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

Establishment of Purse Seine Prohibited Areas in the Mariana Archipelago

Including an Environmental Assessment, Regulatory Impact Review, and Preliminary Regulatory Flexibility Act Analysis

May 15, 2011

Western Pacific Regional Fishery Management Council
1164 Bishop St. Suite 1400
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Environmental Assessment Summary
For

Establishment of Purse Seine Prohibited Areas in the Mariana Archipelago

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

February 2011

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Project No.: RIN 0648-AW67

Abstract

Amendment X to the Pelagics Fishery Ecosystem Plan was recommended by the Western Pacific Fishery Management Council (Council) and would provide for the establishment of a purse seine fishing prohibited areas in the U.S. EEZ around the CNMI and Guam. The Council recommendations would promote sustained participation in fishing by the Guam and CNMI fishing communities which are made up almost exclusively of small vessel trollers that have a strong cultural and economic dependence on inshore pelagic catches.

Although no purse seine catches have been reported from within the EEZ waters around either Guam or CNMI in recent years, the Council is proposing to prevent purse seine fishing catches around the CNMI and Guam to minimize gear conflicts and catch competition among fishery sectors, while addressing potential unsustainable catches of undersized bigeye tuna. This would have an added benefit of potentially reducing catch competition for skipjack tuna, which the troll fishery targets.

Amendment X includes an environmental assessment (EA) that was prepared by the Council in close coordination with NMFS. The proposed action would result in a geographic separation of some fishing fleets. None of the proposed alternatives for the proposed fishing prohibited areas were found to result in a large change to troll or purse seine fishing including the number of vessels used in the fishery, where the vessels fish, the time of year they fish, or gear used. There is currently no purse seine fishing occurring in the U.S. EEZ around the Mariana Islands and purse seiners would continue to fish in other areas. Because there would not be any large changes to fishing operations as a result of implementing prohibited fishing areas, none of the alternatives would result in overfishing of target, non-target, bycatch stocks or new impacts to protected species or ocean habitats.

NMFS is seeking public comments on Amendment 2 and on the analysis of potential environmental impacts of the proposed prohibited areas. The proposed rule and instructions on how to comment on the document, and how to obtain copies of the EA can be found by searching on RIN 0648-AW67 at www.regulations.gov; or by contacting the responsible official at the above address.

1.0 Executive Summary

The Western Pacific Fishery Management Council (Council) prepared this amendment to the Fishery Ecosystem Plan for Pelagic Fisheries of the Western Pacific Region (Pelagic FEP) to balance the needs of the small and locally-based pelagic fishing fleets of the Mariana Archipelago while minimizing localized depletion[1] and catch competition between U.S. purse seine vessels and other pelagic fishing fleets operating in the U.S. EEZ around the CNMI and Guam.

The troll fleet is the main small-scale pelagic fishery in the Mariana Islands and was estimated to consist of over 430 vessels in 2008. It is of historic, cultural, and economic importance to the people of the Mariana Islands. The troll fleet mainly targets skipjack and yellowfin tuna within 30 nm of shore among the offshore banks and seamounts that tend to congregate pelagic fish..

Since 2005 the U.S. purse seine fleet operating in the western and central Pacific Ocean (WCPO) increased from 15 to 36 vessels and U.S. landings of skipjack tuna has doubled. There is potential for U.S. purse seine vessels to begin fishing in U.S. EEZ waters around the Mariana Archipelago since catch competition for skipjack tuna with foreign purse seine fleets of the WCPO has increased in recent years. Due to the potentially large harvests that can be made by purse seiners, coupled with their inability to target specific and mature fish, an emergence of purse seine fishing in the U.S. EEZ around the Mariana Archipelago has the potential to negatively impact the viable continuation of the local troll fisheries. Purse seining may result in localized, temporary stock depletion and catch competition with local troll fisheries that target the same pelagic species..

To reduce the potential for localized depletion and catch competition between purse seine vessels and the pelagic troll fishing fleets of CNMI and Guam, the Council recommended establishment of a purse seine fishing prohibited area that conforms to the boundaries of the longline area closure. The Council determined that this would best-protect the fishery resources within the EEZ while providing for the viability of the local troll fleets around CNMI and Guam.

The environmental analysis showed that none of the alternatives would have an adverse impact on resources of management concern including target stocks, non-target stocks, bycatch or protected resources. Current levels of troll fishing in CNMI and Guam are expected to continue under all alternatives, and the purse seiners will continue their fishing in other areas of the western Pacific. There is currently no purse seine fishing reported within the U.S. EEZs around the Mariana Islands, although purse seine catches beyond the EEZ in the Western and Central Pacific may be having an influence on Guam yellowfin catches and CNMI skipjack catches..

The domestic purse seine fleet will continue to be able to fish in the areas of the US EEZ beyond the boundaries of the Marianas purse seine closure; and in the U.S. EEZ around the Pacific remote island areas, in the American Samoa EEZ, in foreign EEZ waters under existing fishing agreements, and in the high seas. The proposed closure of part of the the U.S. EEZ waters of the

[1] Localized fish depletion occurs when a stock in a small area is reduced by the removal of large amounts of fish, thereby temporarily depleting the availability of the stock to fishing activity or other predators in that area.

Mariana Archipelago to purse seine fishing under the Council's preferred alternative is not expected to result in a large change to current fishing intensity or locations by purse seiners.

The analysis also found no large or adverse cumulative effects of the proposed alternatives on the environment or on pelagic fisheries. The proposed action and alternatives were considered in light of recent closures of portions of recently established Pacific marine national monuments to commercial fishing, potential FAD management measures, FAD seasonal closures, and the military buildup on Guam. These past, present, and reasonably foreseeable actions by the Council and NMFS and others would not compound the very low expected effects of the proposed action or alternatives on the environment. The analysis did not show that there were climate change impacts or impacts of the proposed alternatives on climate change, nor were there and disproportionately high and adverse impacts on members of Environmental Justice populations, or marine protected areas.

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3.0 Introduction

The Magnuson-Stevens Fishery Conservation and Management Act (MSA) contains several provisions specifically aimed at fishery development and management in the Pacific Insular Areas which includes recognizing the cultural and economic importance of maintaining local fisheries. Section 305 (2)(E) states "Notwithstanding any other provision of this Act, the Western Pacific Council shall take into account traditional indigenous fishing practices in preparing any fishery management plan." Section 2 (a)(10) states "Pacific Insular Areas contain unique historical, cultural, legal, political, and geographical circumstances which make fisheries resources important in sustaining their economic growth."

Section 301 of the MSA describes the ten national standards that fishery management plans must be consistent with. National Standard 8 states "Conservation and management measures shall, consistent with the conservation requirements of this Act (including the prevention of overfishing and rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities by utilizing economic and social data that meet the requirements of paragraph (2), in order to (A) provide for the sustained participation of such communities, and (B) to the extent practicable, minimize adverse economic impacts on such communities." The objective of the alternatives considered here is to minimize adverse impacts to the troll fleet and the communities which rely on a continued supply of locally-caught fresh fish by reducing chances of gear conflicts and catch competition among the various fishery sectors operating within the U.S. EEZ around the Mariana Archipelago.

Due to the potentially large harvests that can be made by purse seiners, coupled with their inability to target specific and mature fish, an increase in purse seine fishing in the EEZ around CNMI and Guam has the potential to negatively impact the viable continuation of the troll and longline fisheries. Purse seining may result in localized, temporary stock depletion and catch competition with local fisheries that target the same pelagic species. The proposed action would provide spatial separation between purse seiners and troll fishing vessels to reduce the impacts of purse seiners on the troll fishing fleets.

3.1 Background

Historically, few U.S. vessels have conducted pelagic longline fishing based out of the Mariana Archipelago. In 1992, a prohibited area for longline fishing around Guam was implemented which extends 50 nm to the ea sans west but about 100 nm to the south. The extension in the south is to include a chain of banks and seamounts that are important fishing grounds for Guam's fishermen.

Trolling is the primary fishing method utilized in the locally-based pelagic fisheries in the Mariana Archipelago and the troll fishery is comprised of approximately 430 vessels. The pelagic trolling fishing fleet consists primarily of vessels less than 24 ft in length that generally take one-day trips within 30nm around the islands where they find abundant skipjack tuna. These vessels have a limited travel and fishery participants necessarily rely on catches from waters within their reach.

The Council has recognized the potential for purse seine vessels to expand their fishing grounds which could include EEZ waters around the Mariana Archipelago and elsewhere as the U.S. fleet has more than doubled in fleet size over the past few years although only U.S. hull vessels can fish in the U.S. EEZ. If purse seiners were to fish in U.S. EEZ waters there is potential for gear interactions and catch competition between small boats targeting skipjack and seiners. Fishery interactions between purse seiners and other sectors (including longline, troll, and artisanal) have been observed in several research studies, described in Section 8.4.4. For example, Sibert and Hampton (2003) concluded that in addition to the need for international cooperation in conserving tuna stocks, "... Pacific Island countries can implement effective domestic management policies to promote conservation and sustainable utilization of tuna stocks within their EEZs," which highlights the Council's intention in recommending this proposed action.

Local troll vessels have a limited travel and fishing range and fishery participants necessarily rely on catches from waters within their range. Continuing to allow purse seine fishing around the Mariana Archipelago is predicted to result in adverse impacts to the troll fleet through localized stock depletion of skipjack tuna, the target species of both sectors. Demand for skipjack tuna is high and therefore catches in the WCPO are increasing with 2007 showing the highest catch recorded in the WCPO (WCPFC 2009). The skipjack market is expected to continue to expand and with it interest in fishing for skipjack in new areas, such as waters around the Mariana Archipelago. Worldwide, the majority of skipjack tuna is harvested by purse seine vessels and therefore it is prudent to take measures to ensure the locally-based fleets in Guam and CNMI are not adversely impacted by future increased skipjack harvests.

In addition, regulating purse seine fishing within U.S. EEZ waters around the Mariana Islands is consistent with the need to limit impacts of purse seine fishing on juvenile recruitment of bigeye tuna while maintaining fishing opportunities for longline fishing on older fish, which may have had the opportunity to spawn. The recent renaissance of the U.S. purse seine fleet means that it is one of the largest in the Western Pacific and typically has fished extensively with untethered fish aggregating devices (FADs), in some years making up to 90% of sets on FADs, which captures juvenile bigeye along with the targeted skipjack.

Accordingly, the U.S. EEZ around the Mariana Archipelago, American Samoa and the Pacific Remote Island Areas (PRIA), outside of the newly designated marine national monument areas, may become increasingly attractive for the U.S. purse seine fleet to exploit. In the Mariana Archipelago, purse seine fishing has not been recorded, and under the proposed action, purse seine fishing would be prohibited within the U.S. EEZ, while providing the maximum opportunity for the fledgling longline fishery out of Saipan to develop. Moreover, skipjack is the dominant fish caught by several hundred small vessel trollers in Saipan and Guam and thus would be easily outcompeted by the larger catching power of purse seiners, which are also more mobile than the two local fleets and can still fish in large areas across the western and central Pacific Ocean including in the U.S. EEZ around the PRIA.

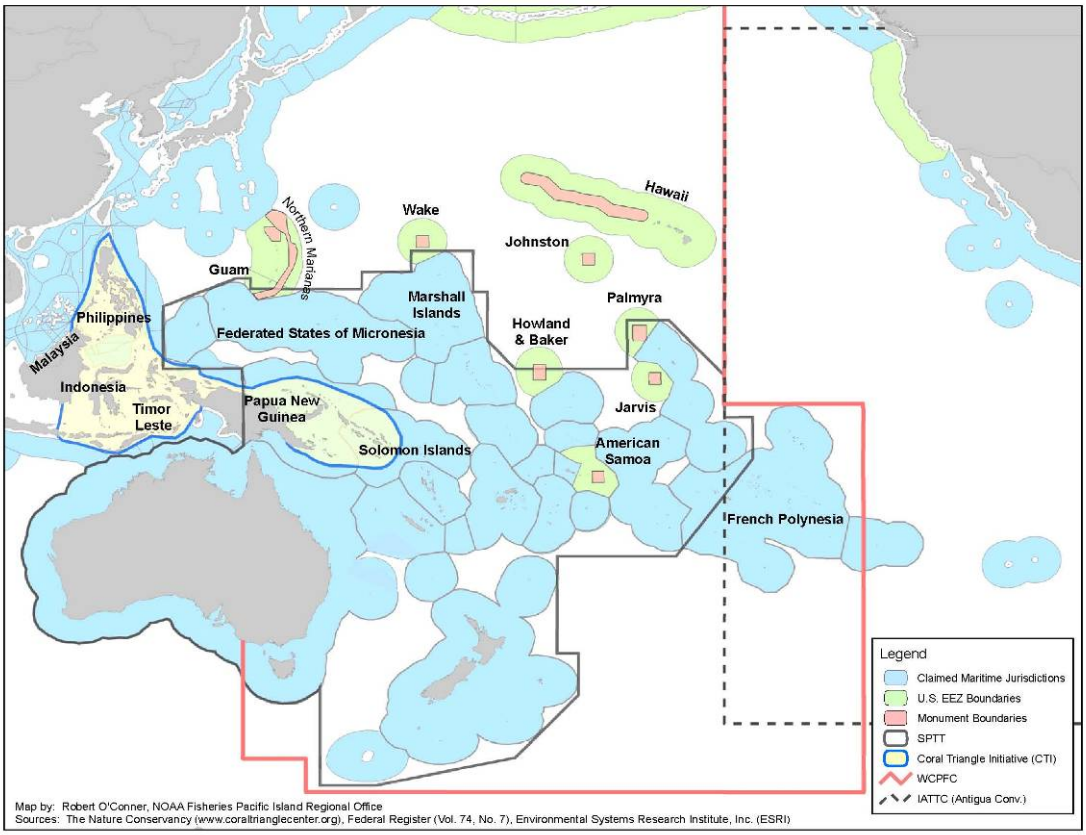


Figure 1: EEZ boundaries in the western Pacific.
The proposed action focuses on the waters of the U.S. EEZ around the Northern Mariana Islands and Guam.

CNMI and Guam and their associated EEZ waters (Figure 1 and Figure 2) lie within the northern boundaries of the Western Pacific Warm Pool, which is the source of the largest proportion of the tuna catch in the Pacific Ocean. Therefore, a precautionary approach to managing tuna resources in the WCPO would include protecting this area. Prohibiting fishing activities capable of harvesting large amounts of tuna, such as purse seine fishing, could contribute to protecting the area from localized depletion while allowing small scale local fisheries to continue. With the near tripling of the size of the U.S. purse seine fleet in the past several years coupled with reductions in available areas due to establishment of marine national monuments, U.S. vessels may look to expand their fishing grounds and U.S. hulls could expand into the large area of U.S. EEZ waters around the Mariana Archipelago. In addition, U.S. purse vessels with valid fishery endorsements may fish in other areas of the WCPO including exclusive rights to fish in U.S. EEZ waters around the Pacific Remote Islands Areas (PRIA), except those parts recently designated as a marine national monument (see Section 8.4.2).

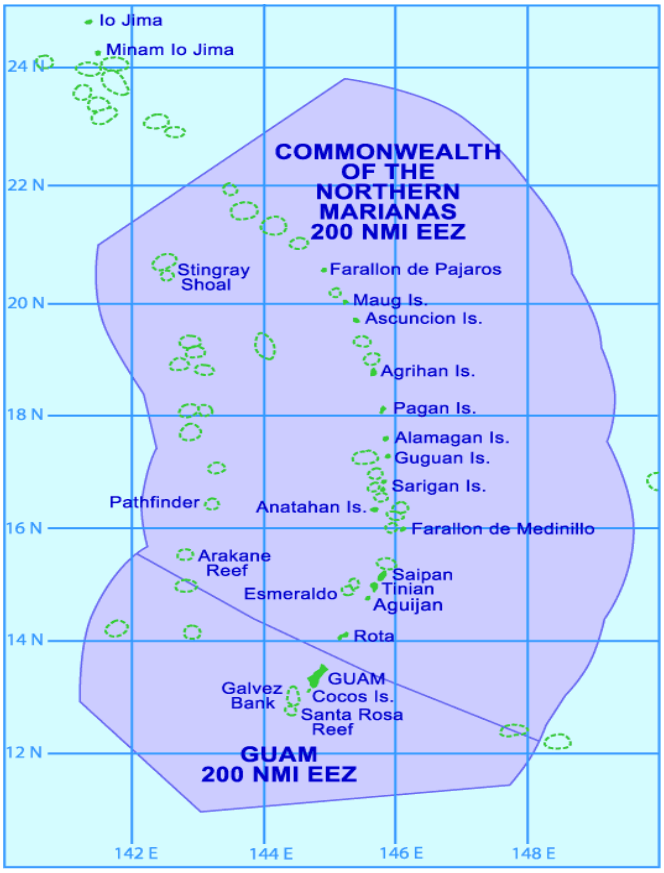


Figure 2: U.S. EEZ waters around the Mariana Archipelago

Source: NMFS, Pacific Islands Fisheries Science Center, Western Pacific Fisheries Information Network

4.0 Purpose and Need for Action

The purpose of this proposed action is to prevent or minimize adverse impacts to the troll and longline fleets and the communities which rely on a continued supply of locally-caught fresh pelagic fish. The prohibition is intended to reduce the potential for localized fish depletion by purse seine fishing, and limit the potential for catch competition and gear conflicts between the purse seine fishery and the Guam and CNMI pelagic longline and trolling fleets. The alternatives considered here are intended to comply with the MSA, while balancing the needs and concerns of Guam and CNMI's troll and longline fisheries, and the US purse seine fleet.

5.0 Initial Actions

The Council has taken a series of management actions to avoid gear conflicts in waters close to island areas in the western Pacific, to protect species or habitats, and to facilitate the continuation and emergence of small-scale localized fishing effort in the various island areas of the Council's jurisdiction.

In 1991, Amendment 3 (56 FR 52214, October 18, 1991) to the Pelagics Fishery Management Plan (PFMP) created a protected species zone around the NWHI to protect endangered Hawaiian

monk seals. This is a contiguous area extending 50 nm from named features in the NWHI and connected by 100-nm wide corridors between those areas where the 50-nm-radius areas do not intersect.

In 1992, Amendment 5 (57 FR 45989, March 4, 1992) created a domestic longline vessel prohibited area around the Main Hawaiian Islands ranging from 50 to 75 nm, and a similar 50 nm prohibited area around Guam and its offshore banks. The prohibited areas were designed primarily to prevent gear conflicts and vessel safety issues arising from interactions between longline vessels and smaller fishing boats which had arisen with the rapid growth of the Hawaii-based longline fleet early in the fishery. A seasonal reduction in the size of the closure was subsequently implemented in October 1992; between October and January, longline fishing is prohibited within 25 nm of the windward shores of all the main Hawaiian Islands except Oahu, where it is prohibited within 50 nm from the shore.

In 2002, the Council closed waters within 3-50 nm around American Samoa to pelagic fishing by any vessel greater than 50 ft in length (67 FR 4369, January 30, 2002). This action was taken to prevent potential gear conflicts and catch competition between large fishing vessels and locally-based small vessels.

Amendment 14 addressed overfishing of WCPO yellowfin and Pacific bigeye tuna and was partially approved by the Secretary of Commerce. It contained recommendations regarding both international and domestic management, including a mechanism by which the Council could participate in international negotiations regarding these stocks. Amendment 14 also contained measures to implement control dates (June 2, 2005) for Hawaii's non-longline commercial pelagic vessels (70 FR 47781) and purse seine and longline vessels (70 FR 47782), as well as requirements for federal permits and reporting for Hawaii-based non-longline commercial pelagic vessels. NMFS disapproved the Amendment's international measures as premature given ongoing international negotiations as well as the development of a memorandum of understanding by the Councils and the Secretary of Commerce, in consultation with the Secretary of State, regarding participation in U.S. delegations and other issues. The implementation of a control date is in recognition of the fact that unlimited expansion of purse seining and longline fishing is untenable with the conservation of bigeye and yellowfin tuna. NMFS also noted that Amendment 14 met the requirements of the Magnuson-Act regarding overfishing of fisheries that have been determined to be subject to overfishing due to excessive international fishing pressure.

At the 96th meeting of the Council's Scientific and Statistical Committee (SSC), held September 25-27, 2007, Council staff presented an options paper describing several alternatives to meet the objective described below. These included establishing longline prohibited areas of varying sizes (25, 50, or 100 nm) around the islands. The discussion focused on a 30 nm prohibited area that would fully encompass historic fishing grounds for the troll fleet by including popular banks (e.g., Esmeralda Bank), without creating a zone that would be onerously far offshore for development of local longline fishing. The SSC recommended consideration of a 30 nm zone.

Scoping meetings to discuss proposed exclusion areas and determine issues of concern were held in Saipan, Tinian, and Rota on September 4, 5, and 6, 2007, respectively to solicit comments on

the proposed prohibited areas in Guam and CNMI. The meetings were attended primarily by fishermen. For the longline prohibited area around CNMI, the majority of participants preferred a 25 nm closure (Alternative 1B). Those in favor of this alternative claimed that it would still provide an incentive to those interested in longline fishing in the area, but the local pelagic trollers would have access to most of the banks and seamounts located within 25 nm. They felt that allowing longline fishing outside this 25 nm area would help the fishermen and the ailing economy while preventing gear conflict. Attendees stated that a larger prohibited area could be impracticable for developing a local longline fishery as the cost of fuel is now prohibitive. Others at the meeting opposed Alternative 1B and supported a bigger prohibited area such as 30 nm or 50 nm (i.e., Alternative 1C and 1D). These participants contended that a bigger zone would include all of the favorite trolling fishing areas, further reduce the potential for gear conflict, and reduce catch competition for targeted species. They also argued that unlike the small boats, longline vessels are designed to fish further out in the open waters. For the purse seine prohibited area, all in attendance at the meetings supported closing the entire EEZ to purse seine fishing around CNMI and Guam (Alternatives 2D and 3D). Meeting participants expressed that purse seine fishing catches large volumes of fish and they were concerned about the depletion of target species (i.e., skipjack tuna).

At the 139th Council meeting held October 9-12, 2007, the Council took initial action to recommend establishment of a 30-nm longline prohibited area around CNMI and a purse seine fishing prohibition for all EEZ waters around the Mariana Archipelago. At the 140th Council meeting held March 17-21, 2008, in Tumon, Guam, and Saipan, CNMI, the Council took action to recommend adopting Alternative 1C, establishment of a 30-nm longline prohibited area around CNMI; and Alternatives 2D and 3D, prohibitions on purse seine fishing in all EEZ waters around CNMI and Guam, respectively. Subsequently, only the longline area closure was approved by the Secretary of Commerce, while the closure of the entire US EEZ around the Maraiana Islands to purse seine fishing was disapproved[2]

At the 153rd Council Meeting the Council recommended staff to re-draft the amendment to the Pelagics Fisheries Ecosystem Plan that would include an alternative for a purse seine area closure with the same boundaries used for managing longline fishing for consideration at a future Council meeting.

6.0 Objective

As noted under Section 4.0 (Purpose and Need for Action) , the objectives of the alternatives considered here is to prevent or minimize adverse impacts to the troll and longline fleets and the communities which rely on a continued supply of locally-caught fresh pelagic fish. The prohibition is intended to reduce the potential for localized fish depletion by purse seine fishing, and limit the potential for catch competition and gear conflicts between the purse seine fishery and the Guam and CNMI pelagic longline and trolling fleets.

This action is consistent with the following objectives of the Council's Pelagic Fisheries Ecosystem Plan (PFEP):

[2] Federal Register Vol. 76, No. 123, June 27, 2011, 37287-37829

Objective 2: To provide flexible and adaptive management systems that can rapidly address new scientific information and changes in environmental conditions or human use patterns.

Objective 4: To encourage and provide for the sustained and substantive participation of local communities in the exploration, development, conservation, and management of marine resources.

7.0. Description of Alternatives

The following alternatives are intended to meet the purpose and need and objective described above. For ease of analysis and consideration of alternatives, the proposed actions were divided into two separate topics with a series of alternatives for each topic. Alternatives were developed by Council staff by examining the most recent fisheries data and relevant studies, consideration of public comment, and consideration of recommendations made by fishing communities and participants at public hearings between the 139th and 153rd Council meetings. Figure 3 shows the Mariana Archipelago, and the purse seine area closure alternatives.

7.1 : CNMI Purse Seine Prohibited Area

7.1.1 Alternative 1A: No Action

Under Alternative 1A (No Action), no new regulations would be made and pelagic purse seine vessels would not be prohibited from fishing within U.S. EEZ waters around CNMI.

7.1.2 Alternative 1B: 30 nm Purse Seine Prohibited Area (Preferred)

Under this alternative the all vessels would be prohibited from pelagic purse seine fishing within 30 nm of the CNMI, essentially within the same zone as the same boundaries as longline closed area

7.1.3 Alternative 1C: 100 nm Purse Seine Prohibited Area

Under Alternative 1C, all vessels would be prohibited from pelagic purse seine fishing within 100 nm of CNMI.

7.2 Guam Purse Seine Prohibited Area

7.2.1 Alternative 2A: No Action

Under Alternative 2A (No Action), no new regulations would be made and pelagic purse seine vessels would not be prohibited from fishing within U.S.EEZ waters around Guam

7.2.2 Alternative 2B: 50-100 nm Purse Seine Prohibited Area

Under Alternative 2B, all vessels would be prohibited from pelagic purse seine fishing within 50 nm to the east and west of Guam, and 100 nm to the south. As with the CNMI this would be the same boundaries as the current longline area closure. **(Preferred)**

7.2.2 Alternative 2C: 100 nm Purse Seine Prohibited Area

Under Alternative 2C, all vessels would be prohibited from pelagic purse seine fishing within 100 nm of Guam.

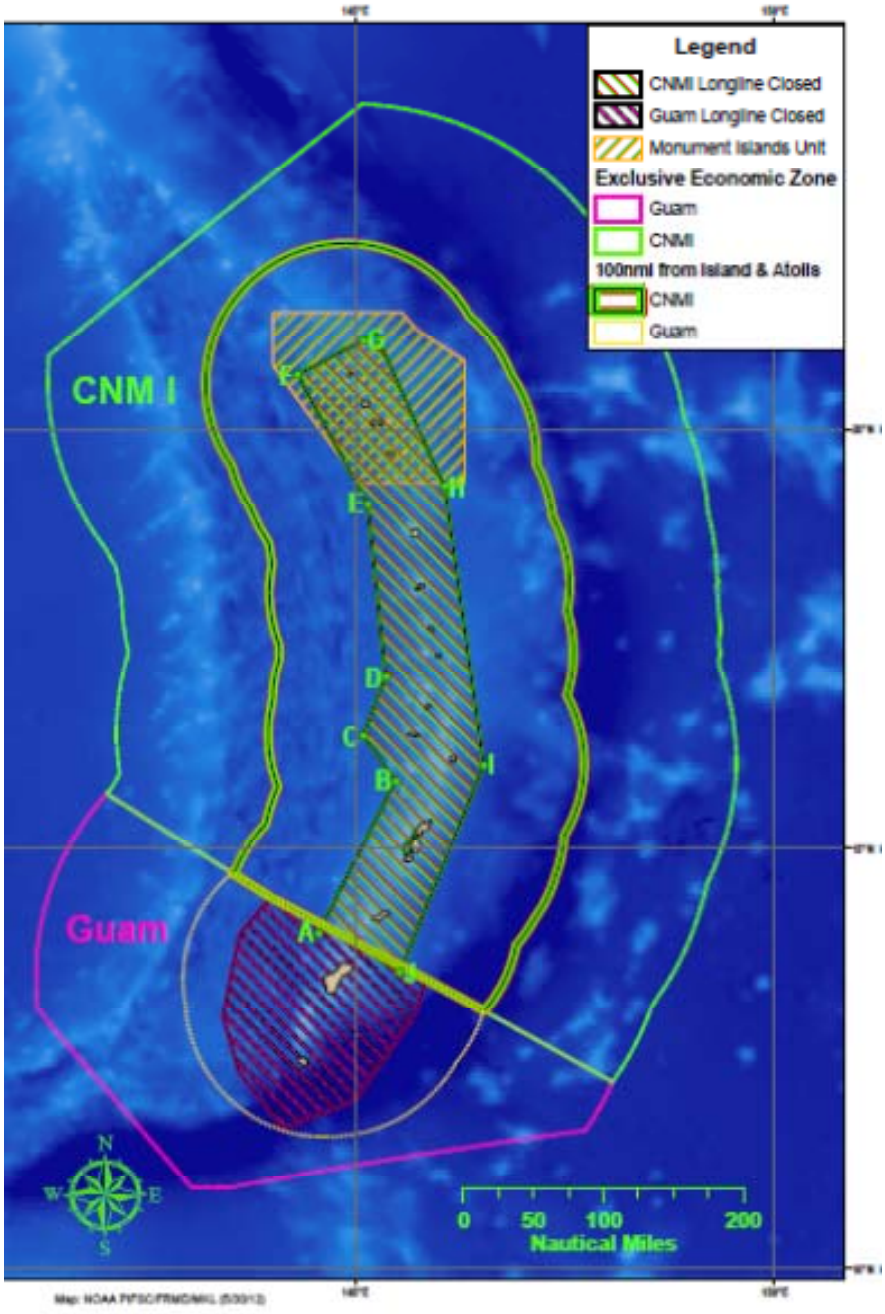


Figure 3. Map of the Mariana Archipelago showing the EEZ boundary, the current longline area closure boundaries around Guam and CNMI and 100 nm potential closed area boundary for purse seiners. The boundaries of the Mariana Trench MNM Islands Unit are also shown. Source NMFS PIFSC

7.3 Alternatives Considered but not Further Analyzed

7.3.4 Alternative 1D: Entire EEZ Purse Seine Prohibited Area

Under Alternative 1D, all vessels would be prohibited from pelagic purse seine fishing within all U.S. EEZ waters around CNMI.

7.3.3 Alternative 2D: Entire EEZ Purse Seine Prohibited Area

Under Alternative 2C, all vessels would be prohibited from pelagic purse seine fishing within all U.S.EEZ waters around Guam.

Both these alternatives would close the entire US EEZ portions around Guam and the CNMI to purse seine fishing . However, these alternatives which were preferred alternatives in Amendment 2 to the Fishery Ecosystem Plan for Pelagic Fisheries of the Western Pacific Region in 2010, which included both purse seine and longline area closures. The closure of the entire EEZ around the Mariana islands to purse seine fishing was subsequently disapproved by NMFS[3] and so are not considered any further here.

8.0 Description of the Affected Environment

8.1 U.S. EEZ around the Mariana Archipelago and the Western Pacific Warm Pool

The Mariana Archipelago is composed of 18 islands and extends north to south over a distance of 350 miles. Guam is the southernmost island of the Mariana Archipelago, located at 13° N latitude, 144° E longitude (Bureau of Statistics and Plans, 2006). U.S. EEZ waters around Guam are approximately 82,400 square miles whereas U.S. EEZ waters around CNMI are 3.5 times the size at 291,800 square miles.

CNMI, Guam, and their associated EEZ waters (Figure 1 and Figure 2) lie within the northern boundaries of the Western Pacific Warm Pool, which has the highest mean annual sea surface temperatures on earth ranging from 28°C to greater than 29.5°C. The largest proportion of the tuna catch in the Pacific Ocean originates from the Warm Pool, even though, paradoxically, this is a region of low primary productivity.

The Mariana Archipelago EEZ waters extend over varying degrees of latitude and oceanographic conditions which has the potential to cause variations in the catchability of target tuna species (OFP 1998). The EEZ waters around Guam have a shallower and steeper thermocline than those around CNMI indicating that yellowfin and bigeye catchability might be greater in Guam's EEZ than in the waters around the CNMI (OFP 1998). However, there are also localized effects of the many submarine features which lead to increased productivity in certain areas.

A major oceanographic and climatic phenomenon which drives variation in the Warm Pool is the El Niño–Southern Oscillation (ENSO). ENSO is linked to climatic shifts that are part of a normal

[3] Federal Register, Vol. 76, No. 123, Monday, June 27, 2011, 37287-37289

and prominent weather pattern in the Pacific and Indian Oceans. ENSO, which can occur every 2–10 years, results in the reduction of normal trade winds which reduces the intensity of the westward flowing equatorial surface current (Sturman and McGowan 2003). In turn, the eastward flowing countercurrent tends to dominate circulation, bringing warm, low-salinity low-nutrient water to the eastern margins of the Pacific Ocean. As the easterly trade winds are reduced, the normal nutrient-rich upwelling system does not occur, leaving warm surface water pooled in the eastern Pacific Ocean. During strong ENSO events, the area where tunas typically school at the surface, such as skipjack and yellowfin tuna, may shift eastward by thousands of kilometers. Highly mobile fishing fleets of purse seiners and longliners are able to move to follow the fish schools, while Guam and CNMI's small-boat fleets must continue to fish in whatever conditions prevail within their limited range.

Larval and juvenile yellowfin stay in surface waters while adults are increasingly found at greater depths. Juvenile yellowfin tuna form a major component of surface landings in the Pacific and form an economically and socially important component of domestic, artisanal and subsistence fisheries in the Pacific, particularly in small island areas such as the Mariana Archipelago. In particular, although the primary target fish is skipjack tuna, small-scale troll and surface handline fisheries in the Mariana Islands generally catch juvenile yellowfin less than 100 cm in length.

Large-scale purse seine fishing operations using fish aggregation devices (FADs) in the WCPO have generated management concern due to their tendency to aggregate juvenile and commercially undersized tuna as well as bycatch species, e.g. billfish, oceanic sharks, and marine turtles (Hampton and Bailey 1993). Of particular management concern is the unintended catch of juvenile bigeye tuna by WCPO purse seine fleets as well as elevated landings of juvenile yellowfin tuna in drifting object sets[4]. Juvenile yellowfin are also regularly taken as an incidental byproduct in skipjack pole and line fisheries when fishermen target effort around FADs. Large, mature-sized yellowfin tuna are caught by higher value sub-surface fisheries, primarily longline fleets landing sashimi grade product. Adult yellowfin tuna aggregate to drifting flotsam and anchored buoys, though to a lesser degree than juvenile fish. Large yellowfin also aggregate over deep seamount and ridge features where they are targeted by some longline and handline fisheries. It appears that juvenile yellowfin tuna are particularly vulnerable to being caught by longline gear from around 55 cm and may be retained or discarded depending on the market characteristics of the fishery. Increasing harvests of juvenile yellowfin have been a concern for many years as evidenced by the IATTC's 1999 Resolution to implement catch limits which states that "fishing for juvenile yellowfin has increased considerably during 1999, and that these small fish must be protected"[5]. At the WCPFC's December 2006 3rd regular session, a conservation and management measure (CMM 2006-01) was adopted which says that "management plans for the use of FADs shall include strategies to limit the interaction with juvenile bigeye and yellowfin tuna". Recognizing the urgent need to reduce fishing mortality of juvenile bigeye and yellowfin tuna from fishing on FADs, in December 2008, the Commission adopted measures (CMM-2008-01) to reduce juvenile bigeye and yellowfin mortalities from fishing effort on FADs through a FAD seasonal closure (August 1 - September 30) in the

[4] http://www.soest.hawaii.edu/PFRP/biology/holland_itano_png.html
[5] http://www.iattc.org/PDFFiles/C-99-08%20YFT%20resolution%20Oct%2099.pdf

convention area bounded by 20ºN and 20ºS; and provided guidelines for the development of FAD management plans"[6].

8.2 Pelagic Fishing in CNMI

Foreign Vessels

Since 1980 foreign vessels have been prohibited from fishing in CNMI's EEZ waters. Prior to the MSA and the establishment of U.S EEZ boundaries in 1980[7], foreign longline and pole-and-line fishing fleets operated in CNMI waters. A Japanese pole-and-line fishery and longliners from distant water fishing nations (DWFN) caught relatively large amounts of skipjack and yellowfin in CNMI waters. Japanese pole-and-line catch of skipjack (bonito) in the vicinity of CNMI ranged as high as 17,606 metric tons[8] with an average closer to 5,000-6,000 mt (Table 1). The Japanese fishing activities (pole-and-line and longline fishing) within the 200 miles of the Northern Mariana Islands waters from 1973 to 1975 (between 5,700 and 7,700 mt) far exceeded local catches of tuna, marlins, etc. (Source: American Embassy - Japan). Longline catches of yellowfin, bigeye and blue marlin were relatively insignificant, with a peak level of 1,718 metric tons in 1962 (SPC 2010a). In the 1990's there was some purse seine fishing effort outside of the U.S. EEZ around CNMI. To date, no purse seine fishing activity has been recorded in the U.S. EEZ waters or in the vicinity of CNMI.

Table 1: Annual catches (mt) of bigeye (BET), blue marlin (BLZ), yellowfin (YFT) and skipjack (SKJ) by foreign fleets in the vicinity of CNMI (15°-25°N, 140°-150°E) 1962-1997.
Source: OFP 1998

[6] http://www.wcpfc.int/doc/cmm-2008-01/conservation-and-management-measure-bigeye-and-yellowfin-tuna-western-and-central-pa

[7] Based on a recent court decision EEZ waters around CNMI are defined to begin at the shoreline, and there are no territorial waters.

[8] Note: 1 mt = 2,204.62 lb.

	LONGLINE				POLE AND LINE		PURSE SEINE		TOTAL				
YEAR	BET	BLZ	YFT	TOTAL	SKJ	YFT	SKJ	YFT	BET	BLZ	SKJ	YFT	TOTAL
1962	623	140	955	1,718					623	140		955	1,718
1963	316	43	270	629					316	43		270	629
1964	77	52	74	203					77	52		74	203
1965	129	47	80	256					129	47		80	256
1966	37	57	95	189					37	57		95	189
1967	112	38	46	196					112	38		46	196
1968	60	31	37	128					60	31		37	128
1969	69	23	52	144					69	23		52	144
1970	114	109	288	510					114	109		288	510
1971	131	78	230	439					131	78		230	439
1972	78	36	128	242	6,676	77			78	36	6,676	204	6,995
1973	51	15	25	91	7,495	347			51	15	7,495	372	7,932
1974	29	41	30	100	4,893	330			29	41	4,893	360	5,322
1975	45	28	65	137	6,039	284			45	28	6,039	348	6,460
1976	66	32	114	212	3,123	311			66	32	3,123	425	3,646
1977	121	24	173	318	3,159	455			121	24	3,159	627	3,931
1978	75	40	421	536	4,418	429			75	40	4,418	849	5,383
1979	40	38	78	156	6,330	497			40	38	6,330	575	6,982
1980	75	40	304	418	5,283	230			75	40	5,283	533	5,931
1981	31	22	53	105	7,026	374			31	22	7,026	427	7,505
1982	23	19	36	78	7,551	193			23	19	7,551	230	7,822
1983	49	42	124	215	6,941	328			49	42	6,941	451	7,483
1984	48	13	79	140	17,606	537			48	13	17,606	615	18,283
1985	24	4	46	75	4,979	345			24	4	4,979	392	5,398
1986	85	35	138	258	3,813	314			85	35	3,813	452	4,385
1987	115	40	107	262	6,184	85			115	40	6,184	192	6,531
1988	34	23	81	139	4,834	286			34	23	4,834	367	5,259
1989	11	6	25	42	6,194	183			11	6	6,194	207	6,419
1990	39	8	33	80	6,441	117			39	8	6,441	150	6,638
1991	62	19	130	211	3,569	202			62	19	3,569	332	3,982
1992	95	24	126	245	3,646	88	4	3	95	24	3,650	216	3,985
1993	118	29	125	272	5,277	124	2	2	118	29	5,279	250	5,675
1994	68	31	129	229	3,281	125	7	14	68	31	3,288	268	3,656
1995	24	20	203	247			15	5	24	20	15	208	267
1996	19	20	166	204			434	21	19	20	434	187	659
1997													

Domestic fishing in the CNMI

For a complete description of troll, purse seine and longline gear please refer to section 4.1.1 of the Fishery Ecosystem Plan for Pelagic Fisheries of the Western Pacific (WPFMC 2009a).

With the exception of the purse seine support base on Tinian discussed above, CNMI has never had a large infrastructure dedicated to commercial fishing. The majority of boats in the local fishing fleet are small, outboard engine-powered vessels. The harvest of pelagic species by CNMI-based vessels has always been small, around 100 metric tons annually, caught with trolling gear. Both supply and demand conditions direct the majority of domestic commercial fishing effort in CNMI toward reef fish and bottomfish. There is less seasonality in these fisheries, and they require shorter offshore trips; moreover, their market value is often much higher than that of the commonly caught pelagic fish.

CNMI's pelagic fishery occurs primarily from waters off the island of Farallon de Medinilla south to the Island of Rota. The pelagic fishing fleet consists primarily of trolling vessels less than 24 ft in length which generally take one-day trips within 30 nm around the islands where

they find abundant skipjack tuna. These vessels have a limited travel and fishing range and fishery participants necessarily rely on catches from waters within their reach.

Currently there is a new longline fishing company located on Saipan which, as of 2010, has four longliners fishing waters around the Mariana Archipelago, beyond 30 nm from shore but within EEZ waters. During the development of this document, there are no catch data available on this new fishery. Interest in longline fishing in CNMI has been variable with the issuance of eight, four, and five Western Pacific General Longline permits from 2007 through 2009, respectively.

The pelagic fishery is monitored using data in the Commercial Purchase Data Base which currently documents landings on Saipan where the majority of the CNMI's population and fishery participants live. Staff from the Department of Lands and Natural Resources, Division of Fish and Wildlife (DFW) routinely distribute and collect invoice books from 30 participating local fish purchasers on Saipan that record all fish purchases by species categories. The establishment of data collection systems for the islands of Tinian and Rota are in process. It is believed that the commercial purchase database landings include around 90 percent of all commercial landings on Saipan. There is also an un-quantified subsistence fishery on Saipan where income is made by selling a small portion of catches door-to-door to cover fishing expenses.

The primary target and most marketable species for the pelagic fleet is skipjack tuna. In 2010, skipjack tuna continued to dominate the pelagic landings, comprising around 80 percent of commercial pelagic landings and revenues totaling about $215,946 (Table 2). Schools of skipjack tuna have historically been common in nearshore waters, providing an opportunity for trollers to catch numerous fish with a minimum of travel time and fuel costs. Yellowfin tuna and mahimahi are also easily marketable species but are seasonal. Peak mahimahi catches are usually from February through April while the yellowfin season usually runs from April through September.

In 2010, skipjack tuna landings were slightly lower when compared to landings in 2009, while yellowfin tuna and mahimahi ranked second and third in total landings. However mahimahi and yellowfin landings both increased in landed volume from the previous year. The total weight of commercial pelagic landings increased slightly from 183,981 lb to 188,351 lb (Table 3, Figure 3).

