,077	34,349	957,343
1989	532,657	449,361	36,864	1,018,882
1990	607,364	457,366	50,548	1,115,278
1991	761,973	476,080	50,800	1,288,853
1992	755,790	466,857	59,145	1,281,792
1993	692,477	414,822	48,438	1,155,737
1994	775,974	434,688	78,397	1,289,059
1995	790,720	449,018	86,059	1,325,797
1996	774,626	409,788	116,801	1,301,215
1997	768,260	510,052	164,588	1,442,900
1998	1,032,640	590,138	110,492	1,733,270
1999	1,032,151	570,352	116,406	1,718,909
2000	1,024,089	552,024	166,774	1,742,887
2001	959,386	673,926	117,633	1,750,945
2002	1,077,082	742,005	116,671	1,935,758
2003	1,185,253	740,309	93,823	2,019,385
2004	1,260,430	552,861	135,699	1,948,990
2005	1,343,518	698,858	138,425	2,180,801
2006	1,500,766	530,240	152,990	2,183,996
2007	1,551,615	551,530	114,932	2,218,077
2008	1,580,444	684,190	130,945	2,395,579
2009	1,695,098	603,213	145,881	2,444,192
2010	1,528,262	633,529	112,108	2,273,899
Average	**640,515**	**390,729**	**63,189**	**1,094,433**
Standard Deviation	**506,036**	**195,092**	**53,349**	**736,723**

Figure 143. Total purse seine catch of skipjack and yellowfin tuna in the Pacific Ocean, 1968–2010. Source: SPC

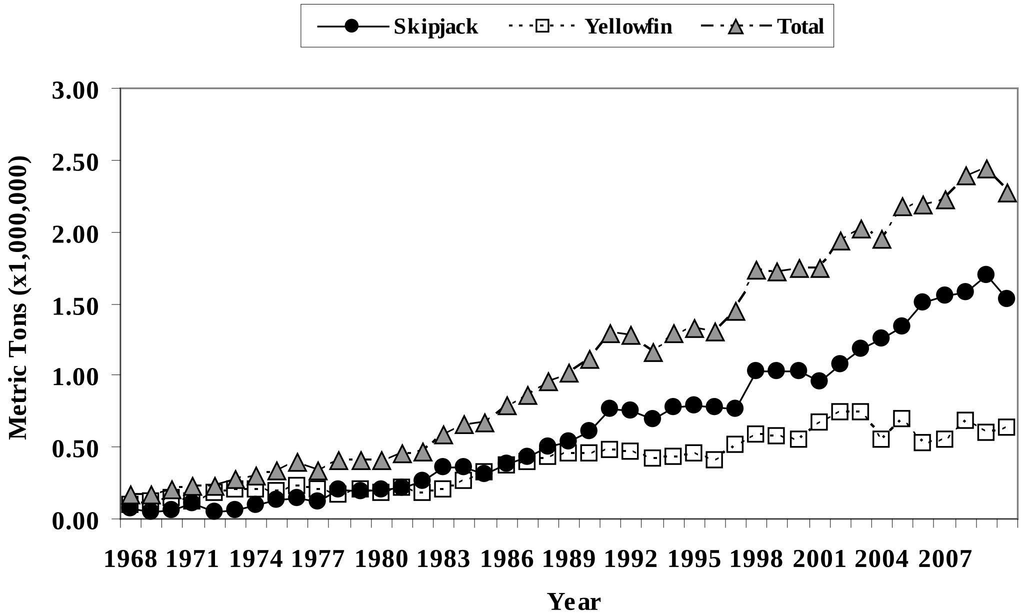


Figure 144. Distribution of purse seine skipjack catch in 2008. Source: SPC and I-ATTC.

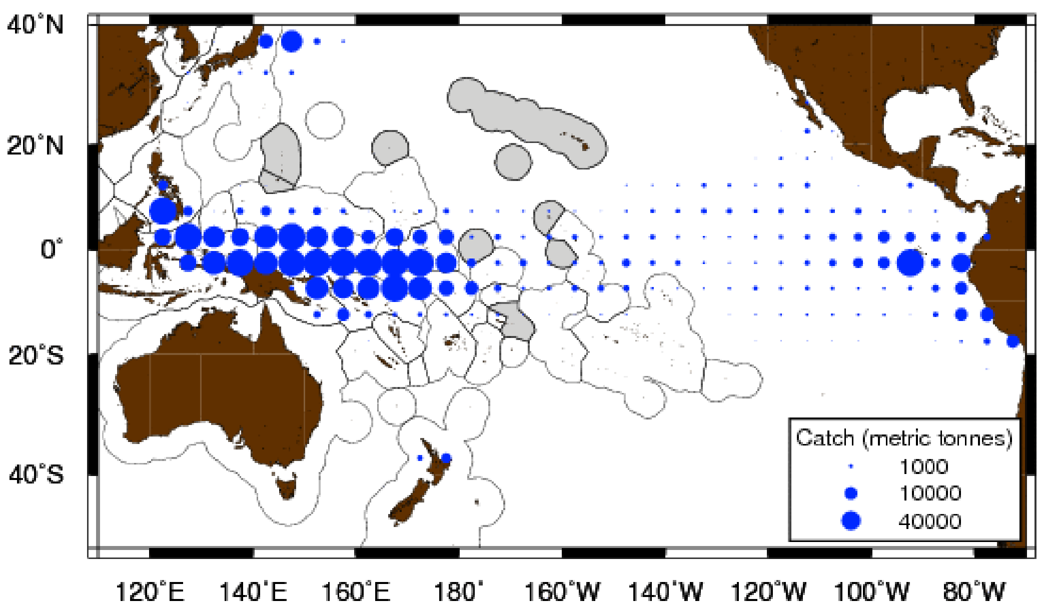
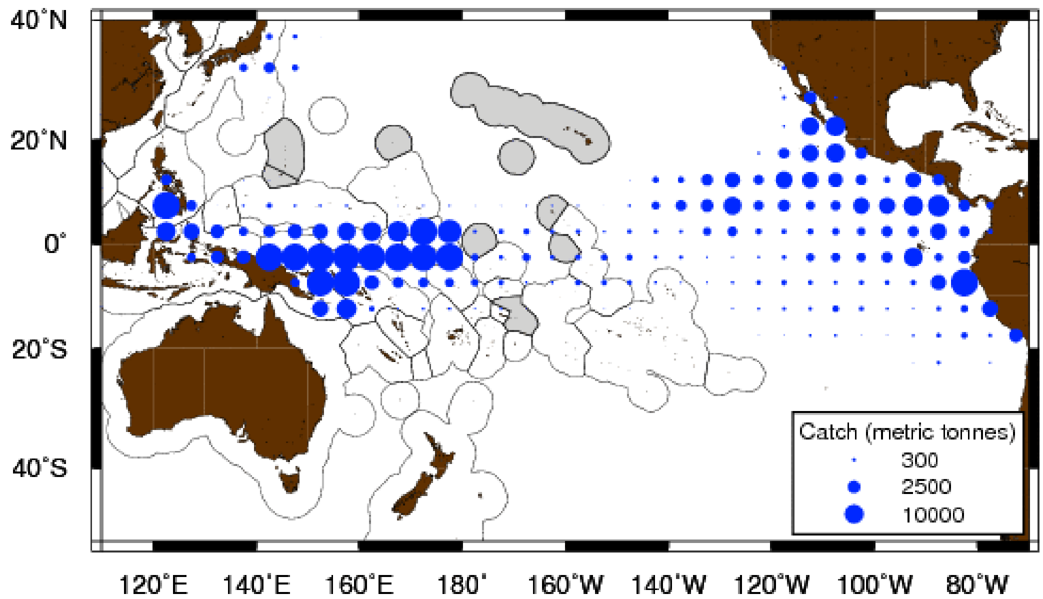


Figure 145. Distribution of purse seine yellowfin catch in 2008. Source: SPC and IATTC



2. The 2010 longline fishery in the WCP-CA

Vessels: The total number of vessels involved in the fishery has generally fluctuated between 3,500 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.

• **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.

• **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 Hawaiian 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 (239,853 mt) for 2010 was the fourth highest on record, at around 17,000 mt lower than the highest on record attained in 2002 (256,582 mt). The WCP–CA albacore longline catch (104,482 mt – 44%) for 2010 was the highest on record, 12,000 mt higher than the previous record (92,539 mt in 2009). In contrast, the provisional bigeye catch (58,324 mt – 24%) for 2010 was the lowest since 1996, but may be revised upwards when final estimates are provided. The yellowfin catch for 2010 (76,067 mt – 32%) was slightly higher than the average catch level for this species over the period 2000-2010. 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) making up the Pacific Islands domestic albacore fishery have numbered more than 400 (mainly small “offshore”) vessels in recent years.

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 2010. The Japanese distant-water and offshore longline fleets have experienced a substantial decline in both bigeye catches (from 20,725 mt in 2004 to 8,486 mt in 2010) and vessel numbers (366 in 2004 to 171 in 2010). The Chinese-Taipei distant-water longline fleet bigeye catch declined from 16,888 mt in 2004 to 8,863 mt (in 2010), mainly related to a substantial drop in vessel numbers (137 vessels in 2004 reduced to 75 vessels in 2009, but back up to 90 vessels in 2010). The Korean distant-water longline fleet experienced smaller declines in bigeye and yellowfin catches in recent years, but with a more significant drop in vessel numbers –from 184 vessels active in 2002 reduced to 108 vessels in 2008, but back to 122 vessels in 2010.

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 are 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 examples are the increases in the Samoan, Fijian and French Polynesian fleets, and more recently the Solomon Islands chartered vessels.

Table 83. Total reported longline catch (metric tonnes) of PMUS in the Pacific Ocean.

Year	Albacore	Yellowfin	Bigeye	Striped Marlin	Black Marlin	Blue Marlin	Swordfish	Total
1962	51,069	65,758	80,945	18,925	2,560	21,634	11,325	252,216
1963	44,734	72,158	109,157	19,625	2,918	23,626	11,627	283,845
1964	38,483	62,222	77,268	28,484	2,306	16,334	8,959	234,056
1965	39,681	61,113	59,012	23,229	2,808	12,864	9,858	208,565
1966	64,261	70,751	66,784	18,710	2,979	11,651	11,882	247,018
1967	73,773	45,368	69,510	21,961	3,081	10,729	12,243	236,665
1968	57,520	61,056	62,990	25,996	3,724	10,431	11,807	233,524
1969	44,028	66,956	84,642	17,529	3,260	11,767	15,278	243,460
1970	54,004	68,449	68,306	18,600	4,195	14,089	11,729	239,372
1971	53,512	65,779	68,163	16,579	4,316	9,204	10,572	228,125
1972	58,156	78,034	87,168	12,291	4,383	10,368	10,414	260,814
1973	63,735	73,988	93,189	10,763	4,698	11,036	11,112	268,521
1974	47,086	65,306	82,614	10,141	3,635	10,004	10,167	228,953
1975	37,396	80,102	103,221	9,154	3,669	9,279	10,840	253,661
1976	47,467	93,202	127,615	9,929	2,495	9,950	13,444	304,102
1977	55,703	106,769	146,169	6,093	3,048	10,036	13,881	341,699
1978	46,741	120,517	126,896	6,239	3,204	12,431	13,974	330,002
1979	40,900	120,516	119,139	9,196	2,727	13,942	13,836	320,256
1980	46,607	136,352	126,192	9,650	1,887	14,261	12,486	347,435
1981	51,558	102,664	99,239	9,649	2,256	14,808	13,181	293,355
1982	46,622	95,949	101,251	9,247	2,236	15,143	11,818	282,266
1983	40,895	97,082	105,313	7,948	1,981	13,464	13,449	280,132
1984	36,473	83,381	98,283	7,498	1,565	17,394	12,727	257,321
1985	41,919	89,463	123,826	7,108	1,228	13,255	14,300	291,099
1986	45,781	87,827	158,229	9,715	1,418	15,626	14,759	333,355
1987	37,390	95,723	168,163	13,205	1,891	21,685	17,606	355,663
1988	43,889	104,060	140,008	12,896	2,582	20,215	17,720	341,370
1989	33,274	85,940	134,279	10,119	1,400	17,285	15,897	298,194
1990	35,976	108,550	174,012	8,131	1,343	15,740	17,277	361,029
1991	41,434	90,123	163,432	8,230	1,695	17,561	23,384	345,859
1992	50,583	91,154	158,681	8,417	1,878	19,929	28,142	358,784
1993	61,372	90,253	137,051	14,175	1,645	22,425	25,824	352,745
1994	64,943	104,805	148,211	9,585	2,100	24,636	22,047	376,327
1995	62,280	101,003	123,918	10,438	1,493	25,332	20,209	344,673
1996	63,199	94,290	100,985	9,052	1,044	18,122	22,248	308,940
1997	75,468	93,244	118,236	9,483	1,117	18,352	28,751	344,651
1998	85,841	82,786	127,498	10,638	1,713	21,506	29,099	359,081
1999	78,676	70,327	107,736	8,503	2,021	18,263	28,105	313,631
2000	75,934	96,615	118,179	6,153	1,249	17,108	29,696	344,934
2001	85,763	102,068	142,693	6,740	1,461	19,440	33,566	391,731
2002	93,949	99,603	163,601	6,534	1,703	18,646	35,935	419,971
2003	89,245	103,494	138,690	7,270	1,934	27,849	37,475	405,957
2004	87,071	96,342	134,534	6,633	2,100	25,143	36,409	388,232
2005	90,038	82,622	113,741	5,798	2,520	22,950	28,213	345,882
2006	94,573	75,582	108,370	5,584	2,211	19,644	30,940	336,904
2007	88,604	69,225	102,937	4,752	1,562	16,857	28,646	312,583
2008	84,805	68,055	103,173	4,220	1,687	15,746	26,505	304,191
2009	102,667	82,678	98,730	3,489	1,763	15,547	23,458	328,332
2010	110,628	85,823	87,110	3,148	2,085	16,560	21,909	327,263
Average	**60,525**	**86,635**	**113,451**	**10,968**	**2,342**	**16,528**	**19,076**	**309,525**
St Dev	**20,604**	**18,025**	**30,186**	**5,847**	**925**	**4,797**	**8,342**	**52,513**

Figure 146. Reported longline tuna catches in the Pacific Ocean. Source: SPC and I-ATTC.

