Environmental Assessment for the Third Extension of the South Pacific Tuna Treaty

National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Pacific Islands Regional Office

July 2004

Environmental Assessment for the Third Extension of the South Pacific Tuna Treaty

Prepared for:

National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Pacific Islands Regional Office

Prepared by:

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July 2004

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
PROGRAM PLANNING AND INTEGRATION
Silver Spring, Maryland 20910

JL 23 2004

To All Interested Government Agencies and Public Groups:

Under the National Environmental Policy Act, an environmental review has been performed on the following action.

TITLE: Environmental Assessment for the Third Extension of the South Pacific Tuna Treaty

LOCATION: Pacific Islands Region, NOAA Fisheries, Honolulu, Hawaii

SUMMARY: The EA was prepared for the purpose of implementing agreed regulatory changes contained in the Third Extension of the Treaty on Fisheries Between the Governments of Certain Pacific Island States and the Government of the United States of America (Treaty). The Treaty entered into force in 1987 and governs access for U.S. purse seine vessels on the high seas and in exclusive economic zones of the Pacific Island parties to the Treaty. In addition, the Treaty manages access for U.S. longline vessels to the high seas portions of the Treaty Area. Regulatory changes agreed to in the Third Extension of the Treaty relate to data collection methods, vessel monitoring activities and fishing area modifications.

RESPONSIBLE OFFICIAL: William L. Robinson, Regional Administrator
Pacific Islands Region,
1601 Kapiolani Blvd, Suite 1110,
Honolulu, HI 96814
Tel: (808) 973-2937, Fax (808) 973-2941

The environmental review process led us to conclude that this action will not have a significant effect on the human environment. Therefore, an environmental impact statement will not be prepared. A copy of the finding of no significant impact including the supporting environmental assessment is enclosed for your information.

Please submit any written comments to the responsible official named above. Also, please send one copy of your comments to me at the NOAA Strategic Planning Office (PPI/SP), Room 15603, 1315 East-West Highway, Silver Spring, MD 20910.

Sincerely,

Susan A. Kennedy
Acting NEPA Coordinator

Enclosure

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE

Pacific Islands Regional Office
1601 Kapiolani Boulevard, Suite 1110
Honolulu, Hawaii 96814-0047

July 7, 2004

MEMORANDUM FOR: William Hogarth, Ph.D.
Assistant Administrator

FROM: William L. Robinson
Regional Administrator

SUBJECT: NEPA FONSI for the South Pacific Tuna Treaty

Please find attached the Finding of No Significant Impact (FONSI) for the National Environmental Policy Act (NEPA) Environmental Assessment for the Third Extension of the Treaty on Fisheries Between the Governments of Certain Pacific Island States and the Government of the United States of America (Treaty). The Treaty entered into force in 1987 and governs access for U.S. purse seine vessels on the high seas and in exclusive economic zones of the Pacific Island Parties to the Treaty. In addition, the Treaty provides for access of U.S. longline vessels to the high seas portions of the Treaty Area. Regulatory changes agreed to in the Third Extension of the Treaty relate to data collection methods, vessel monitoring activities, and fishing area modifications.

Based on the findings of the NEPA analysis, I recommend that you sign the attached FONSI and forward it to the Office of Strategic Planning (NOAA, NEPA Coordinator) for its concurrence with the FONSI. After the concurrence by your office and by the Office of Strategic Planning, the PIR will forward a notice of availability of the EA for publication in the Federal Register.

Agree RL 7/20/04 Disagree _____ Please Discuss _____

Attachments: Finding of No Significant Impact (FONSI) and Environmental Assessment for the Third Extension of the Treaty on Fisheries Between the Governments of Certain Pacific Island States and the Government of the United States of America.

Finding of No Significant Impact for Environmental Assessment for the Third Extension of the South Pacific Tuna Treaty

National Marine Fisheries Service
July 15, 2004

The National Marine Fisheries Service (NOAA Fisheries) Pacific Islands Regional Office (PIRO) has prepared an Environmental Assessment (EA) for the Third Extension of the Treaty on Fisheries between the Governments of Certain Pacific Island States (PICs) and the Government of the United States of America (Treaty).

NOAA Fisheries considered and analyzed the following alternatives, each of which is discussed in detail in the EA:

Alternative 1 (No Action) – NOAA Fisheries does not promulgate a regulation to implement the changes proposed for the Third Extension of the Treaty.

Alternative 2 (Preferred Alternative) – NOAA Fisheries promulgates a regulation to implement the following changes proposed for the Third Extension of the Treaty:

Modifications to vessel reporting requirements relating to reporting times, format and content;

Require the use of a Vessel Monitoring System for U.S. vessels in the Treaty Area;

Opening of previously closed internal waters of Papua New Guinea and the Solomon Islands to the U.S. purse seine fleet;

U.S. longline vessels will now be allowed to operate on the high seas portions of the Treaty Area.

Alternative 3 – The U.S. purse seine industry terminates its participation in the Treaty.

Alternative 2 is selected as the preferred alternative because it fulfills international obligations agreed to by the Administration. It facilitates U.S. participation as a responsible party to a multilateral Treaty by allowing the U.S. purse seine fleet continued access to the exclusive economic zones (EEZ) of certain PICs under the rights and responsibilities of the Third Extension of the Treaty. Implementation of the preferred alternative further ensures continued U.S. involvement in dynamic fisheries management issues in the Western and Central Pacific Ocean (WCPO). The provisions of the Treaty and the Third Extension of the Treaty are fully described in the EA.

National Oceanic and Atmospheric Administration Administrative Order 216-6 (May 20, 1999) contains criteria for determining the significance of the impacts of a proposed action. In addition, the Council on Environmental Quality (CEQ) regulations at 40 C.F.R. §1508.27 state that the significance of an action should be analyzed both in terms of "context" and "intensity." Each criterion listed below is relevant to make a finding of no significant impact and has been considered individually, as well as in combination with the others. The significance of this action is analyzed based on the criteria provided in NAO 216-6 and CEQ regulations. These include:

1) Can the proposed action be reasonably expected to jeopardize the sustainability of any target species that may be affected by the action?

The preferred alternative (2) will not jeopardize the sustainability of any target species known to exist in the action area. The measures being implemented are either administrative or will result at most in minor changes in both fishing effort and catch. The target stocks of the U.S. purse seine fleet are skipjack and yellowfin tuna. These stocks are not overfished and the measures being implemented will not affect their current status. Although there is some concern regarding the status of bigeye tuna, it is not a target species for the purse seine vessels. Bigeye tuna is a target of some segments of longline fleets operating in the area. However, given the logistics and economics associated with longline fishing in this area, it is anticipated that very few - if any - U.S. longline vessels will fish in the international waters of the Treaty Area. Overall, revised vessel reporting requirements are anticipated to provide better data regarding vessel operations and position and the catch on board. The additional information will provide improved fisheries data and may be used to help determine measures necessary for sustainable management of tuna stocks. As a party to the multilateral Treaty, the U.S. will consult with the relevant PICs to ensure that U.S. participation in the Treaty does not jeopardize the sustainability of the target stocks of yellowfin and skipjack tuna.

Fishing area modifications and fishing gear/area modifications represent minor operational adjustments that bring regulations into accord with the Treaty and current practice. Additionally, it is possible that expanded fishing access for U.S. longline vessels could relieve fishing pressures in the U.S. EEZ surrounding American Samoa.

2) Can the proposed action be reasonably expected to jeopardize the sustainability of any non-target species?

The preferred alternative (2) is not expected to jeopardize the sustainability of any of the non-target species or bigeye tuna and assorted pelagic fish species. It is anticipated that there will be few - if any - U.S. longline vessels fishing on the high seas portions of the Treaty Area. This provision will not result in an appreciable increase of longline effort (e.g., increased numbers of hooks fished each year) or catch in the Treaty Area.

3) Can the proposed action be reasonably expected to have a substantial adverse impact on public health or safety?

Public health and safety will not be affected by the preferred alternative (2). For the most part, activities involved take place at-sea and the reporting changes are of an administrative nature. In addition, expanded longline access is not anticipated to affect public health and safety. Adjustments to fishing access areas are not anticipated to affect public health and safety, and any degradation of water quality will be minor, if at all measurable.

4) Can the proposed action be reasonably expected to adversely affect endangered or threatened species, marine mammals, or critical habitat of these species?

Based on available U.S. purse seine fleet WCPO observer data (> 20% of the trips taken over about a five year period) interactions with protected resources are very rare (ca. 0.2% of the observed sets). Unpublished observer data from the South Pacific Forum Fisheries Agency covering a five-year period, 1997-2002, for 6,058 sets (25% of all sets during the period) show three interactions with marine turtles by U.S. purse seine vessels fishing under the Treaty. None of the three turtles was identified as to species and all were released. One turtle was noted as "alive and healthy," while the condition of the other two were listed as "condition unknown."

During the period mentioned above, observers noted interactions with marine mammals during 11 of 6,058 sets (0.18%). The species involved were not recorded and the condition of the individuals generally was recorded as unknown. Prior to the Third Extension of the Treaty, U.S. longline vessels were not allowed to operate on the high-sea portions of the Treaty Area. Consequently, there is no historic U. S. WCPO longline fishery database. Given the logistics and economics associated with longline fishing by U.S. longline vessels in the high seas portion of the Treaty Area, it is considered very unlikely that even minimal levels of fishing by these vessels will occur. The available information indicates that the preferred alternative will have, at most, minimal effects on any protected species or its habitat. The agency is currently undertaking a formal consultation regarding all listed species.

The preferred alternative (2) will not adversely modify designated critical habitat as defined by the ESA or designated essential fish habitat (EFH) as defined by the Magnuson-Stevens Act. As discussed in the EA, because the preferred alternative (2) involves adjustments to reporting requirements and at-sea /high seas fishery operations, there are no adverse effects on critical habitat or EFH.

5) Can the proposed action be expected to have a substantial impact on biodiversity and ecosystem function within the affected area (e.g., benthic productivity, predator-prey relationships, etc)?

The preferred alternative (2) is not expected to have a substantial impact on the biodiversity and ecosystem of the Western and Central Pacific Ocean. The actions

included in the preferred alternative reflect minimal alterations to the status quo. The enhanced reporting and monitoring activities in the preferred alternative will provide increased and improved data on fishing activities and contribute to a more effective basis for future management measures.

6) Are significant social or economic impacts interrelated with significant natural or physical environmental effects?

The preferred alternative (2) is chiefly directed at improved data collection and utilization and based on the analyses provided in the Environmental Assessment these have been shown not to be significant.

7) To what degree are the effects on the quality of the human environment likely to be highly controversial?

There is no scientific or technical controversy regarding effects of the selected alternative on the human environment. There were no issues raised in this regard by the public during the scoping meetings or in the comments received. Actions comport with international agreements and have been vetted and recommended in the international negotiation and ratification process.

8) Can the proposed action be reasonably expected to result in substantial impacts to unique geographic areas, such as historic or cultural resources, park land, prime farmlands, wetlands, wild and scenic rivers or ecologically critical areas?

The preferred alternative (2) involves reporting activities and fishing activities on the high seas and in the EEZs of Pacific Island countries and will not result in substantial impacts to any unique geographic area.

9) To what degree are the effects on the human environment likely to be highly uncertain or involve unique or unknown risks?

The preferred alternative (2) continues an existing international agreement (>15 years) consistent with U.S. international obligations. The effects of this action are relatively certain and do not involve unique or unknown risks. The provisions of the Third Extension of the Treaty are the result of an international negotiation process and do not represent a significant change to the provisions under the existing Treaty. The reporting requirements, monitoring activities, and modification to the areas of fishing access are believed to be an improvement to the existing terms of the Treaty.

10) Is the proposed action related to other actions with individually insignificant, but cumulatively significant impacts?

Fishing activities under this action occur in high seas areas and in the EEZs of PICs. Modifications directed at improved data collection typically take place on board the vessels and will enable more thorough analyses of the effects of fishing on both target

and non-target resources. United States fishermen participate in the fisheries of the WCPO along with several other nations. It is estimated that U.S. purse seine gear constitutes less than 10%, and U.S. longline gear less than 3%, of overall effort. So far as data are available, cumulative impacts were considered, with no significant cumulative impacts expected from implementation of the preferred alternative (2).

11) Is the proposed action likely to adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural or historical resources?

The preferred alternative (2) involves reporting activities and fishing activities on the high seas and in the EEZs of Pacific Island countries. The proposed actions will not affect areas listed in or eligible for listing in the National Register of Historic Places, or cause loss or destruction of significant scientific, cultural or historic resources.

12) Can the proposed action be reasonably expected to result in the introduction or spread of a non-indigenous species?

The reporting actions included in the preferred alternative (2) are not of a nature to impose risks of the introduction or spread of a non-indigenous species. Activities such as shipping and support that may be associated with fishing have not been identified as presenting risks of the introduction or spread of such species.

13) Is the proposed action likely to establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration?

This action carries out U.S. obligations under an international agreement of a ten-year duration. As such, it does not establish a precedent for future actions with significant effects nor does it represent a decision in principal about a future consideration.

14) Can the proposed action reasonably be expected to threaten a violation of Federal, State, or local law or requirements imposed for the protection of the environment?

The preferred alternative (2) comports with U.S. obligations under the Treaty and is implemented for the purposes of enhancing compliance with law, including those for the protection of the environment. The preferred alternative is consistent with all laws of the Pacific Island Parties and the U.S. and does not threaten a violation of any Federal, State or local law or requirements imposed to protect the environment. In addition, compliance can be expected to improve given the enhanced enforcement mechanisms implemented under the Third Extension.

Regarding Environmental Justice (Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations)*: The analysis of the impacts in the EA indicates that there will be no disproportionately high and adverse environmental impacts on minority and low-income populations by preferred alternative (2).

DETERMINATION

In view of the information presented in this document and the analysis contained in the attached Environmental Assessment prepared for the proposed Third Extension of the Treaty on Fisheries between the Governments of Certain Pacific Island States and the Government of the United States of America (Treaty), it is hereby determined that promulgating regulations to implement the Third Extension of the South Pacific Tuna Treaty will not significantly impact the quality of the human environment as described above and in the Environmental Assessment. In addition, all beneficial and adverse impacts of the preferred alternative (2) have been addressed to reach the conclusion of no significant impacts. Accordingly, preparation of an EIS for this action is not necessary.