Table 2: CNMI 2008 Commercial Pelagic Trolling Landings, Revenues and Price Source: WPRFMC 2010

Table 2. 2010 CNMI Estimated Commercial Pelagic Landings, Revenues and Price (from Commercial Receipt Invoices)

Species	Landing (Lbs)	Value ($)	Avg Price ($/Lb)
Skipjack Tuna	124096	215946	1.74
Yellowfin Tuna	30507	59913	1.96
Saba (kawakawa)	268	428	1.60

Tuna PMUS	**154871**	**276286**	**1.78**
Mahimahi	23157	43562	1.88
Wahoo	2887	5693	1.97
Blue Marlin	73	147	2.00
Sailfish	544	817	1.50
Sickle Pomfret (w/woman)	317	1307	4.13
Non-tuna PMUS	**26978**	**51525**	**1.91**
Dogtooth Tuna	5822	10586	1.82
Rainbow Runner	679	1449	2.13
Non-PMUS Pelagics	**6502**	**12034**	**1.85**
Total Pelagics	**188351**	**339846**	**1.80**

Source: WPRFMC unpublished data[9]

Table 3: CNMI Total Commercial Trolling Landings (lb) 1983-2010

Year	Catch lbs						
	Mahimahi	Wahoo	Blue Marlin	Skipjack	Yellowfin	Other species	Total
1983	13,939	8,760	3,787	183,411	21,281	14807	245,985
1984	7,614	14,087	1,544	290,843	19,580	7468	341,136
1985	12,955	18,251	1,860	177,344	12,466	11302	234,178
1986	17,796	9,062	2,654	254,362	16,917	6668	307,459
1987	9,502	13,404	2,460	161,504	10,454	7744	205,068
1988	30,799	11,697	1,309	266,497	15,375	8846	334,523
1989	7,320	1,571	5,704	257,703	10,109	4377	286,784
1990	10,439	3,462	2,034	147,962	10,468	6085	180,450
1991	33,756	1,521	1,568	115,802	13,042	22872	188,561
1992	26,257	17,172	6,603	82,280	25,687	41229	199,228
1993	37,545	2,779	3,687	97,268	14,898	25151	181,328
1994	15,063	3,863	2,635	92,212	13,445	20111	147,329
1995	23,321	5,722	6,619	131,377	20,918	12223	200,180
1996	35,655	10,783	8,593	165,037	38,043	23166	281,277
1997	31,277	7,580	7,068	133,446	21,352	18150	218,873
1998	25,375	6,299	4,201	167,114	14,570	22704	240,263
1999	12,882	8,063	3,541	106,297	24,419	21829	177,031
2000	7,324	4,097	3,608	140,389	17,673	14204	187,295
2001	14,229	4,550	1,924	133,769	14,543	10166	179,181
2002	18,042	8,212	1,261	179,966	30,017	19484	256,982
2003	7,357	7,950	1,130	171,574	26,042	14363	228,416
2004	35,808	6,936	2,001	148,328	27,548	18386	239,007

[9] Draft 2010 WPRFMC Pelagics Annual Report

Year	Catch lbs						
	Mahimahi	Wahoo	Blue Marlin	Skipjack	Yellowfin	Other species	Total
2005	26,891	3,349	1,595	260,614	52,014	27912	372,375
2006	17,360	3,267	1,402	273,715	43,220	17742	356,706
2007	26,410	2,504	76	238,972	34,894	9698	312,554
2008	11,169	1,388	1,098	157,708	16,344	9306	197,013
2009	19,580	3,389	47	129,176	25,113	6,676	183,981
2010	23,157	2,887	73	124,096	30,507	7,631	188,351
Average	19,958	6,879	2,860	171,027	22,176	15,368	238,268

Source: WPRFMC 2011, and unpublished 2010 data

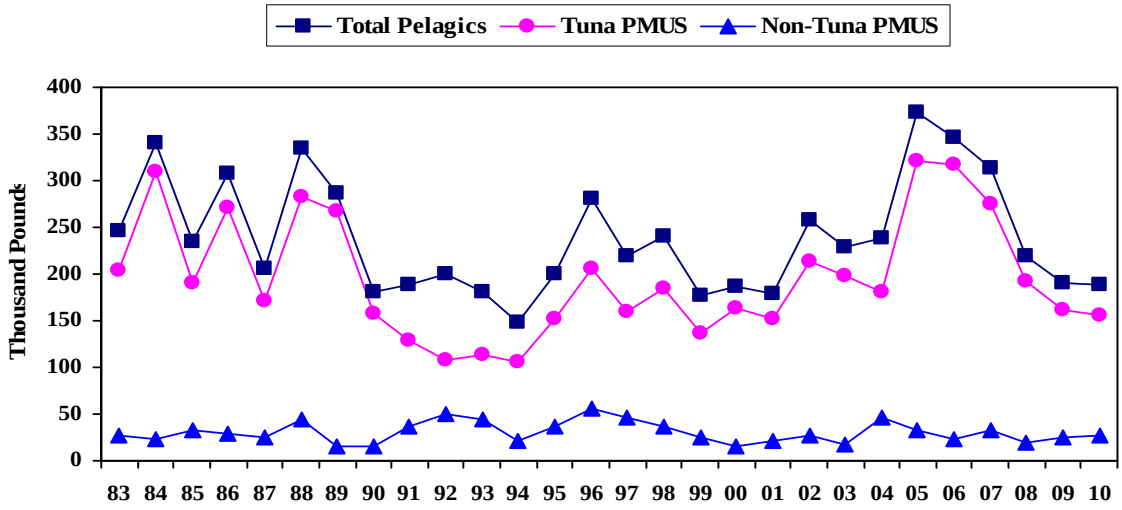


Figure 4: CNMI Annual Commercial Pelagic Trolling Landings 1983-2010
Source WPRFMC (2011) and unpublished 2010 data

Commercial landings of skipjack tuna in 2010 (124,096 pounds) were about 28% below the historical average (171,349 pounds). Skipjack make up the bulk of pelagics landings in CNMI, but have commercial landing records have shown a great deal of variability over the 28-year time series. This variability and recent decline landings, as tracked by the commercial receipt invoices, may reflect the recent downturn in the local economy (i.e. people not buying as much fish) and a possible lack participation in the voluntary Commercial Purchase Information Program. (Figure 4).

Commercial landings of yellowfin tuna (30,507 pounds) in 2010 were 37% greater than the 28-year average (22,265 pounds) (Figure 4). Increases in commercial yellowfin landings in from 2002-2007 were largely due to fish sold by bottomfish fishermen operating in the northern islands, a single longline vessel entering the fishery, and one vessel using short longlines (less than a mile) all landing fish during this time period. Although more highly prized than skipjack, yellowfin tuna is not as common in near-shore waters where they are seasonal. The average fish size tends to be smaller when compared with yellowfin tuna from other geographic areas.

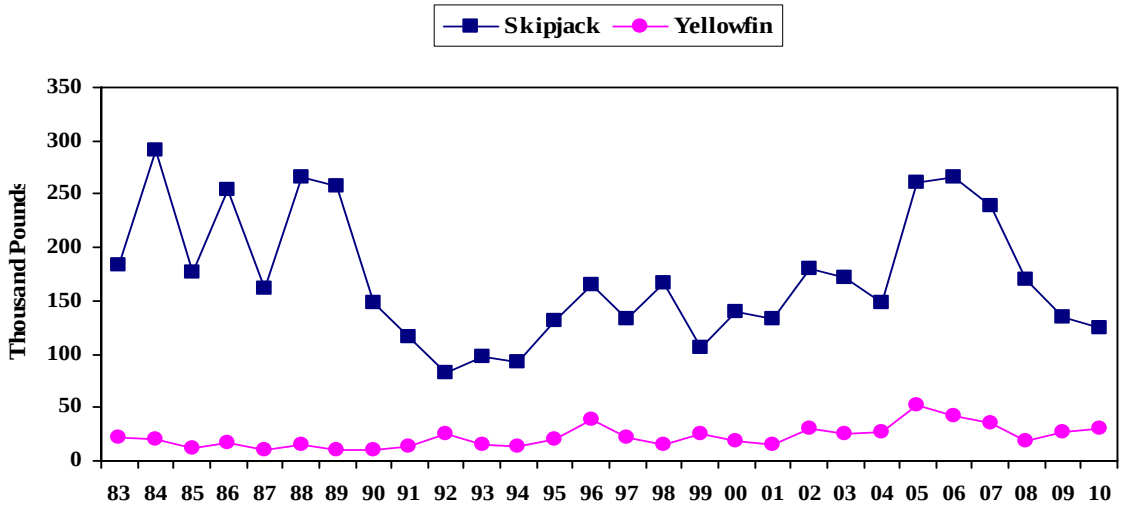


Figure 5: CNMI Annual Commercial Landings of Skipjack and Yellowfin Tuna by Trolling Vessels 1983-2010
Source: WPRFMC (2011) and unpublished 2010 data

In 2010, 40 vessels commercially landed fish (Figure 5).. This is well below the 28-year average of 81 vessels and the high of 114 vessels doing so in 1996. In fact, the commercial fleet has been contracting since 2001. The decline in the number of vessels commercially landing fish seems to have been caused by rising fuel prices, declining prices for skipjack tuna, and a downturn in CNMI's economy..

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

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

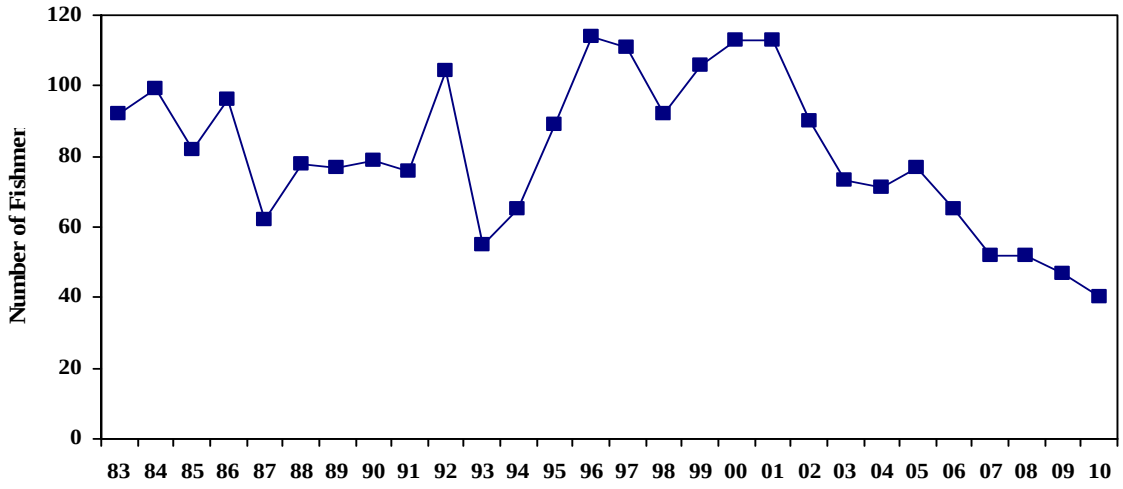


Figure 6: CNMI Active Commercial Pelagic Trolling Vessels from 1983-2010.
Source: WPRFMC (2011) and unpublished 2010 data

Although the number of vessels (Figure 5) and trips (Figure 6) has decreased since 2000, landings have fluctuated, especially for skipjack tuna (Figure 3 and Figure 4). (WPRFMC 2011). Per-trip landings of skipjack displayed a great deal of variability in the 1980s and 1990s. Commercial receipt information and creel survey data showed little agreement over the time period. No explanation has been made to explain the disparity between the two monitoring methods. Zero years for the creel survey indicate years when the creel survey was not conducted. At the beginning of the 2000's, creel survey landings per trip estimates were generally higher than landings per trip estimates from commercial receipt data. In the latter part of the decade, the two monitoring systems have yielded similar results. Per-trip landings for skipjack were highest in the latter 1980s peaking at an estimated166 pounds per trip. In last decade, creel survey estimates for skipjack landings have been between 72-122 pounds per trip. Commercial Purchase Program Data estimated landings over the last decade have been between 49-114 pounds per trip. 2010 Commercial Purchase Program Data per-trip landing estimates (71 pounds per trip) for skipjack are below the historic average of 88 pounds per trip. Creel Survey estimated per-trip landings for skipjack were 94 pounds per trip which is above the historic average for estimates based on Creel Survey data.

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

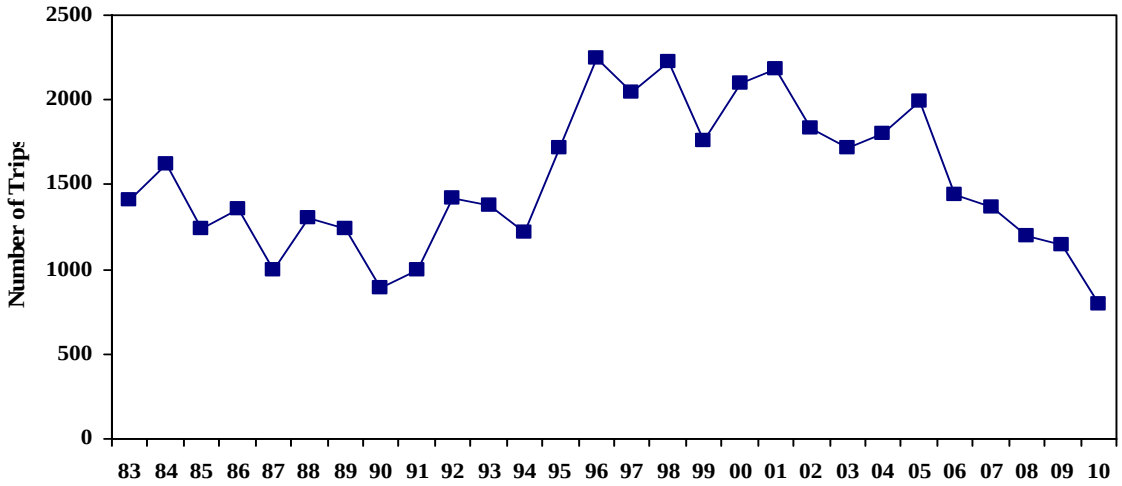


Figure 7: Number of Pelagic Fishing Trips (Trolling) in CNMI, 1983-2010
Source: WPRFMC (2011) and unpublished 2010 data

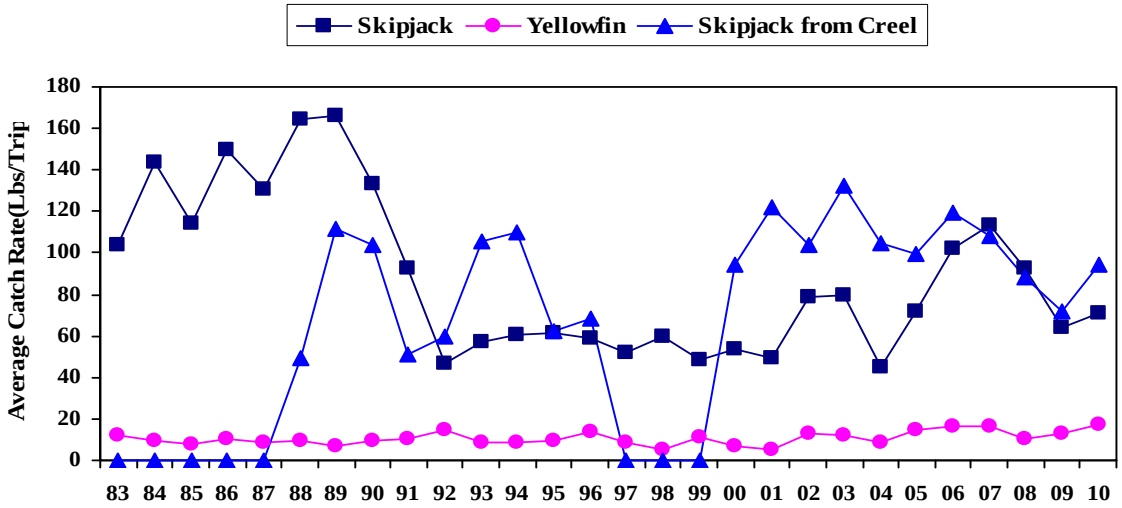


Figure 8: Trolling Catch Rates for Skipjack and Yellowfin Tunas in CNMI, 1983-2010
Source: WPRFMC (2011) and unpublished 2010 data

8.3 Pelagic Fishing in Guam

For a complete description of troll, purse seine and longline gear please refer to section 4.1.1 of the Fishery Ecosystem Plan for Pelagic Fisheries of the Western Pacific (WPFMC 2009a). Aside from the pelagic troll fishery discussed below, there is currently one longline vessel and two purse seine vessels based out of Guam. Pelagic fishing vessels based on Guam are classified into two general groups:

1) distant-water purse seiners and longliners (foreign and domestic) that fish outside Guam's economic exclusive zone (EEZ) and transship through the island and;

2) small, primarily recreational, trolling boats that are either towed to boat launch sites or marina-berthed charter boats and fish only within local waters, either within Guam's EEZ or on some occasions in the adjacent EEZ of the Northern Mariana Islands. Most fishermen sell a portion of their catch at one time or another and it is difficult to make a distinction between recreational, subsistence, and commercial fishers. There are currently 15 civilian charter vessels on Guam and one charter operation run by the U.S. military from Sumay Cove (John Calvo, personal communication.) A summary of the catches by the Guam charter fleet is given in WPRFMC (2010). A feature of the Guam charter industry is that catches are often served as sashimi to the patrons, most of whom are Japanese.

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

High value is placed on sharing one's fish catch with relatives and friends. The social obligation to share one's fish catch extends to part-time and full-time commercial fishermen (Amesbury and Hunter-Anderson, 1989). In a study conducted by Rubinstein (2001), nearly all fishermen (96 percent) reported that they share fish regularly, giving fish to family (36 percent), friends (13 percent) or both (47 percent). A majority (53 percent) said they did not give fish to people other than family and close friends; of those who did occasionally, the main recipients were church fiestas (32 percent) and other church events or organizations (20 percent). A 2005 survey of Guam households found that out of the fish consumed by households, a little more than half (51 percent) was purchased at a store or restaurant and 9 percent was purchased at a flea market or from a roadside stand. Nearly one-quarter (24 percent) of the fish consumed was caught by the respondent or an immediate family member, and an additional 14 percent was caught by a friend or extended family member (Beukering et al., 2007 in Allen and Bartram 2008).

Foreign Vessels

Since 1980, foreign vessels are prohibited from fishing in Guam's EEZ waters, however, prior to this the Japanese pole-and-line fishery and longliners from DWFN caught relatively large amounts of skipjack and yellowfin. Since 1980 there has been some purse seine fishing effort outside of the U.S. EEZ around Guam. Table 4 gives the annual catches made by foreign vessels in the U.S. EEZ around Guam before 1980 and outside the EEZ after 1980.

Table 4: Annual catches (metric tons) of bigeye, blue marlin, yellowfin and skipjack by foreign fleets in the vicinity of Guam (10°-15°N, 140°-150°E), 1962-1997.
Source: OFP 1998

	LONGLINE				POLE AND LINE		PURSE SEINE		TOTAL				
YEAR	BET	BLZ	YFT	TOTAL	SKJ	YFT	SKJ	YFT	BET	BLZ	SKJ	YFT	TOTAL
1962	204	166	544	914					204	166		544	914
1963	103	39	143	284					103	39		143	284
1964	165	122	303	589					165	122		303	589
1965	118	119	367	604					118	119		367	604
1966	74	88	295	457					74	88		295	457
1967	113	58	115	286					113	58		115	286
1968	113	65	232	410					113	65		232	410
1969	106	27	136	268					106	27		136	268
1970	77	53	198	329					77	53		198	329
1971	41	33	60	134					41	33		60	134
1972	42	19	51	111	649	4			42	19	649	55	764
1973	133	77	207	417	764	9			133	77	764	216	1,189
1974	431	206	760	1,396	199	1			431	206	199	761	1,597
1975	467	263	1,085	1,815	1,752	1			467	263	1,752	1,086	3,568
1976	474	152	1,136	1,762	199	3			474	152	199	1,139	1,964
1977	1,503	294	3,542	5,339	3,861	3			1,503	294	3,861	3,546	9,204
1978	586	244	4,196	5,026	1,753	41			586	244	1,753	4,237	6,820
1979	675	157	2,006	2,838	5,209	11			675	157	5,209	2,016	8,058
1980	168	63	527	757	1,289	24	4	0	168	63	1,293	551	2,075
1981	141	59	341	541	606	4	0	0	141	59	606	345	1,151
1982	105	53	136	293	914	4	0	0	105	53	914	140	1,211
1983	231	34	944	1,208	2,035	18	9	9	231	34	2,044	970	3,279
1984	346	118	517	981	202	15	54	54	346	118	256	586	1,307
1985	192	51	289	531	280	13	13	2	192	51	293	304	839
1986	215	56	408	678	3,740	39	164	103	215	56	3,904	550	4,725
1987	601	150	1,055	1,805	9,340	24	344	133	601	150	9,684	1,212	11,647
1988	368	94	684	1,146	840	18	506	183	368	94	1,346	885	2,693
1989	186	42	372	600	202	5	20	20	186	42	222	397	848
1990	286	21	185	492	3,257	14	0	0	286	21	3,257	200	3,764
1991	642	52	612	1,306	1,139	11	62	28	642	52	1,201	651	2,545
1992	500	83	745	1,328	282	0	10	5	500	83	292	750	1,625
1993	832	130	850	1,813	3,225	18	209	139	832	130	3,425	1,008	5,395
1994	332	29	381	743	2,295	15	127	13	332	29	2,422	410	3,193
1995	1,139	104	1,001	2,243	0	0	1,397	271	1,139	104	1,397	1,272	3,911
1996	505	75	555	1,134			764	81	505	75	764	636	1,980
1997	123	5	52	181	0	0	13	13	123	5	13	65	206

Domestic pelagic fisheries in Guam

There are three sources of locally-caught fish in Guam's commercial market: (1) full-time commercial fishermen; (2) part-time commercial fishermen; and (3) subsistence or recreational "expense" fishermen who frequently sell portions of their catch to help defray costs
Licenses are not required to sell fish in Guam, nor are there any reporting requirements for those selling fish.

Prior to establishment of the Guam Fishermen's Cooperative Association (GFCA) in 1979 there was no central place to sell fish, and fishermen had to develop their own markets and peddle fish after each trip. In 1982, the Western Pacific Fisheries Information Network (WPacFIN) began working with the GFCA to improve their invoicing system and to obtain data on all fish purchases. As time progressed, other fish markets began to operate, and DAWR and WPacFIN staff worked with GFCA to obtain data through the voluntary receipt book program. Although a proposed law has been introduced several times that would require reporting by dealers and

possibly commercial fishermen, it has never made it through the legislative process, and the commercial landings data collection system remains voluntary.

The composition of Guam's fishery landings by fishing sector has troll fishing for pelagics forming almost 80 percent of the landings (Figure 8), with just over 40 percent of total troll landings coming from non-commercial troll fishing. The remainder of the landings includes charter fishing (7%) and bottomfish fishing (19%). Guam's fishing activity can be somewhat constrained by seasonality due to weather. In general, lower fishing activity is seen during the November to March period when sea conditions are at their worst.

Estimated annual total pelagic landings and tuna landings have varied widely, ranging between 301,504 and 935,809 lb in the 29-year time series for the total catch (Table 5, Figures 9 and 10). The 2010 total pelagic landings were approximately 726,301 lb, and with an overall average price per pound of $1.81, and value just under $1.0 million (Table 6). Non-charter trolling trips have always accounted for the bulk of the pelagic catch, although charter boats, which make up less than 5% of the troll fleet, account for a high proportion of trolling effort and catch (Figure 10). Prior to 1988, non-charter boats accounted for over 90% of the troll catch. In 1988, this percentage decreased due to an increase in charter boat activity catering specifically to Asian visitors. Beginning in 1996 however, a downturn in Japan's economy caused a significant decrease in charter trips and subsequent landings. No such trend is observed for non-charters. Compared to 2009, 2010 total pelagic landings increased .8%, non-charter landings were virtually unchanged, while charter landings increased 12%. Non-charter boats landed 91.6% of all pelagics in 2009.

Skipjack tuna catch has fluctuated over the reporting period, peaking in 2001 (Figure 11). The reason for the large skipjack catch in 2001 is not clear, but is likely tied to local abundance. The drop in skipjack tuna catches the following year is likely an effect of two super typhoons making landfall and disrupting fishing operations. Total skipjack tuna landings and non-charter landings decreased in 2010 compared to 2009 by 2.5% and 3%, respectively. 2010 charter landings increased by 10%. 2010 total catch was 81% above the 29-year average.

Despite decreasing revenues with decreased commercial landings over the past decade, pelagic fishing continues, as a majority of trollers do not rely on the catch or selling of fish as their primary source of income. Several factors in recent years have negatively affected trolling activity and may affect fishing activity in the future. The price of fuel has increased significantly; making it more costly to fish and also more attractive to sell fish to recoup costs. More than two-thirds of the FADS have been lost and not replaced, and difficulties with procurement have prevented timely redeployment of these aids to fishing. Trolling activity occurs regularly at FADs, and is reported to have occurred with regularity at offshore banks. However, fishermen also reported more interaction with sharks at offshore banks.

Another factor that will have a direct affect on localized fishery resources in Guam is the likely increase in fishing pressure (e.g., trolling) associated with the Guam military buildup, as well as an expected increase in market demand to supply both local and imported fish products to incoming workers and residents. While the levels of additional trolling and demand of addition fish product can't be quantified at this time, future analyses and data monitoring programs will

be increasingly important in understanding the changing dynamics associated therein. No additional longline or purse seine vessels are expected as a direct result of the military buildup.

The number of boats involved in Guam's pelagic trolling or open ocean troll fishery gradually increased from 193 vessels in 1983 to a peak of 469 in 1998 (Table 7). This number decreased until 2001, but has generally been stable since that year. There were 432 boats involved in Guam's pelagic troll fishery in 2010 (Table 7 and Figure 12). A majority of the fishing boats are less than 10 meters (33 feet) in length and are usually owner-operated by fishermen who earn a living outside of fishing. Most fishermen sell a portion of their catch at one time or another. And a small, but significant, segment of the pelagic group is made up of marina-berthed charter boats that are operated primarily by full-time captains and crews.

Non-charter and charter troll trips generally increased for the first 15 years of the 24-year time series (since 1982) shown in Figure 13. The number of troll trips began to decline in 1999, due to a number of factors including a continuing economic recession on the island, a decline in Asian visitors for charter boats, and an increase in cost to maintain, repair, and fuel boats for the average fishermen compared with fish caught for sale to make up for expenses. Five times as many non-charter trips were taken (8,978) than charter trips (1,736) in 2010.

In 2010, trolling catch rates (pounds per hour fished) declined compared to 2009 (Figure 14). Catch rates for skipjack tuna by the Guam troll fleet have fluctuated widely over the past 25 years (Figure 15). The wide fluctuations are probably due to the high variability in the year-to-year abundance and availability of the stocks, although skipjack tuna is caught year round. However, it is not possible to allocate species-specific effort, since effort used to target other species can result in an artificially high or low catch rate for a given species. Although total skipjack CPUE has increased, the overall decreases are primarily a reflection of the low CPUEs for yellowfin tuna, mahi mahi and blue marlin (Figures 16 through 19). Charter catch rates have generally been lower than catch rates of non-charter boats, probably due to their shorter fishing time, and non-charter boats beginning earlier in the morning and ending as late as early evening.

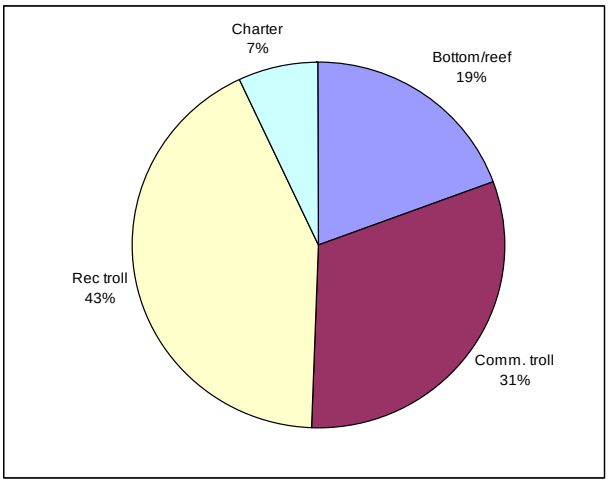


Figure 9: Guam fishery landings by origin (2001-2006)
Source: WPacFin data

Table 5. Estimated Total Guam Pelagic Landings (lb) 1982-2010

Year	Catch lbs						
	Mahimahi	Wahoo	Blue Marlin	Skipjack	Yellowfin	Other species	Total
1982	112,202	55,909	21,787	126,652	112,654	17792	446,996
1983	156,340	86,530	30,402	97,802	65,996	13753	450,823
1984	26,080	53,847	49,711	218,556	68,048	8614	424,856
1985	72,699	130,304	54,319	107,815	93,018	18999	477,154
1986	102,921	69,583	57,105	77,735	55,611	18395	381,350
1987	79,601	86,203	49,508	61,767	41,475	19896	338,450
1988	332,874	96,996	60,863	210,185	84,102	27941	812,961
1989	95,975	127,096	86,163	128,015	40,355	28193	505,797
1990	140,293	85,280	94,796	149,312	72,314	17370	559,365
1991	415,007	59,132	96,962	122,378	44,068	15171	752,718
1992	85,017	79,894	82,965	123,903	134,653	16927	523,359
1993	234,979	62,550	57,992	109,582	50,350	32842	548,295
1994	138,014	50,457	76,633	188,784	71,221	20808	545,917
1995	327,394	77,369	76,703	178,635	93,424	27864	781,389
1996	327,604	146,926	64,527	238,409	107,023	51320	935,809
1997	265,157	65,034	90,777	219,177	90,167	29620	759,932
1998	264,695	158,230	43,872	201,666	137,392	35957	841,812
1999	161,935	76,338	80,537	124,452	128,026	61066	632,354
2000	85,585	70,484	86,565	267,541	76,606	27929	614,710
2001	183,278	119,765	33,302	331,768	57,929	28986	755,028
2002	173,130	72,643	53,761	176,356	45,089	13899	534,878
2003	84,739	64,266	68,204	185,575	71,626	40410	514,820
2004	195,340	120,288	38,845	168,232	104,845	65667	693,217
2005	105,715	43,906	9,270	99,391	24,884	18338	301,504
2006	162,512	105,878	29,222	146,658	28,049	38289	510,608
2007	258,260	44,354	18,994	156,651	47,833	33799	559,891
2008	111,811	98,345	9,704	295,250	19,888	15083	550,081
2009	146,649	130,733	32,605	331,063	50,279	28,562	719,891
2010	288,427	45,407	30,811	322,482	24,599	14,575	726,301
Average	177,043	85,646	54,721	178,131	70,397	27,175	593,113

Source WPRFMC 2011 and unpublished data

Table 6: Guam 2010 Landings and Prices

Fish	Landing (lb)	Value ($)	Avg Price ($/lb)
Skipjack Tuna	296,121	467,871	1.58
Yellowfin Tuna	19,899	41,588	2.09

Fish	Landing (lb)	Value ($)	Avg Price ($/lb)
Tunas (misc.)	4,459	89,18	2.00
Tuna PMUS	**320,479**	551,223	**1.72**
Mahimahi	111,746	208,965	1.87
Wahoo	98,865	197,730	2.00
Blue Marlin	9,707	13,783	1.42
Sailfish	283	464	1.64
Oceanic sharks	508		n/a
Pomphrets	2,672		n/a
Non-tuna PMUS	**223,781**	396,092	**1.77**
Dogtooth Tuna	2,622	4,011	1.53
Rainbow Runner	2,455	5,351	2.18
Barracuda	2,167	4,290	1.98
Non-PMUS Pelagics	**7,244**	14,053	**1.94**
Total Pelagics	**551,504**	998,222	**1.81**

Source: WPRFMC 2011

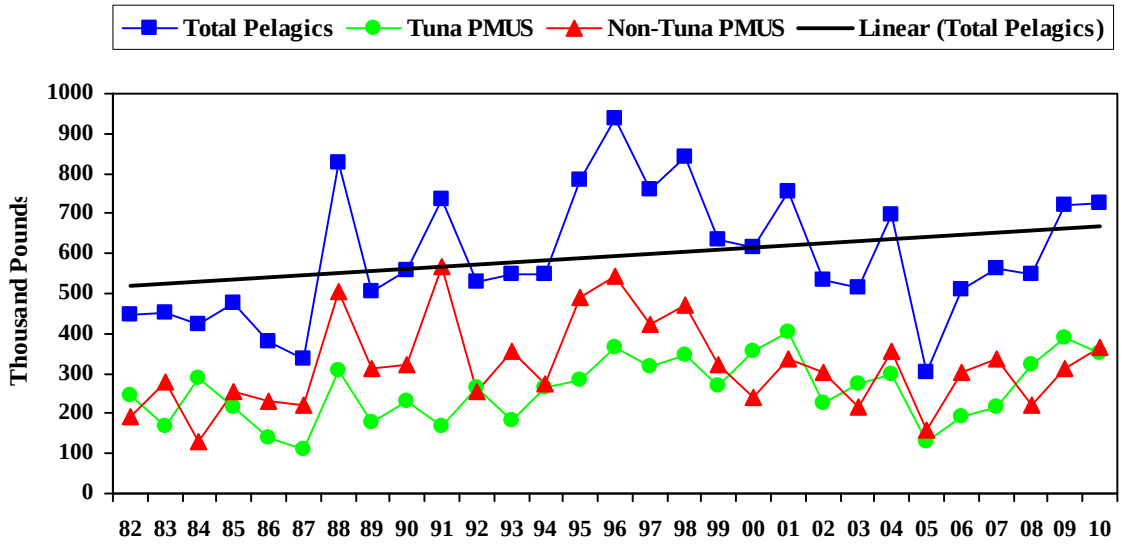


Figure 10: Guam Annual Estimated Total Landings: All Pelagics, Tuna PMUS, and Non-Tuna PMUS 1980-2010
Source: WPRFMC (2010)

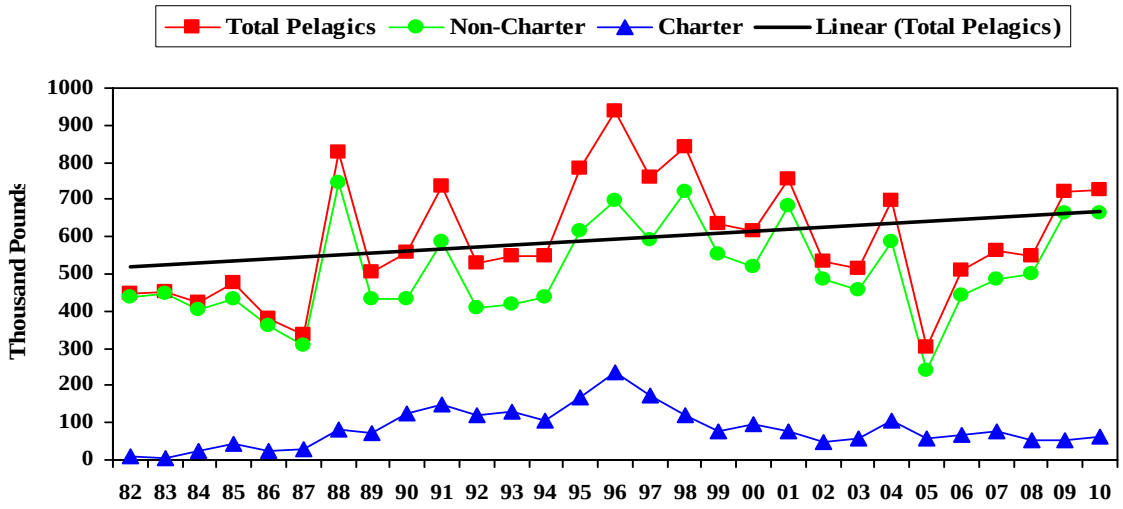


Figure 11: Guam Annual Estimated Total Tuna PMUS Landings 1982-2010
Source: WPRFMC 2010

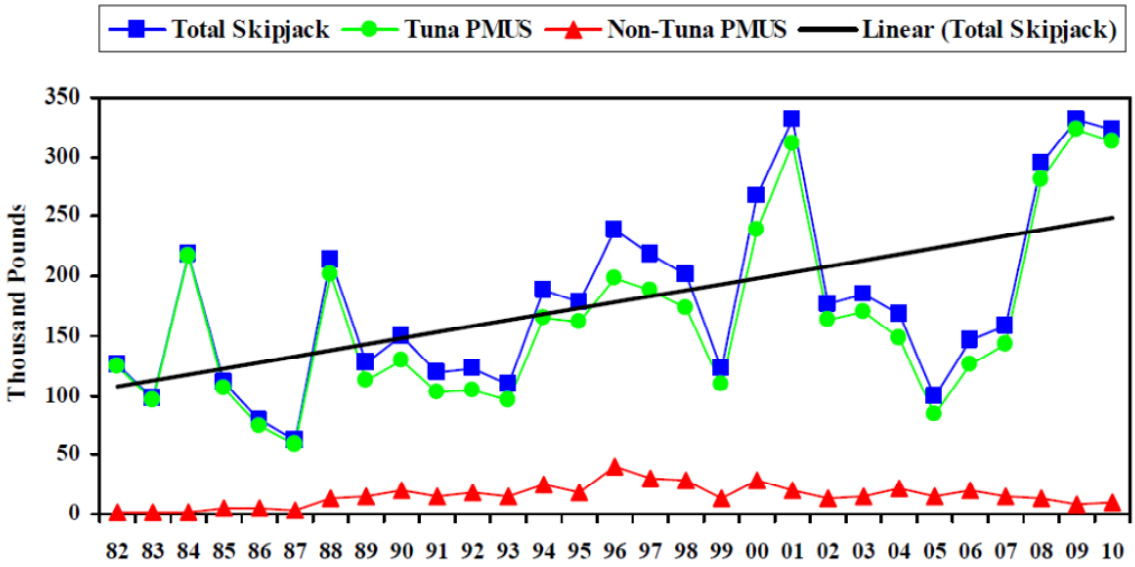


Figure 12: Guam Annual Estimated Total Skipjack Landings 1982-2010
Source: WPRFMC 2010

Table 7: Estimated Number of Guam Trolling Vessels

Year	Estimated number of boats	Upper 95% CL	Lower 95% CL

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

Source: WPRFMC 2009

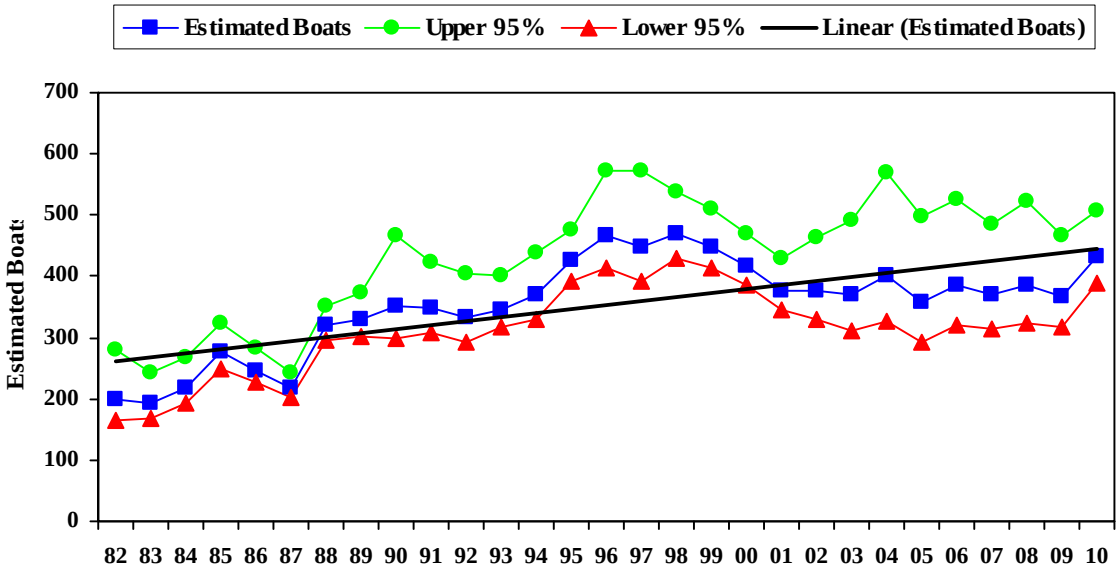


Figure 13: Guam Estimated Number of Trolling Boats 1982-2010
Source: WPRFMC 2009

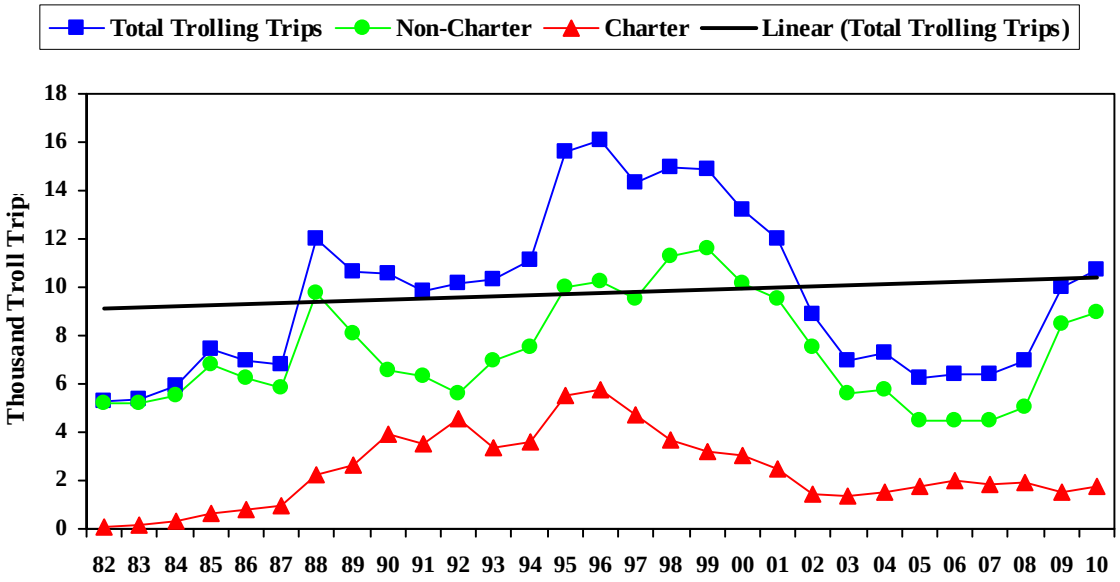


Figure 14: Guam Estimated Number of Troll Trips
Source: WPRFMC 2009

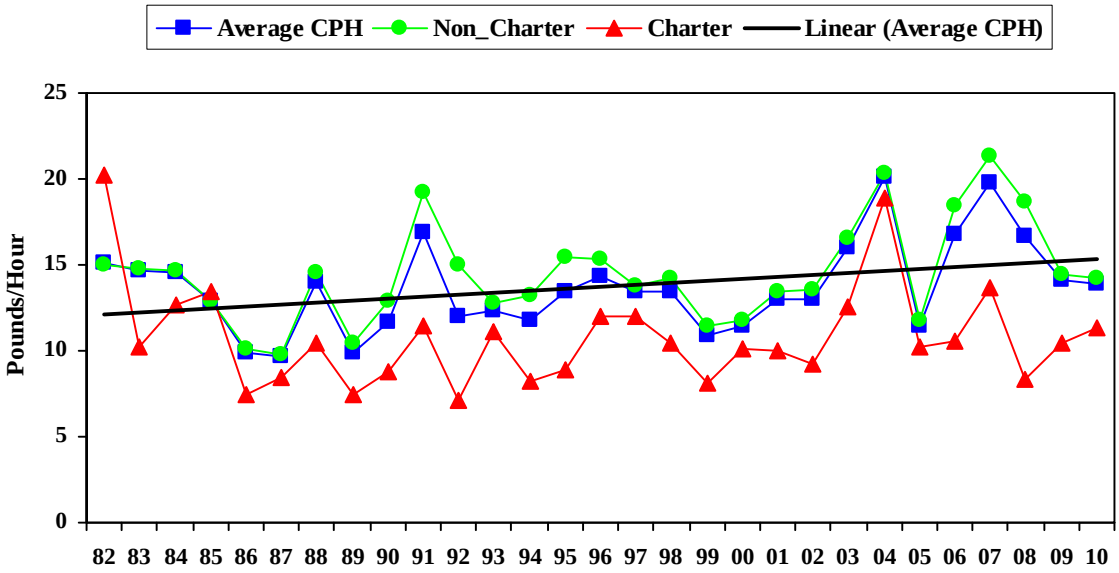


Figure 15: Guam Trolling CPUE (lb/hour) 1982-2010
Source: WPRFMC 2010

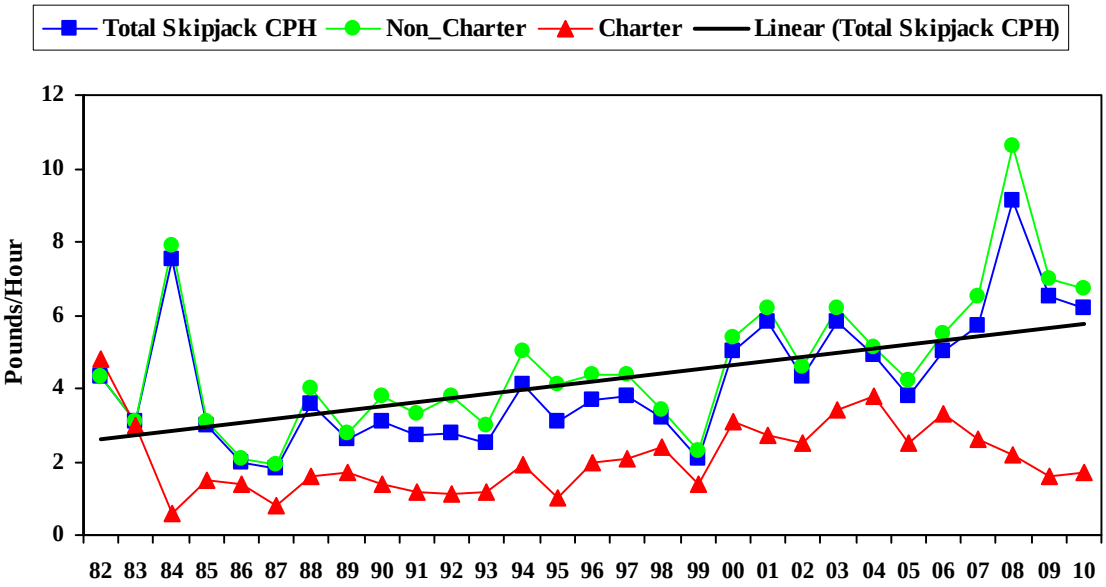


Figure 16: Skipjack CPUE (lb/hour): All, Non-charter, and Charter Vessels 1982-2008
Source: WPRFM 2010