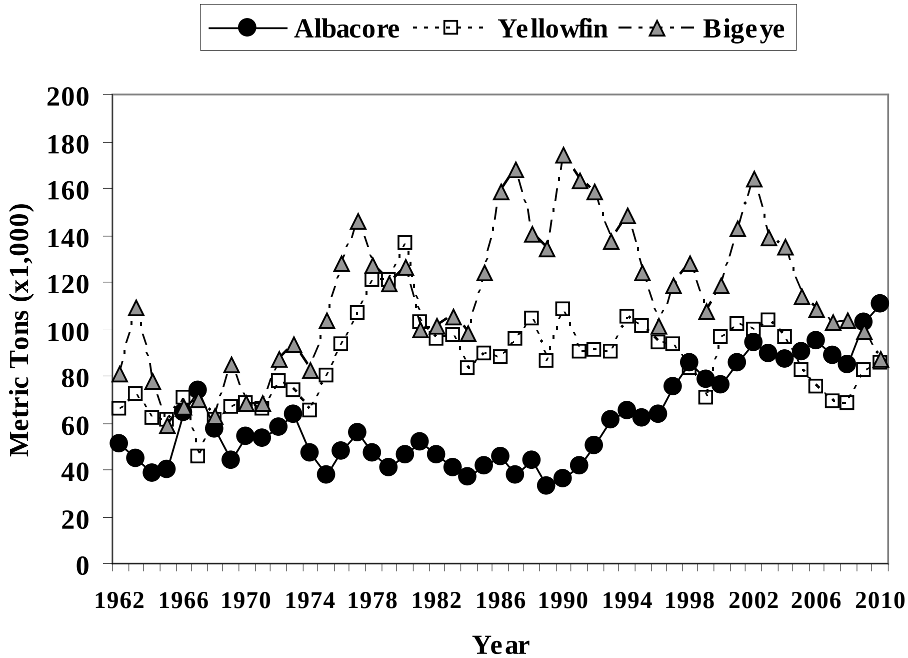


Figure 147. Reported longline billfish catches in the Pacific Ocean. Source: SPC and I-ATTC

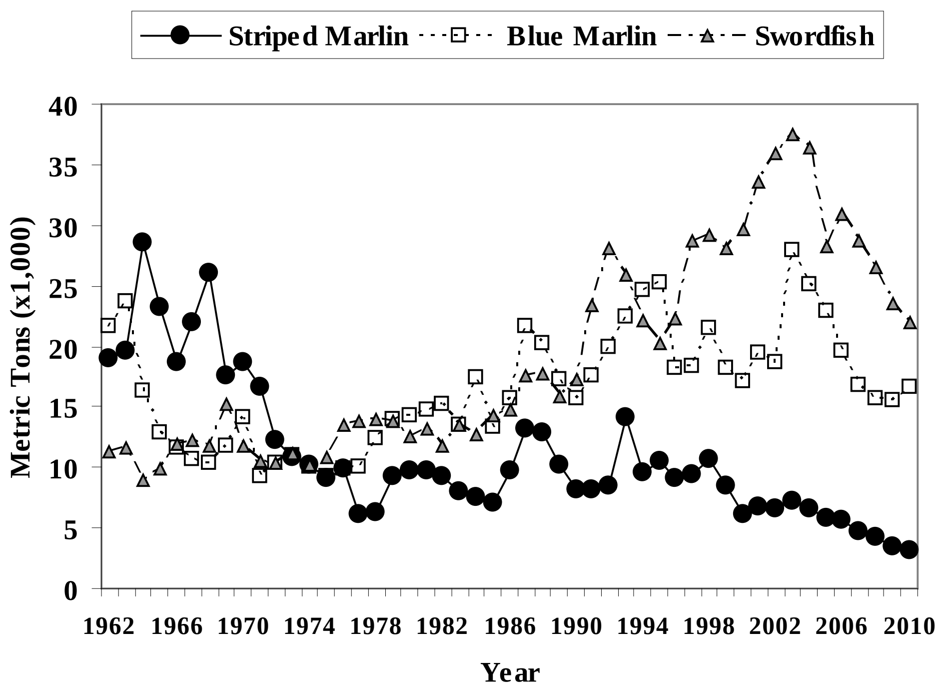


Figure 148. Distribution of longline catches of yellowfin tuna reported in 2004. Source: SPC public domain data.

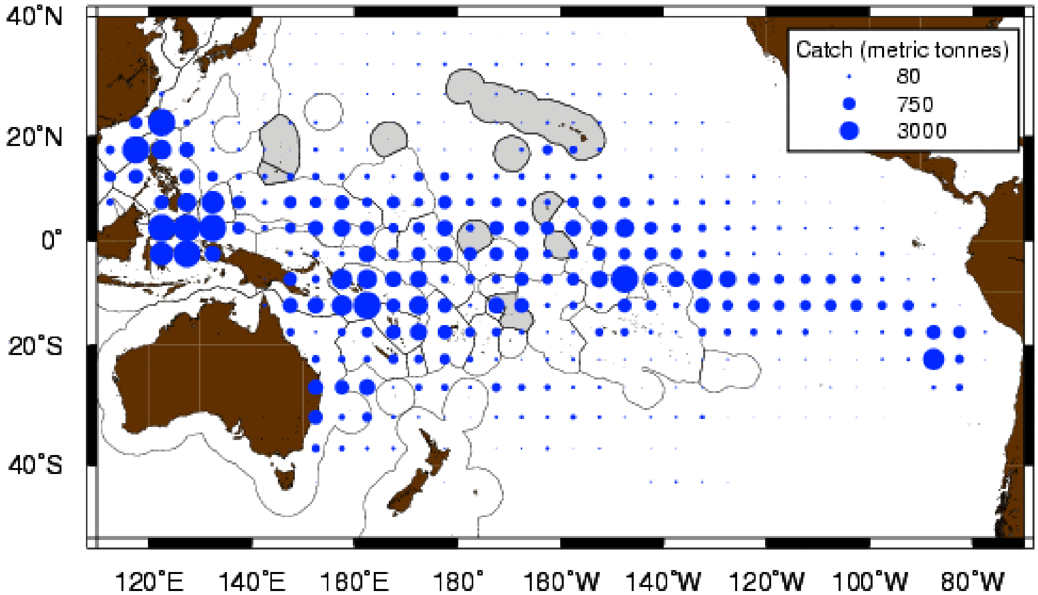


Figure 149. Distribution of longline catches of bigeye tuna reported in 2004. Source: SPC public domain data.

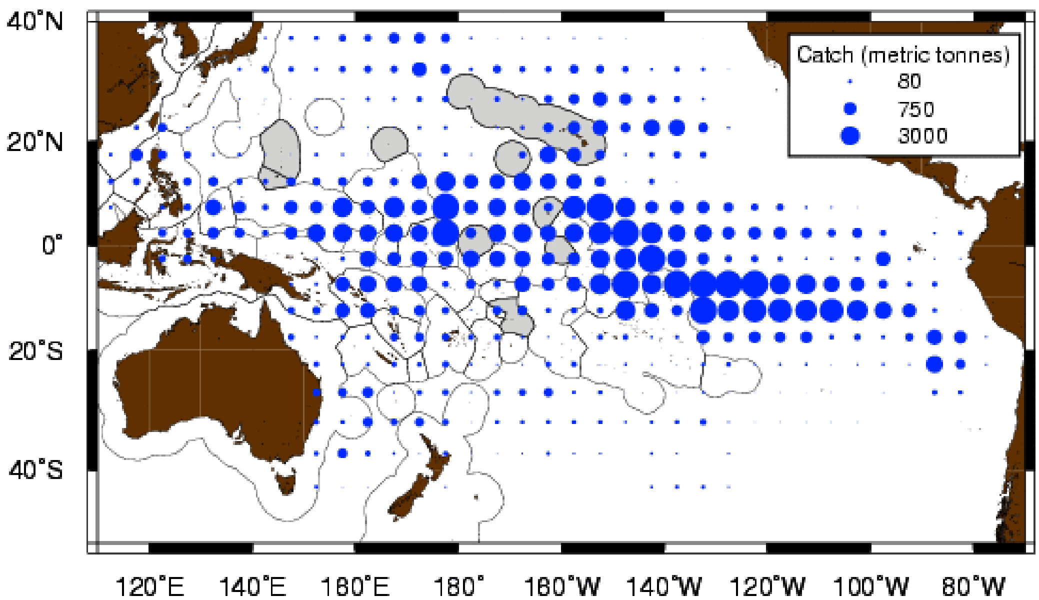


Figure 150. Distribution of longline catches of albacore tuna reported in 2004. Source: SPC public domain data.

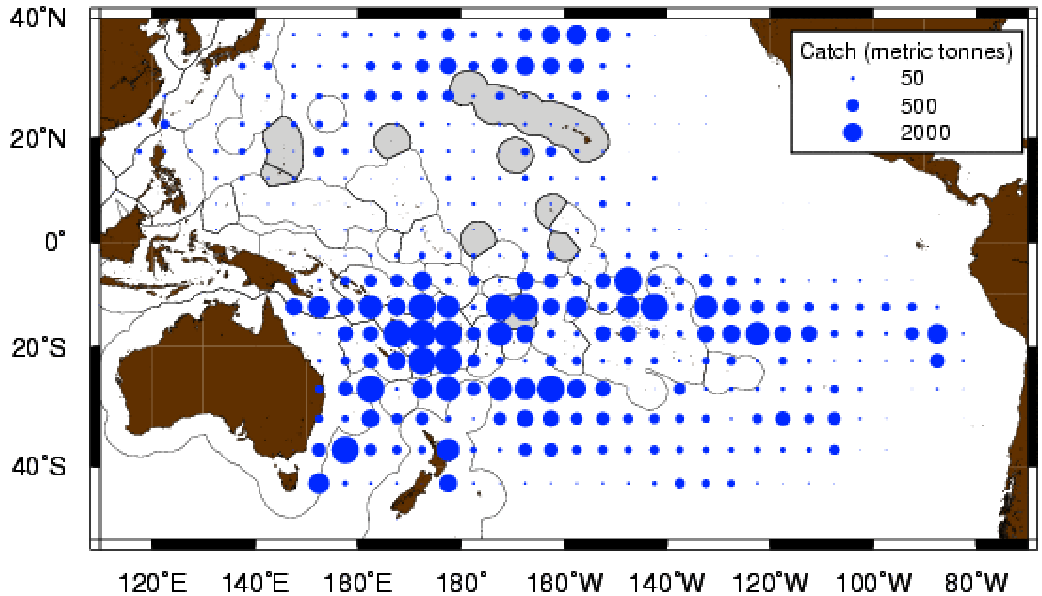


Figure 151. Distribution of longline catches of swordfish reported in 2004. Source: SPC public domain data.

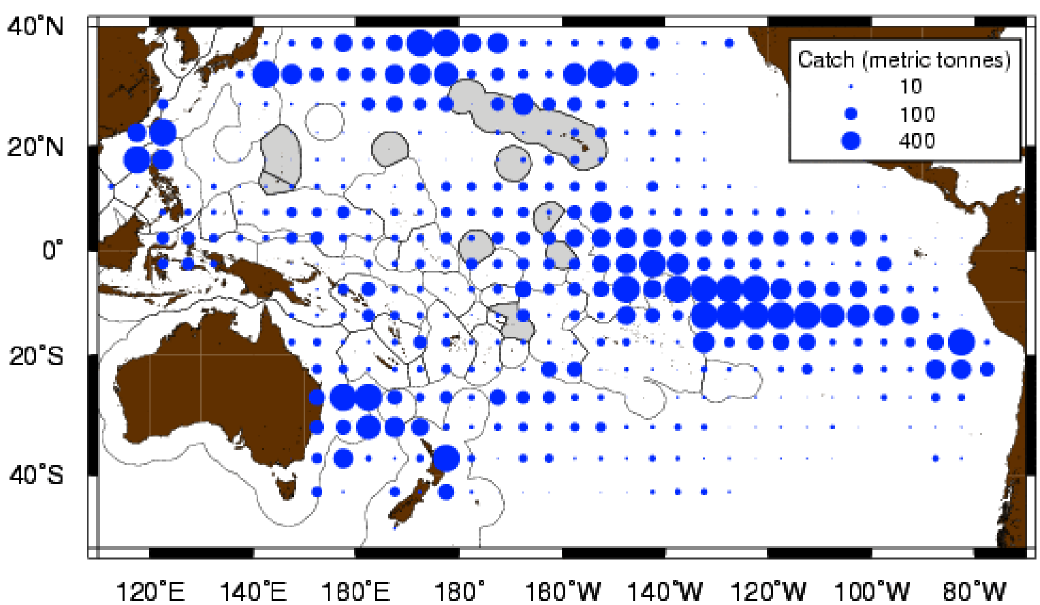


Figure 152. Distribution of longline catches of blue marlin reported in 2004. Source: SPC public domain data.