Rebecca Lent for 7/20/04

William Hogarth
Assistant Administrator,
National Marine Fisheries Service

Date

Attachment: Environmental Assessment for the Third Extension of the South Pacific Tuna Treaty

CONTENTS

APPENDIXES

FIGURES

TABLES

ACRONYMS AND ABBREVIATIONS

°	Degree
CFR	Code of Federal Regulations
cm	Centimeter
CPUE	Catch Per Unit of Effort
DLP	dolphins, porpoises
DMWR	Department of Marine and Wildlife Resources, American Samoa
DWFN	Distant-Water Fishing Nation
EA	Environmental Assessment
EEZ	Exclusive Economic Zone
ENSO	El Niño Southern Oscillation
ESA	Endangered Species Act
FAD	Fish Aggregation Device
FFA	Forum Fisheries Agency
FL	Fork Length
FMP	Fishery Management Plan
FSM	Federated States of Micronesia
GRT	Gross Registered Ton
kg	Kilogram
km	Kilometer
MAM	Unidentified Marine Mammal
MOU	Memorandum of Understanding
MSY	Maximum Sustainable Yield
mt	Metric Ton
MTC	Minimum Terms and Conditions
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service (i.e., NOAA Fisheries)
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
OFP	Oceanic Fisheries Programme
PICs	Pacific Island Countries
PIFSC	Pacific Islands Fisheries Science Center
PIRO	Pacific Islands Regional Office
PNA	Parties to the Nauru Agreement
RPL	Regional Purse Seine Logsheet
SCTB	Standing Committee on Tuna and Billfish
SPC	Secretariat of the Pacific Community
U.S.	United States
ULT	Ultra-Low Temperature
UNEP	United Nations Environment Programme
USCG	United States Coast Guard
UTC	Universal Coordinated Time
VMS	Vessel Monitoring System
WCPO	Western and Central Pacific Ocean
WLE	Unidentified Whale
WPacFIN	Western Pacific Fisheries Information Network
WPFMC	Western Pacific Fishery Management Council
WTPO	World Tuna Purse Seine Organization

1 PURPOSE AND NEED

This Environmental Assessment (EA) provides a National Environmental Policy Act (NEPA) analysis for regulatory changes proposed for the third extension of the Treaty on Fisheries Between the Governments of Certain Pacific Islands States and the Government of the United States of America (Treaty).[1] The Treaty governs fishing activities of United States (U.S.) tuna purse seine vessels participating in the tuna fishery of the Western and Central Pacific Ocean (WCPO).[2] Specifically, the Treaty manages access of U.S. purse seine vessels to the Exclusive Economic Zones (EEZ) of Pacific Island Countries (PICs)[3] and provides for technical assistance in the area of fisheries development.

1.1 Background

1.1.1 Treaty Background

In the early 1980s, some U.S. vessels were granted access to fishing areas in the WCPO under multilateral industry-to-government arrangements that ultimately proved unsatisfactory. Several disagreements arose between the U.S. and some of the PICs. These disagreements were partly due to U.S. tuna policy at the time, which did not recognize coastal state rights with respect to tuna resources, and to the actions of a relatively small number of U.S. vessel captains (Van Dyke and Nicol, 1987; Teiwaki, 1988).

In response to these conflicts, the Treaty was negotiated, ratified, and finally implemented on June 15, 1988. The Treaty provides licensed U.S. vessels with predictable access to most of the waters of the 16 member states of the Forum Fisheries Agency (FFA),[4] all of which are party to the Treaty. The full text of the Treaty is presented in Appendix A. The Treaty was extended by mutual agreement in 1993 for an additional 10 years until June 14, 2003. Recently concluded negotiations resulted in agreement between the parties to extend the Treaty for an additional 10 years until 2013.

The Treaty continues to provide significant benefits to both the U.S. Government and the U.S. tuna purse seine industry. It enables the U.S. Government to obtain reliable fishery management

[1] Unless otherwise noted, references in this document to the Treaty include references to its annexes and schedules, as well as the linked Agreement Between the Government of the United States of America and the South Pacific Forum Fisheries Agency, where appropriate. It is noted that the completion of this document falls approximately in one year into the third extension of the Treaty.

[2] In this document, the term "Western and Central Pacific Ocean" refers to that part of the Pacific Ocean west of 150 degrees West Longitude.

[3] The 16 Pacific Island Countries that are party to the Treaty are Australia, Cook Islands, Federated States of Micronesia, Fiji, Kiribati, Marshall Islands, Nauru, New Zealand, Niue, Palau, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu, and Vanuatu.

[4] The Forum Fisheries Agency is comprised of 16 Pacific Island Countries who meet regularly as the Forum Fisheries Committee to set regional fisheries policy on sustainable management and development of tuna resources in the western and central Pacific Ocean. The FFA Secretariat is led by a Director and consists of technical and administrative staff who advise and assist member governments manage, conserve, and utilize the tuna resources in their Exclusive Economic Zones (EEZs) and beyond through enhancing national capacity and strengthening regional solidarity. The FFA Secretariat activities are guided by the Forum Fisheries Committee.

information from the fleet through access to fishery data and the operation of a cooperative observer program (Annex I, Part 7). The Treaty strengthens U.S. cooperation with the PICs and the FFA through annual meetings to address Treaty and fishery issues. It also facilitates the U.S. Government's implementation of flag State control over its fleet through the implementing legislation and applicable regulations. Indirectly, being involved in the management of the fishery enhances the U.S. Government's position when it interacts with other resource users (including Asian countries) in international tuna fishery discussions.

The Treaty benefits the U.S. tuna industry in many ways, including reduced access fees paid by vessel owners compared to the need to purchase multiple access licenses PIC EEZs covered by the Treaty. From an operational standpoint for the U.S. fleet, the Treaty provides vessels with the ability to seek tuna schools over a wide geographic area. The access guaranteed under the Treaty enables vessels to move freely within jurisdictions (with the exception of some internal archipelagic waters and closed zones) to adjust to changes in resource availability. Administratively, the Treaty is a significant benefit to the fleet, because it is subject to only one set of rules governing access to all participating PIC jurisdictions (Gillett et al., 2002).

Since its implementation, the Treaty has greatly improved relations between the U.S. and the PICs, primarily through the provision of an economic development fund and an annual payment by the U.S. tuna industry that contribute significantly to the national incomes of the PICs. The financial terms of the Treaty have reflected both the value of the resource as well as additional benefits described below that accrue to all parties. Annual payments for the Treaty's various periods are as follows:

- **Initial 5-year period:** US$10 million from the U.S. Government, and US$2 million from the U.S. tuna industry

- **Second 10-year extension:** US$14 million from the U.S. Government, and US$4 million from the U.S. tuna industry

- **Proposed third 10-year extension:** US$18 million from the U.S. Government, and US$3 million from the U.S. tuna industry

For most of the PICs, funds provided by the Treaty represent all or almost all of the economic assistance provided by the U.S. to the region.[5] However, three of the PICs—Palau, Federated States of Micronesia (FSM), and the Marshall Islands—also receive substantial amounts of aid under their individual Compacts of Free Association with the U.S.[6]

The Treaty provides for a formal consultation meeting for reviewing the operation of the Treaty. This consultative mechanism enables the U.S. and the PICs to discuss areas of mutual concern and review the operation of the Treaty in a cordial atmosphere.

[5] Australia participates in the distribution of funds provided under the Treaty, but returns their share to the FFA as a further contribution; New Zealand accepts their share on behalf of their dependency, Tokelau.

[6] The Compacts set out the terms of the individual political and economic relationships between the United States and these three former portions of the U.S. Trust Territory of the Pacific Islands, including the level of funding and financial assistance provided by the United States.

The Treaty's long-term nature allows for business planning and reduces transaction costs inherent in bilateral licensing arrangements, which usually provide access periods of shorter duration. The availability of access to the fishery provided under the Treaty by a designated number of vessels in the U.S. fleet is also desirable from the industry's business planning standpoint.

The Treaty has benefits for biological resources because high-quality and complete data are provided on the catch of tuna, facilitating effective management of the tuna populations. Through designation of suitable fishing areas, fishing gear, vessel monitoring, and enforcement, the PICs exercise sustainable management of tuna species.

The observer program is an important component of the Treaty and helps provide data on interaction with threatened and endangered species. If avoidable interactions are recorded, changes to the Treaty can be implemented to provide additional protection.

1.1.2 Organization and Legal Application of the Treaty

The Treaty is organized into a main body (consisting of 12 articles) and two annexes.

The details of the license fees and other payments are not completely set out in the main body of the Treaty. This was done intentionally for various political and practical reasons when the Treaty was first negotiated, and has been carried through to the third extension. The annual payments required of the U.S. are referenced in Annex II, Schedule 2, but no specific amounts are stated there. The annual industry payment is set out in the schedule along with the maximum number of vessels allowed. Other costs to be paid by the industry are referenced in the schedule but appear in Annex I. The largest component of the annual payment is that paid by the U.S. Government. Although it is referenced in Schedule 2, a separate but related agreement between the U.S. and the PICs specifies the annual government payment, characterized as a contribution to an economic development fund.

From a fisheries management perspective, the U.S. tuna purse seine fishery operating under the Treaty is distinct from the longline fisheries based in Hawaii and American Samoa. The Treaty and U.S. implementing legislation and regulations provide the management framework for the U.S. tuna purse seine fishery within the Treaty area. The longline fisheries are governed by the *Fishery Management Plan for the Pelagic Fisheries* developed by the Western Pacific Fishery Management Council (WPFMC) (1986) and implemented by the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NOAA Fisheries) under the Magnuson-Stevens Fishery Conservation and Management Act. In addition, all U.S. vessels operating on the high seas are subject to the High Seas Fishing Compliance Act.

During the first 5 years of the third extension, the Treaty provides for licensing of up to 45 U.S. tuna purse seiners including 40 licenses for individual vessels and 5 licenses for vessels owned by joint ventures between the U.S. and a PIC. Vessels may commence their licensing for an annual period at any time during the licensing year (June 15–June 14). Payment for such licenses must be made by the industry in two biannual installments (June 14 and December 14) during each licensing period. Before the sixth annual licensing period of the third extension, the parties are obligated to review the number of licenses, license fees, and the potential impact of any existing or pending catch or effort limitations or other measures that may substantially affect the operations of the U.S. fleet. During this review, the Parties will determine the number of licenses to be issued and the license fees for the second 5-year period of the third extension.

In Article 2 of the Treaty, the U.S. has pledged to cooperate in economic areas related to maximizing benefits for the PICs from their fisheries resources, known in the Treaty as "Broader Cooperation".

Such cooperation can include technical or economic assistance to PICs in the form of employment, use of PIC ports by U.S. vessels and U.S. investment in PICs for on-shore fisheries activities.

An important part of the Treaty requires the U.S. to enforce the provisions of the Treaty and the license conditions in accordance with flag State responsibilities. The U.S. is also required to investigate specific incidents or alleged violations and take action against vessels that have not submitted to the jurisdiction of the PIC concerned (Article 4). A key provision of the Treaty eliminates the ability of (and need for) the U.S. to apply sanctions or restrictions on trade as a result of enforcement measures taken by a PIC, as long as those measures are consistent with the Treaty (Article 5.4).

Another key provision of the Treaty requires a PIC to promptly release U.S. fishing vessels confiscated and any crew arrested for breach of the Treaty upon the posting of a reasonable bond or other security, and prohibits imprisonment or corporal punishment by the PIC for fishing violations under the Treaty (Article 5.3). Should a U.S. vessel be involved in an alleged infringement of the Treaty and not submit to the jurisdiction of the PIC, the U.S. is required to investigate. Any penalty assessed should be similar in amount to violations of U.S. law relating to foreign fishing vessels licensed to fish in the exclusive economic zone of the U.S., and not exceed the sum of $250,000 (Article 4.6).

The two annexes to the Treaty provide additional conditions and procedures:

- Annex I sets out the terms and conditions under which fishing vessels of the U.S. are permitted to engage in fishing in the Licensing Area. It includes six schedules defining details of applicable national laws, closed and limited areas, and reporting details and formats.

- Annex II describes licensing procedures. It includes three schedules relating to license applications, forms, and payment.

1.1.3 Treaty Provisions Relating to Fishery Access

1.1.3.1 Access to Geographic Areas

The Treaty applies to four (some times overlapping) geographic areas, presented in descending order of size as described below.

Treaty Area. The Treaty Area encompasses the limits of what can be characterized as the world's most productive tuna fishing area, from Palau eastward to the Line Islands of Kiribati. This area, which is defined in Article 1 of the Treaty, is depicted in Figure 1.1-1.