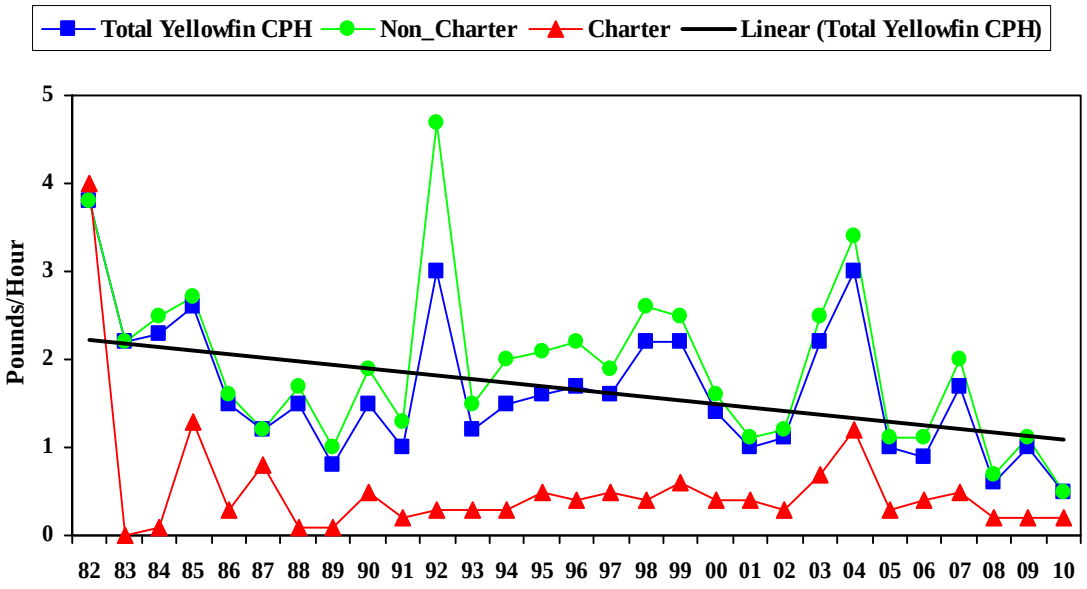


Figure 17 Yellowfin CPUE (lb/hour): All, Non-charter, and Charter Vessels 1982-2008
Source: WPRFMC 2010

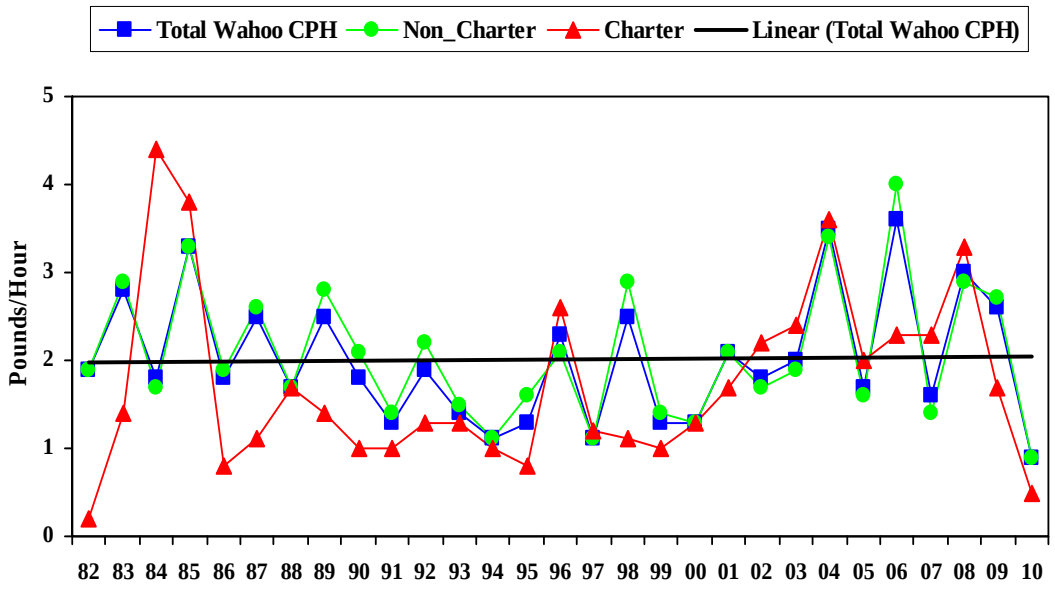


Figure 18: Wahoo CPUE (lb/hour): All, Non-charter, and Charter Vessels 1982-2008
Source: WPRFMC 2010

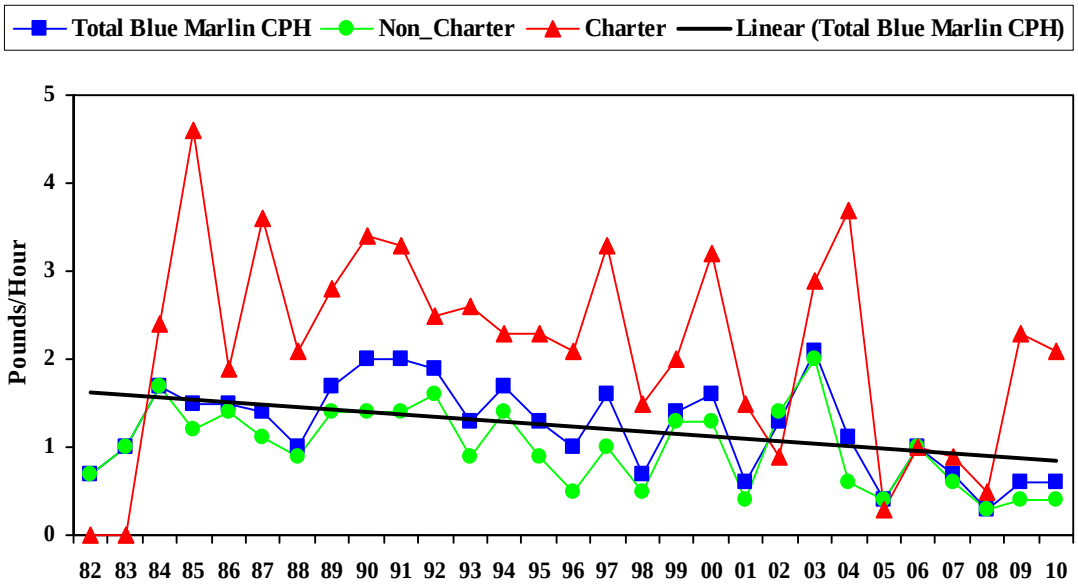


Figure 19: Blue Marlin CPUE (lb/hour): All, Non-charter, and Charter Vessels 1982-2008
Source: WPRFMC 2009

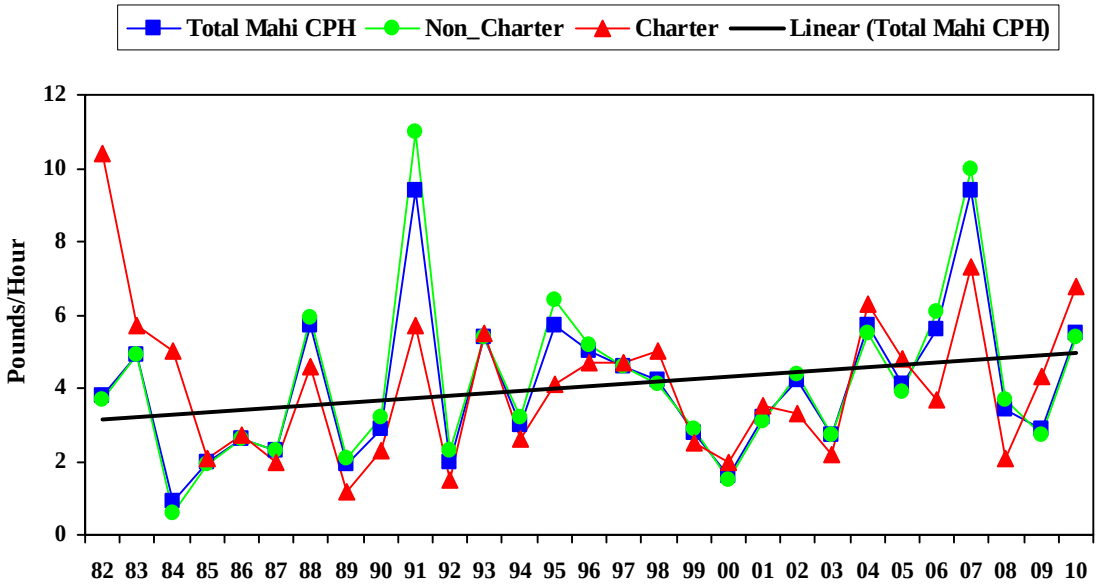


Figure 20: Mahimahi CPUE (lb/hour): All, Non-charter, and Charter Vessels 1982-2008
Source: WPRFMC 2009

Guam domestic longline and purse seine fishing operations

Guam has one longliner and no domestic purse seine vessels in current operation. Catches from the single longline vessel cannot be reported due to confidentiality requirements.

8.4 WCPO Purse Seine Tuna Fishery

Purse seine fishing for tuna involves setting a net vertically in the water, with floats attached to the upper edge and chains for weight on the lower edge. A series of rings is attached to the lower edge of the net, and a pursing cable passes through the rings, enabling a winch on board the vessel to draw the net closed on the bottom. Purse seine nets can be up to 1,600 meters (m) or more in length and 220 m in depth. When the net is deployed from the purse seine vessel, a large skiff carrying the end of the net is then released from the stern of the fishing vessel. While the skiff holds one end of the net, the purse seine vessel circles and encloses the school of tuna, keeping it in visual contact if on the surface, or by using sonar if below the surface, and then retrieves most of the net onto the vessel. The fish are confined in the "sack" portion of the net, which consists of finer mesh webbing that prohibits their escape. The catch is removed from the sack onto the vessel with large "scoops" holding one mt or more, and then is placed in brine tanks for freezing and later storage (NMFS 2006). Purse seiners are one of the most complex classes of fishing vessels in terms of both technology and machinery.

Fishing by U.S. vessels in the WCPO purse seine tuna fishery currently occurs outside of the U.S. EEZ around Guam and CNMI. The purse seine tuna fishery is monitored by and operates under regulations promulgated by NMFS in accordance with the WCPFC. Summaries of the purse seine catch, total catch by species and total catch by pelagic fishing gear are shown in Figures 20-22.

The estimated delivered value of the purse seine tuna catch in the WCPFC area for 2010 was $2,480 million, an increase of $119 million or 5 percent increase on the estimated delivered value of the catch in 2009 (Williams and Terawasi 2011). In NOAA's 2011 annual report to the WCPFC, the domestic purse seine fishery was the largest U.S. fishery in 2010, accounting for 94 percent of the total U.S. catch of skipjack, yellowfin, bigeye, and albacore tuna in the WCPO. Total U.S. purse seine landings increased to 246,133 metric tons (mt) (or 177 percent over 2007 landings). Yellowfin tuna catches in the fishery increased from 10,541 mt in 2007 to 25,686 mt in 2010, and skipjack tuna catches increased from 75,210 mt in 2007 to 215,587 mt in 2011.

The fishery operated mainly in areas between 5° N and 10° S latitude and 150° E and 180° longitude in 2008; below the U.S. EEZ around the Mariana Islands which resides between 11° N and 24° N (Figure 1). Before 1995, the fleet in the WCPO fished mainly on free-swimming schools of tunas. Though highly variable during the last 5 years, the fleet has been fishing equally on free-swimming schools and schools associated with floating objects, including logs and fish aggregating devices (FADs). In 2010 there were about 280 purse seine vessels in the region (Williams and Terawasi 2011). Thirty seven of those vessels were U.S. permitted purse seine vessels.

The majority of the catch is taken by the distant water fishing nations (DWFN) fleets of Japan, Korea, Chinese Taipei, and the U.S. comprising of 137 vessels in 2011, down from 147 in 1995. In recent years, increasing numbers of Pacific Island domestic or joint venture vessels (i.e., Australia, New Zealand) have joined the fishery as well as some new distant water entrants (e.g., China). There has been a steady increase in the number of vessels from Pacific Island fleets, which totaled 78 vessels in 2008 (Williams and Terawasi 2008). Skipjack makes up 70-85

percent of the total WCPO purse seine fishery landings with yellowfin accounting for 15-30 percent (Williams and Terawasi 2011)

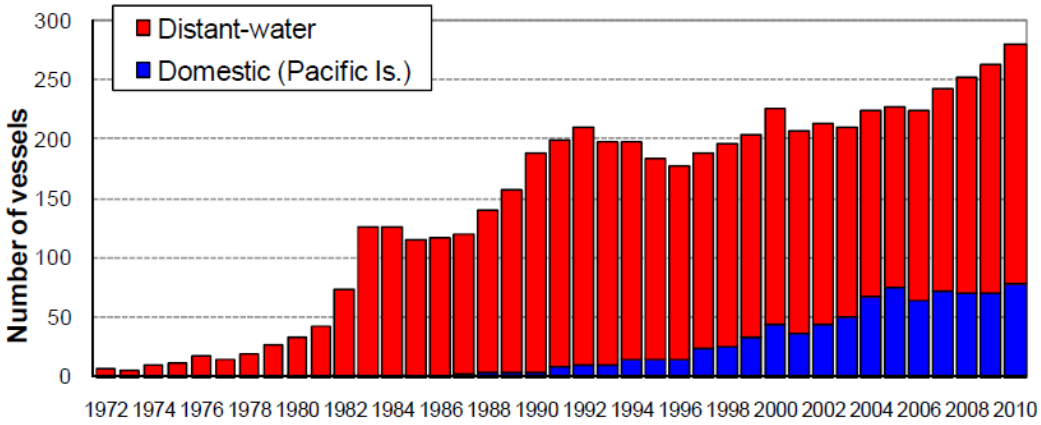


Figure 21: WCPO Purse Seine Vessels 1972-2010
Source: Williams and Terawasi. 2011

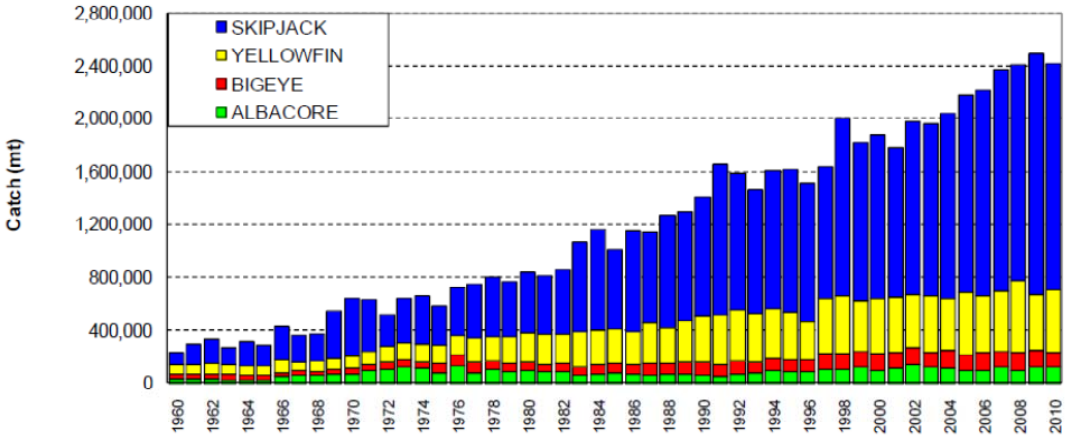


Figure 22: Catches of tuna in the WCPFC Statistical Area, by species
Source: Williams and Terawasi (2011)

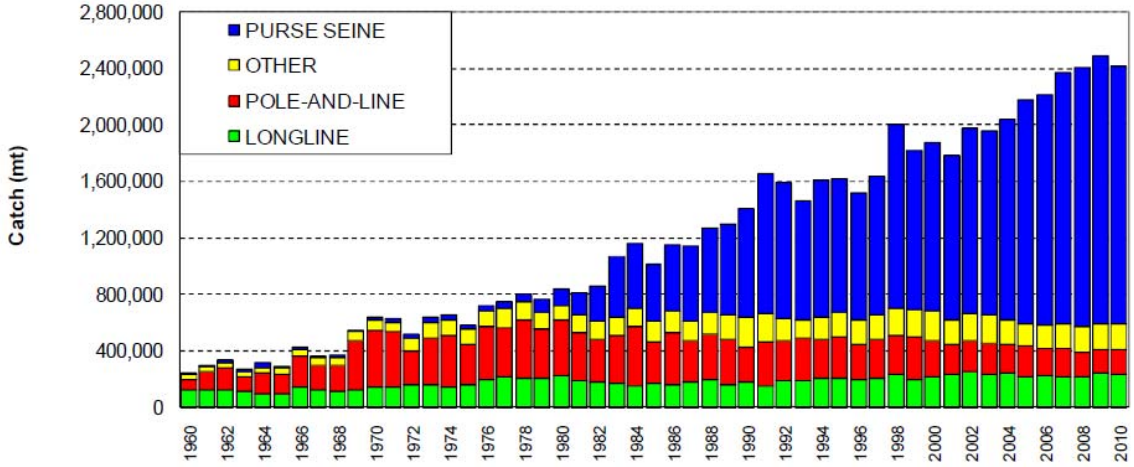


Figure 23: Catches of tuna in the WCPFC Statistical Area, by gear type
Source: Williams and Terawasi (2011)

The numbers and landings of active distant water fishing nations' purse seine vessels in the WCPO during 2007 are listed in descending order of catch in Table 8.

Table 8: Numbers and Landings of Active DWFN Purse Seine Vessels in the WCPO, 2009

Country	vessels	SKJ Catch (mt)	YFT Catch (mt)	BET Catch (mt)	TOTAL
Korea	27	257,481	23,647	2,140	283,421
Japan distant water	72	192,437	33,035	3,433	231,922
Chinese Taipei	33	173,725	16,237	2,113	192,388
PNG	41	160,782	41,976	6,512	209,333
Philippines distant water	25	3781	21823	1,693	61,707
USA	38	241,916	20,942	5,931	268,851
Vanuatu	6	25,454	2,035	351	37,853
Marshall Islands	6	40,517	1,577	2,248	44,349
China	12	67,635	7,073	1,535	76,670
Philippines distant-water	12	864	11,792	21,562	34,413
New Zealand	6	25,143	1,264	204	26,625
Philippines domestic ring-net and purse seine	(164)*	153,598	28,728	2,954	266,618
Spain	4	3,040	4,019	12,688	19,747
Solomon Islands	7	9,464	8,096	193	17,758
FSM	6	16,784	1,807	545	19,143
Kiribati	1	103	1,169	4,178	5,450
Japan coastal**	18	2	87	1,024	1,113
Totals	478	1,372,726	225,307	69,304	1,797,361

Source: WCPFC (2010)
* This number is divided between domestic purse seine and ringnet gear vessels
*data from 2004

Purse seine fishing targeting skipjack is currently and has historically occurred near EEZ waters around the Mariana Archipelago, although no catches have been reported from within the EEZ

waters. Japan is the primary nation purse seining in closest proximity to the Mariana Islands, both to the north and the south (Figure 23 and 24). This document utilizes Japan's purse seine catch data (CPUE and species composition) as a proxy for being most representative of what purse seine catches from EEZ waters around the Mariana Islands would be like, if purse seine fishing were to occur there (Table 9). Based on the WCPFC 2009 Tuna Fishery Yearbook, there were 72 active Japanese distant water purse seine vessels in 2009 (WCPFC 2010). The three-year averages (2004 – 2006) are shown in Table 9 below. The average number of days fished by the Japanese DWFN vessels over the three years was 235 days per vessel.

The Federated States of Micronesia (FSM) has a relatively large-scale fishing operation with annual purse seine catches exceeding 200,000 mt in some years; however, most of this catch is taken by foreign vessels fishing under charter access arrangements. In 2004 there were six FSM flag purse seiners which caught a total of 27,000 mt. Since then, two vessels have left and one has sunk; the three remaining vessels are partly owned by State governments, with shareholding recently acquired by management of the two companies[10].

Table 9: Japan's Average Distant Water Purse Seine Catches, 2006-2007

	Skipjack Catch (t)		Yellowfin Catch (t)		Bigeye Catch (t)		Total Catch (t)	
	Per Year	Per Day	Per Year	Per Day	Per Year	Per Day	Per Year	Per Day
Fleet	209,915	1,828	32,077	280	4,351	38	263,772	2,297
One Vessel	2,999	26	458	4	62	0.54	3,768	33

Source: WCPFC Yearbook 2008[11]

[10] http://www.ffa.int/system/files/Trip+report+-+Palau,+FSM,+RMI.pdf

[11] Tuna Yearbooks after 2007 did not include the number of days fished by purse seine vessels

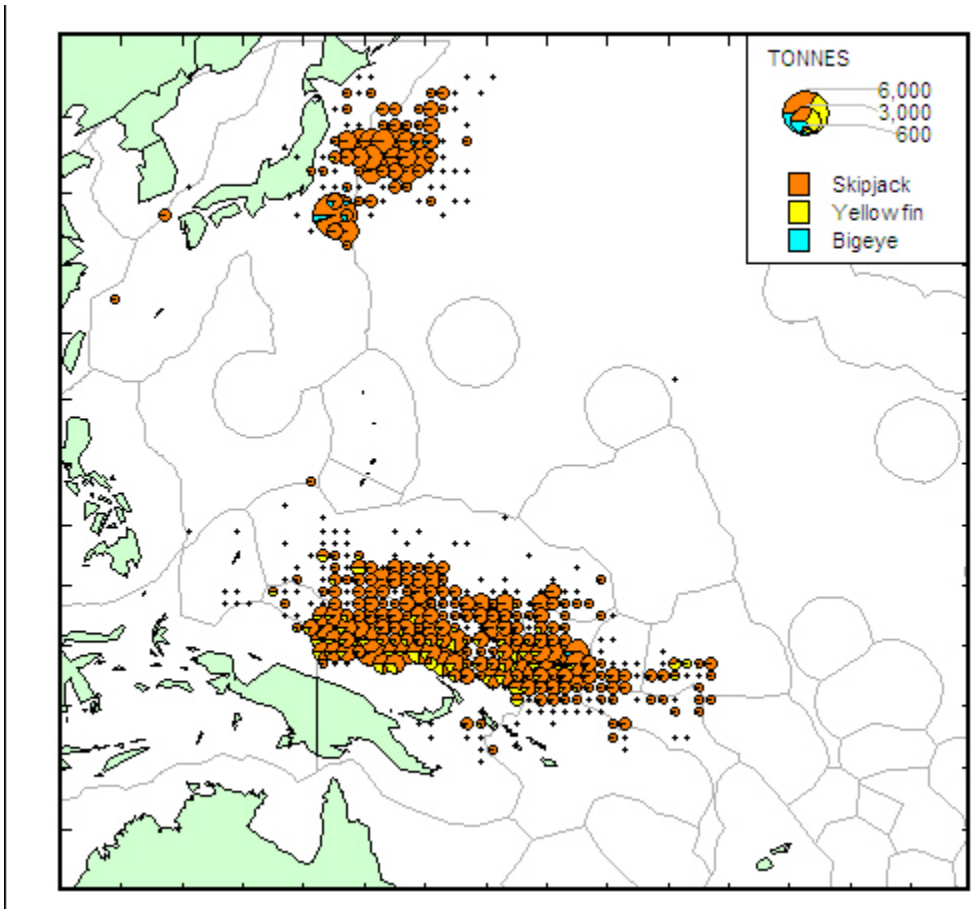


Figure 24: Japanese Purse Seine Catch by Location, 2007
Source: WCPFC Yearbook 2007

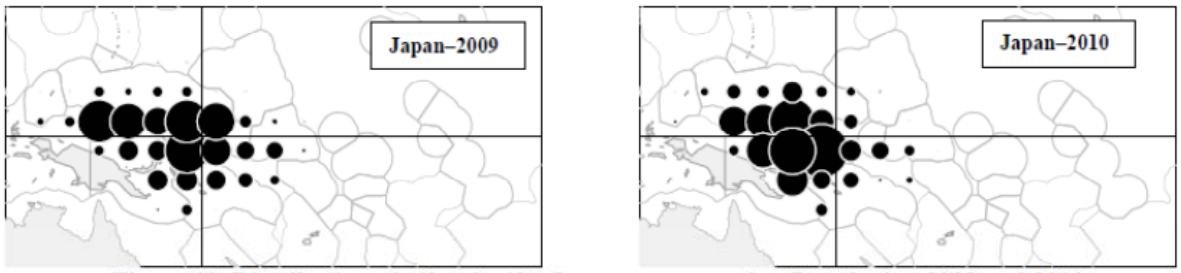


Figure 10. Distribution of effort by the Japanese purse seine fleet during 2008 and 2010
lines for the equator (0° latitude) and 160°E longitude included.

Figure 25: Japan Purse Seine Catch by Location, 2009 and 2010
Source: Williams and Terawasi (2011)

FAD Fishing

There have been increases in the amount of purse seine fishing effort around FADs especially by the U.S. fleet. In 2006, approximately 80 percent of U.S. purse seine sets were associated sets where they set on FADs or other floating objects (Reid 2007).

Deployment of FADs leads to an increased risk that the migratory behavior of tuna in the western Pacific might be affected as FADs may retain tuna in areas where they would otherwise quickly pass through, and not be enticed by concentrated forage to remain. This behavioral modification could affect their biological parameters (growth, maturity, survival) and population dynamics. These potential effects on the population dynamics of tunas and on their ecosystem are largely unknown and require research attention. Most large skipjack tuna (i.e. over 70 cm) are caught by unassociated sets whereas FAD sets and pole-and-line fishing account for most of the smaller sized skipjack catch in the WCPO tuna fishery (OFP 2007a). In addition, purse seine catch composition is more varied when fishing around FADs and their use may have higher impacts on biodiversity as compared to purse seine fishing unassociated with FADs (Langley et al. 2006).

As a tuna fishery conservation and management measure, the WCPFC has been considering taking further action to reduce fishing on FADs by prohibiting FAD sets in EEZs and on the on the high seas, as was proposed at the fourth Commission meeting (WCPFC 2007). If this is finalized, such a measure as this could have a substantial impact on the U.S. fleet which is highly reliant on FAD sets (Figure 25)

Currently, the WCPFC implemented a 2-month FAD closure during August-September (WCPFC 2009). As of August, 2010, there has not yet been a WCPFC regulation prohibiting FAD sets in EEZs or in the high seas. It should be noted, however, that even if a prohibition on FAD sets in the EEZs and high seas were to be implemented by the WCPFC, this would not result in an increase in purse seine fishing in the U.S. EEZ of the Mariana Islands. Figure 26 below shows the distribution of total purse seine effort in the WCPO, 2003-08, by days fishing. The pink shading shows the extent of average sea surface temperature (SST) >28.5°C

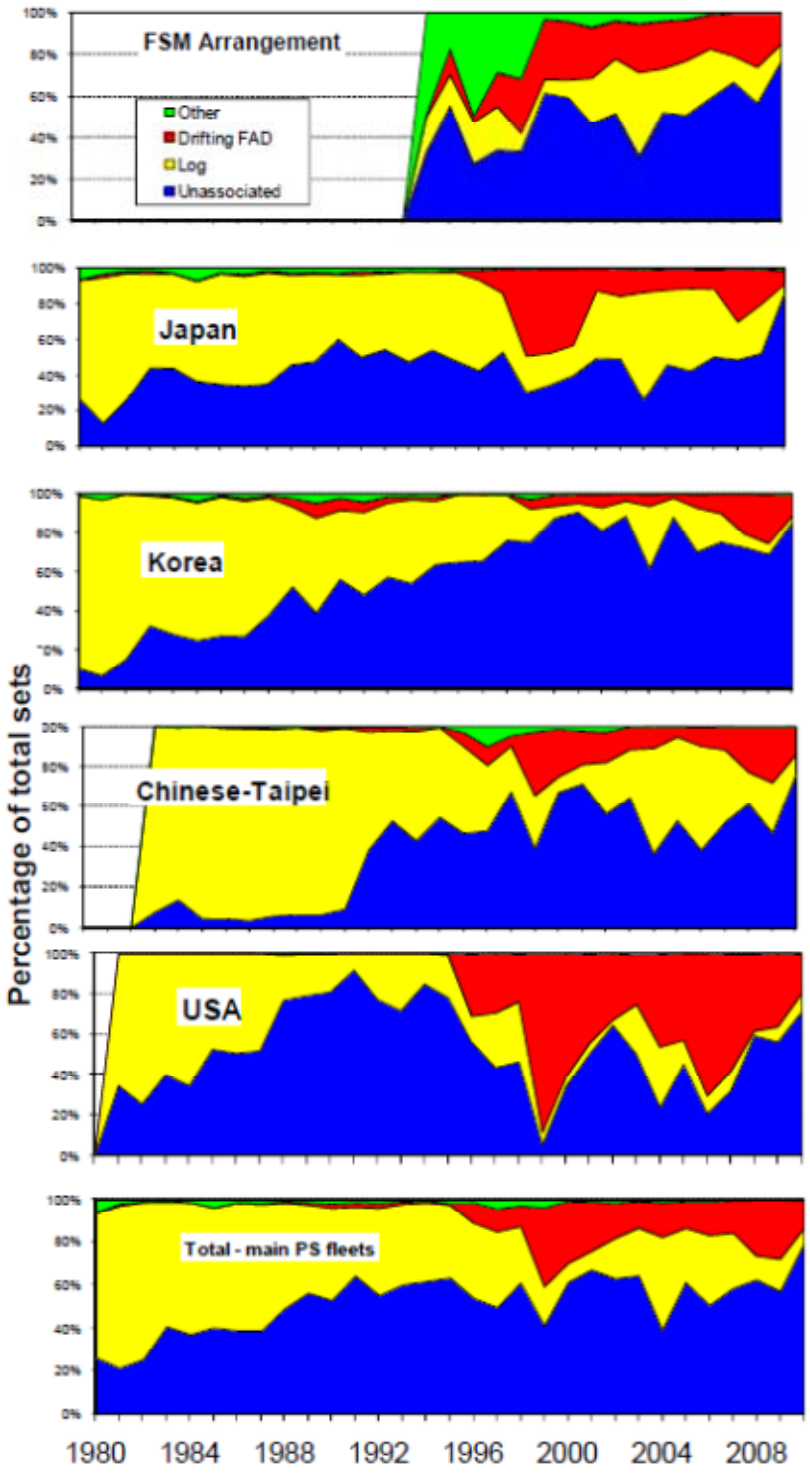


Figure 26: Time series showing the percentage of total sets by school type for the major purse-seine fleets operating in the WCPO, 1980-2010. Source: Williams and Terawasi (2011)

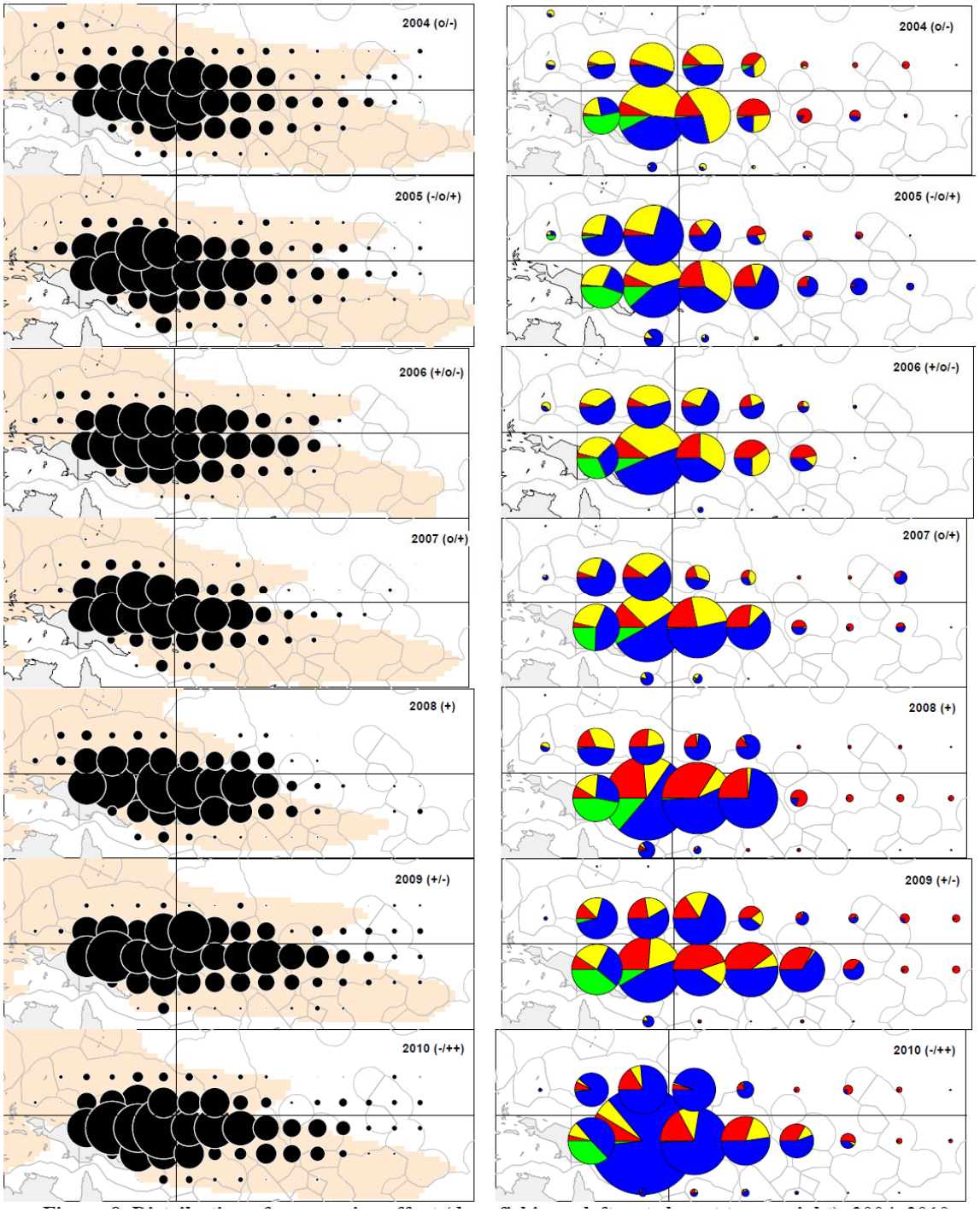


Figure 27: Distribution of purse-seine effort (days fishing – left; sets by set type – right), 2004–2010.
(Blue–Unassociated; Yellow–Log; Red–Drifting FAD; Green–Anchored FAD). Pink shading represents the extent of average sea surface temperature > 28.5°C ENSO periods are denoted by "+": La Niña; "-": El Niño; "o": transitional period. Source: Williams and Terawasi (2011)

WCPO Purse Seine Fishery Capacity

Through the Palau Arrangement and the FFA, the Pacific Island countries (PICS) maintains a register of fishing vessels allowed to operate in the WCPO region (Figure 27) which is currently set at 205 purse seine vessels allowed to operate in the region at any one time. Of the 205 total, the U.S. is allotted up to 40 licenses (+ 5 reserved for vessels owned by joint ventures between U.S. and PIC interests) in accordance with the SPTT[12]. In the event that the U.S. does not fully utilize its full complement of 40 licenses in any fishing year, the unused portion of the licenses is added to "the special arrangements category". These are licenses that may be issued under the FSM Arrangement[13] or on a bilateral basis to get to the 205 total for the year. In addition to limiting the number of purse seine vessels operating in the WCPO region to 205, the PICS implemented a vessel day scheme (VDS). Under the VDS, each purse seine vessel operating in the region will be allocated a given number of days to fish within the EEZ of the relevant PICS issuing the days. According to the PICS, the number of fishing days allotted to a vessel will correlate to the size of the vessel and the conservation concerns of the PICS. U.S. vessels are not subject to the VDS.

Some Pacific Island nations are beginning to restrict access to fish in their EEZ waters, such as the Cook Islands who now prohibit purse seine fishing in their waters except by SPTT nations [of which the U.S. is a member]; the Kiribati Islands and other members of the Parties to the Nauru Agreement (PNA Group)[14]. These measures are being implemented to protect the tuna stocks of the PICS and possibly reduce impacts on small-scale and artisanal fleets which target skipjack and yellowfin.

In addition, to strengthen conservation and management of tuna in the Pacific Islands, fishery management measures taken in the WCPO are also moving toward imposing restrictions to distant water fishing nations (DWFNs), including bans on high seas fishing in areas between their EEZs[15].

[12] See http://www.fpir.noaa.gov/IFD/ifd_sptt.html
[13] See http://www.ffa.int/taxonomy/term/443
[14] http://www.ffa.int/node/1101
[15] See http://www.ffa.int/node/330

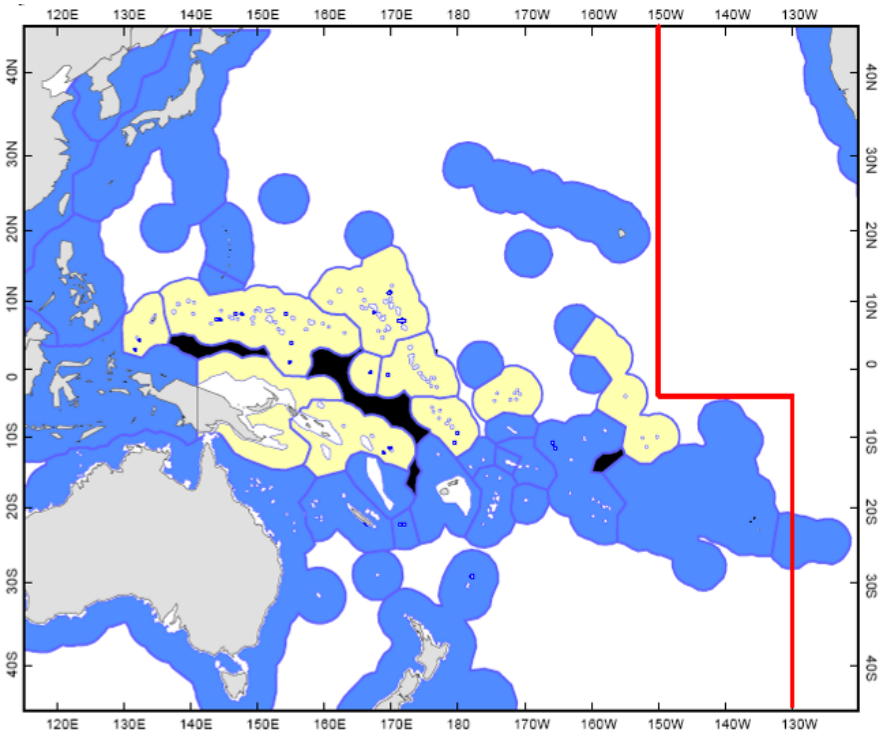


Figure 28: The WCPFC Convention Area. The PNA Exclusive Economic Zones (EEZs) are shown in yellow (light), Archipelagic Waters and Territorial Seas for Pacific Island Countries and Territories, Australia and New Zealand are shown in white within the EEZs. Coordinates for Archipelagic Waters and Territorial Seas for other CCMs were not available and are not shown. The high-seas pockets wholly enclosed by EEZs between 20 deg N and 20 deg S are shown in black[16].
Source:
http://www.spc.int/coastfish/countries/nauru/nfmra/laws/WCPFC_CMM_2008-01.pdf

All fishing vessels, especially vessels fishing for highly migratory fish need to roam over the ocean looking for fish. The closure of the two high seas pockets denies the purse seine fleets a substantial area of ocean in which they have previously operated looking for skipjack schools. The WCPFC high seas pocket closure on January 2010 forces purse seiners to concentrate their fishing within the EEZs of the Pacific Island nations clustered around the Western Pacific warm pool, or fish in high seas in the Central Pacific.