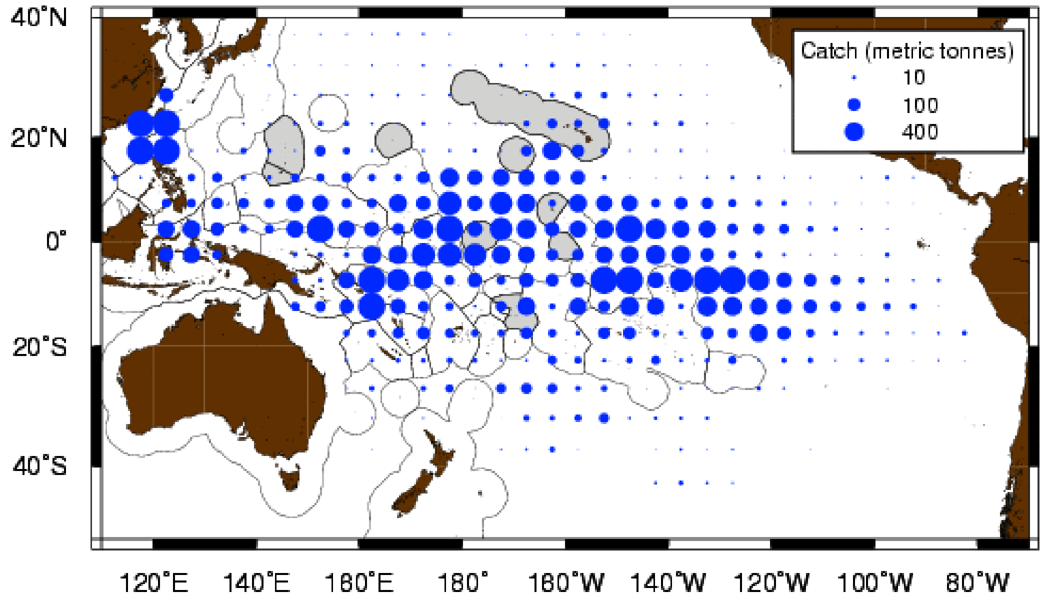
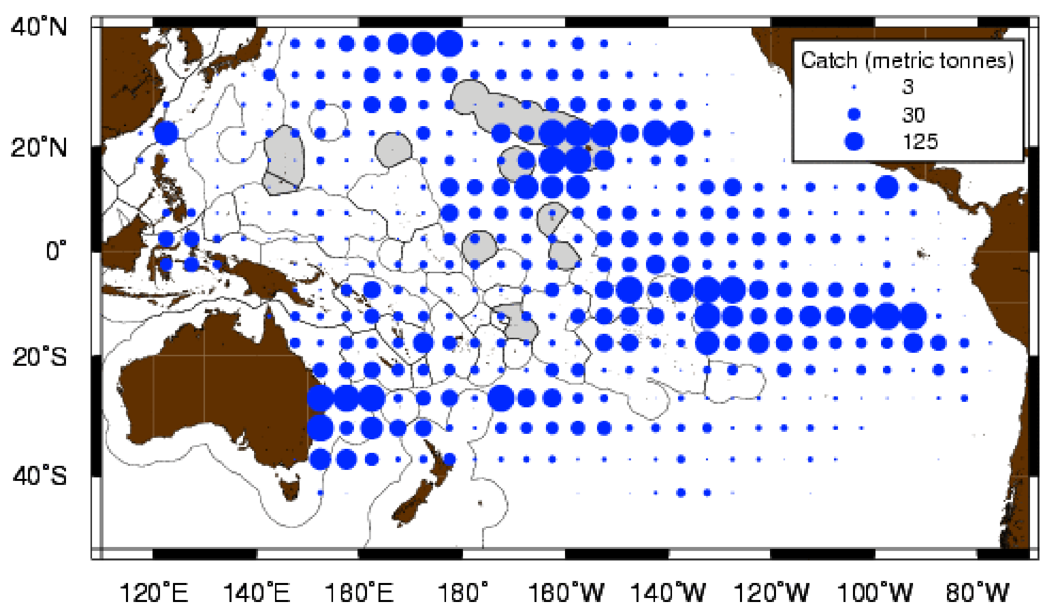


Figure 153. Distribution of longline catches of striped marlin reported in 2004. Source: SPC public domain data.



3. The 2010 pole-and-line fishery in the WCP-CA.

Vessels: The pole-and-line fleet was composed of less than 200 vessels in the 2010 fishery which excludes vessels in the Indonesia domestic fishery.

Catch: The 2010 pole-and-line catch (171,604 mt) was a slight improvement (6,000 mt) on the catch level in 2009, which was the lowest annual catch since the mid-1960s. Skipjack tends to account for the majority of the catch (~70-80% in recent years, but typically more than 85% of the total catch in tropical areas) and 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 (5–10%) and a small component of bigeye tuna (1–6%) make up the remainder of the catch. The Japanese distant-water and offshore (110,612 mt in 2010) fleets, and the Indonesian fleets (60,415 mt in 2007), account for most of the WCP–CA pole-and-line catch. 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 2009/2010 reduced to only 96 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 there are expectations of it resuming activities in 2011.

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).

Figure 154. Distribution of pole-and-line catch of skipjack reported in 2004. Source: SPC public domain data.

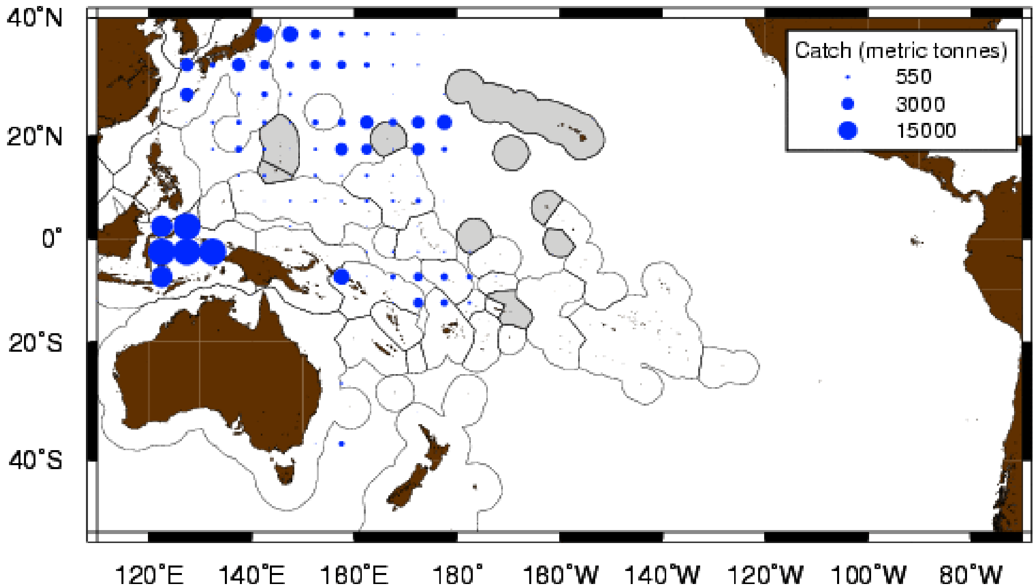


Table 84. Total reported pole-and-line catch (metric tonnes) of skipjack in the Pacific Ocean. Source: SPC.

Year	Catch
1970	409,754
1971	382,914
1972	242,745
1973	330,841
1974	370,499
1975	279,663
1976	382,627
1977	345,257
1978	407,482
1979	344,799
1980	395,746
1981	343,584
1982	309,802
1983	338,181
1984	422,512
1985	293,206
1986	368,730
1987	297,935
1988	324,805
1989	317,802
1990	250,390
1991	314,979
1992	282,598
1993	307,966
1994	271,071
1995	297,106
1996	251,053
1997	273,844
1998	282,965
1999	302,239
2000	261,937
2001	207,308
2002	216,944
2003	221,676
2004	203,903
2005	213,055
2006	192,178
2007	198,590
2008	178,611
2009	165,176
2010	171,597

Figure 155. Reported pole-and-line catch (metric tons) in the Pacific Ocean. Source: SPC.

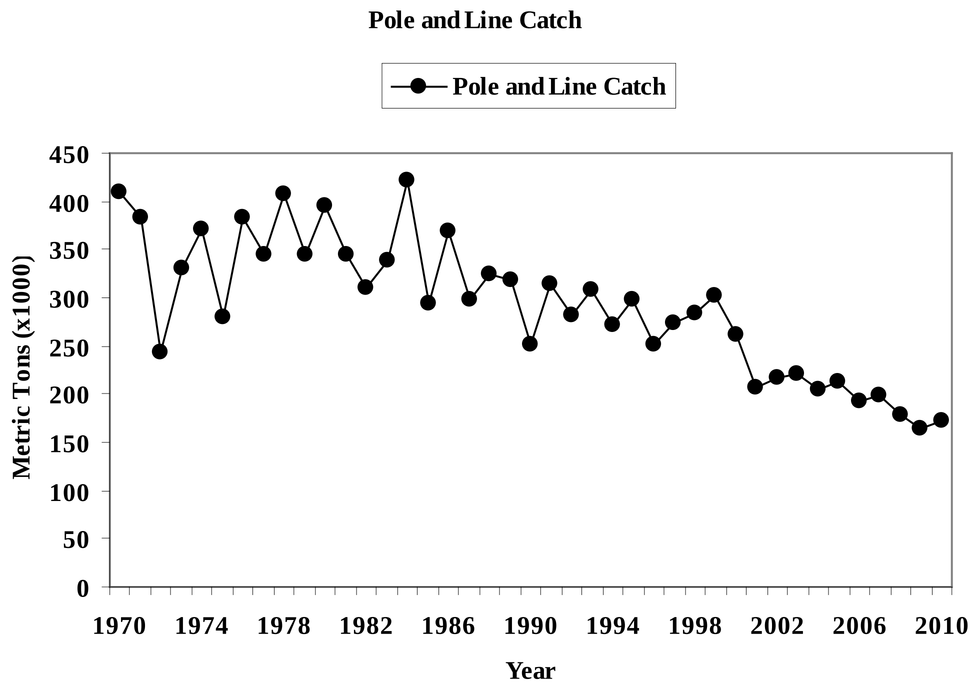


Figure 156. Estimated total catch of tuna species in the Pacific Ocean. Source: SPC

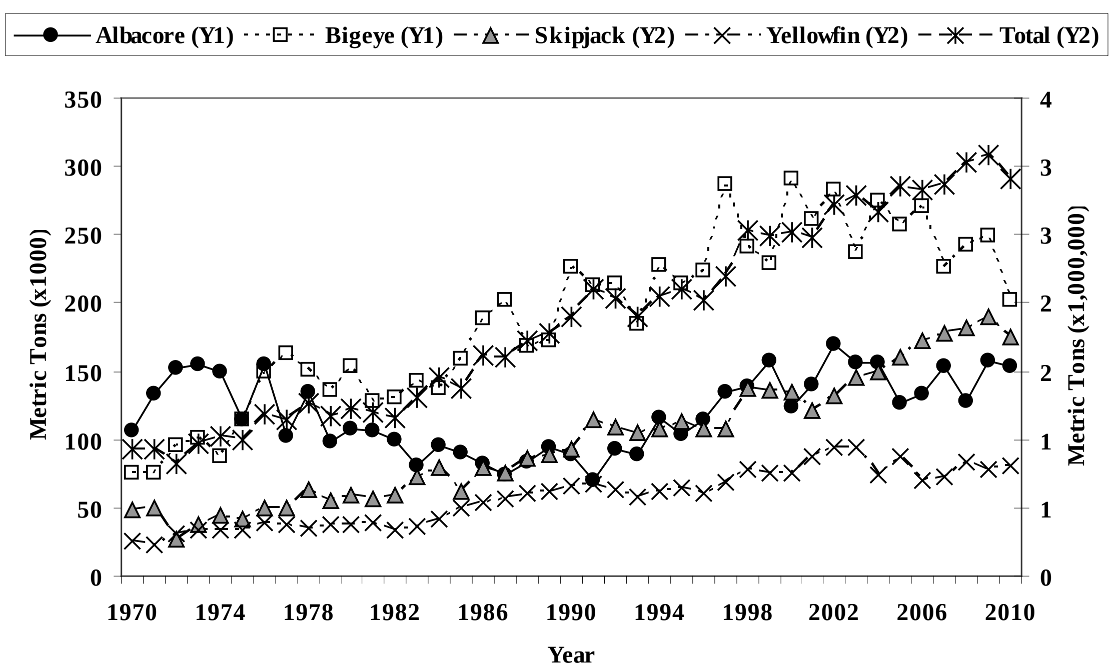


Table 85. Estimated annual catch (metric tons) of tuna species in the Pacific Ocean. Source: SPC.

