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Prohibition of fishing for pelagic management unit species within a closed area around the islands of American Samoa by vessels more than 50 feet in length

Management Plan for
Pelagic Fisheries of the Western Pacific Region

Includes Environmental Assessment and Initial Regulatory Flexibility Analysis

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1.0 Introduction

1.1 Summary

1.2 Table of Contents

1.3 Responsible Agencies

The Council was established by the Magnuson Fishery Conservation and Management Act to develop Fishery Management Plans for fisheries operating in the US EEZ around American Samoa, Guam, Hawaii, the Northern Mariana Islands and the US possessions in the Pacific.[1]1. Howland Island, Baker Island, Jarvis Island, Johnston Atoll, Midway Island, Kingman Reef, and Palmyra Atoll, and Wake Island. Once an FMP is approved by the Secretary of Commerce, it is implemented by federal regulations which are enforced by the National Marine Fisheries Service and the US Coast Guard, in cooperation with state, territorial and commonwealth agencies. For further information, contact:

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2.0 Fishery Management Program

2.1 Problems for resolution

Fishermen in American Samoa are concerned about the long-term sustainability of the local small boat pelagic fishery. In particular, there is apprehension that large US longline vessels will seek new fishing opportunities in the EEZ around American Samoa as fisheries in other areas of the US EEZ become increasingly restricted. Such a rapid influx of large vessels occurred in Hawaii during the late 1980s and led to extensive gear conflicts and fear of a possible decline in the landings of small boat fishermen. In addition, there is concern that the large vessels supplying fish to American Samoa's tuna canneries already occasionally fish in the EEZ. A widely held perception among small-scale trollers and longliners is that these larger vessels intercept fish migrating to local waters and reduce the supply of tuna and other pelagic species available for capture by artisanal, subsistence and recreational fishermen.

2.2 Initial actions

The Council was asked at the 92nd meeting in April, 1997 to assist in forming a fishermen's working group to consider various management options to ensure the long term sustainability of the small boat fishery. Various meetings of the working group and other fishermen were convened by the Council and the Department of Marine and Wildlife Resources between June and October 1997. The consensus among fishermen was that the most effective management action would be to establish a 100-nm closed area around the islands of American Samoa that prevented entry into the fishery by additional pelagic fishing vessels larger than 50 ft in length. Discussions with fishermen revealed that, as the fishery develops, they may wish to acquire larger catamarans and monohull vessels up to 50 ft in length. These larger boats would have a greater fishing range and provide a safer fishing platform while still being within the financial capabilities of artisanal and recreational fishermen. A 100-nm area closure would encompass the major off-shore banks, seamounts and pinnacles around which pelagic fish species aggregate.

Local fishermen also recognize that stock-mediated interactions and gear competition could occur if the size of the artisanal fishing fleet becomes excessive. Currently, the number of boats in American Samoa harvesting pelagic species in the EEZ is relatively small. However, if a significant expansion in the size of the fleet occurs, measures to restrict the number of participants in the fishery, such as a license limitation system, may be required.

In anticipation of creating a closed area, NMFS established a control date of November 13, 1997, after which vessels larger than 50 ft entering the fishery will not be assured of being allowed to use longline gear to fish for pelagic management unit species within 100-nm of the coastlines of American Samoa. The control date placed the owners of large longline vessels on notice that they might be excluded if they entered the fishery after this date.

At the 95th meeting in April 1998, the Council recommended that all domestic fishing vessels, including purse seiners and albacore trollers, greater than 50 ft in length be prohibited from fishing for pelagic management unit species within 100-nm of the coastlines of American Samoa. However, the Council noted that such an area closure could impose an economic hardship on certain longline vessels that acquired permits prior to the control date. When the owners of these vessels purchased their boats they had the expectation that there would be no area restrictions on their fishing activity around the islands of American Samoa. All of the fishing activity of these boats inside the US EEZ has occurred within 100-nm of the shoreline of Tutuila. Therefore, the Council recommended that any vessel that is greater than 50 ft in length and holds a NMFS longline permit on or prior to November 13, 1997 and made a landing of pelagic management unit species in American Samoa on or prior to that date be exempt from the prohibition to take PMUS within the closed area.

Other large vessels, including a number of purse seiners, have also fished for pelagic species within 100 nm of the islands of American Samoa. However, the Council did not consider it appropriate to grant these vessels exemptions, as the amount of fish caught by the vessels within the 100-nm area has historically been a negligible fraction of their total catch.

In late April 1998, a document describing the problem and alternative ways to resolve the problem was distributed to interested persons and organizations with a request for comments. Among the individuals and groups that reviewed the document were all holders of NMFS longline vessel permits in the western Pacific, the United States Tuna Foundation and the Western Fishboat Owners Association.

2.3 Management objectives

The following objectives of the FMP are relevant to this management measure:

1) To manage fisheries for management unit species in the Western Pacific to achieve optimum yield. The FMP defines optimum yield as the amount of each management unit species or species complex that can be harvested by domestic and foreign fishing vessels in the EEZ and adjacent waters to the extent regulated by the FMP without causing 'local overfishing' or 'economic overfishing' within the EEZ of each island area, and without causing or significantly contributing to 'growth overfishing' or 'recruitment overfishing' on a stock-wide basis.

2) To diminish gear conflicts in the EEZ, particularly in areas of concentrated domestic fishing.

3) To promote, within the limits of managing at OY, domestic harvest of the management unit species in the Western Pacific EEZ and domestic fishery values associated with these species, for example, by enhancing the opportunities for a) satisfying recreational fishing experience; b) continuation of traditional fishing practices for non-market personal consumption and cultural benefits; and c) domestic commercial fishermen, including charter boat operations, to engage in profitable fishing operations.

2.4 Management unit

The management unit is defined as the pelagic species complex harvested in the EEZ around American Samoa. The principal species in this complex are listed in Section 4.1.1.

2.5 Management alternatives

The management alternatives considered by the Council included prohibiting vessels more than 50 ft in length from fishing for pelagic management species within an area approximately 100-nm around the islands of American Samoa (preferred measure); implementing a smaller closed area (e.g., 50-nm closure); and taking no action.

2.6 Measures recommended to attain management objectives

2.6.1 Specification of OY

The FMP defines optimum yield as the amount of each management unit species or species complex that can be harvested by domestic and foreign fishing vessels in the EEZ and adjacent waters to the extent regulated by the FMP without causing 'local overfishing' or 'economic overfishing' within the EEZ of each island area, and without causing or significantly contributing to 'growth overfishing' or 'recruitment overfishing' on a stock-wide basis.

Notwithstanding the non-numeric definition of optimum yield, the Council estimates the annual harvest associated with optimum yield to be less than or equal to MSY. The estimates of MSY and optimum yield are not to be construed as quotas for the fishery, but as revised yield estimates.

2.6.2 Preferred management measure

2.6.2.1 Closed area

This measure prohibits the taking of PMUS by domestic fishing vessels larger than 50 ft (length overall) from waters within an area that is approximately 100-nm of the baselines of Tutuila Island, Swain's Island, Rose Atoll and the Manu'a Islands. To facilitate enforcement of the management measure the closed area was configured using straight lines. The area closure boundary is identified by lines connecting the following points expressed in decimal degrees to four significant figures:

1. -11.5486, -173.0000
2. -10.7461, -173.0000
3. -10.1488, -170.0000

4. -13.0000, -170.0000
5. -13.0000, -167.0000
6. -16.0000, -167.0000
7. -16.0000, -171.7536
8. -10.7461, -173.0000
9. -10.1488, -170,0000
10. -16.0000, -171.7536
11. -11.5486, -173.0000

Any vessel that is greater than 50 ft in length and holds a NMFS longline permit on or prior to November 13, 1997 and made a landing of pelagic management unit species in American Samoa on or prior to November 13, 1997 would be exempt from the prohibition to take PMUS within the closed area. Documentation of a qualifying landing must be from a properly submitted NMFS Western Pacific Daily Longline Fishing Log.

The permit of a vessel that qualifies for an exemption may be transferred, but only to another vessel of equal or smaller length. An application for a permit transfer must be submitted to the NMFS Pacific Island Area Office, as specified in Section 660.13 of Title 50 of the Code of Federal Regulations. The applicant must provide satisfactory documentation of vessel ownership and the size of the vessel to which the transferred permit will be registered.

Any vessel less than 50 ft in length that is "upgraded" to a size larger than 50 ft, or replaced by a vessel longer than 50 ft, is prohibited from taking PMUS within the closed area.

2.6.2.1.1 Annual evaluation

The Council concluded that a relatively large area closure should be initially established given the uncertainty about the nature of interactions between pelagic fisheries. A comprehensive evaluation of the effectiveness and impacts of the closed area will be made each year after implementation of the management measure. During the evaluation the views and opinions of representatives of all sectors of the fishing industry in American Samoa will be solicited. The size of the closed area may be adjusted downward if new information becomes available that suggests that a smaller area would provide sufficient protection to artisanal, subsistence and recreational fishing activities. During the annual evaluation the Council will also consider the need to restrict fishing effort or catches within the closed area.

2.6.3 Reporting and record keeping requirements

Any person who receives a permit to fish for pelagic management unit species using longline gear in the EEZ around American Samoa, Guam, the Northern Mariana Islands or other Pacific Insular Areas must comply with reporting and record keeping requirements as described in Section 660.14 of Title 50 of the Code of Federal Regulations. This reporting provision also applies to pelagic fish caught outside the US EEZ waters in the Pacific by US longline vessels.

3.0 Analysis of the impacts of management alternatives

Preparation of a Regulatory Impact Review is necessary to satisfy the requirements of the national standards, other parts of the Magnuson-Stevens Act and Executive Order 12866. The purpose of this section is to assist in understanding the relative biological, economic and social consequences of alternative management measures identified in this document. Limitations on available information concerning the potential physical effects of management alternatives on fishing activities precludes a detailed quantitative analysis of beneficial and adverse impacts. However, the analysis presented provides an adequate basis for making a management decision.

3.1 Identification and analysis of the problem

The harvest of pelagic fish has long been an important source of food and cultural identity for the indigenous inhabitants of American Samoa. In recent years, its importance as a source of income and employment has increased with the expansion of the local artisanal fishing fleet (Section 4.3.1). Artisanal fishing in American Samoa involves small-scale commercial ventures employing small vessels and relatively simple fishing technology. In addition to selling their catch, artisanal fishermen consume and give away part of it. Presenting a portion of the catch to family and friends is a customary social obligation that is an integral part of Samoan culture.

Small boat fishermen in American Samoa are becoming increasingly concerned about the long-term sustainability of the local pelagic fishery. In particular, there is apprehension that large US longline vessels will seek new fishing opportunities in the EEZ around American Samoa. In addition, there is concern that the large vessels supplying fish to American Samoa's tuna canneries already occasionally fish in the EEZ. A widely held perception among small-scale trollers and longliners in the Territory is that these larger vessels intercept fish migrating to local waters and reduce the supply of tuna and other pelagic species available for capture by artisanal, subsistence and recreational fishermen.