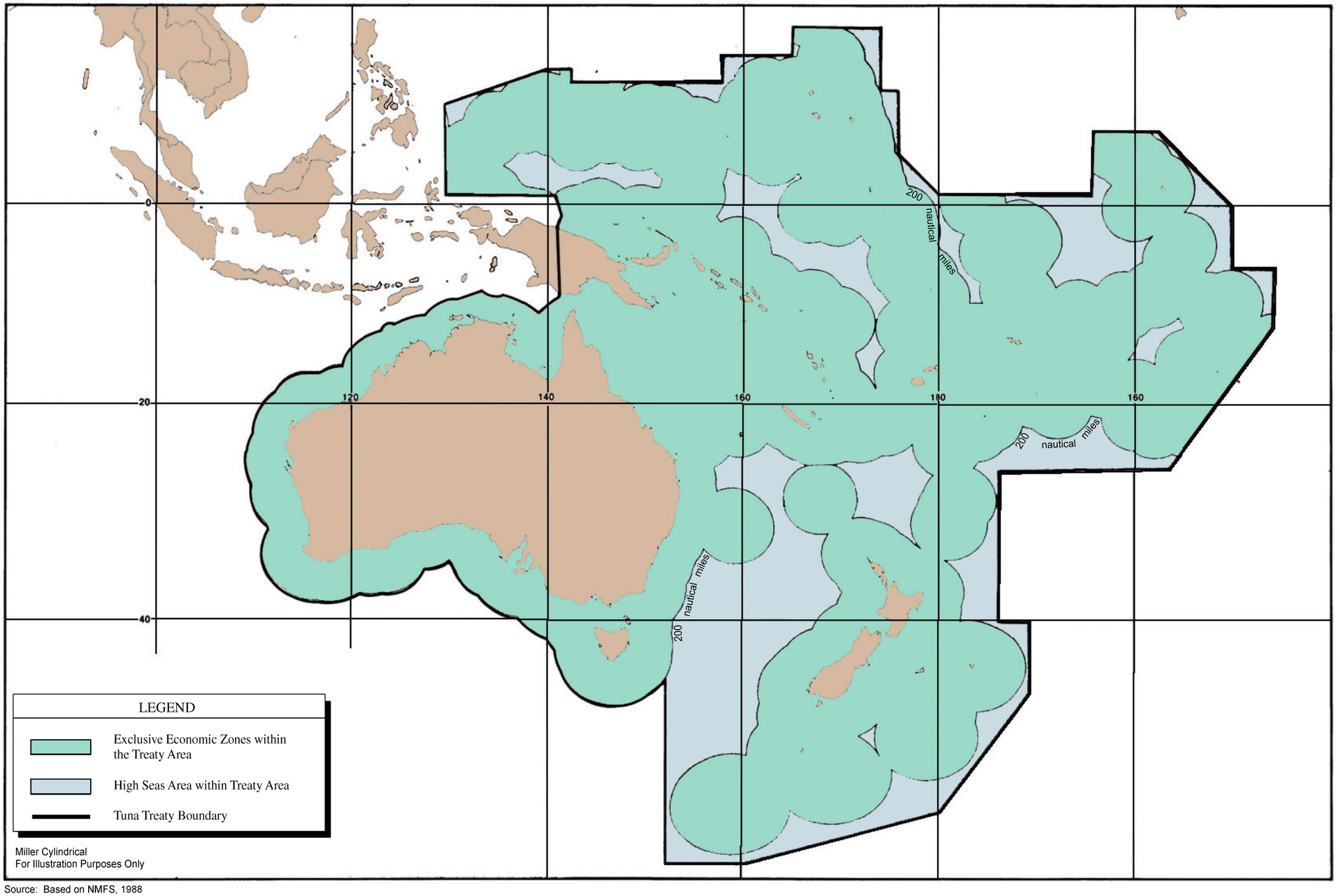
Licensing Area. Articles 1 and 3 of the Treaty identify the Licensing Area. The Licensing Area means all waters in the Treaty Area except for the following:

- Waters subject to the jurisdiction of the U.S. in accordance with international law;

- Waters closed to fishing by fishing vessels of the U.S. in accordance with Annex I of the Treaty.

Pursuant to the Treaty, a license is required to fish in this area. U.S. vessels submit a completed application to the U.S. Government, which forwards approved applications to the FFA Secretariat for consideration. The FFA Secretariat then issues licenses on behalf of the PICs.

Figure 1.1-1
Tuna Treaty Boundary and
Pacific Island Country Exclusive Economic Zones



Source: Based on NMFS, 1988

Closed Areas. Closed Areas are those in which U.S. purse seiners are not allowed to fish; these are typically territorial seas, internal or archipelagic waters, waters in proximity to or used by domestic-based tuna fisheries in the PIC, or waters proximal to named offshore banks and reefs. In the Treaty, each of the 16 PICs has declared a portion of its waters as a Closed Area.

In addition to Papua New Guinea's territorial sea and internal waters, one large area within its waters significant for purse seining has been closed to U.S. vessels through its inclusion in Annex I, Schedule2. This area, depicted in Figure 1.1-2, includes waters both inside and outside Papua New Guinea's archipelagic waters. This Closed Area was originally set aside in the 1970s for the exclusive use of skipjack pole-and-line fishing operations based in the Papua New Guinea islands of New Britain, New Ireland and Manus.[7] The area has remained off-limits to foreign-based purse seining, even though Papua New Guinea's domestic pole-and-line fishery ceased in the early 1980s.

Limited Areas. A Limited Area is one where the PIC has established a limit on effort for purposes of the Treaty. The only country to declare a Limited Area is Solomon Islands, where a 500 "fishing day" cap on effort was established for the Licensing Area within Solomon Islands. This area, a relatively small portion of the EEZ of Solomon Islands, is depicted in Figure 1.1-3 and described in Annex I, Schedule 2 of the Treaty.

Adjustments to Closed and Limited Areas. The following two adjustments to the lists of Closed Areas and Limited Areas were agreed to on March 30, 1999, at the Eleventh Annual Treaty Consultations, held in Palau:

- Add the archipelagic waters of Papua New Guinea as a Closed Area;
- Adjust the Closed Area for Solomon Islands so as to increase somewhat the Licensing Area in that country's waters and eliminate the Limited Area altogether.

Subsequent delays experienced by some Parties in following their domestic ratification processes resulted in these amendments not entering into force until after June 15, 2003, under an interim agreement between the Parties (see Subchapter 1.1.6).

1.1.3.2 Fishing Gear/Area Modification within the High Seas

The initial application of the Treaty was intended to apply only to activities of U.S. purse seine fishing vessels, as reflected by original Treaty language. However, the Treaty also provides flexibility for a PIC to permit other U.S. vessels to fish in the waters of that Party, in which case, the Party must obtain U.S. concurrence to such an arrangement.[8]

When the Treaty was negotiated in the mid-1980s, it was recognized that the U.S. had a relatively small but developing fleet of albacore tuna trolling vessels that likely would want to operate in the high seas areas of what was to become the Treaty Area. A provision was thus inserted into the Treaty

[7] This area (referred to as the "Morgado Square" or "Morgado Quadrangle" by Papua New Guinea fishery managers) contains approximately 43,000 square nautical miles in a quadrangle surrounding the northern two-thirds of New Ireland Island.

[8] After such concurrence is received, the provisions of the Treaty relating to flag State responsibility and corresponding legal proceedings apply (Article 3).

that enables vessels fishing for albacore tuna by the trolling method to operating in the high seas portion of the Treaty Area.[9]

At the time, the U.S. did not have a large distant-water longline fleet and no provision similar to that for albacore trollers was inserted to cover U.S. longline vessels. By the late 1990s, it became evident that at least some U.S. longline vessels would benefit from access to the high seas areas in the Treaty Area, given that several vessels were already based in American Samoa. The PICs were approached prior to the Eleventh Annual Treaty consultations to make provision for U.S. longline vessels to operate in the Treaty Area, reflecting the emergence of the U.S. longline fleet in the region. On March 30, 1999, a Memorandum of Understanding (MOU) was signed to amend Article 3 to give U.S. longline vessels access to the high seas portions of the Treaty Area. The text of the MOU is attached at Appendix C.

Subsequent delays experienced by some Parties in following their domestic ratification processes have resulted in late entry into force for this amendment, after June 15, 2003. As a result, approval for this modification is included with the amendments to the Treaty and Annexes made in 2002 and has been made a part of the regulatory changes proposed for the third extension of the Treaty.

1.1.4 Vessel Reporting Requirements

U.S. purse seine vessels participating in the fishery under the Treaty are required to submit both written and electronic reports on their fishing activities in the Treaty Area (as specified in Annex I). These include reports submitted to the FFA Secretariat as the Treaty Administrator for the PICs, and a separate set of reports made to the relevant Pacific Island Country.

1.1.4.1 Reports to FFA

Two main categories of reports are made to FFA: "telex reports" and logsheet reports.

Telex reports (so named because of the previous method of transmission, now typically transmitted via email or fax) provide information on the position of the vessel and catch on board. The telex reports are required at the following times:

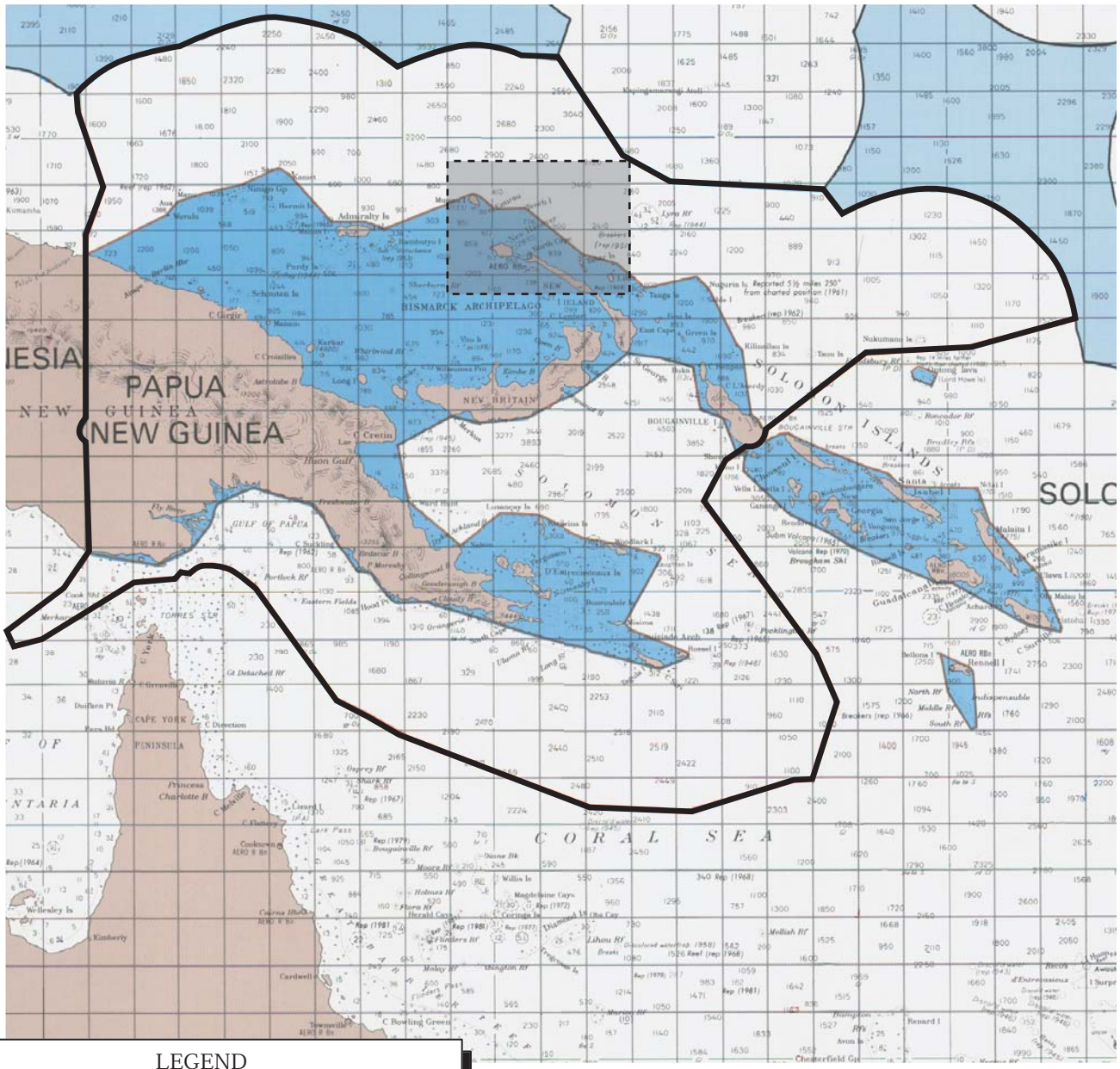
- Before departure from port for the purpose of beginning a fishing trip in the Licensing Area;
- Each Wednesday while within the Licensing Area or a Closed Area;
- Before entry into port for the purpose of unloading fish from any trip involving fishing in the Licensing Area (Annex 1, Part 5).

The Treaty requires two logsheet reports:

- The "Regional Purse Seine Logsheet" (RPL) is completed on a daily basis and submitted by the captain of each vessel at the completion of each fishing trip (depicted in Schedule 5 of Annex I). The RPL describes and details the vessel's daily estimated catch and other related activities;

[9] When used in this document, *high seas* refer to those international waters beyond the 200-mile EEZ of any country.

Figure 1.1-2
Area Closed to Fishing by U.S. Purse Seine Fleet
in Waters of Papua New Guinea
Under the Second Extension of the Treaty



LEGEND

- Claimed Archipelagic Waters (open to fishing)
- High Seas Area within Treaty Area
- Waters of Papua New Guinea
- Area Closed to Fishing

Source: This map reflects information avaliable to the Office of Oceans Affairs. U.S. Department of State on July 1, 2001.