Year	Albacore	Bigeye	Skipjack	Yellowfin	Total
1970	105,911	75,237	485,170	260,032	926,350
1971	133,348	75,969	493,639	224,992	927,948
1972	152,045	95,721	275,227	303,537	826,530
1973	154,422	101,272	377,584	338,511	971,789
1974	149,330	87,643	443,585	339,103	1,019,661
1975	113,804	114,001	422,926	340,137	990,868
1976	155,028	149,899	493,912	386,081	1,184,920
1977	102,141	163,449	497,779	380,817	1,144,186
1978	134,054	150,610	629,099	348,674	1,262,437
1979	98,292	135,842	554,685	380,746	1,169,565
1980	107,775	154,047	593,847	373,362	1,229,031
1981	106,185	127,772	569,843	392,784	1,196,584
1982	99,778	130,817	589,485	342,855	1,162,935
1983	80,643	142,157	720,884	364,048	1,307,732
1984	95,904	137,293	800,608	413,528	1,447,333
1985	90,739	158,493	625,925	497,795	1,372,952
1986	81,934	188,961	795,324	544,619	1,610,838
1987	74,082	201,600	758,278	564,862	1,598,822
1988	83,617	167,753	864,039	611,784	1,727,193
1989	94,281	172,871	887,736	625,317	1,780,205
1990	88,445	226,540	927,282	661,187	1,903,454
1991	70,627	213,085	1,143,140	668,420	2,095,272
1992	92,639	213,468	1,092,568	631,019	2,029,694
1993	89,469	184,703	1,045,810	574,987	1,894,969
1994	115,272	227,037	1,075,425	623,993	2,041,727
1995	103,783	213,926	1,135,571	642,358	2,095,638
1996	113,979	223,144	1,072,688	603,209	2,013,020
1997	134,022	286,263	1,079,648	692,907	2,192,840
1998	138,558	240,618	1,370,324	775,123	2,524,623
1999	157,744	229,101	1,361,651	747,123	2,495,619
2000	124,293	290,426	1,343,756	758,558	2,517,033
2001	140,450	261,064	1,209,774	870,143	2,481,431
2002	170,065	282,722	1,320,338	941,612	2,714,737
2003	156,242	236,842	1,451,422	943,600	2,788,106
2004	155,512	273,961	1,496,882	741,536	2,667,891
2005	127,182	257,624	1,596,545	874,135	2,855,486
2006	133,302	270,137	1,728,400	697,107	2,828,946
2007	153,660	225,966	1,771,368	720,574	2,871,568
2008	127,315	241,926	1,815,549	840,365	3,025,155
2009	158,014	249,554	1,902,878	777,988	3,088,434
2010	152,907	202,535	1,744,294	808,900	2,908,636
Average	**119,922**	**189,806**	**989,388**	**576,3031,8**	**1,875,418**
Standard Deviation	**28,214**	**61,674**	**458,125**	**203,405**	**710,277**

3. Stock status and WPRFMC reference points

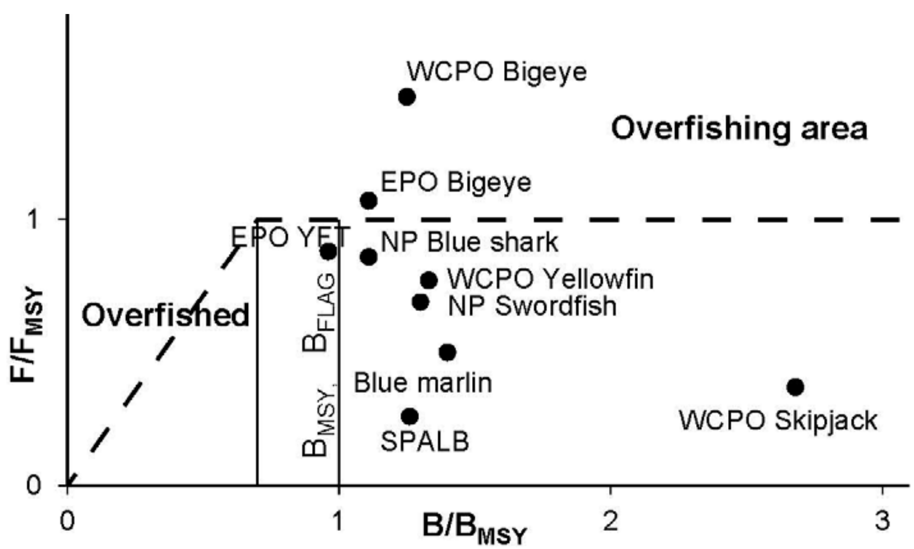
This section contains a brief review of the stock status for several pelagic species and the status of these stocks in relation to WPRFMC reference points. Stock assessments are presented annually at the Scientific Committee (SC) of the WCPFC and at the International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean (ISC). In August 2010, the SC reviewed an assessment for bigeye and skipjack tuna. In addition, recent assessments are available for North Pacific blue shark (Tables 5 and 6). Stock status for the four tuna species are summarized from the SC species summary statements (http://www.wcpfc.int/node/2751) and http://www.wcpfc.int/node/2911 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 2011, the 11th meeting of the ISC reviewed assessments for North Pacific swordfish and Pacific bluefin tuna and summary statements from the meeting are available (http://isc.ac.affrc.go.jp/reports/isc/isc10_reports.html#Plenary).

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 16). 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 86. Schedule of completed stock assessments for WPRFMC PMUS.

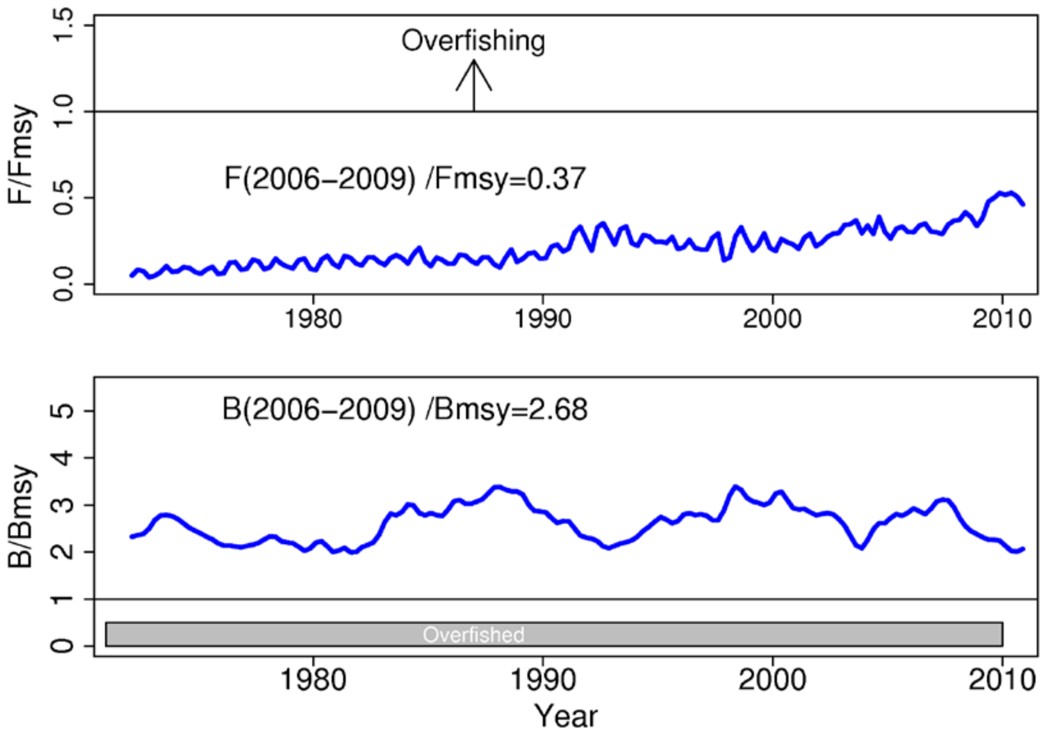
Albacore Tuna (S. Pacific)	2011	Swordfish (N. Pacific)	2009
Albacore Tuna (N. Pacific)	2011	Wahoo	
Other tuna relatives (Auxis sp., 2011(allothunnus sp., Scomber sp.)		Yellowfin Tuna (WCPO)	2011
Bigeye Tuna (WCPO)	2011	Kawakawa	
Black Marlin		Bluefin Tuna (Pacific)	2008
Blue Marlin	2002	Common Thresher Shark	
SharkBlue		Pelagic Thresher Shark	
Mahimahi		Bigeye Thresher Shark	
Oilfishes		Shotfin Mako Shark	
Opah		Longfin Mako Shark	
Pomfrets		Blue Shark (N. Pacific)	2009
Sailfish		Silky Shark	
Shortbill Spearfish		Oceanic Whitetip Shark	
Skipjack Tuna (WCPO)	2011	Salmon Shark	
Striped Marlin (N. Pacific)	2007	Squid	

Figure 157. 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

Figure 158. 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/F_{MSY} figure indicates an overfishing reference point. The shaded area in the B/B_{MSY} figure indicates an overfished reference point.



Stock status: The 2011 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 (Figure 17, Table 6).

Management advice and implications: Catches in 2010 were roughly 1.556 million mt, the second highest recorded and below the record high catch of 1.608 million mt in 2009. Equilibrium yield at the current F is about 1.14 million mt. This is about 76% of the MSY level. The assessment continues to show that the stock is currently only moderately exploited (FCUR/FMSY = 0.37) and fishing mortality levels are sustainable. However, there is concern that high catches in the equatorial region could result in range contractions of the stock, thus reducing skipjack availability to higher latitude (e.g. Japan, Australia, New Zealand, and Hawaii) fisheries.

If recent fishing patterns continue, catch rate levels are likely to decline and catch should decrease as stock levels are fished down to MSY levels. Due to the rapid change of the fishing mortality and biomass indicators relative to MSY in recent years, increases of fishing effort should be monitored. The Commission should consider developing limits on fishing for skipjack to limit the declines in catch rate associated with further declines in biomass.

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 Nino and La Nina events, which impact upon catch rates and stock size. Additional purse-seine effort will yield only modest gains in long-term skipjack 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.

Yellowfin tuna in the WCP-CA

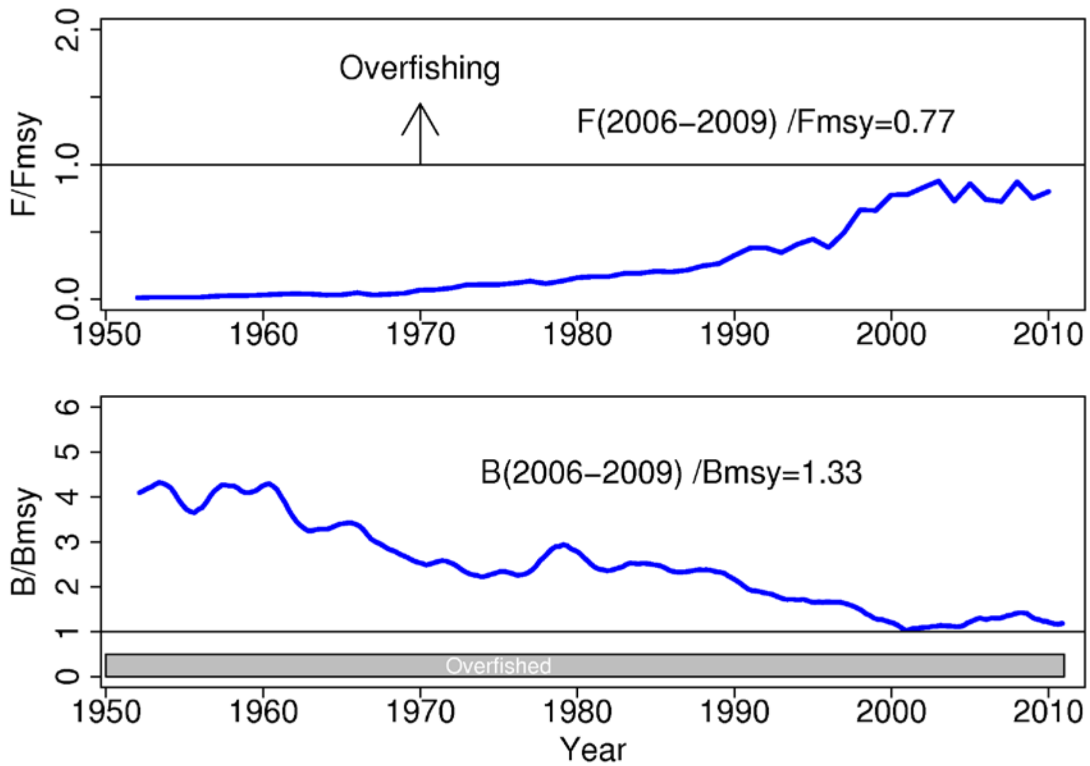
Stock status: The 2011 stock assessment indicates that for the yellowfin stock in the WCP-CA overfishing is not occurring ($F_{current}$ / F_{MSY} < 1), that the stock is not in an overfished state ($B_{current}$ / B_{MSY} > 1, Figure 18, Table 6).