A related problem, but one that will not be directly addressed by the Council at this time, is the dramatic increase in the number of small vessels in neighboring Western Samoa that are targeting pelagic species. Between 1990 and 1996, the Western Samoa fleet grew from 40 to 140 boats, and, at present, more than 200 vessels are active in the fishery. In 1997, about 3,450 metric tons of albacore were exported to the Pago Pago canneries from Western Samoa (Chapman 1998). Western Samoa's EEZ is the smallest of any Pacific island nation, and the EEZ boundary it shares with the US lies only 20 miles from Tutuila.[2] American Samoa fishermen report that Western Samoa vessels fish close to the boundary and, increasingly, inside the US EEZ. The entry of large commercial operators into the American Samoa fishery would further increase the competition for pelagic fishery resources around the Samoa archipelago. It should also be noted that the success of small longliners in Western Samoa and American Samoa has attracted the attention of fishermen in other nearby Polynesian countries. For example, Niue, with an EEZ boundary about 200 nm south of Tutuila, is planning to develop its tuna fishery by expanding the local small boat fleet.

3.2 Management objectives

The following objectives of the FMP are relevant to this management measure:

1) To manage fisheries for management unit species in the Western Pacific to achieve optimum yield. The FMP defines optimum yield as the amount of each management unit species or species complex that can be harvested by domestic and foreign fishing vessels in the EEZ and adjacent waters to the extent regulated by the FMP without causing 'local overfishing' or 'economic overfishing' within the EEZ of each island area, and without causing or significantly contributing to 'growth overfishing' or 'recruitment overfishing' on a stock-wide basis.

2) To diminish gear conflicts in the EEZ, particularly in areas of concentrated domestic fishing.

3) To promote, within the limits of managing at OY, domestic harvest of the management unit species in the Western Pacific EEZ and domestic fishery values associated with these species, for example, by enhancing the opportunities for a) satisfying recreational fishing experience; b) continuation of traditional fishing practices for non-market personal consumption and cultural benefits; and c) domestic commercial fishermen, including charter boat operations, to engage in profitable fishing operations.

3.3 Description of alternatives

The management alternatives considered by the Council are as follows:

1) Taking no action

2) 100-nm area closure - Vessels more than 50 ft in length will be prohibited from fishing for pelagic management species within an area approximately 100-nm around the islands of American Samoa (Figure 3.1). The closed area constitutes about 77 percent of the total EEZ area. Any vessel that is greater than 50 ft in length and holds a NMFS longline permit on or prior to November 13, 1997 and made a landing of pelagic management unit species in American Samoa on or prior to November 13, 1997 would be exempt from the prohibition to take PMUS within the closed area. A comprehensive evaluation of the effectiveness and impacts of the closed area will be made each year after implementation of the management measure.

3) 50-nm area closure - Vessels more than 50 ft in length will be prohibited from fishing for pelagic management species within an area approximately 50-nm around the islands of American Samoa (Figure 3.2). The closed area constitutes about 44 percent of the total EEZ area. Any vessel that is greater than 50 ft in length and holds a NMFS longline permit on or prior to

November 13, 1997 and made a landing of pelagic management unit species in American Samoa on or prior to November 13, 1997 would be exempt from the prohibition to take PMUS within the closed area. A comprehensive evaluation of the effectiveness and impacts of the closed area will be made each year after implementation of the management measure.

3.4 Analysis of alternatives

3.4.1 No Action

This section draws on the best available information to examine the likelihood that an increased number of large vessels will enter the pelagic fishery around American Samoa if no management action is taken and the effects if such an increase occurs.

3.4.1.1 Likelihood of an increase in the number of large vessels

The domestic longline fleet based in Hawaii and the mainland US is highly mobile. The dozens of longline vessels that arrived in Hawaii during the late 1980s were from Alaska, California, the Gulf of Mexico and the East Coast. Some of these vessels have since returned to the continental US or moved on to new areas such as Fiji. In addition, quotas, limited access programs, commercial trip limits, incidental catch restrictions, prohibitions on sale, minimum size limits and time and area closures are among the array of measures that have been implemented or are being discussed by federal and state entities to manage pelagic stocks in the Atlantic and Gulf of Mexico. It is likely that these measures will restrict longline fishing along the Eastern seaboard and will cause some longline vessels in this area to seek alternative fishing grounds.

It is also possible that American Samoans may wish to purchase large longline vessels and operate these boats from Pago Pago. In the last five years four large longline vessels have been acquired by businesses located in the Territory. These boats are similar in length (65-109 ft) to domestic Hawaii-based longline vessels. However, a shortage of private sector capital in the Territory may restrict the ability of residents to construct or purchase additional vessels of this size.

The domestic purse seine and albacore trolling fleets are as mobile as the longline fleet. Most of the fishing activity by the purse seine vessels occurs in the EEZ waters of Papua New Guinea, Federated States of Micronesia and other Pacific island nations far to the west of American Samoa. However, during an ENSO event these vessels may shift their fishing activity to areas in the central Pacific, including the upper portion of the EEZ around American Samoa (Section 4.2.2.3). The South Pacific albacore vessels operate on dense concentrations of albacore that form along the sub-tropical convergence zone that lies 35-47E S and 170-130E W. Therefore, the likelihood that albacore trollers will fish in the EEZ around American Samoa is low.

It is also possible that large foreign fishing vessels may seek permission to fish in the EEZ around American Samoa under a Pacific Insular Area Fishing Agreement (PIAFA). This agreement would give foreign vessels access to these EEZ waters in exchange for a negotiated fee and subject to a variety of permit conditions. However, the level of interest of foreign nations in entering into a PIAFA may be low, as a large portion of the EEZ around American Samoa is closed to foreign longline vessels. Furthermore, a PIAFA may not be entered into if it is determined by the Governor of American Samoa that such an agreement will advesely affect the fishing activities of the indigenous people of the Territory.

3.4.1.1 Effects of an increase in the number of large vessels

As discussed in Section 4.1.3.1, the nature of existing or potential interactions between pelagic fisheries is not well understood. The likelihood that a Type 1 interaction (competition for fish) will occur increases as more vessels enter the fisheries (Section 4.1.3.1). Evidence suggests that competitive interaction occurred in the waters around American Samoa as the Asian longline fleet expanded rapidly during the 1950s. Analysis of longline fishing by Asian longline vessels from the 1950s to the 1970s by Otsu and Sumida (1968) and Yoshida (1975) indicates that the large build up of longline fishing effort around American Samoa had an effect on the South Pacific albacore stock. That the apparent overall effect was not greater was due to the fact that the fishing grounds expanded, especially into areas south of latitude 20E S where good catch rates were obtained. The mean catch per day and

catch per 1000 hooks of longline vessels based in Pago Pago declined steadily between 1959 and 1971. To compensate for the reduced CPUE, the longline vessels fished more days per trip and traveled up to 2,500 nm from Pago Pago seeking new fishing grounds.

Competive interaction may also occur among different gear types if the same species are harvested. For example, interaction has been observed between purse seine and artisanal troll fisheries catching yellowfin tuna in the waters around Kiribati (Section 4.1.3.1). In American Samoa large longline or purse seine vessels could similarly compete with small vessels using troll gear to catch species such as mahimahi, yellowfin tuna, wahoo and blue marlin.

A Type 2 fisheries interaction is a more intensive form of competitive interaction that may occur if fishing gear is dispersed unequally over the population (Section 4.1.3.1). In Western Samoa the entry of large numbers of small *alia* catamarans fishing in only a limited area of the EEZ led to competition and gear conflict between vessels (Chapman 1998). Western Samoa has the smallest EEZ of any Pacific island nation, and the effort of the longline fishery is concentrated in less than 40 percent of this area. In 1994, when 20-30 small boats were using longline gear, catch rates averaged 1.65 lbs/hook (Mulipola 1998). By 1997, 170 vessels were active and catches had declined to 0.497 lbs/hook.

The problems created by a small boat fleet fishing intensely within a limited area may be exacerbated by the entry of larger fishing vessels with greater fishing capacity. The fishing power of small *alia* catamarans is limited due to the relatively small number (200-300) of hooks deployed, short trip duration and limited on-board storage capacity. By comparison, longline vessels similar in size to those in the Hawaii fishery can make trips of several weeks duration and deploy longlines with 1200-1500 hooks. To avoid an accelerated decline in catch rates due to the entry of large vessels, the Western Samoa government introduced regulations that would establish a 50-nm area around the islands of Western Samoa that is closed to fishing vessels greater than 50 ft in length (Chapman 1998).

A Type 2 fisheries interaction may also occur when fish are not distributed homogeneously throughout a fishing ground, but are concentrated in certain areas (Section 4.1.3.1). Juvenile tuna and other pelagic fish are known to aggregate in specific locations, including banks and seamounts that rise from the ocean to within a few hundred meters of the surface. These “core areas” are particularly important from a management perspective, since local overfishing or depletion may occur if these areas are fished intensively. Such an effect was observed on the Pacific coast of Mexico, where an increase of longline fishing effort in two areas of striped marlin abundance led to marked overall decreases of both longline and troll gear CPUE (Section 4.1.3.1). Large vessels fishing for pelagic species in other areas of the Pacific and in the Atlantic have also traditionally tended to concentrate their fishing effort in areas where off-shore banks or seamounts are located (Fonteneau 1991).

The banks and seamounts around American Samoa have long been important fishing grounds for artisanal and recreational fishermen participating in both pelagic and bottomfish fisheries. Even distant banks, such as South Bank, which is located about 45 nm from Tutuila, are frequently visited by small boats using troll gear (Section 4.2.2.1). In addition, the concentrations of juvenile tunas on these banks and seamounts may represent a reservoir of fish that over time move into nearshore waters and come within range of the troll and longline vessels operating nearer the islands. Most of these banks and seamounts are within the range of the small boat fleet, but, as stated above, their fishing power is limited. In contrast, large longline vessels can fish intensively on bank and seamount areas, which could lead to local overfishing and general declines in CPUE throughout the fishery.

It is uncertain how long the effects of intense fishing on catch rates will last. However, given the high mobility and great range of tuna and billfish, the recovery of local stock abundance may occur within a few years if fishing effort decreases. For example, in Mexico the enforcement of the longline exclusion zone between 1977 and 1980 produced a rapid recovery of overall gamefishing catch rates (Section 4.1.3.1).

A Type 3 interaction occurs when gear interferes directly with other gear (Section 4.1.3.1). This interaction was evident between the small boat and longline fleets based in Hawaii, and led to the physical separation of the two fleets through the implementation of an area closure for the longline vessels (Section 4.1.3.1). In American Samoa most of the longline fishing occurs to the south of Tutuila within a relatively narrow area. The *alia* catamarans normally set their lines perpendicular to the coast and parallel to each other. Because these vessel use relatively short longlines, they can set their gear within the area where albacore and other pelagic fish are concentrated, while avoiding gear interaction with one another. The four large longline vessels currently based in Pago Pago have so far

avoided gear interactions with smaller boats by fishing in more distant areas of the EEZ. If additional large longline vessels enter the fishery, it is possible that they will attempt to maximize catch rates by setting their gear parallel to the coast in order to deploy the maximum number of hooks in the most favorable area. The result would be serious interactions between the gear of the large and small vessels.

In summary, the nature of existing or potential interactions between pelagic fisheries in the EEZ around American Samoa is not clearly understood. However, the information available suggests that one or more of the different types of fisheries interactions could occur in the pelagic fisheries of American Samoa if no management action is taken.