For Illustrative purposes only

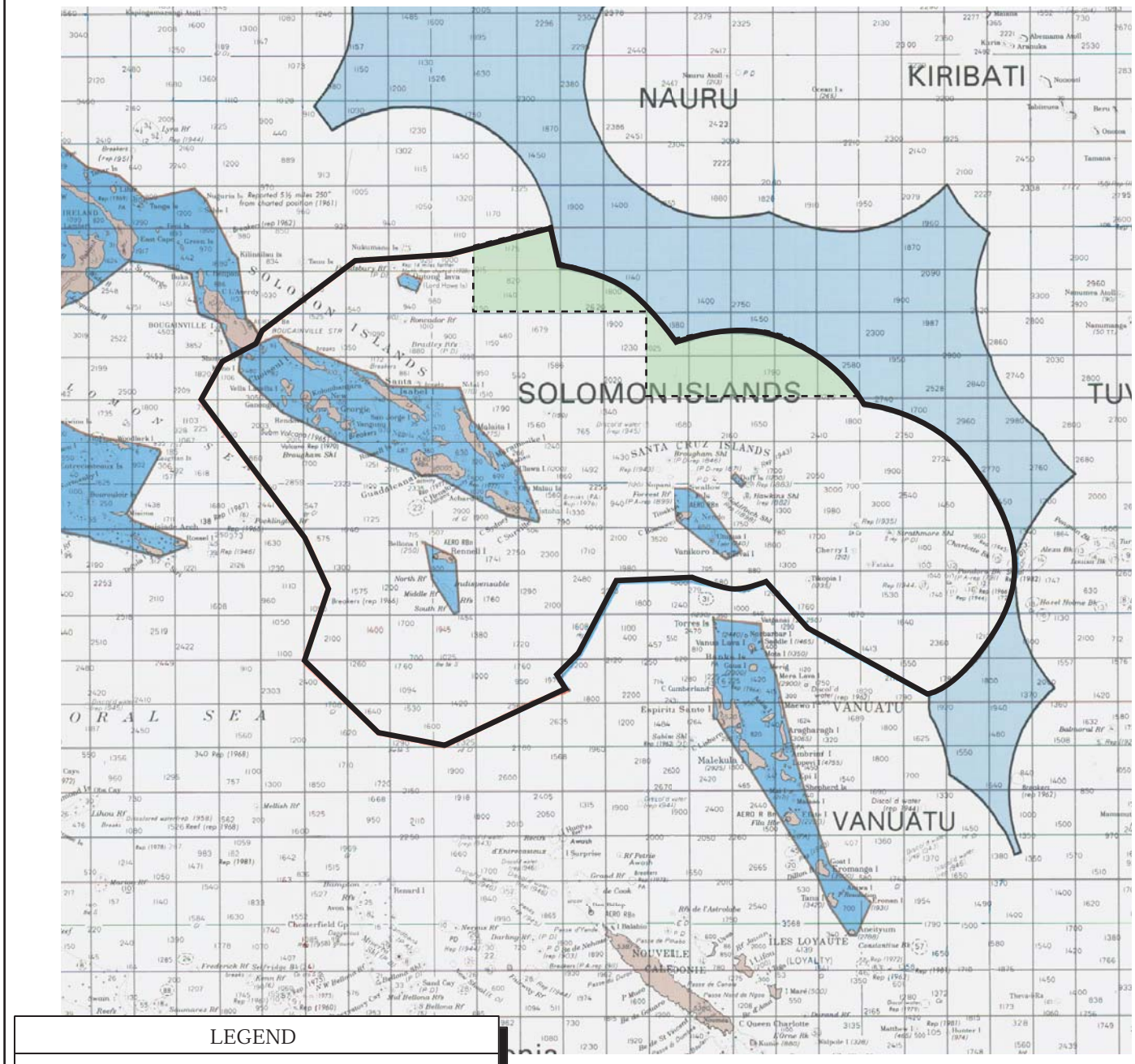
N

0 500 km

0 500 statute miles

APPROXIMATE SCALE

Figure 1.1-3
Solomon Islands' Limited Area
Open to Fishing by U.S. Purse Seine Fleet
Under the Second Extension of the Treaty



- A second logsheet report provides details of offloading including a quantitative summary of all catch offloaded.

To assist in the reporting and timely transmittal of the required information, NOAA Fisheries acts as a conduit for the transmittal of these reports to the FFA Secretariat.[10]

The reference to RPL in relation to the logsheet shown in Annex I Schedule 5 can be confusing, because at one time differing opinions existed between the U.S. and the PICs on what information is required to be recorded by captains of licensed vessels on the RPL. The PICs have yielded that any information other than that shown in Schedule 5 is voluntary.

When implemented in bilateral access arrangements, the RPL form typically contains revisions of the latest review by a Data Forms Committee comprising experts from the FFA Secretariat and the Secretariat of the Pacific Community (SPC); such reviews are conducted every 2 years. Although the PICs preferred such changes to apply regularly to Schedule 5, Annex I, the procedures and requirements for amending an annex are clearly set out in Article 9 of the Treaty and the U.S. takes the position that these must be adhered to when instituting any changes to an annex schedule. The resolution to this situation adopted by the PICs has been for the captains of licensed vessels to use the RPL as provided by the FFA,[11] but be required to fill in only that information shown on the form in Schedule 5. Captains of licensed vessels may voluntarily provide additional information in the RPL.

Each FFA member country has its own domestic conservation and management measures, therefore telex reports must also be sent to each PIC whose EEZ a U.S. vessel is about to enter, exit, or transship. The formats of these reports are the same regardless of the national authority to which they are sent (Annex 1, Schedule 2, Part 2).

1.1.4.2 Other Reporting Requirements

In addition to reports to the FFA Secretariat, seven of the PICs (Australia, Fiji, Kiribati, New Zealand, Solomon Islands, Tonga, and Tuvalu) have additional national reporting requirements, as identified in Annex I, Schedule 4, Part 3. These range from a requirement by Kiribati (among others) to report 24 hours before and immediately upon entry or departure into a Closed Area and 24 hours prior to and immediately after refueling from a tanker, to Tonga's requirement to report daily position by radio or telex while in the Tonga EEZ.

1.1.5 Regional Vessel Monitoring System

In 1992, the PICs recognized the potential value of vessel monitoring technology and agreed to language that was included in Annex 1, Part 8 of the Treaty:

> It is understood that a region-wide vessel tracking system applicable to all vessels licensed to fish in the Treaty Area may be established. U.S. vessels with a license to fish under the

[10] Reporting requirements specifying that the completed logsheet forms are to be provided to the NOAA Fisheries Regional Administrator are contained in 50 Code of Federal Regulations (CFR) Part 300.34.

[11] The CFR section that implements the Treaty (50 CFR Part 300, Subpart D) states, in part, "Information provided by license holders under Schedule 5 of Annex I of the Treaty shall be provided on the designated Forum Fisheries Agency form(s) to the Regional Administrator…"

> Treaty shall participate in such a system and shall install and operate a transponder of a type and in such a manner as may be agreed by the Parties. It is understood that data derived through the system shall be treated as confidential business information and that the terms and conditions for access to that information shall be a matter of discussions between the Parties.

Implementation of a Vessel Monitoring System (VMS) using satellite technology is a standard compliance measure throughout the world to enhance efforts at monitoring fishing activity. VMS enables information such as a vessel's geographic position to be reported to a monitoring station on-shore using a VMS unit known as a transponder or automatic location communicator. The VMS unit is placed aboard the vessel and information is relayed via satellite to one or more land-based monitoring stations. All VMS position reports are automatically transmitted without any input or direction from those onboard the vessel.

The VMS unit onboard a vessel is typically preset to determine a vessel's position on a regular basis, and remotely enable the shore-based monitoring station to "poll" the vessel more frequently (e.g., when the vessel is thought to be operating suspiciously or near a closed area). The system on board a fishing vessel can also receive and process commands from the shore-based monitoring system, such as one to immediately send the vessel's current position. This is accomplished by using a Global Positioning System receiver that is an integral part of the transceiver used with the system.

The benefits of a uniform regional VMS include avoiding multiple, and potentially incompatible national systems, as well as contributing to the sound conservation and management of tuna resources. Such a regional system is particularly useful in monitoring a fishery targeting migratory tuna species in 26 million square kilometers of ocean. A regional system also reduces the potential for tampering, thereby enhancing information security and operational efficiency.

1.1.6 Changes to the Treaty, its Annexes and Schedules Relevant to this Assessment

At the conclusion of negotiations for the third extension held at Kiritimati Island, Republic of Kiribati on March 20–24, 2002, the Parties initialed two documents constituting the agreed-upon record of amendments adopted by the Parties to the Treaty:

- Agreed Record of Amendments to the Treaty on Fisheries Between the Governments of Certain Pacific Island States and the Government of the United States (Anon., 2002a)

- Amendments to the Annexes to the Treaty on Fisheries Between the Governments of Certain Pacific Island States and the Government of the United States (Anon., 2002b)

The contents of these two documents form the bulk of amendments to the Treaty for the third extension. The following amendments are also included:

- Amendments to the relevant Annex I Schedules relating to changes in Closed Areas for Papua New Guinea and Closed and Limited Areas for Solomon Islands.

- The amendment to Article 3 that allows longline vessels to fish in the high seas of the Treaty Area, as previously agreed upon in 1999.

A complete listing of Treaty Amendments for the third extension is presented in Appendix B.

On May 9, 2002, the PICs signed a non–legally binding MOU that has the effect of provisionally applying the amendments to the Treaty and Annexes (except for amendments to Article 9). The MOU is a political commitment that enables practically all of the agreed amendments to be followed prior to final ratification by the required number of Parties. The text of the MOU is attached at Appendix C.

The changes to the Treaty, its Annexes, and Schedules relevant to this assessment are the regulatory changes for the third extension. These are discussed below under the following four groups.

1.1.6.1 Vessel Reporting Requirement Changes

Changes to vessel reporting requirements are contained in the amendments to the Treaty Annexes and occur in three areas as follows:

- **Units of time and measure.** In all reports made by vessel captains, dates and times are required to be provided in Universal Coordinated Time (UTC)[12] (Annex I, Schedule 4) (dates and times were formerly reported in local time). Tonnage is required to be provided in metric tons (Annex I, Schedules 4 and 5) (tonnage was formerly reported by U.S. operators in short tons).

- **Weekly reports.** The licensed vessel's former weekly report to the FFA Secretariat known as the WEEK report is eliminated (Annex I, Part 5, and Annex 1 Schedule 4 (b)). The weekly reports provided to national authorities continue to be required and are amended to indicate whether or not an observer is on board the vessel (Annex I, Schedule 4).

- **Port entry for unloading.** The licensed vessel's report for port entry for the purposes of unloading (LFIN) requires submittal 24 hours prior to the vessel's arrival into port for the purpose of unloading fish from any trip involving fishing in the Licensing Area (Annex I, Part 5). In addition, the vessel is required to report the estimated date and time of arrival, and the estimated date of departure from port (Annex I, Schedule 4, Part 1(a)).

A further clarification to vessel reporting requirements, although not occurring as a result of amendment to the Treaty, reflects the manner in which the latest version of the Regional Purse Seine Logsheet is to be filled out and as such is included here:

- **RPL.** Providing information about the number of fish aggregation devices (FADs) used, tender vessels used (Y/N), and unloadings to cannery, cold storage, carrier, or other vessel sections of the RPL would be voluntary. The vessel operator is required to complete all other data fields or elements in a timely manner.

1.1.6.2 Vessel Monitoring System Requirement

The Treaty language relating to implementation of the regional VMS (Annex I, Part 8, Paragraph 30[13]) was amended to require licensed vessels to comply with the regional VMS requirements,

[12] Also known as Greenwich Mean Time (GMT).

[13] In Paragraph 30, the term *ALC* (Automatic Location Communicator) is used rather than the synonymous term *VMS,* which is more common in general use in the United States and used throughout this document.

safeguard the confidentiality of information, specify the recipients of such data, and address the financial implications.

1.1.6.3 Fishing Area Modifications Within a PIC EEZ

Fishing area modifications are proposed for two PICs: Papua New Guinea and Solomon Islands.

Papua New Guinea. In the late 1990s, Papua New Guinea notified the other Parties to the Treaty of its intention to place its archipelagic waters under its listing of Closed Areas in Annex I, Schedule 2. Papua New Guinea's archipelagic waters are often an area of high tuna abundance, and the country has, as a matter of policy, reserved access to this area for domestic-based fishing operations.

Access to the area has been granted to the U.S. fleet with the understanding that plans were moving forward for shore-based fish processing activities that would utilize the catch of a considerable portion of the U.S. purse seine fleet. When adverse business conditions in the industry resulted in the cessation of such planning, Papua New Guinea expressed its desire to amend the Treaty. Consequently, an amendment to Annex I, Schedule 2, was agreed upon at the 11th Annual Treaty Consultations in Palau in 1999. The amendment results in the subheading "Papua New Guinea" reading in its entirety as follows:

> At all times, all territorial seas, archipelagic, and internal waters.

The shaded areas shown in Figure 1.1-4 depict those areas in Papua New Guinea that would be closed to fishing by U.S. purse seine vessels under an interim agreement between the Parties (see Subchapter 1.1.6). As a result, this modification has been included as part of the regulatory changes proposed for the third extension of the Treaty.

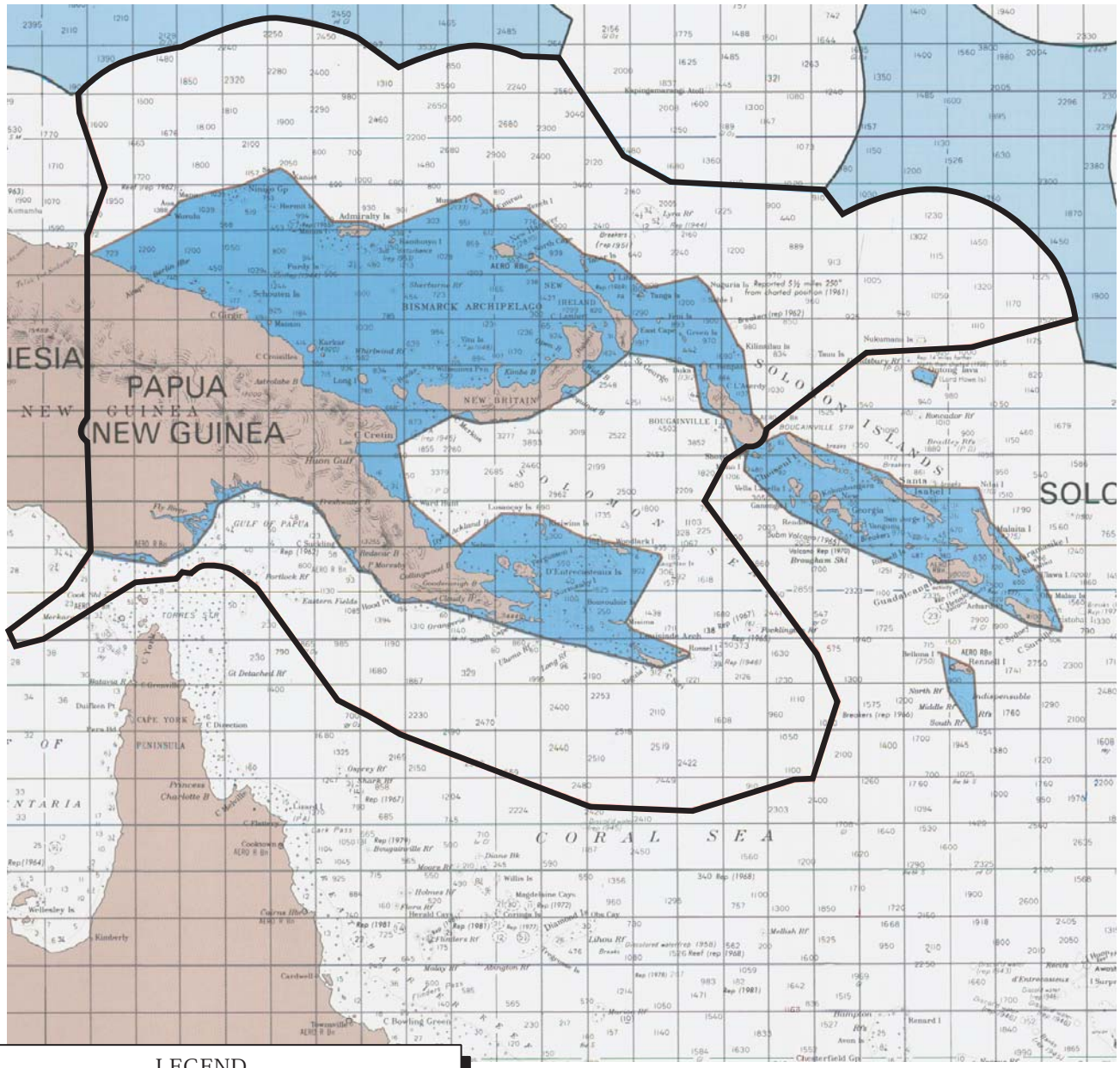
Solomon Islands. In 1988, the Solomon Islands had closed much of the waters under its jurisdiction, except for a relatively small portion in the easternmost part of its EEZ. That portion was made available as a Limited Area (as described in Subchapter 1.1.3). In closing off most of its EEZ, the Solomon Islands had taken steps to protect a domestic fishery that, at the time, they believed provided greater benefits than granting access under the Treaty. When subsequent economic conditions in the domestic industry changed, the Solomon Islands sought an amendment to modify its Closed Areas and open up the portion of its zone that is east of 163 degrees East Longitude.