Management advice and implications: The WCPFC Scientific Committee (SC) determined that the WCPO yellowfin appears to be capable of producing MSY. The stock is not experiencing overfishing and is not in an overfished state. Projections to 2021 indicate that fishing mortality is projected to remain below FMSY and the spawning biomass will remain above SB_{MSY}.

However, the SC noted that levels of fishing mortality, exploitation rates and depletion differ
between regions, and that exploitation rates were highest in the western equatorial region (region 3 in the stock assessment model), which accounts for ~81% of the total yellowfin tuna catch, and that the spawning biomass in this region is estimated to have declined to about 31% of the unexploited level (SBB_{2010},F=0).

The SC recommended that there be no increase in fishing mortality in the western equatorial
region. The increase in catch of juvenile yellowfin has resulted in a moderate (~40%) reduction in the potential yield of the WCPO yellowfin stock. The SC concluded that MSY levels would increase if the mortality of juvenile yellowfin was reduced.

Figure 159. 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)



Big eye tuna in the WCP-CA

Stock status: A stock assessment was undertaken for bigeye during 2011. The WCPFC choose a model to represent the basebase and 5 additional models to characterize uncertainty.

F_current/F_MSY is estimated at 1.46 (base case; range 1.16 – 2.10) indicating that overfishing is occurring for the WCPO bigeye tuna stock (Figure 19, Table 6) and that in order to reduce fishing mortality to F_{MSY} the base case indicates that a 32% reduction in fishing mortality is required from the 2006–2009 level. Considering historical levels of fishing mortality, a 39% reduction in fishing mortality from 2004 levels is required and a 28% reduction from average 2001–2004 levels (consistent with the aim of CMM2008-01).

The base case indicates that the current total and spawning biomass are higher than the associated MSY levels (*Bcurrent/B~MSY*=1.25 and *SBcurrent/SB*=1.19). However, two of the alternate models found that *SBcurrent* < 1.0 with a range across the six models considered of 0.86 – 1.49. Therefore, there is a possibility that bigeye tuna is currently in an overfished state.

An analysis of historical patterns in the mix of fishing gears indicates that MSY has been reduced
to less than half its levels prior to 1970 through increased harvest of juveniles. Recent overfishing could result in further losses in potential yields in the future.

Management advice and implications: The SC recommends a minimum of 32% reduction in fishing mortality from the average levels for 2006–2009 to return the fishing mortality rate to FMSY. This recommended level of reduction is equivalent to a minimum 39% reduction of the 2004 level in fishing mortality, and a 28% reduction of the average 2001–2004 levels.

It is too early to quantitatively conclude whether CMM2008-01 has reduced fishing mortality for
bigeye tuna to the levels specified in the CMM. Data for 2009 and 2010 have been incorporated into the stock assessments, but the data for these years are incomplete and estimates of fishing mortality in the final year of the model (2010) are particularly uncertain.

The FAD closure introduced in 2009 contributed to the reduction of bigeye catches in 2009 and
preliminarily in 2010 (Agenda item 4.3a). Total purse seine effort between 20N-20S is 14% and 21% higher in 2009 and 2010, respectively, relative to 2004, and is 27% and 35% higher in 2009 and 2010, respectively, relative to the average of 2001-2004 (for flag specific references, refer to attachment B, CMM 2008-01).

Total purse seine effort between 20N-20S has increased by 6% from 2008 to 2010 corresponding to the implementation of CMM2008-01 and 2009 was a near record high for associated school effort in spite of the two month FAD closure. This occurred because of an increase in days fished and the provisions and exemptions within the CMM2008-01 and a range of other reasons.

Longline catch in 2010 appeared to have been reduced by 34% from the 2001-2004 level and by 48% from 2004 (for flag specific references, refer to attachment F, CMM 2008-01). However this may be overestimated due to incomplete data for 2009 and 2010.

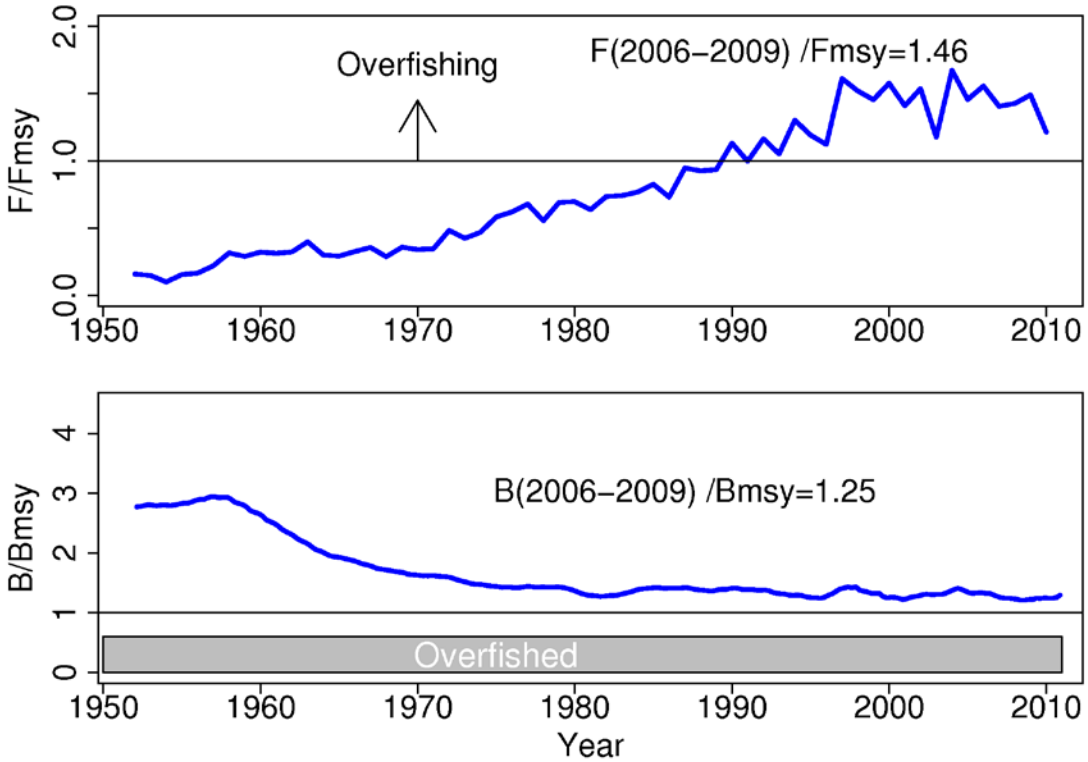
Reported catches since 2009 from the mix of surface fisheries in Indonesia and Philippines declined by 33% in 2010, however confirmation is required when more detailed data for 2010 are available including purse seine effort data.

Projections to 2021 indicate that fishing mortality would be reduced to close to the FMSY level, and the stock would move to a slightly overfished state. However, these conclusions should be treated with caution because projections are based on incomplete data and the assumption that catch and effort levels in 2010 will be maintained.

Overfishing and the increase in catch of juvenile bigeye have resulted in a considerable reduction in the potential yield of the WCPO bigeye stock. The SC concludes that *MSY* levels would increase if the mortality of juvenile bigeye was reduced.

The SC noted that levels of fishing mortality, exploitation rates and depletion differ between regions, and that exploitation and depletion rates were highest in equatorial regions (regions 3 and 4 in the stock assessment model), which accounts for 88% of the total bigeye tuna catch (2001-2010), and that the spawning biomass in these regions is estimated to have declined to about 17% of the level that is estimated to occur in the absence of fishing (SB2010, F=0). The Commission may consider measures that utilize a spatial management approach.

Figure 160. 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.

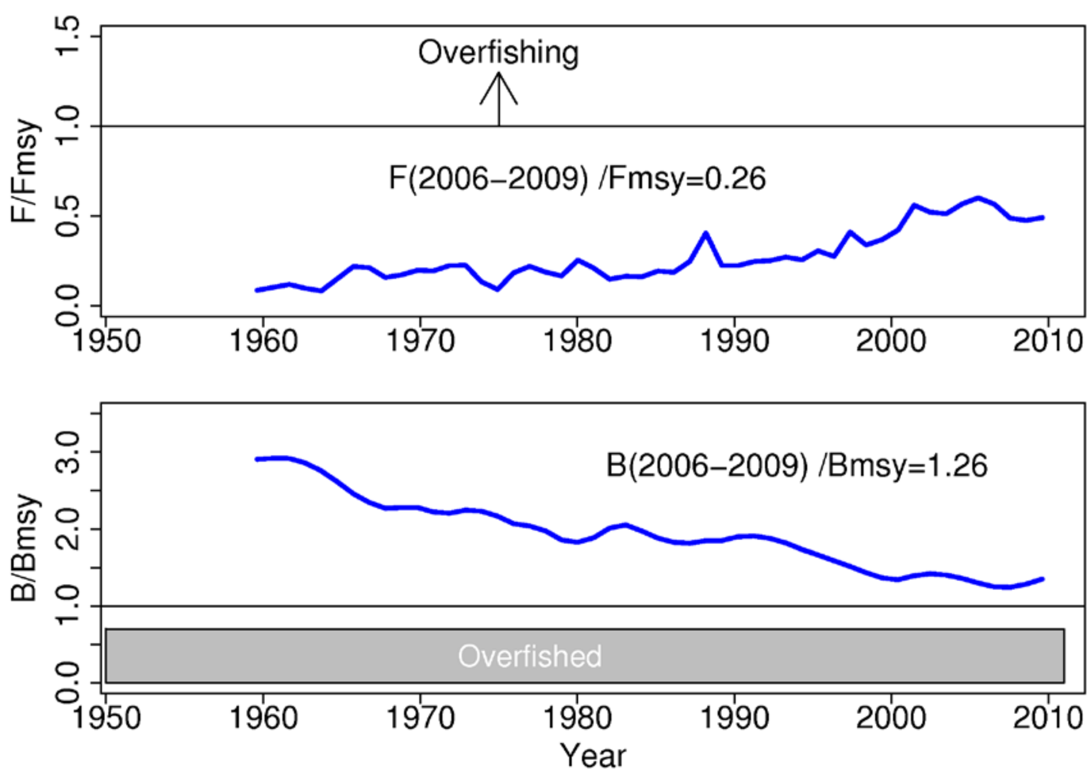


South Pacific albacore tuna

Stock status: A stock assessment was undertaken for albacore during 2011. The key conclusion of the reference case is that overfishing is not occurring and the stock is not in an overfished state (Figure 20, Table 6). Reference point levels estimated in the 2011 assessment were similar to those estimated in the 2009 assessment and depletion levels of albacore was moderate at ~37%. However SC7 noted that the depletion levels of albacore available to the longline fisheries north of 25S was above 50%.

Management implications: The South Pacific albacore stock is currently not overfished nor is overfishing occurring, and current biomass levels are sufficient to support current levels of catch. Any increases in catch or effort are likely to result in catch rate declines, especially relating to longline catches of adult albacore, with associated impacts upon vessel profitability. SC7 further notes that vessel activity must be managed, as per the requirements of CMM 2010-05.
Figure 20. 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

Figure 161. 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



Stock status – North Pacific albacore

An assessment was completed in June 2011. The ISC noted that F2006-2008 is significantly below F2002-2004 and provided the following recommendations on conservation advice:

a) The stock is considered to be healthy at average historical recruitment levels and fishing mortality (F2006-2008).

b) Sustainability is not threatened by overfishing as the F2006-2008 level (current F) is about 71% of FSSB-ATHL and the stock is expected to fluctuate around the long-term median SSB (~400,000 t) in the short- and long-term future.

c) If future recruitment declines by about 25% below average historical recruitment levels, then the risk of SSB falling below the SSB-ATHL threshold with 2006-2008 F levels increases to 54% indicating that the impact on the stock is unlikely to be sustainable.

d) Increasing F beyond F2006-2008 levels (current F) will not result in proportional increases in yield as a result of the population dynamics of this stock.

e) The current assessment results confirm that F has declined relative to the 2006 assessment, which is consistent with the intent of the previous (2006) WG recommendation.

Stock status – North Pacific striped marlin

Spawning biomass has declined from around 40,000 mt in the early 1970s to about 5,000 mt in the early 2000s. Spawning biomass in 2003 was estimated to be 14–15% of the 1970 level, depending on model scenario. Recruitment estimates also exhibited a long-term decline since the 1970s. Recent average recruitment (1996–2003) is roughly one-half of the long-term average (1965–2003) under both model scenarios. Stock projections from 2004 through 2009 based on re-sampling the distribution of recent average recruitment indicate that both spawning biomass and landings will continue to decline if the current fishing mortality rate (average of F2001−F2003) is maintained, regardless of model scenario. Fishing mortality has increased more than three-fold, from roughly F=0.20 in the early 1970s to over F=0.6 in the early 2000s. The current fishing mortality rate exceeds the F20% reference point by roughly 60% under both model scenarios. It was also noted that the current fishing mortality rate corresponds to maintaining only 9% of maximum spawning potential (F9%).