3.4.2 100-nm area closure

Spatial separation of different sized vessels and gear lengths through the establishment of a closed area will reduce the potential for stock-mediated interaction (harvesting the same resources) and gear competition or interference between large- and small-scale fisheries. As shown in Figure 3.1, a 100-nm closed area that extends in a continuous band from Swain's Island to Rose Atoll would encompass all the islands and off-shore banks and seamounts in the EEZ that are areas of high pelagic fish concentration. Areas close to the islands (particularly where FADs have been deployed), banks and seamounts are important fishing grounds to small trolling vessels, some of which regularly fish 45 nm from shore (Section 4.2.2.1). Most of the fishing activity of the small boats using longline gear occurs within 25 nm of Tutuila (Figure 3.3). However, it is likely that
more distant fishing areas will increasingly be used by artisanal fishermen employing longline gear as they acquire larger (35-40 ft) boats. Establishment of a 100-nm closed area takes into account this interest by artisanal fishermen in acquiring vessels up to 50 ft in length and seeks to avoid interactions before they arise.

As mentioned above and as shown in Figure 3.3, purse seine vessels have fished in the upper portion of the EEZ around American Samoa. If a 100-nm closed area is established, purse seiners will continue to be able to fish in a portion of the EEZ around the Territory. However, the area open to fishing by these vessels would be considerably reduced (Figure 3.1).

3.4.3 50-nm area closure

A 50-nm closed area would enclose all the bank and seamount areas where small boats currently fish. However, a 50-nm closed area may not be sufficient to reduce interactions between small and large vessels. A large area of the EEZ would remain open to fishing by purse seine and other large vessels (Figure 3.2). Implementation of a 50-nm closed area does not anticipate the acquisition by artisanal fishermen of larger vessels with a fishing range of more than 50 nm, nor does it provide a "buffer zone" around the off-shore banks that at present are regularly used by small boat fishermen.

3.5 Analysis of expected costs and benefits

3.5.1 Domestic fishing activities

3.5.1.1 No action

The alternative of no action would maintain fishing opportunities for large vessels throughout the EEZ around American Samoa. However, an increase in the number of large vessels could have

substantial economic and social effects on American Samoa's small boat fleet. Small vessels would compete with large vessels over common resources and would likely lose against vessels with greater fishing power and range. If fishing pressure by large vessels results in local overfishing and a fall in catch per unit of effort the economic impact on the small boat fleet could be severe, even if the effects of local overfishing do not last more than a few seasons. A poor fishing season would result in decreases in income, possible defaulting on boat loans and other economic hardships. Furthermore, residents of American Samoa would suffer from a discontinuation of traditional fishing practices for non-market personal consumption and cultural benefits. Large vessels, on the other hand, have the capability of mitigating the costs of a decrease in catch rates due to competitive interaction by traveling to more distant fishing grounds.

3.5.1.2 100-nm or 50-nm closed area

The establishment of a closed area reserved for use by small boats will have little direct effect on the domestic purse seine or albacore troll fleets. The most productive fishing grounds for purse seiners and albacore trollers lie outside the EEZ around American Samoa (Section 4.3.1.2). Consequently, the total catches and revenues of these vessels could be maintained if effort is directed beyond the area closure. However, a closed area could potentially result in lost fishing opportunities for large longline vessels currently based in Hawaii or the continental US. Furthermore, although large longline vessels that landed PMUS in American Samoa prior to the control date will be allowed to fish within the area closure, the establishment of a closed area may discourage residents of American Samoa from purchasing or constructing additional large longline vessels. Such vessels may be profitable investments; a larger vessel is faster than a small one, has a greater fishing range and can fish year round. However, in American Samoa there is a shortage of private sector capital to purchase large fishing vessels and an excess of labor. In these circumstances it is likely that American Samoans can benefit more from local ownership of less-expensive boats that provide greater employment opportunities. Table 4.4 in Section 4.3.1 indicates that a fishing enterprise using a typical 28 ft *alia* catamaran is a viable economic alternative for American Samoa. This data, coupled with estimates of local per capita income, suggest that the capital investment required to enter the fishery is within the financial reach of the typical American Samoan household.

The economic importance of marine fisheries in the Pacific Insular Areas is recognized in the Magnuson-Stevens Act, which states: "Pacific Insular Areas contain unique historical, cultural, legal, political, and geographical circumstances which make fisheries resources important in sustaining their economic growth." With its very limited economic base, American Samoa, in particular, has a compelling interest to promote development of local fisheries (Section 4.5). As a result of employment cutbacks within the American Samoa Government and the unavailability of appropriate private sector jobs, an increasing number of American Samoans are seeking employment outside of the Territory. Developing fish harvesting capability sufficient to support substantial participation in fisheries will expand and diversify the local economy and help the Territory attain a higher level of economic self-sufficiency. Small-scale commercial fishermen in the Territory have the desire to harvest a larger number of PMUS than are now taken, and some of these fishermen are investing in larger (30-40 ft.) boats that have a greater fishing range and are capable of carrying ice and delivering a higher-value product. By anticipating the acquisition of larger artisanal fishing vessels with a fishing range of more than 50 nm and maximizing the potential for increased catches by these boats, the preferred closed area will contribute to the success of these more ambitious fishing enterprises.

At present, the artisanal fishing fleet generates little indirect economic activity because the fuel, gear, bait and other supplies it purchases are almost all imports. However, an expansion of the fleet could lead to the development of a number of linked industries in American Samoa. One 39 ft *alia* catamaran has recently been constructed by a local firm, and it is likely that increased business activity and employment will occur in the local boat-building industry as the demand for vessels grows. Investment opportunities in forward-linked industries may also be created if additional local and export markets develop for the catches of the artisanal fleet. A growing number of local businesses are purchasing the catches of the artisanal fleet and selling the fish in retail and wholesale outlets, and several entrepreneurs have expressed interest in exporting the fish to Hawaii or the mainland US.

While it is important to recognize the significant role marine fisheries may play in the economy of American Samoa, it is equally important to keep in mind that the value of pelagic fisheries in the Territory extends beyond the creation of employment and generation of exports and income. Allowing residents of American Samoa a fair and reasonable opportunity to participate in fisheries will also preserve and protect a continuation of traditional fishing practices for non-market personal consumption and cultural benefits. Pelagic fishing has historically had considerable socio-

cultural value in Samoan society and continues to contribute to the cultural integrity and social cohesion of American Samoa communities (Section 4.6). For example, tuna are still harvested to meet customary social obligations and age-old ceremonial traditions specifying the distribution of tuna catches within a village endure. These socio-cultural attributes of fishing are at least as important as the contributions made to the nutritional or economic well-being of island residents.

The establishment of a closed area will ensure that the fishing grounds that have traditionally been the most important to the small-scale fishing fleet in American Samoa will be reserved for their use. This allocation of fishing space is consistent with Article 6.18 of the Food and Agriculture Organization of the United Nations (FAO) Code of Conduct for Responsible Fisheries:

> Recognizing the important contributions of artisanal and small-scale fisheries to employment, income and food security, States should appropriately protect the rights of fishers and fish-workers, particularly those engaged in subsistence, small-scale and artisanal fisheries, to a secure and just livelihood, as well as preferential access, where appropriate, to traditional fishing grounds and resources in the waters under their national jurisdiction.

3.5.2 Conservation of other stocks

Stocks of pelagic species that occur in the waters around American Samoa offer far greater resource potential than deep-slope bottomfish or inshore fish stocks. Inshore resources are heavily exploited or over-exploited in most areas of American Samoa (Wass 1980). The effects of heavy fishing pressure have been exacerbated by the environmental effects of cyclones, pollution and sedimentation (Saucerman 1995). The exploitation of the slow growing, deep-water snappers in American Samoa is limited by the low standing stock of the resource (Itano 1996). As a result of an increase in effort in the bottomfish fishery during the 1980s, catch rates fell from 352 lbs/trip to 120 lbs/trip within three years. Development of offshore pelagic fisheries for local consumption would constitute a means of relieving the pressure on inshore and deep-slope fisheries.

3.5.3 Minimizing bycatch

The establishment of a closed area may reduce overall bycatch levels, as less fishing area would be available to large vessels which tend to have greater amounts of bycatch than do small vessels. In 1997, NMFS logbook data for domestic longline vessels based in American Samoa indicated that discards amounted to 4.5 percent of the total catch of large (>50 ft) longline vessels, while 0.2 percent of the total catch of small vessels using longline gear was discarded. Most of the catch of large longliners that has no market value is discarded. In addition, a fraction of the total catch that could be sold is not retained for economic reasons. For example, marlins are often discarded at the beginning of a trip to leave hold space for more valuable species. Small quantities of tuna and other pelagic species are discarded by purse seine vessels. In comparison, small vessels in American Samoa using longline and troll gear generally discard only sharks, and this to a decreasing extent as the demand for shark fins increases. Any unsaleable fish are usually taken home by the crew.

3.5.4 Safety at sea

The 50-ft restriction on vessel size will limit interactions but not place the safety of fishery participants at risk. Troll and handline vessels averaging 40 ft in length regularly make trips of 150 nm or more to seamounts and weather buoys around Hawaii. The vessels that make voyages as far as 1000 nm to participate in the federally-regulated Northwestern Hawaiian Islands bottomfish fishery have an average size of 54 ft. No replacement vessel larger than 60 ft is allowed into this fishery. While vessel size is a significant safety factor, safety training and the acquisition of emergency equipment are also important. The US Coast Guard has recently undertaken a campaign to educate fishermen in American Samoa about US commercial fishing vessel safety regulations and to ensure compliance with these regulations.

3.5.5 Monitoring and enforcement costs

A closed area of any size will result in monitoring and enforcement costs. Current constraints on US Coast Guard surveillance resources could limit the ability to enforce an area closure. However, it is likely that in the near future,

international fisheries agreements in the central and western Pacific will require vessels that harvest pelagic species in more than one EEZ or on the high seas to carry an automated, satellite-based vessel monitoring system (FFA 1996a). The Council has demonstrated that such surveillance systems provide an effective tool to enforce area closures in Hawaii and are cost-effective and fair to the fishing industry.

3.5.6 Foreign fishing activities

A large portion of the EEZ around American Samoa is already closed to foreign longline vessels. Increasing the size of the EEZ area closed to foreign boats is likely to reduce the interest of foreign nations in acquiring rights to fish in the open portion of the EEZ. A Pacific Insular Area Fishery Agreement would allow access fees to be deposited in the treasury of the American Samoa Government. However, at this time the American Samoa Government is more interested in encouraging the development of local domestic fishing enterprises than in collecting revenues from foreign fishing. Particular attention is being given to developing artisanal fisheries because of their importance as a source of food for local consumption, income and employment and a means of preserving Samoan cultural values.

3.5.7 International implications

The United States Tuna Foundation and Western Fishboat Owners Association have expressed concerns that the establishment of a 100-nm closed area may set a precedent that will be followed by Pacific island nations that are parties to the Treaty on Fisheries.[3] This treaty sets forth the terms and conditions that US purse seine vessels must adhere to in order to fish in the region. Among the principal issues of the treaty are closed and limited areas (Table 4.3). The Tuna Foundation states that such a precedent could adversely affect efforts by the purse seine fleet to retain vital fisheries access throughout the region. However, a number of Pacific island nations such as Kiribati, Tuvalu and the Federated States of Micronesia depend upon foreign fishing access fees for a significant portion of their government revenue. The access fees paid by the US under the Treaty on Fisheries are the highest of any licensing arrangement in the region (10 percent of the value of fish harvested). Given this economic incentive to accomodate foreign fishing vessels, particularly US purse seiners, it is unlikely that these nations will be induced to enlarge the areas closed to foreign vessels by the implementation of a 100-nm closed area in the EEZ around American Samoa.