In the late 1990s, the Solomon Islands proposed changes to its listings of areas in Annex I. Consequently, an amendment was agreed upon at the 11th Annual Treaty Consultation in Palau in 1999. The amendment has the practical effect of amending Annex I, Schedule 2 relating to Closed Areas to read in its entirety as follows:

> **Solomon Islands** At all times, all internal waters, territorial seas, and archipelagic waters together with all waters within the exclusive economic zone of the Solomon Islands that are west of the meridian of Longitude 163 degrees East.

In addition, the heading **Solomon Islands** and Paragraphs 1, 2, and 3 in the Limited Area listing found in Annex I, Schedule 3, are deleted. A map depicting the Solomon Islands areas that would be open and closed to fishing by U.S. purse seine vessels is presented in Figure 1.1-5.

Figure 1.1-4
Waters of Papua New Guinea
Closed to Fishing by U.S. Purse Seine Fleet
Under the Third Extension of the Treaty



LEGEND

- Claimed Archipelagic Waters (closed to fishing)
- High Seas Area within Treaty Area
- Waters of Papua New Guinea (open to fishing)

Source: This map reflects information avaliable to the Office of Oceans Affairs. U.S. Department of State on July 1, 2001.

For Illustrative purposes only

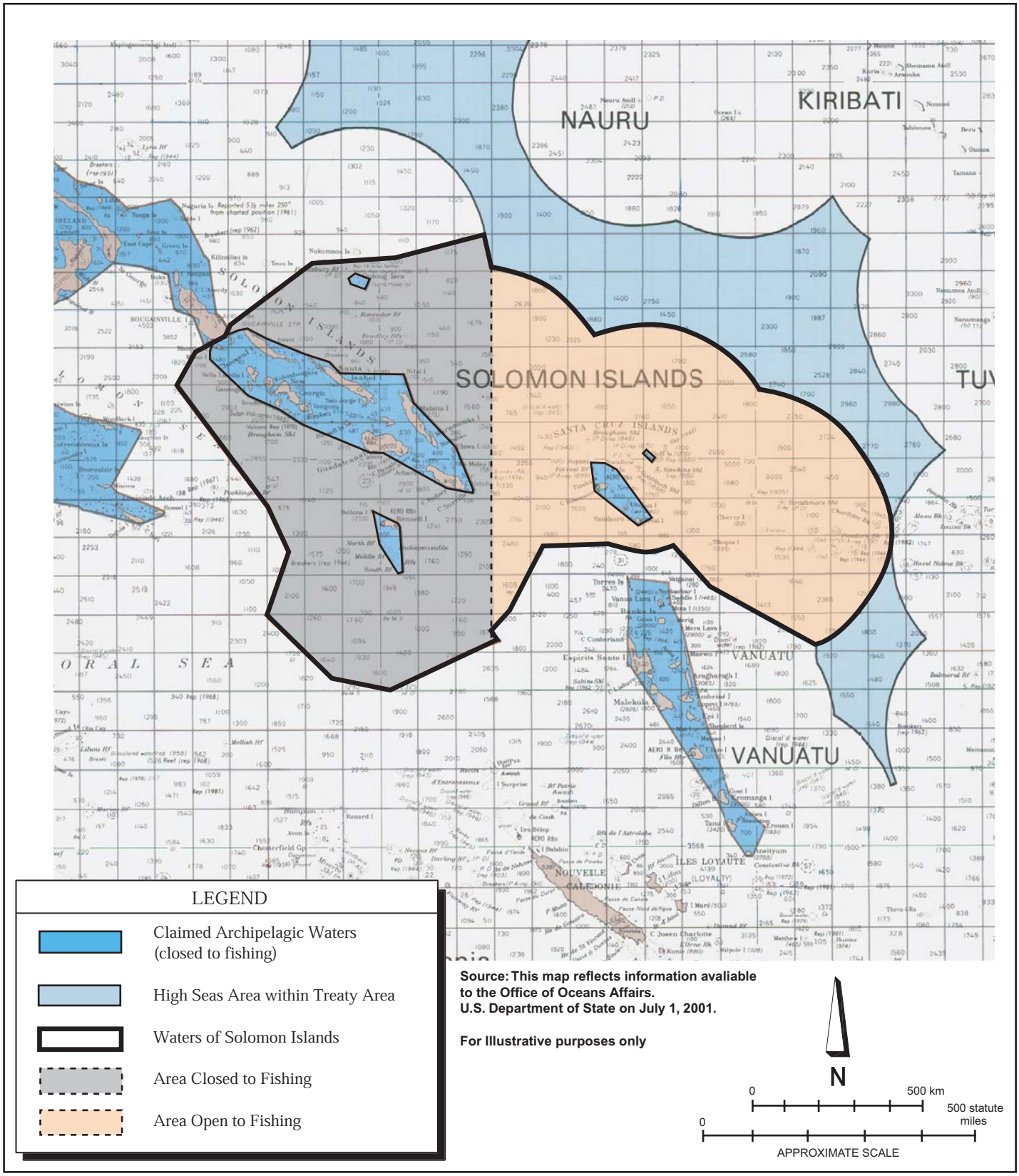
N

0 500 km

0 500 statute miles

APPROXIMATE SCALE

Figure 1.1-5
Waters of Solomon Islands
Closed to Fishing by U.S. Purse Seine Fleet
Under the Third Extension of the Treaty



1.2 Proposed Action

The proposed action is to implement the regulatory changes for the third extension of the Treaty.[14] The regulatory changes to the Treaty are described in Subchapter 1.1.6, and relate to vessel reporting requirements, the VMS requirement, fishing area modifications, and fishing gear/area modification.

1.2.1 Vessel Reporting Requirements

The regulatory changes to vessel reporting requirements entail adjustments to existing data requirements, to better enable the data to be collected in a manner suitable for analysis. Under the proposed changes, captains are required to report dates and times in UTC format on all reports, and tonnage in metric tons (rather than short tons), on all reports submitted. Captains of licensed vessels are longer be required to send the weekly "WEEK" report to FFA while in the Licensing Area or in a Closed Area. Captains of licensed vessels are required to slightly expand the information already specified in reports for port entry for unloading and subsequent departure. Submittal of the relevant report, LFIN, is now required at least 24 hours before entry into port for the purpose of unloading fish from any trip involving fishing in the Licensing Area. The LFIN report is required to include the estimated date and time of arrival, and the estimated date of departure.

In information provided to vessel operators relating to changes under the third extension of the Treaty, NOAA Fisheries included a clarification relating to completing the RPL (NOAA Fisheries, 2003b).

1.2.2 Vessel Monitoring System

The regional VMS portion of the proposed action amends rules implementing the South Pacific Tuna Act of 1988 to require U.S. tuna purse seine vessels licensed to fish under the Treaty to comply with the prescribed VMS procedures and requirements.[15] This action implements VMS requirements that are consistent with FFA specifications and is applicable to persons and vessels subject to the terms and conditions of the Treaty and the jurisdiction of the U.S.

Vessel operators licensed to fish in the Treaty Area are required to install, carry, activate, operate, and maintain a VMS unit while in the Treaty Area. The type of VMS unit and attendant software installed requires approval by the FFA Secretariat, as Treaty Administrator. If the VMS unit malfunctions or fails, the vessel owner or operator is required to provide notice of such failure or malfunction, submit substitute reports by an alternative means, and proceed immediately to a nominated port to repair the VMS unit as directed by NOAA Fisheries, the FFA Secretariat or the appropriate PIC.

Purse seine vessel owners and operators are required to register with the FFA VMS Register of Foreign Fishing Vessels on an annual basis. NOAA Fisheries expects to facilitate such application, although owners and operators are responsible for completing the brief FFA VMS registration form and the payment of required fees. While U.S. vessels are fishing within the U.S. EEZ, their VMS signal is blocked from being received by the FFA Secretariat, thereby protecting the right of the U.S. to be the sole monitor of fishing activities within its own EEZ.

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[14] The U.S. Senate gave final approval of the Treaty amendments for what is known as the third extension on July 31, 2003 (Congressional Digest, 2003).

[15] Contained in 50 CFR 300, Subpart D, South Pacific Tuna Fisheries.

1.2.3 Fishing Area Modifications

The fishing area modifications of the proposed action affect the fishery waters of two of the PICs: Papua New Guinea and Solomon Islands. The proposed action prohibits fishing by U.S. purse seiners in the following waters:

- The portion of the Licensing Area that is within Papua New Guinea's archipelagic waters. Previously, the archipelagic waters of Papua New Guinea were open to such fishing;

- The portion of the Solomon Islands EEZ that is east of Longitude 163 degrees East within the Licensing Area.[16] Previously, a small portion of these waters was part of a Limited Area that would now be deleted from the Treaty, and the remainder was a Closed Area.

1.2.4 Fishing Gear/Area Modification

The fishing gear/area modification portion of the proposed action enables documented fishing vessels of the U.S.[17] using longline gear to fish in the high seas portions of the Treaty Area. This modification requires amendment to the relevant wording in the Treaty's implementing Act (the South Pacific Tuna Act of 1988). At the present time, the documented U.S. vessels that are most affected by this modification are those based in Hawaii and American Samoa. The modification could, however, also apply to any documented U.S. longline vessel based in other U.S. locations, such as the Territory of Guam or the Commonwealth of the Northern Mariana Islands. It could also apply to any documented U.S. longline vessel that was permitted to fish in waters of a PIC under a bilateral arrangement, as long as the provisions of Article 3 in the Treaty relating to such arrangements were followed.

1.3 Purpose and Need for the Proposed Action

The purpose of the proposed action is to give effect to those amendments to the Treaty for the third extension that are deemed regulatory changes. The proposed action is needed to bring the U.S. into compliance with its obligations under these new Treaty provisions.

These new Treaty provisions were agreed upon as part of the package of amendments at the final round of negotiations for the third extension of the Treaty that took place among the delegations from the U.S. and the 16 PICs in Kiritimati Island, Republic of Kiribati, during March 20–24, 2002. This meeting was the third and final negotiation session to amend and extend the Treaty under the third extension. The package of agreed amendments meets the needs and interests of both the PICs and the U.S. Government and tuna industry, and will help to ensure the continued operation of the Treaty for an additional 10 years, through June 14, 2013.

1.3.1 Vessel Reporting Requirements

The requirements to provide dates and times in UTC and to report all tonnage in metric tons facilitates compilation of data collected from U.S. vessels and enables the data to be better integrated

[16] The internal waters, territorial seas, and archipelagic waters of the Solomon Islands east of Longitude 163 degrees East remain a closed area.

[17] Vessel documentation is a national form of registration that, in the case of vessels fishing in the U.S. EEZ, specifies certain U.S. citizen ownership requirements for vessels over 5 net tons.

with that of other non-U.S. fleets for analytical purposes. Specifying the use of standardized UTC for all reports eliminates any ambiguities in reporting and avoids potential confusion in analyzing the catch data presented at the conclusion of a trip. It also enables easier comparison with information on vessel movements obtained from the VMS, which is recorded in UTC. Standardizing the reporting of catches in metric tons eliminates confusion caused by comparing the U.S. fleet operators' short tons with estimates reported by onboard observers and port samplers in metric tons. The VMS requirement renders the weekly report to the FFA Secretariat redundant and is therefore eliminated. Weekly reporting requirements to national authorities (which is retained) to indicate whether or not an observer is on board the vessel is the most efficient way of providing this information to the PICs.[18]

1.3.2 Vessel Monitoring System

It is clear from the existing language of Annex I, Part 8, in the second extension of the Treaty that application of the VMS requirement is intended to integrate the participation of U.S. vessels licensed under the Treaty into the existing FFA regional VMS. The U.S. is responsible for implementing such fishery conservation and management measures provided for in the Treaty and its implementing statute, the South Pacific Tuna Act of 1988.[19] The changes to incorporate the VMS requirement are accomplished by amending the relevant regulations issued pursuant to the South Pacific Tuna Act.

