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Amendment to the Fishery Ecosystem Plan for Pelagic Fisheries of the Western Pacific Region

Proposed Exemption to fish in the Large Pelagic Vessel Areas (LVPA) in American Samoa

Including an Environmental Assessment (and Regulatory Impact Review)

May 17, 2014

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1.0 Abstract

This preliminary draft amendment to the pelagics FEP considers the potential fishery and environmental effects of a recommendation by the Western Pacific Regional Fishery Management Council to improve the economic efficiency of the American Samoa longline fishery. The Council recommended that a temporary exemption to fish within the large pelagic vessels fishing area (LVPA) which currently amounts to about 26% of the current extent of the area closure (30,210 sq nm). The exemption to fish within parts of the LVPA under the Council's preferred alternative means that only 18.3% of the US EEZ would be closed, as opposed to 26% at present. Another alternative, which includes exemptions to fish in the southern part of the LVPA, to the east and west of South Bank would mean that only 15.2% of the US EEZ would be closed as opposed to 17.4% under the preferred alternative. The increased area over which the large longline vessels could fish may reduce trip lengths and competition between longliners and improve economic efficiency. The locations of areas that would be available to fishing by large longline vessels would continue to prevent conflicts between troll fishing vessels from Tutuila.

1.1 Document Overview and Preparers

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2.3 List of Acronyms and Abbreviations

ASG	American Samoa Government
CMM	conservation and management measure
CPUE	catch per unit of effort
Council	Western Pacific Fishery Management Council
DMWR	American Samoa's Department of Marine and Wildlife Resources
EA	environmental assessment
EEZ	Exclusive Economic Zone
EFH	Essential Fish Habitat
EPO	eastern Pacific Ocean
ESA	Endangered Species Act
FAD	fish aggregating device
FEP	fishery ecosystem plan
FMP	fishery management plan
FR	Federal Register
HAPC	Habitat Areas of Particular Concern
IATTC	Inter-American Tropical Tuna Commission
ITS	Incidental Take Statement
MMPA	Marine Mammal Protection Act
MSY	maximum sustainable yield
MUS	management unit species
NMFS	National Marine Fisheries Service
NEPA	National Environmental Policy Act
NOAA	National Oceanic and Atmospheric Administration
PIFSC	Pacific Islands Fisheries Science Center
PIRO	Pacific Islands Regional Office
RFMO	regional fishery management organization
SEC	South Equatorial Current
SECC	South Equatorial Counter Current
SSC	Scientific and Statistical Committee
SPC	Secretariat of the Pacific Community
USCG	U.S. Coast Guard
USFWS	U.S. Fish and Wildlife Service
VMS	vessel monitoring system
WCPFC	Western and Central Pacific Fisheries Commission
WCPO	western and central Pacific Ocean

3.0 Introduction

3.1 Background Information

The American Samoa longline fishery has suffered poor economic conditions. In 2013, longline vessels based in American Samoa recorded their lowest annual catch in the past decade. The catch of the American Samoa longline fleet reached a maximum of about 6,000 mt (more than 300,000 fish) in 2002, and catches have declined since 2007. The catch per uinit of effort (CPUE) has declined by 40% on average, and the 2013 catch rate is a record low and 70% less than the highest catch rate, recorded in 1996 (Figure 1).

A low of about 2000 mt (~117,000 fish) was recorded in 2013, and there is no prospect that there will be a rapid improvement in fishing conditions in 2014 (Figure 2).

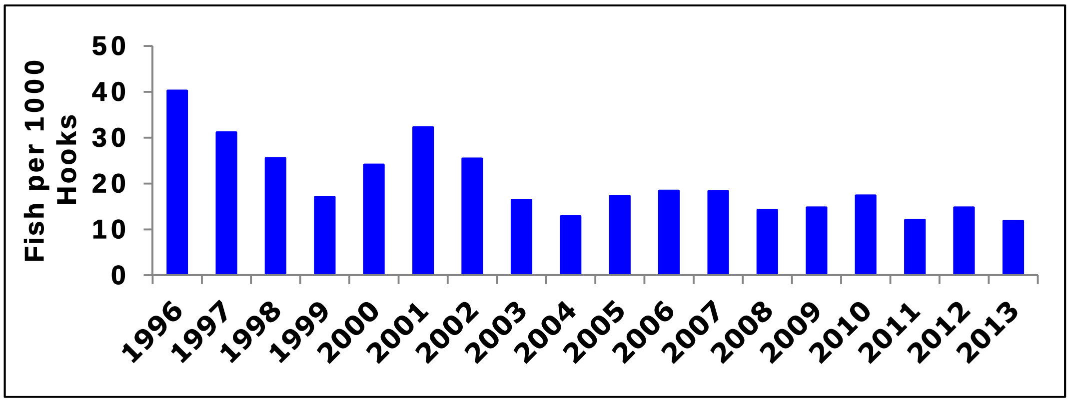

Figure 1 Time series of albacore CPUE in the American Samoa longline fishery 1996-2013
Source: NMFS WPacFIN[1] plus unpublished data

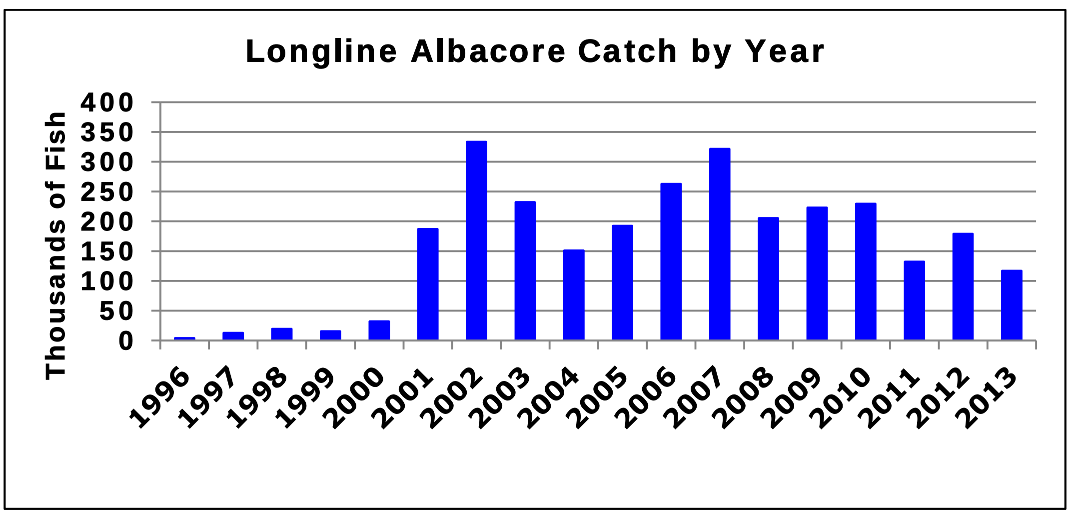

Figure 2 Time series of albacore landings by the American Samoa longline fishery 1996-2013
Source: NMFS WPacFIN plus unpublished data

[1] http://www.pifsc.noaa.gov/wpacfin/as/Pages/as_data_2.php

The fishery is strongly seasonal with a low period in the Austral summer between December and April. Typically, vessels experience lower catches in these months and fishing effort is much lower than the rest of the year (Figure 3). However, even the peak of the fishing season in 2013 has failed to yield sufficient catches to cover fishing expenses. Most vessels ceased fishing by the start of 2014 since catches were insufficient to cover operating costs and.

A study by NMFS PIFSC showed that a vessel operator could expect to clear $100,000 from the fishery in 2001. In 2009, this revenue had fallen by 94%, to $6,000, and has worsened since then (see Appendix 1). A sensitivity analysis which showed a very thin profit margin and small declines in CPUE or fish price would yield a negative net return to owners. An update of this study in 2014 showed that the fishery had indeed worsened in 2013 compared to 2009. There were further declines in CPUE, possibly due to localized depletion, lower fish prices and higher fuel costs with the expected negative net returns to owners.

The situation became so dire that in January 2014, American Samoa-based owners en masse have offered their vessels for sale (Figure 4).

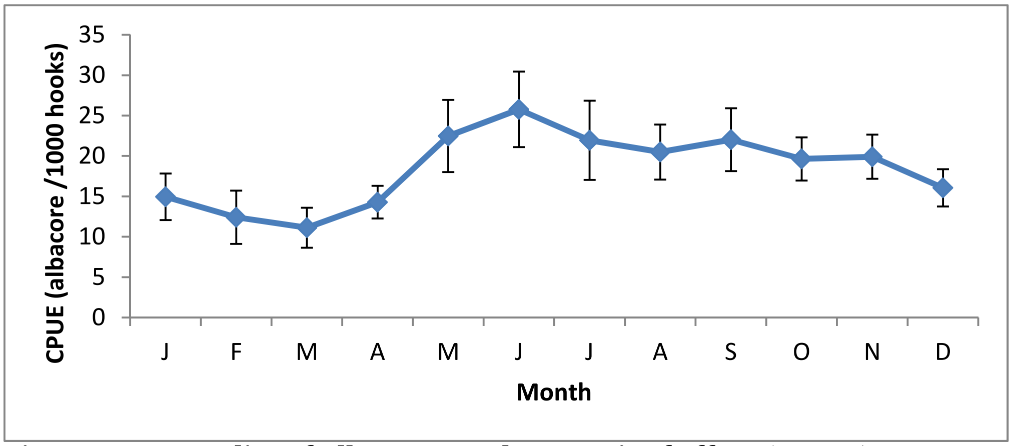

Figure 3 Seasonality of albacore catch per unit of effort (CPUE)
Source: NMFS WPacFIN

Figure 4 Longline vessels for sale in American Samoa in February 2013. Source:

Nate Ilaoa, Council Staff

This collapse is not confined to American Samoa; it has also been documented across the Central South Pacific – from Fiji (Fiji Sun, Thursday January 16), Samoa (John Luff, Apia Export Fish Packers Ltd, Samoa, pers. comm.) Tonga (Charles Hufflett, Pacific Islands Tuna Industry Association, pers. comm.) and the Cook Islands (Josh Mitchell, Ministry of Foreign Affairs, pers. comm.) However, the fishery in French Polynesia is being maintained by government subsidies for now (C. Daxboeck, pers. comm.)

Anecdotal information from longline fishermen in American Samoa, Fiji, Samoa and other Pacific Islands indicates a shared perception that an influx of Chinese longline vessels across the region is mostly responsible for the collapse. The Chinese government has encouraged and facilitated substantial longline vessel construction in recent years and Chinese vessels enjoy generous subsidies on fuel, licensing, freight costs, exports, tax, loans and labor. This can be seen as an unfair advantage in that the government subsidies allow the Chinese longline vessels to fish heavily, even on fish species that may not be plentiful in a particular area at a particular time; in other words, this foreign fleet is not dependent on catches to continue to fish.

It is likely this influx of these vessels that has caused the South Pacific albacore catch to double from around 40,000 mt in 1990 to over 80,000 mt in 2012 (Figure 5). Most of this catch is taken in the EEZs of Pacific Island Countries (PICs) through access agreements for foreign longline vessels. These large catches by foreign vessels in areas outside of the U.S. EEZ around American Samoa are believed to be depressing CPUE in the U.S. EEZ around American Samoa. Low CPUE and low prices for fish that are caught are making it difficult for the American Samoa longline fishery to continue fishing for albacore.

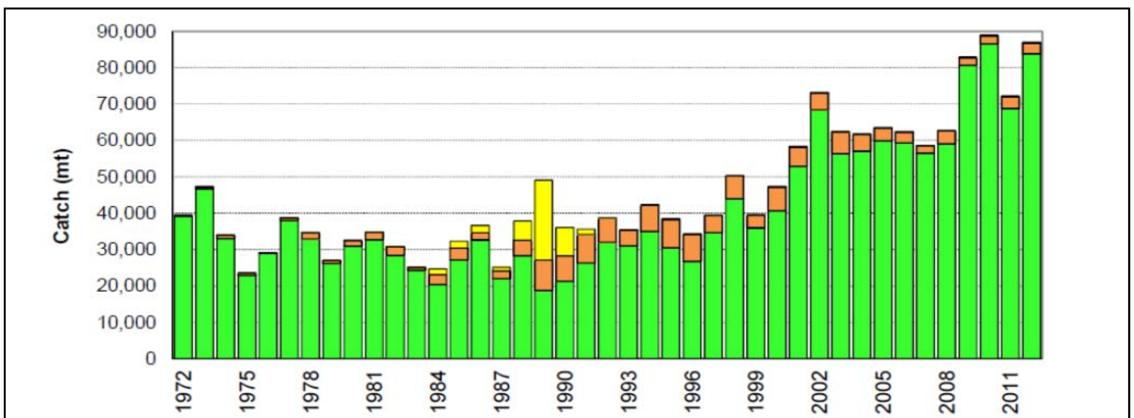

Figure 5 Time series of South Pacific albacore catch for all countries combined. Longline catches are shown in green
Source Williams & Terawasi 2012

4.0 Purpose and Need

The needs for this amendment is to provide temporary regulatory relief to the American Samoa longline fishery to enhance catches (or improve CPUE) and improve the viability of the American Samoa commercial longline fishery. There is also a need to provide a continued supply of sustainably caught, high quality albacore to the Pago Pago based cannery, and to continue to prevent competition between large longline fishing vessels and small, community-based non-commercial or recreational troll fishing vessels.

The purpose of the proposed action is to provide large longline vessels greater opportunities to catch SP Albacore in the U.S. EEZ around American Samoa and achieve optimum yield (OY), while continuing to promote conservation of SP Albacore stocks and preventing gear conflicts between large commercial longline fishing vessels and the alias and the locally based troll fleet. Another purpose is to temporarily enhance the longline fishery's ability to provide albacore to the local cannery.

5.0 Initial Actions

The state of the American Samoa longline fishery, and the issues described in Section 3.1 were discussed by the Council at its 159th Meeting in March 2014 held in Guam. At that meeting the Council made the following recommendation:

> The Council directed staff to prepare a draft regulatory/FEP amendment/Framework measure to the Pelagics FEP to modify the Large Vessel Prohibited Area (LVPA) and identify options to reduce, for a period of one year, the northern boundary of the LVPA around Tutuila, Manua, and Rose to 25 nautical miles and to reduce the LVPA around Swains to 12 nautical miles, as preliminarily preferred.

5.1. Recently Implemented Measures

A. Gear modifications. Completed in May 2011 and final rule published in August 2011

Pelagics FEP Amendment 5 implemented gear requirements for American Samoa longline vessels to ensure that all hooks are set below 100 m to reduce interaction with between the American Samoa longline fishery and green sea turtles. The amendment also set a trip retention limit of ten swordfish per longline fishing trip.

B. Modification of the boundaries of the southern large vessel (> 50 ft) area closure for congruency with the Rose Atoll Marine National Monument boundary. Completed in April 2011 and final rule published in April 2012

This amendment modified the boundaries to the southern portion of the large vessels area closure implemented around the American Samoa Archipelago. The large vessel closure had two functions; to prevent purse seine fishing in the immediate vicinity of the islands of American Samoa, and to provide a buffer between large conventional monohull longline vessels and smaller outboard powered artisanal alia longliners. The establishment of the Rose Atoll MNM by Presidential Proclamation in 2011 was done without consultation with the Council with the net result that the 50 nm monument boundary did not overlap congruently with the large vessel closure boundary. The modification was to make boundaries more congruent to enhance the ability of longline fishermen to comply with the LVPA. The LVPA around Tutuila and Manua became smaller in some areas which was expected to benefit the LL vessels.

5.2. Measures adopted by the Council but yet to be transmitted to NMFS

Modification of the American Samoa Limited Entry Permit Program Final Action Taken at 150th Council Meeting In March 2011

Large vessels, 50 ft and longer comprise > 95% of the American Samoa longline fishery in 2011. The lack of small vessel participation in the longline fishery is of concern to the Council, because this fleet, when active, is believed to provide a primary pathway for sustained community and indigenous American Samoan participation in the fishery. The amendment combines the four vessels size classes into just two classes A (vessels < 50f) and B (vessel > 50ft), reduces the minimum landing requirement for vessel size class A from 1000 lbs to 500 lbs per three year period, and permit eligibility would be limited to U.S. citizens and nationals, with no other qualifying criteria (i.e., documented history in the fishery would no longer be required). The prior history ranking system is maintained if there are two or more applications for the same available permit.

American Samoa Shallow-Set Longline Fishery for Swordfish, Final Action at 153 CM, March 2102, Sent to NMFS-PIRO for Review in May 2012 (detailked review in progress)

The final rule implementing gear modifications to minimize sea turtle interaction for the American Samoa longline fishery (see 1. A) requires all hooks set by the fishery to be deeper than 100 m. This eliminates the possibility of shallow-set targeting of South Pacific swordfish, which was conducted on a limited scale in 2006 and 2007, prior to the management action. One of the main concerns about shallow-set longlining is its potential to interact with protected species of sea turtles and seabirds, resulting in bycatch and unintentional mortality. The preferred alternative would amend the PFEP to permit the use of shallow-set longline fishing to target swordfish employing the full suite of mitigation measures required for sea turtle mitigation in the Hawaii shallow set fishery, but without the interaction limits for loggerhead and leatherback turtles, and no specific seabird mitigation measures.

American Samoa Longline Swordfish Trip Limit, Final Action June 2013

The final rule implementing gear modifications to minimize sea turtle interaction for the American Samoa longline fishery requires all hooks set by the fishery to be deeper than 100 m. Part of that measure was to implement a trip limit of 10 swordfish that may be retained per trip as a disincentive for fishermen to set hooks shallower than 100 m. The limit was adopted directly from the Hawaii longline fishery as a disincentive for fishermen to surreptitiously switch from deep setting to shallow setting on unobserved trips and thus maximize swordfish catches. American Samoa fishermen have asked that the current trip retention limit of 10 swordfish be increased, as it was in the Hawaii deep set longline fishery once that fishery was required tom use only circle hooks. American Samoa longline fishermen are suffering economic hardship from an economic downturn in the albacore longline fishery and do not want to discard economically important species which could be sold locally.

5.3 Related Council and NMFS Action

Establishment of American Samoa Large Pelagic Fishing Vessel Prohibited Areas

The final rule implementing the LVPAs in American Samoa was published on January 2, 2002. The purpose of the LVPAs was to prevent the potential for gear conflict and catch competition between large fishing vessels and locally based small fishing vessels. Such conflicts and competition could lead to reduced opportunities for sutained participation by residents in American Samoa

Amendment 7.

(describe here because the AS LL fishery would be subject to a 1,000 mt BET catch limit per year for 2014; and as specified thereafter.
6.0 Description of Alternatives

6.1. Alternative 1. No Action (Status Quo).

Under this alternative the areas closed to longline fishing by vessels > 50ft overall length would remain unchanged. Only those American Samoa longline vessels that had been grandfathered into the fishery prior to March 1 2002 would be able to fish within the LVPAs around around American Samoa./ Figure 6 shows the current LPVAs in American Samoa.

Under the no-action alternative, the America Samoa longline fishery is not expected to experience any relief from current LVPA requirements.

Alternative 2. Exemption for longline vessels holding an American Samoa longline limited entry permit to be able to fish seaward 25 nm to the north of Tutuila and Manua Islands and seaward from 12 nm around Swains Island for a period of:

Alternative 2a. One year exemption for permitted large longline vessels (Preferred)

Alternative 2b. Three year exemption for permitted large longline vessels

Under this alternative, those vessels holding American Samoa longline limited entry permits would receive an exemption to allow them to fish within LVPA to a distance of 25 nm to the north of Tutuila and Manua Islands, and to within 12 nm of Swains Island (Figure 6) for a period of one year (Alternative 2a) , or for a longer period of three years (Alternative 2b). The exemption opwuld permit the vessels to fiosh over an additional 8,618 sq nm of ocean Alternative 2a, a one year reduction is the Council's preliminary preferred alternative.

Under Alternative 2, the American Samoa longline fishery would experience some relief in terms of opening more areas to longline fishing including areas closer to Tutuila. The relief would be for a year (Alternative 2a), or up to 3 years (Alternative 2b). This alternative would have the effect of reducing fishing density within the U.S. EEZ around American Samoa and could provide more stability to the American Samoa longline fishery and the cannery.

Alternative 3. One year Exemption for longline vessels holding an American Samoa longline limited entry permit to be able to fish in waters of the LVPA:

i. seaward of 25 nm to the north of Tutuila and Manua Islands;
ii. seaward from 12 nm around Swains Islands; and,
iii. within designated waters south of Tutuila and Manua (Figure 7):

Alternative 3a. One year exemption for permitted large longline vessels (Preferred)

Alternative 3b. Three year exemption for permitted large longline vessels

Under this alternative, the northern boundary of the LVPA around Tutuila, Manua, and Rose would be reduced from 50 nm to 25 nm, and to within 12 nm of Swains Island. There would also be two exempted areas the south of Tutuila and Manua Islands. These exemptions would be for a period of one year or for a period of three years.

Under Alternative 3, the American Samoa longline fishery would experience some relief in terms of opening more areas to longline fishing including areas closer to Tutuila (10,333 sq. nm in total) . The relief would be for a year (Alternative 2a), or up to 3 years (Alternative 2b). This alternative would have the effect of reducing fishing density within the U.S. EEZ around American Samoa and could provide more stability to the American Samoa longline fishery and the cannery

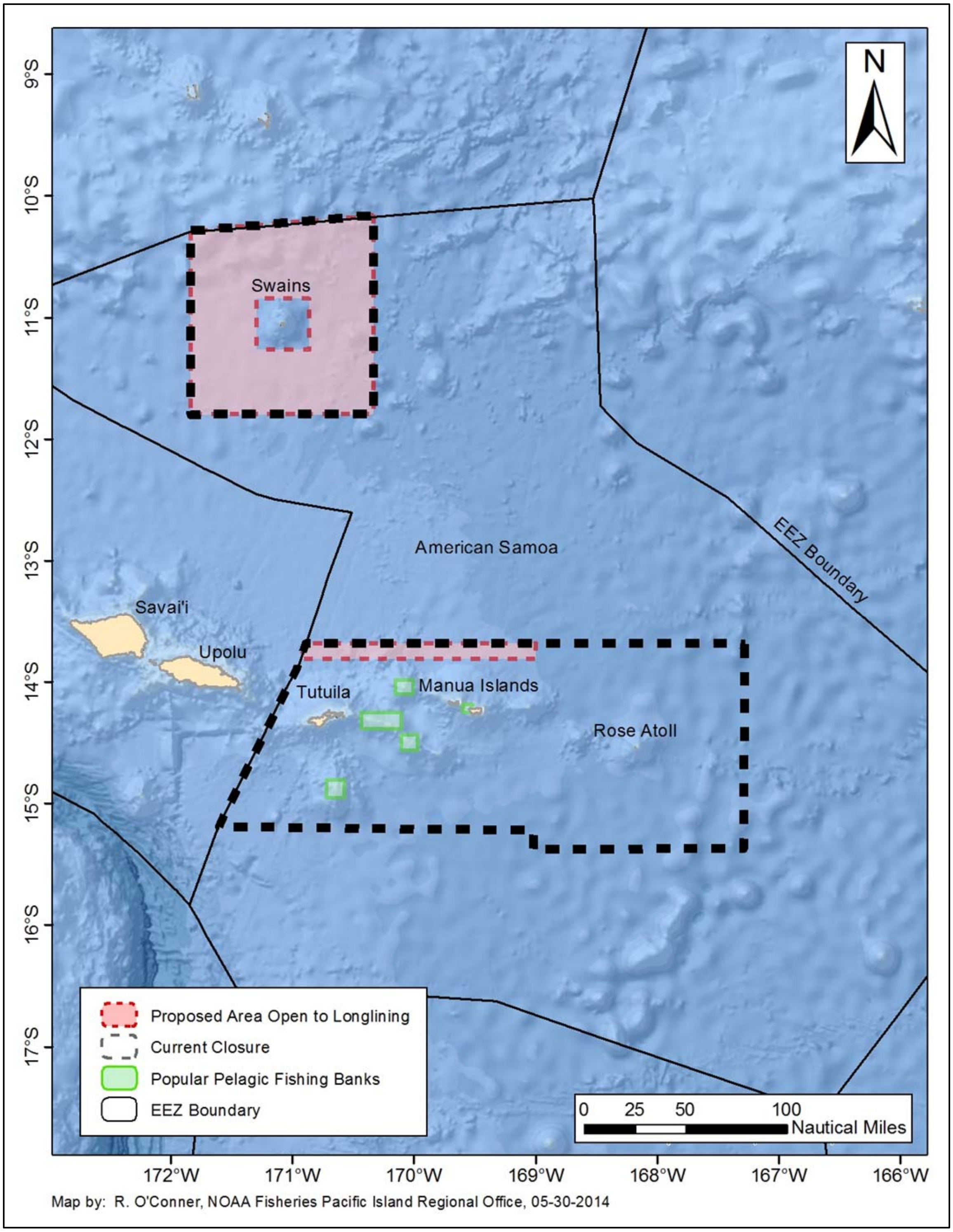

Figure 6. Map of American Samoa showing the current LVPA boundaries, exempted areas to 25 nautical miles of the LPVA boundary north of Tutuila and Manua Islands and 12 nautical miles around Swains, and commonly fished banks and seamounts between Tutuila and Manua Islands

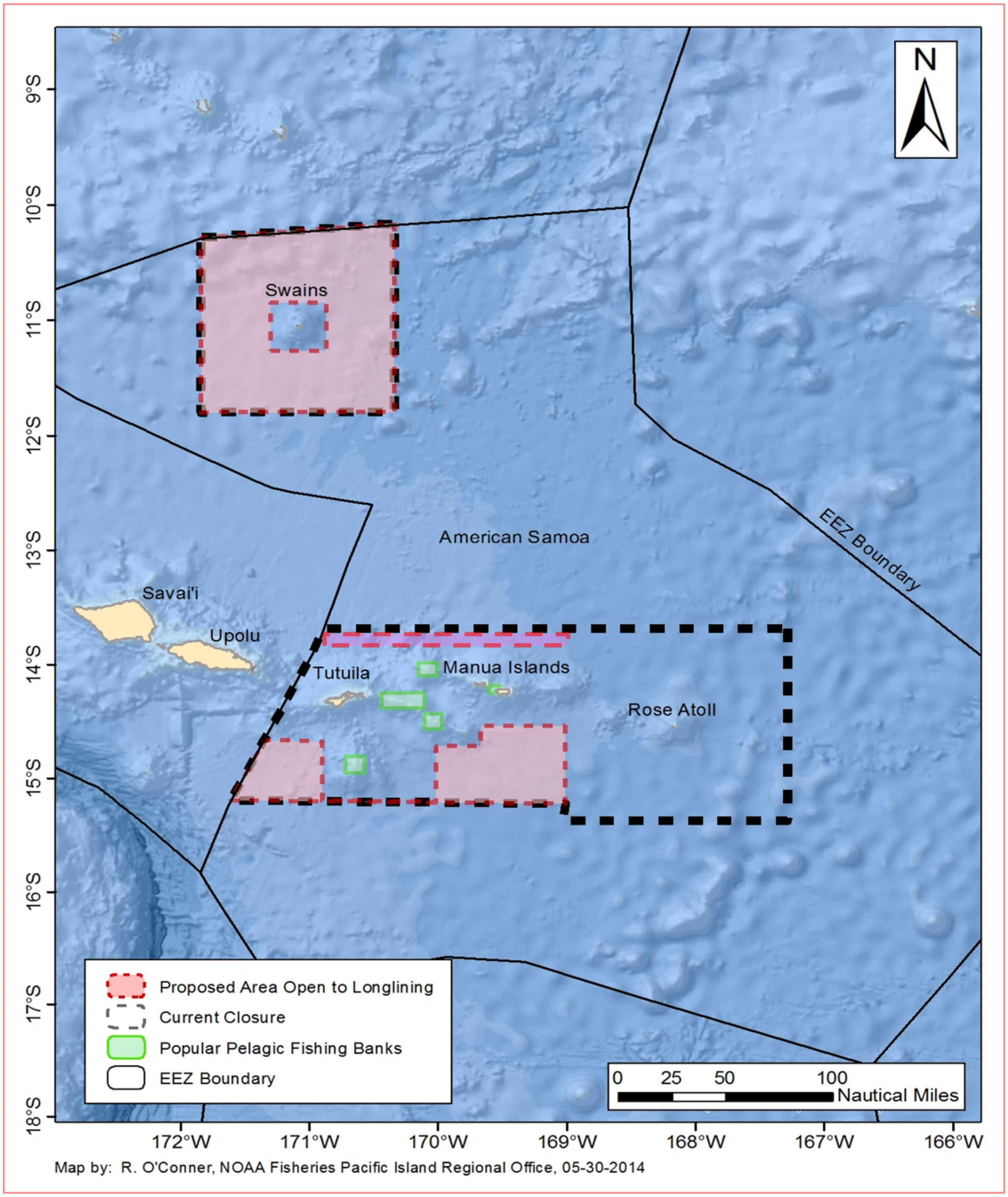

Figure 7. Map of American Samoa showing the current LVPA boundaries, exempted areas to 25 nautical miles of the LPVA boundary north of Tutuila and Manua Islands, 12 nautical miles around Swains, and areas south of Manua and Tutuila. Commonly fished banks and seamounts between Tutuila and Manua Islands are also shown

6.5. Alternatives considered but no analyzed in detail

The Council considered but did not take action on removing the restrictions and conditions for holding an American Samoa longline limited entry permit in order to fish in the LPVAs.