Stock status – North Pacific swordfish

The North Pacific WCPO and EPO SWO stocks were assessed by the ISC Billfish Working Group in 2009. Based on the 2009 stock assessment results, the exploitable biomass of the WCPO SWO stock was estimated to be about 75,000 t in 2006 (B2006), roughly 30% above BMSY. The exploitation rate on the WCPO stock in 2006 was estimated to be 14% with a total catch of roughly 9,900 t or roughly 69% of MSY (MSY=14,400 t). Based on the 2010 stock assessment update results for the EPO stock only, the exploitable biomass of the EPO SWO stock was estimated to be about 69,000 t in 2006, over 200% above BMSY. The ISC indicated that both the WCPO and EPO stocks of swordfish are healthy and above the level required to sustain recent catches.

Pacific bluefin tuna

Stock status: A summary of the 2010 assessment update is as follows:

1. A number of sensitivity runs were conducted in 2010 to investigate uncertainties in biological assumptions and fishery data. Results indicate that the assumption of adult M is particularly influential to the estimate of absolute spawning biomass and fishing mortality. Although absolute estimates from the stock assessment model were sensitive to different assumptions of M, relative measures were less sensitive.
2. The estimate of spawning biomass in 2008 (at the end of the 2007 fishing year) declined from 2006 and is estimated to be in the range of the 40-60 percentile of the historically observed spawning biomasses.
3. Average Fishing Mortality 2004-2006 (F2004-2006) had increased from F2002-2004 by 6% for age-0, approximately 30% for ages 1-4, and 6% for ages 5+.
4. 30-year projections predict that at F2004-2006 median spawning biomass is likely to decline to levels around the 25th percentile of historical spawning biomass with approximately 5% of the projections declining to or below the lowest previously observed spawning biomass. At F2002-2004 median spawning biomass is likely to decline in subsequent years but recover to levels near the median of the historically observed levels. In contrast to F2004-2006, F2002-2004 had no projections (0%) declining to the lowest observed spawning biomass. In both projections long-term average yield is expected to be lower than recent levels.

Management implications: ISC‘s plenary reached consensus on the management advice for Pacific bluefin tuna as follows: given the conclusions of the July 2010 PBFWG workshop, the current (2004–2006) level of F relative to potential biological reference points, and the increasing trend of F, it is important that the level of F is decreased below the 2002–2004 levels, particularly on juvenile age classes.

Table 87. 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/F_{MSY}=0.37	No	No	B/B_{MSY}=2.68	No	No	Hoyle et al. 2011	>0.5 yr^{-1}	0.5 B_{MSY}
Yellowfin Tuna (WCPO)	F/F_{MSY}=0.77	No	No	B/B_{MSY}=1.33	No	No	Langley et al. 2011	0.8-1.6 yr^{-1}	0.5 B_{MSY}
Albacore Tuna (S. Pacific)	F/F_{MSY}=0.26	No	No	B/B_{MSY}=1.26	No	No	Hoyle 2011	0.3 yr^{-1}	0.7 B_{MSY}
Albacore Tuna (N. Pacific)	Unknown			Unknown				0.3 yr^{-1}	0.7 B_{MSY}
Bigeye Tuna (WCPO)	F/F_{MSY}=1.46	Yes	Not applicable	B/B_{MSY}=1.25	No	No	Davies et al. 2011	0.4 yr^{-1}	0.6 B_{MSY}
Blue Marlin (Pacific)	F/F_{MSY}=0.50	No	Unknown	B/B_{MSY}=1.4	No	Unknown	Kleiber et al. 2002	0.2 yr^{-1}	0.8 B_{MSY}
Swordfish (N. Pacific)	F/F_{MSY}=0.54	No	Unknown	B/B_{MSY}=1.60	No	Unknown	ISC 2009	0.3 yr^{-1}	0.7 B_{MSY}
Blue Shark (N. Pacific)[2]	F/F_{MSY}=0.86	No	Unknown	B/B_{MSY}=1.11	No	Unknown	Kleiber et al. 2009	0.2 yr^{-1}	0.8 B_{MSY}
Other Billfishes	Unknown			Unknown				Unknown	
Other Pelagic Sharks	Unknown			Unknown				Unknown	
Other PMUS	Unknown			Unknown				Unknown	

[1] Estimates based on Boggs et al. 2000

[2] Assssment results based on run - A

Table 88. U.S. longline landings of reported to WCPFC and IATTC in 2010

U.S. and Territorial longline catch (mt) by species in the WCPFC Statistical Area, 2006-2010.																			U.S. and Territorial longline catch in P. Ocean N. of the Equator, 2006-2010.					U.S. longline catch in Eastern Pacific Ocean, 2006-201				
	U.S. in North Pacific Ocean					A. Samoa in N.P.		American Samoa					Total					U.S.					U.S.				
	2010	2009	2008	2007	2006	2010	2009	2010	2009	2008	2007	2006	2010	2009	2008	2007	2006	2010	2009	2008	2007	2006	2010	2009	2008	2007	2006
Vessels	124	127	129	129	127	11	10	26	26	28	29	28	147	151	155	156	154	125	128	130	130	128	118	102	119	85	25
Species																											
Albacore, North Pacific	326	178	298	243	256	33	2	0	0	0			359	179	298	243	256	409	201	353	250	270	50	22	55	7	14
Albacore, South Pacific		0	0			0	0	3,914	3,883	3,550	5,183	4,078	3,914	3,883	3,550	5,183	4,078	0	0	0			0	0	0		
Bigeye tuna	3,576	3,741	4,649	5,381	4,381	315	89	176	160	132	218	181	4,067	3,990	4,781	5,599	4,562	5,242	4,560	5,927	5,798	4,466	1,351	730	1,277	417	85
Pacific bluefin tuna	0	1	0	0	1	0	0	3	1	1	2	0	3	2	1	2	1	0	1	0	0	1	0	0	0	0	0
Skipjack tuna	114	117	117	91	93	12	4	108	151	165	162	190	234	271	282	253	283	149	136	121	93	94	23	16	4	1	1
Yellowfin tuna	462	429	836	833	937	28	12	441	386	333	640	513	930	826	1,169	1,473	1,450	544	524	869	844	958	54	84	33	11	21
Other tuna	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0
TOTAL TUNA	4,479	4,464	5,900	6,549	5,668	388	107	4,641	4,581	4,180	6,205	4,967	9,508	9,152	10,081	12,753	10,635	6,345	5,423	7,269	6,986	5,789	1,478	851	1,369	437	121
Black marlin	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	1	0	0	0	0	0	0
Blue marlin	238	334	333	255	409	10	4	39	37	34	38	25	287	374	367	293	433	293	357	348	262	409	45	20	15	7	0
Sailfish	9	10	10	10	9	0	0	1	2	1	1	6	11	11	11	11	15	10	10	11	10	9	1	1	1	0	0
Spearfish	79	97	210	141	160	5	1	2	3	1	1	2	86	100	211	142	162	114	111	226	148	161	30	14	16	7	1
Striped marlin, North Pacific	124	234	411	267	609	6	3	0	0	0			130	237	411	267	609	158	256	426	276	611	28	19	16	9	2
Striped marlin, South Pacific	0	0	0			0	0	2	4	1	1	4	2	4	1	1	4	0	0	0			0	0	0		
Other marlins	1	0	2	1	4	0	0	0	0	0	0	0	1	0	2	1	4	1	0	2	1	4	0	0	0	0	0
Swordfish, North Pacific	1,011	1,242	1,301	1,428	1,149	11	3	0	0	0			1,022	1,244	1,301	1,428	1,149	1,654	1,813	1,980	1,735	1,211	632	569	679	307	62
Swordfish, South Pacific	0	0	0			0	0	8	9	7	13	38	8	9	7	13	38	0	0	0			0	0	0		
TOTAL BILLFISH	1,462	1,916	2,267	2,103	2,340	33	10	52	54	43	54	75	1,547	1,980	2,310	2,156	2,415	2,232	2,549	2,994	2,433	2,405	737	623	727	331	66
Blue shark	6	9	7	6	10	0	0	1	1	1	1	1	7	9	7	7	10	7	9	7	8	10	1	1	0	3	0
Mako shark	62	102	109	119	94	2	0	0	0	0	0	1	65	102	109	120	95	90	119	131	128	97	25	17	22	9	2
Thresher	16	28	39	42	33	0	0	0	0	0	0	0	16	28	39	42	33	18	29	42	44	35	2	1	3	2	2
Other sharks	3	6	4	7	12	0	0	1	0	0	1	0	3	6	4	7	12	3	6	4	7	12	1	0	0	0	0
TOTAL SHARKS	87	144	159	174	149	3	0	2	1	1	2	1	92	146	160	176	151	118	164	184	188	154	29	19	25	14	4
Mahimahi	229	265	323	376	316	13	4	8	16	12	14	26	251	285	335	390	342	433	327	374	438	322	190	58	51	62	6
Moonfish	356	485	412	451	477	21	9	3	3	2	3	4	380	497	415	454	482	800	874	615	573	492	423	380	202	122	14
Oilfish	164	194	178	180	173	12	4	0	2	0	0	1	176	200	178	180	175	227	223	203	190	175	51	25	25	10	2
Pomfret	170	202	224	234	250	10	7	1	1	0	0	0	180	210	224	235	251	230	251	279	259	254	50	42	55	25	4
Wahoo	100	116	194	169	231	5	2	129	139	133	197	274	233	258	326	366	505	119	133	206	174	232	15	14	12	4	2
Other fish	10	8	14	10	14	0	0	1	1	0	0	0	11	8	14	10	14	12	8	14	10	14	2	0	0	0	0
TOTAL OTHER	1,029	1,269	1,345	1,420	1,462	61	26	141	162	148	215	306	1,231	1,458	1,493	1,635	1,768	1,821	1,815	1,690	1,642	1,489	732	519	345	223	27
GEAR TOTAL	7,056	7,794	9,671	10,246	9,619	485	144	4,836	4,798	4,372	6,475	5,349	12,378	12,736	14,043	16,720	14,968	10,516	9,950	12,137	11,249	9,837	2,975	2,012	2,466	1,004	218

U.S. longline catch is the sum of the Hawaii-based and California-based fisheries. American Samoa catch is presented separately.

U.S. longline catch estimates originate from the PIFSC enhanced (with eight estimates) logbook 5x5 degree summary database, and from the SWFSC for California

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F. Marine Recreational Fisheries of the Western Pacific Region

Introduction

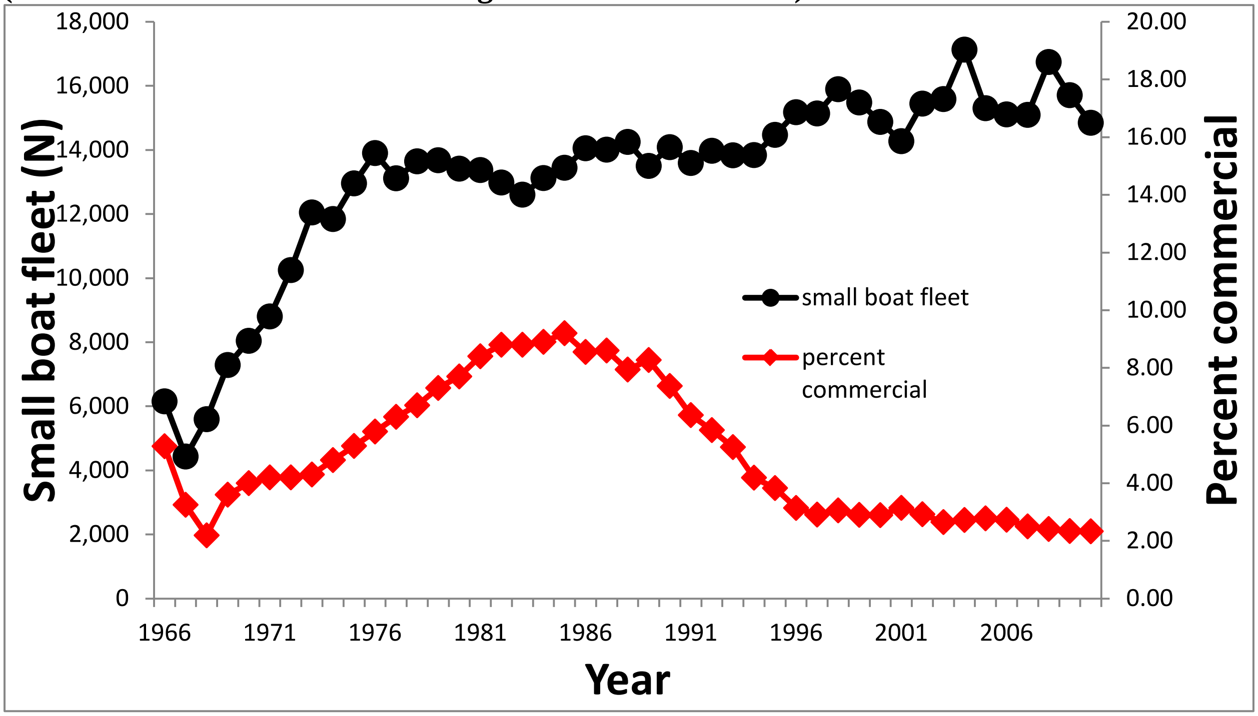
Fishing, either for subsistence or recreation, continues to be an important activity throughout the Western Pacific Region in the four major populated island areas of the Western Pacific Region, Hawaii, American Samoa, Guam and the Commonwealth of the Northern Mariana Islands (CNMI). Fish consumption 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 1). 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 to 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 162. Annual number of small vessel fleet registrations in Hawaii, 1966-2010. Figure shows 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 be 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. In 1997, the SSA listed approximately 40 members.