As discussed in Section 8.4.1., the U.S. fishery currently fishes under a treaty with the Pacific Island Nations (PINs), which expires in 2013. This treaty allows access to the EEZ waters of the PINs, including those of the PNA Group, and the ability to fish on the high seas. Like other purse

[16] The map in Figure 27 indicative maritime boundaries only. It is presented without prejudice to any past, current or future claims by any State. It is not intended for use to support any past, current or future claims by any State or territory in the western and central Pacific or east Asian region. Individual States are responsible for maintaining the coordinates for their maritime claims. It is the responsibility of flag States to ensure their vessels are informed of the coordinates of maritime limits within the Convention Area. Coastal States are invited to register the coordinates for their negotiated and agreed maritime areas with the Commission secretariat

seine fleets the U.S. fleet must abide by the Conservation and Management Measures of the WCPFC and is thus now unable to fish in the high seas pockets. The pocket that lies between the Federated States of Micronesia and Papua New Guinea has in the past been an important fishing ground for the U.S. purse seine fleet. Regardless, it is unlikely that the closure of the high seas pockets will greatly change the fishing behavior of the U.S. pure seine fleet, given its access to the PNA Group EEZs.

However, as will be discussed later under Section 9.2.6, the PNA Group intends to prohibit all high seas fishing as part of access agreements to their EEZs. Moreover, the renewal of the treaty beyond 2013 will likely be contingent on issues such as high seas fishing and the amount of vessel days allocated to the U.S. fleet. An unfavorable outcome may make the U.S. EEZ waters a more attractive proposition for fishing by the U.S. fleet, especially the Central Pacific equatorial EEZ segments (Howland and Baker, Jarvis, Palmyra and Kingman Reef), or around the Mariana Islands, the southern part of which borders the warm pool, and has proven skipjack resources (OFP 1998).

High Seas Fishery Compliance Act (HSFCA) permits are issued to vessels that carry an SPTT license. As of November 2009, 39 HSFCA permits with five-year durations have been issued. Two of these purse seine vessels were owned by a Guam limited liability company with majority U.S. ownership. These vessels transhipped their catches primarily where they fished, i.e. ports in the Federated States of Micronesia and Kiribati and have made few port calls into Guam or American Samoa. One vessel sank in June 2010, and the owners have indicated to NMFS that they are interested in replacing the lost vessel (Source: NMFS PIRO Division of International Fisheries). The remaining purse seine vessels are home ported in Pago Pago, American Samoa.

WCPO Purse Seine Vessel Capacity

Gillett and Lewis (2003) estimated the numbers and carrying capacities (amount of fish a vessel can store) of purse seine vessels participating in the tuna fishery of the WCPO during 1988, 1995 and 2003. They considered any vessel with a capacity greater than 400 cubic meters that fished during the year to be participating in the fishery in that year, and excluded vessels that fished only in the EEZs of Indonesia, the Philippines, Australia, New Zealand and other countries of the WCPO. For 1988, they estimated that there were 136 purse-seine vessels with a combined capacity of 140,000 cubic meters (average capacity equal to 1,073 cubic meters). For 1995, they estimated that there were 175 vessels, with a combined capacity of 200,000 cubic meters (average capacity equal to 1143 cubic meters). By 2003 the number of vessels had increased to 191, with a combined carrying capacity of 233,000 cubic meters. This represents a growth of 66 percent between 1988 and 2003 in the capacity of the purse-seine fleet in the WCPO.

In 2009, the U.S. domestic vessels had an average length of 212 ft (65 m) and an average gross registered tonnage (GRT) of 1,500. Fish carrying capacity was estimated to be 34,833 t for the U.S. fleet as a whole. This was an increase from 1995 when the average GRT was 1,181 with an average vessel length of 64.1 meters.

8.4.1 U.S. Purse Seine Fishery-History

Prior to beginning purse seine fishing operations in the Western Pacific, the U.S. fleet had been fishing out of California in areas of the eastern Pacific for decades. The main impetus for the transition from fishing in the eastern Pacific to the western Pacific was due to economic (overcapitalization) reasons, eroding relations with central America states over fishing access issues, increased management controls enacted by the IATTC, and difficulties over environmental concerns associated with fishing on tuna associated with dolphins. During the years when the fleet transitioned from fishing in the eastern Pacific to western Pacific operations U.S. vessels made several gear changes including deepening nets, installing larger power blocks and winches to accommodate larger seines, and using helicopters to spot schools of fish, among other changes (Gillett et al. 2002).

Under the South Pacific Tuna Treaty (SPTT), U.S. tuna fishing vessels are allowed access to fish in vast areas of the western and central Pacific Ocean (subject to certain conditions), including the exclusive economic zones of several Pacific Island States. In addition to the United States, the Parties to the Treaty include the 16 States of the South Pacific Forum Fisheries Agency (FFA): Australia, Cook Islands, Federated States of Micronesia, Fiji, Republic of Kiribati, Republic of the Marshall Islands, Republic of Nauru, New Zealand, Niue, Republic of Palau, Papua New Guinea, Solomon Islands, Kingdom of Tonga, Tuvalu, Republic of Vanuatu and Samoa. The Treaty entered into force on June 15, 1988. While the Treaty itself does not expire, the operational provisions were originally designed for a five-year period. In 1993, the operation of the Treaty was extended for 10 years, until June 14, 2003. The United States and the Pacific Island Parties extended operation of the Treaty for an additional 10-year period, through June 14, 2013.

Under the SPTT and corresponding South Pacific Tuna Act (SPTA), the U.S. provides, via an Economic Assistance Agreement associated with the SPTT, $18 million annually to the South Pacific Parties to the Treaty for economic development purposes. This is approximately 10 percent of the total amount of U.S. assistance provided to Pacific Islands with almost $190 million in assistance provided in FY 2006. Of this amount, about $150 million was comprised of grants from the United States to the Federated States of Micronesia, the Republic of the Marshall Islands, and Palau under the Compacts of Free Association administered by the Department of the Interior. The SPTT governs the conduct of U.S. fishing vessel operations in the Treaty Area. The Treaty Area, which is defined at 50 CFR 300.31, encompasses approximately 10 million square miles (26 million square kilometers). Licenses are issued by the Pacific Islands Forum Fisheries Agency (FFA), based in Honiara, Solomon Islands, which acts as the Treaty administrator on behalf of the Pacific Island Parties to the Treaty (PIPs). Currently, the Treaty allows for a maximum of 45 licenses to U.S. purse seine fishing vessels to fish in the Licensing Area of the Treaty. Of the 45 licenses, 5 are reserved for "joint venture" arrangements with PIPs.

NMFS has announced that persons who enter the purse seine fishery in the WCPO, as managed under the SPTA, the Western and Central Pacific Convention Implementation Act (WCPFCIA) and other laws, after March 28, 2008, are not guaranteed future participation in the fishery if NMFS decides to revise the criteria and procedures used to process license applications and/or to limit further the number of licenses available in the fishery. NMFS is considering the need to

undertake such actions in order to provide greater clarity about the process used and thus help license holders and prospective license applicants in making business decisions, as well as to fulfill the obligations of the United States under international agreements to which it is party.

Requirements for U.S. purse seine vessels fishing under the SPTT including 2007 regulatory changes including: (1) vessel monitoring system (VMS) requirements, (2) vessel reporting requirements, and (3) area restrictions may be found in NOAA's "Small Entity Compliance Guide for the Regulations Implementing the Third Extension of the South Pacific Tuna Treaty for Purse Seine Vessels," June 14, 2007[17]. For comprehensive regulatory information please see 50 CFR 300 subpart D.

Foreign purse seine vessels have infrequently fished in the vicinity of Guam, as shown in Table 4, with effort less than 50 boat days since 1980 and an average catch of 500 mt and a high catch of 1,675 mt (OFP 1998). In the vicinity of CNMI, purse seine activity is rare as shown in Table 1 and was reported for only five years since 1980 with the largest catch reported by foreign fleets of 455 mt (434 SKJ and 21 YFT)(OFP 1998).

Before 1995 the purse seine fleet in the WCPO fished mainly on free-swimming schools of tunas; i.e., unassociated sets, perhaps because these sets result in increased value of catch due to large size of fish and the possibility of setting on pure yellowfin schools despite the lower success rates of these types of sets (Gillett et al. 2002). This trend peaked in 1991 when 90 percent of sets were made on unassociated schools and the fleet achieved its highest catches of 216,000 tons (Coan et al. 2002 in Gillett et al. 2002). In 2007, the U.S. fleet made 65 percent of all sets on drifting FADs which is a considerably higher percentage than other nations fishing in the WCPO (OFP 2007). Skipjack is the dominant component of the catch ranging from approximately 70–74 percent of the total catch, with yellowfin and bigeye tuna comprising the majority of the remaining retained catch.

Activity by the U.S. purse seine fleet in the western and central Pacific Ocean (WCPO) increased from 32 U.S. vessels in 2007 to 39 in 2009. As of 2010, 36 vessels were operating in the WCPO and range in length from 50-115 m with the largest being able to hold up to 3,000 mt or more of frozen fish. Most tuna seiners are 70-80 m in length and can carry approximately 800-1,500 mt of frozen fish. Some vessels also carry helicopters that can improve their ability to find schools of fish and assist in keeping track of the school once the net is set (NMFS 2006).

8.4.2 U.S. Fishing in the PRIA

On January 6, 2009, President Bush established three new National Marine Monuments in the Western Pacific region by issuing Proclamations published in the Federal Register. These monuments were designated by the President using his authority under the Antiquities Act, a 1906 land-oriented statute which does not require public participation or compliance with the National Environmental Policy Act (NEPA). Proclamation 8336 (74 FR 1565) established the Pacific Remote Islands Marine National Monument located in waters around the Pacific Remote Islands Areas (PRIA) of Wake, Baker, Howland, and Jarvis Islands, Johnston Atoll, Kingman

[17] http://www.fpir.noaa.gov/Library/IFD/Compl_guide_third_extension_PS.pdf

Reef, and Palmyra Atoll. The monument prohibits all commercial fishing from within 50 nm around the islands in the PRIA.

As commercial fishing is prohibited in monument waters, this monument designation resulted in displacement of longliners, purse seiners and some bottomfish fishing vessels. U.S. EEZ waters around the PRIA have been fished by the longline and the purse seine fleets based out of Hawaii and American Samoa, respectively. In some years, waters around Palmyra and Kingman Reef are important fishing grounds for the Hawaii-based longline fleet targeting bigeye and yellowfin tuna, however, effort shifts annually (Dowdell et al. 2009). For example, in 2002, more than 20% of the yellowfin and bigeye catch for the Hawaii longline fleet was harvested from within U.S. EEZ waters around Kingman Reef and Palmyra Island.

The U.S. purse seine fishery has historically and exclusively (foreign fishing is prohibited) fished in U.S. EEZ waters around the PRIA. On average, from 5 to 12 percent of the U.S. WCPO annual purse seine catch is harvested from within U.S. EEZ waters around Jarvis, and Howland and Baker Islands, respectively. In 1997, however, almost 20% of the total U.S. purse seine catch in the WCPO was caught from waters of the U.S. EEZ around Howland and Baker Islands. Figure 28 shows the overall average annual catch from the U.S. EEZ waters around Jarvis Island, Howland and Baker Islands, and Kingman Reef and Palmyra Atoll, compared against the average annual catch from within 50 nm (i.e., monument waters) for the period 1988-2007. This figure shows that most of the catch comes from waters outside the new monument designation.

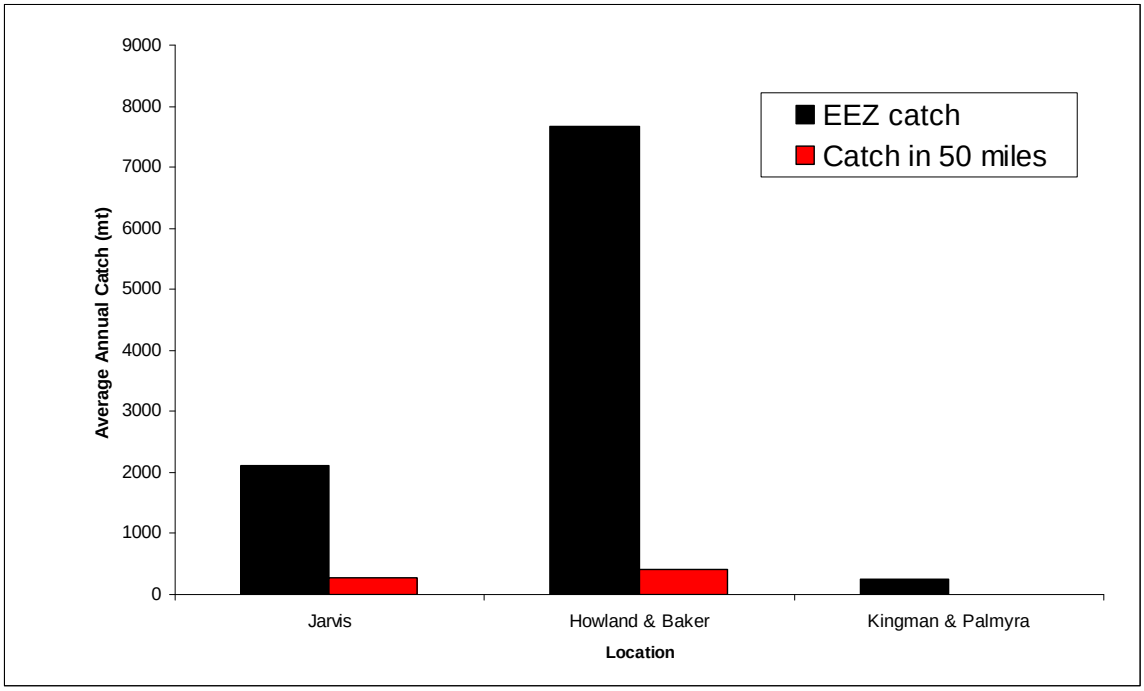


Figure 29: Overall Average Annual Catch from the EEZ Waters around Jarvis Island, Howland and Baker Islands, and Kingman Reef and Palmyra Atoll, and Average Annual Catch from within 50 nm, (i.e., Monument Waters), 1988-2007

8.4.3 U.S. Purse Seine Fishery-Present and Future

Currently, most of the fishing activity by U.S. purse seine vessels occurs in areas between 5° N and 10° S latitude and 150° E and 170° W longitude in the EEZ waters surrounding Papua New Guinea, Federated States of Micronesia and other Pacific island nations. During El Nino events, however, purse seine fishing activity shifts east to the equatorial central Pacific. The percentage of yellowfin tuna in their catches often increases with this shift. U.S. purse seine catch locations for 2007 and 2008 and amount of effort, illustrated in (Figure 29) show the large increase in effort and for 2008 a shift to the west, closer to the Mariana Archipelago.

The purse seine catch is stored as a frozen whole product. Most of the catch has historically been off-loaded to the canneries in Pago Pago, American Samoa, however more and more vessels are transshipping catches in Pacific Islands ports for canning and loining destinations in Southeast Asia and Latin America. The final product that is canned in American Samoa is typically destined for the domestic U.S. canned tuna markets. Frozen non-tuna catches may be processed locally (e.g., wahoo) or transshipped to foreign destinations (e.g., billfish and shark)(NMFS 2009).

The number of U.S. vessels active in the WCPO purse seine fleet declined from 39 active vessels in 1998 to 15 in 2005 (WCPFC 2006) with catches following suit. Increased investment and participation in the U.S. purse seine fishery is evident (NMFS 2009). However, since 2005, the U.S. purse seine fleet has more than doubled to 32 vessels in 2008. The most recent information regarding purse seine activity is that there are 36 purse seiners licensed in the U.S. for the 2009/2010 licensing year; the U.S. may license up to 40 vessels.

The U.S. purse seine catch of 157,849 mt in 2008 was composed primarily of skipjack tuna, with smaller catches of yellowfin and bigeye (Table 10). Total catches and effort increased significantly from 2007. Yellowfin tuna catches in the fishery increased from 10,541 mt in 2007 to 23,801 mt in 2008 and catches of skipjack have doubled since 2005 to 127,307 mt in 2008. Catch rates in terms of mt of fish caught per day by U.S. purse seiners are shown in Figure 30. The average catch rate for 2006 and 2007, based on data in WCPFC 2008 was 23.1 and 3.3 mt/day respectively for skipjack and yellowfin tuna.

Table 10: Reported Annual Landings (metric tons) for U.S. Purse Seine Vessels Operating in the WCPO, 1999-2008

Year	# Active Vessels	Skipjack (mt)	Yellowfin (mt)	Bigeye (mt)
1999	36	129,262	34,529	18,694
2000	33	81,368	29,961	13,886
2001	32	85,539	24,143	6,176
2002	29	88,535	27,191	4,889
2003	26	62,907	20,079	4,470
2004	21	47,896	14,492	5,031
2005	15	62,379	17,685	6,108
2006	13	55,633	8,448	4,364
2007	21	75,210	10,541	2,985
2008	32	127,307	23,801	6,741
2009	38	241,916	20,942	5,931

Source: WCPFC (2010)

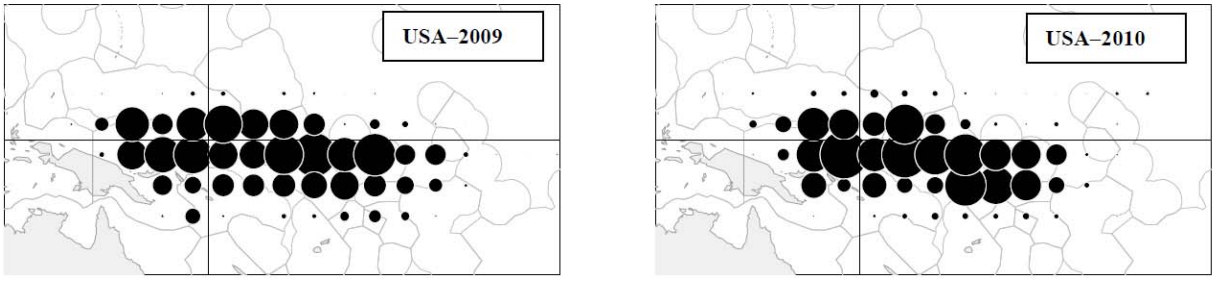


Figure 30: Distribution of Effort by the U.S Purse Seine Fleet, 2009 and 2010
Note: Mariana Archipelago is located in the mid upper left-hand quadrant.
Source: Williams and Terawasi (2011)

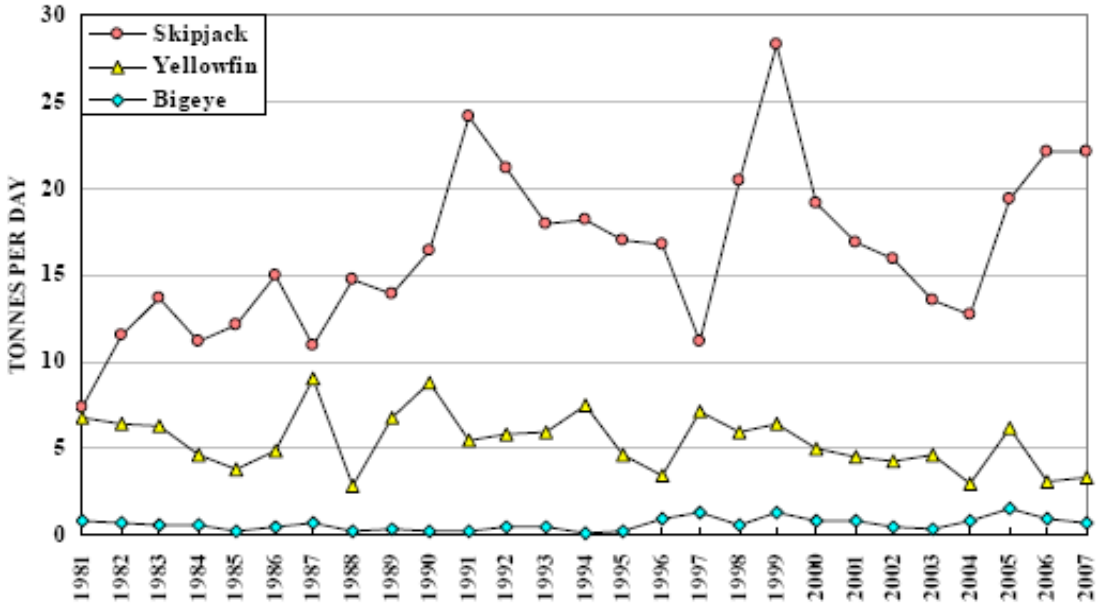


Figure 31: U.S. Purse Seine Catch Rates in the WCPO
Source: WCPFC 2008

To date no U.S. purse seine catches have been recorded in U.S. EEZ waters around CNMI. Although catches by the Japanese pole-and-line fleet from the 1980's show that these waters have the capacity to produce tunas in large quantities (see Table 1). As noted earlier, two of these purse seine vessels were owned by a Guam limited liability company with majority U.S. ownership. These vessels transhipped their catches primarily where they fished, i.e. ports in the Federated States of Micronesia and Kiribati and have made few port calls into Guam or American Samoa. One vessel sank in June 2010, and the owners have indicated to NMFS that they are interested in replacing the lost vessel (Source: NMFS PIRO Division of International Fisheries).

The largest element of purse seine catches in U.S. EEZ waters of the Western Pacific is from purse seining around Howland and Baker Islands (Figure 31), where this segment of the U.S. EEZ straddles the equator in the Central Pacific. Catches from these waters have ranged between 500 to 23,500 mt with the annual average catches of about 8,500 mt (PIFSC data).

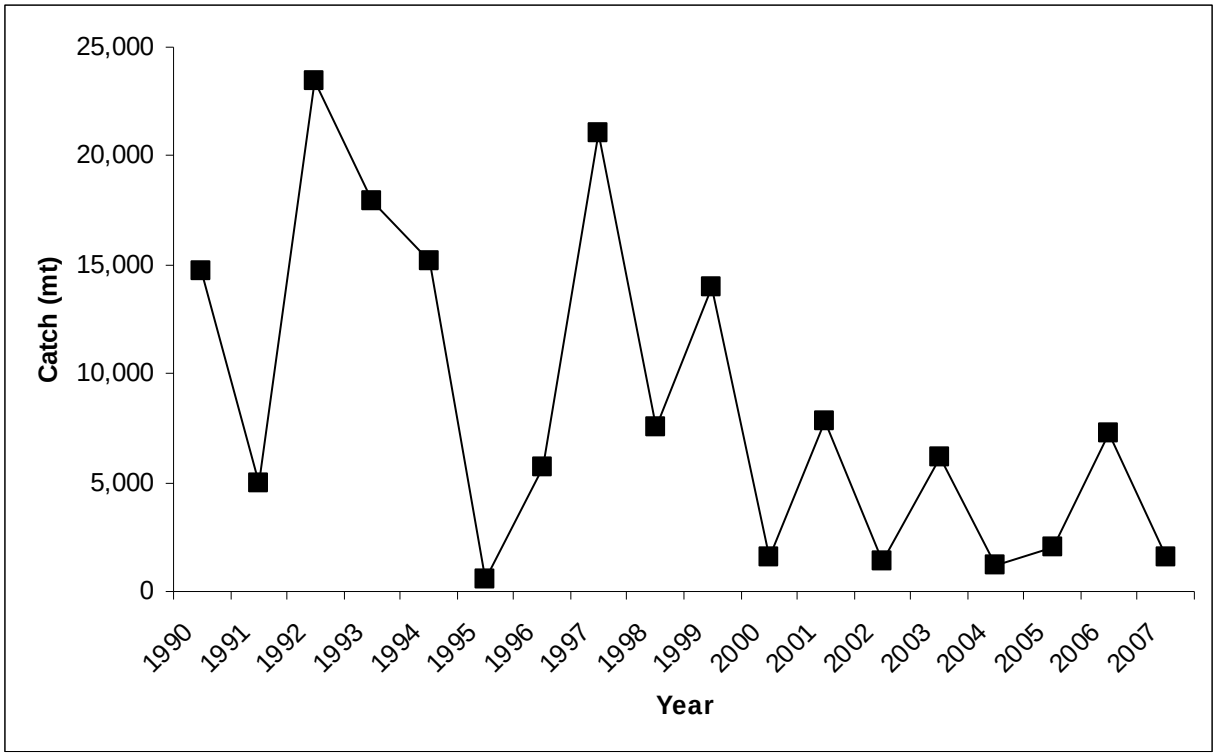


Figure 32: U.S. Purse Seine SKJ Catch from Howland and Baker Islands, PRIA

Bycatch

Purse seine floating object sets are known to result in greater overall amounts and species of bycatch than unassociated sets. Non-target species caught and discarded by the U.S. purse seine fleet in 2004 and 2005 included: marlins, silky shark, wahoo, mackerel scad, mahimahi, oceanic triggerfishes, rainbow runner, and others. Table 12 shows the amount of discard per vessel calculated from the data provided in Table 11. Based on observer data collected under the U.S. Multilateral Treaty the overall discard levels by the U.S. fleet for tunas varied from 2.4 percent to 20.2 percent (Tables 12 & 13) . The main reasons for discard of tunas, including skipjack are: small size (i.e. too small for canning), gear damaged, and vessel fully loaded (OFP 2007a). Associated-school sets accounted for higher rates of tuna discards than unassociated-school sets (i.e. more small fish are associated with drifting FADs than unassociated schools).

Nearly all the bycatch and discard species are important food fishes for the people of the Mariana Archipelago. Blue marlin is an important pelagic species for the troll and charter fleets in the Pacific Islands. The most recent stock assessment was in 2002 (Kleiber et al 2002) which concluded that current fishing effort in the early part of this decade is producing close to the maximum sustainable yield (MSY). However, because of uncertainty in projected yield curves, and because of sensitivity of the model to assumptions such as selectivity, the situation may well be more optimistic with current levels significantly less than those that would produce MSY. An

update of the stock assessment is anticipated to be conducted by the International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean (ISC 2010).

Table 11: Purse Seine Discards by U.S. Vessels Fishing in the WCPO, 2005 to 2008

Species or species group	**Metric tons**			
	2005	**2006**	**2007**	**2008**
Target species discards				
Total:	**3,900**	**1,245**	**1,560**	**245**
Skipjack tuna (*Katsuwonus pelamis*)	3,796	1,190	1,417	223
Yellowfin tuna (*Thunnus albacares*)	104	55	143	22
Other discards				
Billfish:	**16.09**	**18.1**	**7.5**	**9.8**
Black marlin (*Makaira indica*)	0.17	0.34	3.01	2.93
Sailfish (*Istiophorus platypterus*)	0.08	0.12	0.15	0.15
Marlin (Istiophoridae)	15.84	17.64	4.34	6.74
Sharks/Rays:	**11.18**	**1.06**	**9.53**	**9.38**
Oceanic whitetip shark (*Carcharhinus longimanus)*	0	0.03	0.21	1.62
Silky shark (*Carcharhinus falciformis)*	0.23	1.03	8.73	6.19
Shark	10.76	0	0.05	0.52
Rays, skates, mantas (Rajiformes)	0.19	0	0.54	1.05
Other tunas/Tuna-like species:	**10.13**	**3.87**	**3,45**	**3.72**
Albacore tuna (*Thunnus alalunga*)	4.50	0	0.04	0.5
Tuna unspecified (tribe Thunnini)	2	0	0	0.21
Mackerel (Scombridae)	3.23	3.51	0.35	
Wahoo (*Acanthocybium solandri*)	0.40	0.36	3.06	3.01
Other fish:	**234.94**	**80.22**	**97.5**	**94.04**
Mahimahi (*Coryphaena hippurus*)	0.69	0.62	2.96	12.79
Ocean sunfish (*Mola mola*)	0	0.02	0	0.07
Rainbow runner (*Elagatis bipinnulatus*)	2.65	5.02	78.63	36.65
Triggerfish (Balistidae)	0.69	0.58	15.93	1.90
Yellowtail (*Seriola lalandi*)	11.61	14.79	0.01	0.28
Other unspecified	219.99	59.19	25.01	42.35

Source: NMFS (2007); SPC (2010b)

Table 12: 2005 U.S. Purse Seine Discards, (average/vessel)

FISH	**Amount Discarded (lb)**
Skipjack	573,196
Yellowfin	15,285
Marlins	2,352
Albacore	6,614

FISH	Amount Discarded (lb)
Wahoo	59
Mahimahi	101
Misc. spp.	31,158

Source: SPC –OFP Note: Data based on 20% observer coverage.

Table 13: Percent of Catch Discarded by U.S. Purse Seine Fleet

Year	Skipjack tuna	Yellowfin tuna	Bigeye tuna
2005	14.1	7.7	20.2
2006	2.6	4.5	2.4
2007	8.8	6.4	10.2
2009	1.2	0.9	4.4

Source: SPC –OFP Note: Data based on 20% observer coverage.

8.4.4 Fishery Interactions Between Various Gear Types

There are no records of purse seine fishing in the US EEZ around the Mariana Islands Archipelago. However, the southern part of the EEZ is adjacent to the world's largest tuna fishery. This purse seine fishery may oscillate longitudinally to the east and west in response to El Niño/La Niña events, but stays primarily within the equatorial and tropical zone, and in particular the Pacific warm pool between New Guinea and Micronesia. The potential influence of the purse seine fishery was on the skipjack and yellowfin catches was analyzed by using simple regressions of mean annual troll skipjack and yellowfin catch per unit of effort (CPUE) versus annual catches of skipjack and yellowfin from the waters immediately south of Guam and the CNMI.

This data was obtained from the Secretariat of the Pacific Community and was drawn from their statistical square (Region 3) used in the spatially explicit stock assessments for yellowfin and bigeye tuna (Figure 32) (Langley et al 2011; Davies et al 2011) . This statistical square is bounded roughly by the Philippines and Indonesia to the west, the 170 degree east line longitude in the east, and latitudes 10 degrees south and 20 degrees north. In the skipjack stock assessment, a similar area is defined as Region 2 but which has a southern boundary at 20 degrees south, though very little skipjack is caught by purse seiners below 10 degrees south (Hoyle et al 2011). Essentially, most skipjack and yellowfin catches from Region 3 are caught between latitudes 10 degrees north and south

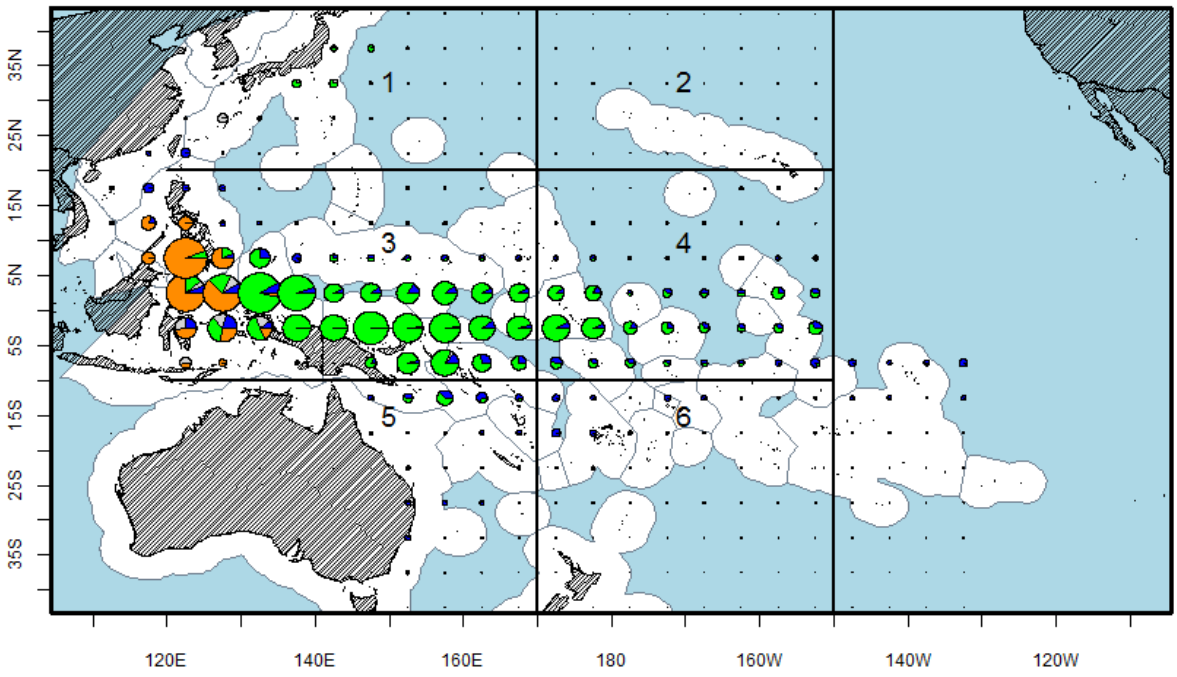


Figure 33. Map of the statistical squares used in the yellowfin and bigeye stock assessments. Circles show cumulative WCPFC yellowfin tuna catch from 2000 to 2009 by 5 degree squares of latitude and longitude and fishing gear; longline (blue), purse-seine (green), pole-and-line (grey) and other (principally Indonesia and Philippines, dark orange)

Troll yellowfin CPUE declined markedly in Guam between 1982 to 2010 from 3.8 lbs/hour to 0.5 lbs/hr (Figure 33) . Yellowfin tuna went from comprising over 25% of the troll catch to less than 5%. Over the same period, skipjack CPUE increased, especially between 2000 and 2010 (Figure 34). CNMI troll data for yellowfin tuna was variable but showed no definitive trend. Skipjack CPUE similarly showed no major trend but was higher between 1983 and 1990, and lower between 1992 and 2010. Regression analyses showed that Guam yellowfin troll CPUE declined significantly as Region 2 purse seine yellowfin catch volume increased (Figures 35). The opposite trend was apparent for skipjack (Figure 36), where there was an increasing troll CPUE trend with Region 2 purse seine skipjack catch volume. For the CNMI, there was an increasing yellowfin troll CPUE with increasing Region 2 yellowfin purse seine catch (Figure 37. There was a significant declining CNMI troll skipjack CPUE trend with increasing Region 2 purse seine skipjack catch.

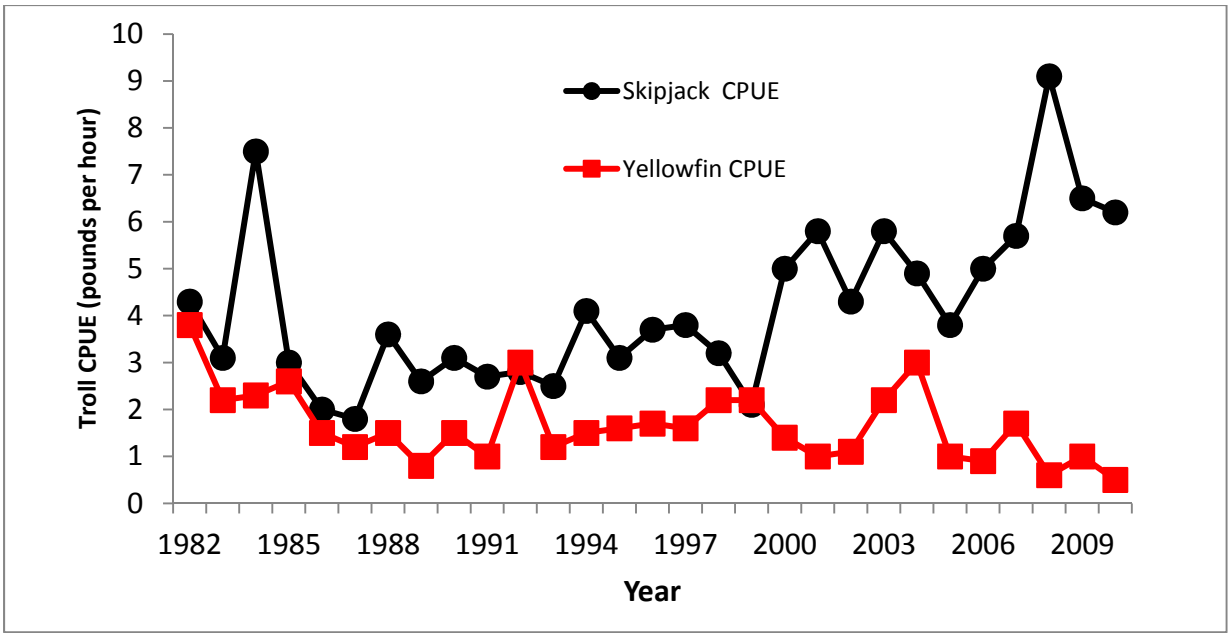


Figure 34. Time series of Guam skipjack and yellowfin troll catch per unit of effort (CPUE), 1982-2010

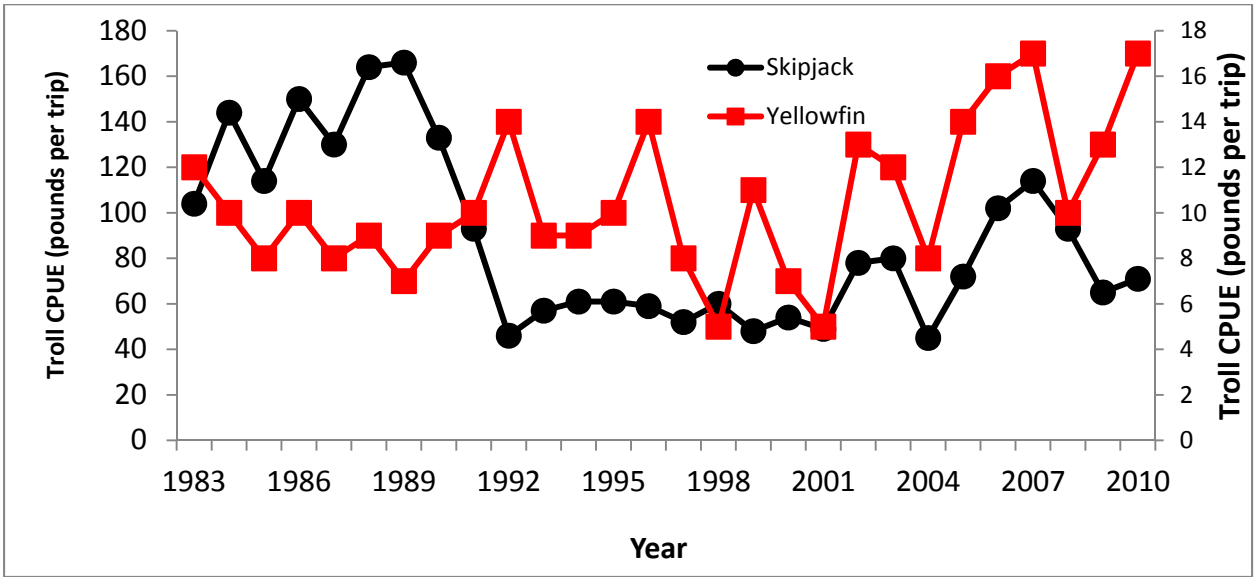


Figure 35 Time series of CNMI skipjack and yellowfin troll CPUE

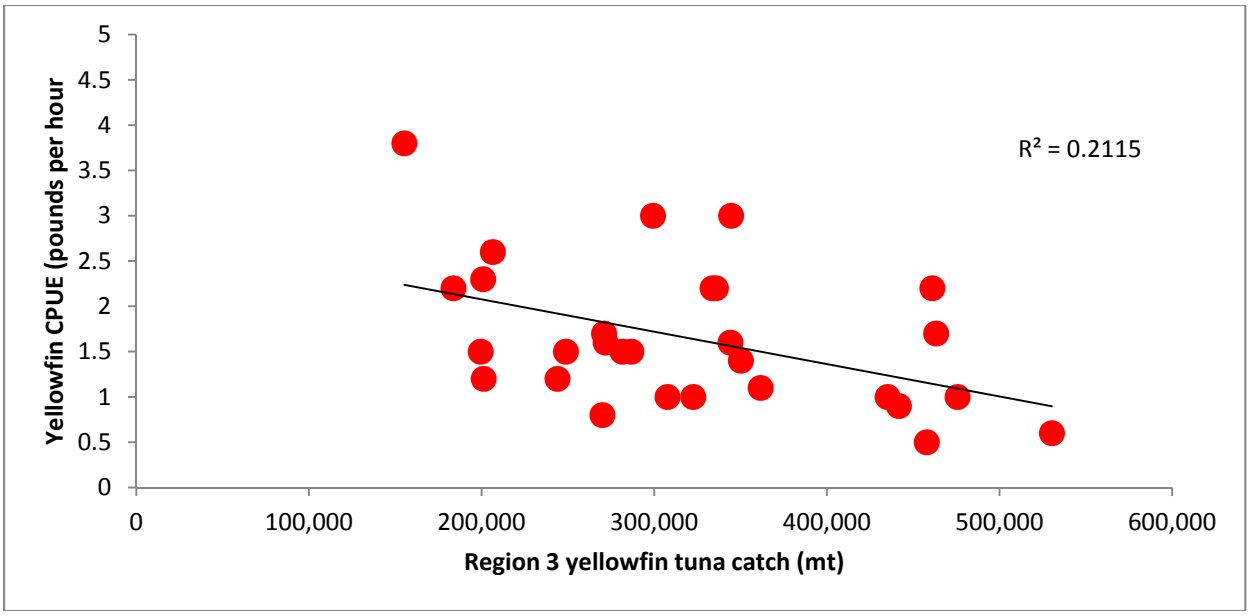


Figure 36. Relationship between Guam yellowfin troll CPUE and yellowfin catch from Region 3

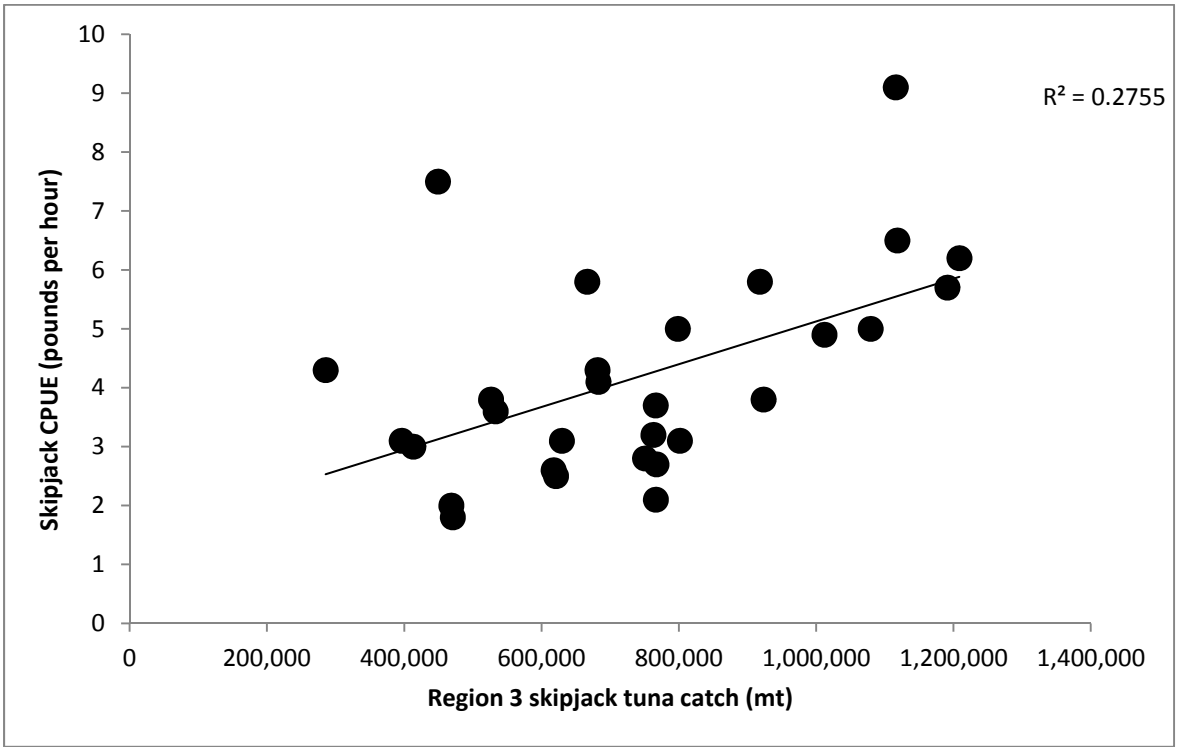


Figure 37. Relationship between Guam skipjack troll CPUE and skipjack catch from Region 3