The American Samoa limited entry program was designed to maximize American Samoan participation in the longline fishery based out of Pago Pago. It has an overall limit of 60 permits which are spread between four size classes of vessels, namely 30-40 ft, 40-50 ft, 50-70 ft and >70 ft. Holders of an American Samoa permit must land a minimum volume of fish in order to renew their permits. Further, permits are tied to fishing vessels so a permit holder must surrender their permit to NMFS if they lose or sell their boat and do not replace it. By contrast, Hawaii longline permit holders may renew their permits without vessel ownership and have no landing requirements to maintain permit ownership

The Council recognized that the American Samoa limited entry program may be acting as a disincentive for participation in the fishery. At its 150th meeting (March 2011; American Samoa), the Council took final action and recommended to:

- **Combine A and B permits and C and D permits into new Small class (vessels up to 49.9 ft) and Large class (vessels 50 ft and above)**
- **Reduce landing requirements for Small class from 1000 lb to 500 lb/3yrs. Maintain 5000 lb/3yrs landing requirement for Large class**
- **Modify eligibility criteria to US Citizen or US National without prior participation in fishery (fishing history to apply in the event of multiple applications)**

If this recommendation is implemented, it too, is expected to provide more incentive and a more stable operating environment for the Am. Samoa longline fishery.

The Council initially considered removing the LVPA altogether, but rejected this from additional detailed consideration.

7.0 Description of the Affected Environment

7.1 American Samoa

American Samoa is an unincorporated and unorganized territory of the United States located in the central South Pacific Ocean. It is the only U.S. territory in the southern hemisphere. The Council and NMFS, under the Magnuson-Stevens Act, formally designated American Samoa as a fishing community in 1999. However, local dependence on fishing goes back approximately 3,500 years to when the islands of the Samoan archipelago were first inhabited (Sabater and Carroll 2009; Severance and Franco 1989). Many aspects of the culture have changed in contemporary times, but American Samoans have retained a traditional socio-cultural system that is strongly interrelated with fishing. Social values still influence when and why people fish, how they distribute their catch, and the meaning of fish within the society. Fish and other resources may move through a complex and culturally embedded exchange system that supports the food needs of *`aiga* (family), and recognizes the status of both *matai* (chief) and village ministers (Severance et al. 1999).

The 1899 Tripartite Convention divided the Samoan archipelago between the U.S. and Germany, with the 199 sq km (~ 77 sq mi) of land on the islands of Tutuila, Aunuu, Ofu, Olosega, Tau, Swains, and Rose Atoll in the east coming under U.S. control. A year later, the U.S. and local chiefs signed a Deed of Cession to formally declare American Samoa a U.S. territory. The U.S. and other powers especially prized the deepwater harbor at Pago Pago for its strategic and commercial value. Following World War I, the League of Nations granted New Zealand the responsibility to administer German or "Western" Samoa. In 1962, Western Samoa was granted independence and the country changed its name to Samoa in 1997 (it is also referred to as Independent Samoa). However, the demarcation between Samoa and American Samoa is largely political; many families are cross-related and there is much cultural and commercial exchange between the two. American Samoa, with a population of about 68,000, is about 90 percent indigenous Samoan (AS DOC, 2011) who are descended from the aboriginal people who, prior to European contact, occupied the archipelago and exercised local sovereignty for millennia.

The small economy in American Samoa continues to develop. Its two most important sectors are the American Samoa Government (ASG), which receives income and capital subsidies from the U.S. Government, and tuna canning (BOH 1997). In 2011, total export value of commodities was about $17 million; $13.4 million is attributed to canned tuna (AS DOC 2011). Private businesses and commerce comprise a smaller third sector. Unlike some of its South Pacific neighbors, American Samoa has never had a robust tourist industry.

The excellent harbor at Pago Pago, 390,000 square kilometers of EEZ, and certain special provisions of U.S. law form the basis of American Samoa's decades-old fish processing industry (BOH 1997). The territory is exempt from the Nicholson Act, which prohibits foreign ships from landing their catches in U.S. ports. American Samoan products with less than 50 percent market value from foreign sources enter the United States duty free (Headnote 3(a) of the U.S. Tariff Schedule).

Despite recent declines, tuna canning remains an important industry in the territory. In 2012, tuna exports represented more than 99 percent of the $416 million in commodities that American Samoa exported to the United States. However, the tuna canning industry faces competition from other countries. From 1995 to 2003, the value of canned tuna imported into the United States from American Samoa exceeded that of tuna imported from all other countries combined (GAO 2014). In a recent study, the Government Accountability Office estimated that in 2012 tuna canning was responsible for 2,200 jobs, or about 12% of American Samoa's non-government workforce. While this is a substantial decrease from pre-2010 figures, the job impact of fish processing still extends well beyond direct employment; the industry's operating expenditures create employment opportunities in other parts of the economy. Analysis by McPhee and Associates (2008) found that fish processing accounted for nearly one out of every two jobs in the territory in 2002.

On October 5, 2010, Tri Marine International acquired the former Chicken of the Sea facility in American Samoa. Tri Marine anticipates processing sashimi-grade tuna in early 2014 and re-opening the cannery in 2015. When the cannery again becomes fully operational, Tri Marine expects to employ 1,200 people (GAO, 2014).

Unfortunately, fish processing has not become widely and deeply integrated within the wider territorial economy; fewer linkages have developed between it and other sectors of the local economy. The multinational corporations that ran the operations supplied a number of raw and finished materials, including shipping services and infrastructure facilities (Schug and Galeai 1987). Even a substantial portion of the raw tuna processed by StarKist Samoa was landed by vessels owned by the parent company. Furthermore, most of the unskilled labor of the canneries is imported (many from nearby Samoa and Tonga), resulting in much of the payroll of the canneries being remitted overseas.

There is currently an effort to promote the export of fresh fish from American Samoa led by Samoa Tuna Processors (STP), a subsidiary of TriMarine. In March 2012, STP signed contracts for the construction of a new cold storage facility that will have the capacity to store over 5,000 tons of tuna. The location and design of the building will allow tuna boats to unload tuna directly into a climate-controlled facility, which will then be transferred to the cannery for processing within the facility. STP also receives, processes, and exports fresh tuna by air to Japan and the United States. Plans also are progressing for a new seawall and dock to service the local alia fleet[2]. STP potentially could promote the sustainability of the small boat fleet, as well as the large vessel fleet, and contribute significantly to the economy of American Samoa. However, it is too soon for any statistics to be created to substantiate this.

On September 29, 2009, a magnitude 8.0 submarine earthquake south of the Samoan archipelago triggered a tsunami that made landfall in several Pacific island locations, including American Samoa and Samoa. Four tsunami waves 15 to 20 feet (4 to 6 meters) high arrived ashore on American Samoa about 15 minutes after the quake, killing 31 people. Reports indicate that in some areas the waves reached a mile (1.5 kilometers) inland (Sagapolutele 2009). In Pago Pago, near the capital, streets and fields filled with debris, mud, overturned cars and boats. Several buildings in the village were flattened and a primary power generation station was damaged. For a period following the disaster, shelters housed an estimated 2,200 people across the island.

In terms of fish harvesting equipment and fishery management resources, the waves damaged or destroyed all of the American Samoa Department of Marine and Wildlife Resources' floating docks and the first floor of the building. The tsunami also damaged Department equipment, such as vehicles and boats. All ramps in Pago Pago and shipyard dry-docking facilities sustained damage and major boat dock areas was unusable for a time because of the many vessels that were tossed about. A facility and associated equipment located in Pago Pago that was funded by the Community Development Project Program for the Pago Pago Commercial Fishermen Association project was destroyed.

The Council and NMFS' PIRO jointly examined the effects of the tsunami on the territory's fishing fleets. Fortunately, a purse seiner at dry dock was released the day before the tsunami and many longline vessels were out to sea at the time. However, the tsunami destroyed or damaged many alia vessels predominately used in the bottomfish fishery. The U.S. Secretary of Commerce determined a commercial fishery failure occurred for the commercial bottomfish fishery on January 26, 2012, clearing the way for Congress to appropriate relief funds if it so

[2] http://www.trimarinegroup.com/news/press/STP_Project_Update_Press_031212.html

chooses. Congress has yet to authorize any funds pursuant to the disaster declaration as of October 2012.

7.1.1 U.S. EEZ Waters around American Samoa

The EEZ waters around American Samoa comprise 390,000 square kilometers and are truncated by the EEZs around the other nearby island nations (Figure 1).

The islands of American Samoa are in an area of modest oceanic productivity relative to areas to the north and northwest. To the south of American Samoa lie the subtropical frontal zones consisting of several convergent fronts located along latitudes 25°- 40° N and S often referred to as the Transition Zones. To the north of American Samoa, spanning latitudes 15° N -15° S, lies the equatorial current system consisting of alternating east and west zonal flows with adjacent fronts; the southern branch of the South Equatorial Current (SEC) flows westward from June to October and the South Equatorial Counter Current (SECC) flows eastward from November to April.

Domokos et al. (2007) have investigated the oceanography of the waters surrounding American Samoa and noted the impact of the SEC and SECC on the productivity of the longline fishery. They note that the American Samoa fishing ground is a dynamic region with strong mesoscale eddy activity and temporal variability on scales of less than one week. Seasonal and interannual variability in eddy activity, induced by baroclinic instability that is fueled by horizontal shear between the eastward-flowing SECC and the westward-flowing SEC, seems to play an important role in the performance of the longline fishery for albacore.

Mesoscale eddy variability in the EEZ around American Samoa peaks from March to April, when the kinetic energy of the SECC is at its strongest. Longline albacore catch tends to be highest at the eddy edges, while albacore catch per effort (CPUE) shows intra-annual variability with high CPUE that lags the periods of peak eddy activity by about 2 months. When CPUE is highest, the values are distributed toward the northern half of the EEZ, the region affected most by the SECC. Further indication of the possible importance of the SECC for longline performance is the significant drop in eddy variability in 2004 when compared with that observed in 2003 – resulting from a weak SECC – which was accompanied by a substantial drop in albacore CPUE rates and a lack of northward intensification of CPUE.

From an ecosystem perspective, evidence to support higher micronekton biomass in the upper 200 m at eddy boundaries is inconclusive. Albacore's vertical distribution seems to be governed by the presence of prey. Albacore spend most of their time between 150 and 250 m, away from the deep daytime and shallow nighttime sonic scattering layers, at depths coinciding with those of small local maxima in micro-nekton biomass whose backscattering properties are consistent with those of albacore's preferred prey. Settling depths of longline sets during periods of decreased eddy activity correspond to those most occupied by albacore, possibly contributing to the lower CPUE by reducing catchability through rendering bait less attractive to albacore in the presence of prey.

7.2 American Samoa-based Pelagic Fisheries

In 1995, small-scale longline fishing began in American Samoa following training initiated by the Secretariat of the Pacific Community (SPC; Chapman 1998). Commercial ventures are diverse, ranging from small-scale vessels having very limited range to large-scale vessels catching tuna in the EEZ and distant high seas waters, and then delivering their catches to the cannery based in American Samoa. Currently the pelagic fisheries of American Samoa rely on supplying frozen albacore, and small amounts of other pelagic fish directly to a large cannery in Pago Pago. These fisheries include small and large-scale longlining, and a pelagic trolling fishery. Regulations require all owners and operators of American Samoa longline vessels to obtain a federal permit and to submit logbooks containing detailed data on each of their sets and the resulting catch. Boat-based creel surveys, a Commercial Purchase System, and Cannery Sampling Forms are also used to collect fishery information for all fishing activity. Additional historical and recent data can be found in the Council's 2011 Pelagic Fisheries Annual Report (WPFMC 2012).

More than $7.3 million worth of pelagic species were landed in American Samoa during 2011 (WPFMC 2012). Longline fishing dominated (98.8%) the value of pelagic landings during 2011. Over $5 million worth of albacore dominated (70%) the value of longline caught pelagic species during 2011 followed by yellowfin (~ $1.2 million), bigeye (~$378,000), and skipjack (~$244,000) tunas. Wahoo (~$282,000) and mahimahi (~19,300) were the top-value non-tuna species during 2011 (WPFMC 2012).

7.2.1 Small-Scale Longline and Troll

Historically, most participants in the small-scale domestic longline fishery had been indigenous American Samoans with vessels under 50 ft in length, most of which were alia; locally-built fiberglass or aluminum catamaran boats under 40 ft in length. In the mid-1990s, American Samoa's commercial fishermen shifted from troll gear to longline gear largely based on the fishing success of 28-ft alia vessels that engaged in longline fishing in the EEZ around Samoa. Following this example, the alia fishermen in American Samoa began deploying short monofilament longlines with an average of 350 hooks per set from hand-operated reels. Their predominant catch was albacore tuna, which they marketed to the tuna cannery (DMWR 2001). By 1997, 33 alia vessels received general longline permits from NMFS to fish in federal waters around American Samoa, although only 21 were actively fishing at that time. However, since 2008, only one alia vessel has been actively longline fishing (Table 3), and NMFS cannot report its landings due to data confidentiality rules.

Troll fishers land relatively small amounts of pelagic MUS with just over 33,000 lb reported in 2011. The average number of vessels participating in the troll fishery from 1982-2011 is 28; only 10 vessels participated in trolling in 2011 (WPFMC 2012). The reduction in vessel participation in the pelagic trolling fishery is due to high fuel prices and vessels switching to bottomfish fishing. Trolling does occur while fishermen move between bottomfish fishing locations or transitioning to and from port, which creates large apparent fluctuations in CPUE for pelagic species.

7.2.2 Large-Scale Longline

In 2000, the American Samoa longline fishery began to expand rapidly with the influx of large (≥50 ft) conventional monohull vessels similar to the type used in the Hawaii-based longline fishery, including some vessels from Hawaii. These vessels were larger, had a greater range, and were able to set more hooks per trip than the average alia vessel. The number of permitted and active longline vessels in this sector increased from three in 1997 to 31 in 2003. Of these 31 vessels, 10 permits were believed to be held by indigenous American Samoans as of March 21, 2002 (P. Bartram, pers. comm., March 2002). Economic barriers, such as the capital needed to purchase and operate a large vessel, are believed to have prevented more substantial indigenous participation in the large-scale sector of the longline fishery. In 2011, there were 23 active Class C and D (large) vessels in the fishery (Table 3).

Vessels over 50 feet can set from 1,500 to over 4,000 hooks per day, have a greater fishing range, and have greater capacity for storing fish (8-40 metric tons (mt)) compared to small-scale vessels (0.5-2 mt). Large vessels are outfitted with hydraulically powered reels to set and haul mainline, and with modern electronic equipment for navigation, communications, and fish finding. All are presently being operated to freeze albacore onboard, rather than to land chilled fish. Based on logbook data from 2002-200, the average number of hooks per set used by the longline fleet steadily increased from 1,905 to 3,070 (WPacFIN[3]; Table 1), but has since declined to 2,877 in 2012. Observed effort for 2012 was 2,877 hooks per set.[4]

Table 1. Logbook Effort in the American Samoa Longline Fishery from 2008-2011

Year	Average Hooks per Set	Number of Sets	1000s of Hooks
2008	3,038	4,754	14,444
2009	3,070	4,910	15,074
2010	2,906	4,534	13,174
2011	2,851	3,776	10,767
2012	2,877	4,068	11,702

Source: http://www.pifsc.noaa.gov/wpacfin/index.php. and WPRFMC unpublished data from draft American Samoa Pelagics Annual Report module.
Note: Data presented for 2008-2011 because it captures predominantly Class C and D vessels; only one Class A vessel was active and zero Class B vessels were active.

As of October 2012, 18 of the American Samoa longline limited access permit holders also hold Hawaii longline limited access permits for the Hawaii-based fisheries (W. Ikehara (c), NMFS, pers. comm., Oct. 2012). Of those, three were Class B, five were Class C, and 10 were Class D.

7.2.3 Effort and Catch

Effort

Since 2001, the number of American Samoa troll and longline vessels landing pelagic species has decreased from a high of 80 vessels to 34 in 2011 (Table 2). Effort is dominated by large

[3] Found at: http://www.pifsc.noaa.gov/wpacfin/index.php
[4] 2012 data from draft 2012 Pelagics Annual Report Module

longline vessels (Class D) as there is only active small longline vessel in 2012 and the troll fleet continues to decrease in numbers of vessels and trips.

Table 2. Number of Vessels Using Different Fishing Methods, 1996-2010

Year	Number of Vessels		
	Longline	Trolling	Total
1996	12	37	49
1997	21	32	53
1998	26	24	50
1999	29	36	65
2000	37	19	56
2001	62	18	80
2002	58	16	74
2003	50	20	70
2004	41	18	59
2005	36	9	45
2006	31	9	40
2007	29	19	48
2008	28	16	44
2009	27	10	36
2010	26	7	33
2011	24	10	34
2012	22	9	31

Note: The number of vessels does not reflect the number of permits. The number of vessels can be higher if a permit transfer occurred within a year. WPacFIN program uses vessel number as a proxy for permit number when analyzing data. Source: WPRFMC 2013 and WPRFMC unpublished data from draft American Samoa Pelagics Annual Report module.

Fishing power[5] is clearly distinct between the different size classes of vessel, and separate catch statistics are compiled. The alia vessels use manually powered mainline drums that hold about four miles of monofilament line. The boats make single day trips with a crew of three, setting around 300 – 350 hooks per set and keep their catch on ice. Large monohull vessels in the fishery are typically steel-hulled vessels of around 20 – 25 m operating hydraulically driven mainline reels holding 30 – 50 miles of monofilament, setting around 3,000 hooks per day with crews of 5 – 6. They are also likely to be well equipped with marine electronics and have refrigeration systems to freeze catch onboard for extended trips. Therefore, the larger vessels can range out to the outer portions of the EEZ and, in the past, some have negotiated fishing access

[5] Fishing power provides a measure of vessel efficiency. Full explanation may be found on FAO website at: http://www.fao.org/DOCREP/003/X2250E/x2250e0f.htm

with neighboring states. The large monohull vessels are, in some cases, the same vessels that have engaged in the Hawaii longline fisheries.

Recent fishing effort has occurred in EEZ waters surrounding American Samoa (excluding existing large vessel prohibited areas) and some foreign EEZ waters surrounding American Samoa where vessels have fishing access agreements, including the Cook Islands, Samoa, Tokelau, and others, as well as all four high seas areas (NW, NE, E, and S) giving an operational area roughly 155° W to 180°, and from 3° to 32° S from 2000 through 2009 (NMFS 2010a)

Individual vessels have negotiated access agreements with the neighboring countries surrounding American Samoa. Most agreements have been made with the Cook Islands, whereby U.S. vessels fishing in the Cook Island's EEZ do not have to re-flag their vessels to the Cook Islands. A limited number of permits exist for these arrangements in the Cook Islands. Since 2001, American Samoa-based longline vessels have fished in several foreign EEZ waters surrounding American Samoa, such as Samoa, Tokelau, and others. Fishing effort in these countries has ranged from a couple thousand hooks per year to over 2.7 million hooks set in the Cook Islands in 2006.

The number of hooks set by the American Samoa-based longline fleet has varied considerably over time. Data for 2011 indicates 10.9 million hooks were set by the American Samoa longline fishery, down from 15 million hooks set in 2009, and 38 percent less than a high of 17.5 million set in 2007 (WPFMC 2012). Table 3 shows landing and effort statistics for the longline fishery.

Table 3. American Samoa Longline Fishery Landings and Other Statistics, 2002-2011.

Item	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Active Vessels	58	49	41	36	30	29	28	26	26	24	22
Hooks Set (millions)	13.1	14.2	11.7	11.1	14.3	17.5	14.4	15.0	13.2	10.8	11.7
Trips	NA	650/282*	430/193*	223/179*	331	377	287	177	264	274	275
Sets Made	6,872	6,220	4,850	4,359	5,069	5,919	4,754	4,910	4,534	3,776	4,068
Total Landings (mt)	7,138	5,173	4,079	3,999	5,401	6,586	4,347	4,787	4,673	3,250	4,022
Albacore Tuna Landings (mt)	5,996	3,931	2,488	2,919	4,104	5,329	3,456	3,910	3,938	2,292	3,092
Yellowfin Tuna (mt)	485	517	890	516	493	620	336	155	445	536	385
Bigeye Tuna (mt)	196	253	226	132	199	199	124	146	178	170	167
Skipjack Tuna (mt)	244	120	235	141	213	165	163	156	111	109	250
Wahoo (mt)	164	195	215	221	287	198	136	139	131	125	83

Item	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Total Ex-vessel Value (adjusted) ($ millions)	$14.1	$10.7	$9.1	$8.0	$11.5	$13.7	$9.4	$10.4	$ 10.4	$7.2	$7.2

Source: WPFMC 2013 and WPRFMC unpublished data

*The first number is trips by alia and the second is by larger monohull vessels. From 2006, three or fewer alia vessels were active and those data are confidential.

Note: all other species (e.g. mahimahi, swordfish, etc.) landed are less than 1 percent of total landings.

Catch

Approximately 8.8 million lb of pelagic species is estimated to have landed by American Samoa vessels (longline and troll) during 2012, an increase of about 1.5 million lb from the 7.4 million lb landed in 2011. Landings of tuna species increased substantially by 1.5 million lb, while non-tuna decreased by about 100,000 lb.

More than 8.5 million lb (96%) of total landings were of tuna species, while the non-tuna landing were roughly 362,000 lb. Albacore dominated tuna species landings at 80 percent and comprised 77 percent of all pelagic species landings; yellowfin (8.7%), bigeye (4%), skipjack (6%), and unknown tunas make up the rest of the tuna landings. Wahoo species dominate the "Non-Tuna and Others" total landings, make up 51 percent of non-tuna landings and 2 percent of all pelagic landings (WPFMC 2012). Class D (>70 feet) longline vessels dominate the American Samoa total pelagic landings and commercial landings.

Catch-Per-Unit Effort

The CPUE of albacore, the main target species of the longline fishery, reached a peak in 2001 at 33 fish per 1,000 hooks and has decreased to approximately 12 fish per 1,000 hooks in 2011 (Table 4 & Figure 7).

Table 4. CPUE (catch/1,000 hooks) for All American Samoa Longline Vessels, 2006-2012.

Species	2006	2007	2008	2009	2010	2011	2012
Skipjack	3.2	2.3	2.4	2.3	2.4	2.5	4.3
Albacore	18.5	18.3	14.2	14.8	17.4	12.1	14.9
Yellowfin	1.6	1.9	1	1.1	1.8	2	1.2
Bigeye	1	0.9	0.5	0.6	0.8	0.7	0.7
TUNAS SUBTOTAL	24.2	23.5	18.2	18.8	22.4	17.3	21.1
Mahimahi	0.4	0.1	0.1	0.2	0.2	0.1	0.1
Blue marlin	0.2	0.2	0.2	0.2	0.2	0.2	0.1
Wahoo	1.5	1	0.7	1	1	0.9	0.7
Sharks	0.5	0.4	0.4	0.4	0.4	0.5	0.6
Swordfish	0.1	0	0	0	0	0	
Spearfish	0.1	0	0.1	0.1	0.1	0.1	0.1
Oilfish	0.5	0.5	0.4	0.5	0.6	0.6	0.8

Pomfret	0.1	0.1	0.1	0.1	0.1	0.1	0.1
NON-TUNA PMUS							
SUBTOTAL	3.3	2.4	2	2.5	2.5	2.4	2.4
Pelagic fishes							
(unknown)	0.1	0.2	0.1	0.2	0.3	0.4	0.3
OTHER PELAGICS							
SUBTOTAL	0.1	0.2	0.1	0.2	0.3	0.4	0.3
TOTAL PELAGIC	27.5	26	20.3	21.5	25.2	20	23.8

Source: WPRFMC 2013 and WPRFMC unpublished data from draft American Samoa Pelagics Annual Report module.