On the other hand, there is a growing interest by most Pacific island nations in developing domestic tuna-based fishing industries in order to increase the economic benefits from their fishery resources. In the 1970s and 1980s, few Pacific island nations (Fiji, Papua New Guinea and Solomon Islands being the principal exceptions) were fishing for cannery quality skipjack and albacore. However, recently the participation of island states and territories in tuna fishing has increased with the advent of small-scale longline fisheries for *sashimi*-quality yellowfin and bigeye tuna (FAO Fisheries Department 1997). These fisheries operate mainly off the Federated States of Micronesia, Fiji, French Polynesia, Marshall Islands, New Caledonia, Palau and Tonga.

In the future, it is possible that one way in which Pacific island countries encourage the further development of local tuna industries is to reserve a larger portion of their EEZ waters for the exclusive use of domestic vessels. For example, Papua New Guinea has closed its entire EEZ to foreign longline vessels and is considering reducing the EEZ area available to US purse seiners. Such actions by Pacific island nations will probably continue regardless of whether an area closure is established in the EEZ around American Samoa.

3.6 Rationale and net benefit discussion

The nature of interactions between pelagic fisheries is not well understood. Moreover, there is uncertainty as to the most effective measures for reducing interactions. However, establishing a closed area is consistent with management initiatives undertaken throughout the Pacific islands and previously by the Western Pacific Council to minimize interactions between pelagic fisheries. Establishment of an area closure contrasts with the strategy of taking no action until sufficient evidence accumulates to demonstrate that fishing by large vessels leads to local overfishing of stocks and/or adversely impacts on small boat fisheries. The Council is adopting a precautionary approach and encouraging a rational, more easily managed use of the resource by instituting measures before a crisis in the fishery occurs.

This allocation of ocean area to small vessels is consistent with the FMP objectice to promote, within the limits of managing at OY, domestic harvest of the management unit species in the Western Pacific EEZ and domestic fishery values associated with these species by enhancing the opportunities for a) satisfying recreational fishing experience; b) continuation of traditional fishing practices for non-market personal consumption and cultural benefits; and c) domestic commercial fishermen to engage in profitable fishing operations. Limiting the risk of interceptions of PMUS in the EEZ by establishing a 100-nm closed area will maximize the potential for increased small boat catches and increased artisanal, subsistence and recreational fishing values in the Territory without significantly decreasing the catches of larger vessels targeting pelagic fish. In addition, if local overfishing occurs due to competitive interaction the economic and social costs are likely to be more severe for the small boat fleet than for larger vessels. Large vessels have the capability of mitigating the costs of a decrease in catch rates by traveling to more distant fishing grounds where good catch rates can be obtained. In short, the total potential benefits that the small boat fleet in American Samoa may receive from an area closure outweigh the potential hardship that may be imposed on those large vessels excluded.

This management measure is reasonably calculated to promote conservation of the resource. Allocation of a portion of the EEZ around American Samoa to small boats will tend to limit the rate of increase of total fishing effort. Entry by a large (>50ft) vessel represents a much greater increase in fishing pressure and fishing mortality, in comparison with an *alia* catamaran. However, if a significant expansion in the size of the small vessel fleet occurs, measures to restrict the number of participants in the fishery, such as a license limitation system, may be required.

The Council recognizes that as information on the economic and social impact of the area closure becomes available, modification of the closure may be desirable. A comprehensive evaluation of the effectiveness and impacts of the closed area will be made each year after implementation of this management measure. During the evaluation the views and opinions of representatives of all sectors of the fishing industry in American Samoa will be solicited.

4.0 Supporting Material

4.1 Description of the stock(s) comprising the management unit

4.1.1 Species or group of species and their distribution

The PMUS commonly caught in pelagic fisheries in the EEZ around American Samoa are listed in Table 4.1. All the PMUS species harvested are part of larger populations which are contiguous throughout most of the tropical and sub-tropical Pacific Ocean.

Table 4.1. Pelagic management unit species in American Samoa fishery

English Common Name	Scientific Name	Samoan names
Albacore	*Thunnus alalunga*	Apakoa
Yellowfin tuna	*T. albacares*	Asiasi, To'uo
Indo-Pacific blue marlin	*Makaira mazara:*	Sa'ula
Bigeye tuna	*T. obesus*	Asiasi, To'uo
Oceanic sharks	Alopiidae, Carcharinidae, Lamnidae, Sphynidae	Malie
Mahimahi (dolphinfish)	*Coryphaena* spp.	Masimasi
Wahoo	*Acanthocybium solandri*	Paala
Sailfish	*Istiophorus platypterus*	Sa'ula
Swordfish	*Xiphias gladius*	Sa'ula malie
Other tuna relatives	*Auxis* spp, *Scomber* spp; *Allothunus* spp	(various)
Skipjack tuna	*Katsuwonus pelamis*	Atu, Faolua, Ga'oga
Striped marlin	*Tetrapturus audax*	
Shortbill spearfish	*T. angustirostris*	Sa'ula
Pomfret	family Bramidae	Manifi moana
Oilfish family	Gempylidae	Palu talatala
Moonfish	*Lampris* spp	Koko
Kawakawa	*Euthynnus affinis*	Atualo, Kavalau
Dogtooth tuna	*Gymnosarda unicolor*	Tagi

4.1.2 Abundance and present condition

There are no obvious signs that fisheries across the Pacific have had a serious negative impact on skipjack or yellowfin stocks (SPC 1997). There is concern over a five year continuous decline in the CPUE of large yellowfin in Japanese purse seine catches, but changes in both targeting and fishing grounds over the same period of time confound interpretations of the change in the CPUE. Studies indicate that there is little, if any, separation of eastern and western Pacific bigeye stocks, but the longline CPUE for the eastern Pacific has been decreasing while that for the western Pacific was stable. Analysis of the eastern Pacific data indicated that catch levels in that region may be nearing full exploitation. Lack of complete information on bigeye mortality and exploitation rates makes it difficult to determine the status of Pacific bigeye stocks.

Analyzes conducted by the South Pacific Commission (SPC 1997) on the South Pacific Albacore stock as a whole suggest that total catches have been stable over the past several years, although the success of the troll fishery in the

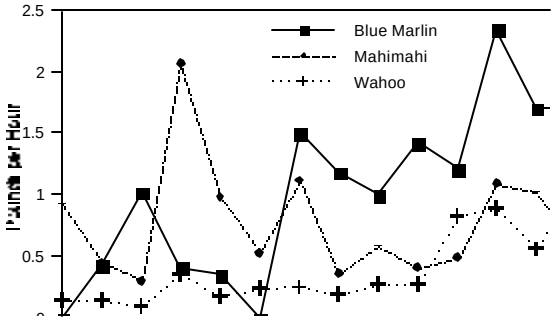

Figure 4.2. Troll gear CPUE for non-tuna PMUS in American Samoa pelagic fishery

sub-tropical convergence zone has been variable. The CPUE of Asian longline vessels has been stable or increasing in recent years and there is no evidence in the data that current levels of fishing are having an overall adverse affect on the stock. However, SPC (1997) notes that analysis of tagging and length frequency data indicate relatively slow growth and low mortality rates for South Pacific albacore, compared to the tropical tunas such as bigeye and yellowfin. The fisheries potential of albacore is therefore thought to be more restricted by comparison with the tropical tunas.

Less is known about the status of billfish in the Central and Western Pacific. Most billfish are taken incidentally during longline operations targeting tuna, apart from swordfish which are targeted by longliners in the higher latitudes north and south of the equator. While most studies suggest that Pacific billfish stocks are healthy, there is considerable uncertainty in the quality of data and the methods used to evaluate the trends (WPFMC 1998).

In the pelagic fisheries occurring in the EEZ around American Samoa the skipjack catch rates of small boats using troll gear has fluctuated widely over the past 15 years, with some suggestion of an overall decline (Figure 4.1). Yellowfin CPUE has remained relatively steady over the same time period. The troll gear CPUE for blue marlin, yellowfin, wahoo and mahimahi has been increasing over the past few years (Figure 4.2), due, in part, to use by fishermen of better fishing gear and larger boats that can go further offshore to fish around seamount.

There are only two years of longline CPUE data due to the recent adoption of this gear type by the local artisanal fleet. The longline CPUE for albacore in 1997 was similar to that in 1996. CPUE values for blue marlin, swordfish, bigeye and yellowfin declined overall in 1997, while those of skipjack and mahimahi increased.

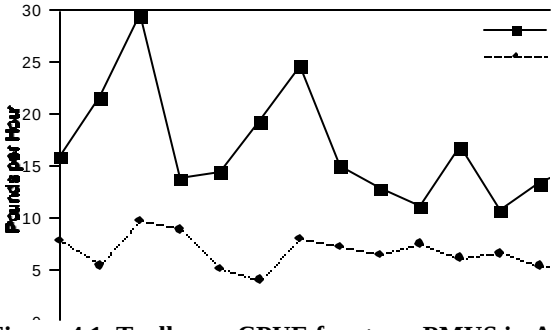

Figure 4.1. Troll gear CPUE for tuna PMUS in American Samoa pelagic fishery

Table 4.2. Longline CPUE for target PMUS in American Samoa pelagic fishery

Species	CPUE (no/1000 hooks)

	1996	1997
Blue marlin	0.90	0.61
Swordfish	0.03	0.01
Albacore	30.91	31.18
Bigeye	1.05	0.14
Skipjack	0.30	0.60
Yellowfin	4.09	2.51
Mahimahi	1.25	2.81

4.1.3 Probable future condition

4.1.3.1 Potential fishery induced changes

The future condition of the component PMUS stocks exploited in American Samoa's artisanal and recreational pelagic fisheries will be affected by the size and composition of other pelagic fishing fleets operating both within and outside the EEZ around the Territory and the degree of interaction between pelagic fisheries. Ricker (1975) identifies three types of fisheries interactions:

Type 1 - Competition: A fish population is exploited by a fishery whose units of gear are scattered randomly over it, so that all fish are exposed to the possibility of capture at short intervals of time and there is no possibility of local depletion occurring. Further, the units of gear do not interfere with each other in respect to the mechanics of their operation. In such a situation, today's catch by any new unit of gear reduces tomorrow's catch by the others, and thus in a sense it may be said to 'compete' with them. 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 catches fewer and fewer fish (or at any rate fewer than it would have caught had there been no previous fishing that year); and the more gear is present, the more rapid is this decrease in catch.

Type 2 - Local overfishing: If fishing gear is dispersed unequally over the population, its action tends to produce local reduction on abundance greater than what the population as a whole is experiencing, leading to a different type of competition. If a population is vulnerable in only certain parts of its range, then fishing in such areas produces a local depletion of the supply. Additional gears deployed in the same region increase the local depletion and catch per unit of 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 keep moving 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 of effort reflects the size of only the immediately available restricted portion of the stock, rather than the stock as a whole.

Type 3 -Gear conflict: If the setting of an additional unit of gear interferes directly with other gear there exists 'physical' competition between them, which is independent of population abundance, even locally.