From a technological standpoint, there is no impediment to implementing the VMS requirement. The applicable hardware and software are readily available, having been developed and subsequently implemented in numerous fisheries during the latter part of the 1990s. The technology continues to be implemented as a requirement in several domestic U.S. fisheries, and the U.S. fishing industry is familiar with its applications.[20]

FFA member countries have long discussed the benefits of a regional VMS that is cost-effective and supports existing surveillance activities, such as patrol boats, surveillance flights, and regional observers. Such automated systems are able to assist both fishery managers and enforcement personnel in ensuring compliance with conservation and management measures, such as those that seek to maintain the integrity of certain areas closed to fishing activity.

1.3.3 Fishing Area Modifications

The fishing area modification for the waters of Solomon Islands in the third extension of the Treaty places a large portion of the Solomon Islands EEZ, part of which was formerly a Limited Area, into the Licensing Area. This action results in a considerable expansion of area available for fishing by the U.S. purse seine fleet. Roughly 750,000 square kilometers in the eastern portion of the Solomon Islands EEZ is available for fishing, with no limits on vessel days, as was the case in the much smaller Limited Area in effect under the Treaty's second extension.

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[18] The presence of such information in the weekly report from the vessel is unambiguous and unlikely to be lost in the flow of information to the Pacific Island party from other sources.

[19] The South Pacific Tuna Act of 1988 and implementing regulations at 50 CFR 300, Subpart D, governs operations of the U.S. purse seine vessels and operators participating in the fishery under the terms of the Treaty.

[20] U.S. pelagic longline fisheries in Hawaii and the Atlantic, as well as several fisheries in Alaska, are now required to install and utilize VMS.

Increases in the Licensing Area that are relatively close to the main offloading port in American Samoa are desirable to the U.S. purse seine fleet to maximize its ability to find concentrations of fish and minimize costs associated with transit times to and from such fishing grounds. In the case of the inclusion of a significant portion of Solomon Island waters, transit times to and from potential fishing grounds in the Licensing Area are shorter. The inclusion of these waters in the Licensing Area also affords U.S. vessels freedom of movement in following fish out of adjacent high seas areas.

The fishing area modification for waters of Papua New Guinea in the Treaty's third extension designates its archipelagic waters, formerly a part of the Licensing Area, as a Closed Area. It has been the policy of the Papua New Guinea government to allow access to archipelagic waters for domestic-based vessels only. In the case of purse seiners, this has meant either vessels associated with ongoing or planned onshore processing, or vessels registered in Papua New Guinea. Because U.S. vessels do not fall into either of these two categories, the adjustment to the Licensing Area is made by Papua New Guinea.

The modification also removes a portion of a large quadrangle commonly referred to as the "Morgado Square" from the Closed Area listing. About 55% of this quadrangle is located within archipelagic waters and thus remains closed to fishing by U.S. purse seiners. About 45%, or an area of approximately 69,000 square kilometers, is now included in the Licensing Area. Although the new addition to the Licensing Area does not completely offset the loss of access to Papua New Guinea's archipelagic waters, the added area is known for its high abundance of skipjack and yellowfin tuna. Its inclusion enables fishing to continue from other contiguous portions of the Licensing Area.

The Treaty allows countries to unilaterally propose areas within their jurisdiction for change in a manner reflected by the changes to the Solomon Islands and Papua New Guinea areas described above. These provisions, contained in Article 9 of the Treaty, are included as a matter of national sovereignty. The manner in which the changes become effective, however, has proved cumbersome to implement. Under the terms of Article 9 in force for the second extension:

(a) Any party may propose amendment to an Annex of this Treaty at any time by notifying such proposal to the depositary,[21] which shall promptly notify all parties of the proposed amendment.

(b) A party approving a proposed amendment to an Annex shall notify its acceptance to the depositary, which shall promptly notify all the parties of each acceptance. Upon receipt by the depositary of notices of acceptance from all parties, such amendment shall be incorporated in the appropriate Annex and shall have effect from that date, or from such other date as may be specified in such amendment. The depositary shall promptly notify all parties of the adoption of the amendment and its effective date.

Substantial delays can be experienced under the requirement of (b) above because nearly all of the PICs must submit any amendments to the Annexes to their legislative bodies for approval.[22] New language for Article 9 has thus been agreed upon for the third extension of the Treaty. Under this

[21] The Government of Papua New Guinea is the depositary (Article 11).

[22] This is unlike the U.S., where, in the South Pacific Tuna Act of 1988, Public Law 100-330, the Congress has authorized the Secretary of State to approve amendments to the Annexes on behalf of the U.S. government.

amendment, any Party can propose amendments by notifying the depositary at least 120 days before the annual meeting. This enables each Party time to develop a position on the proposed amendment, which must be adopted by consensus. After adoption, each Party acts expeditiously to accept the amendment, and to the extent possible, applies adopted amendments provisionally.[23]

1.3.4 Fishing Gear/Area Modification

Beginning in the mid- to late 1990s, the Hawaii-based longline fleet began increasing its effort in both the high seas and the U.S. EEZ near its Pacific island possessions, primarily near Palmyra Atoll and Kingman Reef. In addition to access for the Hawaii-based longline fleet in the high seas portions of the Treaty Area, a segment of the American Samoa–based U.S. longline fleet could also benefit from such access. The expansion of the U.S. longline fleet based in American Samoa since 2000 has been significant. In that year, only three vessels longer than 15 meters (50 feet) were active in the fishery.[24]

The modification to the Treaty that provides U.S. longline vessels with access to the Treaty Area followed lengthy discussion by the PICs. When the Treaty was first negotiated during the mid 1980s, the PICs recognized the need to enable U.S. fishing vessels other than purse seiners access to the high seas portions of the Treaty Area. At the time, the only such U.S. fleet active on the high seas in what became the area covered by the Treaty was the albacore tuna troll fleet. A provision was thus inserted into the first extension of the Treaty to enable access to the high seas areas of the Treaty Area for the Hawaii- and American Samoa-based longline fleets.

1.4 Organization of this Environmental Assessment

Descriptions of the proposed action and two identified alternatives, including the no action alternative, are provided in Chapter 2. Of the four regulatory changes identified and described above, those reflecting changes in vessel reporting requirements are administrative or routine program functions and categorically excluded under NOAA Administrative Order 216-6, 6.03c3(d). The remaining three regulatory changes—VMS, fishing area modifications, and fishing gear/area modifications—are analyzed in Subchapter 2.2, Alternative B.

The affected environment described in Chapter 3 covers four discrete segments. The capture sector of the U.S. commercial tuna fishing industry that operates in the WCPO is covered in the first two subchapters (the purse seine fleet and the longline fleet, respectively). The third subchapter describes western Pacific tuna fisheries, including shore-based processing activities in American Samoa. Biological resources are described in the fourth subchapter.

The availability of environmental data is necessary to describe existing environmental conditions, and is linked to the analysis of the proposed alternatives. Existing environmental data are identified and their suitability for this purpose discussed in Chapter 3.

Chapter 4 addresses the environmental consequences of the three alternatives, including the proposed action. Each alternative is discussed in relation to its impacts on the affected environment. Separate subchapters address cumulative effects of the alternatives. Chapter 5 lists those agencies,

[23] The MOU that enables the Treaty to continue beyond June 14, 2003, does not implement this change.

[24] O'Malley and Pooley (2002) follow the local description of these vessels and call them "big boats" to distinguish from the smaller vessels of 9 meters (30 feet) and under with significantly less fishing power.

organizations, and persons who were consulted in the EA process and identifies the public involvement process. Chapter 6 lists persons primarily responsible for the preparation of the document, along with their qualifications. Chapter 7 includes the distribution list—agencies, organizations, and persons to whom copies of the EA are circulated for public comment. Chapter 8 includes references sited in the document, and Chapter 9 is a compilation of public comments and responses received.

1.5 Scoping and Public Involvement

Scoping is the crucial start to the NEPA process. It mandates that an agency include all interested parties, "including those who might not be in accord with the action." The Council on Environmental Quality first introduced and described scoping in its 1978 regulations (40 CFR 1501.7).

The scoping process for this EA began with the publication of the Notice of Intent (NOI) in the *Federal Register* on October 9, 2003. The NOI provided background information and locations of the public scoping meetings, and identified the close of the public scoping comment period (December 8, 2003). The NOI was distributed to the various federal, state, and public agencies identified to have a possible interest in this EA: approximately 50 emails were sent on October 10, 2003, and 47 postal mailings on October 14, 2003.

A website (www.nepapir.com) was created and became available to the public on September 15, 2003. The website provides information about the EA, including the locations/times of the public scoping meetings. The website will also act as a repository for the public documents associated with this EA, including the draft EA when it is available.

Newspaper advertisements specific to each of the scoping meetings were published in the following newspapers:

- *San Diego Union-Tribune* (October 24, 2003)
- *Samoa News* (November 10–14 2003)
- *Samoa Post* (November 6, 9, 11, and 13, 2003)

The attendees at the Multilateral Tuna Treaty Broader Cooperation talks, also known as the Informal Tuna Treaty Consultations, were advised of the planned scoping meeting in San Diego, and all were invited to attend by a NOAA Fisheries representative.

Radio and television advertisements were developed for the Pago Pago scoping meeting and were translated into the Samoan language. A press release was sent to two radio stations and one TV station. The radio advertisement ran three times a day for 1 week (November 6–13, 2003) on stations 93 KHJ and 92.1 KSBS. Station KSBS also conducted an "on-air" interview on November 11, 2003, with Dr. Charles Karnella (NOAA Fisheries), Karl Bromwell (Earth Tech), and Sina Solomona (NOAA Fisheries representative performing Samoan translation). TV News KVZK also conducted an interview on November 11, 2003, with Dr. Charles Karnella that ran that evening on the 5 PM and 10 PM news.

The public scoping meetings consisted of informal poster stations review, a Microsoft PowerPoint presentation, and a public comment period. The public was presented with several alternative methods for providing comments, including speaking after the presentation, completing written comment forms, dictating into a tape recorder, and dictating to a person inputting the comment into the electronic form

file on a laptop computer. The comment forms could be submitted at the meeting or mailed/faxed to NOAA Fisheries by December 8, 2003. Several informational handouts, including two fact sheets, were available to the public at the meeting. Public comments that were received at the public scoping meetings or that have been received by NOAA Fisheries are presented in Chapter 9.

1.5.1 Issues Studied in Detail

This EA assesses the impacts of the regulatory changes to the Treaty on the affected environment for a period of up to five years. The economic, social, and physical environmental effects of the proposed action are recognized as being interrelated, owing to the nature of the tuna purse seine fishery in the WCPO. As a result, it is necessary to consider and analyze the economic, social, and environmental impacts of regulatory changes to the Treaty. The U.S. purse seine fleet, the U.S. longline fleets based in Hawaii and American Samoa and WCPO tuna fisheries in general compose the tuna fishing fleets under the Treaty.

The relevant biological resources are the tuna stocks and protected resources of the WCPO. The principle market tuna species include skipjack (*Katsuwonus pelamis*), yellowfin (*Thunnus albacares*), bigeye (*Thunnus obesus*), and albacore (*Thunnus alalunga*). Protected resources fall into three categories: marine mammals, sea birds, and sea turtles.

1.5.2 Issues Eliminated from Detailed Study

The regulatory changes to the Treaty do not affect certain resources that are commonly addressed in an EA pursuant to NEPA. The resources considered irrelevant in the context of this EA are air quality, cultural resources, flood hazards, geology and soils, topography, and visual resources.

Another issue that has been eliminated from detailed study in this EA is water quality. The major areas of concern for water quality relating to worldwide activities that take place on the ocean include oil pollution, toxic hull protective coatings, handling of ballast water and disposal of wastes.

Domestic legal requirements and the nature of the fishing operations point to minimized impacts of U.S. purse seine vessels on water quality. For example, in compliance with U.S. regulations applicable to all vessels over 25 meters in length, U.S. purse seiners may use only antifouling paints that contain a specific release rate for tributyltin set by the government. U.S. purse seiners do not generally ballast their vessels with seawater for stability purposes, as do large commercial vessels such as tankers or bulk carriers. While in port, all U.S. purse seine vessels are required by the U.S. Coast Guard (USCG) to use sanitation systems and oily water separators required for vessels of their size and type.

The extent of the impacts on water quality in the ocean environment by the world's merchant fleet of approximately 87,000 merchant ships representing 558 million gross tons[25] are not well understood or defined. The U.S. tuna purse seine fleet accounts for an estimated 0.006% of worldwide commercial tonnage. It is recognized that there would be considerable difficulty in determining which impacts on water quality in the oceanic environment, if any, could be quantified and differentiated between U.S. purse seiners and those originating from other vessels operating in the same oceanic environment. Because of the current situation described above and the existence of

[25] Lloyds, cited in Statistics Norway (2003); the figure includes all merchant vessels over 100 gross tons and excludes military and non-revenue vessels such as large motor yachts.

regulations applicable to U.S. purse seiners while in port, the impacts of the proposed action and alternatives on water resources are not analyzed.

Nevertheless, steps are being taken that could better define and quantify the amounts and types of pollutants in the ocean environment attributed to fishing vessels in the WCPO. As part of its ongoing Pacific Ocean Pollution Prevention Program, the South Pacific Regional Environment Programme (based in Apia, Samoa) has recently developed a report form to be used by onboard fishery observers in the South Pacific region intended to assist in identifying shipborne sources of ocean pollution. In 2003, onboard observers will be asked to describe the nature and source of any oil spills originating from their vessel, as well as the type of waste dumped or floating at sea.

2 Description of the Proposed Action and Alternatives

The proposed action (Alternative B), an alternative (Alternative C), as well as the no action alternative (Alternative A) are presented below. The no action alternative is evaluated here to serve as a basis of comparison, even though it would not meet the purpose and need for action as described in Subchapter 1.3.

2.1 Alternative A: NOAA Fisheries Does Not Propose a Regulation to Implement Changes Proposed for the Third Extension of the Treaty (No Action Alternative)

Under this alternative, the second extension of the Treaty would continue in force as it has since June 15, 2003, pursuant to the MOU signed on May 9, 2002 (see Appendix C). The non–legally binding MOU represents the political commitment of the signatories to apply the amendments to the Treaty and Annexes (except for amendments to Article 9 described in Subchapter 1.1.3 of this EA) that were not in force by June 15, 2003. With this alternative, NOAA Fisheries would not implement the regulatory changes required for the third extension of the Treaty.[26]

If the Treaty continued to operate under the terms of the MOU, one consequence would be a lack of implementation of the new procedures to amend annexes that are contained in the amendment to Article 9. This amendment is not covered by the MOU. Although this is not a regulatory change per se, the U.S. has sought an alternative method to amend annexes to the Treaty that would bring about a more streamlined and efficient procedure that could have a positive impact on vessels operating under the Treaty.