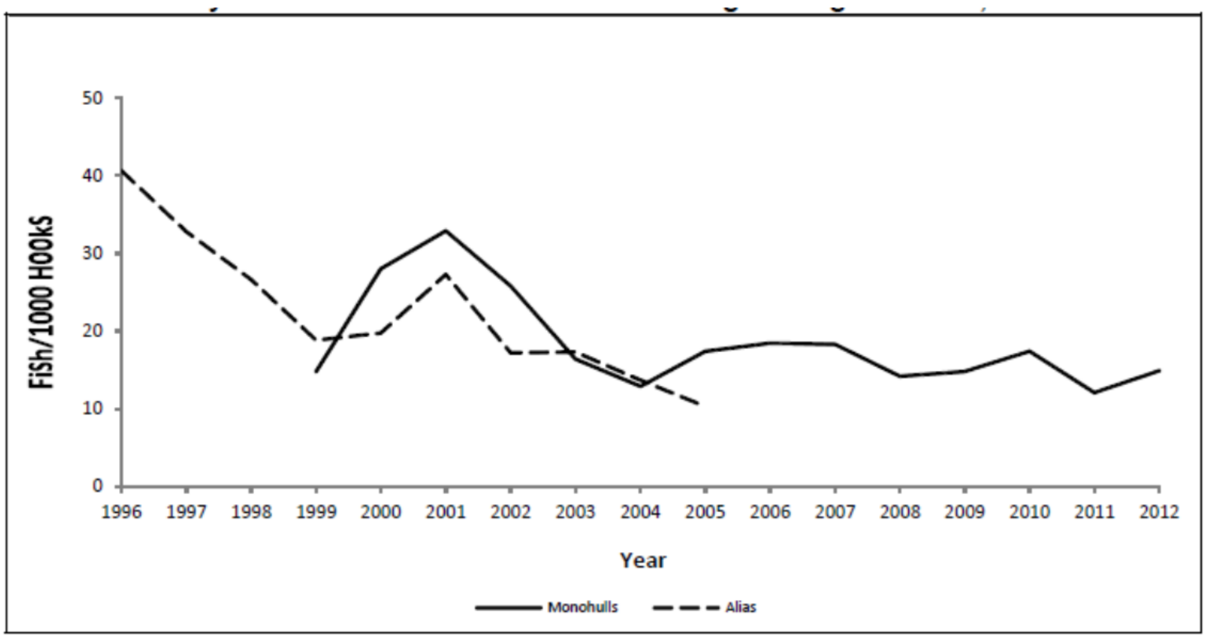

Figure 8. Albacore catch per unit effort (per 1,000 hooks) in the American Samoa longline fishery, 1996-2012
Source: WPRFMC 2013 and WPRFMC unpublished data from draft American Samoa Pelagics Annual Report module.

7.2.4 Observer Program

NMFS funds fishery observer recruitment, training, and support in the western Pacific region including its observer program in American Samoa. NMFS is in the process of increasing observer coverage in the American Samoa longline fishery. Prior to beginning the mandatory observer program in American Samoa, NMFS conducted a pilot program from August through October 2002. The pilot program observed 76 sets on one Class C and two Class D vessels that set 197,617 hooks; there were no sightings of, or interactions with, any protected species including sea turtles, marine mammals, or seabirds (NMFS 2003). Mandatory observer placement to monitor protected interactions and collect other fishery data on American Samoa longline vessels (longer than 40 ft) began in April 2006. Table 5 shows the level of observer coverage from 2006-2012.

Table 5. American Samoa Longline Fishery Protected Species Interactions, 2006-2012.

Year	2006	2007	2008	2009	2010	2011	2012	2013
Number of sets observed	287	410	379	306	798	1,257	662	585
Observer coverage (percent)	8.1	7.1	6.4	7.7	25	33.3	19.8	19.4
Green sea turtles, released dead	3	1	1	2	5	10	0	2
Green sea turtles, released injured	0	0	0	0	1	1	0	0
Marine mammals, released injured	0	0	2	0	0	11	0	1
Marine mammals, released dead	0	0	1	0	0	1	0	1
Seabirds, released dead	0	1	0	0	0	1	0	1

Source: NMFS PIRO Observer Program 2006-2011 Status Reports.
http://www.fpir.noaa.gov/OBS/obs_as_ll_rprts.html
Note: The Observer Program Status Reports provide a preliminary summary of observer coverage in the longline fisheries when vessels leave port. The reports display protected species interactions based on the date vessels return to port and may include some data from the prior reporting period, i.e., previous quarter or year, before the specific reporting period. The following reported period may report information that occurred on trips that left port in one reporting period and arrived in another. Contact the Observer Program for more specific information.

7.2.5 Recreational Fishing

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 (S. Steffany, pers. comm. to P. Bartram, Akala Products Inc., September 15, 2001, Amendment 11).

Table 6 shows a summary of the species composition from fishery tournaments held between 1974 and 2010. The data do not document every tournament held in the four decades since records were kept, but cover 55 individual competitions. Of the nearly 136,000 lb of fish landed in the tournaments, almost two-thirds of the catch comprised equal amounts of skipjack and yellowfin tuna, while blue marlin, wahoo, mahimahi, and sailfish made up the majority of the remaining catch.

Table 6. American Samoa Recreational Fishing Tournaments Catch Composition, 1974 -2010.

Species	Weight (lb)	Percent
Skipjack tuna	40,655.85	29.93%
Yellowfin tuna	39,458.34	29.05%
Blue marlin	21,102.25	15.54%
Wahoo	11,807.25	8.69%
Mahimahi	11,035.20	8.13%
Sailfish	3,215.00	2.37%
Sharks (unknown)	2,805.75	2.07%
Dogtooth tuna	1,786.05	1.32%
Others	3,951.75	2.91%
Total	135,817.44	100.00%

Source: American Samoa Dept. of Marine and Wildlife Resources.

More recently, recreational fishing has undergone a renaissance in American Samoa through the establishment of the Pago Pago Game Fishing Association (PPGFA), founded by a group of recreational anglers in 2003.[6] The motivation to form the PPGFA was the desire to host regular fishing competitions. There are about 15 recreational fishing vessels ranging from 10 feet single engine dinghies to 35-ft long 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 2012, PPGFA hosted the 13th Steinlager I'a Lapo'a Game Fishing Tournament in which a total of 2,598 lb of qualifying fish were landed. Species landed during the tournament included barracuda, blue marlin, dogtooth tuna, mahimahi, wahoo, and yellowfin tuna; blue marlin were also tagged and released.[7] Members of the PPGFA

[6] http://ppgfa.com/page/about-ppgfa.
[7] http://www.ppgfa.com/blog/final-results

fish a few times per week. Not all members go out that frequently, but across the membership, several trips per week are taken. The target species include yellowfin tuna and mahimahi (W. Sword, PPGFA, pers. comm., October 31, 2012).

There is no full-time regular charter fishery in American Samoa similar to those in Hawaii or Guam. However, Pago Pago Marine Charters[8], which is concerned primarily with industrial work such as underwater welding, construction, and salvage, also includes for-hire fishing among the services it offers. Pago Pago Charters goes out two to three times a week, many times to fish but other times to go whale watching. The target species are typical pelagic species including yellowfin tuna and mahimahi (W. Sword, PPGFA, pers. comm., October 31, 2012).

Estimation of the volume and value of recreational fishing in American Samoa is not known with any precision. An approximation of the volume 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[9]. Boat-based recreational catches have ranged from 2,100 to 6,100 lb between 2006 and 2008, comprising primarily pelagic fish (WPFMC 2007, WPFMC 2010). These catches are unsold, but based on the 2008 average price for pelagic fish ($2.19/lb) (WPFMC 2010) this would be worth $4,600 - $18,360. An additional volume of fish is caught recreationally by fishing tournaments mounted by the PPGFA, but WPacFIN does not monitor these landings.

There is no information on any protected species interactions associated with recreational fishing.

7.3 Target Tuna Stocks

7.3.1 South Pacific Albacore Tuna

The most recent assessment of South Pacific albacore was conducted in 2012 by Hoyle et al (2012). The assessment used the integrated stock assessment model known as MULTIFAN-CL (or MFCL), under the assumption that there is a single stock of albacore tuna in the South Pacific Ocean. The model was age (20 age-classes) structured and the catch, effort, size composition and tagging data used in the model were classified by 30 fisheries and quarterly time periods from July 1960 through June 2011. The assessment included a range of model options and sensitivities that were applied to investigate key structural assumptions and sources of uncertainty in the assessment.

Figure 8 is taken from Holye et al (2012) shows a 'Kobe' plot of the ratios of current fishing mortality ($F_{current}$) to fishing mortality at the maximum sustainable yield or MSY (F_{MSY}) versus the current biomass ($B_{current}$) to the biomass at MSY (B_{MSY}).

The fishing mortality reference point $F_{current}/F_{MSY}$ has an estimate of 0.21, and there is a low risk that overfishing is occurring. The corresponding biomass-based reference points $B_{current}/B_{MSY}$ is estimated to be above 1.0 and therefore the stock is not in an overfished state. The estimate of

[8] http://pagopagomarinecharters.com/
[9] http://www.pifsc.noaa.gov/wpacfin/.

MSY (99,085 mt) is comparable to the recent levels of catch[10] from the fishery ($C_{current}$ 78,664 mt, C_{latest} 89,790 mt). There is no indication that current levels of catch are causing recruitment overfishing, particularly given the age selectivity of the fisheries. However, longline catch rates are declining, and catches over the last 10 years have been at historically high levels and are increasing. These trends may be significant for management.

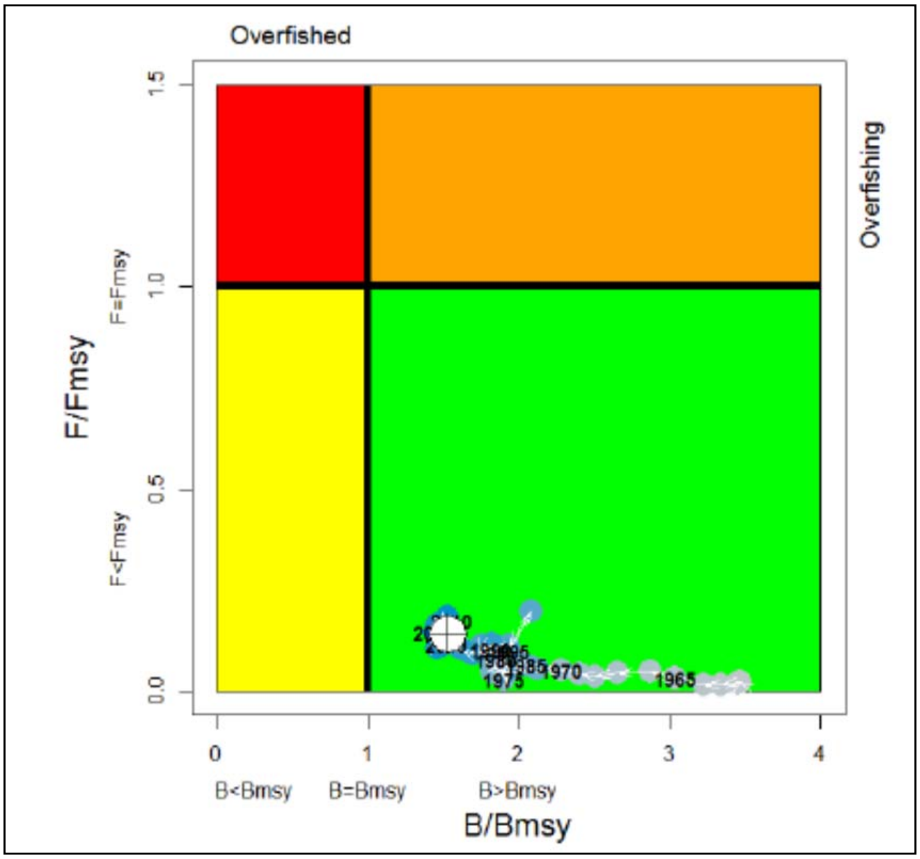

Figure 9. Temporal trend in annual stock status, relative to BMSY (x-axis) and FMSY (y-axis) reference points, for the model period (starting in 1960). The color of points is graduated from lavender (2006) to blue (2009) and white cross (2010), and points are labeled at five-year intervals. The last year of the model (2011) is excluded because it is highly uncertain.

Langley (2006) reported that recent levels of fishing effort from all South Pacific albacore fisheries combined reduced the level of biomass available to the Pacific Island nations domestic longline fisheries by approximately 30 percent compared to unexploited levels. Langley predicted that increases in fishing effort in the Pacific Islands longline fisheries would result in declines in CPUE due to a decline in exploitable biomass. Catch rates in domestic longline fisheries exhibit strong seasonal trends due to fluctuations in the oceanographic conditions and inter-annual variation in albacore catch rates are evident in most of the Pacific Island fisheries

[10] $C_{current}$ = mean catch from June 2007-June 2010, C_{latest} = June 2010-June 2011)

Most of the longline albacore catch is taken in a relatively narrow latitudinal band between 10–40° S. The highest catch rates for albacore in the subequatorial area are relatively localized and limited to discrete seasonal periods; possibly associated with the northern and/or southern movements of fish during winter and/or summer. These peaks in seasonal catch rates tend to persist for a couple of months and to extend over a 10° latitudinal range. On this basis, it would appear that most of the longline exploitable biomass resides in a relatively small area, suggesting a modest stock size.

The results of this assessment suggest that regional stock depletion has contributed to catch rate declines, but localized depletion may also have contributed. Observed declines in catch rates from significant domestic longline fisheries (e.g. Fiji, French Polynesia, and Samoa) — following periods of relatively high albacore catch (3,000–10,000 mt per year) — may indicate localized stock depletion. Strong relationships may occur between catch rates and removals in the preceding 10 day period. Movement rates into and out of EEZ's may be lower than peak catch levels, and there may be some viscosity (perhaps residency) in the population.

As described in Williams and Terawasi (2012), prior to 2001, South Pacific albacore catches were generally in the range 25,000-44,000 mt, although a significant peak was attained in 1989 (49,076 mt), when driftnet fishing was in existence. Since 2001, catches have greatly exceeded this range, primarily because of the growth in several Pacific Islands domestic longline fisheries. The South Pacific albacore catch in 2011 (75,258 mt) was the third highest on record (about 12,000 mt lower than the record catch in 2010 of 87,048 mt; Williams and Terawasi 2012). The American Samoa longline fishery accounts for approximately 6 percent of total South Pacific albacore landings (3,890 mt) (WPFMC 2011).

The longline catch of albacore is distributed over a large area of the South Pacific (Figure 9), but concentrated in the west. The Chinese-Taipei distant-water longline fleet catch is taken in all three regions, while the Pacific Island domestic longline fleet catch is restricted to the latitudes 10°–25°S. Troll catches are distributed in New Zealand's coastal waters, mainly off the South Island, and along the SCTZ. Less than 20 percent of the overall South Pacific albacore catch is usually taken east of 150° W (Williams and Terawasi 2012).

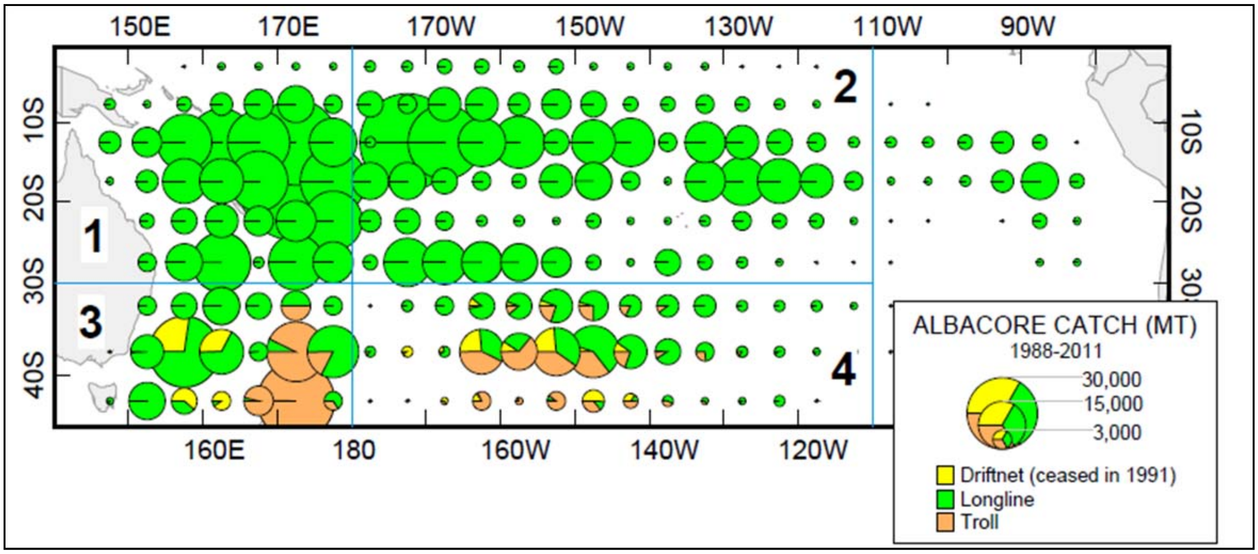

Figure 10. **Distribution of South Pacific albacore tuna catches, 1988-2011.**
Source: Williams and Terawasi 2012.

7.3.2 Skipjack Tuna

Skipjack tuna occur in the upper mixed-layer throughout the equatorial region, but the largest catches are taken from the warm pool, i.e., between the islands of New Guinea and the Federated States of Micronesia, in the western equatorial Pacific with the most successful fishing grounds is located in the vicinity of a convergence zone between the warm (>28-29° C) low-salinity water of the warm pool and the cold saline water of equatorial upwelling in the central Pacific (Lehodey et al. 1997).

The most recent assessment of skipjack tuna in the WCPO was conducted in 2011 (and included data from 1972 to 2010 (Hoyle et al. 2012). Current fishing mortality rates for skipjack tuna are estimated to be well below the F_{MSY} reference point, and therefore, overfishing is not occurring (i.e., current fishing mortality is less than F_{MSY}). The total biomass of skipjack tuna has fluctuated above the biomass based reference point B_{MSY} and recent biomass levels are estimated to be well above the B_{MSY} level. According to the authors, these conclusions appear relatively robust (i.e., scientifically valid), at least within the statistical uncertainty of the current assessment. Recruitment variability, influenced by environmental conditions, will continue to be the primary influence on stock size and fishery performance.

The American Samoa longline fishery is considered to have a sustainable catch of skipjack tuna. This species comprised about 12 percent of the total longline catch between 2004 and 2009, ranging from roughly 136 to 235 mt landed during this period; however, it comprised only three percent of the total longline catch in 2011with landings at 109 mt (WPFMC 2012). In 2007 and 2008, the price for skipjack tuna showed a strong uptrend and reached record levels around mid-2008 with Bangkok benchmark prices of skipjack tuna at US$1,920 per mt and Yaizu prices at US$1,929 per mt (Williams & Terawasi 2012). As such, longline vessels in American Samoa began to retain greater amounts of skipjack tuna in 2008. Retention rates averaged about 74 percent between 2002 and 2007, but rose to almost 85 percent in 2011 with the higher value of skipjack tuna.

7.3.3 Yellowfin Tuna

Western and Central Pacific yellowfin tuna were determined by NMFS to be subject to overfishing in 2006 (71 FR 14837); however, based on recent stock assessments, they are no longer considered to be subject to overfishing. Langley et al. (2011) estimate MSY of WCPO yellowfin tuna between 480,000-580,000 mt and state that estimates of current fishing mortality are generally well below the fishing mortality at MSY, and any increase in fishing mortality would most likely occur with the waters of Region 3, as defined by Langley et al. (2011), which includes the Philippines and Indonesia (American Samoa is in Region 6). Overall, spawning biomass is greater than that needed to produce MSY. There is no indication that the American Samoa longline fishery's catch of yellowfin tuna is not sustainable.

International Stock Management

In December 2008, the WCPFC adopted a conservation and management measure (CMM 2008-01, "Conservation and Management Measure for Bigeye and Yellowfin Tuna in the Western and Central Pacific Ocean") for the years 2009-2011, applicable to bigeye and yellowfin tuna catches from the WCPO; an extension of this measure was approved through February 2013 (CMM 2011-01) and a new comprehensive measure for the years 2014-2017 was adopted in 2013 (CMM 2013-01). For the U.S., the catch of yellowfin tuna is not to be increased in the longline fishery. American Samoa is among the small island developing State members and participating territories to the WCPFC. As such, the catch limit for yellowfin under CMM 2013-01 does not apply to American Samoa; however, the Council may recommend, and NMFS may implement domestic yellowfin tuna catch limits for the American Samoa longline fishery through the Magnuson-Stevens Act. Yellowfin tuna are retained in the American Samoa longline fishery.

7.3.4 Bigeye Tuna

The 2011 WCPO bigeye tuna stock assessment concluded that overfishing is occurring, and it is likely bigeye tuna is approaching an overfished state, if it is not already slightly overfished. It also concluded that MSY levels would rise if small fish mortality were reduced, which would allow greater overall yields to be harvested sustainably (Harley et al. 2010). According to NMFS, the Pacific-wide bigeye tuna stock is classified as subject to overfishing, not overfished and not approaching an overfished state. Landings of bigeye tuna in American Samoa are small relative to Hawaii, averaging 183 mt between 2004 and 2008, with 170 mt landed in 2011 (WPFMC 2010; (WPFMC 2012)). While these catches contribute to the overall fishing mortality of bigeye in the WCPO, they are negligible in comparison to the approximately 40,000 mt caught by purse seines and 60,000 mt caught by longliners in total. Moreover, American Samoa and its longline fishery primarily operate in an area to the south of the main concentration of longline fishing (Fig. 4 in Harley et al. 2010), and is therefore, likely to be sustainable, although fishing has had an impact on the stock.

International Stock Management

As discussed above, the WCPFC adopted CMM 2008-01 for the years 2009-2011, applicable to bigeye and yellowfin tuna catches from the WCPO; the WCPFC extended this measure through February 2013 (CMM 2011-01). The measure includes a phased reduction of bigeye tuna catches for the longline fishery from 2001-2004 or 2004 levels over three years, so that the catch would be reduced 10 percent in 2009, 20 percent in 2010 and 30 percent in 2011. For fresh fish longline fisheries catching less than 5,000 mt annually (such as the Hawaii-based longline fleet), the reduction applies to 2009, with 2010 and 2011 catches to be maintained at the 2009 level, i.e., at a 10 percent reduction. Under CMM 2008-01, the specified bigeye tuna catch limits do not apply to the small island developing State members and participating territories to the WCPFC, including American Samoa, provided they are undertaking responsible development of their domestic fisheries. However, the Council may recommend, and NMFS may implement domestic catch limits for the American Samoa longline fishery through the Magnuson-Stevens Act. Bigeye tuna are retained in the American Samoa longline fishery (Table 15).

Similarly, American Samoa is not subject to bigeye catch limits for longline fleets under 2013-01. The Council has amended its PEGICS FEP to implement a management framework to establish catch or effort limits applicable to the U.S. Participating Territories that includes the authorization for the U.S. Participating Territories to use, assign, allocate, and manage the pelagic management species catch and effort limits agreed to by the WCPFC through arrangements with U.S. vessels permitted under the Pelagics FEP for the purposes of responsible fisheries development. The Western Pacific Fishery Management Council (Council) could also recommend and the National Marine Fisheries Service (NMFS) could specify catch or effort limits in the absence of such limits or additional or more restrictive limits than the WCPFC for conservation and management purposes. The framework would also provide for consistency review of Territory arrangements with the Pelagics FEP and other applicable laws by the Council and NMFS, as well as annual review and specification recommendations by the Council.

The proposed action also includes the specification of catch limits for bigeye tuna caught by longline of 2,000 metric tons (mt) per year for each of the U.S. Participating Territories, of which 1,000 mt may be transferred annually under agreements consistent with the Pelagics FEP and other applicable laws to eligible U.S. vessels permitted under the Pelagics FEP

7.3.5 MSY of Target Tuna Stocks

MSYs for tuna stocks are as follows: 1,375,600 mt for skipjack (Hoyle et al. 2011); 76,760 mt for WCPO bigeye tuna (Davies et al. 2011); and 85,200 mt for South Pacific albacore- (Hoyle et al. 2012). Langley et al. (2011) estimate MSY of WCPO yellowfin tuna between 480,000-580,000 mt.

7.4 Incidental Catch

In addition to tuna species, the American Samoa longline fishery also catch and land various non-tuna PMUS, including wahoo, mahimahi, swordfish, blue marlin, spearfish, striped marlin, and moonfish (Table 7). These landings, however, only represent 6 percent of the total landings and 4 percent of the total landings value in 2011 (WPFMC 2012).

Table 7. 2011 Estimated Total Landings of Pelagic Species by Gear Type.

Species	LongLine Pounds	Troll Pounds	Other Pounds	Total Pounds
Skipjack tuna	551,270	9,703	0	560,973
Albacore tuna	6,815,055	0	0	6,815,055
Yellowfin tuna	768,084	8,479	0	776,564
Kawakawa	0	144	289	433
Bigeye tuna	368,358	0	0	368,358
Tunas (unknown)	1,131	0	0	1,131
TUNAS SUBTOTALS	8,503,898	18,326	289	8,522,514
Mahimahi	22,138	349	0	22,487
Black marlin	4,615	0	0	4,615
Blue marlin	79,927	0	0	79,927
Striped marlin	16,237	0	0	16,237
Wahoo	183,843	597	0	184,440
Sharks (all)	7,085	7	0	7,092
Swordfish	30,033	0	0	30,033
Sailfish	3,262	0	0	3,262
Spearfish	2,806	0	0	2,806
Moonfish	7,409	0	0	7,409
Oilfish	454	0	23	478
Pomfret	942	0	0	942
NON-TUNA PMUS SUBTOTALS	358,749	952	23	359,725
Barracudas	780	73	496	1,349
Rainbow runner	0	10	43	53
Dogtooth tuna	36	151	61	248
Pelagic fishes (unknown)	385	0	0	385
OTHER PELAGICS SUBTOTALS	1,201	233	600	2,034
TOTAL PELAGICS	**8,863,848**	**19,512**	**913**	**8,884,273**

Source: WPRFMC unpublished data from draft American Samoa Pelagics Annual Report module.

7.5 Bycatch

Table 8 shows the number of fish kept and released in the American Samoa longline fishery during 2012. Overall, 12 percent of the total catch was released, with skipjack tuna having one of the highest numbers released. Fishermen released nearly all sharks and oilfish. Fish are released for various reasons including quality, size, handling and storage difficulties, and as well as marketing issues. However, it is expected that catch rates and total catches of some pelagic MUS, such as the billfishes and mahimahi that typically occur closer to the surface, would be reduced by fishing with gear at 100 m and deeper, which was mandated in 2011 through gear configuration requirements (50 CFR 665.819).

Table 8. American Samoa Longline Fishery Quantity Kept versus Released, 2012

Species	Number Kept	Number Released	Percent Released
Skipjack tuna	23,160	4,186	15.3
Albacore tuna	129,930	541	0.4
Yellowfin tuna	21,378	450	2.1
Bigeye tuna	7,232	382	5.0
Tunas (unknown)	20	8	28.6
TUNAS SUBTOTALS	181,720	5,567	3.0
Mahimahi	1,055	352	25.0
Black marlin	14	8	36.4
Blue marlin	641	1,020	61.4
Striped marlin	92	196	68.1
Wahoo	7,589	1,609	17.5
Sharks (all)	104	4,720	97.8
Swordfish	213	105	33.0
Sailfish	117	335	74.1
Spearfish	253	976	79.4
Moonfish	119	263	68.8
Oilfish	85	6,394	98.7
Pomfret	121	542	81.7
NON-TUNA PMUS SUBTOTALS	10,403	16,520	61.4
Barracudas	60	187	75.7
Dogtooth tuna	0	1	100
Pelagic fishes (unknown)	19	3,847	99.5
OTHER PELAGICS SUBTOTALS	79	4,035	98.1
TOTAL PELAGICS	192,202	26,122	12.0

Note: Percent released for a species is calculated from the number released for that species divided by the total number of that species caught plus the number of that species released.
Source: WPRFMC unpublished data from draft American Samoa Pelagics Annual Report module.