The number of cases of fisheries interactions in the Pacific is growing rapidly with the development and expansion of pelagic fisheries (Sakagawa 1996). In particular, questions regarding the possible effects of industrial fisheries, both foreign and domestic, on artisanal and subsistence fisheries are frequently raised (Hampton 1994). However, the First FAO Expert Consultation on Interaction of Pacific Tuna Fisheries in 1991 concluded that empirical evidence for such interactions has been available for only few fisheries, and these interactions have been quantified for even fewer fisheries (Shomura et al. 1994). It is unclear whether interactions are insignificant among fisheries directed at tuna and tuna-like species or whether scientists are unable to detect these interactions possibly due to various changes to fisheries and resources, resulting in too-variable background which conceals the effects of interactions. Similarly, Skillman et al. (1993:27) commented at that time on the potential interaction between Hawaii-based longline vessels and other local pelagic fishing gear types:

> The current level of understanding of fisheries interaction in Hawaii fisheries is inadequate to make reliable scientific predictions regarding the outcome of alternate management schemes. Even if all of the recommended data collection, analysis, and modeling were conducted the results might be insufficient to convincingly show that biological or economic fishery interactions are occurring, or to predict the best management alternatives.

By the Second FAO Expert Consultation on Interaction of Pacific Tuna Fisheries in 1995 the situation had improved as a number of empirical studies of interactions between various pelagic fisheries (e.g., commercial and recreational or industrial and artisanal) in the Pacific were available (e.g., Hampton et al. 1996; Chee 1996; Chullasorn 1996; Mathews et al. 1996; Muhlia-Melo 1996). There are still, however, few scientific analyses to evaluate the practical effects of regulations intended to resolve local pelagic fisheries interaction issues.

Nevertheless, various management measures have been implemented in the US and elsewhere to reduce interactions between pelagic fisheries. Regulations prohibiting the retention of billfish by US longliners operating in the US EEZ in the Atlantic are intended to reduce the competition between sport and commercial fisheries. In the Pacific, the Republic of Kiribati, which has one of the larger EEZs in the region, has imposed a limit on the number of purse seine vessels allowed access to the EEZ to avoid possible adverse impacts on pelagic catch rates of artisanal trolling vessels (FFA 1996b). Hampton et al. (1996), showed that over large areas, e.g., within 300-600 nm of Kiribati, artisanal and purse seine catch rates of yellowfin tuna are generally positively correlated, suggesting that at this scale, variations in abundance or catchability of yellowfin affect both purse seine and artisanal harvests in the same way. However, some negative impacts of purse seine fishing on artisanal catches were found at finer spatial scales when purse seiners fished within 60 nm or less from Kiribati shorelines.

The establishment of closed areas has also been extensively used as a management measure to reduce interactions between pelagic fisheries. In 1983, Mexico established a sport-fishery preserve which extended from the coastline to 50 nm offshore along the Pacific coast. Fishing by longline vessels were completely banned within this area, and in 1987 the prohibited fishing area was extended further offshore (Squire 1990; Muhlia-Melo 1996). Japanese longline fleets began to expand fishing operations in the eastern tropical Pacific during the early 1960s with effort concentrated around the Baja coast of Mexico, rising from near zero levels in 1960 to the deployment of 60 million hooks in 1964 and a generally increasing trend through over the next two decades to 100 million hooks by 1980. Over this same time period, longline tuna and billfish catch rates declined as effort increased, and a parallel decline, particularly for striped marlin was also experienced by recreational troll fishermen operating from coastal ports in Mexico.

The declaration of Mexico's 200-mile EEZ in 1976 and the subsequent enforcement of this zone between 1977 and 1980 produced a rapid recovery of overall gamefishing catch rates, most notably for striped marlin and swordfish. However, entry of a limited number of longliners after 1980 was marked by another period of declining catch rates among both longline and recreational troll fishermen. The decline led to the aforementioned confinement of longliners to the offshore areas of the EEZ. Squire (1990) noted that the decline and recovery of the striped marlin catch rates reflected the fishing down and rebuilding of two localized near-shore areas where fish are attracted and regularly linger during their life cycle.

Prior to 1980, skipjack tuna in the western and central Pacific was caught primarily by pole-and-line bait boats operating from bases in Papua New Guinea, the Solomon Islands, Fiji, Kiribati and Palau. With the advent of purse seining around Papua New Guinea by US and other foreign vessels, concern was expressed by domestic pole-and-line fishing companies in Papua New Guinea that purse seiners would be competing for the same resources harvested by the bait boats. This concern led to the establishment in 1981 of an area in the northern waters of Papua New Guinea that was closed to purse seiners (SPC 1992).

Under the Treaty on Fisheries Between the Governments of Certain Pacific Island States and the Government of the United States implemented in 1989, several Pacific island nations have established closed areas to restrict the fishing area of US purse seine vessels that have acquired access to fish in the region (Table 4.3). Several Pacific island countries depend upon foreign fishing access fees for a significant portion of their government revenue. Consequently, they must weigh the benefits to artisanal vessels resulting from the exclusion of US purse seine vessels to certain fishing grounds against the costs in the form of reduced access fees.

Table 4.3. Description of areas in various Pacific island EEZs that are closed to US purse seine vessels

Australia	Entire EEZ
Cook Islands	12 nm territorial waters
FSM	12 nm territorial waters
Fiji	Internal and archipelagic waters of main island group and 12 nm territorial waters from archipelagic boundary around main islands and Rotuma
Kiribati	Archipelagic waters between islands, 12 nm territorial waters and 2 nm from anchored fish FADs
Marshall Islands	12 nm territorial waters and 2 nm from anchored FADs
Nauru	12 nm territorial waters
New Zealand	Entire EEZ except northern part above 39ES west of main islands and above 40ES east of main islands. Within permitted area, 12 nm territorial waters and a further 6 nm are closed.
Niue	12 nm territorial waters around Niue and 3 nm around Beveridge, Antiope and Harans reefs
Palau	12 nm territorial waters around Palua and an area encompassed in an arc with a radius of 50 nm centered on reef entrance to Malakal Pass
Papua New Guinea	12 nm territorial waters and an area between 0E30' S–3E30' S and 149E E–153E E around New Ireland
Solomon Islands	Entire EEZ except for area between 4E20' S–8ES and 161E E–169E55' E

Tonga	All waters less than 1000 m in depth within coordinates 15ES–23E30'S and 173EW–177E55' W and 12 nm from islands of Teleki Tonga and Teleki Tokelau
Tuvalu	12 nm territorial waters and 2 nmi from Macau, Kosciusko, Rose, Bayonnaise and Hera banks
Vanuatu	12 nm territorial waters and archipelagic and internal waters
Western Samoa	12 nm territorial waters, various b anks and sea mounts and 2 nm from anchored FADs

In Western Samoa the entry of large numbers of small *alia* catamarans fishing in only a limited area of the EEZ led to competition and gear conflict between vessels (Chapman 1998). The Western Samoa government became concerned that these problems may be exacerbated by the entry of larger fishing vessels with greater fishing capacity. In March 1998, the government introduced regulations that would establish a 50-nm area around the islands of Western Samoa that is closed to fishing vessels greater than 50 ft in length (Chapman 1998).

The Western Pacific Council has also previously established closed areas to reduce fishery interactions. To encourage the expansion of the domestic fishery, the original FMP prohibited foreign longline fishing in the following areas of the EEZ: within 150 nm of Guam and the main Hawaiian Islands, 100 nm of the Northwestern Hawaiian Islands and 12 nm of US Pacific island possessions except for Midway Island; and within a rectangle around the principal islands of American Samoa bounded by 14E and 15E S and 168E and 171E W, and in a one degree square surrounding Swain's Island bounded by 10E 33' and 11E 33' S and 170E 34' W and 171E 34" W.

In 1991, the Council established a domestic longline vessel exclusion zone around the main Hawaiian Islands ranging from 50 to 75 nm and a similar 50-nm exclusion zone around Guam and its offshore banks. These area closures are intended to prevent gear conflicts and vessel safety issues arising from interactions between domestic longliners and smaller fishing boats using troll and handline gear. The implementation of the closed areas in Hawaii was generated by the rapid expansion of the Hawaii longline fleet in the late 1980s. The fleet increased from 37 vessels in 1987 to 75 in 1989, and then doubled again to 156 vessels in 1991. Many of these new longline vessels were recent arrivals from the continental US. In addition to straining harbor facilities, the increased fishing effort led to gear conflicts and precipitated heated confrontations between the longliners and the established local fishing fleet. There was also concern by small boat fishermen that the local availability of certain pelagic species to part-time commercial and recreational participants in the fishery were being negatively impacted upon by the longline boats. These fishermen argued that this impact would increase if swordfish catches declined and the longliners increasingly targeted tuna.[1]

Although reports of local depletion of pelagic fishery resources by the newcomers were unsupported by hard evidence, the Council faced a situation which required management measures to be taken in order to resolve sensitive social issues. One of the factors that was weighted heavily was protection of small boat fishermen who have traditionally relied on the pelagic fishery to supplement basic incomes. Without this supplement, many of these fishermen would face economic hardships in Hawaii's expensive economic climate. After many meetings with representatives of all sectors of the fishing industry, the Council developed a series of time and space restrictions which controlled longline fishing operations within the EEZ. Certain small longline vessels are exempted from the area restriction and all longliners are allowed in otherwise closed areas when bigeye tuna are seasonally closer to shore and small boat activity is relatively low.

In most cases these measures effectively separated the longline and small boat fishermen, as the small vessels generally do not venture beyond 20 nm from the coast. However, during the past few years, a group of longtime island residents have developed a small boat handline fishery on a seamount located 150 nm offshore. A gear conflict developed in 1996 when a group of longline vessels, most of which were owned by recent US immigrants, began fishing for tuna on the seamount as a result of a decline in swordfish catches. Towards the end of 1997, small vessel fishermen called for a longline exclusion area around the seamount, comparable to the zone around the main Hawaiian Islands. The problem resolved itself temporarily due to poor fishing conditions on the seamount in 1997, but the potential for conflict still exists.

4.1.3.2 Potential environmental influences

Environmental variables may have a considerable influence the abundance and condition of pelagic fish stocks. The three tropical tunas, skipjack, yellowfin and bigeye, and billfish such as blue and striped marlin prefer waters ranging in temperature from 18-31E C, whereas subtropical fish such as albacore and swordfish prefer cooler waters ranging from 10-25E C. Abundance of these tropical and sub-tropical stocks is predicated on the abundance of prey items which in turn may be the result of a physical structure such as a seamount, or an oceanographic feature such as a frontal system where two different water masses converge.

The largest and strongest environmental influence on pelagic stocks in the western Pacific are *El Niño*-Southern Oscillation (ENSO) events (negative values of the Southern Oscillation Index[2]). ENSO events are associated with a weakening of the prevalent easterly trade winds in the tropical Pacific and an eastward shift of the western Pacific warm pool, the warm water mass that lies between New Guinea and the Micronesian islands.

Lehodey et al. (1997) note the presence of a permanent convergence of surface-layer water masses at the eastern edge of the western Pacific warm pool. This convergence zone is identified by a well marked salinity front induced by westward advection of cold, saline water from the central-eastern equatorial Pacific encountering a sporadic eastward advection of warm, low-salinity water from the western equatorial Pacific. Convergence zones and fronts are important mechanisms for aggregating plankton and micro-nekton, which, in turn, draw larger predators such as tuna.

The eastward displacement of the warm pool during an ENSO event results in a greater abundance of skipjack and yellowfin tuna in the central Pacific (SPC 1997; Lehodey et al. 1997). Further, ENSO events appear to have a negative impact on recruitment of South Pacific albacore, with poor recruitment following albacore spawning during an ENSO event, and good recruitment following spawnings during *La Niña* periods when the Southern Oscillation Index is strongly positive (SPC 1997).