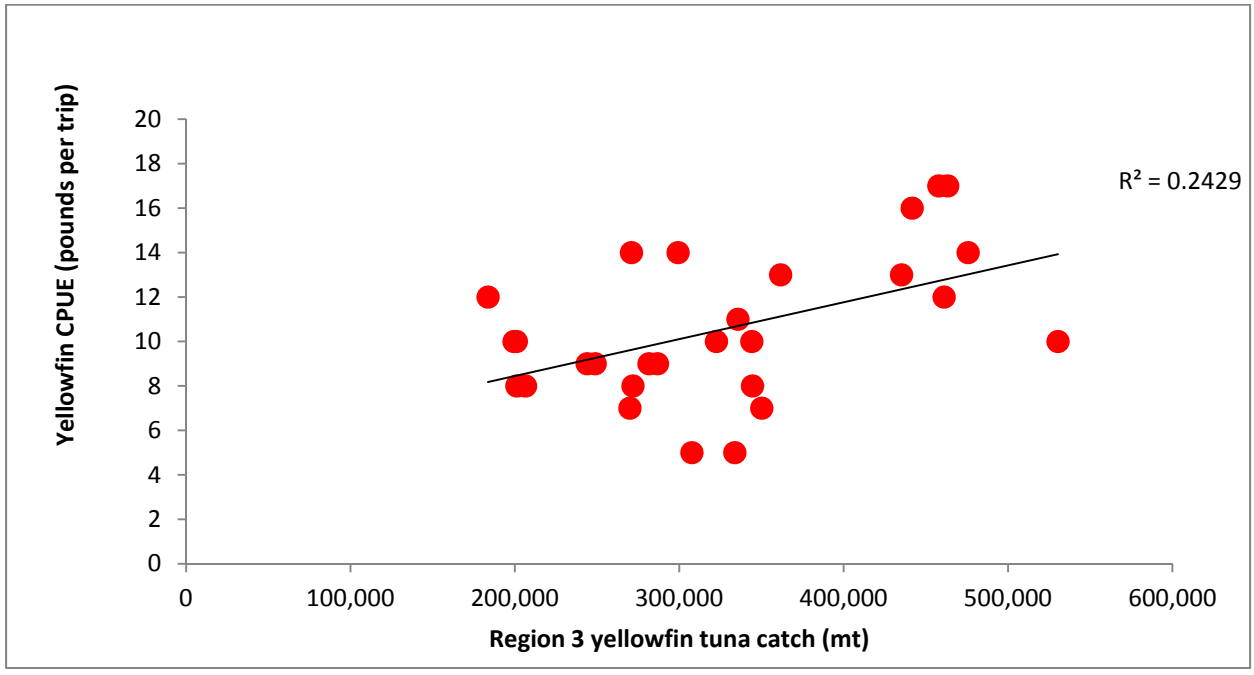


Figure 38. Relationship between CNMI yellowfin troll CPUE and yellowfin catch from Region 3

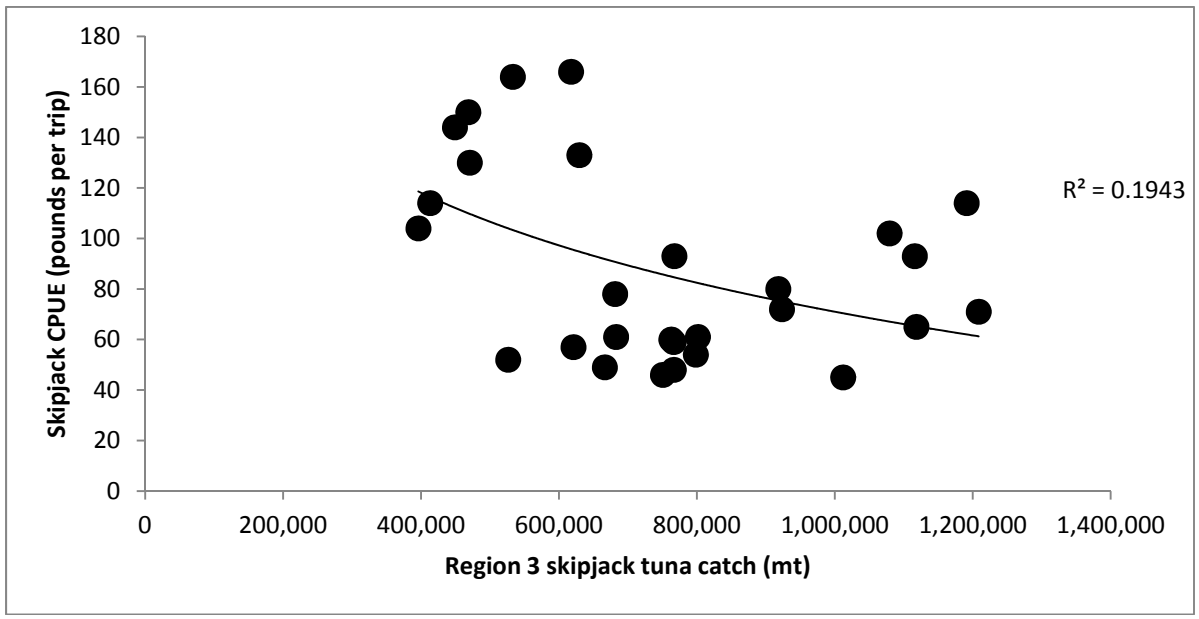


Figure 39. Relationship between CNMI skipjack troll CPUE and skipjack catch from Region 3

These results would suggest that WCPO purse seine catches may have over 30 years negatively influenced Guam troll yellowfin CPUE, but the same is not apparent in CNMI, which shows a contrary positive trend. Guam's increasing CPUE trend for skipjack is broadly similar to purse seine CPUEs for the main fleets (Japan, Korea, Taiwan, USA), which all trend upwards over the same time period, whether on free schools or FADs (Williams and Terawasi 2011). CNMI's skipjack CPUE, however, trends downward with increasing WCPO skipjack catch. Guam's troll fishery is about five times the size of the CNMI fishery although both catch about the same volume of skipjack, which is the primary target of CNMI trollers and accounts for between 70-80% of their catch (WCPFC 2011). As such, for a fishery that it intentionally targeting skipjack, even though it is a little further distant from the purse seine fishery may be more sensitive to depletion effects as purse seine skipjack volume has increased. In Guam, skipjack forms on average about 30% of the catch, although this proportion has been increasing over time from around 20% to 50%.

The reasons for the increasing yellowfin troll CPUE trend in the CNMI with increased purse seine catch are unknown. Yellowfin forms about 9-10% of the CNMI troll catch (WCPFC 2011), and is most likely taken opportunistically when targeting skipjack. The increasing CPUE trend may be a reflection of greater abundance of yellowfin as indicated by increased purse seine catches. Purse seine nominal CPUEs for yellowfin caught from free swimming schools have been variable but without a clear declining or increasing trend (Williams and Terawasi 2011).

In summary, without purse seine fishing within the US EEZ around the Mariana Islands, the large volume of purse seine fishing immediately to the south of the archipelago may be having some influence on troll catch rates. As such, an area closure conforming to the longline exclusion zone boundaries would be a precautionary measure to protect the abilities of Guam and CNMI troll fishermen.

Determining the degree of fishery interactions between purse seining and longline or other small-scale pelagic fisheries has been studied extensively (see references cited below). However, the demonstration of a correlation of the negative impacts of one sector upon another is difficult and the results of such studies far from definitive.

The studies cited below are all drawn from data on various commercial fisheries and not the results of controlled experiments where factors such as seasonal tuna availability, differences in skill levels between fishery participants and variable oceanographic conditions may confound the results. Nevertheless, the examples summarized in this section do indicate that there may be competition between different pelagic fisheries operating within proximity to one another.

A 1995 study investigated the impact of purse seine fishing on troll and domestic pole-and-line and artisanal fisheries in waters around Kiribati (Hampton et al. 1996). Over large areas, e.g., within radii of 300-600 nm of the islands, artisanal catch rates and purse seine catches were generally positively correlated, suggesting that, on this scale, variations in the abundance or catchability of yellowfin affect both purse seiners and artisanal catches in the same way. However, some negative correlations were found for smaller area (60 nm) and time scales, indicating that localized effects may occur.

Hampton et al. 1996 also conducted an analyses of tagging data to estimate the average impact of purse seine fishing on the Kiribati pole-and-line and artisanal catch rates. A spatially aggregated model for the Gilbert Islands area indicated only a modest overall impact of local purse seine catches on pole-and-line and artisanal catch rates. A regional model with 1° square spatial structure indicated a slightly higher overall impact of the regional purse seine fishery on skipjack catches by the Kiribati pole-and-line fishery. The results of the correlation and tagging data analyses suggest that adverse impacts of purse seine fishing on artisanal and pole and- line catches in the Gilbert Islands were more likely to occur at a small scale (1° square or less) due to local concentrations of purse seine effort, rather than at a regional scale or on a scale of tens of degrees.

In addition, there is some indication from additional preliminary modeling of theoretical skipjack tuna movement that purse seine fishing could have an impact on the availability of skipjack tuna for small-scale trolling from equivalent levels of fishing effort occurring as far away as 600-800 nm (P. Kleiber, NOAA PIFSC, pers. comm.). Taken together the Hampton et al (1996) and Kleiber studies suggest that every mile of separation between purse seine fisheries and small-scale troll fisheries is beneficial for troll fisheries.

Another study was undertaken to examine the influence of purse seine fishing on longline catches of yellowfin tuna in the Indian Ocean (Nishida 1995). Using a spatial analysis this study's data analysis showed that the catch of the purse seine fishery affects the longline fishery when the purse seine catch exceeds 1 ton/month per 5° x 5° area. There was a modest decrease in longline CPUE when data for the heavily fished purse seine area were examined for impacts to the longline fishery. The author of this study does point out, however, that a decrease in CPUE of the longline caught yellowfin tuna does not necessarily imply impacts of the purse seine fishery; other factors such as environmental conditions and fish availability may be responsible for the changes in CPUE (Nishida 1995). Although this study occurred on a fishery in the Indian Ocean it is likely that similar outcomes may be expected on western Pacific tuna fisheries.

A similar study on interactions between Mexican longline and purse seine fisheries in the eastern Pacific concluded that the information was not sufficient to define an interaction; it was possible to suggest a "consecutive" interaction (Ortega-Garcia 1995). Another study looked at skipjack movement with regards to fisheries interactions in the western Pacific (Sibert et al. 1995). This study predicted declining yields of 20 percent in the pole-and-line fishery due to purse seine fishing activities, with greatest declines for pole-and-line fleets operating closest to the purse seine fleets. The authors point out that a change of this magnitude would be difficult to detect in actual recorded catches and to be separated from inter-annual variability in the fisheries. At the time of this study (late 80's – early 90's) pole-and-line and purse seine were the two principal gear types catching skipjack in the western Pacific. They also point out that potential fishery interaction estimates depend on the natural mortality rate as does the estimated movement pattern used in their analysis (Sibert et al. 1995).

These relationships may be statistical artifacts, but the possibility that purse seine catches in the U.S. EEZ around American Samoa, especially of skipjack, do have some weak but detectable influence on troll CPUEs. However, the mechanism by which this occurs relative to the much larger catches of skipjack and yellowfin made by the American Samoa longline fishery is

unknown. One potential hypothesis is that large catches of yellowfin and skipjack may remove fish which are abundant at the surface and available to troll fishermen thus depressing the troll CPUE.

In summary the conclusions of the studies cited above and others contained in Shomura et al. (1994; 1996) indicate that detection of fishery interactions, where one tuna fishery can be shown to be affecting another, is generally difficult and the degree of correlation is often weak.

A study examined the migratory nature of some tunas, specifically skipjack and yellowfin, and the implications for fisheries management (Sibert and Hampton 2003). They found that the recoveries of most skipjack tags from two major tuna tagging programs in the Western & Central Pacific spanning three decades (1970s-1990s) were within 200 nautical miles of the release point. Moreover the median displacement[18] of skipjack was only 28 nautical miles in the earliest study and 158 miles in a later study. The later study also produced a median displacement of yellowfin of 132 nautical miles. Sibert and Hampton (2003) also estimated the displacements of all tagged fish in their lifetimes. Skipjack were found to have median lifetime displacements ranging from from 420-470 nm and for yellowfin approximately 20% less (about the extent of an EEZ unconstrained by a neighboring EEZ). They also concluded that fishing reduces the median displacement. The key conclusion form this study was that a substantial proportion of skipjack and yellowfin population production takes place within a single EEZ, particularly for skipjack. Longer periods of residency provide the opportunity for implementation of effective unilateral domestic policies. It should be possible to base successful domestic fisheries on the expected yield from that portion of the population that persists within EEZs.

8.4.5 Foreign Fishing in U.S. EEZ Waters

Section 204 of the MSA authorizes the Secretary of State to enter into a Pacific Insular Area Fishery Agreement (PIAFA) with a foreign nation that would allow vessels of that nation to fish in EEZ waters around Guam, CNMI, American Samoa, or other U.S. possessions in the Pacific. Fishing under a PIAFA must comply with any applicable FMP or FEP, and harvest levels must fall within the total allowable level of foreign fishing (TALFF). A PIAFA can be effective for up to three years, and may be concluded only with the concurrence of the appropriate Governor, if any. A PIAFA may be concluded only after a Marine Conservation Plan (MCP) for the insular area has been developed by the Governor (in the case of Guam, CNMI, and American Samoa) or by the Western Pacific Fishery Management Council (in the case of other western Pacific territories). An MCP identifies conservation and management objectives for the marine and coastal environment of the island area, and prioritizes those objectives. Neither the Guam nor the CNMI MCP, completed in 2009, contain provisions for purse seine fishing. Fees collected under a PIAFA for fishing around Guam, CNMI, or American Samoa are deposited in the treasury of the island government; the Governor may spend the funds to implement an approved MCP, to compensate the Council or the State Department for various administrative or travel expenses, or to carry out other purposes of section 204(e). Currently, there are no PIAFAs in effect between CNMI/Guam and foreign countries.

[18] The median displacement is the displacement exceeded by 50% of tagged fish. It can be expressed empirically, i.e. the distance travelled between mark and recapture, or estimated from the tagging data for the lifetime of the fish from the point of release.

8.5 Protected Species

8.5.1 Sea Turtles

All Pacific sea turtles are designated under the Endangered Species Act (ESA) as either threatened or endangered (except for the flatback turtle). The breeding populations of Mexico's olive ridley sea turtles (*Lepidochelys olivacea*) are currently listed as endangered, while all other ridley populations are listed as threatened. Leatherback sea turtles (*Dermochelys coriacea*) and hawksbill turtles (*Eretmochelys imbricata*) are also classified as endangered. Loggerhead (*Caretta caretta*) and green sea turtles (*Chelonia mydas*) are listed as threatened (the green sea turtle is listed as threatened throughout its Pacific range, except for the endangered population nesting on the Pacific coast of Mexico). These five species of sea turtles are highly migratory, or have a highly migratory phase in their life history (NMFS 2001).

Leatherback Sea Turtles

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

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

Satellite telemetry studies indicate that adult leatherback turtles follow bathymetric contours over their long pelagic migrations and typically feed on cnidarians (jellyfish and siphonophores) and tunicates (pyrosomas and salps), and their commensals, parasites, and prey (NMFS 1998a). Females are believed to migrate long distances between foraging and breeding grounds, at intervals of typically two or four years (Spotila et al. 2000). In the western Pacific, nesting peaks on Jamursba-Medi Beach (Papua, Indonesia) from May to August, on War-Mon Beach (Papua) from November to January (Starbird and Suarez 1994), in peninsular Malaysia during June and July (Chan and Liew 1989), and in Queensland, Australia in December and January (Limpus and Reimer1994).

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

Leatherback Sea Turtles in the Mariana Archipelago

There have been occasional sightings of leatherback turtles around Guam (Eldredge 2003); however, the extent to which (i.e. preferred location, abundance, seasonality) leatherback turtles are present around the Mariana Archipelago is unknown (WPRFMC 2007).

Loggerhead Sea Turtles

Loggerheads can be divided into five regions: the Atlantic Ocean, Pacific Ocean, Indian Ocean, Caribbean Sea and Mediterranean Sea. These regions may be further divided into nesting aggregations. In the Pacific Ocean, loggerhead turtles are represented by a northwestern Pacific nesting aggregation (located in Japan) which may be comprised of separate nesting groups (Hatase et al. 2002) and a smaller southwestern nesting aggregation that occurs in Australia (Great Barrier Reef and Queensland) and New Caledonia (Limpus, 2006).

North Pacific loggerhead turtles nest in Japan, undertake trans-Pacific developmental migrations in the waters of the Central North Pacific, Mexico, and U.S. territorial waters throughout the Eastern Pacific, and reside as adults in waters of the Asian region. Loggerheads originating in Japan travel westward, move seasonally north and south primarily through the region 28–40°N, and occupy sea surface temperatures (SST) of 15–25°C. Their dive depth distribution indicated that they spend 40 percent of their time at the surface and 90 percent of their time at depths <40 m. Loggerheads are found in association with fronts, eddies, and geostrophic currents. Specifically, the North Pacific Transition Zone Chlorophyll Front and the southern edge of the Kuroshio Extension Bifurcation Region appear to be important forage and migration habitats for loggerheads (Polovina et al., 2004 and 2007).

The loggerhead sea turtle is listed as threatened under the ESA throughout its range, primarily due to direct take, incidental capture in various fisheries, and the alteration and destruction of its habitat. In the South Pacific, Limpus (1982) reported an estimated 3,000 loggerheads nesting annually in Queensland, Australia during the late 1970s. However, long-term trend data from Queensland indicate a 50 percent decline in nesting by 1988–89 due to incidental mortality of turtles in the coastal trawl fishery. This decline is corroborated by studies of breeding females at adjacent feeding grounds (Limpus and Reimer 1994). Currently, approximately 300 females nest annually in Queensland, mainly on offshore islands (Capricorn-Bunker Islands, Sandy Cape, Swains Head; Dobbs 2001). In southern Great Barrier Reef waters, nesting loggerheads have declined approximately 8 percent per year since the mid-1980s (Heron Island), while the foraging ground population has declined 3 percent and comprised less than 40 adults by 1992. Researchers attribute the declines to recruitment failure due to fox predation of eggs in the 1960s and mortality of pelagic juveniles from incidental capture in longline fisheries since the 1970s (Chaloupka and Limpus 2001). Of the loggerheads taken in the Hawaii-based longline fishery,

all have been determined to have originated from Japanese nesting beaches, based on genetic analyses (P. Dutton, NMFS, pers. comm., August 2005).

Loggerhead Sea Turtles in the Mariana Archipelago
There are no known reports of loggerhead turtles in waters around the Mariana Archipelago (WPRFMC 2007).

Green Sea Turtles
Green turtles were listed as threatened under the ESA on July 28, 1978, except for breeding populations found in Florida and the Pacific coast of Mexico, which were listed as endangered. Using a precautionary estimate, the number of nesting female green turtles has declined by 48 to 67 percent over the last three generations (approx. 150 years; + and Rankin 2005). Causes for this decline include harvest of eggs, subadults, and adults; incidental capture by fisheries; loss of habitat; and disease. The degree of population change is not consistent among all index nesting beaches or among all regions. Some nesting populations are stable or increasing (Balazs and Chaloupka 2004; Chaloupka and Limpus 2001; Troeng and Rankin 2005). However, other populations or nesting stocks have markedly declined. Because many of the threats that have led to these declines have not yet ceased, it is evident that green turtles face a measurable risk of extinction (Troeng and Rankin 2005).

Green sea turtles are a circumglobal and highly migratory species, nesting and feeding in tropical/subtropical regions. Their range can be defined by a general preference for water temperature above 20° C. Green sea turtles are known to live in pelagic habitats as post-hatchlings/juveniles, feeding at or near the ocean surface. The non-breeding range of this species can lead a pelagic existence many miles from shore while the breeding population lives primarily in bays and estuaries, and are rarely found in the open ocean. Most migration from rookeries to feeding grounds is via coastal waters, with females migrating to breed only once every two years or more (Bjorndal 1997).

Tag returns of eastern Pacific green turtles (often reported as black turtles) establish that these turtles travel long distances between foraging and nesting grounds. In fact, 75 percent of tag recoveries from 1982–1990 were from turtles that had traveled more than 1,000 kilometers from Michoacán, Mexico. Even though these turtles were found in coastal waters, the species is not confined to these areas, as indicated by sightings recorded in 1990 from a NOAA research ship. Observers documented green turtles 1,000–2,000 statute miles from shore (Eckert 1993). The east Pacific green is also the second-most sighted turtle in the east Pacific during tuna cruises; they frequent a north–south band from 15° N to 5° S along 90° W and an area between the Galapagos Islands and the Central American Coast (NMFS 1998).

The non-breeding range of green turtles is generally tropical, and can extend approximately 500–800 miles from shore in certain regions (Eckert 1993). The underwater resting sites include coral recesses, undersides of ledges, and sand bottom areas that are relatively free of strong currents and disturbance from natural predators and humans. In the Pacific, the only major (> 2,000 nesting females) populations of green turtles occur in Australia and Malaysia. Smaller colonies occur in the insular Pacific islands of Polynesia, Micronesia, and Melanesia (Wetherall 1993)

and on six small sand islands at French Frigate Shoals, a long atoll situated in the middle of the Hawaii Archipelago (Balazs et al. 1994).

Green Sea Turtles in the Mariana Archipelago

Based on nearshore surveys conducted jointly between the CNMI–DFW and NMFS around the Southern Mariana Islands (Rota and Tinian 2001; Saipan 1999), an estimated 1,000 to 2,000 green sea turtles forage in these areas (Kolinski 2001). The green sea turtle is a traditional food of the native population and although harvesting them is illegal, divers have been known to take them at sea and others have been taken as nesting females (NMFS and USFWS 1998a). Turtle eggs are also harvested in CNMI. Nesting beaches and seagrass beds on Tinian and Rota are in good condition but beaches and seagrass beds on Saipan have been impacted by hotels, golf courses and general tourist activities.

Nesting surveys for green sea turtles have been done on Guam since 1973 with the most consistent data collected since 1990. There have been up to 60 nesting females observed annually, with a generally increasing trend over the past 12 years aerial surveys done in 1999–2000 also found an increase in green sea turtle sightings around Guam (Cummings 2002).

Hawksbill Sea Turtles

The hawksbill turtle is listed as endangered throughout its range. In the Pacific, this species is rapidly approaching extinction primarily due to the harvesting of the species for its meat, eggs, and shell, as well as the destruction of nesting habitat by human occupation and disruption. Along the eastern Pacific Rim, hawksbill turtles were common to abundant in the 1930s (Cliffton et al. 1982). By the 1990s, the hawksbill turtle was rare to absent in most localities where it was once abundant (Cliffton et al. 1982).

Hawksbills are circumtropical in distribution, generally occurring from latitudes 30° N to 30° S within the Atlantic, Pacific, and Indian Oceans and associated bodies of water (NMFS 1998b). Hawksbills have a unique diet of sponges (Meylan 1985, 1988). While data are somewhat limited on their diet in the Pacific, it is well documented that in the Caribbean hawksbill turtles are selective spongivores, preferring particular sponge species over others (Van Dam and Diez 1997). Foraging dive durations are often a function of turtle size, with larger turtles diving deeper and longer. As a hawksbill turtle grows from a juvenile to an adult, data suggest that the turtle switches foraging behaviors from pelagic surface feeding to benthic reef feeding (Limpus 1992). Within the Great Barrier Reef of Australia, hawksbills move from a pelagic existence to a "neritic" life on the reef at a minimum CCL of 35 centimeters. The maturing turtle establishes foraging territory and will remain in this territory until it is displaced (Limpus 1992). As with other sea turtles, hawksbills will make long reproductive migrations between foraging and nesting areas (Meylan 1999), but otherwise they remain within coastal reef habitats. In Australia, juvenile turtles outnumber adults 100:1. These populations are also sex biased, with females outnumbering males 2.57:1 (Limpus 1992).

Along the far western and southeastern Pacific, hawksbill turtles nest on the islands and mainland of southeast Asia, from China to Japan, and throughout the Philippines, Malaysia, Indonesia, Papua New Guinea, the Solomon Islands (McKeown 1977), and Australia (Limpus 1982).

Hawksbill Sea Turtles in the Mariana Archipelago
Although hawksbill turtles have occasionally been sighted in the past around CNMI they were not observed in a detailed assessment conducted in 1999, nor were they observed in 10 aquatic surveys along the shores of Tinian in 1995. According to the 1998 Pacific Sea Turtle Recovery Team Recovery Plan for the hawksbill turtle (NMFS and USFWS 1998b), there are no reports of nesting in CNMI. This does not rule out the possibility of a few hawksbill nests, as nesting surveys on small pocket beaches in remote areas of CNMI have never been done. A single hawksbill sighting occurred in 1996 during the detonation of an unexploded ordinance off of Rota. The turtle was recovered near the explosion sight and subsequently died, apparently from internal injuries incurred from the blast (Trianni 1998). One hawksbill sea turtle nest was found in November 1991 on Guam (NMFS and USFWS 1998b); however this was highly unusual as nesting individuals are otherwise virtually unknown on Guam (Eldredge 2003).

Olive Ridley Sea Turtles
Olive ridley turtles are olive or grayish green above, with a greenish white plastron, and adults are moderately sexually dimorphic (NMFS and FWS1998b). Olive ridleys lead a highly pelagic existence (Plotkin 1994). These sea turtles appear to forage throughout the eastern tropical Pacific Ocean, often in large groups, or flotillas. Olive ridleys generally have a tropical range, however, individuals do occasionally venture north, some as far as the Gulf of Alaska (Hodge and Wing 2000). The postnesting migration routes of olive ridleys, tracked via satellite from Costa Rica, traversed thousands of kilometers of deep oceanic waters ranging from Mexico to Peru and more than 3,000 kilometers out into the central Pacific (Plotkin 1994). Stranding records from 1990–1999 indicate that olive ridleys are rarely found off the coast of California, averaging 1.3 strandings annually (J. Cordaro, NMFS, personal communication, NMFS 2004). At least one olive ridley was reported in Micronesia (Yap) in 1973 (Falanruw et al. 1975).

The olive ridley turtle is omnivorous, and identified prey include a variety of benthic and pelagic prey items such as shrimp, jellyfish, crabs, snails, and fish, as well as algae and seagrass (Marquez 1990). It is also not unusual for olive ridley turtles in reasonably good health to be found entangled in scraps of net or other floating synthetic debris. Small crabs, barnacles, and other marine life often reside on debris and are likely to attract the turtles. Olive ridley turtles also forage at great depths, as a turtle was sighted foraging for crabs at a depth of 300 meters (Landis 1965, in Eckert et al. 1986). The average dive lengths for adult females and males are reported to be 54.3 and 28.5 minutes, respectively (Plotkin 1994, in Lutcavage and Lutz 1997).

Olive Ridley Sea Turtles in the Mariana Archipelago
There are no known reports of olive ridley turtles in waters around the Mariana Archipelago (WPRFMC 2007).

8.5.2 Marine Mammals

Cetaceans listed as endangered under the ESA that have been observed in Mariana Archipelago include the humpback whale (*Megaptera novaeangliae*), sperm whale (*Physeter macrocephalus*), and sei whale (*Balaenoptera borealis*) (WPRFMC 2007). Other ESA listed

marine mammals that may occur in the EEZ around the Mariana Archipelago include the blue whale (*Balaenoptera musculus*) and the fin whale (*Balaenoptera physalus*).

Blue Whale
The blue whale is listed as endangered under the ESA and is the largest living animal. Blue whales can reach lengths of 30 meters and weights of 160 tons (320,000 lb), with females usually being larger than males of the same age. They occur in all oceans, usually along continental shelves, but can also be found in the shallow inshore waters and on the high seas. No sightings or strandings of blue whales have been reported in Hawaii, but acoustic recordings made off Oahu and Midway Islands have reported blue whales somewhere within the EEZ around Hawaii. The stock structure of blue whales in the North Pacific is uncertain. The status of this species in Hawaii waters relative to the optimum sustainable population is unknown, and there are insufficient data to evaluate trends in abundance.

Prior to whaling, the worldwide population of blue whales is believed to have been about 200,000 animals. Only 8,000-12,000 are estimated to be alive today. Blue whales have always been more abundant in the Antarctic than in the northern hemisphere. An estimated 4,900 to 6,000 blue whales are believed to have inhabited the North Pacific prior to whaling. The North Pacific population is now estimated at 1,200 to 1,700 animals.

Fin Whales
Fin whales are listed as endangered under the ESA and found throughout all oceans and seas of the world from tropical to polar latitudes. Although it is generally believed that fin whales make poleward feeding migrations in summer and move toward the equator in winter, few actual observations of fin whales in tropical and subtropical waters have been documented, particularly in the Pacific Ocean away from continental coasts. There have only been a few sightings of fin whales in Hawaii waters. There is insufficient information to accurately determine the population structure of fin whales in the North Pacific, but there is evidence of multiple stocks.

Humpback Whales
Humpback whales can attain lengths of 16 meters. Humpback whales winter in shallow nearshore waters of 100 fathoms or less. Mature females are believed to conceive on the breeding grounds one winter and give birth the following winter. At least six well-defined breeding stocks of humpback whales occur in the Southern Hemisphere Genetic and photo identification studies indicate that within the U.S. EEZ in the North Pacific, there are at least three relatively separate populations of humpback whales that migrate between their respective summer/fall feeding areas to winter/spring calving and mating areas (Hill and DeMaster 1999). The Central North Pacific stock of humpback whales winters in the waters of the Main Hawaiian Islands (Hill et al. 1997). The humpbacks that winter in the Mariana Archipelago are believed to be part of the "Asian" stock, which migrate from the Bonin (Ogasawara) Islands (Eldredge 2003). Humpback whales have been sighted around Guam and CNMI (Eldredge 2003), however, the number of whales that winter in the Mariana Archipelago each year is unknown.

There is no precise estimate of the worldwide humpback whale population. The humpback whale population in the North Pacific Ocean basin is estimated to contain 6,000–8,000 individuals (Calambokidis et al. 1997). The Central North Pacific stock appears to have increased in

abundance between the early 1980s and early 1990s; however, the status of this stock relative to its optimum sustainable population size is unknown (Hill and DeMaster 1999).

Sei Whales
Sei whales have a worldwide distribution but are found mainly in cold temperate to subpolar latitudes rather than in the tropics or near the poles (Horwood 1987). They are distributed far out to sea and do not appear to be associated with coastal features. Two sei whales were tagged in the vicinity of the Northern Mariana Islands (Reeves et al. 1999). The International Whaling Commission considers there to be one stock of sei whales in the North Pacific, but some evidence exists for multiple populations (Forney et al. 2000). In the southern Pacific most observations have been south of 30° (Reeves et al. 1999).

Sperm Whales
Sperm whales are found in tropical to polar waters throughout the world (Rice 1989). They are among the most abundant large cetaceans in the region. Sightings of sperm whales were made during May–July in the 1980s around Guam, and in recent years stranding of dwarf and pygmy sperm whales have been reported on Guam (Reeves et al. 1999).

Dugong
Dugongs are members of the Sirenia order, which include sea cows and manatees, and have a distribution from the east African coast to islands in the southwestern Pacific. In general, dugongs remain in coastal areas, such as protected bays and mangrove channels, feeding primarily on seagrass. Dugongs can be found further offshore in areas that have wide, shallow, and protected continental shelves (Marsh et al. 2002).

A single dugong (*Dugon dugong*) was observed in Cocos Lagoon, Guam in 1975 (Randall et al 1975). Several sightings were reported in 1985 on the southeastern side of Guam (Eldredge 2003). Since that time, however no reports of dugong sightings have been made. No observations of dugongs have been reported for CNMI.

Other Marine Mammals
Table 14 lists known non-ESA listed marine mammals that have been observed in the Mariana Archipelago and all protected by the Marine Mammal Protection Act (MMPA).

Table 14: Non-ESA Listed Marine Mammals

Common Name	Scientific Name
Blainville's beaked whale	*Mesoplodon densirostris*
Bottlenose dolphin	*Tursiops truncatus*
Bryde's whale	*Balaenoptera edeni*
Common dolphin	*Delphinus delphis*
Cuvier's beaked whale	*Ziphius cavirostris*
Dwarf sperm whale	*Kogia simus*

Common Name	Scientific Name
False killer whale	*Pseudorca crassidens*
Fraser's dolphin	*Lagenodelphis hosei*
Killer whale	*Orcinus orca*
Longman's beaked whale	*Indopacetus pacificus*
Melon-headed whale	*Peponocephala electra*
Minke whale	*Balaenoptera acutorostrata*
Northern Elephant Seal	*Mirounga angustirostris*
Pantropical Spotted Dolphin	*Stenella attenuate*
Pygmy killer whale	*Feresa attenuata*
Pygmy sperm whale	*Kogia breviceps*
Risso's dolphin	*Grampus griseus*
Rough-toothed dolphin	*Steno bredanensis*
Short-finned pilot whale	*Globicephala macrorhynchus*
Spinner dolphin	*Stenella longirostris*
Spotted dolphin	*Stenella attenuata*
Striped dolphin	*Stenella coeruleoalba*

Source: Eldredge 2003

8.5.3 Seabirds[19]

The following seabirds are considered residents of CNMI: wedge-tailed shearwater (*Puffinus pacificus*), white-tailed tropicbird (*Phaethon lepturus*), red-tailed tropicbird (*Phaethon rubricauda*), masked booby (S*ula dactylatra*), brown booby (*Sula leucogaster*), red-footed booby (*Sula sula*), white tern (*Gygis alba),* sooty tern (*Sterna fuscata*), brown noddy (*Anous stolidus*), black noddy (*Anous minutus*), and the great frigatebird (*Fregata minor*). There are no known interactions between seabirds and any of the Mariana Archipelago pelagic fisheries (WPRFMC 2007).

The following seabirds have been sighted and are considered visitors (some more common than others) to CNMI; short-tailed shearwater (*Puffinus tenuirostris;* common visitor), Newell's shearwater (*Puffinus auricularis;* rare visitor), Audubon's shearwater (*Puffinus iherminieri*), Leach's storm-petrel (*Oceanodroma leucorhoa*), and the Matsudaira's storm-petral (*Oceanodroma matsudairae*). Of these, only the Newell's shearwater is listed as endangered. There have been no sightings of the endangered short-tailed albatross (*Phoebastria albatrus*) in

[19] The USFWS is the primary federal agency with authority and responsibility to manage ESA listed seabirds.

CNMI although CNMI is within the range of the only breeding colony at Tora Shima, Japan (WPRFMC 2007).

Newell's shearwater

The Newell's shearwater is listed as threatened under the ESA. The Newell's shearwater is listed, because of its small population of approximately 14,600 breeding pairs, its isolated breeding colonies, and the numerous land-based hazards affecting them at their breeding colonies (Ainley et al. 1997). The Newell's shearwater breeds only in colonies on the main Hawaiian Islands, especially Kauai, from April to October-November (Sincock and Swedberg 1969). They are present from about 18° to 25° N and from about 160° to 120° W (Ainley et al. 1997). They have been associated with the North Equatorial Counter Current (NECC) directly south of Hawaii, and from about 160° to 120° W, with occasional sighting throughout the tropical Pacific (USFWS 1983; Spear et al. 1995; Ainley et al. 1997; N. Holmes, KESRP, pers. comm. June 2009). No breeding colonies or resident population of Newell's shearwater is known to exist in the CNMI or Guam. This bird is considered a rare visitor to the CNMI and has not been observed in Guam.

Shearwaters are most active in the day and skim the ocean surface while foraging. During the breeding season, shearwaters tend to forage within 50–62 miles (80–100 km) of their nesting burrows (Harrison 1990). Shearwaters also tend to be gregarious at sea, and the Newell's shearwater is known to occasionally follow ships (Harrison 1990). Shearwaters feed by surface seizing and pursuit plunging. Often shearwaters will dip their heads under the water to sight their prey before submerging (Warham 1990).

Based on observer data from August 1994 to January 2009 from the SPC there have been no recorded interactions between U.S. purse seine vessels or foreign longline fisheries with Newell's shearwater (SPC 2010b). No interactions with Newell's shearwater have been reported or observed in the Guam or CNMI longline fisheries. Since no purse seine activity is taking place in the U.S. EEZ around the Mariana Archipelago, and limited longline activity (less than 30 trips since 2007) is taking place in the EEZ, it is highly unlikely that these fisheries would interact with Newell's shearwaters.

Short-tailed albatross

Short-tailed albatross breed primarily on Torishima, Japan, and the Senkaku Islands. In the western Pacific, they generally range north of 15° N. No known breeding or resident populations of short-tailed albatross exist, and, to date, there have been no sightings of them in the CNMI or Guam.

No interactions with short-tailed albatross have been reported in Federal logbooks for Guam or the CNMI longline fisheries or in the SPC observer data from 1994 to 2009 for foreign longliners operating outside the U.S. EEZ (SPC 2010b). Since purse seine activity is not taking place in the U.S. EEZ around the Mariana Archipelago and longline activity (less than 30 trips since 2007) is limited in the EEZ, it is highly unlikely that these fisheries would interact with short-tailed albatross.

According to Wiles et al. (2003), the only resident seabirds on Guam are the brown noddy and the white tern. Common visitors to Guam include the following seabirds: black noddy the short-

tailed shearwater. Other less common or rare visitors include: brown and red-footed boobies, wedge-tailed shearwater, Matsudaira's storm-petral, white-tailed and red-tailed tropicbirds, great frigatebird, gulls, and terns.

8.6 Status of Target Stocks

Bigeye Tuna

The Secretary of Commerce determined that overfishing of bigeye tuna (*Thunnus obesus*) was occurring Pacific-wide[20] in 2004 (69 FR 78397). Pacific bigeye tuna are caught by a suite of domestic and foreign purse seiners and longliners, with small amounts also taken by handline and troll vessels. Until recently, the majority of the bigeye catch was taken by longliners, primarily for the Japanese sashimi market. However, during the past 10 years, catches of bigeye by purse seiners have increased considerably. This is not due to deliberate targeting of bigeye tuna by purse seiners, but as an incidental catch when purse seiners are targeting skipjack (*Katsuwonus pelamis*) and juvenile yellowfin tuna (*Thunnus albacares*) around FADs with larger and deeper purse seine nets. Stock assessments for bigeye tuna in the eastern and western Pacific, conducted in 2003 and 2004, showed that the level of fishing mortality had exceeded the fishing mortality associated with maximum sustainable yields (F_{msy}). This level of fishing mortality is one of the limit reference points of the Council's overfishing control rule for bigeye tuna and other pelagic fishes. The Pacific-wide stock itself is not yet overfished, but could become so if levels of fishing mortality are not reduced.

The status of bigeye tuna stocks in the Pacific Ocean has typically been assessed for two separate regions, the eastern Pacific Ocean (EPO) and the WCPO. That approach is based on the areas of authority and interest of the regional fishery management organizations, particularly the Inter-American Tropical Tuna Commission in the EPO and the Western and Central Pacific Fisheries Commission in the WCPO and assumed population structure of bigeye tuna in the Pacific (which is not well known).The 2011 WCPO stock assessment concluded that overfishing of bigeye tuna is occurring, the stock is approaching an overfished state, if it hasn't already reached a slightly overfished condition (Davies et al 2011). The same authors also concluded that MSY levels would increase if the mortality of small fish were reduced, which would allow greater overall yields to be sustainably harvested. NMFS makes a Pacific-wide bigeye tuna stock status determination, updated quarterly as applicable, based on assessments in both the EPO and WCPO.

Under the Magnuson-Steven Act, a fishery is classified as approaching an overfished condition if it is estimated to become overfished within two years, based on fishing effort trends, fishery resource size, and other appropriate factors; Magnuson-Stevens Act 304(e)(1)) Fishing mortality for adult and juvenile bigeye tuna is estimated to have increased continuously since the beginning of industrial tuna fishing. Overall, depletion is estimated to have been rapid, particularly since the mid-1980s. While total biomass has remained relatively stable since 1970,

[20] A stock is considered to be subject to overfishing whenever it is subjected to a rate of fishing mortality that jeopardizes its capacity to produce MSY on a continuing basis (50 CFR 600.310(d)(ii)). See Section 5.4 of this document for further information.

it appears to have been sustained by above average recruitment, particularly since 1995. The assessment indicates that recruitment may have returned to the long-term average level (although recent recruitment estimates have high uncertainty) and, if recruitment remains at that level, biomass would decline rapidly at current exploitation rates. The current level of biomass is 20–26 percent of the unexploited level with higher depletion estimated from the model as longline catchability increases.

The attribution of depletion to various fisheries or groups of fisheries indicates that the Pacific-wide longline fisheries have the greatest impact throughout the model domain. The purse seine and Philippines/Indonesian domestic fisheries also have substantial impact in the western Pacific and to a lesser extent in the central Pacific; and the Japanese coastal pole-and-line and purse-seine fisheries are also having a significant impact near Japan (Davies et al 2011).

Yellowfin Tuna

In August 2011, the Scientific Committee of the WCPFC reviewed a stock assessment for yellowfin tuna in the western and central Pacific (Langley et al. 2011). The main conclusions indicated that recent recruitment of yellowfin tuna is estimated to be considerably lower than the long-term average and fishing mortality is estimated well below the stocks fishing mortality maximum sustainable yield. The estimates of MSY for the four principal models range from 552,000–637,000 mt and considerably higher than recent catches estimates for yellowfin (430,000 mt, source WCPFC Yearbook 2007). Therefore the WCPO yellowfin tuna stock is not experiencing overfishing or in an overfished state.

Yellowfin tuna are caught primarily by purse seine and ring nets in the Western and Central Pacific, and by purse seines in the Eastern Pacific Ocean. Substantial volumes of yellowfin tuna are also caught by pole-and-line fleets in Indonesia and by handliners in the Philippines. Yellowfin catches by longlines comprise a significant catch of yellowfin tuna, but longlining is a much smaller component of the fishing mortality on this species compared to bigeye tuna.