A recent innovation in the Mariana Island 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[3]. 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 2010, PPGFA played host to the 11th 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[4], which is concerned primarily with industrial work such as underwater welding, construction, and salvage, also includes for-hire fishing among the services it offers.

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3 http://ppgfa.com/page/about-ppgfa

4 http://pagopagomarinecharters.com/

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 catch for the Western Pacific are given in Table 1. The data for Guam, Northern Mariana Islands 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 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 89. Estimated recreational pelagic fish catches in the four principal island groups of the Western Pacific Region in 2010

Location	Total catch (lbs)	Unsold catch (lb)	Nominal recreational catch (lb)	Recr. catch as % of total catch	Recr. fishing trips
American Samoa	81,243	6,259	857	1.1%	66
Guam	613,237	251,273	229,982	37.5%	10,772
Hawaii	40,411,938	NA	12,482,349	30.9%	396,338
NMI	403,555	72,049	62,599	15.5%	3,753

Charter vessel sports-fishing

Tables 2-6 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 2010 only formed about a quarter of the charter vessel catch and was superseded by yellowfin and mahmahi. Although commercial troll vessels take blue marlin, these comprise only about a ten percent of their catch, with the majority of the target species being yellowfin, mahimahi, and wahoo (Table 3). 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 8.4 %

of the troll catch and 36% and 13% 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. Tourism is not a significant component of the American Samoa economy, and hence there is little charter fishing activity. As noted previously, there are few vessels suitable for charter-type operations (Tulafono 2001).

Table 90. Estimated catches by pelagic charter fishing vessels in Guam, Hawaii and Northern Mariana Islands in 2010

Location	Catch (lb)	Effort (trips)	Principal species
Guam	60,951	1,736	Mahimahi, Blue marlin, Skipjack, Wahoo
Hawaii	536,679	9,429	Yellowfin, Mahimahi, Blue marlin, Wahoo
CNMI	5,937	119	Wahoo, Skipjack, 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 in local markets, as is the case in Hawaii. The catch composition of charter vessel catch versus conventional commercial trolling in Hawaii reflects the different target species of the two fisheries. Blue marlins are the dominant feature of charter vessels in Hawaii, while in Guam (Tables 3 & 4), the charter catch composition is broadly similar to the species mix of commercial troll catches.

Table 91. Comparison of species composition of landings made by Hawaii pelagic charter vessels versus commercial troll vessels, 2010

	Charter		Commercial	
Species	**Landings (lb)**	**Percent**	**Landings (lb)**	**Percent**
Yellowfin tuna	148,656	27.70%	689,812	33.12%
Mahimahi	142,536	26.56%	464,943	22.32%
Blue marlin	127,314	23.72%	156,374	7.51%
Wahoo	57,526	10.72%	387,326	18.60%
Skipjack	34,362	6.40%	160,282	7.70%
S.N. spearfish	9,792	1.82%	7,396	0.36%
Others	6,570	1.22%	44,507	2.14%
Bigeye tuna	4,275	0.80%	159,938	7.68%
Striped marlin	4,097	0.76%	6,505	0.31%
Kawakawa	1,552	0.29%	5,571	0.27%
Total	536,679	100.00%	2,082,654	100.00%

Table 92. Comparison of species composition of landings made by Guam pelagic charter vessels versus commercial troll vessels, 2010

	Charter		Commercial	
Species	**Landings (lb)**	**Percent**	**Landings (lb)**	**Percent**
Mahimahi	36,259	59.49%	252,168	37.90%
Blue Marlin	11,204	18.38%	19,607	2.95%
Skipjack Tuna	9,255	15.18%	313,227	47.08%
Wahoo	2,902	4.76%	42,505	6.39%
Yellowfin Tuna	843	1.38%	23,756	3.57%
Others	488	0.80%	14,087	2.12%
Total	60,951	100.00%	665,350	100.00%

In Hawaii, there is considerable variation in charter vessel catches between the various islands (Table 5), with the largest charter vessel fishery based on the island of Hawaii. In 2010, charter vessel catches on the island of Hawaii accounted for nearly 32% of the total charter vessel landings within the state, with Oahu, Kauai, and Maui County charter vessels forming the remaining charter vessel catch.

Table 93. Charter vessel catches in Hawaii by island, 2010

Island	**Catch (lb)**	**Percent**	**Trips**	**Percent**	**CPUE (lb/trip)**
Hawaii	169,524	31.59%	4,069	43.15%	41.66
Kauai	73617.5	13.72%	1,181	12.53%	62.33
Maui County	90852.3	16.93%	2,096	22.23%	43.34
Oahu	202685.4	37.77%	2,083	22.09%	97.30
Total	**536,679**	**100.00%**	**9,429**	**100.00%**	**56.91**

* DAR confidentiality protocols prevent reporting 2007 charter vessel activity for Molokai and Lanai separately, and these are aggregated with data for Maui, reported collectively as Maui County

Most charter fishing on the island of Hawaii is conducted from Kona's small boat harbor at Honokohau, and about 38% of the charter vessel catch is blue marlin (Table 6). Blue marlin used to be 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, and mahimahi tend to dominate charter vessel landings, although in 2010 skipjack was the second most important fish for the Kauai charter fishery. Blue marlin comprised between 9% and 22% of catches at Oahu, Maui and Kauai. Other important species in charter vessel catches, depending on location, include wahoo and shortnose spearfish.

Table 94. Composition of charter vessel catches in the Main Hawaiian Islands, 2010

Hawaii	Landings (lb)	Percent	Kauai	Landings (lb)	Percent
Blue marlin	65,031	38.36%	Yellowfin tuna	33,212	45.11%
Yellowfin tuna	46,066	27.17%	Skipjack	15,309	20.79%
Wahoo	21,640	12.76%	Mahimahi	7,819	10.62%
Mahimahi	21,411	12.63%	Wahoo	7,275	9.88%
Shortnose spearfish	6,722	3.96%	Blue marlin	6,691	9.09%
Skipjack	4,532	2.67%	Striped marlin	941	1.28%
Bigeye tuna	1,911	1.13%	Kawakawa	307	0.42%
Striped marlin	1,612	0.95%			
Other	601	0.35%	Other	2,064	2.80%
Total	169,524	100.00%	**Total**	73,618	100.00%

Maui	Landings (lb)	Percent	Oahu	Landings (lb)	Percent
Mahimahi	43,256	47.61%	Mahimahi	70,051	34.56%
Blue marlin	19,341	21.29%	Yellowfin tuna	61,818	30.50%
Wahoo	15,379	16.93%	Blue marlin	36,251	17.89%
Yellowfin tuna	7,560	8.32%	Skipjack	13,374	6.60%
Skipjack	1,148	1.26%	Wahoo	13,233	6.53%
Bigeye tuna	929	1.02%	Shortnose spearfish	2,172	1.07%
Shortnose spearfish	898	0.99%	Bigeye tuna	1,436	0.71%
Striped marlin	242	0.27%	Striped marlin	1,303	0.64%
			Kawakawa	1,245	0.61%
Other	2,101	2,31%	Other	1,804	0.89%
Total	90,852	100.00%	**Total**	202,685	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 weighted proportionately to 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 7 provides summaries of the recreational boat and shoreline fish catch between 2003 and 2010 for pelagic and other species of fish.

Table 95. Recreational fish catches in Hawaii between 2003 and 2010. Source: HDAR HMFRS and NMFS PIFSC

Year	(Fish type)	Boat –based (lbs)	Shore-based (lbs)	Total
2003	Pelagic	14,905,992	422,434	15,328,426
	Others	517,119	1,429,637	1,946,756
	Total	15,423,111	1,852,071	17,275,182
2004	Pelagic	12,210,684	120,780	12,331,464
	Others	1,193,998	1,148,203	2,342,202
	Total	13,404,683	1,268,983	14,673,666
2005	Pelagic	12,804,980	229,060	13,034,040
	Others	795,859	1,015,650	1,811,509
	Total	13,600,839	1,244,710	14,845,549
2006	Pelagic	11,830,852	258,802	12,089,653
	Others	856,243	1,519,289	2,375,533
	Total	12,687,095	1,778,091	14,465,186
2007	Pelagic	13,956,647	114,831	14,071,478
	Others	404,284	346,457	750,741
	Total	14,360,931	461,288	14,822,219
2008	Pelagic	21,802,390	56,937	21,859,327
	Others	231,584	773,611	1,005,195
	Total	22,033,974	830,548	22,864,522
2009	Pelagic	17,071,412	66,635	17,138,048
	Others	272,841	369,993	642,834
	Total	17,344,253	436,629	17,780,882
2010	Pelagic	11,754,054	14,469	11,768,523
	Others	728,295	492,484	1,220,778
	Total	12,482,349	506,952	12,989,301

Figures 2-5 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 2010. Figure 6 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 2) followed by yellowfin tuna, mahimahi and wahoo. In terms of weight, however, yellowfin tuna dominates recreational pelagic fish catches (Figure 3).

Although blue marlin numbers in the catch are small compared to other species, because of their much greater average size (Figure 4) they 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 considerably between years for blue marlin, striped marlin and yellowfin tuna. This is also reflected in the nominal catch rate (lbs/trip) in Figure 5, where yellowfin catch rate was high in 2003, declined in 2004 and 2005, and then increased to a peak in 2009. Yellowfin catch rates declined in 2010 but were comparable to 2003 and 2007. 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 163. Catch number estimates for six major pelagic species in 2003-2010. Black vertical bars are 95% confidence intervals.

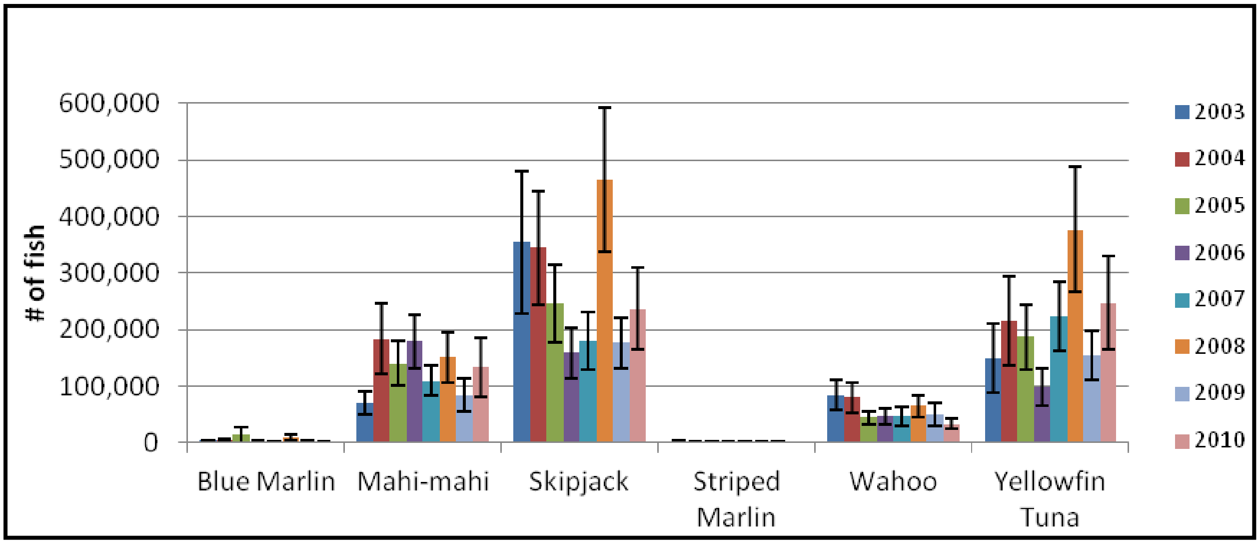


Figure 164. Annual recreational fishery landings by weight of six major pelagic fish species in Hawaii between 2003 and 2010