4.2 Description of fishing activities affecting the stock(s) comprising the management unit

4.2.1 History of exploitation

4.2.1.1 Local small-scale fishery

For hundreds of years prior to Western contact, and up until the 1950s on the island of Tutuila, and even into the 1970s in the Manu'a Islands, the indigenous residents of these islands pursued skipjack tuna in offshore waters using specialized canoes and gear (Severance and Franco 1989). Other tunas, billfish, wahoo and mahimahi were occasionally caught with baited lines and trolling gear. When the canoes returned from fishing, villagers participated in culturally important ceremonial exchanges involving fish, *kava* and other items.

The advent of outboard motors in the 1950s and 1960s meant that the traditional fishing methods declined in favor of the use of motorized dinghies and skiffs for trolling and handlining. The development of offshore artisanal fisheries began in earnest during the early 1980s. It was at this time that the FAO-designed *alia* catamaran was introduced into the islands. The number of vessels participating in commercial pelagic and bottomfish fisheries quadrupled between 1980 and 1985. Almost all of the commercial catch of pelagic species was taken by trolling since there were only a few handline vessels and a single 50 ft longliner which targeted albacore and sold its catch to the tuna canneries. Most of the pelagic fishing occurred in coastal waters, near seamounts, where seabird flocks are feeding (thus indicating the presence of baitfish that tuna may also be feeding upon), or at fish aggregating devices (FADs) deployed around Tutuila Island. FADs were introduced to American Samoan coastal waters in 1979 and proved to be a popular way to increase the CPUE of widely dispersed pelagic fish (Craig et al. 1993). FADs attract and retain schools of fish and make it easier for vessels to locate concentrations of tuna.

The use of longline gear by the artisanal fleet in American Samoa is a recent phenomenon, with longline catches rising from zero prior to 1994 to almost 800,000 lbs in 1997. The stimulus for fishermen, who generally used only troll gear or handlines, to shift to longline gear was the fishing success experienced by small longline vessels in Western Samoa. The artisanal longline fleet in American Samoa presently consists mainly of 28-32 ft *alia* catamarans, although at least one larger (39 ft) *alia* has been locally constructed and outfitted for longline fishing. The vessels deploy a short monofilament longline with 200-300 hooks from a hand-powered reel. The longlines harvest mainly albacore tuna, which are sold to the local tuna canneries. The use of longline gear requires the

acquisition of a federal permit from the NMFS Pacific Islands Area Office, but there no restrictions on the number of permits issued. To date, 38 permits have been issued, although only about 17 vessels are active on a regular basis.

Tournament fishing for pelagic species began in the Territory in the 1980s. Most of the boats that participate are *alia* catamarans and small skiffs. Catches from tournaments are 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 55 to 70 fishermen participate in each tournament, which are held 2 to 5 times per year (Craig et al. 1993).

4.2.1.2 Large-scale distant water fishery

Large-scale commercial longline fishing in what is now the EEZ around American Samoa was initiated by Japanese vessels in the late 1940s. These foreign vessels later supplied tuna to the two canneries established in the Territory by Van Camp Seafood Company and Star-Kist Foods in 1954 and 1963, respectively. From 1950 to 1965 there was a progressive expansion of the area of operations of the longliners from the waters in the immediate vicinity of American Samoa, to more distant waters (Otsu and Sumida 1968; Yoshida 1975). The expansion of fishing area paralleled an increase in fleet size. Between 1954 and 1965 the number of foreign longline vessels off-loading in Pago Pago rose from less than 20 to over 150. In the mid-1960s, the Japanese vessels began to be replaced by Taiwanese and Korean longline vessels as the canneries' major suppliers of albacore. In recent years, the number of foreign longline vessels delivering fish to the canneries has sharply declined, and, presently, only about 40 vessels are based in the Territory. A typical Asian longline vessel is 80-150 ft in length and may set 50-60 nm of mainline with 1,500-2,000 hooks each day (WPFMC 1995).

Legal fishing by foreign longline vessels in the waters around American Samoa ceased completely in 1980 after the implementation of the pelagic fisheries Preliminary Management Plan for the Western Pacific region,[3] which placed onerous requirements (e.g., permits, fees, observers) on foreign vessels. However, foreign longline vessels occasionally fish illegally in the EEZ around American Samoa. The last incursion documented by the Coast Guard occurred in 1992 and involved a Taiwanese longline vessel fishing near Swain's Island. There is a possibility that legal fishing in the EEZ by foreign vessels may resume under a Pacific Insular Area Fishing Agreement (PIAFA). This agreement would give foreign vessels access to EEZ waters around American Samoa in exchange for a negotiated fee and subject to a variety of permit conditions.

As discussed above, the domestic longline fleet based in American Samoa has generally consisted of small vessels. However, during the 1980s one of the largest longliners operating out of Pago Pago was locally-owned. This vessel has since been scrapped. By 1997, four vessels ranging in length from 65 to 109 ft had located in the Territory and received NMFS longline fishing permits.

US purse seine vessels began exploratory fishing in the central and western Pacific in the late 1970s. The rapid expansion of the fleet during the 1980s coincided with an increase in the volume of skipjack and yellowfin tuna landed at the canneries in American Samoa. The purse seiners commonly measure 200-250 ft in length and are equipped with sophisticated "fish-finding" equipment, including helicopters. The purse seine nets typically capture 15-45 metric tons of fish in a single set (WPFMC 1995). Most of the fishing activity by these vessels occurs in the EEZ waters of Papua New Guinea, Federated States of Micronesia and other Pacific island nations far to the west of American Samoa. However, during an ENSO event these vessels may shift their fishing activity to areas in the central Pacific (Section 4.1.3.2), including the upper portion of the EEZ around American Samoa. At present, about 30 purse seiners supply fish to the Pago Pago canneries.

The South Pacific albacore fishery, which began in 1986, operates from December through early April, with 20-30 US vessels joining an international fleet (WPFMC 1995). This high seas fishery operates on dense concentrations of albacore that form along the sub-tropical convergence zone that lies 35-47E S and 170-130E W. Vessels are generally 60-80 ft in length, operating with crews of 3-5, and capable of freezing 45-90 tons of fish.

4.2.2 Domestic Activities

4.2.2.1. Vessel characteristics and fleet composition

The artisanal and recreational fishing sector consists of approximately 50 boats. Typically, the boats are double- or single-hulled vessels equipped with outboard engines. Average boat length is 28 ft (Severance et al. 1998). In addition to carrying troll and longline gear to catch pelagic species, many boats are outfitted with wooden handreels that are used for bottomfish fishing as well as for trolling.

The technology employed by the artisanal fleet is relatively unsophisticated. Ten percent or less of the boats carry a depth finder, fish finder or global positioning system (Severance et al. 1998). The small vessels equipped for longline fishing store their gear on deck on a hand-powered reel, which can hold as much as 10 nm of monofilament mainline. Typically, the longlines are 3 to 5 nm in length. An average of 214 hooks per vessel per fishing day are set. Most boats leave for the fishing grounds in the early morning and return in the afternoon or early evening. The boats fish up to 25 nm from shore, but effort is mainly concentrated on banks 5 to 10 nm off the southern coast of Tutuila.

Less information is available concerning the locations of troll fishing by the artisanal fleet. Moana (1988) states that trolling is commonly conducted on FADs and seamounts between 3-6 nm from Tutuila. However, he notes that small boats are increasingly traveling to distant offshore banks and seamounts such as South Bank, located about 45 nm from Tutuila. This trend has also been observed by more recent researchers in American Samoa (personal communications Paul Bartram, Akala Products, Inc., Honolulu, Hawaii and Craig Severance, University of Hawaii, Hilo, Hawaii).

The four large domestic longline vessels now based in Pago Pago are similar in length (65-109 ft) to domestic Hawaii-based longline vessels and are outfitted with modern electronic equipment for navigation, communications and locating fish.

Descriptions of the domestic purse seine vessels and albacore trollers that supply American Samoa's two tuna canneries with fish are provided in Section 4.2.1.2.

4.2.2.2 Effort levels

Between 1992 and 1996, there has been a marked increase in the number of small vessels landing PMUS in American Samoa, although the number is still below the level that existed prior to the 1987 hurricane that damaged or destroyed a large segment of the fleet (Figure 4.3). The level of trolling fishing effort rose markedly between 1993 and 1995 but declined in 1996 (Figure 4.4). The decline in trolling effort coincided with a shift in gear types by small boat fishermen from trolling to longlining.

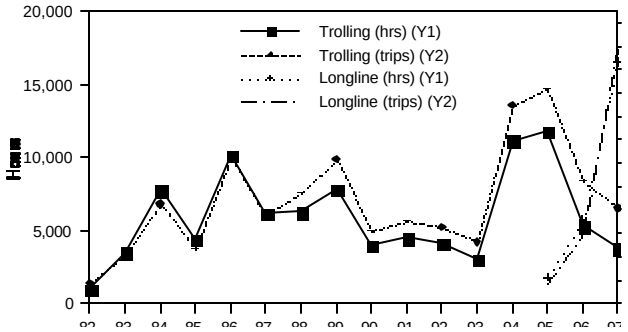

Figure 4.4. Fishing effort for PMUS in American Samoa pelagic fishery

4.2.2.3 Landings

Total landings of PMUS by the small boat fleet have fluctuated widely due to the effects of hurricanes, entry and exit of highliners and annual variations in fishing effort (Figure 4.5). Catches increased in volume after 1993, initially as a result of an increase in trolling activity and later because of the widespread adoption of longline gear. Harvests of PMUS and other pelagic species doubled between 1996 and 1997. This increase is largely due to increases in the catches of small boats using longline gear. In 1997, the catches of three large domestic longline vessels based in American Samoa accounted for about 16 percent of the total number of pelagic fish caught with longline gear.

Most of the longline landings are albacore, with yellowfin tuna, bigeye tuna, blue marlin, mahi mahi and wahoo

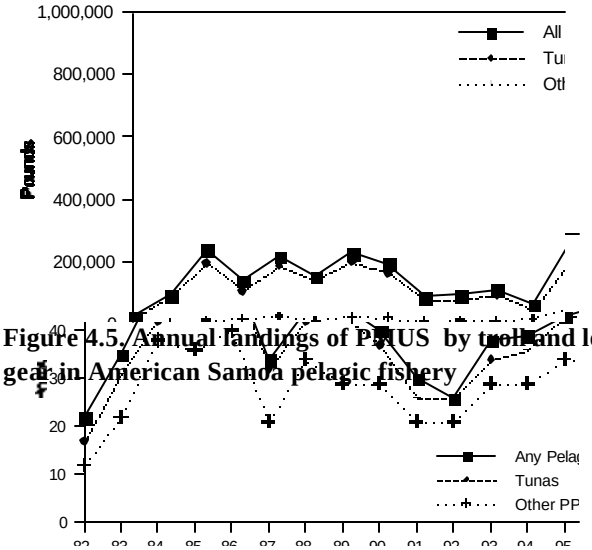

Figure 4.5. Annual landings of PMUS by troll and longline gear in American Samoa pelagic fishery

Figure 4.3. Number of boats landing PMUS in American Samoa pelagic fishery

Figure 4.6. Composition of longline and troll catches in American Samoa pelagic fishery

making up most of the remainder of the catch. In the EEZ around American Samoa albacore is rarely taken by trolling, as it is confined to deeper epipelagic waters at that latitude. The dominant species in the troll catch are skipjack and yellowfin tuna, with smaller but significant quantities of mahi-mahi, blue marlin, wahoo and dogtooth tuna (Figure 4.6).