Skipjack Tuna

The major conclusions of the 2011 skipjack assessment (Hoyle et al 2011) are similar to those of previous assessments.

Similar to other tropical tunas, estimates of natural mortality are strongly age-specific, with higher rates estimated for younger skipjack. Stocks of skipjack tuna in the WCPO appear to be robust at this time with increased landings and catch rates being experienced for the past few years in the WCPO. The 2009 catch of skipjack tuna in the WCPO was the highest ever continuing a trend begun in 2002 (Figure 39), and with 2010 catches being the second highest.

The most recent assessment of skipjack tuna in the WCPO includes data from 1972 to 2010 (Hoyle et al. 2011). Current fishing mortality rates for skipjack tuna are estimated to be well below the F_{MSY} reference point, and therefore, overfishing is not occurring (i.e., current fishing mortality is less than F_{MSY}). The total biomass of skipjack tuna has fluctuated above the biomass based reference point B_{MSY} and recent biomass levels are estimated to be well above the B_{MSY} level. According to the authors, these conclusions appear relatively robust (i.e., scientifically valid), at least within the statistical uncertainty of the current assessment. Recruitment

variability, influenced by environmental conditions, will continue to be the primary influence on stock size and fishery performance.

The model estimates significant seasonal movements between the western and eastern equatorial regions. The performance of the fishery in the eastern region has been shown to be strongly influenced by the prevailing environmental conditions with higher stock abundance and/or availability associated with El Niño conditions (Lehodey et al. 1997). This is likely to be at least partly attributable to an eastward displacement of the skipjack biomass due to the prevailing oceanographic conditions, although this dynamic is unlikely to be captured by the parameterization of movement in the current model.

Recruitment showed an upward shift in the mid-1980s and is estimated to have remained at a higher level since that time. Recruitment in the eastern equatorial region is more variable with recent peaks in recruitment occurring in 1998 and 2004−2005 following strong El Niño events around that time. Conversely, the lower recruitment in 2001−2003 followed a period of sustained La Nina conditions. Recent recruitment is estimated to be at a high level, but is poorly determined due to limited observations from the fishery.

Overall, most of the skipjack biomass is within regions the equatorial Western and Central Pacific. The trend in total biomass is consistent with the trend in overall recruitment, and with the CPUE time series (Kiyofuji, Uosaki, and Hoyle 2011). There is relatively low biomass during the early period, followed by an increase to a higher level of biomass throughout 1984-2000, and declining biomass over the most recent 5 years. In the equatorial Western and Central Pacific, the average biomass 1986-88 is 59% higher than the average of 1979-8.

The model also incorporates a considerable amount of tagging data that provides information concerning absolute stock size during the main tag recovery period. For the equatorial regions, the most recent data included in the model are from an intensive tagging program that ceased in the early 1990s with most tag recoveries occurring over the following 18 months. Further analyses should be carried out to integrate the Pacific Tuna Tagging Program (PTTP) data into the stock assessment as soon as possible. Initial analyses of the data suggest results consistent with evidence from the CPUE time series. However, integrating the PTTP data into the model is likely to improve the accuracy and precision of estimates, particularly in the eastern equatorial region.

Within the equatorial region, fishing mortality increased throughout the model period and is estimated to be highest in the western region in the most recent years. The impact of fishing is predicted to have reduced recent biomass by about 50% in the western equatorial region and 25% in the eastern region. For the entire stock, the depletion is estimated to be approximately 40%.

The principal conclusions are that skipjack is currently exploited at a moderate level relative to its biological potential. Furthermore, the estimates of and indicate that overfishing of skipjack is not occurring in the WCPO, nor is the stock in an overfished state. These conclusions appear relatively robust, at least within the statistical uncertainty of the current assessment. Fishing

pressure and recruitment variability, influenced by environmental conditions, will continue to be the primary influences on stock size and fishery performance.

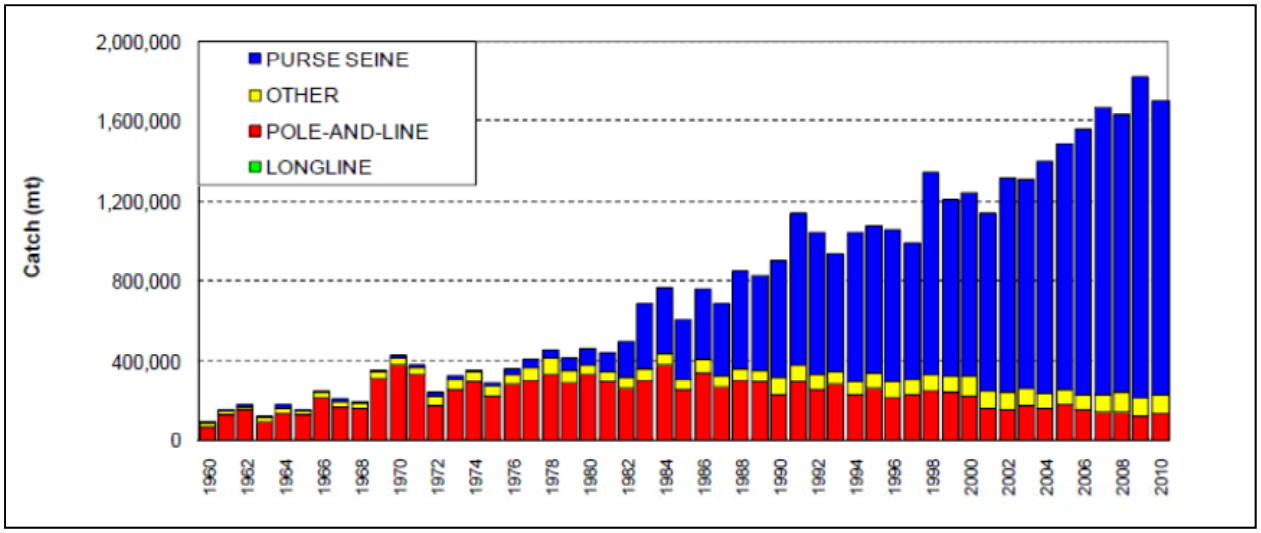


Figure 40: Skipjack Catch by Gear (mt) in WCPO
Source: Williams and Terawasi 2011

8.7 Regional Tuna Fisheries Management

Management of pelagic fisheries is complicated by the nature of the targeted "highly migratory species" whose life histories span the arbitrary jurisdictional boundaries used in management, such as EEZs, of many nations. U.S. pelagic fisheries do much of their fishing on the high seas outside the EEZ of the U.S. and other nations. Management includes trans-boundary issues, both because fish stocks may straddle EEZs and because fishing may occur in international waters where no nation has comprehensive jurisdiction. For this reason, fishery managers and their governments have sought to establish stable multilateral arrangements, but establishing such a regime is always difficult for "open access" resources. In Ward et al. (1998) a review of regional organizations established to manage or research living marine resources, 25 organizations were identified. The following cover the Pacific region and target species relevant to Council/NMFS managed pelagic fisheries:

The Western and Central Pacific Fisheries Commission (WCPFC). The WCPFC was established by the coastal States of the Western and Central Pacific and States fishing in that region through the Convention on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean. The Convention was opened for signature at Honolulu on September 5, 2000. The objective of the Convention is to ensure, through effective management, the long-term conservation and sustainable use of highly migratory fish stocks in the WCPO in accordance with the 1982 United Nations Convention on the Law of the Sea and the 1995 U.N. Fish Stocks Agreement. For this purpose, the Convention establishes a Commission for the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean.

The Convention was open for signature for 12 months from September 5, 2000, by the States that participated in the Multilateral High-Level Conference on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific. These nations include: Australia, Canada, China, the Cook Islands, the Federated States of Micronesia, the Fiji Islands, France, Indonesia, Japan, the Republic of Kiribati, the Republic of the Marshall Islands, the Republic of Nauru, New Zealand, Niue, the Republic of Palau, the Independent State of Papua New Guinea, the Republic of the Philippines, the Republic of Korea, the Independent State of Samoa, the Solomon Islands, the Kingdom of Tonga, Tuvalu, the United Kingdom of Great Britain and Northern Ireland in respect of Pitcairn, Henderson, Ducie and Oeno Islands, the United States of America and the Republic of Vanuatu. The depositary for the Convention is the Government of New Zealand.

The WCPFC implemented its first conservation measure for WCPO bigeye tuna in December 2005, when the Commission promulgated its first resolution for tuna management (Conservation and Management Measures for Bigeye and Yellowfin Tuna in the Western and Central Pacific Ocean). Under this measure, members of the Commission and cooperating non-members, agreed to establish catch limits to reduce fishing mortality on bigeye for the years (2006-2008) to the average annual bigeye catch for the years 2001-2004 or the year 2004 (the year 2004 only applies to the U.S. and China). This measure did not apply to members or cooperating non-members that caught less than 2,000 mt in 2004; those that caught less than 2,000 mt of bigeye in 2004 was required to ensure that their catch did not exceed 2,000 mt in each of the next three years. This measure was maintained in 2006 at the third meeting of the WCPFC under Conservation and Management Measure 2006-01. In December 2008, the WCPFC adopted CMM 2008-01 which limited the Hawaii longline fishery to its 2004 bigeye tuna total catch (4,159 mt) and allocated a catch quota of 2,000 mt each to the U.S. territories of American Samoa, Guam and the Northern Mariana Islands.

The Inter-American Tropical Tuna Commission (IATTC). The IATTC, established by international convention in 1950, is responsible for the conservation and management of fisheries for tunas and other species taken by tuna-fishing vessels in the Eastern Pacific Ocean (generally speaking, off the coast of Latin America west to 150° W. longitude). It collects data, assesses stock status, provides management advice to member nations, operates an observer program and conducts fishery research. In addition to target species issues, incidental dolphin mortality has been a major problem in the Eastern Tropical Pacific (ETP) and the IATTC has established a program to monitor incidental mortality and make conservation recommendations. The member countries of the IATTC are: Costa Rica, Ecuador, El Salvador, France, Guatemala, Japan, Mexico, Nicaragua, Panama, Peru, Republic of Korea, Spain, United States, Vanuatu, and Venezuela. Belize, Canada, China, Cook Islands, the European Union, Honduras and Chinese Taipei are Cooperating Non Parties or Cooperating Fishing Entities.

The South Pacific Tuna Treaty (SPTT). The SPTT entered into force in 1988 and after an initial 5-year agreement was extended in 1993 and again in March 2002. In 2002, the Parties agreed to amend and extend the Treaty and to extend the related Economic Assistance Agreement between the United States and the Forum Fisheries Agency (FFA) beyond the June 2003 expiration date, for a term of 10 years. The 2002 extension provides licenses for up to 40 U.S. purse seiners, with an option for 5 additional licenses reserved for joint venture arrangements, to fish for tuna in the EEZs of the Pacific Island Parties. It also contains a number of amendments to the Treaty and its

annexes, such as updating the methods available for reporting; a revised procedure for amending the annexes; a revised observer program fee formula; provisions on the use of a vessel monitoring system (VMS); and general provisions on fishing capacity, revenue sharing, and linkages between the Treaty and the Western and Central Pacific Tuna Convention (WCPTC), among others. The SPTT agreement expires on June 14, 2013. The parties involved in the SPTT include: Australia, Cook Islands, Federated States of Micronesia , Fiji, Kiribati, Marshall Islands, Nauru, New Zealand, Niue, Palau, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu, United States and Vanuatu.

The SPTT's implementing legislation is the South Pacific Tuna Act of 1988 as amended (54 FR 4033, January 27, 1989; 56 FR 19312, April 26, 1991). Of the total cost for access under the SPTT, the U.S. tuna industry, as coordinated by the American Tunaboat Association, provides up to $3 million each year to the Forum Fisheries Agency (FFA) located in Honiara, Solomon Islands. The FFA Director and staff act as the SPTT Administrators for the Pacific Island Parties to the agreement. The FFA deducts a small amount (approx. $500,000) for treaty administration, after which 15 percent of the revenue is divided equally among FFA members, with the remaining balance (85 percent) distributed on a *pro rata* basis depending on the weight of tuna landed in each respective EEZ.

Also associated with the SPTT is an Economic Assistance Agreement between the U.S. Government (U.S. Agency for International Development) and the FFA. The U.S. Government pays $18 million annually, subject to the availability of appropriated funds for this purpose, into an economic development fund administered by the FFA. The FFA ensures that the fund is used to support economic development programs in the region. Payments to the Pacific Island Countries under the Economic Assistance Agreement are now the only significant source of U.S. economic support for the stability and security of the region outside the assistance provided to the Freely Associated States. Under the terms of the SPTT, both the U.S. tuna industry and the U.S. Government annual payments must be made before any fishing licenses will be issued. In addition to paying access fees, the U.S. tuna industry also pays the FFA costs associated with observer coverage (including training), VMS deployment and associated recurring costs, and a regional registration fee.

U.S. operational, administrative, and enforcement commitments under the SPTT are carried out by NOAA, specifically its regional offices located in Honolulu, Hawaii. Issues that arise typically are addressed in formal annual consultations between U.S. Government and Pacific Island States representatives, or during informal discussions which also have taken place on an annual basis. The Department of State has specific authority to act for the United States.

The Oceanic Fisheries Program (OFP). The OFP is a component of the Secretariat of the Pacific Community (SPC), based in Noumea, New Caledonia. All Pacific island nations and several metropolitan states are members. American Samoa, CNMI and Guam have member status separate from U.S. membership. The OFP developed from SPC tuna assessment programs that began in the late 1970s. The program gathers fishery statistics and conducts research, including stock assessments for major Western Pacific tuna stocks. It advises member states by providing detailed scientific information on stock status.

The International Scientific Committee (ISC). The ISC was established in 1995 through an intergovernmental agreement between Japan and the United States of America (USA). Since its establishment and first meeting in 1996, the ISC has undergone a number of changes to its charter and name (from the Interim Scientific Committee to the International Scientific Committee) and has adopted guidelines for its operations. The two main goals of the ISC are to 1) to enhance scientific research and cooperation for conservation and rational utilization of the species of tuna and tuna-like fishes which inhabit the North Pacific Ocean during a part or all of their life cycle; and 2) to establish the scientific groundwork, if at some point in the future, it is decided to create a multilateral regime for the conservation and rational utilization of these species in this region. The ISC provides scientific advice on the stocks and fisheries of tuna and tuna-like species in the North Pacific to the Member governments and regional fisheries management organizations. (ISC Report, July 2008)

The Forum Fisheries Agency (FFA). Ten Pacific island countries founded the FFA in 1979 under the auspices of the South Pacific Islands Forum (now known as the Pacific Islands Forum). It has subsequently expanded to include 16 countries in the western and central Pacific. It is governed by the Forum Fisheries Committee with representation from each member country; they direct a Secretariat based in Honiara, Solomon Islands. The FFA assists member countries to conserve and manage their tuna stocks, for example in its early days by advising emerging Pacific islands on the establishment of their EEZs. With Secretariat assistance, member countries negotiated the United States Multilateral Fisheries Treaty, also known as the South Pacific Tuna Treaty discussed above, which was finalized in 1987. This treaty establishes a license regime for U.S. purse seine vessels that fish in member countries' EEZs. More recently the FFA has emphasized sustainable management of tuna resources, particularly through multi-lateral arrangements, and securing greater economic benefits from tuna resources for member nations.

8.9 Climate Change Background

A memorandum dated February 18, 2010, issued by the Chair, Council on Environmental Quality (Sutley 2010) provides draft guidance to Federal departments and agencies on ways to improve consideration of effects of greenhouse gas (GHG) emissions and climate change in their evaluation of proposals under the National Environmental Policy Act (NEPA). Effects to be considered include the potential effects of agency action on global climate change and potential effects of climate change on a proposed project. This section provides a general discussion of climate change concepts as it may be tuna stocks, protected resources, and fisheries considered in this proposed action. Climate change considerations for the proposed action and alternatives are addressed in the impacts section, section 9, below.

The global mean temperature has increased by 0.76°C over the last 150 years, and the linear trend of temperature over the last 50 years is nearly twice that for the last 100 years (IPCC 2007a). Ample evidence now exists supporting the wide-ranging and variable impacts from climate change which can affect the phenelogy (timing of recurring natural phenomena such as life stages), range and distribution of species, and composition and dynamics of communities (Walther et al. 2002). Observed changes in marine systems associated with climate change include increasing water temperatures; sea level rise; changes in ice cover, salinity, oxygen levels, circulation; modification of shorelines; and increased ocean acidification. Changes to

marine systems include shifts in ranges; changes in algal, plankton, and fish abundance (IPCC 2007); damage to coral reefs (Scavia et al. 2002), prey abundance, and other impacts. A more complete summary of climate change and climate change impacts can be found online at http://www.ipcc.ch/publications_and_data/publications_and_data_reports.shtml.

In general, large scale climate cycles can impact winds, currents, ocean mixing, temperature regimes, nutrient recharge, and affect the productivity of all trophic levels in the North Pacific Ocean (Polovina et al. 1994). These impacts are expressed as variability in stock size, recruitment, growth rates, or other factors. Highly migratory pelagic fishes can be affected through changing distribution and abundance of prey species. Bleaching and the effects of ocean acidification on coral reef ecosystems are other climate change-related concerns that can affect food webs of tuna prey species.

Climate change may impact the availability of tunas and this may, in turn, impact all pelagic fisheries; however, how and to what extent is not known. Distinguishing the effects of climate change from natural variability is challenging. NMFS and other federal agencies will continue to conduct prioritized research in order to facilitate ocean resources stewardship. Osgood (2008) provides a review of marine ecosystem climate research priorities and concerns.

Climate change has the potential to impact protected resources that interact with fisheries including marine mammals, seabirds, and sea turtles. Impacts can include changes in prey abundance and distribution, and impacts of sea level rise and temperature changes on nesting seabirds,seaturtles and monk seal pupping sites. These changes will be monitored by NMFS, the Council, local governments and USFWS and information can be used to modify fishery operations, as needed.

Although direct information may not be available, the potential impacts of climate change on pelagic fisheries in the Mariana Archipelagic EEZ will continue to be noted indirectly through ongoing monitoring of fish stocks as well as fish harvests and monitoring of protected resources that interact with the pelagic fisheries. Climate change impacts on listed species and their habitats, are considered in section 7 consultations undertaken on the fisheries of the western Pacific region. The Council and NMFS will continue to implement responsive fishery management measures as needed to manage western Pacific fisheries sustainably.

9.0 Impacts of the Alternatives

9.1 CNMI Purse Seine Prohibited Area

Alternative 1A: No Action

Under Alternative 1A (No Action), no new regulations would be made and pelagic purse seine vessels would not be prohibited from fishing within U.S. EEZ waters around CNMI.

Alternative 1B: 30 nm Purse Seine Prohibited Area (Preferred)

Under this alternative the all vessels would be prohibited from pelagic purse seine fishing within 30 nm of the CNMI, essentially within the same zone as the same boundaries as longline closed area

Alternative 1C: 100 nm Purse Seine Prohibited Area

Under Alternative 1C, all vessels would be prohibited from pelagic purse seine fishing within 100 nm of CNMI.

9.1.1 Impacts on Target Stocks

Under Alternative 1A (No Action) pelagic landings and fishing effort by CNMI's existing pelagic troll fleet would continue and the current level of fishing is considered sustainable with respect to all target stocks. However, under any of the alternatives in which purse seine could take place in the EEZ, troll fishing could be impacted by gear interactions and decreased catches should purse seining expand into the EEZ around CNMI. Catches of pelagic species by the troll fleet under all alternatives would be expected to continue to be small, with a long term average of about 250,000 lb (114 mt) which would have no significant adverse impact on target species. I

If the relationships between troll CPUE and yellowfin and skipjack CPUE are as suggested by Figures 35 - 38, then the present levels of WCPO purse seine yellowfin catch are expected to have a positive influence CNMI troll yellowfin CPUE, and a negative influence on Guam yellowfin troll CPUE. Conversely greater fishing success in the WCPO purse seine fishery is expected to be paralleled by declining CPUEs in the CNMI troll skipjack CPUE, but with a positive influence in the Guam troll fishery. How these relationships would change if purse seine fishing were permitted within the US EEZ around CNMI is unknown, however, having purse seine fishing within 30-100 nm of the CNMI troll fishery may lead to declines in yellowfin troll CPUE and exacerbate the negative trend in the CNMI troll skipjack CPUE. Under the preferred alternative (Alternative 1B), a 30 mile area closure to purse seining would at a minimum offer some protection for the small scale troll fleet, while allowing the purse seine fishery to operate within the EEZ.

9.1.2 Impacts on Non-target Stocks

Troll and longline impacts on non-target stocks are considered sustainable and none of the alternatives is expected to change the conduct of these fisheries, so there would be no change on impacts to non-target stocks from troll or longline fishing.

There is currently no purse seine fishing in the U.S. EEZ around CNMI; however, purse seining is expected to continue to occur at the same levels of intensity and in the same areas that it is currently occurring.

Under any of the alternatives purse seine vessels would be expected to catch primarily target species, however, they would also catch some non-target species. Between 2005 and 2008 purse seine fleet non-target catches included: black marlin, blue marlin, silky shark, kawakawa, wahoo, mackerel scad, mahimahi, oceanic triggerfishes and rainbow runner (Table 11). Wahoo,

mahimahi and blue marlin are retained by troll fishermen and collectively account for about 16% of the total pelagic fish catch on CNMI in 2010 (Table 3) and on average 13% of the annual pelagic troll catch between 1982 and 2010 (WPRMC 2011, unpublished).

The majority of these species were discarded by the U.S. purse seine fleet and similar purse seine catches and discards could be expected under all alternatives. The impacts of purse seine fishing in EEZ waters around CNMI on WCPO populations of non-target species are unknown; however, because of the large capacity and inability to target specific fishes, localized stock depletion may occur for non-target species, including those which have economic value. There is no change to current purse seine fishing that would affect non-target species. Management of purse seine impacts on non-target species will continue to be the purview of the WCPFC, regardless of which alternative is selected.

9.1.3 Impacts on Protected Species

Under all of the alternatives, pelagic fishing around CNMI would continue to be conducted by trolling in small boats with concomitant impacts on protected species expected to continue to be nonexistent to minimal. The troll fishery around CNMI was included in NMFS' 2002 and 2009 biological opinions on pelagic fisheries of the Western Pacific Region which concluded that continued operation was not likely to jeopardize the continued existence of any listed sea turtles or marine mammals. A small potential exists that the trolling gear may incidentally hook or entangle a sea turtle or marine mammal; however, NMFS and the Council consider this type of interaction extremely rare and therefore unlikely to adversely affect listed species. None of the alternatives is expected to result in a change to impacts of trolling on protected species.

Under all Alternatives there is a potential for impacts on protected resources. In November 2006, NMFS issued a biological opinion on the effects of the U.S. purse seine fishery in the WCPO on listed sea turtles and whales. Potential adverse effects on listed species were analyzed on aspects of the fishery identified to have potential adverse impacts including vessel traffic, gear deployment and retrieval, entanglement in FADs, and removal of fish biomass from the pelagic ecosystem (NMFS 2006). However, the relative impact of these interactions would depend on whether already existing purse seine vessel(s) moved to CNMI from other areas of the WCPO, or new vessels were built for CNMI fishery. The former case would represent a transfer of existing impacts to CNMI waters, while the latter would result in new impacts to protected species. Marine mammal and sea turtle interactions are reported to be disproportionately higher in sets associated with floating objects (associated sets) than in free swimming (unassociated sets) schools (NMFS 2006). Interaction information used in the biological opinion's analysis of effects was derived from observer data.

Molony (2005) found that the majority of interactions between turtles and marine mammals occur in the western tropical WCPO west of 170° W around the EEZs of Papua New Guinea, FSM, the Solomon Islands, and Nauru. The NMFS biological opinion concluded that the fishery is not likely to jeopardize the continued existence of any of the threatened or endangered species found in the area. The biological opinion's Incidental Take Statement expects 14 green, 14 hawksbill, 11 leatherback, 11 loggerhead, and 11 olive ridley sea turtles per year to be

incidentally taken in the U.S. WCPO purse seine fishery. The biological opinion indicates zero mortality to result from interactions. Alternatives 1A, 1B, and 1C all allow purse seine fishing within all or some EEZ waters around CNMI, with impacts to protected species likely to increase within the EEZ of CNMI proportional to the extent at which purse seine fishing were to occur, and proximity to shore where turtles such a greens and hawksbills are likely to be more abundant.

None of the alternatives would result in a change of the number of purse seiners, fishing intensity or activity of purse seining, or areas purse seiners are fishing in, so none of the alternatives would result in a change in impacts to protected species. Under the preferred alternative (Alternative 1B), no purse seine fishing would not be allowed within 30 miles around CNMI, which would lessen the risk to protected species that are more island associated, such as green and hawksbill sea turtles, spinner dolphins and false killer whales.

9.1.4 Impacts on Marine Habitat

Purse seine vessels are believed to normally have little impact on marine habitat as they deploy nets in the water column that do not contact the seabed, however, the EEZ waters around the Mariana Archipelago contain many submarine banks and seamount features which could be impacted by deployment and retrieval of a large purse seine net should it come into contact with these shallow features[21]. Alternative 1A would allow purse seine fishing within zones in CNMI where seamounts are known to exist, Alternatives 1B, and 1C would all allow purse seine fishing within 30nm or 100nm, respectively, from shore within EEZ waters around CNMI. Since the majority of seamounts for fishing are within 30nm of landmasses in CNMI, the preferred alternative (Alternative 1B) would have little or no impact on marine habitat.

The area affected by this action has been identified as EFH for pelagic management unit species managed in the western Pacific. The action is not likely to lead to substantial physical, chemical, or biological alterations to the habitat. The action in the context of the fishery as a whole will not change the intensity of fishing or fishing operations, therefore, the proposed alternatives would not result in a large or adverse impact on EFH; therefore, an EFH consultation is not required.

9.1.5 Impacts on Public Health and Safety

Allowing purse seine activities to occur within small boat pelagic fishing areas, under Alternative 1A, could decrease catches and potentially cause the small boats to fish farther from land and in unfamiliar waters resulting in a decrease in safety for those participants. Under Alternatives 1B excluding purse seine fishing from zero to 30 miles within the EEZ is expected to have positive impacts to the troll fishing sector in reducing catch competition, and Alternative 1C to increase these positive benefits. Prohibiting purse seine fishing from a portion of the U.S. EEZ waters around CNMI is not expected to result in any safety impacts to purse seine fishing participants as it is currently conducted in all areas of the Pacific including the high seas and this would not change.

[21] Purse seine nets employed in the WCPO extend between 220 to 309 meters and are fished at depths ranging from 65 to 226 meters (Delgado de Molina et al. 2010)

9.1.6 Impacts on Fishery Participants and Communities

If a purse seine fishery were to fish in the EEZ around CNMI under Alternatives 1A, 1B, or 1C, the troll fishing community could be impacted by localized stock depletion leading to catch competition between the two fisheries above and beyond what appears to happening with respect to skipjack troll CPUE (Figure 38). The majority of the purse seine catch is projected to be skipjack tuna, which is also the most important target species for CNMI's troll fleet. The second highest purse seine catch would be yellowfin tuna which is also the trolling fleet's second most important species, but which does not appear to be impacted in the same way as for skipjack troll CPUE. Greater amounts of purse seine effort closer to areas fished by the small boat fleets of CNMI could force the troll fleet to travel farther to maintain their current catches, and/or to lose revenue normally gained through skipjack and yellowfin catches.

Under the preferred Alternative 1B, limiting purse seine fishing to within 30 nm of the coast is expected to provide a measure of protection for CNMI's troll fishermen while allowing US purse seines to set in the remainder of the EEZ Impacts, however, are expected to be minimal because the highly mobile purse seine fleet typically fishes in large areas of the Pacific and has exclusive rights to fish in U.S. EEZ waters in the PRIA, except those waters now off limits due to the establishment of the PRIA Marine National Monument.

While the U.S. purse seine fleet does not currently fish in waters of or deliver to CNMI, future purse seine fishing near CNMI, or the ability to accept fish transshipped by nearby purse seine vessels could influence the development the infrastructure needed to process or export such species. Aside from the negative impacts discussed earlier associated with gear competition and stock depletion, the support of a purse seine industry could provide positive benefits through increasing potential employment while opening up markets currently unexplored in CNMI. Although for this to occur, CNMI's marine-based infrastructure (i.e., dock space, fueling platforms, skilled labor, etc) would need to be significantly enhanced beyond current conditions and is not likely to happen in the near future.

Purse seine fishing is likely to become more restricted elsewhere, especially if measures being proposed by the PNA Group are adopted by the WCPFC. These include the doubling or tripling of the costs of access agreements to fish in PNA Group EEZs[22], and, as a condition of access, the requirement of purse seine access agreements, not to fish on the high seas between 10 deg N to 20 deg S latitude and 170 deg E to 150 deg W longitude[23]. There has also been a proposal advanced at the 2010 WCPFC Technical and Compliance Committee (TCC) meeting (WCPFC 2010) by the PNA Group to extend an existing annual three-month ban on purse seining on FADs in PNA EEZs for an additional three months for purse seine fleets that catch in excess of 4,000MT of bigeye annually.

The U.S. fleet operates under the South Pacific Tuna Treaty (SPTT) which provides access to PNA Group waters. Other Pacific Island Nations (PINs) are also members of the Treaty, but the

[22] Islands Business November 2010 article: 'Pacific islands look at tuna fisheries'

[23] FFA Press release April 23, 2010, PNA announces date for closure of 4 million square kilometer high seas areas to purse seine fishing.

it's the PNA Group countries, clustered around the Pacific Warm Pool that are the principal fishing grounds for U.S. and other nation's purse seine fleets. At the time of writing, the SPTT expires in 2013 and a new agreement has not yet been concluded. However, as noted above, the PNA Group is signaling its intentions to place greater restrictions on purse seine fleet operations for access to their waters. Further, the FFA member countries and the PNA group have elected to allocate access to their EEZs for purse seiners based on a Vessel Day Scheme (VDS). The current SPTT has provisions for U.S. 40 vessels to fish, with an additional 5 vessels allowed under joint venture arrangements. However, the PNA Group may want the U.S. vessels to fish under the VDS like other fleets. The number of Vessel Days allocated to the U.S. fleet may fall short of the number needed by a fleet currently with 36 active vessels.

Taken together, the more aggressive attitude of the PNA Group to confine purse seine fishing to their EEZ waters, to increase access costs, to penalize purse seine fleets with domestic longline bigeye fisheries and the potential for the VDS allocation to be less than optimum for the U.S. fleet provides an incentive for those U.S. hulled vessels to explore options such as fishing in U.S. EEZ waters. There are proven skipjack resources in the U.S. EEZ around the Mariana Archipelago as evinced from the Japanese pole and line fishery that operated from Saipan between 1922 and 1942 (Higuchi 2007) and which at its peak landed 3,700 mt of skipjack. As noted above, a single purse seine vessel is capable of catching twice this amount annually.

Closing part of the U.S. EEZ around the Mariana Archipelago (Alternatives 1B and 2B or Alternatives 1C and 2C) to purse seine fishing provides a degree of protection for the small boat fleets of the two island groups, which collectively amount to over 430 small fishing vessels in Guam and CNMI (Figures 5 and 12), and protects the long terms continuity of small scale pelagic fisheries which have social, economic and cultural importance for the two U.S. territories. U.S. vessels with authorization to fish within U.S. EEZ waters would still have access to parts of the U.S. EEZ around Guam and CNMI, as well as around American Samoa and the Pacific Remote Islands Area, of which Howland and Baker, Jarvis and Palmyra and Kingman Reef. All of these areas have been fished by the U.S. fleet in the past and would continue to be accessible to vessels with U.S. hulls. The preferred alternatives 1B and 2B balances the needs of the CNMI and Guam fishermen to fish and provide a source of fresh tuna to the local populace, with those U.S. purse seine vessels who have authorization to fish within UZ EEZ waters still able to fish in other segments of the U.S. EEZ in the Western Pacific.

9.1.7 Impacts on Biodiversity and Ecosystem Functions

Under the preferred Alternative 1B, no purse seine fishing would be allowed in seaward out to 30 nm from the Commonwealth of the Northern Mariana Islands. This action will have no known adverse impacts on biodiversity and ecosystem functions since the action of creating fishing prohibited zones would protect, rather than diminish, marine resources. Evidence to date suggests that purse seining, primarily to the south of the Mariana Archipelago, has differential effects on the abundance and availability of yellowfin in Guam and skipjack in the CNMI. If purse seiners were to begin fishing in U.S. EEZ waters around the CNMI these effects are more likely to be exacerbated and the implementation of a purse seine area closure out to 30 nm offers troll fishermen protection from potential purse seine impacts

9.1.8 Impacts on Administration and Enforcement

There would be no impacts on administration and enforcement under Alternative 1A (No Action). Alternatives 1B and 1Cwould all place similar administrative burden of publishing regulations associated with a prohibited area and informing all fishery participants. Alternatives 1B, 1C, and 1D would all place an additional burden on law enforcement, U.S. Coast Guard and NOAA Office of Law Enforcement (OLE), in enforcing the closed areas through VMS, which all U.S. purse seiners are obliged to carry.

9.1.9 Cumulative Effects of the Proposed CNMI Purse Seine Prohibited Areas

Establishment of a 30 nm purse seine prohibited area in the CNMI would address concerns about the large harvests and harvests of juvenile tunas. Regardless of which alternative is selected for a purse seine prohibited area in the CNMI, none of the alternatives would likely change the intensity or location of fishing by trollers or purse seiners. Other fishery management activities that are being proposed that affect purse seiners (e.g., e managing FAD use by purse seiners) would not result in any of the alternatives having a large or negative environmental effect.

9.1.10 Environmental Justice Effects of the Proposed CNMI Purse Seine Prohibited Areas

Environmental justice policies intend to promote environmental protection by focusing attention on potential environmental harms and risks that may disproportionately and adversely affect minority, low-income and Tribal populations. None of the proposed alternatives to establish a purse seine prohibited area would have a high adverse health or environmental effect on environmental justice populations. The proposed action is intended to reduce gear conflicts, reduce catch competition, and prevent localized depletion by purse seining. None of the alternatives would change the current intensity or location of fishing by purse seine vessels, or troll or longline vessels, so there would not be an adverse environmental or health impact from implementing any of the alternatives.

9.1.11 Climate Change Impacts of the Proposed CNMI Purse Seine Prohibited Areas

The alternatives consider various distances from shore at which purse seiners could fish. There is no purse seine fishing occurring in the CNMI, and none of the alternatives would change the locations or intensity of fishing by purse seiners, or local troll and longline fishing vessels. None of the proposed alternatives would result in a federal contribution to greenhouse gas emissions greater than 25,000 mt carbon dioxide equivalents. Climate change impacts are not expected to affect the effectiveness of any of the alternatives with respect to achieving the fishery objectives and meeting the purpose and need for action. Climate change is also not expected to affect the environmental impact of implementing any of the alternatives which would establish a geographic separation between fishing fleets.

9.1.12 Reasons the Council Selected the CNMI Purse Seine Prohibited Area as its Preferred Alternative

The preferred Alternative 1B, recommended by the Council, would prohibit all vessels from pelagic purse seine fishing within 0-30 nm of the U.S. EEZ waters around CNMI. This is intended to preserve the viability of smaller scale local pelagic fisheries in CNMI while potentially providing positive benefits to Pacific stocks of target tunas by preventing the harvest of undersized tunas within part of the U.S. EEZ waters.

Over the past 6 years, there has been an increasing trend in total tuna catch, primarily due to increases in purse-seine fishery catches (Williams and Terawasi 2011). The provisional total WCP–CA tuna catch for 2010 was estimated at 2,414,994 mt, the second highest annual catch recorded and 80,000 mt lower the previous record in 2009 (2,494,112 mt). During 2010, the purse seine fishery accounted for an estimated 1,820,844 mt (75% of the total catch), with pole-and-line taking an estimated 171,604 mt (7%), the longline fishery an estimated 239,853 mt (10%), and the remainder (7%) taken by troll gear and a variety of artisanal gears, mostly in eastern Indonesia and the Philippines. The 2010 WCP–CA catch of skipjack (1,706,166 mt – 71% of the total catch) was the second highest recorded and 115,000 mt less than the previous record catch of 2009 (1,821,770 mt). The WCP–CA yellowfin catch for 2010 (470,161 mt – 19%) was more than 50,000 mt higher than the 2009 catch level, but still 70,000 mt lower than the record catch taken in 2008 (541,262 mt) (Williams and Terawasi 2011).

As discussed earlier, in a few days, a single purse seiner has the potential to catch tuna species well in excess of similar catches by the entire CNMI troll fleet for one year (see Table 3) Moreover, the conclusions from the Hampton et al (1996) and Kleiber (pers. comm.) studies, and others listed in Section 8.4.4 (Nishida 1995; Ortega-Garcia1995; Sibert et al. 1995; Shomura et al. 1996) suggest that every mile of separation between purse seine fisheries and other pelagic fisheries is beneficial in terms of the other fisheries catch rates.

Alternative 1B was selected because it best balances the needs of the existing small boat fleet around CNMI to operate without potential impacts of stock depletion and subsequent catch competition caused by purse seine fishing, while still offering fishing opportunities for those US-hulled vessels to fish in the remainder of the EEZ.

There are several other compelling justifications that support a prohibition on purse seine fishing within 30 nm of the CNMI, including:

(1) As noted above in this Section and as described in Section 8.4.3, several studies have shown direct impacts of purse seine fishing on tuna catches in longline and pole-and-line fleets. Moreover, purse seine fishing, primarily to the south of the Mariana Archipelago already appears to be having a negative impact on CNMI troll skipjack CPUEs.

(2) Although no purse seine catches have yet been recorded from EEZ waters around CNMI the potential impacts to the small boat fleet should this occur must be considered especially in light of the fact that the largest skipjack catch in world history was recorded in 2009 and it already appears to be having a negative impact on CNMI troll skipjack CPUEs.

(3) The U.S. purse seine fleet has rebuilt and thus more vessels may lead to expansion of fishing grounds because of competition with other purse seine fleets especially since the Pacific-wide catch of skipjack is at an all-time high;

(4) The U.S. purse seine fleet may be looking for new areas to fish to compensate for lost fishing grounds from Monument closures in the Pacific (PRIA, Rose Atoll and the Mariana Trench) and potential RFMO instituted high seas pockets closures;

(5) CNMI small boats rely on catches of skipjack and other pelagics for sustenance and as an important part of their economy.

The cumulative effects of the expansion of purse seine fishing in both the WCPO and the EPO have contributed to overfishing of bigeye tuna across the Pacific. FAD-associated purse seine fishing is contributing to excess catches of juvenile yellowfin tuna which is of Pacific-wide concern. In 2007 the U.S. fleet made 80 percent of all sets on drifting FADs which is a considerably higher percentage than other nations fishing in the WCPO (OFP 2007a). It should be noted that regulatory measures being considered and in place now (annual seasonal FAD closures) in the WCPO may further restrict FAD associated fishing of this type in the WCPO.

In addition, there are other suitable fishing areas the purse seine fleet can access due to their great mobility unlike the small vessel fleets which are travel restricted. Hence, the Council believes Alternative 1B is warranted to balance the needs of the existing small boat fleet around CNMI while minimizing the potential for localized stock depletion associated catch competition with purse seine vessels.

9.2 Impacts of Proposed Alternatives for a Guam Purse Seine Prohibited Area

Alternative 2A: No Action

Under Alternative 2A (No Action), no new regulations would be made and pelagic purse seine vessels would not be prohibited from fishing within U.S.EEZ waters around Guam

Alternative 2B: 50-100 nm Purse Seine Prohibited Area

Under Alternative 2B, all vessels would be prohibited from pelagic purse seine fishing within 50 nm to the east and west of Guam, and 100 nm to the south. As with the CNMI this would be the same boundaries as the current longline area closure. **(Preferred)**

Alternative 2C: 100 nm Purse Seine Prohibited Area

Under Alternative 2C, all vessels would be prohibited from pelagic purse seine fishing within 100 nm of Guam.

9.2.1 Impacts of the Proposed Guam Purse Seine Prohibited Areas on Target Stocks

Under Alternative 2A (No Action) pelagic landings and fishing effort by Guam's existing pelagic troll fleet would continue to fluctuate based on weather, catchability, fuel prices, and other factors. Catches of pelagic species by this troll fleet would be expected to continue to be

sustainable because they are small and this fishery does not have a large and adverse impact on target species.

There is currently no purse seine fishing in the U.S. EEZ around Guam. However, purse seine fishing elsewhere, primarily to the south of the Mariana Archipelago, appears to be having a negative impact on Guam's troll yellowfin CPUE. Interestingly, the trend with skipjack CPUE is positive; suggesting that catch success by the purse seine fishery with respect to skipjack is reflected by improved troll skipjack CPUE. How this relationship would change with purse seine fishing within the US EEZ around Guam is unknown. However, skipjack purse seine catches already seem to be having a negative influence on the neighboring CNMI skipjack troll CPUEs, in a fishery for which skipjack is the principal target.

Based on 2002 Japanese purse seine operations (which are considered most representative of catches in this area, see Section 8.4), if a single purse seine vessel were to fish for a single day in EEZ waters around Guam, it could be expected to catch up to 32 mt of tuna, including 26 mt of skipjack, 4 mt of yellowfin tuna, and 0.54 mt of bigeye and mixed species which represents approximately 36 percent of the long term mean annual skipjack and yellowfin catch (107 mt) by Guam's entire troll fleet (Table 5).

If a single purse seine vessel were to fish for an entire year in U.S. EEZ waters around Guam under Alternatives 2A, 2B and 2 C they could be expected to catch up to 7,533mt of tunas, assuming the relatively small EEZ around Guam could support such catch rates, and that fish remained available to purse seiners as the fishable area was progressively reduced. Of this total, 84 percent could be expected to be skipjack, 9 percent yellowfin tuna and the remainder bigeye and other mixed species. Impacts arising from purse seine harvest, such as localized stock depletion, would be less pronounced with increased size of a prohibited area (i.e. Alternative 2A would be expected to have greater impact on target stocks than Alternative 2B or 2C). The assumption that a purse seine vessel would spend 100 percent of the time fishing within the EEZ around Guam is unrealistic, as purse seining is a highly mobile fishery which harvests migratory fish species across large areas of the ocean. Because of this, catches within the EEZ of Guam are expected to be lower than projected in this analysis. However, in relation to historical catches of Guam's troll fleet, any purse seining within the EEZ of Guam would be expected to yield significantly greater catches than that caught by the troll fleet, and therefore may impact species composition and stock abundance within waters around Guam.

The relative impact of purse seine fishing on Pacific stocks would depend on whether already existing purse seine vessel(s) moved to Guam from other areas of the WCPO, or new vessels were built for the Guam fishery. The former case would represent a transfer of existing impacts to Guam waters, while the latter would result in new impacts. Note also that the U.S. EEZ around Guam is very small, and is one of the smaller zones in the WCPO, although the entire U.S. EEZ around the Mariana Archipelago is large, amounting to about 182,000 square nautical miles. Moreover, the U.S. EEZ around Guam is immediately adjacent to the epicenter of the Warm Pool where purse seining is known to occur, thus any transfer of fishing effort into the southern part of the U.S. EEZ around the Mariana Archipelago would be expected to have an influence on skipjack and yellowfin abundance.