7.6 Protected Species

The American Samoa longline fishery has the potential to interact with protected species, including sea turtles, marine mammals, and seabirds. The annual levels of observer coverage and related details can be found in Table 5 in section 5.2.4. Table 9 and Table 10 list the observed protected species interactions (hooking and/or entanglements in longline gear) by species.

Table 9. Number of Sea Turtle Interactions by Species Observed in the American Samoa Longline Fishery from 2006-2012.

				Turtles									
Year	Sets	1000s Hooks	Observer Coverage (%)	Green Turtle		Olive Ridley		Loggerhead		Leatherback		Hawksbill	
				Alive	Dead	Alive	Dead	Alive	Dead	Alive	Dead	Alive	Dead
2006	287	797	8.1	-	3	-	-	-	-	-	-	-	-
2007	410	1,260	7.1	-	1	-	-	-	-	-	-	-	-
2008	379	1,194	6.4	-	1	-	-	-	-	-	-	-	-
2009	306	881	7.7	-	3	-	-	-	-	-	-	-	-
2010	798	2,301	25	1	5	1	-	-	-	-	-	-	-
2011	1,257	3,605	33.3	1	10	1	-	-	-	1	1	-	-
2012	284	829	18.4	-	-	-	1	-	-	-	1	-	-
2013	585	1,690	19.4	-	2	-	1	-	-	1	1	-	-

Source: http://www.fpir.noaa.gov/OBS/obs_as_ll_rprts.html

Table 10. Number of Marine Mammal and Seabird Interactions by Species Observed in the American Samoa Longline Fishery from 2006-2012.

	Marine Mammals								Seabirds			
Year	Unidentified Whale		False Killer Whale		Cuvier's Beaked Whale		Rough Toothed Dolphin		Unidentified Shearwater		Unidentified Frigatebird	
	Alive	Dead	Alive	Dead	Alive	Dead	Alive	Dead	Alive	Dead	Alive	Dead
2006	-	-	-	-	-	-	-	-	-	-	-	-
2007	-	-	-	-	-	-	-	-	-	1	-	-
2008	-	-	1	1	-	-	1	-	-	-	-	-
2009	-	-	-	-	-	-	-	-	-	-	-	-
2010	-	-	-	-	-	-	-	-	-	-	-	-
2011	2	-	3		-	1	-	5	-	1	-	-
2012	-	-	-	-	-	-	-	-	-	-	-	-
2013	-	-	-	-	-	-	1	1	-	-	-	1

Source: http://www.fpir.noaa.gov/OBS/obs_as_ll_rprts.html

7.6.1 Sea Turtles

The Endangered Species Act (ESA) lists all Pacific sea turtles as either threatened or endangered, with the exception of the flatback sea turtle found on the continental shelf around Australia. The ESA lists the green sea turtle (*Chelonia mydas*) as threatened, except for the endangered nesting population on the Pacific coast of Mexico. Hawksbill (*Eretmochelys imbricata*) and leatherback sea turtles (*Dermochelys coriacea*) are listed as endangered. The ESA lists the South Pacific loggerhead (*Caretta caretta*) distinct population segment (DPS) as endangered and breeding populations of olive ridley sea turtles (*Lepidochelys olivacea*) Mexico's Pacific coast are listed as endangered, while all other ridleys are listed as threatened. These five species of sea turtles are highly migratory, or have a highly migratory phase in their life history (NMFS 2001). For more detailed information on the life history of sea turtles, see the Council's Environmental Impact Statement on Amendment 18 to the Fishery Management Plan for Pelagic Fisheries of the Western Pacific Region (WPFMC 2008).

Table 11. Estimated sea-turtle interactions from observer data in the American Samoa longline fishery. Source NMFS PIRO based on data in Table 9

Green	**Observed Interactions**	**Observer Coverage**	**Expansion Factor**	**Estimated Interactions**	**Condition Released**	
2006	3.00	8.10	12.35	37.04	3 dead	
2007	1.00	7.10	14.08	14.08	1 dead	
2008	1.00	6.40	15.63	15.63	1 dead	
2009	3.00	7.70	12.99	38.96	3 dead	
2010	6.00	25.00	4.00	24.00	5 dead	1 injured
2011	11.00	33.30	3.00	33.03	10 dead	1 injured
2012	0.00	19.80	5.05	0.00		
2013	2.00	19.40	5.15	10.31	2 dead	
2014	no data					
Leatherback	**Observed Interactions**	**Observer Coverage**	**Expansion Factor**	**Estimated Interactions**	**Condition Released**	
2006	0.00	8.10	12.35	0.00		
2007	0.00	7.10	14.08	0.00		
2008	0.00	6.40	15.63	0.00		
2009	0.00	7.70	12.99	0.00		
2010	0.00	25.00	4.00	0.00		
2011	2.00	33.30	3.00	6.01	1 dead	1 injured
2012	1.00	19.80	5.05	5.05		1 injured
2013	2.00	19.40	5.15	10.31	1 dead	1 injured
2014	no data					
Olive Ridley	**Observed Interactions**	**Observer Coverage**	**Expansion Factor**	**Estimated Interactions**	**Condition Released**	
2006	0.00	8.10	12.35	0.00		
2007	0.00	7.10	14.08	0.00		
2008	0.00	6.40	15.63	0.00		
2009	0.00	7.70	12.99	0.00		
2010	0.00	25.00	4.00	0.00		
2011	1.00	33.30	3.00	3.00		1 injured
2012	1.00	19.80	5.05	5.05	1 dead	
2013	1.00	19.40	5.15	5.15		1 injured
2014	no data					

The estimated number of sea-turtles taken in the American Samoa longline fishery is given in Table 11. Prior to September 2011, the fishery operated without any specific turtle mitigation measures other than those to promote the safe handling and release of captured turtles. After September 2011, vessels were required to ensure that all hooks were set at a minimum depth of 100 m. In 2012 no green turtles were taken by the fishery and 10 in 2013. No leatherback or olive ridley turtles were observed taken by the fishery until 2011.

7.6.1.1 Green Sea Turtles

Green sea turtles are the primary species documented to interact with the American Samoa longline fishery, and all green turtles caught thus far have been juveniles. Although only juvenile green turtles have been observed captured in the fishery, it is likely that adults do occur in the area (NMFS 2010a).

General Distribution

Green turtles are found throughout the world, occurring primarily in tropical, and to a lesser extent, subtropical waters. The species occurs in the western, central, and eastern Atlantic, the Mediterranean, the western, northern, and eastern Indian Ocean, southeast Asia, and the western, central, and eastern Pacific (NMFS & USFWS 2007). The American Samoa longline fishery affects green turtles from the nesting aggregations in Oceania (Polynesia, Micronesia, Melanesia, and eastern Australia).

Based on the best information currently available, about 18,000 to 38,000 green turtles nest annually in Oceania (NMFS 2010b). However, about 90 percent of nesting takes place among two Australian nesting aggregations (Northern Great Barrier Reef (GBR) and Southern GBR, which includes the Coral Sea Platform), with over half of all the nesting occurring on a single island; Raine Island in the Northern GBR (Chaloupka et al. 2008, Limpus 2009). Nesting trends appear to be stable at Raine Island and are increasing at Heron Island in the Southern GBR, as well as at Chichi-jima in the Ogasawara Islands (Chaloupka et al. 2008).

Seven green turtles outfitted with satellite tags on Rose Atoll (the easternmost island of the Samoan Archipelago) traveled on a southwesterly course to Fiji, a distance of approximately 1,500 km (Craig et al. 2004). Tag returns of eastern Pacific green turtles establish that these turtles travel long distances between foraging and nesting grounds. In fact, 75 percent of tag recoveries from 1982-1990 were from turtles that had traveled more than 1,000 kilometers from Michoacán, Mexico.

Sub-adult and adult green turtles occur in low abundance in nearshore waters around the islands of American Samoa. Population trend data are not available, but anecdotal information suggests major declines over the last 50 years (Tuato'o-Bartley et al 1993, Utzurrum 2002). Genetics samples have been collected from stranded or foraging green turtles around Tutuila. To date, four samples have been analyzed: two samples from stranded green turtles in Pago Pago Harbor had a haplotype known from nesting green turtles in American Samoa, Yap, and the Marshall Islands. However, since many green turtle nesting aggregations in the Pacific still have not been sampled, it is possible that this haplotype occurs at more than these three sites. In addition, two samples have been analyzed from foraging green turtles at Fagaalu, American Samoa, but the haplotype is of unknown nesting origin (Peter Dutton, Southwest Fisheries Science Center, pers. comm., 2010).

Identification and Size

Green turtles are distinguished from other sea turtles by their smooth carapace with four pairs of lateral scutes, a single pair of prefrontal scales, and a lower jaw-edge that is coarsely serrated. Adult green turtles have a light to dark brown carapace, sometimes shaded with olive, and can exceed one meter in straight carapace length (SCL) and 100 kilograms (kg) in body mass. Females nesting in Hawaii averaged 92 cm in SCL, while at the Olimarao Atoll in Yap females averaged 104 cm in curved carapace length (CCL) and approximately 140 kg. In the rookeries of Michoacán, Mexico, females averaged 82 cm in CCL, while males averaged 77 cm CCL (in NMFS and USFWS 1998a).

Growth and Age at Maturity

Green turtles exhibit a slower growth rate than other sea turtles, and age to maturity appears to the longest. Based on age-specific growth rates, green turtles are estimated to attain sexual maturity beginning at age 25 to 50 years (Limpus and Chaloupka 1997, Bjorndal et al. 2000, Chaloupka et al. 2008, Seminoff 2002, Zug et al. 2002). The length of reproductivity has been estimated to range from 17 to 23 years (Carr 1978, Fitzsimmons et al. 1995 *in* Seminoff 2002).

Diet

Although most green turtles appear to have a nearly exclusive herbivorous diet, consisting primarily of sea grass and algae (Wetherall et al. 1993; Hirth 1997), those along the east Pacific coast seem to have a more carnivorous diet. Analysis of stomach contents of green turtles found off Peru revealed a large percentage of mollusks and polychaetes, while fish and fish eggs, and jellyfish and commensal amphipods comprised a lesser percentage (Bjorndal 1997). Foraging studies of green sea turtles in Mexico found the turtles to have consumed primarily algae with small amounts of squid, sponges, tube worms, and other invertebrates in their diet (Seminoff 2000). A later study, however, documented a number of deep water invertebrate prey in the diet of local green turtles in Bahia de los Angeles, Mexico, suggesting that green turtles forage in offshore regions as well (Seminoff et al. 2006). Seminoff and Jones (2006) suggest that green sea turtles also exhibit offshore resting activity and they cite studies in the Caribbean where greens showed predictable diel movement patterns with turtles feeding on grass flats in mid-morning and mid-afternoon and moving into deeper water during midday hours. In the Hawaiian Islands, green turtles are thought to be site-specific and consistently feed in the same areas on preferred substrates, which vary by location and between islands (Landsberg et al. 1999).

Global Status

Green turtles were listed as threatened under the ESA on July 28, 1978, except for breeding populations found in Florida and the Pacific coast of Mexico, which were listed as endangered. Using a conservative approach, Seminoff (2004) analyzed subpopulation changes at 32 index sites, and estimated that globally the number of nesting female green turtles has declined by 48 to 67 percent over the last three generations (approximately 107 to 149 years). Causes for this decline include harvest of eggs, subadults and adults, incidental capture by fisheries, loss of habitat, and disease. The degree of population change was not consistent among all index nesting beaches or among all regions. Some nesting populations are stable or increasing. A 2007 study looked at global green sea turtle seasonal nesting activity data from all reliable available long-term datasets and found that rates of nesting population increase in the six main rookeries ranged from 4-14 percent per year over the past twenty to thirty years (Chaloupka et al. 2007). In the Pacific, the only major (> 2,000 nesting females) populations of green turtles occur in Australia and Malaysia. Smaller colonies occur in the insular Pacific islands of Polynesia, Micronesia, and Melanesia (Wetherall 1993) and on six small, sand islands at French Frigate Shoals, a long atoll situated in the middle of the Hawaii Archipelago (Balazs et al. 1995).

Green Sea Turtles in American Samoa

In Samoan folklore, green sea turtles, known in Samoan as *I`a sa* (sacred fish), *laumei ena'ena* or *tualimu* were believed to have the power to rescue fishermen lost at sea (Craig 2002). The life cycle of the green sea turtle involves a series of long-distance migrations back and forth between their feeding and nesting areas (Craig 2002). In American Samoa, green turtles nest at Swains Island, Rose Atoll, and Tutuila (NMFS 2010a).When they finish laying their eggs there, the green turtles leave and migrate to their feeding grounds somewhere else in the South Pacific. After several years, the turtles will return to nest again. Every turtle returns to the same nesting and feeding areas throughout its life, but that does not necessarily mean that all turtles nesting in American Samoa will migrate to exactly the same feeding area.

Following hatching from their natal beaches, green turtle life history is characterized by early development in the pelagic zone followed by development in coastal areas where post-recruitment juveniles and adults forage in shallow coastal areas, primarily on algae and seagrasses. Upon maturation, adult greens typically undertake long migrations between their resident foraging grounds and their natal nesting areas (NMFS 2010a). From 1971-1996, 46 adult female turtles were flipper tagged at Rose Atoll with only three ever recaptured; two in Fiji and one in Vanuatu, all dead. A satellite tagging study, conducted in the mid-1990s tracked seven tagged green sea turtles by satellite telemetry from their nesting sites at Rose Atoll to Fiji (Balazs et al. 1994). Most of the recovered tagged turtles migrated westward to Fiji perhaps for better feeding opportunities in Fiji's abundant, shallow seagrass and algae habitats (Craig et al. 2004). Of 513 greens tagged in French Polynesia between 1972 and 1991, six were recovered in Fiji, three in Vanuatu, two in New Caledonia, and one each were recovered at Wallis Island, Tonga, and the Cook Islands (NMFS 2010a).

Green Sea Turtle Interactions with the American Samoa-based Longline Fishery

The sea turtle interactions that have occurred in waters around American Samoa have been with juvenile green sea turtles. Because the interactions resulted in mortalities (Table 9), tissue samples for genetic analysis were obtained from several of the turtle specimens. The first sample was collected in 2006, and was identified as being a haplotype consistent with the northern Australian stock that include nesting populations in the Northern and Southern GBR and Coral Sea and in New Caledonia. This is quite different from the haplotypes of the few samples obtained from nesting females in American Samoa (NMFS PIRO, pers. comm.). The second sample collected in 2007 is a haplotype that researchers have only found in Micronesia, the Marshall Islands and in American Samoa (NMFS PIRO, pers. comm.).

NMFS and other regional partners including the Southwest Fisheries Science Center (SWFSC) are continually working together to obtain better information on the status and stock structure of the western and central Pacific populations.

7.6.1.2 Hawksbill Sea Turtles

The hawksbill turtle is listed as endangered under the ESA throughout its range. The primary global threat to hawksbills is habitat loss of coral reef communities. In the Pacific, the primary threat is the harvesting of the species for its meat, eggs, and shell, as well as the destruction of nesting habitat by human occupation and disruption (NMFS and USFWS 1998b). Along the eastern Pacific Rim, hawksbill turtles were common to abundant in the 1930s, but by the 1990s, the hawksbill turtle was rare to absent in most localities where it was once abundant (Cliffton et al. 1982).

Hawksbills are circumtropical in distribution, generally occurring from latitudes 30° N to 30° S within the Atlantic, Pacific, and Indian Oceans and associated bodies of water (NMFS and USFWS 1998b). Within the Central Pacific, nesting is widely distributed, though scattered and in very low numbers with the largest concentrations of nesting hawksbills in the Pacific occurring on remote oceanic islands of Australia and in the Indian Ocean. Foraging hawksbills have been reported from virtually all of the island groups of Oceania and from the Galapagos Islands in the eastern Pacific to the Republic of Palau in the western Pacific (Witzell 1983, Pritchard 1982a, b).[11]

Research indicates adult hawksbill turtles are capable of migrating long distances between nesting beaches and foraging areas, which are comparable to migrations of green and loggerhead turtles. Hawksbills have a unique diet comprised primarily of sponges (Meylan 1985, 1988). While data are somewhat limited on their diet in the Pacific, it is well documented that in the Caribbean hawksbill turtles are selective spongivores, preferring particular sponge species over others (Dam and Diez 1997). Foraging dive durations are often a function of turtle size, with larger turtles diving deeper and longer. As a hawksbill turtle grows from a juvenile to an adult, data suggest that the turtle switches foraging behaviors from pelagic surface feeding to benthic reef feeding (Limpus 1992). Within the Great Barrier Reef of Australia, hawksbills move from a pelagic existence to a “neritic” life on the reef at a minimum CCL of 35 cm. The maturing turtle

[11] From NMFS website at: http://www.nmfs.noaa.gov/pr/species/turtles/hawksbill.htm

establishes foraging territory and will remain in this territory until it is displaced (Limpus 1992). As with other sea turtles, hawksbills will make long reproductive migrations between foraging and nesting areas (Meylan 1999), but otherwise they remain within coastal reef habitats. In Australia, juvenile turtles outnumber adults 100:1. These populations are also sex-biased, with females outnumbering males approximately 2.5:1 (Limpus 1992).

Throughout the far western and southeastern Pacific, hawksbill turtles nest on the islands and mainland of southeast Asia, from China to Japan, and throughout the Philippines, Malaysia, Indonesia, Papua New Guinea, the Solomon Islands (McKeown 1977), and Australia (Limpus 1982). The largest nesting population of hawksbills appears to occur in Australia. Approximately 2,000 hawksbills nest on the northwest coast of Australia and about 6,000 to 8,000 off the Great Barrier Reef each year (Spotila 2004). Additionally, about 2,000 hawksbills nest each year in Indonesia and 1,000 in the Republic of Seychelles (Spotila 2004).[12]

Hawksbill Sea Turtles in American Samoa

Hawksbill turtles are known in Samoan as *laumei uga or laumei ulumanu*. Hawksbills are solitary nesters, and are most commonly found at Tutuila and the Manua Islands, and are also known to nest at Rose Atoll and Swains Island (Utzurrum 2002). In October 2007, a nest was found containing 167 shells, of which there were 142 live baby turtles, four of which died, and 25 unhatched eggs were located. Students from the village of Amanave where the nest was found assisted and kept the hatchlings safe overnight until DMWR staff arrived the next morning when they all let the hatchlings free at Amanave Beach. DMWR believes it is the largest group of hawksbill hatchlings to have been found in American Samoa.[13] In the Samoan Archipelago (Samoa and American Samoa), fewer than 30 hawksbills are estimated to nest annually, and the nesting trends are declining (NMFS & USFWS 2007). There are no documented interactions with hawksbill sea turtles in the American Samoa longline fishery (Table 9).

7.6.1.3 Olive Ridley Sea Turtles

Olive ridleys lead a highly pelagic existence (Plotkin 1994). These sea turtles appear to forage throughout the eastern tropical Pacific Ocean, often in large groups, or flotillas. Olive ridleys generally have a tropical range; however, individuals do occasionally venture north, some as far as the Gulf of Alaska (Hodge and Wing 2000). The post-nesting migration routes of olive ridleys, tracked via satellite from Costa Rica, traversed thousands of kilometers of deep oceanic waters ranging from Mexico to Peru and more than 3,000 kilometers out into the central Pacific (Plotkin 1994). Stranding records from 1990–1999 indicate that olive ridleys are rarely found off the coast of California, averaging 1.3 strandings annually (J. Cordaro, NMFS, pers. comm., 2004). At least one olive ridley was reported in Yap, Micronesia in 1973 (Falanruw et al. 1975).

The olive ridley turtle is omnivorous, and identified prey include a variety of benthic and pelagic prey items such as shrimp, jellyfish, crabs, snails, and fish, as well as algae and seagrass (Marquez 1990). It is also not unusual for olive ridley turtles in reasonably good health to be found entangled in scraps of net or other floating synthetic debris. Small crabs, barnacles, and

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[12] "

[13] From an article by Tina Mata'afa in the Samoa News. October 2007.

other marine life often reside on debris and are likely to attract the turtles. Olive ridley turtles also forage at great depths; a turtle has been sighted foraging for crabs at a depth of 300 meters (Landis 1965 *in* Eckert et al. 1986).

Olive Ridley Sea Turtles in American Samoa

Olive ridley turtles are uncommon in American Samoa, although there have been at least three sightings. A necropsy of one recovered dead olive ridley found that it was injured by a shark, and may have recently laid eggs, indicating that there may be a nesting beach in American Samoa (Utzurrum 2002). Fishery observers recorded interactions with olive ridleys in 2010 and 2011; both turtles were released injured (Table 9) [14]. Two further interactions were observed in 2012 and 2013 with both turtles released dead (Table 9)

7.6.1.4 Leatherback Sea Turtles

Leatherback turtles (*Dermochelys coriacea*) are widely distributed throughout the oceans of the world, and are found in waters of the Atlantic, Pacific, and Indian Oceans; the Caribbean Sea; and the Gulf of Mexico (Dutton et al. 1999). Increases in the number of nesting females have been noted at some sites in the Atlantic (Dutton et al. 1999), but these are far outweighed by local extinctions, especially of island populations, and the demise of once-large populations throughout the Pacific, such as in Malaysia (Dutton et al. 1999) and Mexico (Sarti et al. 1996; Spotila et al. 1996). In other leatherback nesting areas, such as PNG, Indonesia, and the Solomon Islands, there have been no systematic, consistent nesting surveys, so it is difficult to assess the status and trends of leatherback turtles at these beaches. In all areas where leatherback nesting has been documented, current nesting populations are reported by scientists, government officials, and local observers to be well below abundance levels of several decades ago. The collapse of these nesting populations was most likely precipitated by a tremendous overharvest of eggs coupled with incidental mortality from fishing (Sarti et al. 1996).

Leatherback turtles lead a mostly pelagic existence, foraging widely in temperate waters, except during the nesting season when gravid females return to tropical beaches to lay eggs. Males are rarely observed near nesting areas, and it has been proposed that mating most likely takes place outside of tropical waters, before females move to their nesting beaches (Eckert and Eckert 1988). Leatherbacks are highly migratory, exploiting convergence zones and upwelling areas in the open ocean, along continental margins, and in archipelagic waters (Eckert 1998). In a single year, a leatherback may swim more than 10,000 kilometers (Eckert 1998).

Satellite telemetry studies indicate that adult leatherback turtles follow bathymetric contours over their long pelagic migrations and typically feed on cnidarians (jellyfish and siphonophores) and tunicates (pyrosomas and salps), and their commensals, parasites, and prey (NMFS 1998). Females are believed to migrate long distances between foraging and breeding grounds, at intervals of typically two or four years (Spotila et al. 2000). In the western Pacific, nesting peaks on Jamursba-Medi Beach (Papua, Indonesia) from May to August, on War-Mon Beach (Papua) from November to January (Starbird and Suarez 1994), in peninsular Malaysia during June and

[14] http://www.fpir.noaa.gov/OBS/obs_as_ll_rprts.html

July (Chan and Liew 1989), and in Queensland, Australia in December and January (Limpus and Reimer1994).

Migratory routes of leatherback turtles originating from eastern and western Pacific nesting beaches are not entirely known. However, satellite tracking of post-nesting females and genetic analyses of leatherback turtles caught in U.S. Pacific fisheries or stranded on the west coast of the U.S. presents some strong insights into at least a portion of their routes and the importance of particular foraging areas.

Leatherback Sea Turtles in American Samoa

In 1993, the crew of an American Samoa government vessel engaged in experimental longline fishing pulled up a small freshly dead leatherback turtle about 5.6 kilometers south of Swains Island. This was the first leatherback turtle seen by the vessel's captain in 32 years of fishing in the waters of American Samoa. A fisherman also reported catching a leatherback in their longline logbook in 2009. Fishery observers recorded two interactions with leatherbacks in 2011. One turtle was released injured, and one turtle was dead and returned to port as a specimen. (Table 9). A single leatherback was released dead in 2012 and one leatherback was released alive and one dead in 2012 (Table 9).

7.6.1.5 Loggerhead Sea Turtles

The loggerhead sea turtle is listed as threatened under the ESA throughout its range, primarily due to direct take, incidental capture in various fisheries, and the alteration and destruction of its habitat. There are nine distinct population segments, including the South Pacific and North Pacific, and the Southeast Indo-Pacific Ocean, among others. In the South Pacific, Limpus (1982) reported an estimated 3,000 loggerheads nesting annually in Queensland, Australia during the late 1970s. However, long-term trend data from Queensland indicate a 50 percent decline in nesting by 1988-1989 due to incidental mortality of turtles in the coastal trawl fishery. This decline is corroborated by studies of breeding females at adjacent feeding grounds (Limpus and Reimer 1994). Approximately 300 females nest annually in Queensland, mainly on offshore islands (Capricorn-Bunker Islands, Sandy Cape, Swains Head; Dobbs 2001). In southern Great Barrier Reef waters, nesting loggerheads have declined approximately 8 percent per year since the mid-1980s (Heron Island), while the foraging ground population has declined 3 percent and comprised less than 40 adults by 1992. Researchers attribute the declines to recruitment failure due to fox predation of eggs in the 1960s and mortality of pelagic juveniles from incidental capture in longline fisheries since the 1970s (Chaloupka and Limpus 2001).

Loggerhead Sea Turtles in American Samoa

There are no known reports of loggerhead turtles in waters around American Samoa (Tuato'o-Bartley et al. 1993), nor reports of fishery interactions (Table 9).

7.6.2 Threatened and Endangered Marine Mammals

Cetaceans listed as threatened or endangered under the ESA and that have been observed in the waters around American Samoa include the humpback whale (*Megaptera novaeangliae*), sperm whale (*Physeter macrocephalus*), and sei whale (*Balaenoptera borealis*).

7.6.2.1 Humpback Whales

The humpback whale is known in Samoan as *tafola* or *ia maanu*. These whales can attain lengths of 50 ft (16 m) and winter in nearshore waters of usually 600 ft or shallower. Mature females are believed to conceive on the breeding grounds one winter and give birth the following winter. At least six well-defined breeding stocks of humpback whales occur in the Southern Hemisphere. In Fagatele Bay National Marine Sanctuary, southern humpback whales mate and calve from June through September. Humpbacks arrive in American Samoa from the south as early as July and stay until as late as December (Reeves et al. 1999). They are most common around Samoa during September and October. They occur in small groups of adults or in mother-calf pairs. Humpbacks have been sighted around all seven of the islands in American Samoa, but it is unknown how many spend time in the area.

The appearance of humpbacks around American Samoa is an important segment of their migration north and south in the South Pacific Ocean.[16] During the warm months of the southern hemisphere, they feed in Antarctica's waters, about 3,200 miles to the south. When Antarctic's winter sets in, these whales seek warmer waters by migrating northward, with some going towards Australia and others migrating towards Tonga. According to the Natural History Guide to the National Park of American Samoa most of this latter group remains near Tonga, but at least some migrate onward to Samoa, however, one whale seen in Samoan waters was sighted near Tahiti, so their migration patterns are not entirely predictable.[17]

The worldwide humpback whale population size is unknown. However, estimates of the number of individuals in the South Pacific…. No humpback whale interactions have been observed in the American Samoa longline fishery.

7.6.2.2 Sperm Whales

The sperm whale is the most easily recognizable whale with a darkish gray-brown body and a wrinkled appearance. The head of the sperm whale is very large, making up to 40 percent of its total body length. The current average size for male sperm whales is about 15 meters, with females reaching up to 12 meters.