Domestic purse seine vessels operating in the central and western Pacific are not required to report catches made in the US EEZ. However, these boats often do so, using report forms provided under the Treaty on Fisheries (Section 3.5.7). According to these reports, six US purse seine vessels made seven sets within the EEZ around American Samoa between 1988 and 1997. The total catch from these sets was 46 metric tons of skipjack tuna. Four of these seven sets were made in 1994 by three vessels. All seven sets were made by vessels that recorded “searching” while

transiting the EEZ around the Territory. There is no information available on domestic purse seine catches in the EEZ around American Samoa prior to 1988.

4.3 Description of economic characteristics

4.3.1 Harvesting sector

The economic performance of the small boat fleet has improved dramatically in recent years. Despite a slight decrease in the price of tuna and other PMUS, revenues from harvests of PMUS and other pelagic species doubled between 1996 and 1997 (Figure 4.7). The increased catches are largely due to the adoption of longline gear by small boats.

Table 4.5 provides estimates of average gross and net revenue and fixed and vaiable costs for small boats using longline gear. Estimates of operating costs are based on a 1997 NMFS survey of *alia* vessels in American Samoa, and capital costs were estimated using information provided by Chapman (1998). Average trip revenues are derived from estimates of current effort, catch rates and average ex-vessel prices reported in WPFMC (1998).

It is estimated that in 1997 the average *alia* catamaran equipped with longline gear earned a net revenue (before labor costs and taxes) of about $15,000. Factors such as experience and skill level impact directly both revenues and costs, and there is undoubtedly a high variability across boats in the values of parameters. The cost-earnings analysis did not include a labor cost or identify how expenses, revenues and profits are shared among crew, captain and owner. Some owners pay each crew member a flat salary, while others pay the crew a percentage of the revenues after certain expenses have been deducted.

Catch composition and marketing strategy have a major influence on vessel earnings in American Samoa where local fresh fish markets and cannery tuna markets operate with different price structures. The most lucrative tuna fishing operations in the Pacific islands at present are those producing high-grade, fresh tuna. The ex-vessel price for

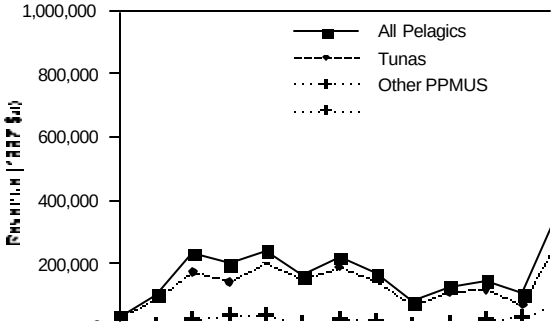

Figure 4.7. Annual inflation-adjusted revenue from harvests of PMUS and other pelagic species in American Samoa pelagic fishery

premium-quality fresh fish is as high as $4.75 per pound in American Samoa as compared to the $1.06 per pound that the canneries pay. There is interest among many American Samoans in producing fish for this market, but limited on-board capacity for properly handling and storing fish, inadequate shore-side cold storage facilities and infrequent air transportation links are restrictive factors. If such constraints can be overcome, the profitability of artisanal fishing operations would increase substantially (Section 4.3.2).

4.3.2 Business and markets

Most of the albacore tuna landed by the artisanal fishery are sold to industrial processing plants, while the other PMUS are sold fresh or fresh on ice in local markets. The development of a cottage export industry would expand market channels. However, a main limitation for fish exports is the shortage of cold storage and freezing facilities. This is a major hinderance because of the difficulty of storing the fish until it can be transported by the infrequent air links to Hawaii or other large export markets. A second constraint is the lack of proper post-harvest handling and processing techniques that are essential for developing export markets. On-board post-harvest handling is generally poor due to the inability of the 28 ft *alia* catamarans to carry adequate quantities of ice. Local fishermen are

interested in acquiring larger boats that have a greater fishing range and chilling capacity. For example, a 39 ft *alia* catamaran has recently been constructed in Pago Pago that can carry sufficient ice to maintain good fish quality.[4]

As noted above, the recent adoption of longline gear by the small boat fleet has opened up a new lucrative fishery for large yellowfin, bigeye and albacore tuna. The increased harvests of these species has stimulated local entrepreneurial activity in fishing-related businesses, including boat-builders, ice and cold storage facilities, marine supplies and fish brokerages. If the constraints outlined above can be overcome, economic returns and export earnings within the fishing industry in American Samoa can be improved.

Table 4.5. Average gross and net revenue (before labor costs and taxes) and fixed and variable costs for a 28 ft *alia* catamaran using longline gear in American Samoa pelagic fishery

Annual Revenue

Number of fishing trips per year: 100 (average trip length is 7.6 hrs)

Number of hooks set per trip: 214

Catch per trip (lbs): Tuna - 300; Other PMUS - 50; Misc. fish - 5

Price per pound ($): Tuna - 1.06; Other PMUS - 1.40; Misc. fish - 1.44

Total Revenue $39,520

Required Capital

Vessel [1]	13,000
Engine	7,000
Fishing gear (longline)	3,000
Radio	200
Safety	1,000
Total Required Capital	24,200

Fixed Costs		**Variable Costs**	
Debt service [2]	3,748	Fuel and oil	3,350
Insurance (5%)	1,210	Provisions	2,400
Maintenance and repair	1,500	Bait	10,300
Depreciation [3]	2,057		
Miscellaneous (permit, etc.)	35		
Subtotal	8,550	Subtotal	16,050

Total Costs $24,600

Net Revenue $14,920

[1] 28-ft *alia* catamaran constructed in American Samoa or Western Samoa

[2] Debt service assumed to occur over a 10-year period, 15% annual interest and with a 20% down payment

[3] Depreciation calculated on a straight line, 15% salvage basis, assuming a vessel life span of 10 years

The Council is currently assisting local fishermen and the Territorial government in identifying and implementing appropriate projects to increase production efficiency (while protecting the natural resource base) and develop new product markets. One source of funding for such projects will be the Western Pacific Fishery Demonstration Projects. This grants program was included in the Magnuson-Stevens Act to address concerns that communities consisting of descendants of indigenous peoples in the Council's area have not been appropriately sharing in the benefits from the region's fisheries. The Act authorizes the Secretary of Commerce and the Secretary of the Interior to make direct grants to "Western Pacific communities," as defined in section 305(i)(2)(A), for the purpose of establishing demonstration projects to foster and promote the involvement of eligible communities in the fisheries of the region.

4.4 Description of the socioeconomic aspects of the commercial, recreational and subsistence domestic fishing industries and communities

American Samoa is an unincorporated Territory of the US consisting of the islands of Tutuila, Swain's and the Manu'a group (Ofu, Olosega and Ta'u) and Rose Atoll. The total land area is 77 square miles. The Territory's population is about 60,000 and is growing rapidly, with a doubling time of only 20 years. Most of the islands are mountainous with limited flat land suitable for agriculture. The two major employers are the tuna processing industry and the Territorial government, which employ 33 percent and 31 percent of the labor force, respectively. For many years the tuna canneries have been the largest private-sector employers in American Samoa and its leading exporters. However, the majority of cannery employees are alien workers from Western Samoa (Schug and Galea'i 1987).[5] The single largest employer of American Samoans is the Territorial government, which is facing mounting debts and a major budget deficit. In recent years, Federal financial assistance to the government has declined. Consequently, the number of jobs available in the Territorial government is decreasing (Department of Commerce 1998). The shortage of jobs has led to heavy out-migration of American Samoans to the United States.

Like most other Pacific islands, American Samoa views pelagic fish stocks as a resource which is not yet fully exploited, and the pelagic fishing industry is actively promoted by the government as a growth industry. Stocks of pelagic species offer far greater resource potential than deep-slope bottomfish or inshore fish stocks. Inshore resources are heavily exploited or over-exploited in most areas of American Samoa (Wass 1980; Saucerman 1995). The exploitation of the slow growing, deep-water snappers in American Samoa is limited by the low standing stock of the resource (Itano 1996).

Developing tuna harvesting and marketing capability sufficient to support substantial participation in pelagic fisheries will expand and diversify the local economy and help the Territory attain a higher level of economic self-sufficiency. Government projects such as the deployment of FADs have contributed significantly to increased production in these fisheries. However, the development of the local fish harvesting sector has been constrained by a shortage of private capital and, to some extent, by the economic preferences and social values of local fishermen. The median household income in the Territory is $16,114, and 56 percent of families have incomes below the federal poverty level (Department of Commerce 1998). Most residents interested in commercial fishing do not have sufficient financial resources to invest in specialized, capital intensive vessels that consume large amounts of fuel to pursue and harvest fish. In addition, most, if not all of the fishermen in American Samoa do not rely on the sale of their catch as their only means of income. According to a recent survey, 65 percent of local fishermen are employed at another job (Severance et al. 1998). Furthermore, all Samoans have undeniable commitments to their families, villages, church, elders and chiefs that take them away from their regular employment a great deal of the time (Itano 1996). Undertaking fishing on a part-time basis, rather than as a full-time business, provides local residents with the flexibility to fulfill these kinship and community obligations that are an essential element of Samoan culture.

Over the past three decades, American Samoa has experienced several fishery development programs aimed at the creation of sustainable, economically viable artisanal fishing enterprises (Itano 1996). In general, local fishermen have demonstrated a willingness to adopt new types of fishing gear and methods that have increased catching power and efficiency. A suitable style of boat is now in use and an appropriate harvesting technology has been adopted (Itano 1996). The outboard powered vessels that fishermen favor are easily built and maintained and capable of harvesting multiple target species utilizing a variety of gear types.[6] According to an early report on fisheries development in the American Pacific islands, this flexibility is essential in establishing commercially-viable fisheries in the region (PBDC 1984). Futhermore, the technologies and patterns of fishing that have evolved over the years are culturally acceptable as well as economically reasonable for local artisanal fishermen.

4.6 Description of social and cultural framework of domestic commercial, recreational and subsistence fishermen and their communities

For hundreds, if not thousands, of years fisheries have been of considerable economic and social importance to the people of what is today American Samoa. The narrow shelf around the main islands of American Samoa and the lack of shallow productive lagoon waters has meant that fishing offshore for pelagic fish has been particularly important. Severance and Franco (1989) and Severeance et al. (1998) documented the traditional importance of fishing for large pelagics, particularly skipjack tuna, and the technology and skills developed by Samoans to catch these fish. This included special canoes (*va'a alo*) designed for lightness and speed which could follow tuna schools,

and tuna hooks made from mother-of-pearl and turtle shell. In the past, fishermen in canoes might fish as far as 30 miles from shore when following tuna schools. Other tunas, billfish, wahoo and mahimahi were occasionally caught with baited lines and trolling gear.

The methods and equipment for catching skipjack and other pelagic species have changed, and island residents no longer depend on their catches for food. However, seafood continues to be an integral part of the local diet. There has been no recent attempt to formally assess the subsistence fishing contribution to the American Samoa economy,[7] but subsistence fishing is known to be an important supplement to cash income in many communities (Severance et al. 1998).