As a signatory to the MOU, the U.S. Government has explained to the U.S. fishing industry the requirements for U.S. vessels to implement VMS, the fishing area modifications relating to Papua New Guinea and Solomon Islands and the opening of the high seas portions of the Treaty Area to pelagic longlining by duly authorized U.S. vessels (NOAA Fisheries, 2003b).

The Parties agreed upon the use of an MOU for the continuation of the Treaty while the package of amendments is submitted to and approved by each government to give effect to the amendments for the third extension. As the acceptance process by individual governments is expected to be drawn-out, the MOU could remain in place for an unspecified period of time. Amendments to the Treaty enter into force only "upon receipt by the depositary of instruments of ratification, acceptance or approval by the parties" (Article 8). In addition, amendment of annexes currently requires "…receipt by the depositary of notices of acceptance from all parties" (Article 9). As a result, one or more Parties could conceivably delay implementation of the amendments, making the MOU a useful tool for maintaining Treaty relations.

The no action alternative would generally enable the U.S. to meet its obligations under the Treaty and allow U.S. tuna purse seine fishing vessels to continue to operate in the WCPO, including access to the increased Licensing Area within the Solomon Islands EEZ. However, this alternative could deprive the U.S. of its ability to completely enforce important new provisions of the Treaty.

[26] The regulatory changes would require new language in 50 CFR Part 300, Subpart D, to include the VMS requirement and to exempt longliners from the various prohibitions and licensing requirements of the Treaty while operating in the high seas portions of the Treaty Area, as is now the case for albacore tuna trollers.

Without the appropriate regulations in place, in particular those that govern the use of VMS by U.S. purse seine vessels, the U.S. Government would need to rely on alternative applications of U.S. law as a means of ensuring compliance with new Treaty provisions. One such avenue could be the Lacey Act, which makes it unlawful to possess any fish in the maritime or territorial jurisdiction of the U.S. that was taken in violation of any foreign law.[27] However, most PICs have national laws or regulations requiring VMS, therefore the U.S. could use this statute to enforce this provision in specific situations. Application of the Lacey Act in relation to the laws of so many separate jurisdictions and varied circumstances is likely to be cumbersome. It is also unclear as to whether this law would apply to fish caught on the high seas areas of the Treaty, because the VMS laws or regulations of PICs are applicable only in their respective EEZs.

2.2 Alternative B: NMFS Proposes a Regulation to Implement the Changes Proposed for the Third Extension of the Treaty (Preferred Alternative)

Under the preferred alternative, the U.S. would implement the regulatory changes that have been agreed upon for the third extension of the Treaty as described in Subchapter 1.1.6. No new legislation would be required to provide the necessary legal authority to implement such changes.[28]

Regulations would, however, need to be promulgated that amend the portions of 50 CFR Chapter 3 relating to South Pacific tuna fisheries, to require U.S. tuna purse seine vessels licensed to fish under the Treaty to comply with the prescribed VMS procedures and requirements. This would implement VMS requirements that are consistent with FFA specifications and be applicable to persons and vessels subject to the terms and conditions of the Treaty and the jurisdiction of the United States.

Vessel operators fishing with a license under the Treaty are required to install, carry, activate, operate and maintain a VMS unit while in the Treaty Area. The VMS unit and attendant software that is installed must be of a type approved by the FFA Secretariat as Treaty Administrator. If the VMS unit malfunctions or fails, the owner or operator is required to provide notice of such failure or malfunction, submit substitute reports by an alternative means, and proceed immediately to a nominated port to repair the VMS unit as directed by NOAA Fisheries, the FFA Secretariat or the appropriate PIC.

Purse seine vessel owners and operators are required to register annually on the FFA VMS Register of Foreign Fishing Vessels. NOAA Fisheries will administratively facilitate these applications, although vessel owners and operators are responsible for completing the FFA VMS registration form and the payment of associated fees.

The South Pacific Tuna Act of 1988 needs to be amended to authorize the regulatory changes required for implementation of the amendments relating to longline access to high seas areas of the Treaty Area and the VMS requirement for U.S. purse seine vessels. Management responsibility for the activities of longline vessels will continue to be governed by the relevant Fisheries Management Plan.

Implementation of the fishing area modifications to the Treaty does not require any amendment to the existing regulations.

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[27] The Lacey Act Amendments of 1981, 16 United States Code 3401–3408, and the regulations in 50 CFR 246 are commonly referred to as the "Lacey Act" and prohibit illegal trade in fish, providing for civil and criminal penalties for violations of federal, state, and foreign laws.

[28] The Magnuson-Stevens Fishery Conservation and Management Act and the South Pacific Tuna Act of 1988 provide the necessary legal authority to implement U.S. obligations under the Treaty.

Upon incorporation of the regulatory changes into relevant domestic law and regulation, the U.S. will be fully capable of discharging its duties under the Treaty as amended for the third extension.

2.3 Alternative C: The Termination of U.S. Purse Seine Industry Participation in the Treaty

The manner in which the Treaty is organized, as explained in Subchapter 1.1.2, could enable the continuation of the Treaty without the participation of the U.S. purse seine industry. Thus, even if industry participation ceases, the U.S. could continue to participate through payment of the economic development fund portion of the agreed-upon annual amount of US$18 million dollars. As described in Subchapter 1.1.1, except for funds provided to Palau, the FSM, and the Republic of the Marshall Islands under their respective Compacts of Free Association, Treaty payments are currently the only significant source of U.S. economic support to the region.

The Treaty facilitates the U.S. fleet's activities and has provided significant benefits to the industry, as has been pointed out in Subchapter 1.1.1. A cessation of participation could occur under at least two possible scenarios:

- The vessel owners are incapable of providing the annual industry payment of US$3 million for each year of the third extension.

- The fleet ceases to exist in its present form.[29]

A situation where U.S. vessel owners are not able to furnish their portion of the Treaty's annual payment could occur as a result of several factors, alone or in combination. The U.S. purse seine fleet could cease to exist entirely due to adverse economic conditions, or the number of vessels seeking access under the Treaty might be deemed too small to justify the Treaty's continued existence. A reduction in the number of vessels desiring access under the Treaty could place a heavier financial burden on the remaining owners, because they are responsible for funding the contribution irrespective of the number of actual vessels being licensed. Adverse financial conditions brought about by factors within or without the tuna industry could also contribute to vessel owners' inability to, or lack of interest in funding the annual payment.

2.4 Alternatives Eliminated from Detailed Study

An additional alternative identified but eliminated from detailed study was one in which the U.S. would agree to implement a portion of the regulatory changes proposed for the third extension of the Treaty, but replace the implementation of VMS with an attempt to provide the same monitoring, surveillance, and compliance capabilities through other means. Two possible sub-alternatives based on existing activities either sanctioned by the Treaty or provided for under U.S. domestic and international laws were considered.

One sub-alternative would have eliminated the need for VMS by increasing the observer coverage on U.S. vessels operating under the Treaty from the existing 20% of fishing trips to 100% of fishing trips. The existing onboard observer program would be operated as an integral part of the Treaty to collect information on the geographic positions of U.S. purse seiners operating under the Treaty.

[29] Alternative forms could include, for example, re-flagging, which would make the vessels ineligible to be licensed under the Treaty, even if the beneficial ownership of the vessel remained in the U.S.

A second sub-alternative would have increased monitoring by aerial and surface elements of enforcement organizations with emphasis on U.S. agencies such as the U.S. Coast Guard (USCG). Assistance would also have been provided by the PICs in the form of their own national sea patrol programs.

Both of these sub-alternatives are rejected for technical and economic reasons. Any changes to the existing observer requirements presented in Article I, Part 7, such as an increase in observer coverage and resultant cost escalation, would require discussions between the PICs in accordance with Annex I, Paragraph 26: "An observer program shall be conducted in accordance with this Treaty and provisions that may be agreed from time to time."[30] There is no indication of how long it would take to agree to such provisions, or if the PICs would accept such a provision in lieu of the VMS requirement.[31]

There are two main technical reasons 100% observer coverage is rejected. Unlike the requirement for VMS that involves the simple addition of one piece of electronic equipment to the vessel, 100% observer coverage could not be fully implemented until a significant number of additional PIC observers could be identified and trained. It is also recognized that the use of observers for compliance purposes in lieu of VMS could result in some data being compromised by human error or intention. Increased aerial and surface monitoring by enforcement organizations is rejected primarily because the physical assets to cover the geographically large Treaty Area are simply not available to those organizations.[32]

The sub-alternatives are also rejected for economic reasons. Although estimated costs for expanded coverage of the Treaty Area by aerial and surface surveillance are not readily available, NOAA Fisheries noted that the annual cost of relying on such traditional surveillance methods for time and area coverage in the Hawaii longline fishery alone was US$25 million (NMFS, 2001c). Replacement of VMS by a 400% increase in observer coverage would be expected to incur significant administrative costs. As the costs of treaty administration are deducted "off the top" by the FFA Secretariat as Treaty Administrator, the result would be a decrease in financial benefits to the PICs, a situation they are unlikely to accept. Further, the U.S. tuna industry currently incurs a cost of approximately US$120,000–US$135,000 for the Treaty's observer program.[33] This cost would be expected to increase significantly with such a large increase in the observer program and implementation of the necessary training and administration. VMS is thus seen as a much more cost-effective and practical means of providing the necessary data required by the Treaty.

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[30] Total direct costs would have to be borne by the fleet as required in Annex I, Part 7, Paragraph 24 (a), which specifies that operators of U.S. vessels licensed to fish pursuant to the agreement shall be responsible for the costs of observers. Costs include full travel costs, salary and allowances, full insurance coverage, and the costs of training.

[31] Observers are used both for the collection of fisheries-related data and for compliance. The observer program coverage of 20% of total trips has been agreed upon by both parties and is contained in Annex 1, Part 7, of the Treaty. It is thus assumed that the parties deem this level of coverage sufficient for the collection of fisheries-related data. An increase in the use of observers to full coverage would thus be solely to enhance compliance up to the level provided by VMS.

[32] The USCG reported that during fiscal year 2002, there were just two high-endurance cutter deployments to the central Pacific. Their priority was given to "patrolling the perimeter of the eight non-contiguous U.S. EEZs to detect and deter encroachments by foreign fishing vessels." With respect to aircraft flights, "the need for flight hours to support the Maritime Homeland Security mission impacted our ability to deploy, and overall, there was a reduction in the total number of C-130 hours flown in support of fisheries enforcement" (USCG, n.d.).

[33] Because observer coverage is linked to the number of vessels licensed, exact amounts cannot be determined in advance for a year of the Treaty's operation.

3 AFFECTED ENVIRONMENT

3.1 Tuna Fisheries in the Western and Central Pacific Ocean (WCPO) Relevant to This Assessment

Recent annual catch information by gear type and fleet is presented below. The status of individual species is discussed in Subchapter 3.6.1. Following an overview, each gear type (purse seine, longline, and pole-and-line) is discussed in terms of current and historical activities, including available information for 2002. The presentation of catch and effort data is based on information from the *Tuna Fishery Yearbook, 2001* (SPC, 2002a) the *Tuna Fishery Yearbook 2002* (SPC, 2002b) and the *Overview of the Western and Central Pacific Ocean Tuna Fisheries, 2002* (Williams, 2003c) as well as other cited documentation.

The target fishery for tuna[34] in the Western and Central Pacific Ocean (WCPO) consists of skipjack, yellowfin, bigeye, and albacore. These species are the target of both small- and large-scale fishing operations, with the most relevant gear types being purse seine, longline, and, to a lesser extent, pole-and-line. Other gear types include handline, ring-net, and lift-net gears that are used primarily in the Philippines to target yellowfin and bigeye, and trolling that targets albacore in the Southern Hemisphere. For the purposes of this document, however, only purse seine, longline, and pole-and-line gear types are analyzed indetail.

3.1.1 Overview

The western Pacific (defined as those areas west of 150 degrees (°) west longitude [W]) is the most significant tuna fishing area in the world. Worldwide, nearly 4 million metric tons (mt) of the principal market species of tuna (skipjack, yellowfin, bigeye, and albacore) are taken annually in the Pacific Ocean, accounting for approximately 65% of the world tuna catch. By contrast, the Indian Ocean accounts for approximately 21% and the Atlantic Ocean approximately 14% of this total. The fishery in the western Pacific accounts for the large majority of the Pacific Ocean catch of approximately 2.5 million mt (Joseph, 2002). In 2002, the total catch of the four species in the WCPO was estimated slightly less than 2 million mt (Williams, 2003c).

Catch and effort statistics for the WCPO are compiled by the Oceanic Fisheries Programme (OFP) of the Secretariat of the Pacific Community (SPC) and published on an annual basis[35] in the *Tuna Fishery Yearbook*. The most complete compilation of data currently available is that for calendar year 2002 (SPC, 2003b). Preliminary results from a given calendar year are usually presented 6–9 months after the conclusion of that year at the annual meeting of the Standing Committee on Tuna and Billfish (SCTB), in the form of a short overview of data available at the time. Williams (2003d) presents the latest version of this report.