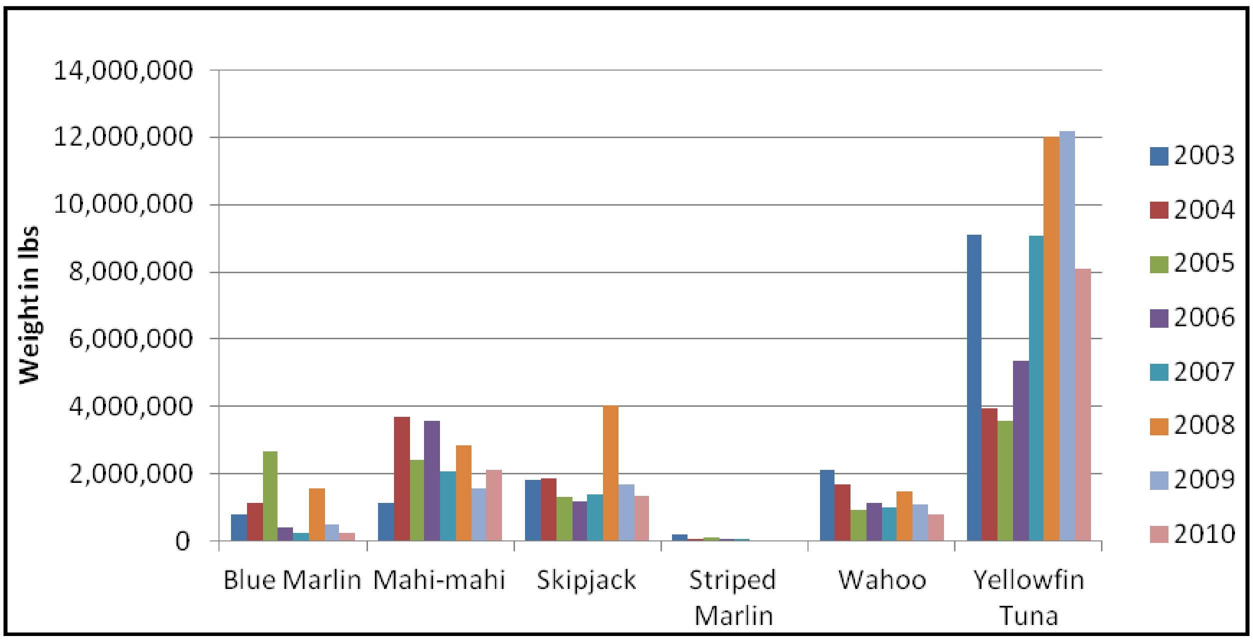


Figure 165. Average weight of six major pelagic fish species caught by recreational fishing in Hawaii between 2003 and 2010

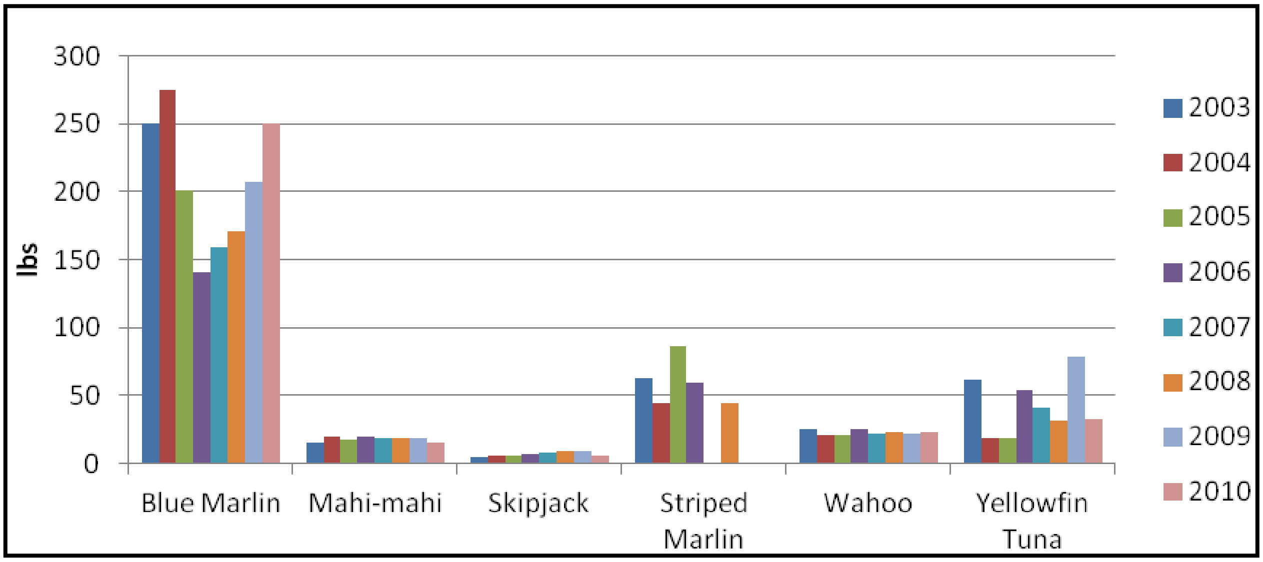


Figure 166. Annual recreational catch per unit effort (lbs per trip) for six major pelagic species in Hawaii between 2003 and 2008

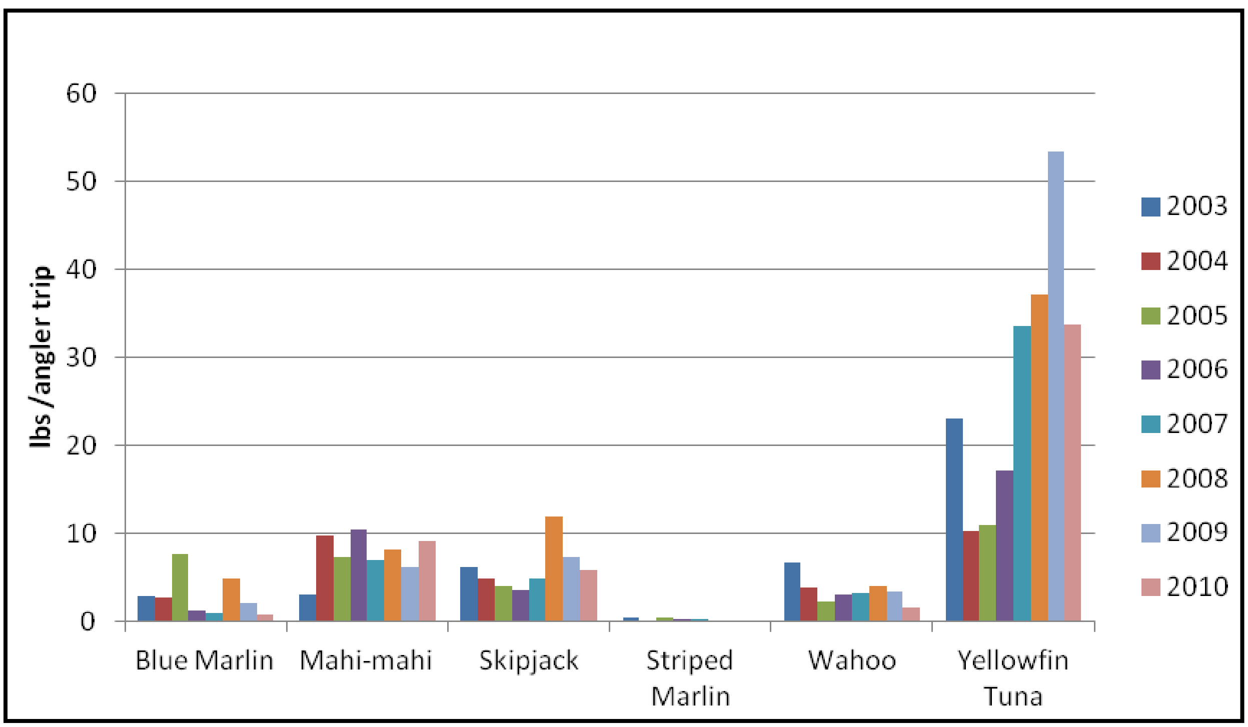
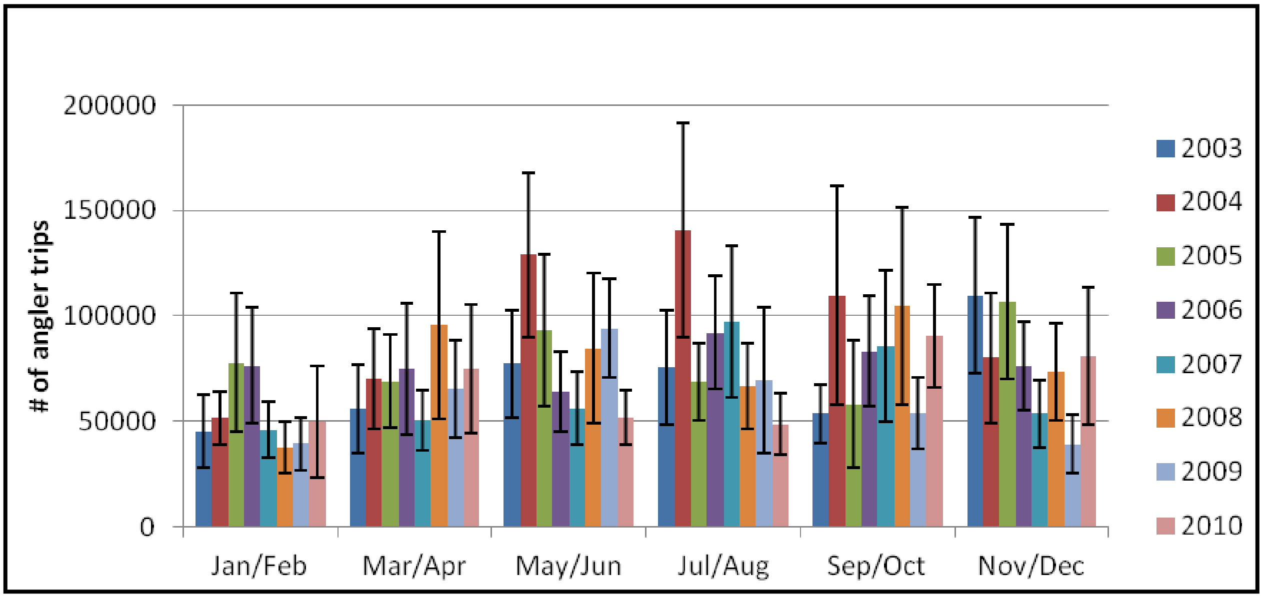


Figure 167. Boat fishing trip estimates (number of angler trips) (2003-2010). Black vertical bars are 95% confidence intervals.



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G. U.S. West Coast Pelagic Fisheries Production

The following tables include time series for pelagic fisheries production along the US West Coast between 2000 and 2010. All data comes from the Pacific Fisheries Information Network website at http://www.psmfc.org/pacfin/woc.html.

Table 96. Annual West Coast Highly Migratory Species Landings (mt) by Species

Year	Albacore	Yellowfin	Skipjack	Bigeye	Bluefin	Swordfish	Common Thresher	Big-eye Thresher	Pelagic Thresher	Shortfin Mako	Blue shark
2000	9041	1148	780	87	312	2652	295	5	3	80	1
2001	11,183	655	58	53	196	2195	373	2	2	46	2
2002	10,028	544	236	10	11	1697	315	0	0	82	42
2003	16,643	465	349	35	36	2126	294	5	4	69	<1
2004	14,469	488	307	22	38	1185	115	5	2	54	<1
2005	9,083	285	522	0	206	294	178	10	<1	33	<1
2006	12,749	77	48	0	<1	539	159	4	<1	46	<1
2007	11,586	104	5	0	45	550	204	5	2	45	10
2008	11,131	65	3	28	<1	531	148	7	0	35	<1
2009	12,307	45	5	0	415	407	106	7	0	30	2
2010	11,855	0.8	0	0	1.3	370	96	0	0	22	0.2

Table 97. Annual Value ($) of West Coast Highly Migratory Landings by Species

Year	Albacore	Yellowfin	Skipjack	Bigeye	Bluefin	Swordfish	Common Thresher	Pelagic Thresher	Bigeye Thresher	Shortfin Mako	Blue Shark
2000	17,154,639	1,294,388	483,242	579,384	577,095	11,772,245	587,702	2,738	4,636	132,970	909
2001	20,687,195	465,558	33,633	320,855	473,821	8,696,689	595,542	2,767	8,428	75,780	1,501
2002	14,291,939	588,677	128,425	87,304	43,512	6,320,439	517,715	N.A.	N.A.	124,522	18,598
2003	24,424,823	450,925	159,961	262,768	75,396	7,797,738	476,067	2,907	3,463	113,689	714
2004	27,345,860	447,555	109,254	147,696	53,613	4,824,309	196,360	2,500	4,060	97,280	972
2005	21,002,429	316,368	292,121	0	136,848	1,872,431	271,451	588	6,234	57,758	1,610
2006	23,759,098	175,646	40,384	0	3,790	2,695,302	299,709	271	4,509	79,313	632
2007	21,663,546	149,568	4,361	0	58,106	3,131,178	337,770	2,903	4,334	78,569	1,984
2008	28,853,123	125,508	3,675	205,536	3,340	2,372,762	280,885	0	5,459	67,255	177
2009	27,584,153	166,620	5,332	0	443,095	1,929,884	197,718	0	5,453	54,463	2,361
2010	29,572,460	6,681	0	0	6,363	2,206,415	156,909	0	0	36,250	177

[1]Real values are current values adjusted to eliminate the effects of inflation by dividing current values by the current year GDP implicit price deflator, with a base year of 1999.

Appendix 1

Pelagic Plan Team Members

<u>Pelagics</u>

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Mr. Nonu Tuisamoa	American Samoa Dept. of Marine & Wildlife Resources
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Appendix 2

Glossary of Terms and List of Acronyms

Glossary of Terms

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.

List of Acronyms

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.
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.
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.
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.
HURL	Hawaii Undersea Research Lab.
JIMAR	Joint Institute of Marine and Atmospheric Research, University of Hawaii.
IATTC	Inter-American Tropical Tuna Commission.
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).
MSY	Maximum Sustainable Yield.
NMFS	National Marine Fisheries Service, National Oceanic and Atmospheric Administration, Department of Commerce. Also NOAA Fisheries.
NOAA	National Oceanic and Atmospheric Administration, 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.
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.
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.