In addition, fishing continues to contribute to the integrity of Samoan culture which is organized around a complex web of family, kinship and village expectations and obligations. Participation in commercial activities, wage labor and a cash economy has not weakened these expectations so much as it has allowed new opportunities for customary exchange of goods and services, both formally and informally, through kinship and friendship networks. Individual Samoans participate as members of extended families or *aiga* that share resources and responsibilities. Each *aiga* is headed by a titled "chief" or *matai* who is the decision-maker and spokes-person for the family in many matters of village life. Untitled men and women of the village have many obligations for service and are expected to contribute goods (including fish), cash and labor to important village ceremonies ranging from holidays to weddings and title investitures.

These customary gifts and exchanges influence a significant portion of fishing effort, and even commercial fishermen are expected to fish when village ceremonies are pending and to be generous in sharing their catch. Some keep fish in freezers with the expectation that they may be called upon by their *matai* or by higher ranking chiefs of their village or district to provide fish for cultural purposes. While reef fish and bottomfish are acceptable offerings, yellowfin and skipjack tuna are preferred. At times, tuna are ceremonially cut up for formal presentation to the *matai* and village pastor (Severance and Franco 1989).

Severance et al. (1998) recently conducted a survey of fishermen in American Samoa who fish for pelagic species. The 60 fishermen interviewed represent about 50% of the total active fishermen in the Territory. Thirty-five percent of the fishermen surveyed reported that they sell less than half of their catch. Forty percent of these fishermen also reported that half or more of the catch that they sold was done so as *fa'ataulofa*, that is, sold at a reduced price to friends or kinsmen as an expression of a sustained social relationship.

The survey examined the cultural importance of the distribution of the unsold portion of the catch. The average number of times during the past year that individual fishermen contributed fish to sunday village meetings was 22. Nineteen percent of the fishermen surveyed reported that half or more of their catch was contributed to a *matai* as a form of *tautua*, that is, service to the kin group. This service is expected of untitled men if they are to rise in status and perhaps achieve a *matai* title themselves. Twenty-five percent of the fishermen surveyed already hold *matai* titles, but they may be obligated to contribute fish to the village pastor or to a higher-ranked individual. Another form of obligatory contribution takes the form of assistance to kinsmen in times of need known as *fa'alavelave*. Forty-two percent of the fishermen surveyed reported contributing fish as *fa'alavelave* three or more times during the past year. A more individualized way of assisting kinsmen is referred to as *fesoasoani*. Thirty-two percent of the fishermen stated that half or more of the unsold portion of their catch was offerred as *fesoasoani*.

In summary, despite increasing commercialization of the catch, fishing continues to contribute to the cultural integrity and social cohesion of American Samoa communities. Over time, local communities developed a close emotional as well as utilitarian association with the marine environment. It shaped their social organization, cultural values and religion. Of course, many aspects of Samoan culture have changed; but fishing remains an important cultural practice for many communities. These sociocultural attributes of fishing are at least as important as the contributions made to the nutritional or economic well-being of island residents.

5.0 Other applicable laws

5.1 Environmental Assessment

The Environmental Assessment (EA) has been prepared to complement the management measure. The context of the EA is summarized and contained in the management measure with appropriate sections being incorporated in the EA by reference. This is intended to minimize the risk of information or conclusions being taken out of context or misunderstanding due to slight variations in language or format.

a) The management measure is expected to support the long-term productivity of pelagic stocks by limiting the rate of increase of total fishing effort (Section 3.6).

b) The management measure will have no adverse impact on ocean and coastal habitats.

c) The management measure is not expected to have any impact on public health or safety (Section 3.5.4).

d) The management measure will not directly affect any endangered or threatened species.

e) The management measure will not result in cumulative, long-term, adverse impacts that could substantially affect pelagic species.

f) The management measure may generate controversy in that it will prohibit the taking of pelagic species by vessels larger than 50 ft from waters within an area that is approximately 100-nm of the baselines of the islands American Samoa. However, the Council considers the management action to be fair and equitable, as the total potential benefits that the small boat fleet in American Samoa may receive from an area closure outweigh the potential hardship that may be imposed on those large vessels excluded (Section 3.6).

g) The management measure will not have any effect upon flood plains or wetlands, nor upon any trails and rivers listed, or eligible for listing, on the National Trails and Nationwide Inventory of Rivers.

5.1.1 Conclusions and determinations

Based on the information contained in this combined amendment and EA, it is concluded that the preferred management measure will not have a significant effect on the human environment. Therefore, the preparation of an environmental impact statement is not required.

5.2 Paperwork Reduction Act

The Paperwork Reduction Act requires federal agencies to minimize paperwork and reporting burdens whenever collecting information form the public. No additional record-keeping and reporting requirements are necessary to implement the management measure.

5.3 Coastal Zone Management

Section 307(c)(1) of the Federal Coastal Zone Management Act of 1972 requires all Federal activities which directly affect the coastal zone be consistent with approved state coastal zone management programs to the maximum extent practicable.

5.4 Endangered Species Act

The management measure is not likely to have any effect on any listed endangered or threatened species, or habitat of those species.

5.5 Marine Mammal Protection Act

All fisheries in the Western Pacific region are designated as Category 3, meaning that fishermen must report interactions with marine mammals, but they are not required to obtain exemption certificates in order to fish. This management measure does not require a MMPA category redesignation.

5.6 Regulatory Flexibility Act

Preparation of a RFA analysis is necessary to satisfy the rquirements of the Regulatory Flexibility Act whenever publication of a proposed rulemaking is required and the proposed action is likely to have a significant economic impact on a substantial number of small entities. NMFS considers economic impacts on small entities as "significant" under the RFA if the proposed action would result in 1) a reduction in annual gross revenues of more than 5 percent, for 20 percent or more of the affected small entities; 2) an increase in total costs of production or more than 5 percent as a result of an increase in compliance costs, for 20 percent or more of the affected small entities; 3) compliance costs as a percent of sales for small entities that are at least 10 percent higher than compliance costs as a percent of sales for large entities, for 20 percent or more of the affected small entities; 4) capital costs of compliance represent a significant portion of capital available to small entities, considering internal cash flow and external financing capabilities; or 4) two percent of the small business entities affected being forced to cease business operations.

5.6.1 Problem statement

The problems to be resolved are described in Section 2.1 of this document.

5.6.2 Management objectives

The objectives of the FMP relevant to the preferred management measure are described in Section 2.3 of this document.

5.6.3 Description of small entities

A description of the small entities to which the preferred management measure will apply is provided in Section 4.2.2.1 and 4.2.2.1 of this document. Most of the purse seine vessels based in American Samoa have annual receipts in access of $3,000,0000, and, therefore, are not small businesses.

5.6.4 Compliance requirements

Small entities will not be subject to any new reporting or recordkeeping requirements by the preferred management measure.

5.6.5 Analysis of economic impacts on small entities

The preferred managment meaure should have a beneficial effect on small-scale commercial fishing enterprises in American Samoa. By limiting the risk of interceptions of pelagic management unit species (PMUS) in the EEZ, a closed area will maximize the potential for increased small boat catches and increased artisanal, subsistence and recreational fishing values in the Territory. To the extent that a closed area maximizes the potential for increased small boat catches, a 100-nm are closure would be expected to have a more beneficial effect than a 50-nm area closure.

The negative effect on the domestic purse seine or albacore troll fleets should be negligible. Almost all of the fishing activity of these vessels occurs outside the EEZ around American Samoa (Section 4.3.1.2). Consequently, the total catches and revenues of these vessels could be maintained if effort is directed beyond the area closure.

The preferred management measure could impose an economic hardship on large domestic longline vessels that are currently based in American Samoa, as all of the fishing activity of these boats inside the US EEZ has occurred within 100-nm of the shoreline of Tutuila. Therefore, any vessel that is greater than 50 ft in length and holds a NMFS longline permit on or prior to November 13, 1997 and made a landing of pelagic management unit species in American Samoa on or prior to that date is exempt from the prohibition to take PMUS within the closed area.

Other large vessels, including a number of purse seiners, have also fished for pelagic species within 100 nm of the islands of American Samoa. However, the Council did not consider it appropriate to grant these vessels exemptions, as the amount of fish caught by the vessels within the 100-nm area has historically been a negligible fraction of their total catch.

A closed area could potentially result in lost fishing opportunities for large longline vessels currently based in Hawaii or the continental US. However, given the lack of information on the probability that these vessels will relocate in American Samoa, any attempt to estimate the costs associated with these lost fishing opportunities would be inconclusive. To the extent that a closed area will result in lost fishing opportunities for these longline boats, a 50-nm are closure would be expected to have a less adverse effect than a 100-nm area closure.

The preferred management measure may discourage residents of American Samoa from purchasing or constructing additional large longline vessels. Such vessels may be profitable investments; a larger vessel is faster than a small one, has a greater fishing range and can fish year round. However, in American Samoa there is a shortage of private sector capital to purchase large fishing vessels and an excess of labor. In these circumstances it is likely that American Samoans can benefit more from local ownership of less-expensive boats that provide greater employment opportunities. A cost-earnings analysis provided in Section 4.3.1 of this document indicates that a fishing enterprise using a typical 28 ft *alia* catamaran is a viable economic alternative for American Samoa. This data, coupled with estimates of local per capita income, suggest that the capital investment required to enter the fishery is within the financial reach of the typical American Samoan household.

In summary, the Council concluded that limiting the risk of interceptions of PMUS in the EEZ by establishing a 100-nm closed area will maximize the potential for increased small boat catches and increased artisanal, subsistence and recreational fishing values in the Territory without significantly decreasing the catches of larger vessels targeting pelagic fish. The total potential benefits that the small boat fleet in American Samoa may receive from an area closure may be substantial while the potential costs that may be imposed on those large vessels excluded are likely to be low.

The Council recognizes that as information on the economic and social impact of the area closure becomes available, modification of the closure may be desirable. A comprehensive evaluation of the effectiveness and impacts of the closed area will be made each year after implementation of this management measure. During the evaluation the views and opinions of representatives of all sectors of the fishing industry in American Samoa will be solicited.

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[2]Western Samoa's EEZ is about 40 percent of the size of the US EEZ around American Samoa.

[3]The complete name is Treaty on Fisheries Between the Governments of Certain Pacific Island States and the Government of the United States of America.

[1] In recent years, a shift in the direction of fishing effort of Hawaii-based longliners towards tuna has, in fact, occurred (WPFMC 1998).

[2] The Southern Oscillation Index is the difference between the barometric pressure recorded in Northern Australia and French Polynesia. Normally, the pressure differential leads to prevailing easterly trade winds. During an *El Niño* the pressure gradient reverses, the trade winds fail and warm ocean water in the western Pacific spreads eastwards into the central and eastern Pacific (Philander 1983).

[3] The PMP was superceded by the Council's Pelagic Fisheries Management Plan in 1986.

[4]Western Samoa has recently submitted a request to FAO to design a larger *alia*. The new design would also be available to boat-builders in American Samoa

[5]About 50 percent of the entire workforce in American Samoa was born in Western Samoa or Tonga (Department of Commerce 1998), where wages are considerably lower than in American Samoa. For example, the minimum wage in Western Samoa is approximately US$0.46 per hour, as compared to $2.45-3.87 in American Samoa..

[6]Since 1981, boat builders in American Samoa have been constructing plywood and fiberglass *alia* catamarans for the local fishing industry (Itano 1996).

[7] Wass (1980) reported that annual per capita consumption of seafood in American Samoa is 148 lbs, which is several times higher than the US national average.