The impacts of purse seine fishing in EEZ waters around Guam on the WCPO skipjack, bigeye and yellowfin populations are unknown, however there is likely to be localized stock depletion, the degree of which would depend on the level and location of fishing effort. Figures 35 and 38 indicate that historical purse seine catches, primarily to the south of the US EEZ around Guam, are having a negative influence of Guam troll yellowfin CPUE and CNMI skipjack troll CPUE. If purse seiners were to set on FADs or other floating objects they would be likely to harvest juvenile bigeye tuna which has been shown to contribute significantly to bigeye overfishing occurring in the WCPO due to concomitant impacts on spawning potential and recruitment of bigeye (Hampton et al. 2005).

With larger prohibited areas, it is anticipated that the potential for adverse effects to stocks within the EEZ and localized depletion would be smaller. Under Alternative 2B, no purse seine fishing would be allowed in EEZ waters around Guam in an area conforming to the current longline area closure. This means the waters closed to purse seine fishing would extend 50 nm to the east and west, and 100 nm to the south (See map in Section 11). To the north of Guam, the CNMI 30 nm purse seine are closure would be implemented. If Alternative 2C was implemented then, purse seine fishing would be limited to waters greater than 100 nm around Guam. Though localized depletion by purse seining appears to related to distance (see references in Section 8.4.4), the difference between the closures proposed under Alternative 2B or 2C would likely be minimal. Moreover as noted previously, the data shown in Figures 36-39, the purse seine fishery to the south of the Mariana Archipelago may already be having an impact on troll skipjack and yellowfin CPUE in Guam and CNMI.

None of the alternatives is expected to change the intensity or location of purse seine fishing or troll fishing, and none is expected to result in overfishing of target stocks.

9.2.2 Impacts on Non-target Stocks

Troll and longline impacts on non-target stocks are considered sustainable and none of the alternatives is expected to change the conduct of these fisheries, so there would be no change on impacts to non-target stocks from troll or longline fishing. There is currently no purse seine fishing in the U.S. EEZ around CNMI; however, purse seining is expected to continue to occur at the same levels of intensity and in the same areas that it is currently occurring.

Under any of the alternatives that would allow purse seine vessels to fish in EEZ waters around Guam (Alternatives 2A, 2B and 2C) they would be expected to catch primarily target species, however, they would also catch some non-target species. Between 2005 and 2008 purse seine fleet non-target catches included: black marlin, blue marlin, silky shark, kawakawa, wahoo, mackerel scad, mahimahi, oceanic trigger-fishes and rainbow runner (Table 11). Wahoo, mahimahi and blue marlin are retained by troll fishermen and collectively account for about 50 of the total pelagic fish catch on CNMI in 2010 (Table 3) and on average 53% of the annual pelagic troll catch between 1982 and 2010 (WPRMC 2011, unpublished).

The majority of these species were discarded by the U.S. purse seine fleet and similar purse seine catches and discards could be expected under all alternatives. The impacts of purse seine fishing under Alternative 2A and 2B in EEZ waters around CNMI on WCPO populations of non-target

species are unknown; however, because of the large capacity and inability to target specific fishes, localized stock depletion may occur for non-target species, including those which have economic value. Purse seine discards could still occur under alternative 2C and there is no change to current purse seine fishing that would affect non-target species. Management of purse seine impacts on non-target species will continue to be the purview of the WCPFC, regardless of which alternative is selected.

9.2.3 Impacts on Protected Species

Under all of the alternatives, pelagic fishing around Gum would continue to be conducted by trolling in small boats with concomitant impacts on protected species expected to continue to be nonexistent to minimal. The troll fishery around Gum was included in NMFS' 2002 and 2009 biological opinions on pelagic fisheries of the Western Pacific Region which concluded that continued operation was not likely to jeopardize the continued existence of any listed sea turtles or marine mammals. A small potential exists that the trolling gear may incidentally hook or entangle a sea turtle or marine mammal; however, NMFS and the Council consider this type of interaction extremely rare and therefore unlikely to adversely affect listed species. None of the alternatives is expected to result in a change to impacts of trolling on protected species.

Under the alternatives that allow purse seine fishing to be conducted in the U.S. EEZ, there is a potential for impacts on protected resources. In November 2006, NMFS issued a biological opinion on the effects of the U.S. purse seine fishery in the WCPO on listed sea turtles and whales. Potential adverse effects on listed species were analyzed on aspects of the fishery identified to have potential adverse impacts including vessel traffic, gear deployment and retrieval, entanglement in FADs, and removal of fish biomass from the pelagic ecosystem (NMFS 2006). However, the relative impact of these interactions would depend on whether already existing purse seine vessel(s) moved to Guam from other areas of the WCPO, or new vessels were built for Guam fishery. The former case would represent a transfer of existing impacts to Guam waters, while the latter would result in new impacts to protected species. Marine mammal and sea turtle interactions are reported to be disproportionately higher in sets associated with floating objects (associated sets) than in free swimming (unassociated sets) schools (NMFS 2006). Interaction information used in the biological opinion's analysis of effects was derived from observer data.

Molony (2005) found that the majority of interactions between turtles and marine mammals occur in the western tropical WCPO west of 170° W around the EEZs of Papua New Guinea, FSM, the Solomon Islands, and Nauru. The NMFS biological opinion concluded that the fishery is not likely to jeopardize the continued existence of any of the threatened or endangered species found in the area. The biological opinion's Incidental Take Statement expects 14 green, 14 hawksbill, 11 leatherback, 11 loggerhead, and 11 olive ridley sea turtles per year to be incidentally taken in the U.S. WCPO purse seine fishery. The biological opinion indicates zero mortality to result from interactions. Alternatives 2A, and 2B would all allow purse seine fishing within all or some EEZ waters around CNMI, with impacts to protected species likely to increase within the EEZ of CNMI proportional to the extent at which purse seine fishing were to occur,

and proximity to shore where turtles such a greens and hawksbills are likely to be more abundant.

None of the alternatives would result in a change of the number of purse seiners, fishing intensity or activity of purse seining, or areas purse seiners are fishing in, so none of the alternatives would result in a change in impacts to protected species. Under the preferred alternative (Alternative 2B), purse seine fishing would not be allowed within 50-100 miles around Guam, which would lessen the risk to protected species that are more island associated, such as green and hawksbill sea turtles, spinner dolphins and false killer whales.

9.2.4 Impacts on Marine Habitat

Purse seine vessels are believed to normally have little impact on marine habitat as they deploy nets in the water column that do not contact the seabed, however, the EEZ waters around the Mariana Archipelago contain many submarine banks and sea mount features which could be impacted by deployment and retrieval of a large purse seine net should it come into contact with these shallow features (see footnote 18). Alternative 2A would allow purse seine fishing within zones in Guam where seamounts are known to exist. The preferred alternative, Alternatives 2B would enclose the areas of seamounts and banks to the south of Guam and thus put them beyond the reach of purse seiners, as also would Alternative 2C.

The area affected by this action has been identified as EFH for pelagic management unit species managed in the western Pacific. The action is not likely to lead to substantial physical, chemical, or biological alterations to the habitat. The action in the context of the fishery as a whole will not change the intensity of fishing or fishing operations, therefore, the proposed alternatives would not result in a large or adverse impact on EFH; therefore, an EFH consultation is not required.

9.2.5 Impacts on Public Health and Safety

If purse seine vessels were to begin fishing in Guam's EEZ waters under Alternatives 2B and 2C there would likely be some positive impacts on the health and safety of the small boat fishery participants, as compared to the no-action alternative, as they would not experience catch conflicts with purse seine vessels when fishing inside the prohibited area. Without a purse seine prohibited area such conflicts, perceived or actual, could cause the small boats to fish farther from land and in unfamiliar waters which could potentially result in a decrease in safety for those participants. The larger the prohibited area, the greater the positive impacts would be. The preferred alternative balances these positive impacts while still retaining opportunities for US purse seine vessels with endorsements to fish within the US EEZ around Guam.

9.2.6 Impacts on Fishery Participants and Communities

If a purse seine fishery were to fish in the EEZ around Guam under Alternatives 2A, 2B or 2C, the troll fishing community could be impacted by localized stock depletion leading to catch competition between the two fisheries above and beyond what appears to happening with respect to Guam yellowfin troll CPUE and CNMI skipjack troll CPUE (Figures 35 - 38). The majority of

the purse seine catch is projected to be skipjack tuna, which is also one of the most important target species for troll fleets. Currently, the relationship between Guam skipjack troll CPUE and the WCPO purse seine catch is positive, suggesting that purse seine skipjack catch success is reflected in greater abundance and availability of skipjack to the Guam troll fleet. How this relationship might change, however, if purse seine fishing was conducted in proximity to the troll fishery is unknown. As noted earlier, Guam yellowfin troll CPUEs already appears to be negatively influenced by WCPO yellowfin catches, caught primarily to the south of Guam. Moreover, the WCPO skipjack catch appears to negatively influence CNMI skipjack troll CPUE, a situation which would be expected to be exacerbated by purse seine fishing in the US EEZ around Guam.

Under the preferred Alternative 2B, limiting purse seine fishing to within 50-100nm nm of the coast is expected to provide a measure of protection for Guam's troll fishermen while allowing US purse seines to set in the remainder of the EEZ. Impacts, however, are expected to be minimal because the highly mobile purse seine fleet typically fishes in large areas of the Pacific and has exclusive rights to fish in U.S. EEZ waters in the PRIA, except those waters now off limits due to the establishment of the PRIA Marine National Monument.

While the U.S. purse seine fleet does not currently fish in waters of or deliver to Guam, future purse seine fishing near Guam, or the ability to accept fish transshipped by nearby purse seine vessels could influence the development the infrastructure needed to process or export such species. Aside from the negative impacts discussed earlier associated with gear competition and stock depletion, the support of a purse seine industry could provide positive benefits through increasing potential employment while opening up markets currently unexplored in Guam.

Purse seine fishing is likely to become more restricted elsewhere, especially if measures being proposed by the PNA Group are adopted by the WCPFC. These include the doubling or tripling of the costs of access agreements to fish in PNA Group EEZs[24], and, as a condition of access, the requirement of purse seine access agreements, not to fish on the high seas between 10 deg N to 20 deg S latitude and 170 deg E to 150 deg W longitude[25]. There has also been a proposal advanced at the 2010 WCPFC Technical and Compliance Committee (TCC) meeting (WCPFC 2010) by the PNA Group to extend an existing annual three-month ban on purse seining on FADs in PNA EEZs for an additional three months for purse seine fleets that catch in excess of 4,000 mt of bigeye annually.

The U.S. fleet operates under the South Pacific Tuna Treaty (SPTT) which provides access to PNA Group waters. Other Pacific Island Nations (PINs) are also members of the Treaty, but the it's the PNA Group countries, clustered around the Pacific Warm Pool that are the principal fishing grounds for U.S. and other nation's purse seine fleets. At the time of writing, the SPTT expires in 2013 and a new agreement has not yet been concluded. However, as noted above, the PNA Group is signaling its intentions to place greater restrictions on purse seine fleet operations for access to their waters. Further, the FFA member countries and the PNA group have elected to allocate access to their EEZs for purse seiners based on a Vessel Day Scheme (VDS). The

[24] Islands Business November 2010 article: 'Pacific islands look at tuna fisheries'
[25] FFA Press release April 23, 2010, PNA announces date for closure of 4 million square kilometer high seas areas to purse seine fishing.

current SPTT has provisions for U.S. 40 vessels to fish, with an additional 5 vessels allowed under joint venture arrangements. However, the PNA Group may want the U.S. vessels to fish under the VDS like other fleets. The number of Vessel Days allocated to the U.S. fleet may fall short of the number needed by a fleet currently with 36 active vessels.

Taken together, the more aggressive attitude of the PNA Group to confine purse seine fishing to their EEZ waters, to increase access costs, to penalize purse seine fleets with domestic longline bigeye fisheries and the potential for the VDS allocation to be less than optimum for the U.S. fleet provides an incentive for those U.S. hulled vessels to explore options such as fishing in U.S. EEZ waters. There are proven skipjack resources in the U.S. EEZ around the Mariana Archipelago as evinced from the Japanese pole and line fishery that operated from Saipan between 1922 and 1942 (Higuchi 2007) and which at its peak landed 3,700 mt of skipjack. As noted above, a single purse seine vessel is capable of catching twice this amount annually.

Closing part of the U.S. EEZ around the Mariana Archipelago (Alternatives 1B and 2B to purse seine fishing provides a degree of protection for the small boat fleets of the two island groups, which collectively amount to over 430 small fishing vessels in Guam and CNMI (Figures 5 and 12), and protects the long terms continuity of small scale pelagic fisheries which have social, economic and cultural importance for the two U.S. territories. U.S. vessels with authorization to fish within U.S. EEZ waters would still have access to part of the U.S. EEZ around Guam and CNMI, as well as around American Samoa and the Pacific Remote Islands Area, of which Howland and Baker, Jarvis and Palmyra and Kingman Reef. All of these areas have been fished by the U.S. fleet in the past and would continue to be accessible to vessels with U.S. hulls. The preferred alternatives 1B and 2B balances the needs of the CNMI and Guam fishermen to fish and provide a source of fresh tuna to the local populace, with those U.S. purse seine vessels who have authorization to fish within UZ EEZ waters still able to fish in other segments of the U.S. EEZ in the Western Pacific.

9.2.7 Impacts on Biodiversity and Ecosystem Functions

Under preferred Alternative 2B, no purse seine fishing would be allowed seaward out to 50-100 nm from the Territory of Guam. This action will have no known adverse impacts on biodiversity and ecosystem functions since the action of creating fishing prohibited zones would protect, rather than diminish, marine resources. Evidence to date suggests that purse seining, primarily to the south of the Mariana Archipelago, has differential effects on the abundance and availability of yellowfin in Guam and skipjack in the CNMI. If purse seiners were to begin fishing in U.S. EEZ waters around the Guam these effects are more likely to be exacerbated and the implementation of a purse seine area closure of between 50-100 nm offers troll fishermen protection from potential purse seine impacts

9.2.8 Impacts on Administration and Enforcement

There would be no impacts on administration and enforcement under Alternative 2A (No Action). Alternatives 2B and 2C would all place similar administrative burden of publishing regulations associated with a prohibited area and informing all fishery participants. Alternatives 2B and 2C would all place an additional burden on law enforcement, U.S. Coast Guard and

NOAA Office of Law Enforcement (OLE), in enforcing the closed areas through VMS, which all U.S. purse seiners are obliged to carry.

9.2.9 Cumulative Effects of the Proposed Guam Purse Seine Prohibited Areas

Establishment of a 50-100 nm purse seine prohibited area around Guam would address concerns about the large harvests and harvests of juvenile tunas. Regardless of which alternative is selected for a purse seine prohibited area in Guam, none of the alternatives would likely change the intensity or location of fishing by trollers or purse seiners. Other fishery management activities that are being proposed that affect purse seiners (e.g., e managing FAD use by purse seiners) would not result in any of the alternatives having a large or negative environmental effect.

9.2.10 Environmental Justice Effects of the Proposed Guam Purse Seine Prohibited Areas

Environmental justice policies intend to promote environmental protection by focusing attention on potential environmental harms and risks that may disproportionately and adversely affect minority, low-income and Tribal populations. None of the proposed alternatives to establish a purse seine prohibited area would have a high adverse health or environmental effect on environmental justice populations. The proposed action is intended to reduce gear conflicts, reduce catch competition, and prevent localized depletion by purse seining. None of the alternatives would change the current intensity or location of fishing by purse seine vessels, or troll or longline vessels, so there would not be an adverse environmental or health impact from implementing any of the alternatives.

9.2.11 Climate Change Impacts of the Proposed Guam Purse Seine Prohibited Areas

The alternatives consider various distances from shore at which purse seiners could fish. There is no purse seine fishing occurring in Guam, and none of the alternatives would change the locations or intensity of fishing by purse seiners, or local troll and longline fishing vessels. None of the proposed alternatives would result in a federal contribution to greenhouse gas emissions greater than 25,000 mt carbon dioxide equivalents. Climate change impacts are not expected to affect the effectiveness of any of the alternatives with respect to achieving the fishery objectives and meeting the purpose and need for action. Climate change is also not expected to affect the environmental impact of implementing any of the alternatives which would establish a geographic separation between fishing fleets.

9.2.12 Reasons the Council Selected the Guam Purse Seine Prohibited Area as the Preferred Alternative

Preferred Alternative 2B would prohibit all vessels from pelagic purse seine fishing within 50-100 nm of the waters around Guam.

As shown in Table 9 a single purse seiner can catch on average 26 t of skipjack and 4 t of yellowfin tuna a day which far exceeds catches by the Guam-based troll fleet with on average 157 mt of skipjack and yellowfin tuna caught in 2010 and on average about 112 mt per year between 1982 and 20010.

Over the past 6 years, there has been an increasing trend in total tuna catch, primarily due to increases in purse-seine fishery catches (Williams and Terawasi 2011). The provisional total WCP–CA tuna catch for 2010 was estimated at 2,414,994 mt, the second highest annual catch recorded and 80,000 mt lower than the previous record in 2009 (2,494,112 mt). During 2010, the purse seine fishery accounted for an estimated 1,820,844 mt (75% of the total catch), with pole-and-line taking an estimated 171,604 mt (7%), the longline fishery an estimated 239,853 mt (10%), and the remainder (7%) taken by troll gear and a variety of artisanal gears, mostly in eastern Indonesia and the Philippines. The 2010 WCP–CA catch of skipjack (1,706,166 mt – 71% of the total catch) was the second highest recorded and 115,000 mt less than the previous record catch of 2009 (1,821,770 mt). The WCP–CA yellowfin catch for 2010 (470,161 mt – 19%) was more than 50,000 mt higher than the 2009 catch level, but still 70,000 mt lower than the record catch taken in 2008 (541,262 mt) (Williams and Terawasi 2011).

As discussed earlier, in a few days, a single purse seiner has the potential to catch tuna species well in excess of similar catches by the entire Guam troll fleet for one year. Moreover, the conclusions from the Hampton et al (1996) and Kleiber (pers. comm.) studies, and others listed in Section 8.4.4 (Nishida 1995; Ortega-Garcia 1995; Sibert et al. 1995; Shomura et al. 1996) suggest that every mile of separation between purse seine fisheries and other pelagic fisheries is beneficial in terms of the other fisheries catch rates.

Alternatives 1Band 2B would implement consistent purse seine prohibited areas around Guam and CNMI which would facilitate compliance and enforcement by providing consistent fishery regulations.

In summary, there are a list of compelling justifications to a prohibition on purse seine fishing in EEZ waters around Guam including:

1) that several studies have shown direct impacts of purse seine fishing on tuna catches in longline and pole-and-line fleets, as described in Section 8.4.3, and purse seine catches beyond the US EEZ, primarily to the south, appear to be having negative impacts on Guam troll yellowfin CPUE and CNMI skipjack troll CPUE;

2) although no domestic purse seine catches have yet been recorded from U.S. EEZ waters around Guam the potential impacts to the small boat fleet should this occur must be considered especially in light of the fact that the largest skipjack catch in world history was recorded in the 2009 fishing year; and

3) FSM also has one of the largest resources of surface tunas in its extensive zone, whereas purse seine catches in Palau and Marshall Islands waters are much smaller and tend to

fluctuate considerably from year to year[26] and Guam's EEZ waters are contiguous with FSM EEZ waters and could therefore be expected to have similar capacity; and

4) Guam has an extremely small segment of the U.S. EEZ as it is truncated by FSM's EEZ waters to the south and CNMI's portion of the U.S. EEZ to the north; and

5) the WCPO purse seine fleet may be at overcapacity[27] while U.S. vessels with an endorsement to fish in the U.S. EEZ may choose to fish in alternate areas of the U.S. EEZ without foreign vessel competition; and

6) Guam's small boats and charter industry relies on catches of skipjack and other PMUS for sustenance and as an important part of their economy, currently in a severe downslide; and

7) the Magnuson-Stevens Fishery Conservation and Management Act mandates consideration of the importance of fishery resources to fishing communities in order to provide for the sustained participation of such communities, and to the extent practicable, minimize adverse economic impacts on such communities.

9.3 Essential Fish Habitat

The preferred alternatives are not expected to have adverse impacts on essential fish habitat (EFH) or habitat areas of particular concern (HAPC) for species managed under the Pacific Pelagics, American Samoa Archipelago, Mariana Archipelago, Hawaii Archipelago, or Pacific Remote Island Areas Fishery Ecosystem Plans. EFH and HAPC for these species groups has been defined as presented in Table 15 and also described in detail in the Pelagics FEP (WPFMC 2009).

None of the alternatives would adversely affect EFH or HAPC for any managed species as none of the alternatives would change the intensity of fishing by the troll, longline, or purse seine fleets, and none of the alternatives would result in physical, chemical, or biological alterations to EFH or HAPC areas. The proposed changes in areas that are open to longliners and purse seiners and the separation of trollers and longliners would not result in damage to ocean or coastal habitats and none of the alternatives would result in an increase in gear loss that could affect EFH or HAPC.

[26] http://www.ffa.int/system/files/Trip+report+-+Palau,+FSM,+RMI.pdf

[27] The increase in purse seine capacity in the WCPO in the past decade has prompted a proposal from Japan for the WCPFC to adopt a Conservation and Management Measure to ensure that the level of purse seine fishing capacity in the number of purse seine vessels from member countries and cooperating non-members fishing on the high seas does not increase from the current level, and to ensure that the level of purse seine fishing effort in days fished on the high seas does not increase from the levels of 2004 or the average of 2001-2004.

Table 15. Essential Fish Habitat (EFH) and Habitat Areas of Particular Concern (HAPC) for species managed under the Fishery Ecosystem Plans.
All areas are bounded by the shoreline, and the outward boundary of the EEZ, unless otherwise indicated.

SPECIES GROUP	EFH (juveniles and adults)	EFH (eggs and larvae)	HAPC
Pelagics	water column down to 1,000 m	water column down to 200 m	water column down to 1,000 m that lies above seamounts and banks.
Bottomfish	water column and bottom habitat down to 400 m	water column down to 400 m	all escarpments and slopes between 40-280 m, and three known areas of juvenile opakapaka habitat
Seamount Groundfish	(adults only): water column and bottom from 80 to 600 m, bounded by 29°-35°N and 171°E -179°W	(including juveniles): epipelagic zone (0-200 nm) bounded by 29°-35°N and 171°E -179°W	not identified
Precious Corals	Keahole, Makapuu, Kaena, Wespac, Brooks, and 180 Fathom gold/red coral beds, and Milolii, S. Kauai and Auau Channel black coral beds	not applicable	Makapuu, Wespac, and Brooks Bank beds, and the Auau Channel
Crustaceans	bottom habitat from shoreline to a depth of 100 m	water column down to 150 m	all banks within the Northwestern Hawaiian Islands with summits less than 30 m
Coral Reef Ecosystems	water column and benthic substrate to a depth of 100 m	water column and benthic substrate to a depth of 100 m	all Marine Protected Areas identified in FEPs, all PRIAs, many specific areas of coral reef habitat (see FMP)

9.4 Other environmental consequences

None of the alternatives for any of the three proposed action topics would result in unavoidable adverse environmental consequences. None of the proposed alternatives is expected to change the intensity of fishing by the CNMI or Guam troll or longline fleets or the U.S. purse seine fleet which is not currently fishing in the U.S. EEZ surrounding the Mariana Islands. None of the proposed alternatives being considered here would result in irreversible or irretrievable commitment of resources; current and anticipated fishing would continue to be managed

sustainably. There are no known controversies regarding the environmental impacts of the proposed actions.

10.0 Consistency with the MSA and Other Laws

10.1 Consistency with National Standards

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

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

The preferred alternatives considered in this amendment would establish prohibited areas for longline vessels around CNMI and purse seine vessels throughout the Mariana Archipelago that would be congruent with the longline area closures. It is not expected to change the intensity of fishing; therefore, it has been determined that the proposed prohibited areas would be unlikely to contribute to overfishing. The pelagic catch by the existing Mariana-based fisheries typically has annual catches averaging approximately 950,000 lb (430 mt) and this action is not expected to increase catches by the existing vessels. It is also intended to inhibit gear conflict between trollers and longliners in CNMI and to reduce the potential for stock depletion and corresponding catch competition which could arise if purse seine vessels were to fish within the EEZ waters. Minimizing pelagic fishing competition between all fisheries impacted by this action would allow local small scale pelagic fisheries to better achieve MSY. In addition, given that WCPO purse seine fisheries are not currently dependent on operating in the U.S. EEZ of CNMI or Guam, a prohibited area out to 200nm would have little or no effect on current yields achieved by WCPO purse seine fisheries.

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

The preferred alternatives considered in this amendment are based on the best currently available information on pelagic fishing in EEZ waters around the Mariana Islands contained in logbook accounts from the small boat and purse seine fleets. Significant correlations were found between CNMI troll skipjack CPUE and Guam yellowfin troll CPUE, and the respective catches of both species in the WCPO. Further, information from research studies examining impacts of purse seining on other fisheries were considered when assessing potential impacts of the preferred alternatives (see Section 8.4.3) including information from a research study examining impacts of purse seining on fisheries in the Kiribati Islands (Hampton et al. 1996). This study documented the impacts of purse seine fishing on the catch rates of small scale artisanal fisheries around the islands of Kiribati. Similar small scale fisheries operate around the Mariana Archipelago, and as such it is reasonable to extrapolate the results of a study from one small Pacific Island to another. Other sources such as the Science Committee of the WCPFC and peer-reviewed scientific journals and reports were used in analyzing the impacts of the alternatives.

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

The preferred alternatives considered in this amendment are not expected to have a significant effect on the management of fish stocks as a unit. The preferred alternatives are intended to avoid localized stock depletion of several tuna target species which are generally managed through international efforts throughout their western and central Pacific-wide range. The tuna PMUS stocks considered in this amendment range throughout western and central Pacific Ocean and the measures in waters around CNMI and Guam were considered together to account for this.

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

The preferred alternatives considered in this amendment do not discriminate between residents of different States. They establish prohibited areas in EEZ waters which are intended to prevent gear conflict and localized stock depletion, while at the same time allow for the development of longline fisheries and minimizing potential impacts.

The preferred alternative would assign ocean areas to different gear users in a fair and equitable manner. In this case, fishing privileges within the first 30 nm of the U.S. EEZ around Northern Mariana Islands and 50-100 nm of the U.S. EEZ around Guam would be provided to local pelagic fishing vessels to promote conservation of local stocks, maximize overall benefits, and promote conservation by optimizing the yield in terms of economic or social benefit of the available, local stock of skipjack and yellowfin tuna. Highly mobile purse seine vessels retain the opportunity to fish in the U.S. EEZ of the PRIA and other areas of international jurisdictions including high seas areas open to purse seining. The initial estimate of the relative benefits and hardships imposed by the assignments are described in section 9.0, and compares the consequences of the proposed action with alternative allocation schemes, including the status quo. No particular individual, corporation, or other entity would acquire an excessive share of such privileges under the preferred alternatives.

U.S. purse seine operators are eligible to fish under the South Pacific Tuna Treaty and may fish in other areas of the WCPO including exclusive rights to fish in U.S. EEZ waters around the Pacific Remote Islands Areas (PRIA), except those parts recently designated as a Marine National Monument (see Section 8.4.2). It might be argued that the preferred alternatives may be perceived as discriminatory towards the purse seine fishery, since the action is precautionary, although the expansion of purse seine fishing beyond the US EEZ of the Mariana Islands may already be impacting local troll catch rates (35 - 38). Potential impacts of purse seining on local troll and longline fisheries are inferred from studies other locations where purse seine fishing has been more intensive and the impacts to troll and longline fisheries measurable (Hampton et al.

1996, Nishida 1996). The Council considered the relative size of harvests among each fishery as well as the inability of purse seine fishing to target adult fishes, in making its recommendation for the proposed purse seine exclusion zone.

The trends documented in section 8.4 which describes the current purse seine fishery in the WCPO, indicates that future international management of purse seine fishing in the WCPO is likely to become more restrictive, given the continuing concern for the overfishing of bigeye tuna. CMM 2008-01 closed the two major high seas pockets to all purse seine fishing from 2010 onwards. In addition, the Parties to the Nauru Agreement (PNA Group) have made it a condition of access to their waters that purse seine vessels would not be able to fish on the high seas between 10 degrees north latitude to 20 degrees south latitude and 170 degrees east to 150 degrees west in longitude, an area of 4,555,000 sq km. The WCPFC established closed seasons and is considering bans on the use of FADs. Increasing restrictions on purse seining are likely to make the U.S. EEZ waters more attractive to the U.S. fleet.

Given the current operational climate of the fisheries, the Council found that the preferred alternative would provide the protection from competitive interactions between the troll and purse seine fisheries, without undue discrimination, and recognizes the total reliance on the part of the troll fishery to fish within Guam and CNMI territorial waters and waters of the the U.S. EEZ as compared to the purse seine fleet.

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

The preferred alternatives considered in this amendment include consideration of efficiency in the utilization of pelagic resources to the extent practicable by establishing prohibited areas in EEZ waters which are intended to prevent gear conflicts and localized stock depletion which could reduce fishery profitability between fishing sectors. Economic allocation is not the sole purpose of the preferred alternatives; the proposal to prohibit purse seine fishing from 50-100 nm in the U.S. EEZ around Guam and from 30 nm in the US EEZ around the CNMI has a conservation benefit in that it would enhance the potential for juvenile bigeye tuna in these areas to mature and reproduce.

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

The preferred alternatives considered in this amendment took into account variation among and contingencies in fisheries based out of Guam and CNMI. The preferred alternatives would provide a suitable buffer in favor of conservation by creating prohibited areas to prevent gear conflict and protect fishery stocks from localized depletion. Each fishery has its own characteristics based on gear type and island areas and these differences were considered in development of the preferred alternatives. In addition, there is little or no purse seine fishing taking place in or around the U.S. EEZ of Guam and CNMI, and establishing a clear boundary for those fisheries to fish beyond is ideal for the conservation of preserving local fishery resources, should purse seine effort migrate toward the Mariana Archipelago in the future.

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

The preferred alternatives under consideration would not duplicate other fishery regulations. Establishment and implementation of purse seine prohibited areas would likely not cause fishery participants to incur any additional costs because a significant portion of the US EEZ waters around the Mariana Archipelago will still be available to US purse seiners . The purse seine fleet also has many options for areas to fish outside of the EEZ around the Mariana Archipelago including exclusive access to U.S. EEZ waters within the PRIA.

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

National Standard 8 requires the consideration of impacts on fishery dependent communities where a fishing community is "a community which is substantially dependent on or substantially engaged in the harvesting or processing of fishery resources to meet social and economic needs, and includes fishing vessel owners, operators, and crew of U.S. fish processors that are based in such community." Guam and CNMI are each defined as fishing communities under the MSA. The preferred alternatives considered in this amendment would be expected to beneficially impact these fishing communities by protecting Mariana Archipelago-based pelagic fishery participants which are almost exclusively small vessel trollers from potential stock depletions and reduced catch rates providing for sustained participation by these communities which are culturally and economically dependent on pelagic catches by the local fleet.

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

The preferred alternatives considered in this amendment are not expected to increase bycatch of any species primarily because the prohibited areas are not expected to change the intensity of fishing by any of the three fleets. The prohibited areas would prevent fishing by certain the purse seine sectors in portions of the US EEZ around the Mariana Archipelago. The purse seine sector catches a substantial amount of bycatch including juvenile bigeye tuna as described in Section 8.4 and shown in Table 11, and the preferred alternatives would remove the potential for this bycatch to occur in waters in the EEZ waters from 50-100 nm around Guam and 30 nmaround the Northern Mariana Islands.

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

The preferred alternatives considered are expected to increase the safety of human life at sea. The small boats currently fish within 30 50 nm of Guam and CNMI, and the purse seine

exclusion zone would preserve this area for these vessels. Without this action small boats may be forced to seek target species farther out to sea which could cause a safety risk to the small boat participants. Establishment of the purse seine prohibited areas is expected to increase safety to small boat participants by eliminating the need for vessel operators to seek out other fishing grounds farther from shore if local stock depletions were to occur. Finally, purse seiners are not being displaced from their current operational areas, and opportunities to fish within the US EEZ around the Mariana Islands are still an option, so no change to this fishery is expected to occur that would increase the risk to human safety at sea.

10.2 National Environmental Policy Act

This proposed amendment to the Council's Pelagics FEP has been written and organized to meet the requirements of the National Environmental Policy Act and thus is a consolidated document including an Environmental Assessment, as described in NOAA Administrative Order 216-6, Section 603.a.2. This document is part of the administrative record for rulemaking associated with U.S. Dept. of Commerce Regulatory Identifier No. (RIN) 0648-AW67.

10.2.1 Purpose and Need

The purpose and need for this action is described in Section 4.0.

10.2.2 Alternatives Considered

The alternatives considered for three proposed actions are described in Section 7.0. The document examines alternatives for three main topics. Topic 1) a range of longline prohibited areas around the Northern Mariana Islands; Topic 2) a range of purse seine prohibited areas around the Northern Mariana Islands; and Topic 3) a range of purse seine prohibited areas around Guam.

10.2.3 Affected Environment

The affected environment for this action is described in Section 8.0. The main focus of the proposed action is the troll and purse seine fisheries in the waters of the U.S. EEZ surrounding Guam and the Northern Mariana Islands. Other areas of the Pacific Ocean were considered because the purse seine fleet would continue to operate in these areas under each of the alternatives.

10.2.4 Impacts of the Alternatives

The expected impacts of the alternatives considered in this action are described in Section 9.0. The analysis included a description of the baseline (no action) alternative and potential impacts of action alternatives on the fisheries and their target fish stocks, non-target fishes, bycatch, protected resources, Essential Fish Habitat (EFH) and Habitat areas of Potential Concern, and special resources or management areas. Direct, indirect, short-term, long-term, and cumulative impacts of each alternative were considered in the analysis in section 9. The impacts with respect to Environmental Justice and climate change were also addressed in section 9.

10.3 Regulatory Impact Review

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

Based on these findings, this rule is determined to not be significant under E.O. 12866. In accordance with E.O. 12866, the following is set forth: (1) This rule is not expected to have an annual effect on the economy of more than $100 million or to adversely affect in a material way the economy, a sector of the economy, productivity, jobs, the environment, public health or safety; or state, local or tribal governments or communities; (2) This rule is not likely to create any serious inconsistencies or otherwise interfere with any actions taken or planned by another agency; (3) This rule is not likely to materially alter the budgetary impact of entitlements, grants, user fees, or loan programs or the rights or obligations of recipients thereof; (4) This rule is not likely to raise novel or policy issues arising out of legal mandates, or the principles set forth in the Executive Order.

10.4 Administrative Procedure Act

All federal rulemaking is governed under the provisions of the Administrative Procedure Act (APA) (5 U.S.C. Subchapter II) which establishes a "notice and comment" procedure to enable public participation in the rulemaking process. Under the APA, NMFS is required to publish notification of proposed rules in the Federal Register and to solicit, consider and respond to public comment on those rules before they are finalized. The APA also establishes a 30-day wait period from the time a final rule is published until it becomes effective, with rare exceptions.

10.5 Coastal Zone Management Act

The Coastal Zone Management Act requires a determination that a recommended management measure has no effect on the land, water uses, or natural resources of the coastal zone or is consistent to the maximum extent practicable with an affected state's enforceable coastal zone management program. A copy of this document will be submitted to the appropriate state government agencies in the Mariana Archipelago for review and concurrence with a determination that the preferred alternatives are consistent, to the maximum extent practicable, with their coastal zone management programs.

10.6 Information Quality Act

To the extent practicable, the information in this amendment complies with the Information Quality Act and NOAA standards (NOAA Information Quality Guidelines, September 30, 2002)

which recognize information quality is comprised of three elements: utility, integrity, and objectivity. The information product was prepared by Council and NMFS staff based on information provided by NMFS Pacific Islands Fisheries Science Center (PIFSC) and NMFS Pacific Islands Regional Office (PIRO). The information product was reviewed by PIRO and PIFSC staff, and NMFS Headquarters (including the Office of Sustainable Fisheries). Legal review was performed by NOAA General Counsel Pacific Islands and General Counsel for Enforcement and Litigation for consistency with applicable laws, including but not limited to the Magnuson-Stevens Act, National Environmental Policy Act, Administrative Procedure Act, Paperwork Reduction Act, Coastal Zone Management Act, Endangered Species Act, Marine Mammal Protection Act, and Executive Orders 13132 and 12866.

10.7 Paperwork Reduction Act

The purpose of the Paperwork Reduction Act is to minimize the paperwork burden on the public resulting from the collection of information by or for the Federal government. It is intended to ensure the information collected under the proposed action is needed and is collected in an efficient manner (44 U.S.C. 3501(1)).

The preferred alternatives do not establish any new collection of information requirements for the purpose of the Paperwork Reduction Act.

10.8 Regulatory Flexibility Act

The Regulatory Flexibility Act (RFA) (5 U.S.C. 601 *et seq.*) requires government agencies to assess and present the impact of their regulatory actions on small entities including small businesses, small organizations, and small governmental jurisdictions. The assessment is done by preparing a Regulatory Flexibility Analysis when impacts are expected, however, the proposed alternatives, described in section 7.0, would have minimal impacts on small entities. Based on the preliminary evaluation of the economic impacts associated with the proposed alternatives (Appendix A), an initial regulatory flexibility analysis is not required and none has been prepared.

10.9 Endangered Species Act

The Endangered Species Act of 1973, as amended, (Public Law 93-205; 87 Stat. 884) prohibits the taking of any endangered species except under limited circumstances. Pursuant to Section 7 of the Endangered Species Act, in November 2006, NMFS prepared a biological opinion (BiOp) on the effects of the U.S. purse seine fishery in the WCPO on sea turtles and whales. The BiOp concluded that the fishery is not likely to jeopardize the continued existence of any of the threatened or endangered species found in the area or adversely modify their critical habitat.

In addition, the troll fisheries around CNMI and Guam were included in NMFS' 2009 biological opinion on pelagic fisheries of the western Pacific which concluded that continued operations were not likely to jeopardize the continued existence of any listed sea turtles or marine mammals. The 2009 BiOp considered potential stressors and impacts related to vessel collisions, hooking and entanglement with fishing gear, human disturbance, exposure to vessel waste, direct

and indirect competition with foraging grounds and exposure to marine mammal deterrents. The 2009 BiOp did consider that a small potential exists that the trolling gear may incidentally hook or entangle a sea turtle or marine mammal; however, NMFS and the Council consider this type of interaction extremely rare and, therefore, unlikely to adversely affect listed species.

Section 8.5 describes the threatened and endangered species known to occur in the WCPO and Section 9.1.3, 9.2.3, and 9.3.3 describe the potential impacts the preferred alternatives may have on these listed species. There are no known interactions between seabirds and any of the Mariana Archipelago pelagic fisheries (WPRFMC 2007). Based on the gear types used and the low likelihood of fishery interactions occurring under the preferred alternatives, the Council believes that the preferred alternatives will not jeopardize or adversely affect any populations or habitats of species listed as endangered or threatened under the ESA.

10.10 Marine Mammal Protection Act

The CNMI and Guam troll fisheries are classified as Category III under Section 118 of the Marine Mammal Protection Act (MMPA) (62 FR 28657, 27 May 1997), meaning that they have been determined by NMFS to have a remote likelihood of, or no known incidental mortality and serious injury of marine mammals (50 CFR 229.2). Vessel owners and crew that are engaged only in Category III fisheries may incidentally take marine mammals without registering or receiving an Authorization Certificate under the MMPA, but they are required to: 1) report all incidental mortality and injury of marine mammals to NMFS, 2) immediately return to the sea with minimum of further injury any incidentally taken marine mammal, 3) allow vessel observers if requested by NMFS, and 4) comply with guidelines and prohibitions under the MMPA when deterring marine mammals from gear, catch, and private property (50 CFR 229.5, 229.6, 229.7).

The List of Fisheries for 2010, published pursuant to 50 CFR 229, classifies the U.S. purse seine fleet as Category II for all fisheries under Section 118 of the MMPA (74 FR 58859; November 16, 2009). The list includes mammal species and stocks incidentally killed or injured in each fishery based on observer data, logbook data, stranding reports, disentanglement network data, and fisher reports. The List of Fisheries in 2010 for the South Pacific Tuna Fisheries lists the marine mammal species killed or injured as “undetermined” until additional information on marine mammal populations and fishery interactions becomes available. The “undetermined” status has not changed from previous years List of Fisheries.

Please see Section 8.5.2 of this document for descriptions of marine mammals found around the Mariana Archipelago. Section 9.0 provides an analysis of the anticipated impacts on these species under each of the alternatives considered by the Council. Based on the gear types used and the low likelihood of fishery interactions occurring under the preferred alternatives, the Council believes that the preferred alternatives will not adversely affect any marine mammal populations or habitats.

11.0 Proposed Regulations

1. In § 665.800, add a definition for "Purse seine" to read as follows:

§ 665.800 Definitions.

* * * * *

Purse seine means a floated and weighted encircling net that is closed by means of a drawstring threaded through rings attached to the bottom of the net.

* * * * *

2. In § 665.802, add a new paragraph (u) to read as follows:

§ 665.802 Prohibitions.

* * * * *

(u) Fish with purse seine gear within a purse seine fishing prohibited area, except as allowed pursuant to an exemption issued under § 665.17, in violation of § 665.805.

* * * * *

3. Add a new § 665.805 to read as follows:

§ 665.805 Purse seine fishing prohibited area management.

(a) Prohibited areas. Purse seine fishing shall be prohibited in the purse seine fishing prohibited areas as defined in paragraph (b) of this section.

(b) Mariana Archipelago (Guam and CNMI). The Mariana Archipelago purse seine fishing prohibited area is defined as all waters of the U.S. EEZ surrounding Guam and CNMI.