Sperm whales are found in tropical to polar waters throughout the world (Rice 1989). They are among the most abundant large cetaceans in the region. Historical observations of sperm whales around Samoa occurred in all months except February and March (Reeves et al. 1999). Sperm whales are occasionally seen seaward of Fagatele Bay Sanctuary, Tutuila.[18]

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[16] See http://www.nps.gov/archive/npsa/5Atlas/parts.htm#top
[17] Ibid
[18] See http://sanctuaries.noaa.gov/science/condition/fbnms/history.html

The world population of sperm whales had been estimated to be approximately two million. However, the methods used to make this estimate are in dispute, and there is considerable uncertainty over the remaining number of sperm whales. The world population is at least in the hundreds of thousands, if not millions. No sperm whale interactions have been observed in the American Samoa longline fishery.

7.6.2.3 Sei Whales

Sei whales are members of the baleen whale family. There are two subspecies of sei whales recognized, *B. b. borealis* in the Northern Hemisphere and *B. B. schlegellii* in the Southern Hemisphere. They can reach lengths of about 40-60 ft (12-18 m) and weigh 100,000 lb (45,000 kg). Sei whales have a long, sleek body that is dark bluish-gray to black in color and pale underneath. The body is often covered in oval-shaped scars (probably caused from cookie-cutter shark and lamprey bites) and sometimes has some mottling, i.e., has spots or blotches of different color or shades of color.[19]

Sei whales have a worldwide distribution but are found mainly in cold temperate to subpolar latitudes rather than in the tropics or near the poles (Horwood 1987). They are distributed far out to sea and do not appear to be associated with coastal features. In the South Pacific most observations have been south of 30° S (Reeves et al. 1999). No sei whale interactions have been observed in the American Samoa longline fishery.

7.6.3 Other Marine Mammals

Other marine mammals that occur in the western Pacific region and have been recorded as being sighted in American Samoa waters (SPREP 2007) are shown in Table 12. Observers have recorded fishery interactions with small cetaceans on an infrequent basis since regular observer coverage started in 2006. No large whale interactions have been observed in the American Samoa longline fishery. See Table 12for observed interactions with marine mammals in the fishery.

Table 12. Non ESA-listed Marine Mammals Occurring Around American Samoa.

Common Name	Scientific Name	Common Name	Scientific Name
Blainville's beaked whale	*Mesoplodon densirostris*	**Melon-headed whale**	*Peponocephala electra*
Bottlenose dolphin	*Tursiops truncatus*	**Minke whale**	*Balaenoptera acutorostrata*
Bryde's whale	*Balaenoptera edeni*	**Pygmy sperm whale***	*Kogia breviceps*
Common dolphin	*Delphinus delphis*	**Risso's dolphin**	*Grampus griseus*
Cuvier's beaked whale	*Ziphius cavirostris*	**Rough-toothed dolphin**	*Steno bredanensis*

[19] From: http://www.nmfs.noaa.gov/pr/species/mammals/cetaceans/seiwhale.htm

Common Name	Scientific Name	Common Name	Scientific Name
Dwarf sperm whale*	*Kogia simus*	**Short-finned pilot whale**	*Globicephala macrorhynchus*
False killer whale	*Pseudorca crassidens*	**Spinner dolphin**	*Stenella longirostris*
Fraser's dolphin	*Lagenodelphis hosei*	**Spotted dolphin**	*Stenella attenuata*
Killer whale	*Orcinus orca*	**Striped dolphin**	*Stenella coeruleoalba*

Sources: SPREP 2007 and PIFSC unpublished.
Note: * these are unconfirmed SPREP records. Marine mammal survey data are limited for this region. This table represents likely occurrences in the action area.

7.6.4 ESA-listed Seabird

Newell's shearwater (*Puffinus auricularis newelli*), has been documented in American Samoa and is listed as threatened under the Endangered Species Act. Newell's shearwater generally known with other shearwaters as ta`i`o in Samoan, has been identified as a 'seabird visitor' to Tutuila by the National Park Service.[20]

A recent publication prepared for the WCPFC 2009 Scientific committee meeting presents distribution maps of seabirds in the WCPO and shows this seabird's distribution as being north of American Samoa (Waugh et al. 2009). There is one documented case of a single bird from American Samoa. The specimen appeared to be sick (Grant et al. 1994). Local biologists have not documented any other Newell's shearwater in American Samoa (J. Seamon, National Park Service, pers. comm., Nov. 2009). Therefore, Newell's shearwater is very rare in the archipelago and should be considered an accidental visitor to American Samoa. In a letter sent May 19, 2011, the U.S. Fish and Wildlife Service (USFWS) concurred with the NMFS determination that the American Samoa longline fishery, as modified by Pelagics FEP Amendment 5, is not likely to adversely affect the Newell's shearwater.[21] Since its inception in 2006, the American Samoa Observer Program has not documented any sightings or interactions between the longline fishery and Newell's shearwaters.

7.6.5 Other Seabirds

Other seabirds not listed under the ESA found in American Samoa are listed in Table 13. There have been two unidentified shearwaters released dead in the American Samoa longline fishery, one each in 2007 and 2011.

Table 13. Seabirds Occurring in American Samoa

Residents (i.e., breeding)		
Samoan name	English name	*Scientific name*
ta'i'o	Wedge-tailed shearwater	*Puffinus pacificus*
ta'i'o	Audubon's shearwater	*Puffinus lherminieri*
ta'i'o	Christmas shearwater	*Puffinus nativitatis*

[20] Bird Checklist for American Samoa found at: http://www.nps.gov/archive/npsa/5Atlas/partzj.htm
[21] The USFWS is the primary federal agency with authority and responsibility to manage ESA listed seabirds.

Residents (i.e., breeding)		
ta'i'o	Tahiti petrel	*Pterodroma rostrata*
ta'i'o	Herald petrel	*Pterodroma heraldica*
ta'i'o	Collared petrel	*Pterodroma brevipes*
fua'o	Red-footed booby	*Sula sula*
fua'o	Brown booby	*Sula leucogaster*
fua'o	Masked booby	*Sula dactylatra*
tava'esina	White-tailed tropicbird	*Phaethon lepturus*
tava'e'ula	Red-tailed tropicbird	*Phaethon rubricauda*
atafa	Great frigatebird	*Fregata minor*
atafa	Lesser frigatebird	*Fregata ariel*
gogouli	Sooty tern	*Sterna fuscata*
gogo	Brown noddy	*Anous stolidus*
gogo	Black noddy	*Anous minutus*
laia	Blue-gray noddy	*Procelsterna cerulea*
manu sina	Common fairy-tern (white tern)	*Gygis alba*
Visitors/vagrants:		
ta'i'o	Short-tailed shearwater	*Puffinus tenuirostris*
ta'i'o	Mottled petrel	*Pterodroma inexpectata*
ta'i'o	Phoenix petrel	*Pterodroma alba*
ta'i'o	White-bellied storm petrel	*Fregetta grallaria*
ta'i'o	Polynesian storm petrel	*Nesofregetta fuliginosa*
-----	Laughing gull	*Larus atricilla*
gogosina	Black-naped tern	*Sterna sumatrana*

Source: WPFMC 2009.

8.0 Impacts of the Alternatives

The following section describes the potential direct, indirect, and cumulative impacts, which may stem from implementation of the alternatives under detailed consideration.

8.1 Alternative 1: No Action

A summary of the various shapes of the various implemented and proposed managed areas within the US EEZ around American Samoa is given in Table 14.

Table 14. Implemented and proposed managed areas in the US EEZ around American Samoa

Spatial management unit	Area (sq nmi)	Percent of EEZ
American Samoa EEZ	117983	100
Current Swains LVPA closure	8,363	7.0
Current Southern Closure (Tutuila, Manua, Rose)	21,846	18.5
Current Closure Total	30,210	25.6
Rose Atoll Marine National Monument	10,141	8.6
Swains proposed 12 nm square	639	6.0
Swains proposed open	7,724	0.5
Small strip north of Tutuila and Manua proposed open	894	0.8
South of Manua Island proposed open	2144	1.8
South of Tutuila proposed open	1501	1.3
Total Southern Closure areas proposed open	4,539	3.8
Proposed new exempted fishable area under Alt 2	8,618	7.3
Proposed new exempted fishable area under Alt 3	12,263	10.4
Total fishable area in EEZ under Alt 2	96,391	81.7
Total fishable area in EEZ under Alt 2	100,036	84.8

8.1.1 Impacts of the No Action Alternative on Target and Non-Target Stocks

Under the No Action Alternative, LPVA would not be changed and thus the American Samoa longline fishery would not radically depart from its current patterns of fishing activity. The fishery would continue operating within those parts of the US EEZ around American Samoa that remain open to longline fishing by large longline vessels. In addition, the fishery would either operate on the high seas areas to the north of American Samoa, or fish under access agreements with neighboring South Pacific countries. Most fishing effort in the longline fishery is conducted between the southern islands of American Samoa and Swains Island (see Figure 10). The troll fishery would remain unaffected.

Under the No Action Alternative, impacts to target and non-target stock status would thus remain largely unchanged, and may even be reduced, due to the lower levels of longline fishery participation during a prolonged period of low catch rates of albacore, the primary target of the fishery.

It is not anticipated that catch rates of albacore would improve significantly in the short-term other than expected seasonal fluctuations (see Figure 3). Declines in island-based domestic fisheries might be expected to lead to better fishing conditions in the long term if some participants drop out of the fishery. Conversely, entry of additional Chinese longline vessels fishing on the high seas and in neighboring country EEZs may offset any gains to target and non-target stocks from reduced participation by domestic island fisheries.

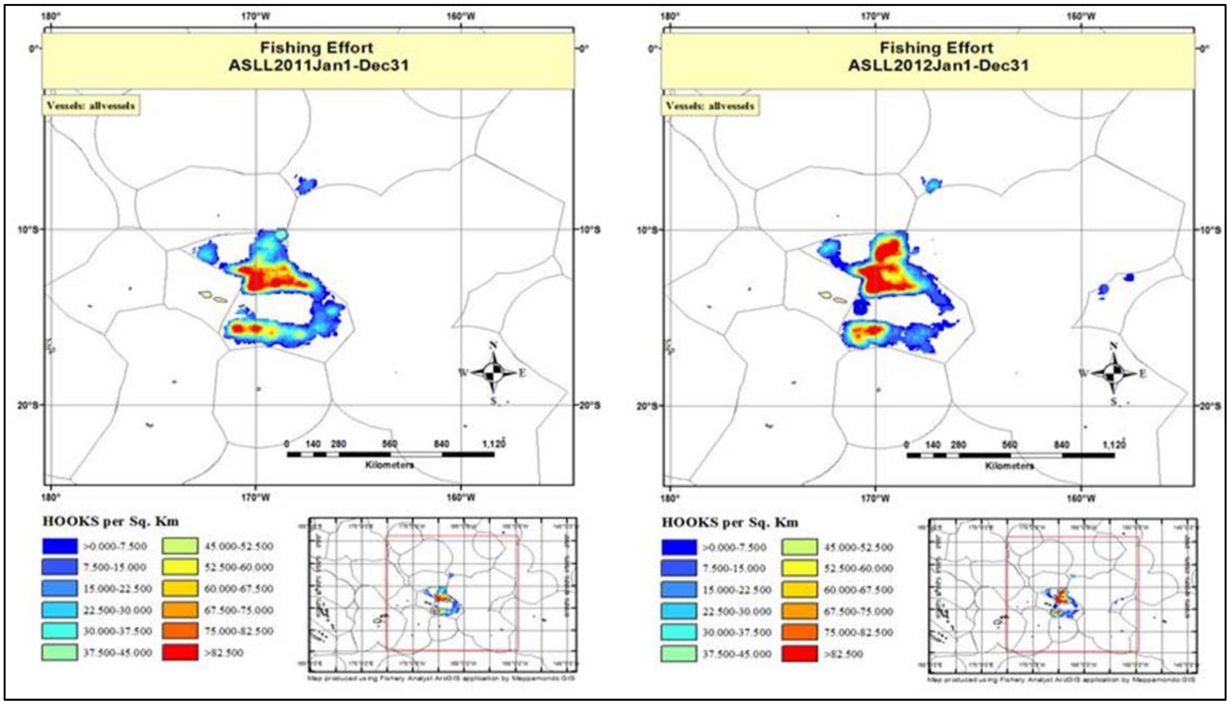

Figure 11 Location of longline fishing effort within and beyond the US EEZ around American Samoa.

Impacts of the No Action Alternative are likely to be sustainable for albacore, notwithstanding the impacts of higher recent overall catch on the CPUE and the price of albacore as noted in Section 3. The impacts of the No Action Alternative on catches of skipjack tuna, bigeye tuna and yellowfin tuna are also likely to be sustainable, as these are only minor components of the overall catch by American Samoa longline vessels. Catches of bycatch species such as sharks are also likely to be sustainable as they are discarded alive for the most part.

Impacts to the target specie and bycatch species caught by troll fishing are highly likely to remain unchanged under the No Action Alternative. The same separation would be maintained between troll vessels and the longline fishery, with only one vessel grandfathered to fish within the LVPA.

8.1.2 Impacts of the No Action Alternative to Protected Species and Habitat

A summary of sea-turtle and marine mammal interactions with the American Samoa longline fleet is shown in Figure 11. The distribution of interactions broadly conforms to the pattern of fishing effort in the US EEZ around American Samoa (Figure 11). Under the No Action Alternative the fishery would not greatly change its patterns of fishing and the potential for interactions with seabirds, sea turtles and marine mammals would remain unchanged. Annual total numbers of seabirds, sea turtles and marine mammals may indeed be reduced if fleet-wide effort remains constrained by the persistence of poor fishing conditions.

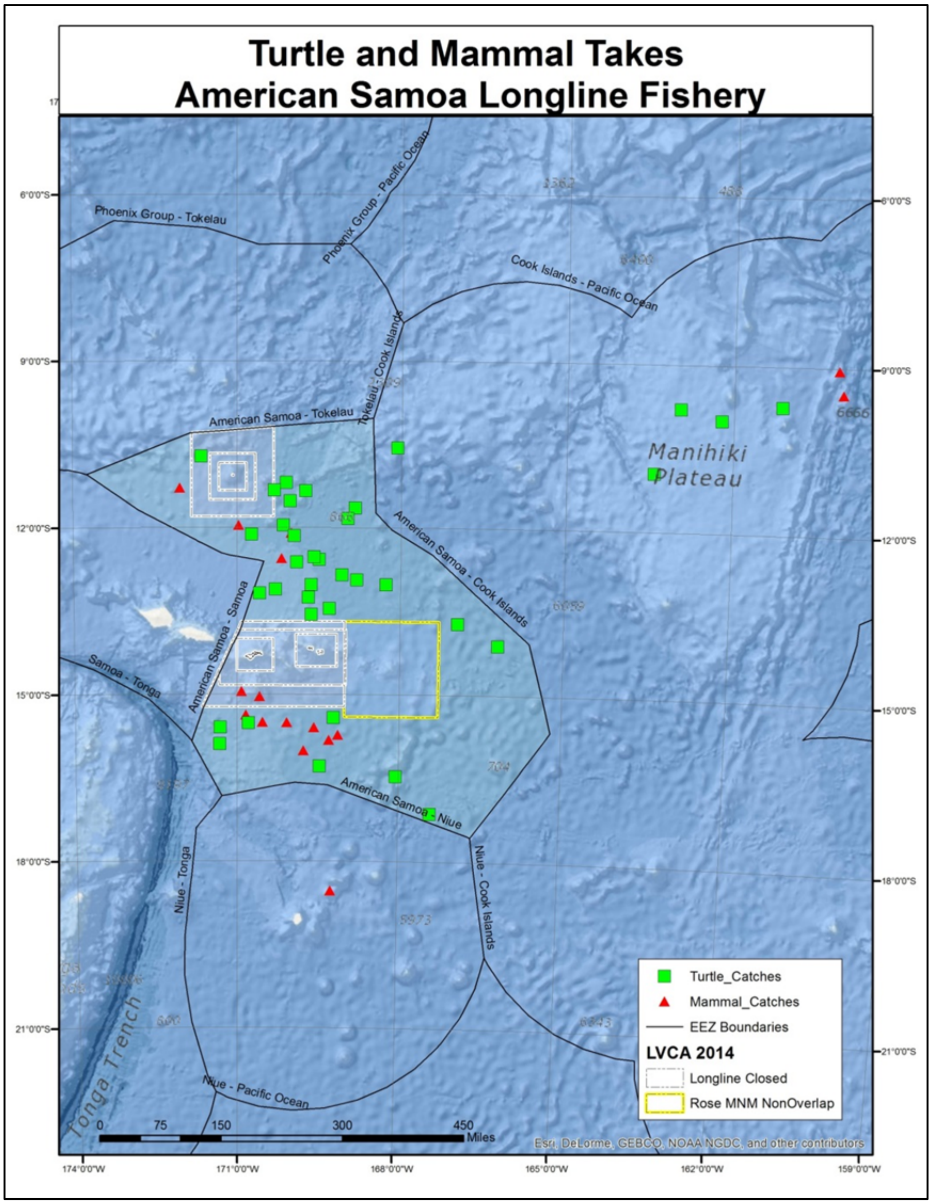

Figure 12. Cumulative observed sea-turtle and marine mammal interactions with the American Samoa longline fleet, 2006-2013.
Source NMFS PIRO Observer Program

The impact of the No Action Alternative on seabirds would likely not change. The American Samoa longline fishery has had only two documented interactions with seabirds in the American Samoa longline fishery. The American Samoa longline fishery catches very few sharks (

Table 8) and this small volume is unlikely to be affected by the No Action Alternative.

Pelagic longline gear by virtue of its fishing in the water column and not on a substrate and its construction from largely chemically inert materials means it has little impact on seawater. Under the No Action alternative, the fishery would continue to operate away from areas of shallow seamounts such as South Bank and Northeast Bank where longline gear might come into contact with the benthic substrate. Thus the No Action Alternative is highly unlikely to have any impacts on coral reefs or on coral proposed for listing under the Endangered Species Act Further, longline fishing is not having any discernable impact on resources in the American Samoa National Marine Sanctuaries or the Rose Atoll Marine National Monument, nor having an adverse impact on essential fish habitat (EFH) or habitat areas of particular concern (HAPC).

8.1.3 Impacts of the No Action Alternative to Fishery Participants and Fishing Communities

Under the No Action Alternative the American Samoa fishery would not change its patterns of fishing and large longline vessels would have to continue fishing predominantly within the open areas inside the US EEZ around American Samoa. The fishery would thus have to continue to deal with any adverse impacts of the fishery within the current fishing grounds, including potential for catch competition between longlines and low catch rates, thus prolonging the period of low economic returns from the fishery.

The No Action Alternative would maintain most longline fishing outside of the LVPA which means that hook densities within the available fishing grounds are high with the inevitable potential for gear conflict and catch competition. Under the No Action alternative, therefore, there may be a reduction of participation in the domestic longline fleet in American Samoa, with concomitant negative impacts to the incomes and livelihoods of vessels crew and owners.

The No Action Alternative would not have any impacts to the troll fisheries of Tutuila or Manua, since the volume of longline fishing within the LVPA would remain unchanged, i.e 1-2 alias and one grandfathered large longline vessel.

8.1.4 Impacts of the No Action Alternative to Enforcement and Administration

Under the No Action Alternative there would be no increase to the existing enforcement and administration burden. There may, however, be issues with respect to the placement of observers to obtain random non-biased samples if fleet size declines or participation in the fishery fluctuates. This is due to the placement of observers on vessels following a randomized sampling scheme established in the expectation of a given number of vessels operating in the fishery. If the fleet size contracts or fluctuates markedly from month to month then the randomness of the observer placement will break down.

8.2. Alternative 2 Exemption for longline vessels holding an American Samoa longline limited entry permit to be able to fish seaward 25 nm to the north of Tutuila and Manua Islands and seaward from 12 nm around Swains Island for a period of:

Alternative 2a. One year exemption for permitted large longline vessels (Preferred)

Alternative 2b. Three year exemption for permitted large longline vessels

Under Alternatives 2a and 2b, vessels larger than 50 feet in length could fish in areas closer to Tutuila and the Manua Islands (to within 25nm north of these areas, and closer to Swains Island (to within 12nm). The expected fishery outcome is that the level of fishing would not dramatically increase within one or three years; longline vessels are expected to be able to be more spread out, reducing the intensity of fishing in any given area. The number of vessels and number of hooks set are not expected to increase substantially; however CPUE of target South Pacific Albacore could increase slightly by allowing longline vessels to fish in areas that have been prohibited since 2011. There could be an increase in the number of trips if vessels are able to fish closer to port. Both alternatives would be limited in impact because the duration of the change in prohibited areas would be limited to up to 3 years.

8.2.1 Impacts to Target and Non-Target Stocks under Alternatives 2a and 2b

The exemption that would allow longline vessels longer than 50 ft to fish within LVPA up to 25 nm to the north of Tutuila and Manua and within 12 nm of Swains would result in more fishable area within the US EEZ around American Samoa (see). The net effect of this on target stocks, however, is unlikely to readily detectable unless there are accumulations of unfished stocks, especially albacore, within the previously closed portions of the LVPA. Any accumulations of target and non-target stocks within the LVPA are not expected to have any discernable influence on stock status, nor as noted in Section 8.1.1 would this be affected by fishing any such accumulations. South Pacific albacore stock status (Figure 9) indicates that it continues to be neither overfished nor subject to overfishing. Any improvements of the performance of the American Samoa longline fishery are going to be localized to the US EEZ around the Territory, and within the levels of catch already observed in the fishery. Thus any improvements to the American Samoa fishery are unlikely to alter the overall stock status of South Pacific albacore.

Similarly, unless there are accumulations of non-target species within the LPVA, bycatch is not expected to increase appreciably under Alternative 2a and 2b.

Figure 12 shows the albacore CPUE time series for the entire American Samoa fishery and from aggregated CPUE for vessels permitted to fish within the LVPA around Swains and the southern islands of the archipelago. The data, though incomplete for the LVPA around Swains shows a clear correspondence of the CPUE trends in all three time series, with the fishery as a whole having on average a higher CPUE than the two closed areas.

Thus improved CPUEs by fishing within the previously closed zones may not eventuate; however, the greater separation of the fleet over the larger area of the fishing ground may reduce the incidence of catch competition. All fish in a given population are exposed to an equal probability of capture by a fishery whose units of gear are scattered randomly over the fishing grounds (Ricker 1975). Further, at low densities the units of gear do not interfere with each other in respect to the mechanics of their operations. In such a situation, catches by any additional new unit of gear may reduce the potential catch of all vessels. The competition takes the form of a faster reduction in the size of the population as a whole. As the fishing season progresses, each unit may catch fewer and fewer fish, and the more gear present, the more rapid is this decrease in catch

Ricker (1975) states that if fishing gear is dispersed unequally over the population, its action tends to produce local reductions in abundance greater than what the population experiences as a whole, leading to a different type of competition. This may be the case in American Samoa, with the LVPA and Rose Atoll MNM crowding the fishing fleet into the remaining EEZ waters. In such an instance fishing may produce a local depletion of the supply; additional hooks set in the same region increase the local depletion and catch per unit effort will fall off in proportion to the local abundance. The magnitude of this fall will be cushioned if some fish from the rest of the stock migrate into the fishing area and so keep the supply there from dropping as far as it otherwise would. However, competition between units of gear is intensified because catch per unit effort reflects the size of only the immediately available restricted portion of the stock, rather than the stock as a whole.

Reduction in catch competition by providing more fishable area of ocean may lead to better catch rates, especially of the target species, albacore. This in turn should lead to shorter fishing trips and improvements to the economic performance of the fishery. Any such benefits will be cumulatively greater for a three year period than a one year period and thus Alternative 2b would have a greater cumulative impact on the longline fishery, but the impact would niot be large given the limited time period of the benefit

In summary, beyond potential benefits to fishermen, the impacts to target and non-target stocks of this alternative is unlikely to be distinguishable from the No Action Alternative.

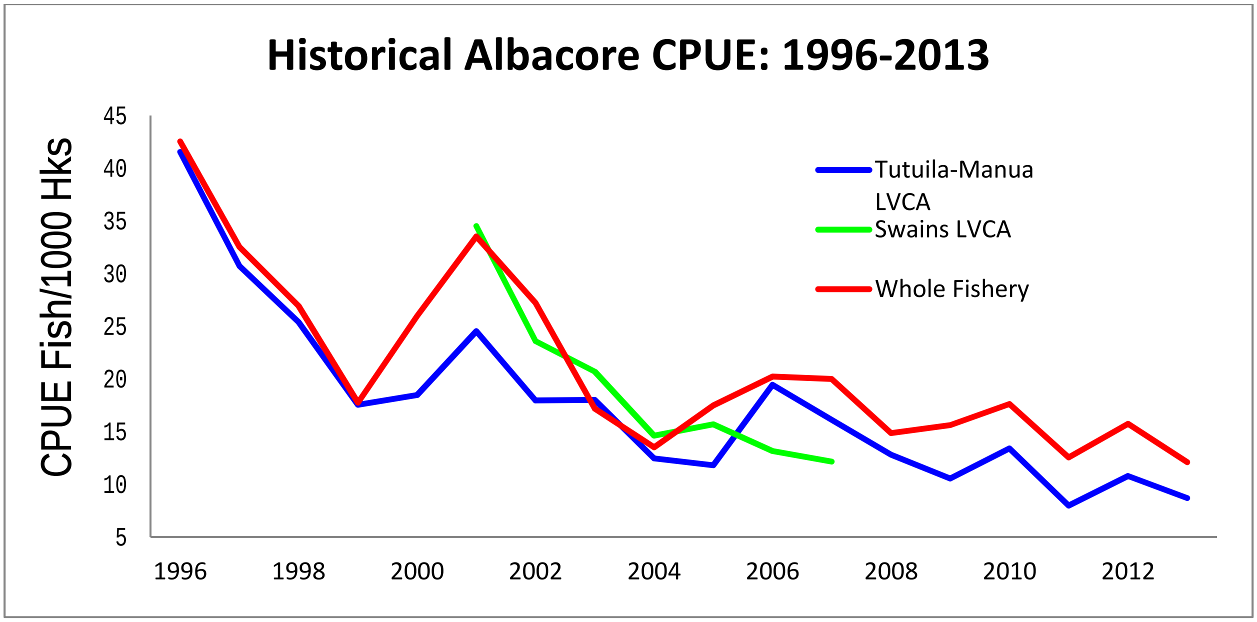

Figure 13. Albacore CPUE time series for the entire American Samoa longline fishery and for vessels permitted to fish in the LVPA around Swains and around Tutuila and Manua Islands

8.2.2 Impacts to Protected Species and Habitat under Alternatives 2a and 2b

The exemptions to the current LVPA boundaries would result in more fishable area within the US EEZ closer to the islands of the archipelago. The net impacts from this alternative may be to spread out the existing longline effort over a wider area, especially around Swains Island, thus reducing hook densities and decreasing potential interactions with protected species when considered in the EEZ as a whole. Figure 12 shows the distribution of interactions with marine mammals and sea-turtles and these correspond with the distribution of fishing effort in the US EEZ around American Samoa (see Figure 11). The exemption to fish from 25 nm seaward to the northern boundary of the southern segment of the LPVA is unlikely to have any major impacts on sea-turtle and marine mammal interactions in this part of the EEZ.

The ability of longline vessels to fish within 12 nm of Swains could mean that there is an increased potential for longline gear to interact with those species which are more island associated, such as hawksbill turtles, green sea turtles and cetaceans such as rough toothed dolphins, beaked whales and false killer whales.

However, hawksbill turtles are strongly associated with coral reefs, where they forage on sponges. Thus even a reduced barrier of 12 nm should be sufficient to minimize any potential interactions between hawksbill turtles and longlines. Moreover the longline fishery is subject to regulations to require deep setting of fishing gear to reduce the likelihood of and severity of interactions with green sea turtles. These measures have reduced green sea turtle interaction rates from 0.0025 turtles/1000 hooks (in 2007; prior to new regulations) to 0.0005 turtles/1000 hooks (from 2012 and 2013; after the regualtions were implemented, a reduction of 80%[22]. The increase in areas in which large longline vessels may fish (up to a year under Alternative 2a and up to 3 years under Alternative 2b) is not expected to result in large increases in interactions with green turtles, olive ridley turtles or leatherback turtles. There is not expected to be any increase in loggerhead sea turtle interactions (zero reported to date) which are found in cooler waters at higher latitudes.

Unlike Hawaii, there is no data for American Samoa to indicate that there are any island associated marine mammal stocks. Further, the South Pacific has many archipelagos in proximity to one another and has a different ecology compared to a remote archipelago like Hawaii. It is therefore assumed that fishing closer to Swains would not have any substantial impact on encounter rates and hence interactions.

Impacts to marine mammals from opening up the LVPA to fishing by large longline vessels is not expected to result in large increases in fishing intensity or in number of hooks so no large change to interaction rates. Observer data will allow fishery managers and scientists to continue to monitor interactions.

As noted above, pelagic longline gear by virtue of its fishing in the water column, not deployed on a substrate and comprised of largely chemically inert materials, means it has little impact on seawater habitat. Further, as noted in Section 8.1.2, the fishery would continue to operate away from areas of shallow seamounts such as South Bank and Northeast Bank where longline gear might come into contact with benthic substrate. Thus the No Action Alternative is highly unlikely to have any impacts on coral reefs or on coral proposed for listing under the Endangered Species Act Further, longline fishing is not having any discernable impact on resources in the American Samoa National Marine Sanctuaries or the Rose Atoll Marine National Monument, nor having an adverse impact on essential fish habitat (EFH) or habitat areas of particular concern (HAPC).

With no large changes to the way in which the longline fishery is conducted, and with the only fishery outcome being a potential reduction in crowding among longline fishermen, no changes are expected to occur with respect to continued low interaction rates with seabirds. The American Samoa longline fishery has had only two documented interactions with seabirds in the American Samoa longline fishery.

The American Samoa longline fishery is not having a large adverse effect on ecosystem processes, such as fish diversity or predator prey relationships. The ability for large longline vessels to fish in areas closer to Tutuila and the Manua Islands, and closer to Swains Island would not result in a large change of fishing intensity in any area, so ecosystem processes would not be affected.

> **A change to the location in which fishing by large longline vessels may take place would not increase catches of any shark species because Alternatives 2a and 2b are expected to spread fishing out within the U.S. EEZ around American Samoa. Catches of sharks are not having an adverse impact on shark**

[22] Based on mean of sea turtle interaction rates from 2007-2007 versus mean rate from 2012-2013, NMFS PIRO observer annual reports: http://www.fpir.noaa.gov/OBS/obs_as_ll_rprts.html

populations and this would not change under either Alternative 2a or 2b. The American Samoa longline fishery catches very few sharks (

Table 8) and this small volume is unlikely to be affected by the No Action Alternative.

Under Alternatives 2a and 2b, large longline vessels could fish closer to Tutuila and Manua Islands (within 25 nm in the north) and within 12nm from Swains Island for up to one year (Alternative 2a) or three years (Alternative 2b). Longline fishing in these areas is not expected to have an adverse impact on special areas including the National Marine Sanctuaries because the special coral reef resources would be 12 nm from where longliners may fish. In the past, when the waters around Swains Island were open to longline fishing, there were no known accidents with longline fishing that affected these areas.

Thus impacts to protected species and habitat would likely be no greater than the No Action Alternative, whether the exemption was for one year or three years.

8.2.3 Impacts to Fishery Participants and Fishing Communities

The current area closures in American Samoa amount to about 25.6% of the US EEZ around the territory. The reductions in the LVPA area closures under Alternatives 2a and 2b would amount to 18.3% of the EEZ area or a 7.3% increase in waters available to the longline fishery.

The exemption to be able to fish seaward from 25 nm to the north of Tutuila and Manua Islands is relatively small, amounting to 1,117 sq nm. However, the exemption to fish seawards of 12 nm around Swains makes available an additional 6,660 sq. nm of fishing grounds. As the American Samoa longline fishery operates predominantly in waters to the north of Tutuila, the freeing up of fishing grounds around Swains should reduce competition for fish between longlines set in this area. It is expected to improve CPUE by allowing longline fishermen to access fishing areas that may harbor stocks of South Pacific albacore in the US EEZ around American Samoa

Potential Impacts to Larger Longline Vessels

The LVPA imposed some economic costs on large vessels that were excluded from fishing for pelagic species within 50 nm of the shore. For example, to fish outside the LPVA, more fuel is now necessary to make fishing trips, then would have been requires prior to the establishment of the LPVA around Tutuila and Manua islands. Fuel prices have increased (Figure **13**) and this portion of the trip cost has become a much more important consideration.

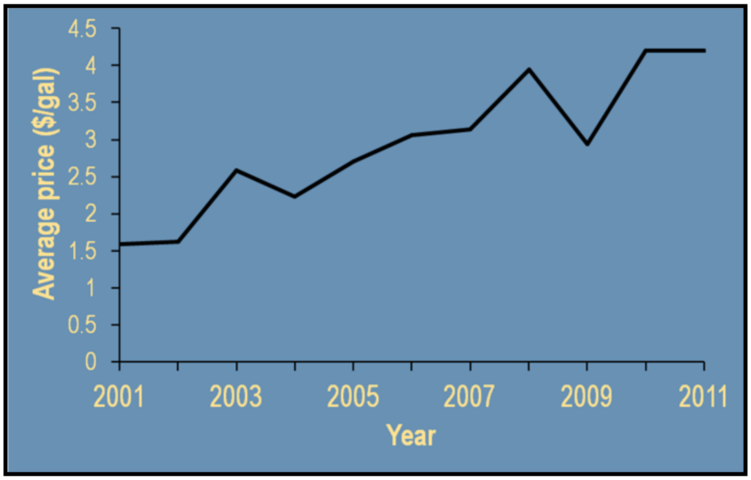

Figure 14. Average annual fuel price in American Samoa, 2001-2011
Source: American Samoa Government

Under Alternatives 2a and 2b, some larger longline vessels could see a reduction in the amount required to be spent on fuel, if they choose to fish in areas to the north of Tutuila and Manua Islands. Allowing large vessels (> 50 ft) to spread fishing effort over wider areas may reduce catch competition as noted above in Section 8.1.1 and thus would reduce the length of fishing trips if vessels can fill their fish holds more rapidly. Shorter duration fishing trips would enable vessels to make more frequent fishing trips with potentially lower operating costs.

It is believed that minimal improvements to the economic efficiency of longline vessels may have larger positive effects, including the ability to amass revenue for the diversification of fishing operations. For example, American Samoa pelagic fishermen have recently been discussing innovations to their fishing techniques. However, the difficult economic conditions in the fishery may be dissuading them from trying anything new or different.

Any such benefits are more likely to be realized for a three year period than a one year period and thus Altarenative 2 would have a greater cumulative economic impact on the longline fishery. A three year time horizon would provide more opportunity to evaluate the impact of the LVPA boundaries under a variety of different environmental and socio-economic conditions.

Potential Impacts to Smaller Longline Vessels

The impetus for creating the LVPA was to provide a buffer between American Samoa's large and small-scale fisheries. The measure intended to maintain the potential for economically viable catches of pelagic fish in those fisheries, by disallowing larger vessels from fishing around some known banks and seamounts which are likely to aggregate tuna. In doing so, it avoided gear conflicts between large and small vessels and encouraged domestic harvest of underutilized pelagic fishery resources at a small scale.

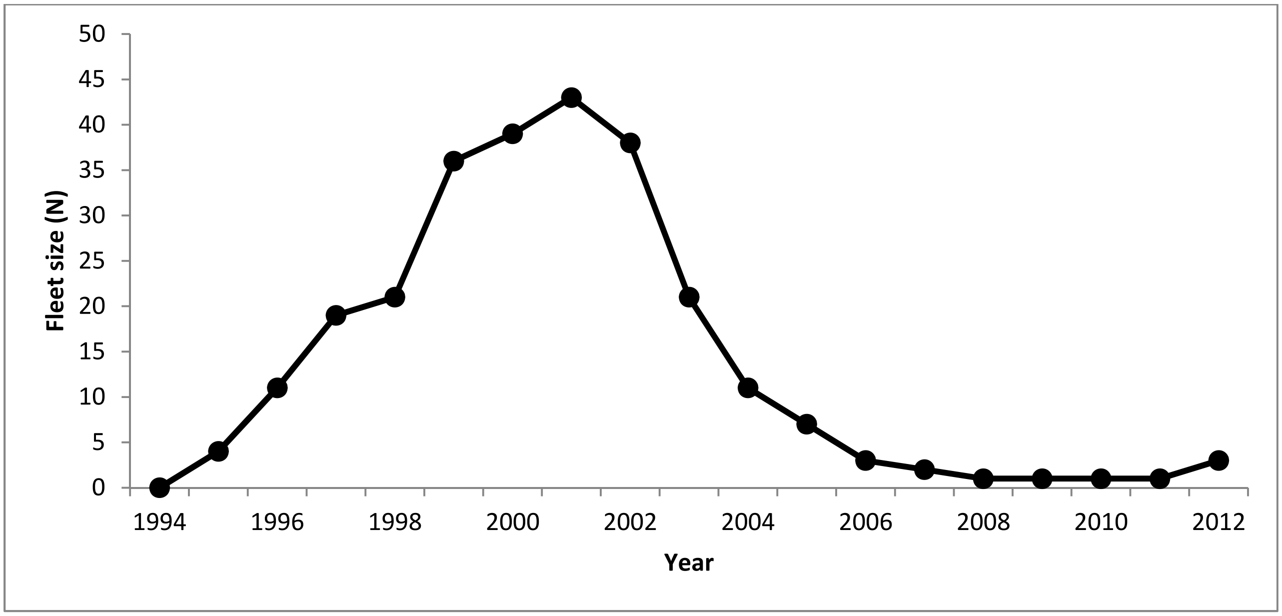

Figure 15. Fleet size of Class A and Class B longline vessels (alia catamarans) in American Samoa
Source WPRFMC 2013 and unpublished data

However, small-scale longline fishing in American Samoa has declined dramatically since its peak in 2001 (Figure 14). Currently, there is only one fully active participant in the fishery and it is unlikely that additional participants will enter the fishery in the near term (e.g. during the period of the LPVA exemption). Thus, there is little potential for gear conflict or catch competition between the two fishery sectors under the preliminary preferred alternative. Moreover, the purpose and need for the action that established the LPVAs was to help the longline fishery consideing the needs of the remnant small scale alia fleet and the commercial and sports fishing trollers operating out of Tutuila and to keep catch competition minimized, which these two proposed alternatives would do by maintaining the longline fleet at a minimum of 25 nm from Tutuila and Manua Islands

The 50-nm area LPVA closure around Swains Island, located 210 miles north of Tutuila was established to support the development of a small-scale pelagic fishery. However, prior to the closure, the island was devastated by Hurricane Tusi in 1987 and Hurricane Val in 1991 which reduced the Swains population to about 33 families. In February 2005, Cyclone Percy struck the island, causing widespread damage and virtually destroying the village of Taulaga. Although the majority of the 200 Swains islanders living elsewhere in American Samoa wished to return home and some of them to become involved in small-scale fisheries and other cottage industries, such resettlement never occurred. Only seven people were on the island at the time of Cyclone Percy, and a Coast Guard visit in March 2007 listed 12 to 15 inhabitants. Currently, Swains continues to be inhabited by a few people throughout the year and therefore, there is no basis to consider potential impacts to a small-scale pelagic fishery around Swains Island.

Potential Impacts to Charter and Recreational Pelagic Vessels

In scoping meetings with recreational fishery participants in February 2014, fishermen expressed apprehension at reducing the size of the closed area. In order to reduce the potential for gear and catch competition with larger longline vessels, the proposed Alternatives 2a and 2b leaves in place the larger vessel prohibited area around the southern banks, which are important grounds for recreational and charter fishing.

An exemption to fish within the LPVA to seaward from 25 nm north of Tutuila and Manua means that longline vessels are unable to fish at Northeast Bank, an important troll fishing ground. It might be argued that the reduction in the northern boundary of the LVPA would reduce the area of buffer between large and small pelagic vessels and which could potentially have some impact on catch rates at Northeast Bank. However, the potential negative impacts of this alternative to the small-boat pelagic fisheries in American Samoa are not likely to be substantial, since Northeast Bank is only one of several banks fished by the troll vessels from Tutuila (Figure 14). Moreover, studies in Hawaii of longline vessels in Hawaii and other small pelagic fishing vessels could find no firm evidence of interactions, even when these vessels were fishing in proximity with one another (Skillman et al 1993; He & Boggs 1996).

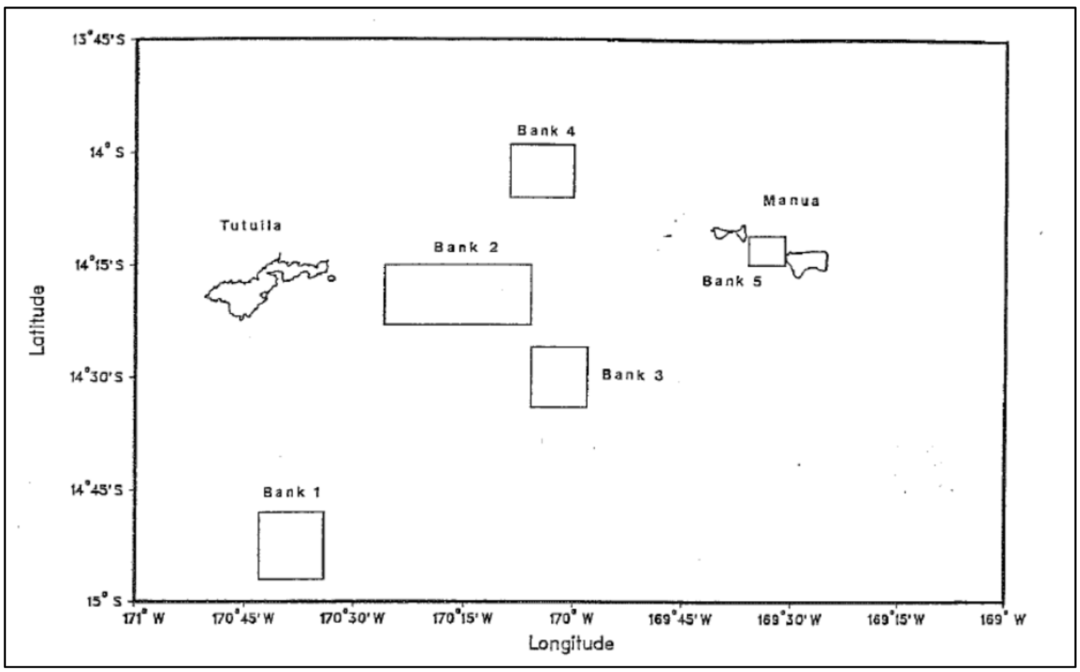

Figure 16. Locations of banks and seamounts around Tutuila and Manua Islands. Bank 1 = South Bank, Bank 2 = East Bank, Bank 3 = Southeast Bank, Bank 4 = Northeast Bank, Bank 5 = Manua Bank.
Source: Ralston & Goolsby (1986)

The exemptions to the LVPA envisioned under these Alternatives would be better implemented for the shorter time period of one year, in case there are impacts to the remnant alia fleet and troll fishers. Skipjack and yellowfin tunas are the major components of the troll catch (see Table 7) accounting for over 90% of the catch. However, no interactions have been documented from the longline catch data and troll CPUE in Table 15. Regressions were conducted of skipjack and yellowfin troll CPUE on skipjack and yellowfin longline catch based on the data in Table 15 to determine whether longline fisheries were affecting troll fishery catches. The regressions were not significant, but all had positive slopes, suggesting that increased longline catches of skipjack and yellowfin are coincident with higher CPUEs of the same two species in the troll fishery. This suggests that the CPUEs for both fisheries are dependent on regional availability of skipjack and yellowfin tuna. Studies from other parts of the region (Skillman et al 1993; He & Boggs 1996) showed no evidence of interactions and catch competition between troll and longline vessels.

Table 15. Summary of longline skipjack and yellowfin catches and skipjack and yellowfin troll CPUE in the American Samoa EEZ

Year	Longline Catches (mt)			Troll cpue (lb/hr)		
	Skipjack	Yellowfin	Skipjack & Yellowfin	Skipjack	Yellowfin	Skipjack & Yellowfin
1997	1.15	22.04	23.19	10.10	7.19	16.57
1998	18.43	41.97	60.40	10.80	4.89	15.36
1999	25.41	63.27	88.68	18.40	5.62	23.59
2000	14.63	86.46	101.09	14.90	4.61	18.22
2001	66.14	187.91	254.05	11.40	4.44	12.47
2002	244.27	485.41	729.69	9.03	9.83	16.40
2003	119.63	496.86	616.48	19.80	7.10	25.30
2004	234.64	889.85	1,124.49	18.20	5.10	21.91
2005	141.54	522.09	663.63	13.30	9.25	23.20
2006	213.25	496.99	710.23	15.40	10.80	32.28
2007	165.66	633.37	799.03	18.20	13.40	32.05
2008	163.14	340.21	503.35	21.50	26.90	45.03
2009	155.89	393.16	549.05	11.70	14.00	13.11
2010	111.42	445.68	557.11	8.78	9.23	13.30
2011	110.38	540.67	651.05	30.50	19.10	45.35
2012	289.23	374.06	663.29	29.50	23.20	46.74
mean	129.68	376.25	505.93	16.34	10.92	25.06

8.2.4 Impacts to Enforcement and Administration

There would be some additional administrative burden to the NMFS since the longline fleet would operate under an exemption for the LVPA as specified i.e. seawards of 25 nm to the north of Tutuila and Manua, and seawards 12 nm from Swains. This would require to modifications to the current regulations (Appendix 2) to allow those vessels with an American Samoa limited longline limited entry permit to fish within the newly opened areas within LVPA. Moreover regardless of whether the Council decides after one year or three years to terminate the exemption then this will also incur an additional administrative burden. This alternative will necessitate coordination between the Council, NMFS, NMFS OLE and the USCG to ensure that the new exemption boundaries are understood by both the regulatory agencies and fishermen.

All vessels > 50ft in the American Samoa longline fleet must carry a VMS beacon so that there would likely be little extra enforcement burden, other than noting the exemption boundaries within the VMS monitoring program.

The administrative burden of providing a temporary exception from the LPVA to large longline vessels are not considered large. However, there would be little benefit to making the exemption for a one year period only. Any economic benefits to the longline fishery from the exemptions are more likely to be realized cumulatively over a three year period than a one year period. A three year time horizon provides more opportunity to evaluate the economic impact of the LVPA boundaries under a variety of different environmental and socio-economic conditions.

Another aspect of the exemption process to consider is if the Council decides it would like to maintain the exemptions for longliners within the LVPA. If the exemptions are for one year only then it is highly unlikely that the requisite documentation and rulemaking would be completed so that there would be a seamless transition from the initial sunset date and the new period for exemption. Further, even with an initial three year exemption, there is no guarantee that such a seamless transition would happen. The Council would want to review all information available, conduct public hearings prior to developing the documentation and rulemaking. Thus in both instances, longline participants may find themselves eligible only to fish in waters beyond the LVPA as in the past, until the new rule allowing them exemptions to fish in the LVPA is promulgated.

8.3. Alternative 3

Alternative 3. One year Exemption for longline vessels holding an American Samoa longline limited entry permit to be able to fish in waters of the LVPA:

i. seaward of 25 nm to the north of Tutuila and Manua Islands;
ii. seaward from 12 nm around Swains Islands; and,
iii. within designated waters south of Tutuila and Manua (Figure 7):

Alternative 3a. One year exemption for permitted large longline vessels (Preferred)

Alternative 3b. Three year exemption for permitted large longline vessels

8.3.1 Impacts to Target and Non-Target Stocks

Under Alternative 4, the total new area opened to fishing would amount to 12,263 sq. nm with 17,947 sq. nm or 15.2% of the US EEZ waters around American Samoa still closed to fishing.

The impacts to target and non-target stocks from modifying the LVPA boundaries under this alternative with respect to the longline fishery are similar to those described under Section 8.2.1. However, a greater area of the LVPA may be fished by the longline fishery due to exemptions to fish to the east and west of South Bank, up to the boundaries of the EEZ in the west and the Rose Atoll MNM in the east. Given the greater area of the LVPA that may be fished, then this alternative should have the greater potential to minimize catch competition between the vessels of the longline fleet.

As noted in Section 8.2.1, the impacts to target stocks are likely to be indistinguishable to those under the No Action Alternative. However, any benefits from the LVPA boundary modifications will be greater for a three year period than a one year period.

8.3.2 Impacts to Protected Species and Habitat

The modification of the LVPA would result in more fishable area within the US EEZ closer to the islands of the archipelago for a three year period, and adjacent to the offshore banks. The net impacts from this alternative may be to spread out the existing longline effort over a wider area, especially around Swains Island, and in the southern portions of the LVPA to the east and west of South Bank. The decrease in hook densities may have the potential to decrease interactions with protected species. The impacts to protected species are likely to be similar to those described in section 8.2.2.

As noted above, however, it may be argued that the ability of longline vessels to fish within 12 nm of Swains and with greater proximity to the offshore banks could mean that there is an increased potential for longline gear to interact with those species which are more island associated, such as hawksbill turtles, green sea turtles and cetaceans such as rough toothed dolphins, beaked whales and false killer whales.

However, as note previously, hawksbill turtles are strongly associated with coral reefs, where they forage on sponges. Thus even a reduced barrier of 12 nm should be sufficient to minimize any potential interactions with longlines, and the recent regulations to require deep setting of fishing gear has appeared to reduce interactions with green sea turtles.

Unlike Hawaii, there is no data for American Samoa to indicate that there are any island associated marine mammal stocks. Further, the South Pacific has many archipelagos and banks and seamounts in proximity to one another and has a different ecology compared to a remote archipelago like Hawaii. It is therefore assumed that fishing closer to Swains would not have any substantial impact on encounter rates and hence interactions.

8.3.3 Impacts to Fishery Participants and Fishing Communities

The impacts to fishing participants and communities will be largely similar to those described in section 8.2.3. Having a wider area over which to fish for three years may be of benefit to the longline fleet, if the ability to fish in the exempted segments of the LVPA minimizes catch competition between longline vessels and thereby reducing trip lengths and minimizing costs. This alternative also frees up three bodies of water that are much closer to Tutuila than the larger fishing area around Swains. Thus this alternative has the potential to reduce travel times and trip length that would have a beneficial impact to reducing costs.

However, having a three year opening may be perceived as being too onerous for small scale alia and troll vessels if they experience poor fishing conditions, regardless of whether this is from opening up of the LVPA or for other reasons. However, as noted in Section 8.2.3 there is little evidence that longline vessels directly compete with non-longline troll vessels based on data from American Samoa (Table 15) and studies in Hawaii (Skillman et al 1993; He & Boggs 1996). Moreover, this alternative still maintains buffers between the main islands of American Samoa and the banks and seamounts important to the commercial and recreational troll fisheries.

8.3.4 Impacts to Enforcement and Administration

There will be some additional administrative burden to NMFS since new temporary boundaries will need to be established in the regulations for the LVPA (Appendix 2), i.e. seaward of 25 nm north from Tutuila and Manua, south of Tutuila and Manua, and seaward from 12 nm around Swains for one or three years. This alternative will necessitate coordination between the Council, NMFS, NMFS OLE and the USCG to ensure that the new exemption boundaries are understood by both the regulatory agencies and fishermen.

All vessels > 50ft in the American Samoa longline fleet must carry a VMS beacon so that there would likely be little extra enforcement burden, other than noting the exemption boundaries within the VMS monitoring program.

The administrative burden of amending the FMP to provide the American Samoa longline fishery is significant and the same regardless of the time period selected. Thus there would be little benefit to making the exemption for a one year period only. As argued above, any benefits are more likely to be realized for a three year period than a one year period and thus would have a greater cumulative impact on the longline fishery. A three year time horizon provides more opportunity to evaluate the impact of the LVPA boundaries under a variety of different environmental and socio-economic conditions.

As noted above in Section 8.2.4, extensions to the exemption will take time draft and implement and may result in longline participants being unable to fish in the exempted areas following sunset provisions until rulemaking is complete.

8.4 Cumulative Effects

The MSA and NEPA require analysis of the potential cumulative effects of a proposed action, as well as the cumulative effects of the alternatives to the proposed action. Under NEPA, cumulative effects are defined as those combined effects on the human environment that result from the incremental impact of the proposed action when added to other past, present, and reasonably foreseeable future actions, regardless of what Federal or non-Federal agency or person undertakes such other actions (40 CFR 150.8.7). The following cumulative effects analysis is organized by the following issues: target and non-target species, protected species, fishery participants and communities.

8.4.1 Target and Non-Target Species

8.4.1.1 Past, Present, and Reasonably Foreseeable Management Actions

Pelagics FEP

The Fishery Management Plan (FMP) for Pelagic Fisheries in the Western Pacific Region was approved by the Secretary of Commerce in 1987. In 2009, the Secretary of Commerce approved the Fishery Ecosystem Plan for Pacific Pelagic Fisheries of the Western Pacific Region, which replaced the FMP and establishes the framework for an ecosystem approach to manage pelagic fisheries. The American Samoa longline fishery was first managed under the FMP through federal permit and catch reporting regulations that were in effect at the time of the FMP's approval. In 2002, the large vessel prohibited are was implemented that restricts vessels larger than 50 ft from fishing for pelagic MUS within approximately 50 nm around Tutuila, the Manua Islands, Rose Atoll, and Swains Island. In 2005, the American Samoa longline limited entry program was implemented and initial permits were awarded in late 2005/early 2006. Longline fisheries under the FEP are comprehensively managed through the use of observers, vessel monitoring system (VMS), gear restrictions and other management measures, which allow the Council and NMFS to monitor the fishery and its impacts to target and non-target species. In 2011, the large vessel prohibited areas were modified slightly to line up the boundaries with the Rose Atoll MNM boundary.