4. In § 665.806, revise paragraph (a) and add a new paragraph (e) to read as follows:

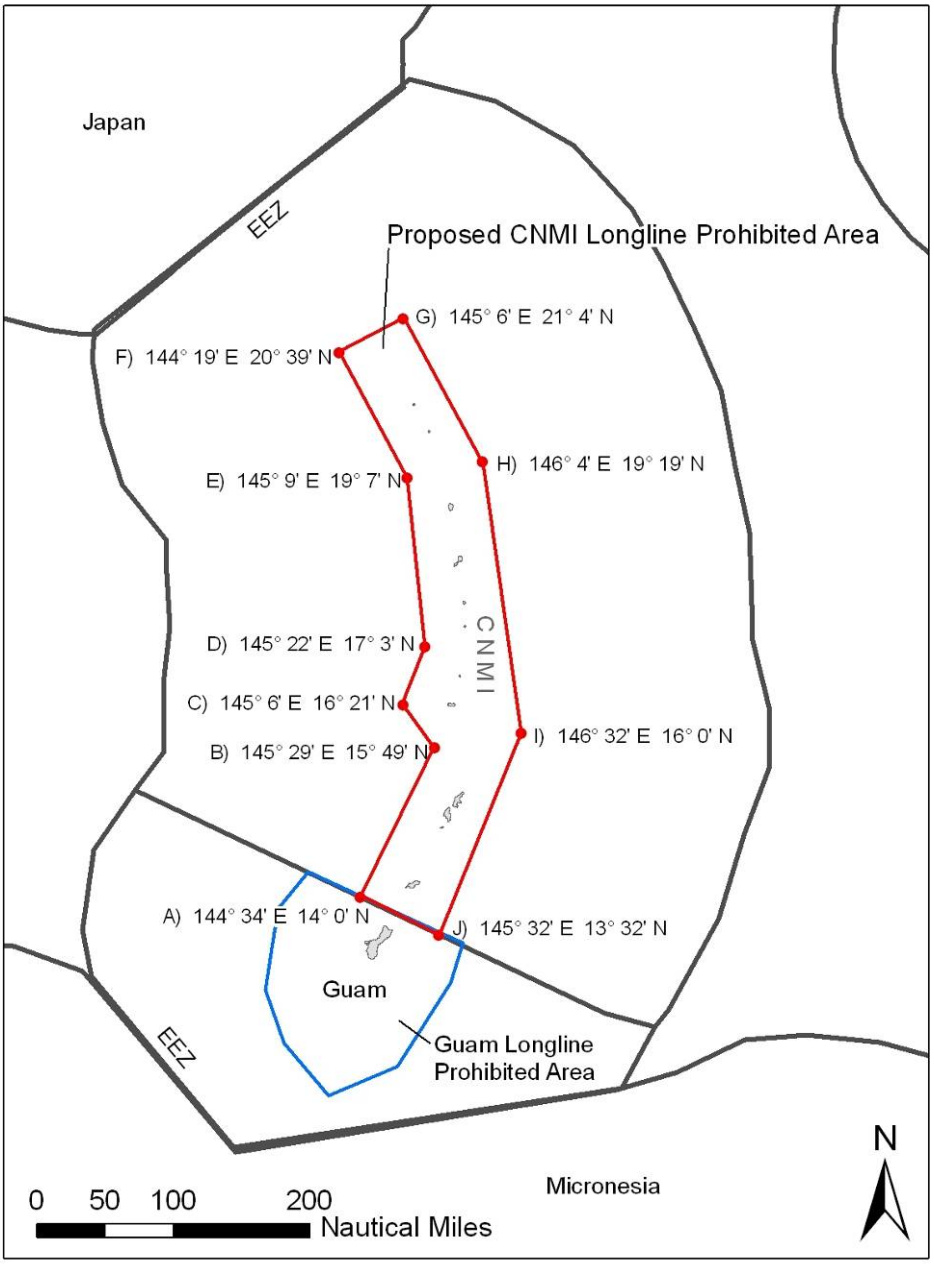
§ 665.806 Longline fishing prohibited area management.

(a) Prohibited areas. Longline fishing shall be prohibited in the longline fishing prohibited areas as defined in paragraphs (b) through (e) of this section.

* * * * *

(e) CNMI. The CNMI purse seine prohibited area is defined as the waters of the U.S. EEZ surrounding CNMI that are enclosed by straight lines connecting the following coordinates in the order listed:

Point	N. lat.	E. long.
A	14° 0'	144° 34'
B	15° 49'	145° 29'
C	16° 21'	145° 06'
D	17° 03'	145° 22'
E	19° 07'	145° 09'
F	20° 39'	144° 19'
G	21° 04'	145° 06'
H	19° 19'	146° 04'
I	16° 00'	146° 32'
J	13° 32'	145° 32'
A	14° 00'	144° 34'


Japan
EEZ
Proposed CNMI Longline Prohibited Area
G) 145° 6' E 21° 4' N
F) 144° 19' E 20° 39' N
H) 146° 4' E 19° 19' N
E) 145° 9' E 19° 7' N
CNMI
D) 145° 22' E 17° 3' N
C) 145° 6' E 16° 21' N
I) 146° 32' E 16° 0' N
B) 145° 29' E 15° 49' N
A) 144° 34' E 14° 0' N
J) 145° 32' E 13° 32' N
Guam
Guam Longline
Prohibited Area
EEZ
Micronesia
N
0 50 100 200
Nautical Miles

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Appendix A

Regulatory Impact Review and

Preliminary Regulatory Flexibility Act Analysis

Amendment 2 to the Fishery Ecosystem Plan for Pelagic Fisheries of the Western Pacific Region

Regulatory Impact Review (RIR)

1.0 Introduction

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

This document contains discussion of the economic impacts to fisheries, fishing communities, and the region due to the implementation of Amendment 2 to the Fisheries Ecosystem Plan for Pelagic Fisheries of the Western Pacific Region. This amendment contains three regulatory actions proposed for domestic pelagic fisheries operating or based in the U.S. exclusive economic zone (EEZ) waters of the Mariana Islands Archipelago which includes the Commonwealth of the Northern Mariana Islands (CNMI) and Guam. It also contains a discussion of the net national benefits of the proposed actions.

2.0 Purpose and Need for Action

The purpose of this proposed action is to prevent or minimize adverse impacts to the troll fleet and the communities which rely on a continued supply of locally-caught fresh fish by reducing chances of gear conflicts and catch competition among fishery sectors while allowing for continued the possibility of purse seine fishing within the US EEZ around the Mariana Archipelago. The proposed 50-100 Guam and 30-nm CNMI purse seine closures are intended to avoid gear conflicts and catch competition in the nearshore waters between purse seine fishing vessels and CNMI-based small boat fishing fleet, primarily troll vessels.

3.0 Description of Alternatives Considered

Two sets of alternatives were developed, each designed to provide long-term viability of CNMI and Guam's small and locally-based fishing fleets, while balancing the needs and concerns of the fishing industry regarding the development of larger-scale domestic fisheries in U.S. EEZ waters around the Mariana Archipelago.

3.1 Topic 1: CNMI Purse Seine Fishing Prohibited Area

Alternative 1A: No Action

Under Alternative 1A (No Action), no new regulations would be made and pelagic purse seine vessels would not be prohibited from fishing within U.S. EEZ waters around CNMI.

Alternative 1B: 30 nm Purse Seine Prohibited Area (Preferred)

Under this alternative the all vessels would be prohibited from pelagic purse seine fishing within 30 nm of the CNMI, essentially within the same zone as the same boundaries as longline closed area

Alternative 1C: 100 nm Purse Seine Prohibited Area

Under Alternative 1C, all vessels would be prohibited from pelagic purse seine fishing within 100 nm of CNMI.

Alternative 1D: Entire EEZ Purse Seine Prohibited Area

Under Alternative 1D, all vessels would be prohibited from pelagic purse seine fishing within all U.S. EEZ waters around CNMI.

3.2 Topic 2: Guam Purse Seine Fishing Prohibited Area

Alternative 2A: No Action

Under Alternative 2A (No Action), no new regulations would be made and pelagic purse seine vessels would not be prohibited from fishing within U.S.EEZ waters around Guam

Alternative 2B: 50-100 nm Purse Seine Prohibited Area

Under Alternative 2B, all vessels would be prohibited from pelagic purse seine fishing within 50 nm to the east and west of Guam, and 100 nm to the south. As with the CNMI this would be the same boundaries as the current longline area closure. **(Preferred)**

Alternative 2C: Entire EEZ Purse Seine Prohibited Area

Under Alternative 2C, all vessels would be prohibited from pelagic purse seine fishing within all U.S.EEZ waters around Guam.

4.0 Description of Potentially Affected Fisheries

4.1 CNMI-based boats

In the 1990's there was some purse seine fishing effort outside of the U.S. EEZ around CNMI. To date, no purse seine fishing activity has been recorded in the U.S. EEZ waters or in the vicinity of CNMI. The CNMI has served as an important transshipment hub for many fishery products because it is exempt from the Jones Act, which requires the use of U.S. built and flagged vessels to carry cargo between U.S. ports. This exemption allows U.S. purse seine vessels fishing on the high seas to offload their catch at Tinian onto foreign vessels for shipment to tuna canneries in American Samoa. In the early 1980s, U.S. purse seine vessels established a transshipment operation at Tinian Harbor. In 1991, a second type of tuna transshipment operation was established on Saipan (Hamnett and Pintz 1996). This operation transshipped fresh longline-caught tuna in the Federated States of Micronesia from air freighters to wide-body jets bound for Japan. The volume of fish flown into and out of Saipan was substantial (Hamnett and Pintz 1996), but the contribution of this operation to the local economy was minimal and it is now defunct for economic reasons.

With the exception of the purse seine support base on Tinian, CNMI has never had a large infrastructure dedicated to commercial fishing. The majority of boats in the local fishing fleet are small, outboard engine-powered vessels. The harvest of pelagic species by CNMI-based vessels has always been small, around 100 metric tons annually, caught with trolling gear. Both supply

and demand conditions direct the majority of domestic commercial fishing effort in CNMI toward reef fish and bottomfish. There is less seasonality in these fisheries, and they require shorter offshore trips; moreover, their market value is often much higher than that of the commonly caught pelagic fish.

CNMI's pelagic fishery occurs primarily from the island of Farallon de Medinilla south to the island of Rota. The pelagic fishing fleet consists primarily of trolling vessels less than 24 ft in length which generally take one-day trips within 20 miles around the islands where they find abundant skipjack tuna. These vessels have a limited travel and fishing range and fishery participants necessarily rely on catches from waters within their reach.

Currently there is a new longline fishing company located on Saipan which as of 2010 has four longliners fishing waters around the Mariana Archipelago, beyond 30 miles from shore but within EEZ waters. As of April 2010, there are not yet catch data available on this new fishery. Interest in longline fishing in CNMI has been variable with the issuance of eight, four, and five Western Pacific General Longline permits from 2007 through 2009, respectively.

The pelagic fishery is characterized using data in the Commercial Purchase Data Base which currently documents landings on Saipan where the majority of CNMI's population and fishery participants live. Staff from the Department of Lands and Natural Resources, Division of Fish and Wildlife (DFW) routinely distributes and collects invoice books from 30 participating local fish purchasers on Saipan that record all fish purchases by species categories. The establishment of data collection systems for the islands of Tinian and Rota are in process. It is believed that the commercial purchase database landings include around 90 percent of all commercial landings on Saipan. There is also an unquantified subsistence fishery on Saipan where income is made by selling a small portion of catches door-to-door to cover fishing expenses.

Table 1 summarizes annual participation, landings, and revenue for commercial pelagic vessels. The primary target and most marketable species for the pelagic fleet is skipjack tuna. Yellowfin tuna and mahimahi are also targeted by the pelagic fleet. In 2008 skipjack tuna continued to dominate the pelagic landings, comprising around 80 percent of commercial pelagic landings.

The number of vessels making commercial pelagic landings was relatively constant from 1988-1991, with a sudden jump in 1992. Part of this increase was attributed to an influx of new fishing boats, but it was also discovered that some fishermen were using several different boats, thus artificially inflating the total number of boats concurrently making pelagic landings. Many of the new boats were believed to have left the fishery during 1993. It has been suggested that the increase in active fishing vessels from 1994 to 1997 might be due to the re-entry of boats from the 1992 fleet.

Although the number of vessels and trips has generally trended downward since 2000, landings have fluctuated, especially for skipjack tuna. The reason for this is not fully understood. Creel survey catch rates show catch rates oscillating between 50 and 100 lb/trip both before and after 1991 whereas, the Commercial Purchase data indicate sustained high catch rates before, and low catch rates after 1991. Skipjack catch rates increased between 2004 and 2007 to 114 lb/trip but declined to 96 lb/trip in 2008. The troll catch rate of skipjack has continued a steady decline from

2006 through 2009, based on creel survey data (PIFSC 2010). In 2003, yellowfin catch rates remained relatively stable at 12 lb/trip despite bad weather (e.g. typhoons) that plagued the Mariana Islands nearly the entire year. In 2004, yellowfin catch rates decreased to eight lb/trip but in 2005 and 2006 they again increased. In 2007, yellowfin catch rates increased slightly by 6 percent to 17 lb/trip but declined the following year to 10 lb/trip.

Table 1. Annual Participation, Catch and Revenue for CNMI-based Commercial Pelagic Vessels

Year	Number of Vessels	Number of Trips	Pounds Sold	Adjusted Price per Pound ($)	Adjusted Revenue ($)	Adjusted Revenue Per Trip ($)	Adjusted Revenue Per Vessel ($)
1983	92	1,408	245,985	2.29	563,838	400	6,129
1984	99	1,621	341,136	2.02	690,231	426	6,972
1985	82	1,240	234,178	2.1	490,784	396	5,985
1986	96	1,356	307,459	2.13	654,181	482	6,814
1987	62	992	205,068	2.18	446,852	450	7,207
1988	78	1,298	334,523	2.18	728,154	561	9,335
1989	77	1,242	286,784	2.19	628,197	506	8,158
1990	79	888	180,450	2.62	473,329	533	5,992
1991	76	999	188,561	2.68	504,578	505	6,639
1992	104	1,419	199,228	2.6	517,468	365	4,976
1993	55	1,372	181,328	2.27	410,971	300	7,472
1994	65	1,218	147,329	2.25	332,122	273	5,110
1995	89	1,721	200,180	2.28	455,504	265	5,118
1996	114	2,249	281,277	2.34	658,346	293	5,775
1997	111	2,042	218,873	2.62	574,156	281	5,173
1998	92	2,223	240,263	2.5	600,949	270	6,532
1999	106	1,759	177,031	2.38	421,274	239	3,974
2000	113	2,095	187,295	2.19	410,048	196	3,629
2001	113	2,178	179,181	2.36	423,214	194	3,745
2002	90	1,835	256,982	2.32	597,436	326	6,638
2003	73	1,715	228,416	2.33	532,700	311	7,297
2004	71	1,801	239,007	2.35	562,321	312	7,920
2005	77	1,990	372,375	2.15	800,952	402	10,402
2006	69	1,463	356,706	1.79	637,137	436	9,234
2007	52	1,366	312,554	1.48	461,951	338	8,884
2008	47	989	197,013	1.61	317,330	321	6,752
Average	**84**	**1,557**	**242276**	**2.24**	**534,386**	**361**	**6,610**

(WPRFMC 2008)

Note: Inflation-adjusted prices and revenues were derived using the 2008 CNMI Annual Consumer Price Index (CPI).

4.2 Guam-based boats

Pelagic fishing vessels based on Guam are classified into two general groups: 1) distant-water purse seiners and longliners (foreign and domestic) that fish outside Guam's economic exclusive

zone (EEZ) and transship through the island and; 2) small, primarily recreational, trolling boats that are either towed to boat launch sites or marina-berthed charter boats and fish only within local waters, either within Guam's EEZ or on some occasions in the adjacent EEZ of the Northern Mariana Islands. Most fishermen sell a portion of their catch at one time or another and it is difficult to make a distinction between recreational, subsistence, and commercial fishers. Landings consist primarily of five major species: mahimahi, wahoo, bonita or skipjack tuna, yellowfin tuna, and Pacific blue marlin.

There are three sources of locally-caught fish in Guam's commercial market: (1) full-time commercial fishermen; (2) part-time commercial fishermen; and (3) subsistence or recreational "expense" fishermen who frequently sell portions of their catch to help defray costs. Licenses are not required to sell fish in Guam, nor are there any reporting requirements for those selling fish.

Prior to establishment of the Guam Fishermans Cooperative Association (GFCA) in 1979 there was no central place to sell fish, and fishermen had to develop their own markets and peddle fish after each trip. In 1982, the Western Pacific Fisheries Information Network (WPacFIN) began working with the GFCA to improve their invoicing system and to obtain data on all fish purchases. As time progressed, other fish markets began to operate, and Guam Department of Agriculture Division of Aquatic and Wildlife Resources (DAWR) and WPacFIN staff worked with them to obtain data through the voluntary receipt book program. Although a proposed law has been introduced several times that would require reporting by dealers and possibly commercial fishermen, it has never made it through the legislative process, and the commercial landings data collection system remains voluntary. Commercial landing data for 2008 show a dramatic decrease from 2007 levels. A primary reason for this is the difficulty in collecting commercial landing data. The largest commercial vendor on Guam, in terms of locally caught fish, ceased providing DAWR with commercial receipts in early 2008. Thus, commercial receipt totals for 2008 reflect only data collected for the first three months of the calendar year. Attempts to convince the vendor to resume providing DAWR with commercial data have thus far failed. As providing this data is voluntary, DAWR does not have legal recourse to force the data to be submitted. Other vendors have been contacted and enrolled in the commercial receipts program, but the amount of data provided thus far has been minimal. All commercial data provided from 2008 should be regarded as partial at best.

The composition of Guam's fishery landings by fishing sector has troll fishing for pelagics forming almost 80 percent of the landings, with just over 40 percent of total landings coming from non-commercial troll fishing. Guam's fishing activity can be somewhat constrained by seasonality due to weather with generally lower fishing activity during the November to March period when sea conditions are at their worst.

Estimated annual pelagic landings have varied widely in the 27-year time series. Aggregate landings of tuna PMUS increased and non-tuna PMUS decreased. There are general wide year-to-year fluctuations in the estimated landings of the five major pelagic species. In 2008, 95 percent of tuna were caught by non-charter boats.

Table 2. Annual Participation, Catch and Revenue for Guam-based Commercial Pelagic Vessels

Year	Number of Boats	Number of Trips	Pounds Sold	Price Per Pound (2008 $)	Revenue (2008 $)	Revenue Per Trip ($)	Revenue Per Vessel ($)
1982	199	5,292	153,577	3.95	606,446	115	3047
1983	193	5,339	285,118	3.83	1,093,163	205	3,047
1984	219	5,913	218,028	3.47	757,480	128	5,664
1985	276	7,454	237,695	4.00	951,683	128	3,459
1986	246	6,999	226,138	3.67	830,019	119	3,448
1987	219	6,776	242,444	3.43	832,514	123	3,374
1988	320	11,981	284,408	3.08	876,748	73	3,801
1989	329	10,669	242,554	2.83	686,650	64	2,740
1990	352	10,523	279,121	3.01	839,281	80	2,087
1991	349	9,870	285,696	2.61	746,438	76	2,384
1992	332	10,167	296,809	2.44	722,802	71	2,139
1993	346	10,295	351,201	2.11	741,769	72	2,177
1994	369	11,125	351,187	1.96	687,665	62	2,144
1995	427	15,562	389,849	1.52	591,140	38	1,864
1996	466	16,066	252,075	1.63	417,099	26	1,384
1997	449	14,313	307,754	1.78	548,780	38	895
1998	469	14,944	405,666	1.87	758,026	51	1,222
1999	449	14,848	260,669	1.91	496,949	33	1,616
2000	416	13,203	376,192	1.66	623,669	47	1,107
2001	375	11,977	399,471	1.69	673,656	56	1,499
2002	375	8,917	325,299	1.54	502,279	56	1,796
2003	371	6,991	272,633	1.43	390,389	56	1,339
2004	401	7,296	285,545	1.39	398,116	55	1,052
2005	358	6,344	228,936	1.32	301,927	48	993
2006	386	6,414	203,139	1.22	248,709	39	843
2007	370	6,383	266,964	1.18	313,946	49	644
2008	385	6,947	136,665	1.81	247,188	36	849
Average	**350**	**9,726**	**280,179**	**2.31**	**625,353**	**72**	642

(WPRFMC 2008)
Note: Inflation-adjusted prices and revenues were derived using the 2008 Guam Annual Consumer Price Index (CPI).

The inflation-adjusted price of tuna and other non-tuna PMUS has exhibited a downward trend since data on the pelagic fishery were first collected in 1980. Sales of locally caught pelagic fish has increasingly suffered due to the prevalence of cheaper pelagic fish caught by longliners.

Despite decreasing revenues with decreased commercial landings over the past decade, pelagic fishing continues, as a majority of trollers do not rely on the catch or selling of fish as their primary source of income. Several factors in recent years have negatively affected trolling activity and may affect fishing activity in the future. The price of fuel has increased significantly; making it more costly to fish and also more attractive to sell fish to recoup costs. More than two-thirds of the FADS are offline, and difficulties with procurement have prevented

timely redeployment of these systems. Trolling activity occurs regularly at FADs, and reported to have occurred significantly at offshore banks. However, fishermen also reported more interaction with sharks at offshore banks.

The number of boats involved in Guam's pelagic or open ocean fishery gradually increased from 193 in 1983 to a peak of 469 in 1998. This number decreased until 2001, but has generally been stable since that year. There were 385 boats involved in Guam's pelagic fishery in 2008, an increase of 4 percent from 2007 of 370 boats. A majority of the fishing boats are less than 10 meters (33 feet) in length and are usually owner-operated by fishermen who earn a living outside of fishing. Most fishermen sell a portion of their catch at one time or another. And a small, but significant, segment of the pelagic group is made up of marina-berthed charter boats that are operated primarily by full-time captains and crews.

4.3 WCPO Domestic Purse Seine Tuna Fishery

The domestic purse seine fishery has become an increasing portion of all purse seine vessels fishing in WCPO (Figure 1). The estimated delivered value of the purse seine tuna catch in the WCPFC area for 2008 is $3,124 million that exceeds the previous year's record level of $2,393 million (Williams and Terawasi 2008). In NOAA's 2009 annual report to the WCPFC the domestic purse seine fishery was the largest U.S. fishery in 2008, accounting for 89 percent of the total U.S. catch of skipjack, yellowfin, bigeye, and albacore tuna in the WCPO. Total U.S. purse seine landings increased to 157,849 metric tons (mt) (or 78 percent over 2007 landings) in 2008. Yellowfin tuna catches in the fishery increased from 10,541 mt in 2007 to 23,801 mt in 2008, and skipjack tuna catches increased from 75,210 mt in 2007 to 127,307 mt in 2008.

The fishery operated mainly in areas between 5° N and 10° S latitude and 150° E and 180° longitude in 2008; below the U.S. EEZ around the Mariana Islands which resides between 11° N and 24° N. Before 1995, the fleet in the WCPO fished mainly on free-swimming schools of tunas. Though highly variable during the last 5 years, the fleet has been fishing equally on free-swimming schools and schools associated with floating objects, including logs and fish aggregating devices (FADs). Since the 1990's there have been more than 200 purse seine vessels operating in the region (Figure 1).

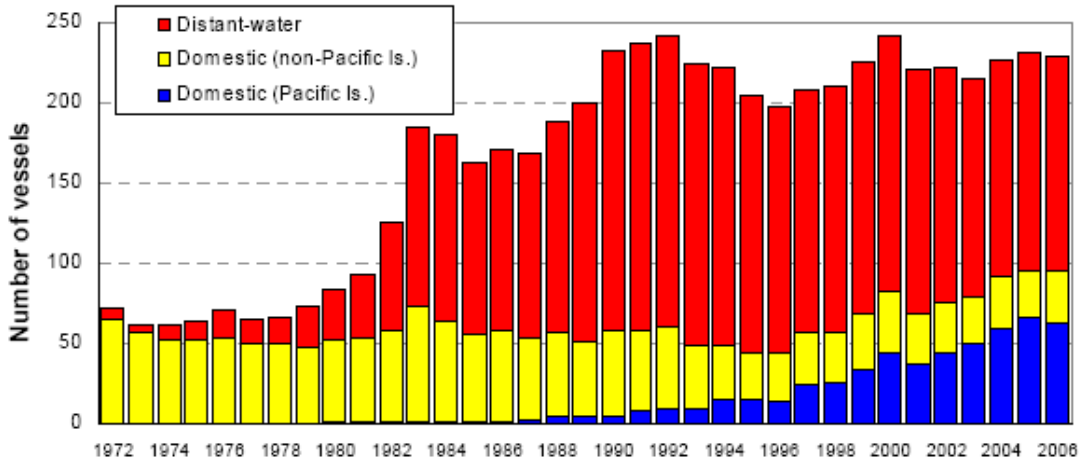

Figure 1: WCPO Purse Seine Vessels 1972-2006
Source: Williams and Terawasi 2008.

4.4 WCPO Domestic Purse Seine Fishery

Prior to beginning purse seine fishing operations in the Western Pacific, the U.S. fleet had been fishing out of California in areas of the eastern Pacific for decades. Various economic, political and regulatory factors contributed to the transition from fishing in the eastern Pacific to the western Pacific, such as fishing overcapacity and increased management controls. Under the South Pacific Tuna Treaty (SPTT), U.S. tuna fishing vessels are able to gain access to fishing grounds in vast areas of the western and central Pacific Ocean (subject to certain conditions), including the exclusive economic zones of several Pacific Island States.

Currently, most of the fishing activity by U.S. purse seine vessels occurs in areas between 5° N and 10° S latitude and 150° E and 170° W longitude in the EEZ waters of Papua New Guinea, Federated States of Micronesia and other Pacific island nations. During El Nino events, however, fishing activity shifts east to the equatorial central Pacific. The percentage of yellowfin tuna in their catches often increases with this shift. U.S. purse seine catch locations for 2007 and 2008 and amount of effort show the large increase in effort and for 2008 a shift to the west, closer to the Mariana Islands Archipelago .

The purse seine catch is stored as a frozen whole product. Most of the catch has historically been off-loaded to the canneries in Pago Pago, American Samoa, however more and more vessels are transshipping catches in Pacific Islands ports for canning and loining destinations in Southeast Asia and Latin America. The final product that is canned in American Samoa is typically destined for the domestic U.S. canned tuna markets. Frozen non-tuna catches may be processed locally (e.g., wahoo) or transshipped to foreign destinations (e.g., billfish and shark)(NMFS 2009).

The number of U.S. vessels active in the WCPO purse seine fleet declined from 39 active vessels in 1998 to 15 in 2005 (WCPFC 2006) with catches following suit. Increased investment and participation in the U.S. purse seine fishery is evident (NMFS 2009). However, since 2005, the U.S. purse seine fleet more than doubled to 32 vessels in 2008 (Table 3). The most recent

information regarding purse seine activity is that there are 36 purse seiners licensed in the U.S. for the 2009/2010 licensing year; the U.S. may license up to 40 vessels.

The U.S. purse seine catch of 157,849 mt in 2008 was composed primarily of skipjack tuna, with smaller catches of yellowfin and bigeye tuna (Table 3). Total catches and effort increased significantly from 2007. Yellowfin tuna catches in the fishery increased from 10,541 mt in 2007 to 23,801 mt in 2008 and catches of skipjack have doubled since 2005 to 127,307 mt in 2008. Figure 2 shows the distribution of effort by the U.S. purse seine fleet in 2007 and 2008.

Table 3: Reported Annual Landings (metric tons) for U.S. Purse Seine Vessels Operating in the WCPO, 1999-2008

	# Active Vessels	Skipjack (mt)	Yellowfin (mt)	Bigeye (mt)
1999	36	129,262	34,529	18,694
2000	33	81,368	29,961	13,886
2001	32	85,539	24,143	6,176
2002	29	88,535	27,191	4,889
2003	26	62,907	20,079	4,470
2004	21	47,896	14,492	5,031
2005	15	62,379	17,685	6,108
2006	13	55,633	8,448	4,364
2007	21	75,210	10,541	2,985
2008	32	127,307	23,801	6,741

Source: WCPFC 2008b

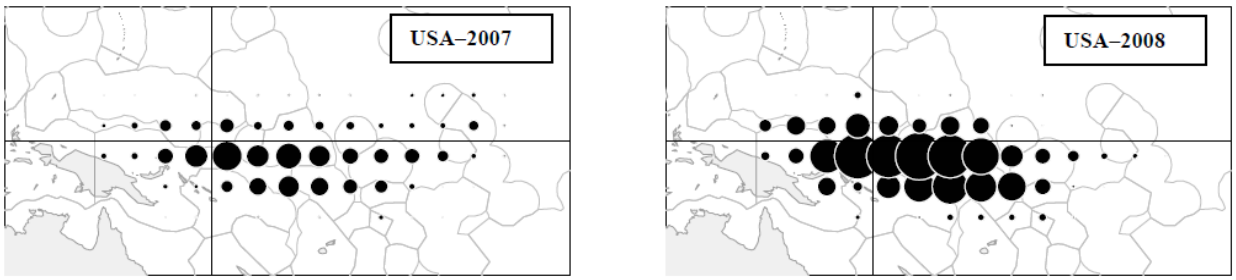

Figure 2: Distribution of Effort by the U.S Purse Seine Fleet, 2007 & 2008
Note: Mariana Archipelago is located in the mid upper left-hand quadrant.
Source: Williams & Terawasi 2009

The South Pacific Tuna Treaty governs the conduct of U.S. fishing vessel operations in the Treaty Area, which encompasses approximately 10 million square miles. Licenses are issued by the Pacific Islands Forum Fisheries Agency (FFA), based in Honiara, Solomon Islands, which acts as the Treaty administrator on behalf of the Pacific Island Parties to the Treaty (PIPs). Currently, the Treaty allows for a maximum of 45 licenses to U.S. purse seine fishing vessels to fish in the Licensing Area of the Treaty. Of the 45 licenses, 5 are reserved for "joint venture" arrangements with PIPs.

5.0 Potential for Gear Conflicts between Purse Seine and Small Boat Fisheries

A 1996 study investigated the impact of purse seine fishing on domestic pole-and-line and artisanal fisheries in waters around Kiribati (Hampton et al 1996). Over large areas, e.g., within radii of 300-600 nm of the islands, artisanal catch rates and purse seine catches are generally positively correlated, suggesting that, on this scale, variations in the abundance or catchability of yellowfin affect both purse seiners and artisanal catches in the same way. However, some negative correlations were found for smaller area (50-60 nm) and time scales, indicating that localised effects may occur (Hampton et al. 1996). In addition, there is some indication from additional preliminary modeling of theoretical skipjack tuna movement that purse seine fishing could have an impact on the availability of skipjack tuna for small-scale trolling from equivalent levels of fishing effort occurring as far away as 600 -800 nm (P. Kleiber pers. comm.).

In addition, a 1998 OFP Report titled *Marianas Islands 1998 Pelagic Fisheries Assessment* in assessing the potential impact of allowing foreign longliners to fish in the EEZ around the Mariana Islands states that "…allowing foreign access to the Marianas Islands may cause negative interactions with the troll or artisanal fisheries. While negative interactions have been difficult to substantiate in a variety of fishery studies, the probability of an interaction increases as longline vessels operate in closer proximity to other fishery sectors." These same conclusions may be applied towards assessing potential impacts of domestic purse seining in EEZ waters around the Mariana Islands.

Another study was undertaken to examine the influence of purse seine fishing on longline catches of yellowfin tuna in the Indian Ocean (Nishida 1995). The spatial analysis showed that the catch of the purse seine fishery affects the longline fishery when the purse seine catch exceeds 1 ton/month/5° X 5° area. When data for the heavily fished purse seine area were examined for impacts to the longline fishery there was a modest decrease in longline CPUE evident. The author of this study does point out, however, that a decrease in CPUE of the longline caught yellowfin does not necessarily imply impacts of the purse seine fishery; that other factors such as environmental conditions and fish availability may be responsible for the changes in CPUE (Nishida 1995). Although this study occurred on a fishery in the Indian Ocean it is likely that similar outcomes may be expected on western Pacific tuna fisheries. A similar study on interactions between Mexican longline and purse seine fisheries in the eastern Pacific concluded that the information was not sufficient to define an interaction; it was possible to suggest a "consecutive" interaction (Ortega-Garcia 1995). Another study looked at skipjack movement with regards to fisheries interactions in the western Pacific (Sibert et al. 1995). This study predicted declining yields of 20 percent in the pole-and-line fishery due to purse seine fishing activities, with greatest declines for pole-and-line fleets operating closest to the purse seine fleets. The authors point out that a change of this magnitude would be difficult to detect in actual recorded catches and to be separated from interannual variability in the fisheries. At the time of this study (late 80's – early 90's) pole-and-line were the two principal gear types catching skipjack in the western Pacific. They also point out that potential fishery interaction estimates depend on the natural mortality rate as does the estimated movement pattern used in their analysis (Sibert et al. 1995).

Finally, a study examined the migratory nature of some tunas, specifically skipjack and yellowfin, and the implications for fisheries management (Sibert and Hampton 2003). They found that the median lifetime movement (i.e. displacement) of skipjack (as a measure of mobility) to be from 420-470 nm and for yellowfin approximately 20% less. They also concluded that fishing reduces this and as such only 50% of the fish move beyond the median displacement while the rest remain closer. In other words, a significant proportion of the population will move beyond most EEZs during their lifetime and therefore, both international and domestic (including sub-regional) conservation policies are necessary for conservation and management. The authors conclude in addition to the need for international cooperation "... results also suggest that Pacific Island countries can implement effective domestic management policies to promote conservation and sustainable utilization of tuna stocks within their EEZs".

6.0 Impacts of the Alternatives

6.1 Topic 2: CNMI Purse Seine Prohibited Area

If a purse seine fishery were to fish in the EEZ around CNMI under **Alternative 1A**, the troll fishing community could be adversely affected by localized stock depletion leading to catch competition between the two fisheries (Hampton et al. 1996). The majority of the purse seine catch is projected to be skipjack tuna, which is also the most important target species for CNMI's troll fleet. The second highest purse seine catch would be yellowfin tuna which is the trolling fleet's second most important species as well. Greater amounts of purse seine effort closer to areas fished by the small boat fleets of CNMI could force the troll fleet to travel farther to maintain their current catches, and/or to lose revenue normally gained through skipjack and yellowfin catches. The catch of skip jack and yellowfin by just one purse seine vessel fishing for just one day would be about 26 tons, which would be approximately 18 percent of the annual skipjack and yellowfin sold by CNMI's entire commercial troll fleet. Reductions in catch rates, landings, revenues and profits accruing to the commercial trolling fleet cannot be quantified due to a lack of detailed information on fishery operations and how these might change under any of the action alternatives. However these are small operations with average annual ex-vessel revenues of $8,500 per vessel which likely have small profit margins, and even minor reductions in fishery revenues could be highly detrimental to this fishery. Greater numbers of purse seine vessels could also cause the troll fleet to travel farther to find new concentrations of fish, thus incurring increased fuel costs and further reducing their profits.

Alternative 1B (Preferred) would prohibit purse seine fishing within 30 nm around CNMI which would provide an exclusive area for trolling vessels. However given the high fishing capacity of purse seine vessels, depending on the amount of purse seine fishing effort localized stock depletion could still occur in the fishing grounds currently used by commercial trolling vessels. Thus trolling operations could experience some adverse impacts, but less than those under Alternative 2A.

Alternative 1C would prohibit purse seine fishing within 100 nm around CNMI which would further protect the areas currently used by trolling operations thus significantly reducing the likelihood of adverse impacts on the trolling fleet. However given the high fishing capacity of

purse seine vessels, depending on the amount of purse seine fishing effort localized stock depletion could still occur in the fishing grounds currently used by commercial trolling vessels. Thus trolling operations could experience some adverse impacts, but less than those under Alternatives 2A or 2B.

Alternative 1D would prohibit purse seine fishing within U.S. EEZ waters around CNMI which would be expected to provide a sufficient buffer area to drastically reduce the likelihood of gear conflicts and catch competition between trollers and purse seiners. Purse seine fishing vessels currently do not fish within U.S. EEZ waters around CNMI, so Alternative 2D will not alter the decision of where to fish, at least in the short term. This may create an adverse impact to purse seine vessels in the future when they would choose to fish within the U.S. EEZ around CNMI, were it not for the implementation of this prohibited area.

Under the preferred alternative, no purse seine fishing would be allowed to take place in the U.S. EEZ waters around CNMI and it is possible there would be some concomitant impacts to the U.S. purse seine fleet if they had chosen to fish these waters, however, impacts are expected to be minimal because the highly mobile purse seine fleet typically fishes in large areas of the Pacific and has exclusive rights to fish in U.S. EEZ waters in the PRIA, except those waters now off limits due to the establishment of the PRIA Marine National Monument. It is also not known what impact upcoming FAD fishing regulations will have on the behavior of the WCPO purse seine fleets.

While the U.S. purse seine fleet does not currently fish in waters of or deliver to CNMI, future purse seine fishing near CNMI, or the ability to accept fish transshipped by nearby purse seine vessels could influence the development the infrastructure needed to process or export such species. Aside from the negative benefits discussed earlier associated with gear competition and stock depletion, the support of a purse seine industry could provide positive benefits through increasing potential employment while opening up markets currently unexplored in CNMI. Although for this to occur, CNMI's marine-based infrastructure (i.e., dock space, fueling platforms, skilled labor, etc) would need to be significantly enhanced beyond current conditions and is not likely to happen in the near future.

6.2 Topic 2: Guam Purse Seine Prohibited Area

If domestic purse seine vessels were to fish in EEZ waters around Guam under **Alternative 2A** (No Action) localized stock depletion could occur and lead to reduced catch rates and catch competition, ex-vessel revenues and profits for commercial trollers (Hampton et al. 1996). The majority of the purse seine catch is projected to be skipjack tuna, which is also the most important target species for Guam's troll fleet. The second highest purse seine catch would be yellowfin tuna which is also important to the trolling fleet. The catch of skipjack and yellowfin by just one purse seine vessel fishing for just one day (26 tons) would be approximately 27 percent of the annual skipjack and yellowfin caught by Guam's entire commercial troll fleet (approximately 96 tons, WPRFMC 2007). Reductions in catch rates, landings, revenues and profits accruing to the commercial trolling fleet cannot be quantified due to a lack of detailed information on fishery operations and how these might change under Alternative 3A (or any of the other alternatives). However these are very small operations with average annual ex-vessel

revenues of $2,780 per vessel which likely have small profit margins and even minor reductions in fishery revenues could be highly detrimental to this fishery. Greater numbers of purse seine vessels could also cause the troll fleet to travel farther to find new concentrations of fish, thus incurring increased fuel costs and further reducing their profits.

Alternative 2B (preferred) would prohibit purse seine fishing within 50-100 nm around Guam which would provide an exclusive area for trolling vessels. However given the high fishing capacity of purse seine vessels, depending on the amount of purse seine fishing effort localized stock depletion could still occur in the fishing grounds currently used by commercial trolling vessels. Thus trolling operations could experience some adverse impacts, but less than those under Alternative 3A.

Alternative 2C would prohibit purse seine fishing within all U.S. EEZ waters around Guam which would be expected to provide a sufficient buffer area to eliminate the likelihood of adverse impacts on the trolling fleet. This Alternative addresses the needs of the existing small boat fleet around Guam while imposing little, if any, financial hardships on domestic purse seine operations. This Alternative is consistent with Magnuson-Stevens Act requirements that fishery managers take into account the importance of fishery resources to fishing communities such as Guam in order to provide for the sustained participation of such communities, and to the extent practicable, minimize adverse economic impacts on such communities.

Restricting or prohibiting purse seine fishing in EEZ waters around Guam is not expected to adversely impact the U.S. purse seine fleet given the lack of historical fishing effort associated with this area. Other suitable fishing areas in the proximity would remain available, as would EEZ waters around the Pacific Remote Island Areas (in which domestic purse seine vessels are known to fish).

7.0 Impacts of the Preferred Alternatives on National Costs and Benefits

In accordance with Executive Order 12866, the following is set forth: (1) This rule is not likely to have an annual effect on the economy of more than $100 million or to adversely affect in a material way the economy, a sector of the economy, productivity, jobs, the environment, public health or safety, or state, local, or tribal governments or communities; (2) This rule is not likely to create any serious inconsistencies or otherwise interfere with any action taken or planned by another agency; (3) This rule is not likely to materially alter the budgetary impact of entitlements, grants, user fees or loan programs or the rights or obligations of recipients thereof; and (4) This rule is not likely to raise novel or policy issues arising out of legal mandates, or the principles set forth in the Executive Order.

As compared to the no action baseline, the implementation of the preferred alternatives would appropriately balance the needs and concerns of CNMI and Guam's small and locally-based fishing fleets with the development of larger-scale domestic longline and purse seine fisheries in waters around the Mariana Archipelago. This action is consistent with the Magnuson-Stevens Fishery Conservation and Management Act.

Preliminary Regulatory Flexibility Act Analysis

The Regulatory Flexibility Act (RFA) requires federal agencies to consider the impact of regulations on small entities in developing the proposed and final regulations. If a proposed rule is expected to have a significant economic impact on a substantial number of small entities, an initial regulatory flexibility analysis (IRFA) must be prepared. Under Section 603(b) of the RFA, each IRFA is required to address:

(1) reasons why the agency is considering the action,
(2) the objectives and legal basis for the proposed rule,
(3) the kind and number of small entities to which the proposed rule will apply,
(4) the projected reporting, record keeping and other compliance requirements of the proposed rule, and
(5) any federal rules that may duplicate, overlap or conflict with the proposed rule.

A business is considered to be 'small' business by the Small Business Administration (SBA) if it has annual receipts less than $4.0 million for fish-harvesting, average annual receipts less than $6.5 million for charter/party boats, 100 or fewer employees for wholesale dealers, or 500 or fewer employees for seafood processors. The IRFA is conducted to comply with the Regulatory Flexibility Act (5 USC 601 et. seq.) and provides a description of the economic impacts of the various alternatives on small entities. If a proposed rule is not expected to have a significant economic impact on a substantial number of small entities, either adversely or beneficially, then the agency is not required to perform an IRFA. In these instances, an agency must undertake a threshold (preliminary) analysis to determine the economic impact of a proposed rule on small entities. Once this preliminary analysis is undertaken, an agency then can determine whether to certify or undertake a complete IRFA.

1.0 Description of Small Businesses to Which the Rule Would Apply

Based on available information, NMFS has determined that there are no disproportionate economic impacts to small entities. CNMI longline and troll vessels are both considered small entities under the Small Business Administration definition of a small entity, i.e., they are engaged in the business of fish harvesting, are independently owned or operated, are not dominant in their field of operation, and have annual gross receipts not in excess of $4 million[28]. Troll vessels are likely to benefit, and CNMI longline vessels could, but are not likely to, be slightly adversely affected. The longliners could benefit because any negative effects of purse seine fishing on the local availability of fish stocks that are targeted by both longliners and purse seiners would be diminished for the longline fleet. Purse seiners are not likely to be negatively affected because they do not currently fish in the areas from which they would be prohibited. Given the amount of landings from U.S. purse seiners, they are not likely to be considered small entities.

The alternatives in this Amendment 2 are primarily are intended to protect the interests of small vessels/fishers in the nearshore fisheries. It will affect all the troll vessels in the same manner and the displacement of few longliners to outside of 30nm from the U.S. EEZ in the CNMI may have insignificant economic impact to this fleet. All these vessels are considered small business entities by the

[28] The annual total revenues for the commercial pelagic fleets in CNMI and Guam have always remained below $1million during 1982-2008 (Table 1 and 2 in this Appendix).

U.S. Small Business Administration, as their annual sales receipts do not exceed $4.0 million. Therefore, there would be no economic impacts resulting from disproportionality between small and large business entities under the proposed amendment. For these reasons, the actions and alternatives were not evaluated through an IRFA.

2.0 Skills Necessary to Meet Compliance Requirements

No special skills would be required to comply with any of the alternatives considered here.

3.0 Identification of Duplicating, Overlapping, and Conflicting Federal Rules

To the extent practicable, it has been determined that there are no federal rules that may duplicate, overlap, or conflict with this action.