At its 159th Meeting, the Council Directed staff to prepare a draft regulatory/FEP amendment/Framework measure to the Pelagics FEP to modify the Large Vessel Prohibited Area (LVPA) and identify options to reduce, for a period of one year, the northern boundary of the LVPA around Tutuila, Manua, and Rose to 25 nautical miles and to reduce the LVPA around Swains to 12 nautical miles, as preliminarily preferred.

In 2013, the Council recommended establishing catch limits for Territorial catches of bigeye tuna. While not implemented at this time, this could occur in the future. If so, American Samoa longline catches of BET could be limited to 2,000 mt, including up to 1,000 mt that could be transferred to the U.S. longline fleet fishing around Hawaii. The recent catches of bigeye tuna by American Samoa longline fleet are indicative of what would continue to occur even under the action alternatives (see Table 7), with catches of about 160-200 mt.

Therefore, even if a catch limit were to be specified annually, the limit would not constrain the American Samoa longline fishery much. Nor would any of the alternatives likely result in the American Samoa longline fishery exceeding the 2,000 mt catch limit within the near future.

The Council is aware of an application for an experimental fishing permit that would allow a fisherman proposes to use a large longline vessel to fish near a fish aggregating device (FAD) in the LVPAs around American Samoa. Although the proposal has not been submitted, this document considers whether that action the proposed alternatives would result in cumulative effects if this permit were to be issued. The permit would be for a single longline fishing vessel. If the permit were issued, and if any of the action alternatives were implemented, there could be other longline fishing vessels in the LVPA. This might affect the experimental results the applicant hoped to study; however, the two longline fishing activities are not expected to result in cumulative impacts to any resource because the amount of fishing that would be done under an experimental fishing permit is expected to be well within the levels analyzed in this document..

Western and Central Pacific Fisheries Commission

The Western and Central Pacific Fisheries Commission (WCPFC) was established by the Convention for the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean (WCPF Convention) which entered into force on 19 June 2004. Members of the Commission include: Australia, China, Canada, Cook Islands, European Union, Federated States of Micronesia, Fiji, France, Japan, Kiribati, Korea, Republic of Marshall Islands, Nauru, New Zealand, Niue, Palau, Papua New Guinea, Philippines, Samoa, Solomon Islands, Chinese Taipei, Tonga, Tuvalu, United States of America, Vanuatu. Participating Territories of the Commission include: American Samoa, Commonwealth of the Northern Mariana Islands, French Polynesia, Guam, New Caledonia, Tokelau, Wallis and Futuna. Cooperating non-members include: Belize, Indonesia, Senegal, Mexico, El Salvador, Ecuador, and Vietnam. The WCPFC area of competence is shown in Figure 14.

In 2005, the WCPFC agreed on a conservation and management measure for South Pacific albacore whereby Commission Members, Cooperating Non-Members, and participating Territories (CCMs) are to not increase the number of their fishing vessels actively fishing for South Pacific albacore in the Convention Area south of 20°S above current (2005) levels or recent historical (2000-2004) levels (CMM 2005-02). The conservation and management measure also includes a provision whereby the requirement to cap the level of fishing vessels described above shall not prejudice the legitimate rights and obligations under international law of small island developing State and Territory CCMs in the Convention Area for whom South Pacific albacore is an important component of the domestic tuna fishery in waters under their national jurisdiction, and who may wish to pursue a responsible level of development of their fisheries for South Pacific albacore.

WCPFC has also agreed on conservation and management measures for Southwest Pacific swordfish, bigeye and yellowfin, Southwest Pacific striped marlin, bluefin, sea turtles, seabirds, and sharks. See http://www.wcpfc.int/conservation-and-management-measures for more information.

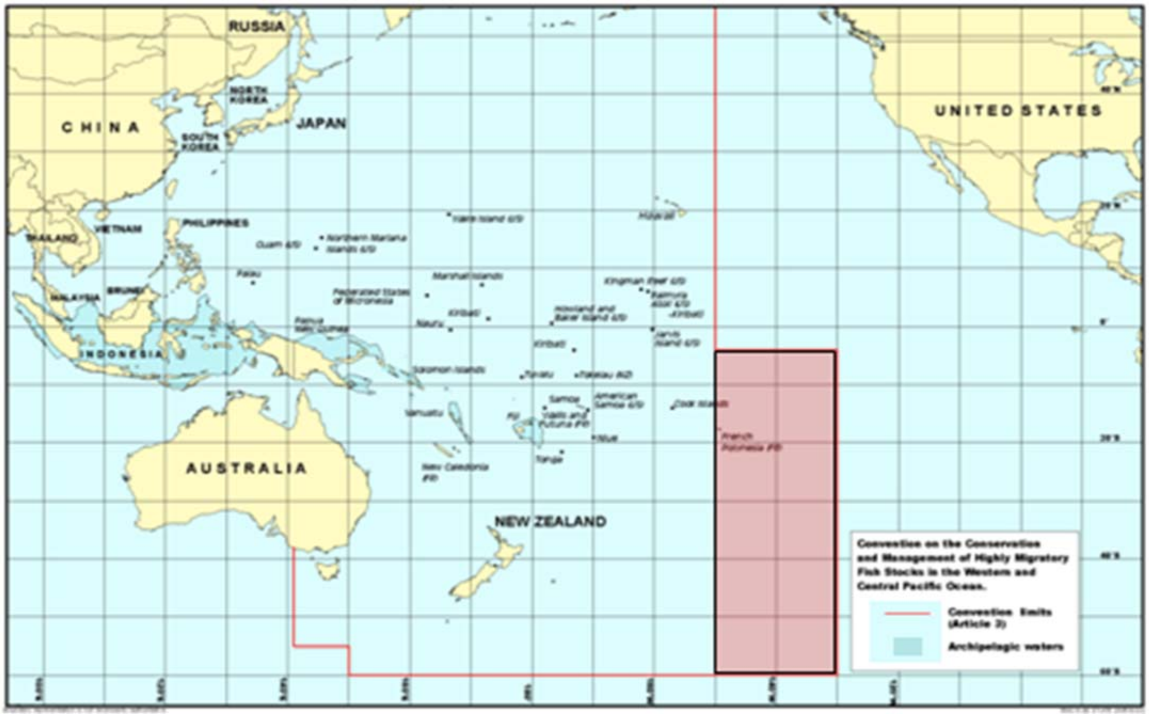

Figure 17: Map of the WCPFC Area of Competence.

8.5.1.2 Exogenous Factors Affecting Target Species and Non-Target Species

Fluctuations in the pelagic ocean environment

Catch rates of pelagic fish species fluctuate in a time and space in relation to environmental factors (e.g. temperature) that influence the horizontal and vertical distribution and movement patterns of fish. Cyclical fluctuations in the pelagic environment affect pelagic habitats and prey availability at high frequency (e.g., seasonal latitudinal extension of warm ocean waters) and low-frequency (e.g., ENSO-related longitudinal extension of warm ocean waters). Low or high levels of recruitment of pelagic fish species are also strongly related to fluctuations in the ocean environment.

The effects of such fluctuations on the catch rates of pelagic MUS obscure the effects of the combined fishing effort from Pacific pelagic fisheries. During an El Niño, for example, the purse seine fishery for skipjack tuna shifts over 1,000 km from the western to central equatorial Pacific in response to physical and biological impacts on the pelagic ecosystem (Lehodey et al. 1997). Future ocean shifts are likely to cause changes in the abundance and distribution of pelagic fish resources, which could contribute to cumulative effects. For this reason, accurate and timely fisheries information is need to produce stock assessments that allow fishery managers the ability to regulate harvests based on observed stock conditions.

Ocean productivity related to global climate change

The global mean temperature has risen 0.76° C over the last 150 years, and the linear trend over the last 50 years is nearly twice that for the last 100 years (IPPC 2007a). Climate change effects are already being observed on a wide range of ecosystems and species in all regions of the world (Walther et al, 2002; Rosenzweig et al., 2007). There is a high confidence, based on substantial new evidence, that observed changes in marine systems are associated with rising water temperatures, as well as related changes in ice cover, salinity, oxygen levels, and circulation. These changes include shifts in ranges and changes in algal, plankton, and fish abundance (IPPC 2007b).

The seasonal north-south movements of many large pelagics appear to track the similar peak migration of primary productivity. Using remotely-sensed chlorophyll[23] concentrations from satellite observations, Polovina et al. (2008) found that over the past decade, primary productivity in the North Pacific Subtropical Transition Zone has declined an average of 1.5% per year, and a 3% per year decline occurring at the southern limit of the transition zone. The expansion of the low chlorophyll waters is consistent with global warming scenarios based on increased vertical temperature stratification of the world's oceans in the mid-latitudes. Expanding oligotrophic[24] portions of large subtropical gyres, will in time lead to a reduction in chlorophyll density and carrying capacity in these oceanic features, which will impact the abundance of pelagic species.

A recent study using an the spatial ecosystem and population dynamics model[25] (SEAPODYM), suggests that by the end of this century, ocean temperatures in the WCPO will increase to levels that will not support bigeye populations in the WCPO (J. Sibert, PFRP, pers. comm. July 2008). An international program called CLIOTOP (climate impacts on oceanic top predators) is currently gathering information on climate change and its effects on pelagic ecosystems. Within this group, the SEAPODYM model is being applied to investigate the future management of tuna stocks and other highly migratory species in the context of climate and ecosystem variability, as well as to investigate potential changes due to greenhouse warming.

Regardless of which alternative is selected by the Council to recommend to NMFS for implementation, international and domestic fishery managers will continue to obtain and consider impacts of climate change on fish stocks under its management purview and will include consideration of these impacts in stock assessments and fishery management actions. For these reasons, climate change impacts are not expected to increase impacts of the proposed alternatives on fish stocks caught by any fishery in American Samoa.

Catches of South Pacific Albacore

The most recent assessment of South Pacific albacore was conducted in 2012 by Hoyle et al (2012). The assessment used the integrated stock assessment model known as MULTIFAN-CL (or MFCL), under the assumption that there is a single stock of albacore tuna in the South Pacific

[23] Chlorophyll is the green pigment found in phytoplankton that absorbs light energy to initiate the process of photosynthesis.
[24] Meaning waters where relatively little plant life or nutrients occur, but are rich in dissolved oxygen.
[25] The model based on advection-diffusion-reaction equations explicitly predicts spatial dynamics of large pelagic predators, while taking into account data on several mid-trophic level components, oceanic primary productivity and physical environment.

Ocean. The model was age (20 age-classes) structured and the catch, effort, size composition and tagging data used in the model were classified by 30 fisheries and quarterly time periods from July 1960 through June 2011. The assessment included a range of model options and sensitivities that were applied to investigate key structural assumptions and sources of uncertainty in the assessment.

The estimated stock status was similar to 2009 and 2011 estimates. The fishing mortality reference point $F_{current}/F_{MSY}$ had a median estimate of 0.21, (90% CI 0.04-1.08) and on that basis it was concluded that there is low risk that overfishing was occurring. The corresponding biomass-based reference points, $B_{current}/B_{MSY}$ and $SB_{current}/SB_{MSY}$, were estimated to be above 1.0 (median 1.6, 1.4-1.9, and median 2.6, 1.5-5.2 respectively), and therefore the stock is not in an overfished state.

The median estimate of MSY from the structural sensitivity analysis (99,085 mt, 46-560 – 215,445) was comparable to the recent levels of (estimated) catch from the fishery ($C_{current}$ = 78,664 mt, C_{latest} = 89,790 mt).

There was no indication that current levels of catch are causing recruitment overfishing, particularly given the age selectivity of the fisheries. However, longline catch rates are declining, and catches over the last 10 years have been at historically high levels and are increasing. These trends may be significant for management.

8.4.1.3 Cumulative Impacts to Target and Non-Target Stocks

The American Samoa longline fishery is capped at 60 vessels under the limited entry program, but only 28 vessels (mostly in Classes C and D) have been active. The action alternatives considered in this document are not expected to change any fishery substantially, however, under the 3-year alternatives (Alternatives 2 and 3), it is expected that longline fishing vessels would be more spread out and could benefit from increased CPUEs of Albacore. No large changes are expected for the American Samoa troll fishery.

However, given that the stocks of target and non-target species caught by the longline fishery are generally in good condition (with the exception of bigeye tuna and striped marlin), the small increase in effort as a result of the alternatives would be negligible even when added to impacts by other fisheries and the environment on the stocks.

The potential additive impacts of the alternatives in combination with the impacts past, present, and future actions as well as exogenous factors are not expected to result to any significant cumulative impacts on target and non-target stocks.

8.4.2 Protected Species

8.4.2.1 Past, Present, and Reasonably Foreseeable Management Actions

ESA and MMPA

In the late 1970's, NMFS and the USFWS listed all five sea turtles species that occur in the U.S. EEZ as either threatened or endangered pursuant to the ESA (43 FR 32800). The ESA offers Federal protection to species that are displaying population trends that make them vulnerable to extinction.

The Marine Mammal Protection Act (MMPA) requires FMP-regulated fisheries be evaluated by NMFS for impacts on marine mammals and be designated as Category I, II, or III (with Category III having the lowest impact). The fishery classification criteria consist of a two-tiered, stock-specific approach that first addresses the total impact of all fisheries on each marine mammal stock, and then addresses the impact of individual fisheries on each stock. Under existing regulations (Appendix 2), all fishers participating in Category I or II fisheries must register under the MMPA, obtain an Authorization Certificate, pay a fee of $25, and report any interactions with marine mammals. Additionally for Category I fisheries, fishers may be subject to a take reduction plan and requested to carry an observer (68 FR 20941). The American Samoa longline fishery is classified as Category II fishery.

Pelagics FMP/FEP

The implementation of the Pelagics FMP and FEP may have some limited benefits for protected species through the management measures applicable to the longline fishery including: large vessel prohibited area, limited entry program, observers, logbooks, and VMS requirements. In September 2011, the Council's recommendation came into effect that required that American Samoa longline fishing vessels fishing in the EEZ around American Samoa follow gear modification requirements ensure that longline gear is fished at depth below 100 meters. This measure is expected to reduce sea turtle interactions (primarily green sea turtles) with the longline fishery, as compared to prior to the gear modification requirement being implemented in the American Samoa fishery.

8.4.2.1 Exogenous Factors Affecting Sea Turtles and Marine Mammals

Existing threats that are common to all species of sea turtles include:

- human use and consumption- legal and illegal harvest of adults, juveniles and/or eggs
- sea turtle nesting and marine environments, including directed takes, predation, and coastal habitat development
- marine debris (entanglement and ingestion)
- incidental capture in fisheries (trawl, gillnet and longline);
- fluctuations in the ocean environment
- climate change

External factors affecting other marine mammals such as whales and dolphins include the following: (a) incidental take in fisheries; (b) collisions with ship traffic, ship disturbance, and ship noise, and (c) marine debris and waste disposal.

8.4.2.3 Cumulative Impacts to Protected Species

The American Samoa longline fishery is capped at 60 vessels under the limited entry program, but only 22 vessels (mostly in Classes C and D) have been active as of 2012 (unpublished 2012 Pelagics Annual Report Module. The impacts of the alternatives when added to the impacts of past, present, and future actions, and exogenous factors are not expected to adversely affect the status of protected species.

No cumulative effects are expected for any of the alternatives. There is no known large adverse impact to these areas from past, present and reasonably foreseeable actions including the alternatives under consideration.

8.4.3 Fishery Participants and Fishing Communities

8.4.3.1 Past, Present, and Reasonably Foreseeable Future Actions

See sections 8.5.1.1 and 8.5.2.1 for description of past, present, future actions by the Council and NMFS that affected and may affect the fishing community of American Samoa.

8.4.3.2 Exogenous factors affecting Fishery Participants and Fishing Communities

There are wide-ranging factors (that change over time) that affect fishing participants as well as fishing communities. Current factors include high fuel costs, increased seafood imports, and restricted access to traditional fishing grounds. High fuel costs affect fishing participants in that it is simply increasingly expensive to go fishing. The effect is that fishery participants reduce fishing trips, switch to less fuel-intensive fisheries, or simply do not go fishing at all. These effects are believed to have resulted in the decline of the small vessel alia fishery in American Samoa.

8.4.3.3 Cumulative Impacts to Fishery Participants and Fishing Communities

The additive effect of alternatives coupled with past, present, and future actions like reducing the large vessel prohibited area may have positive impacts on active longline fishery participants. However, the alternatives would not likely overcome exogenous factors impacting fishery participants such high fuel and other operating costs. There would not be any large adverse environmental impacts from any of the alternatives that would interact with fishing communities to result in a large socio-economic impact on other fisheries or members of fishing communities.

9.0 Consistency with the Magnuson-Stevens Act and Other Applicable Law

9.1 Magnuson-Stevens Act National Standards

Section 301 of the Magnuson-Stevens Act requires that regulations implementing any FMP or FMP amendment be consistent with the ten national standards listed below.

National Standard 1 states that conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery for the United States fishing industry.

The preferred alternative is consistent with National Standard (NS) 1 as it will not lead to overfishing of South Pacific albacore nor lead to become overfished. As noted in section X, the problems associated with sub equatorial longline fisheries across the South pacific are due to depletion of adult stocks within EEZs including the US EEZ around American Samoa. The stock status of South Pacific albacore continues to be healthy, with stock-wide fishing mortality at 20% of that generating MSY, while catches are at about the MSY.

National Standard 2 states that conservation and management measures shall be based upon the best scientific information available.

The preferred alternative is based on the best scientific information available, including the most recent stock assessment and information on catches in the American Samoa longline fishery, and observer data on protected species interactions and information obtained from published reports and articles, as well as recommendations from the Council's Scientific and Statistical Committee.

National Standard 3 states that, to the extent practicable, an individual stock of fish shall be managed as a unit throughout its range, and interrelated stocks of fish shall be managed as a unit or in close coordination.

The preferred alternative is consistent with the concept of managing a stock throughout its range. The impact analysis considers stock assessments for the South Pacific Albacore stock, as well as stock status for other target and non-target stocks as a whole.

National Standard 4 states that conservation and management measures shall not discriminate between residents of different States. If it becomes necessary to allocate or assign fishing privileges among various United States fishermen, such allocation shall be (A) fair and equitable to all such fishermen; (B) reasonably calculated to promote conservation; and (C) carried out in such manner that no particular individual, corporation, or other entity acquires an excessive share of such privileges.

The preferred alternative is consistent with NS 4 in that it does not discriminate between residents of different states and applies to all American Samoa limited entry permit holders of vessels > 50 ft.

National Standard 5 states that conservation and management measures shall, where practicable, consider efficiency in the utilization of fishery resources; except that no such measure shall have economic allocation as its sole purpose.

The preferred alternative is consistent with NS 5 since it is intended to promote the continuity of the American Samoa longline fishery and maintain a supply of albacore for the Pago Pago cannery, and fresh fish for domestic markets in American Samoa.

<u>National Standard 6</u> states that conservation and management action shall take into account and allow for variations among, and contingencies in, fisheries, fishery resources and catches.

The preferred alternative is consistent with NS 6 since it deals with variations and contingencies within the American Samoa longline fishery through modifying the LVPA boundaries, including future boundary changes

<u>National Standard 7</u> states that conservation and management measures shall, where practicable, minimize costs and avoid unnecessary duplication.

The preferred alternative is consistent with NS 7 as it is the most practicable and least costly measure that can be conducted, beyond No Action, to promote the continuity of the American Samoa longline fishery. In developing the management option, the Council sought to minimize costs of the regulation for both the agencies and the fishery and avoided unnecessary duplication.

<u>National Standard 8</u> states that conservation and management measures shall, consistent with the conservation requirements of this Act (including the prevention of overfishing and rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities in order to (A) provide for the sustained participation of such communities, and (B) to the extent practicable, minimize adverse economic impacts on such communities.

The preferred alternative is consistent with NS 8 whereby ensuring the continuity of the American Samoa longline fishery provides for the sustained participation of the American Samoa community attempts to minimize adverse economic impacts on this community

<u>National Standard 9</u> states that conservation and management measures shall, to the extent practicable, (A) minimize bycatch and (B) to the extent bycatch cannot be avoided minimize the mortality of such bycatch.

The preferred alternative is consistent with NS 9 in that it will not modify the fishing operations of the American Samoa longline fishery, and should not lead to any dramatic increases in bycatch.

<u>National Standard 10</u> states that conservation and management measures shall, to the extent practicable, promote the safety of human life at sea.

The preferred alternative is consistent with NS 10 as it will not lead to any modifications of pelagic longline fishing currently being conducted in the fishery and thus any potential increase in the risks of injury or mortality to longline fishermen.

9.2 Magnuson-Stevens Act Essential Fish Habitat Designations

Essential fish habitat (EFH) is defined as those waters and substrate as necessary for fish spawning, breeding, feeding, and growth to maturity. This includes the marine areas and their chemical and biological properties that are utilized by the organism. Substrate includes sediment, hard bottom, and other structural relief underlying the water column along with their associated biological communities. In 1999, the Council developed and NMFS approved EFH definitions for management unit species (MUS) of the Bottomfish and Seamount Groundfish FMP (Amendment 6), Crustacean FMP (Amendment 10), Pelagic FMP (Amendment 8), and Precious Corals FMP (Amendment 4) (74 FR 19067, April 19, 1999). NMFS approved additional EFH definitions for coral reef ecosystem species in 2004 as part of the implementation of the Coral Reef Ecosystem FMP (69 FR8336, February 24, 2004). EFH definitions were also approved for deepwater shrimp through an amendment to the Crustaceans FMP in 2008 (73 FR 70603, November 21, 2008).

Ten years later, in 2009, the Council developed and NMFS approved five new archipelagic-based fishery ecosystem plans (FEP). The FEP incorporated and reorganized elements of the Councils' species-based FMPs into a spatially-oriented management plan (75 FR 2198, January 14, 2010). EFH definitions and related provisions for all FMP fishery resources were subsequently carried forward into the respective FEPs. In addition to and as a subset of EFH, the Council described habitat areas of particular concern (HAPC) based on the following criteria: ecological function of the habitat is important, habitat is sensitive to anthropogenic degradation, development activities are or will stress the habitat, and/or the habitat type is rare. In considering the potential impacts of a proposed fishery management action on EFH, all designated EFH must be considered.

The designated areas of EFH and HAPC for all FEP MUS by life stage are summarized throughout the Western Pacific Region in Table 16.

Table 16: EFH and HAPC for species managed under the Fishery Ecosystem Plans

MUS	Species Complex	EFH	HAPC

MUS	Species Complex	EFH	HAPC
Bottomfish MUS	American Samoa, Guam and CNMI bottomfish species: lehi (*Aphareus rutilans*) uku (*Aprion virescens*), giant trevally (*Caranx ignoblis*), black trevally (*Caranx lugubris*), blacktip grouper *(Epinephelus fasciatus)*, Lunartail grouper *(Variola louti)*, ehu (*Etelis carbunculus*), onaga (*Etelis coruscans*), ambon emperor *(Lethrinus amboinensis)*, redgill emperor *(Lethrinus rubrioperculatus)*, taape (*Lutjanus kasmira*), yellowtail kalekale (*Pristipomoides auricilla*), opakapaka (*P. filamentosus*), yelloweye snapper (*P. flavipinnis*), kalekale (*P. sieboldii*), gindai (*P. zonatus*), and amberjack (*Seriola dumerili*).	Eggs and larvae: the water column extending from the shoreline to the outer limit of the EEZ down to a depth of 400 m (200 fm). Juvenile/adults: the water column and all bottom habitat extending from the shoreline to a depth of 400 m (200 fm)	All slopes and escarpments between 40–280 m (20 and 140 fm)
	Hawaii bottomfish species: uku (*Aprion virescens*), thicklip trevally (*Pseudocaranx dentex*), giant trevally (*Caranx ignoblis*), black trevally (*Caranx lugubris*), amberjack (*Seriola dumerili*), taape (*Lutjanus kasmira*), ehu (*Etelis carbunculus*), onaga (*Etelis coruscans*), opakapaka (*Pristipomoides filamentosus*), yellowtail kalekale (*P. auricilla*), kalekale (*P. sieboldii*), gindai (*P. zonatus*), hapuupuu (*Epinephelus quernus*), lehi (*Aphareus rutilans*)	Eggs and larvae: the water column extending from the shoreline to the outer limit of the EEZ down to a depth of 400 m (200 fathoms) Juvenile/adults: the water column and all bottom habitat extending from the shoreline to a depth of 400 meters (200 fm)	All slopes and escarpments between 40–280 m (20 and 140 fm) Three known areas of juvenile opakapaka habitat: two off Oahu and one off Molokai

MUS	Species Complex	EFH	HAPC
Seamount Groundfish MUS	Hawaii Seamount groundfish species (50–200 fm): armorhead (*Pseudopentaceros wheeleri*), raftfish/butterfish (*Hyperoglyphe japonica*), alfonsin (*Beryx splendens*)	Eggs and larvae: the (epipelagic zone) water column down to a depth of 200 m (100 fm) of all EEZ waters bounded by latitude 29°–35° Juvenile/adults: all EEZ waters and bottom habitat bounded by latitude 29°–35° N and longitude 171° E–179° W between 200 and 600 m (100 and 300 fm)	No HAPC designated for seamount groundfish
Crustaceans MUS	Spiny and slipper lobster complex (all FEP areas): spiny lobster (*Panulirus marginatus*), spiny lobster (*P. penicillatus*, *P.* spp.), ridgeback slipper lobster (*Scyllarides haanii*), Chinese slipper lobster (*Parribacus antarcticus*) Kona crab : Kona crab (Ranina ranina)	Eggs and larvae: the water column from the shoreline to the outer limit of the EEZ down to a depth of 150 m (75 fm) Juvenile/adults: all of the bottom habitat from the shoreline to a depth of 100 m (50 fm)	All banks in the NWHI with summits less than or equal to 30 m (15 fathoms) from the surface
	Deepwater shrimp (all FEP areas): (Heterocarpus spp.)	Eggs and larvae: the water column and associated outer reef slopes between 550 and 700 m Juvenile/adults: the outer reef slopes at depths between 300-700 m	No HAPC designated for deepwater shrimp.

MUS	Species Complex	EFH	HAPC
Precious Corals MUS	Shallow-water precious corals (10-50 fm) all FEP areas: black coral (Antipathes dichotoma), black coral (Antipathis grandis), black coral (Antipathes ulex) Deep-water precious corals (150–750 fm) all FEP areas: Pink coral (*Corallium secundum*), red coral (*C. regale*), pink coral (*C. laauense*), midway deepsea coral (*C.* sp nov.), gold coral (*Gerardia* spp.), gold coral (*Callogorgia gilberti*), gold coral (*Narella* spp.), gold coral (*Calyptrophora* spp.), bamboo coral (*Lepidisis olapa*), bamboo coral (*Acanella* spp.)	EFH for Precious Corals is confined to six known precious coral beds located off Keahole Point, Makapuu, Kaena Point, Wespac bed, Brooks Bank, and 180 Fathom Bank EFH has also been designated for three beds known for black corals in the Main Hawaiian Islands between Milolii and South Point on the Big Island, the Auau Channel, and the southern border of Kauai	Includes the Makapuu bed, Wespac bed, Brooks Banks bed For Black Corals, the Auau Channel has been identified as a HAPC
Coral Reef Ecosystem MUS	Coral Reef Ecosystem MUS (all FEP areas)	EFH for the Coral Reef Ecosystem MUS includes the water column and all benthic substrate to a depth of 50 fm from the shoreline to the outer limit of the EEZ	Includes all no-take MPAs identified in the CREFMP, all Pacific remote islands, as well as numerous existing MPAs, research sites, and coral reef habitats throughout the western Pacific

The alternatives are not expected to have any impacts on essential fish habitat (EFH) or habitat areas of particular concern (HAPC) for species managed under the Western Pacific FEPs. EFH and HAPC for these species groups has been defined as presented in Table 16. The alternatives are largely administrative in mature and they would not lead to substantial physical, chemical, or biological alterations to the habitat, or result in loss of, or injury to, these species or their prey. The proposed action would maintain the same level of protection to EFH and HAPC provided under the current Pelagics FEP. Pelagic fishing usually occurs in deep water environments (greater than 1,000 m) and do not typically make contact with coral or rock substrate; therefore, not altering or substantially impacting EFH and HAPCs. For the same reason, the alternatives are not anticipated to cause substantial damage to the ocean and coastal habitats.

9.3 National Environmental Policy Act

This amendment has been written and organized to meet the requirements of the National Environmental Policy Act and thus is a consolidated document including an Environmental Assessment, as described in NOAA Administrative Order 216-6, Section 603.a.2. The relevant NEPA section requirements can be found in this document as follows:

- Purpose and Need, Section 4,
- Proposed Action and Description of Alternatives, Section 6
- Description of Affected Environment, Section 7
- Impacts of Alternatives, Section 8

9.4 Executive Order 12866 – Regulatory Planning and Review

To meet the requirements of Executive Order 12866 (E.O. 12866), NMFS requires that a Regulatory Impact Review (RIR) be prepared for all regulatory actions that are of public interest. This review provides an overview of the problem, policy objectives, and anticipated impacts of regulatory actions, and ensures that management alternatives are systematically and comprehensively evaluated such that the public welfare can be enhanced in the most efficient and cost effective way.

The proposed action will be reviewed and summarized.

In accordance with E.O. 12866, the RIR will evaluate whether the action would have an annual effect on the economy of more than $100 million or to adversely affect in a material way the economy, a sector of the economy, productivity, jobs, the environment, public health or safety; or state, local or tribal governments or communities; (2) Whether the action is likely to create any serious inconsistencies or otherwise interfere with any actions taken or planned by another agency; (3) whether the action would materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights or obligations of recipients thereof; (4) and whether the action would raise novel or policy issues arising out of legal mandates, or the principles set forth in the Executive Order. Based on the information contained in the final Pelagics FEP amendment, the findings of the action will be evaluated for significance under E.O. 12866.

9.5 Administrative Procedures Act

All federal rulemaking is governed under the provisions of the Administrative Procedures Act (APA) (5 U.S.C. Subchapter II) which establishes a “notice and comment” procedure to enable public participation in the rulemaking process. Under the APA, NMFS is required to publish notification of proposed rules in the Federal Register and to solicit, consider and respond to public comment on those rules before they are finalized. The APA also establishes a 30-day wait period from the time a final rule is published until it becomes effective, with rare exceptions. The draft and final amendments will comply with the provisions of the APA through the Council’s use of public meetings, requests for comments, and consideration of comments. To implement the proposed amendment, NMFS will publish a proposed rule and request public comments on the rule and environmental assessment.

9.6 Coastal Zone Management Act

The Coastal Zone Management Act requires a determination that a recommended management measure will have no effect on the land, water uses, or natural resources of the coastal zone, or is consistent to the maximum extent practicable with an affected state's enforceable coastal zone management program. The American Samoa longline fisheries primarily occur in Federal waters and on the high seas, although vessels do transit the coastal zone. At this initial stage, the proposed action and alternatives are not expected to result in a large change the any fishery in American Samoa, including the longline fishery. At best, given the economic conditions in the fishery, the fishery could return to the peak years of 2001-2007 and there were no large adverse effects on the coastal zone from the longline fishery in those years. Once the draft Amendment and EA are prepared, NMFS will make prepare a determination and coordinate it with the American Samoa Government, Department of Commerce, and American Samoa Coastal Management Program for review and concurrence.

9.7 Executive Order 12898 – Environmental Justice

On February 11, 1994, President Clinton issued Executive Order 12898 (E.O. 12898), "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations." E.O. 12898 provides that "each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations." E.O. 12898 also provides for agencies to collect, maintain, and analyze information on patterns of subsistence consumption of fish, vegetation, or wildlife. That agency action may also affect subsistence patterns of consumption and indicate the potential for disproportionately high and adverse human health or environmental effects on low-income populations, and minority populations. A memorandum by President Clinton, which accompanied E.O. 12898, made it clear that environmental justice should be considered when conducting NEPA analyses by stating the following: "Each Federal agency should analyze the environmental effects, including human health, economic, and social effects of Federal actions, including effects on minority populations, low-income populations, and Indian tribes, when such analysis is required by NEPA[26].

9.8 Information Quality Act

The information in this document complies with the Information Quality Act and NOAA standards (NOAA Information Quality Guidelines, September 30, 2002) that recognize information quality is composed of three elements: utility, integrity, and objectivity. National Standard 2 of the Magnuson-Stevens Act states that an FMP's conservation and management measures shall be based upon the best scientific information available. In accordance with this national standard, the information product incorporates the best biological, social, and economic information available to date, including the most recent biological information on, and assessment of, the pelagic fishery resources and protected resources, and the most recent

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[26] Memorandum from the president to the Heads of Departments and Agencies. Comprehensive Presidential Documents No. 279 (February 11, 1994).

information available on fishing communities, including their dependence on pelagic longline fisheries, and up-to-date economic information (landings, revenues, etc.). The policy choices, i.e., proposed management measures, contained in the information product are supported by the available scientific information. The management measures are designed to meet the conservation goals and objectives of this amendment to the Pelagics FEP and the Magnuson-Stevens Act.

The data and analyses used to develop and analyze the measures contained in the information product are presented in this amendment. Furthermore, all reference materials utilized in the discussion and analyses are properly referenced within the appropriate sections of the environmental assessment. The information product was prepared by Council and NMFS staff based on information provided by NMFS Pacific Islands Fisheries Science Center (PIFSC) and NMFS PIRO. The information product was reviewed by PIRO and PIFSC staff, and NMFS Headquarters (including the Office of Sustainable Fisheries). Legal review was performed by NOAA General Counsel Pacific Islands and General Counsel for Enforcement and Litigation for consistency with applicable laws, including but not limited to the Magnuson-Stevens Act, National Environmental Policy Act, Administrative Procedure Act, Paperwork Reduction Act, Coastal Zone Management Act, Endangered Species Act, Marine Mammal Protection Act, and Executive Orders 13132 and 12866.

9.9 Paperwork Reduction Act

The purpose of the Paperwork Reduction Act (PRA) is to minimize the paperwork burden on the public resulting from the collection of information by or for the Federal government. The PRA is intended to ensure the information collected under the proposed action is needed and is collected in an efficient manner (44 U.S.C. 3501(1)). At the time of this preliminary review, none of the alternatives would establish any new permitting or reporting requirements, and the project would not be subject to the provisions of the PRA.

9.10 Regulatory Flexibility Act

The Regulatory Flexibility Act (RFA) (5 U.S.C. 601 et seq.) requires government agencies to assess and present the impact of their regulatory actions on small entities including small businesses, small organizations, and small governmental jurisdictions. The assessment is done by preparing a Regulatory Flexibility Analysis. An Initial Regulatory Flexibility Analysis will be included in the proposed rule.

9.11 Endangered Species Act

Section 7.6 of this document describes the threatened and endangered species found in the action area of the American Samoa-based longline fishery. The ESA can allow a limited take of listed sea turtles during the otherwise lawful longline fishery through a biological opinion (BiOp) prepared by NMFS pursuant to Section 7 of the ESA,

A BiOp for the American Samoa longline fishery completed on September 16, 2010. The 2010 BiOp considers and analyzes the measures proposed in the Council's preferred alternative in this amendment, intended to reduce the potential for further interactions between longlines and sea turtles. The BiOp concluded that the annual numbers of interactions and mortalities expected to result from implementation of the proposed action for a 3-year period is incidental take of up to 45 green sea turtles over three years (average of 15 interactions per year with 41 mortalities). The occasional hooking and entanglement (no more than 1 every 3 years per species) of hawksbill, leatherback, and olive ridley turtles is also expected (NMFS 2010a). If the total number of authorized sea turtle interactions included in the incidental take statement (ITS) during any consecutive 3-year period is exceeded, re-initiation of consultation will be required (50 CFR 402.16). After implementation of the proposed action and the period of years 1 through 3 has ended, a new 3-year ITS period will begin with years 2 through 4, and so on.

Through Pelagics FEP Amendment 5, approved by the Secretary of Commerce in September 2011, NMFS implemented Council recommended measures anticipated to reduce sea turtle interactions. After gear modifications are made, the Council expects American Samoa longline fishery operations will be consistent with the provisions and conclusions of the 2011 BiOp and will not be likely to jeopardize the continued existence of any listed species or cause any adverse modification to critical habitats.

9.12 Marine Mammal Protection Act

The Marine Mammal Protection Act (MMPA) prohibits, with certain exceptions, the take of marine mammals in the U.S. and by U.S. citizens on the high seas, and the importation of marine mammals and marine mammal products into the United States. The MMPA gives the Secretary of Commerce authority and duties for all cetaceans (whales, dolphins, and porpoises) and pinnipeds (seals and sea lions, except walruses). The MMPA requires NMFS to prepare and periodically review stock assessments of marine mammal stocks.

Under section 118 of the MMPA, NMFS must publish, at least annually, a List of Fisheries that classifies U.S. commercial fisheries into one of three categories. These categories are based on the level of serious injury and mortality of marine mammals that occurs incidental to each fishery. Specifically, the MMPA mandates that each fishery be classified according to whether it has frequent, occasional, or a remote likelihood of or no known incidental mortality or serious injury of marine mammals. The American Samoa longline fishery is a Category II fishery (occasional serious injury and mortality) in the 2013 List of Fisheries (78 FR 53336 August 29, 16, 2013) and this amendment makes no changes to allowable amount of fishing except to open a further 7% of the US EEZ around American Samoa to longline fishing. It does not alter the way that fishery is conducted. As noted above, unlike Hawaii, there is no data for American Samoa to indicate that there are any island associated marine mammal stocks. Further, the South Pacific has many archipelagos in proximity to one another and has a different ecology compared to a remote archipelago like Hawaii. It is therefore assumed that fishing closer to Swains would not have any substantial impact on encounter rates and hence interactions. Thus the American Samoa longline fishery does not require an MMPA category re-designation or other action.

Vessel owners and crew that are engaged in Category II fisheries may incidentally take marine mammals after registering or receiving an Authorization Certificate under the MMPA, but they are required to: 1) report all incidental mortality and injury of marine mammals to NMFS, 2) immediately return to the sea with minimum of further injury any incidentally taken marine mammal, 3) allow vessel observers if requested by NMFS, and 4) comply with guidelines and prohibitions under the MMPA when deterring marine mammals from gear, catch, and private property (50 CFR 229.4, 229.6, 229.7). The MMPA registration process is integrated with existing state and Federal licensing, permitting, and registration programs. Therefore, individuals who have a state or Federal fishing permit or landing license, such as the American Samoa limited entry longline permit, are currently not required to register separately under the MMPA.

In addition, fishers participating in a Category I or II fishery are required to accommodate an observer onboard their vessel(s) upon request (50 CFR 229.7); and fishers participating in a Category I or II fishery are required to comply with any applicable take reduction plans. NMFS may develop and implement take reduction plans for any Category I or II fishery that interacts with a strategic stock.

See Sections 7.4.2 and 7.4.3 of this document for descriptions of marine mammals found around American Samoa. Section 9.0 provides an analysis of the anticipated impacts on these species under each of the alternatives considered by the Council. The Council expects that the alternatives would not adversely affect any marine mammal populations or habitat.

9.13 Executive Order 13132 – Federalism

The objective of Executive Order 13132 is to guarantee the Constitution's division of governmental responsibilities between the federal government and the states. Federalism Implications (FI) is defined as having substantial direct effects on states or local governments (individually or collectively), on the relationship between the national government and the states, or on the distribution of power and responsibilities among the various levels of government. This action does not contain policies with FI under E.O. 13132, as it does not impact or later the relationship between the federal government and the government of the Territory of American Samoa.

10.0 Proposed Draft Regulations

[in prep]

11.0 Literature Cited

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Appendix 1

Economic Performance and Status of American Samoa Longline Fishery Internal Report to Council

Minling Pan
Pacific Islands Fisheries Science Center
National Marine Fisheries Service, NOAA

April 24, 2014

Purpose: The purpose of this report is to document the dynamic changes in the economic health of the American Samoa longline fishery. This brief summary includes a comparison of the cost-earnings status for the 2001 operating year vs. the 2009 operating year. In addition, this report presents a long-term trend of net revenues of the fleet for the period from 2006 to 2013. This trend data, collected through a routine data collection program, illustrates the declining trend in net returns to the fishery, offering an insight to the fishery collapse in 2013.

Cost-Earnings Status of 2009 Operations: The cost-earnings study (Arita and Pan, 2013) found that in 2009, the average annual revenue per vessel was $448,817, just slightly higher than total expenditures; and as a result, the average annual cash return (profit) per vessel was $6,379. Table 1 shows the detailed figures of revenue, variable costs, fixed costs, labor costs, and net cash return (profit) for an average vessel of the American Samoa longline fleet operated in 2001 and 2009. Among 23 active vessels surveyed in 2009, 48% suffered net losses from fishing operations. If depreciation of a vessel is considered, the average profit to an owner was negative per vessel. Rising fuel costs, which accounted for approximately 27% of total expenditures, coupled with relatively low revenues (due to lower albacore CPUE), were the major factors leading to poor economic performance.

Comparison with 2001 Cost Earnings Study: In general, the 2009 cost-earnings status was much worse compared to 2001 operations. While the average vessel generated net cash return (profit) to an owner of $177,207 in 2001, the average vessel in 2009 generated only $6,379, a 96% decrease compared to that in 2001. The detailed cost-earnings data of the American Samoa fleet based on 2001 operations (O'Malley and Pooley, 2002) are also listed in Table 1.

Table 1. Cost-Earnings Performance in 2001 and 2009 of the American Samoa Longline Fishery.

	2009	2001	% Change
Average Annual Revenue per Vessel	448,817	657,063	-32%

Average Annual Trip Costs per Vessel	268,016	200,923	33%
Fuel	121,648	73,314	66%
Oil	6,064	5,085	19%
Freezer Operations	8,389	10,090	-17%
Bait	53,312	60,318	-12%
Provisions	20,109	22,739	-12%
Communication	3,846	n/a	
Fishing Gear	22,843	29,378	-22%
Misc. Trip Costs	31,804	n/a	
Average Annual Labor Costs per Vessel	78,167	177,894	-56%
Total Captain Share	30,594	68,421	-55%
Total Crew Payments	47,573	109,474	-57%
Average Annual Fixed Costs per Vessel	96,256	101,039	-5%
Mooring	3,365	6,480	-48%
Bookkeeping	3,467	1,609	115%
Insurance	24,970	26,533	-6%
Loan Payments	19,251	35,578	-46%
Other Fixed Costs	3,413	8,180	-58%
Drydock Costs	16,541	4,077	306%
Overhaul Costs	5,584	1,558	258%
Major Repairs	10,761	3,333	223%
Routine repairs	8,904	13,691	-35%
Average Total Annual Expenditures per Vessel	442,438	479,856	-8%
Average Annual Net Return per Vessel	6,379	177,207	-96%

Data sources: 2001 data are from O'Malley and Pooley (2002), and 2009 data are from (Arita and Pan, 2013)

There are two main changes in the cost-earning status of 2009 vs. 2001. First, average overall revenues in 2009 per vessel fell by 32% compared to 2001. A decline in albacore CPUE was the main factor that contributed to lower revenues in 2009 because albacore was the main component of the catch. In 2009, CPUE was approximately 14.8 fish per 1000 hooks, which was 56% lower than the 2001 CPUE of 34 fish per 1000 hooks. If we measure CPUE by fish per set (as opposed to fish per hooks), CPUE fell from 66.5 fish per set in 2001 to 45.5 fish per set in 2009, a 32% decline.

Second, there was a substantial increase in variable costs. Annual variable costs (trip expenditure) increased by 33%. The substantial increase in fuel expense, 66% more compared to 2001, was the major driver of overall cost increases. On the other hand, annual fixed costs in 2009 were 5% lower than 2001. Annual labor costs per vessel declined 56% compared to 2001. The decline in labor costs implied that crew received lower payments, thus, fishermen's income from fishing operations were greatly reduced in 2009 compared to in 2001.
When comparing the economic statuses of these two years, it is important to note that the O'Malley and Pooley study (2002) estimated revenues based on a subsample of longline vessels, which may not have been a representative sample of all vessel activity. O'Malley and Pooley also indicated that the revenue may have been overestimated because, during the study period, the majority of vessels arrived in midyear. Albacore are more abundant from May to October in American Samoa's waters (Domokos et al., 2007) than in the early months of the year, hence the catch per unit effort (CPUE) figure after midyear is usually higher than the annual average. In contrast, the revenue data used to evaluate the fishery's 2009 economic performance were based on a full year of logbook data for each vessel in the surveyed sample, reflecting a more accurate depiction of vessel performance. As a result of these methodological differences, our ability to meaningfully make comparisons between the two studies has that limitation.

The Fishery Collapse of 2013: At the end of 2013, the majority of the vessels in the American Samoa fleet were tied up at dock, and 18 vessels posted "For Sale" signs, according to the *Samoa News* of December 18, 2013. The collapse of the fishery seems inevitable due to the poor economic performance resulting from the continuous decline in CPUE, increases in fuel prices, and a sharp drop in albacore prices in 2013. The cost-earnings study (Arita and Pan 2013) had already indicated a thin profit margin for the American Samoa longline fleet in 2009.
A sensitivity analysis shows that if CPUE of the main catch species (albacore) is lower than 14.3 fish per 1000 hooks, and the price is $2,200 per metric ton ($1.00/lb), while holding other factors unchanged, the profit (net cash return) for an individual vessel would be negative. In 2009, the albacore CPUE was 14.8 fish per 1000 hooks and the albacore price was $2,200 per metric ton. Therefore, the profit in 2009 was very close to zero. In 2013, the albacore CPUE declined to 11.9 fish per 1000 hooks from 14.8 fish per 1000 hooks in 2012, and albacore prices declined to $2,200 per metric ton from $3,249 per metric ton in 2012. Obviously, the decline of both CPUE and the price of albacore yielded a negative profit.
In addition, the continuous economic data collection program that has monitored the economic performance from 2006 to the present (Pan et al., 2012) showed that fishing costs continued increasing after 2009. Figure 1 illustrates the revenue and variable costs by fishing set from the period 2006 to 2013. The variable costs presented in the figure include costs of diesel fuel, engine oil, bait, freezer operating costs, gear, provisions, communications, and miscellaneous items, but do not include labor costs. The data were collected on a trip base. However, since the

trip length (total days of a fishing trip) for the American Samoa longline fleet varied substantially across years, the cost per set (usually one set a day) is a better index for a cost comparison across years. In 2013, fishing costs exceeded revenues. Obviously, fleet operations cannot be continued with negative cash returns.

The net revenue per set (Figure 2) further illustrates the poor economic performance of the fishery in recent years. During the period 2006 to 2013, net revenue per set fluctuated but in a declining trend. The net revenue in 2011 and 2012 was $244 and $713 per set, respectively, much lower than the net revenue in 2009 ($1,307 per set). Yet, it further declined in 2013 to a negative -$372 per set.

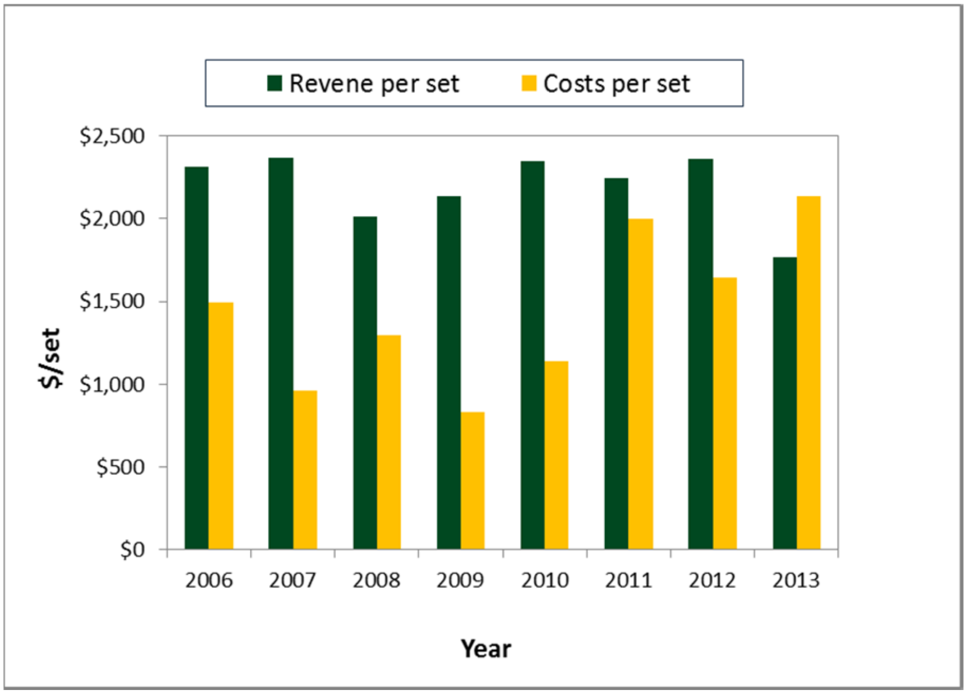

Figure 1. Revenue and cost per set of American Samoa Longline Fishery, 2006-2013.

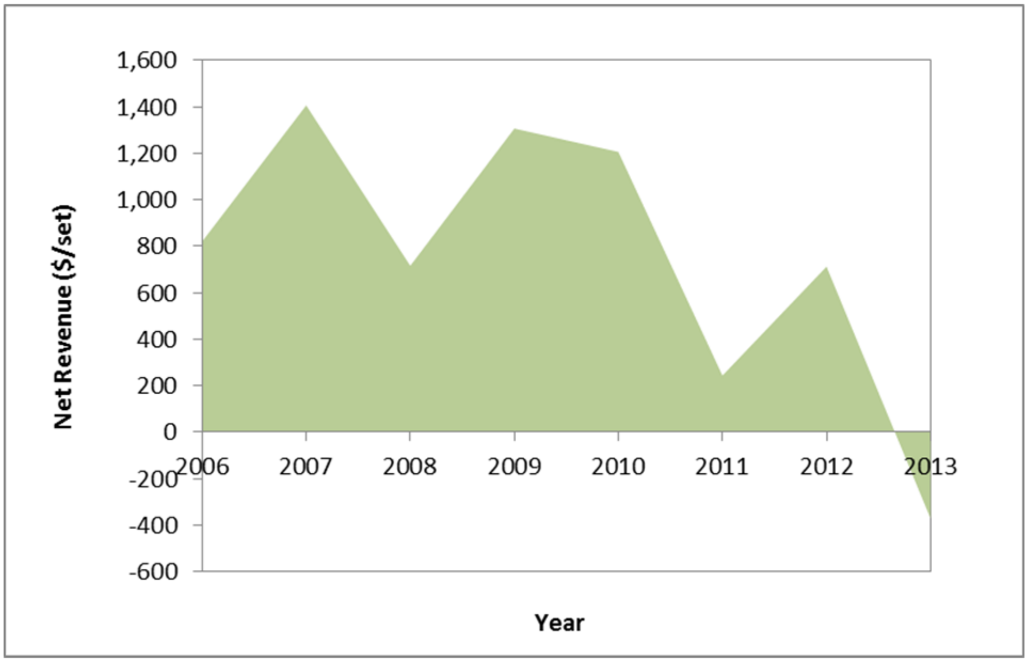

Figure 2. Net Revenue per Set of American Samoa Longline Fishery, 2006-2013.
(Data sources for Figures 1 and 2: cost information are from the continuous economic data collection program (Pan et al., 2012), and revenue per trip are calculated using the annual revenue and the number of sets collected by PIFSC's WPacFIN Program and published at http://www.pifsc.noaa.gov/wpacfin/as/Pages/as_data_5.php

Conclusion: The cost-earnings study shows a thin profit earned in the American Samoa longline fishery in 2009 operations. Earnings to fishermen declined an average 56% for crew and captain, and 96% for a vessel owner. The economic performance became even worse in 2013, showing a negative return (even before charging fixed costs) from fishing. A sensitivity analysis shows that the net return of the fishery is tied to both the CPUE and the price of its main species, albacore. If the CPUE of albacore is lower than 14.3 fish per 1000 hooks (0.5 fish lower than the 2009 CPUE), or the fish price is lower than $0.97/lb (3 cents less than the 2009 reported price), while holding other variables unchanged, the net return for an average vessel will be negative. Therefore, the recovery of the fishery would rely on a significant improvement of either fish catch or price, or a combination of both.

Cited Documents:

Arita, S., and Pan, M. 2013. Cost-Earnings Study of the American Samoa Longline Fishery Based on Vessel Operations in 2009. PIFSC Working Paper WP-13-009, issued 12 July 2013.

O'Malley, J.M. and Pooley, S.G. 2002. A description and economic analysis of large American Samoa longline vessels. Joint Institute for Marine and Atmospheric Research, SOEST Publication 02-02, JIMAR Contribution 02-345. University of Hawaii: Honolulu, HI, 24 p.

Pan, M., Chan, H.L., and Kalberg, K. 2012. Tracking the Changes of Economic Performance Indicators for the Main Commercial Fisheries in the Western Pacific Areas. PIFSC Internal Report IR-12-039, issued 15 October 2012.

Appendix 2

§665.818 Exemptions for American Samoa large vessel prohibited areas.

(a) An exemption will be issued to a person who currently owns a large vessel to use that vessel to fish for western Pacific pelagic MUS in the American Samoa large vessel prohibited management areas, if the person seeking the exemption had been the owner of that vessel when it was registered for use with a Western Pacific general longline permit, and has made at least one landing of western Pacific pelagic MUS in American Samoa on or prior to November 13, 1997.

(b) A landing of western Pacific pelagic MUS for the purpose of this section must have been properly recorded on a NMFS Western Pacific Federal daily longline form that was submitted to NMFS, as required in §665.14.

(c) An exemption is valid only for a vessel that was registered for use with a Western Pacific general longline permit and landed western Pacific pelagic MUS in American Samoa on or prior to November 13, 1997, or for a replacement vessel of equal or smaller LOA than the vessel that was initially registered for use with a Western Pacific general longline permit on or prior to November 13, 1997.

(d) An exemption is valid only for the vessel for which it is registered. An exemption not registered for use with a particular vessel may not be used.

(e) An exemption may not be transferred to another person.

(f) If more than one person, *e.g.,* a partnership or corporation, owned a large vessel when it was registered for use with a Western Pacific general longline permit and made at least one landing of western Pacific pelagic MUS in American Samoa on or prior to November 13, 1997, an exemption issued under this section will be issued to only one person.