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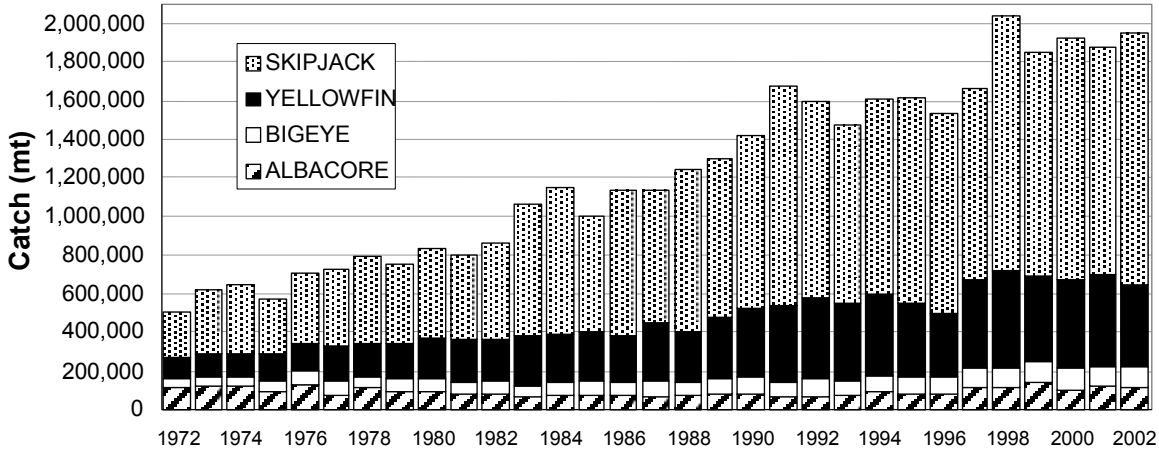
[34] In the following discussion, the term *fishery* or its plural are employed with the understanding that the type of fish sought is tuna, and unless noted otherwise the referenced geographic area for a particular fishery is the WCPO. Depending on the context of the discussion, delineation of a fishery may be expressed by fishing method as in "the purse seine fishery," or may be further described by nationality, as in "the Philippine purse seine fishery." When nationality is used, the context will clarify whether it refers to the nationality of the vessels concerned or a specific geographic area of operation.

[35] Because of the lag time experienced from when logsheet data is submitted by vessel operators to national authorities and the receipt of such data at OFP for necessary compiling, checking, and analyzing those data, it is typically 18–24 months before a definitive compilation is published for a given year.

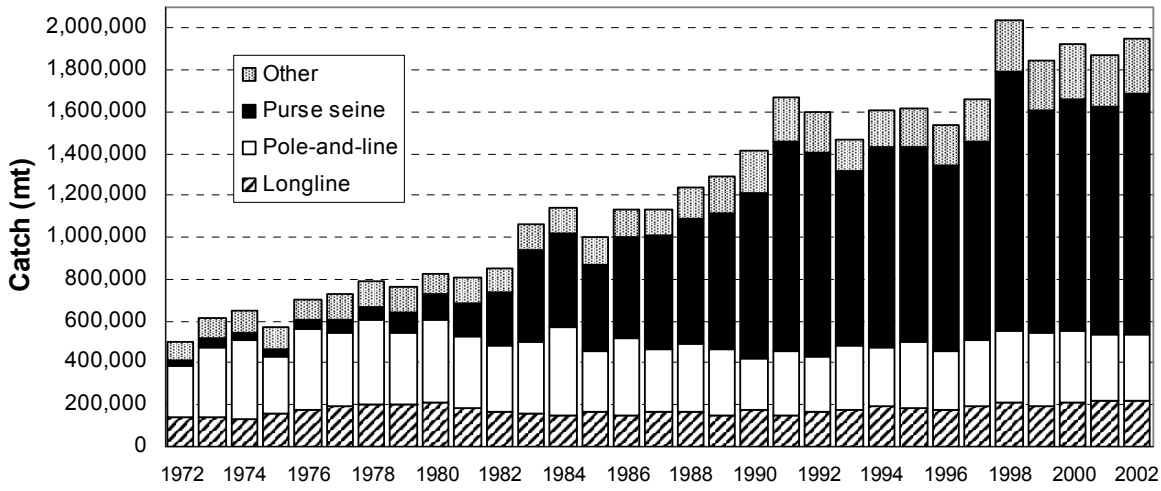
During the 1980s, the aggregate total of catches in the WCPO of the four main tuna species (skipjack, yellowfin, bigeye, and albacore) increased steadily. The total level of catches for all four species remained relatively stable during most of the 1990s, but increased sharply in 1998 and has remained at this level. The species figuring most prominently in the total catch has always been skipjack, which accounted for 67% of the total in 2002. It is believed the 2002 WCPO catch of skipjack at 1,321,939 mt was the highest ever, exceeding the high of 1,314,239 mt in 1998. The total WCPO yellowfin catch of 437,984 mt (22% of the total) was the lowest for 6 years and nearly 70,000 mt lower than the highest catch of 502,960 mt, which occurred in 1998. The bigeye catch in 2002, at 107,658 mt or 5% of the total, was slightly higher than 2001, and the albacore catch, 114,511 mt or 6%, was somewhat below the 2001 level. Figure 3.1-1 depicts the total catches of the four species in the WCPO from 1972 to 2002.



Source: Williams (2003b)

Figure 3.1-1: Catch (mt) of Skipjack, Yellowfin, Bigeye, and Albacore in the WCPO, 1972–2002.

The almost steady increases in the overall total, as well as the sharp increase in 1998, were primarily due to the expansion of purse seining in the region. Purse seine's increased portion of the total catch since the late 1970s can be seen in Figure 3.1-2, which depicts the total aggregate catch of the four main species by gear type.



Source: Williams (2003b)

Figure 3.1-2: Catch (mt) of Skipjack, Yellowfin, Bigeye, and Albacore in the WCPO, by Longline, Pole-and-Line, Purse Seine, and Other Gear Types, 1972–2002

3.1.2 Purse Seine

Purse seiners target mostly skipjack and yellowfin tuna, and on a world scale account for roughly 60% of all the tuna landed (Joseph, 2002). Williams (2003c) notes that purse seiners have accounted for around 55–60% of the WCPO total catch by weight since the early 1990s, with annual catches in the range of 790,000–1,200,000 mt. The vast majority of this catch in the WCPO is taken in equatorial waters between 10° north latitude (N) and 10°S. Smaller seasonal fisheries also exist in subtropical waters, mainly in Japan and to a lesser extent in New Zealand.

The purse seine technique for catching tuna employs a net that is set vertically in the water, with the floats attached to the upper edge and chains for weight on the lower edge. A series of rings is also 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 or more in length and 150 meters deep. When the net is deployed from the purse seine vessel, a large skiff carrying the end of the net is released from the stern of the fishing vessel. The vessel encircles the school of tuna, keeping it in visual contact if on the surface or using sonar if below the surface, and 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 1 mt or more, and placed in brine tanks for freezing and later storage. Joseph (2002) provides a detailed description of tuna purse seining and the fleets involved in the Pacific and Indian Ocean fisheries.

Tuna purse seine vessels are some of the most complex fishing vessels in terms of technology and machinery. The hydraulic systems on large "super seiners" require more than 1,600 meters of piping, and are equipped with at least four auxiliary engines in addition to the main propulsion engine (or engines). The cost of building a new purse seine vessel today exceeds US$15–$20 million, depending upon the country where built. A new net alone can represent an investment of US$500,000–$600,000.

Tuna purse seine vessels in the WCPO vary in length between approximately 50 to 115 meters, and the largest can hold up to 3,000 mt or more of frozen fish. Most tuna seiners average approximately 70–80 meters in length and can carry approximately 800–1,500 mt of frozen tuna. Some carry helicopters that can improve their ability to find fish schools and assist in keeping track of the school when the net is set.

SPC (2002b) lists 18 countries whose fleets have participated in the western Pacific purse seine fishery at some point during the last 15 years. More than 70% of the catch is taken by the four main distant-water fishing nation (DWFN) fleets of Japan, Korea, Taiwan, and the U.S., which together currently number around 140 vessels. Some Pacific Island domestic fleets have been increasingly contributing to the catch total in recent years, particularly vessels flagged in Papua New Guinea, Federated States of Micronesia (FSM) and Marshall Islands. A listing of the number of vessels participating in the fishery by nationality during 1988, 1995, and 2003 is shown in Table 3.1-1.

Table 3.1-1: Number of Active Vessels in the Western Pacific Purse Seine Fishery National Fleets

Fleet	1988	1995	2003	Change Since 1988
Japan [a]	34+5	33	34 (1)	–5
United States	32	43	20 (6)	–12
Korea	23	30	27	+4
Taiwan [a]	16+2	42	38	+20
China	0	0	4	+4
Solomon Islands	4	3	1 (1)	–3
Papua New Guinea	0	3	7	+7
FSM	0	5	9	+9
Marshall Islands	0	0	6	+6
Kiribati	0	1	1	+1
Vanuatu	0	2	15 (3)	+15
New Zealand distant-water	0	0	4	+4
Australia distant-water	3	0	0	–3
Spain [b]	0	0	1 (7)	+1
Netherlands Antilles	0	0	1	+1
Panama	0	0	1	+1
USSR	5	0	0	–5
Philippines distant-water	9	13	22	+12
Indonesia distant-water	3	0	0	–3
Total	136	175	191	+55

Source: Gillett and Lewis (2003)
Note: Numbers in parentheses indicate the number of additional vessels that appear on the Forum Fisheries Agency (FFA) Regional Register but were not licensed to fish under access arrangements in 2003 when the list was compiled.
[a] The seven Japan and Taiwan vessels following plus signs (+) in 1988 are group-seining operations.
[b] Includes the Spanish-owned vessels flagged in El Salvador and Guatemala.

Papua New Guinea is noteworthy in that their fleet's catch (both domestic and as a DWFN) has steadily increased in recent years, and in 2002 is estimated to have taken slightly more than the U.S. fleet during that year (Williams, 2003d). Table 3.1-2 shows the purse seine catches for the years 2000, 2001 and 2002 for the four main DWFN fleets operating in the WCPO.

Table 3.1-2: Estimated Purse Seine Catches (mt) by the Four Major DWFN Fleets, 2000–2002

Nation	2000	2001	2002
Japan	232,593	225,812	211,960
Korea	170,025	178,072	180,087
Taiwan	234,978	230,668	258,126
United States	125,351	115,524	119,158
Total	764,947	752,077	771,333

Sources: SPC (2002b, 2003a)

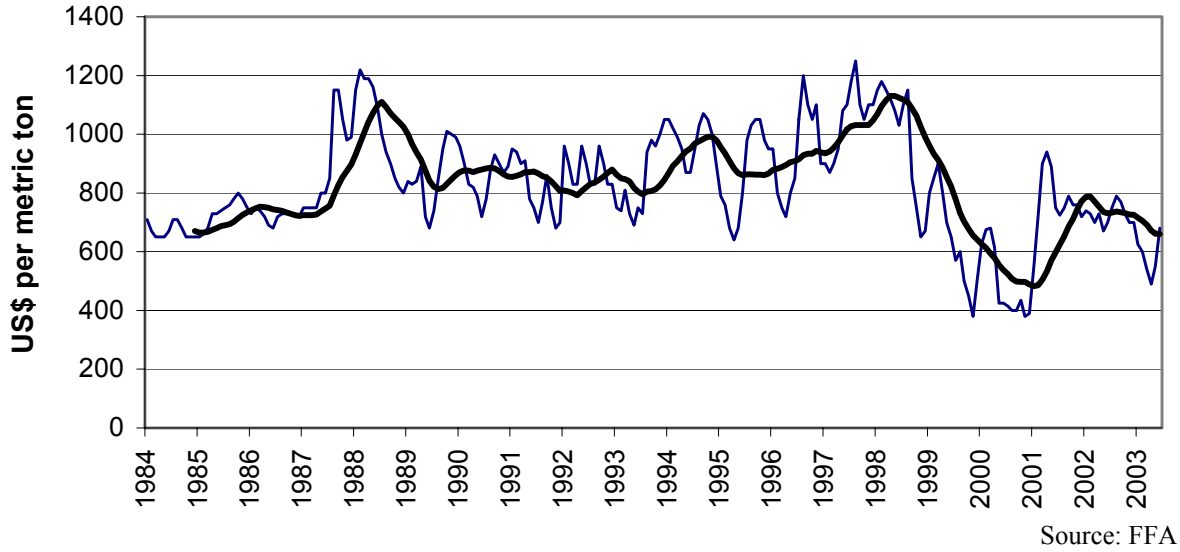
Williams (2003b) states that the provisional 2002 purse seine catch by all fleets is 1,157,045 mt, the second largest catch on record. The largest catch, more than 1,200,000 mt, occurred in 1998.

The majority of purse seine effort by the four DWFN fleets in 2001 stretched from 150° east longitude (E) to 180°E, and from 5°N to 10°S. During 2000, the majority of effort by both Korean and Taiwanese fleets was considerably to the west of 150°E, while Japanese and U.S. fleets stayed to the east of that longitude. In 2001, the Taiwanese and Korean fleets appear to have expended only approximately 10% or less of their fishing effort west of 160°E during 2001. The locations of effort by Taiwanese and Korean fleets coincided with Japanese and U.S. fleets eastward from 160°E (SPC, 2002b).

In the late 1990s, a major feature of the fishery was an increased reliance on sets (deployment of the purse seine) on drifting fish aggregating devices (FADs). With the exception of the Korean fleet (which continues to rely on fishing without using drifting FADs), the fleets used drifting FADs as a means of aggregating and holding tuna to make them more vulnerable to purse seining. However, by, 2001, the percentage of sets on drifting FADs dropped for all fleets. For the first time since 1998, the proportion of drifting FAD sets for the U.S. fleet was less than for unassociated free-swimming school sets. Provisional data from the U.S. fleet for 2003 indicates a continuing trend away from sets on drifting FADS (OFP, 2004). Thailand is the largest purchaser of WCPO purse seine–caught fish though multiple destinations exist for the catch of the various purse seine fleets.[36] Taiwanese and Korean fleets transship the majority of their catch in various ports in the western Pacific region, with the Taiwanese selling mainly to canneries in Thailand, and the Koreans splitting their catch between Thailand and domestic canneries in Korea. Fish caught by the Japanese purse seine fleet is returned to Japan, where the bulk of the skipjack is used domestically for the production of *katsuobushi* (a product made from dried skipjack loins, primarily for use in soups), and yellowfin is used mainly for canning. The U.S. fleet operates out of American Samoa and unloads more than 85% of its catch to the two canneries there. The balance of U.S. purse seine landings goes to sites in Fiji, Thailand, the Philippines, and more recently the Marshall Islands.

[36] Depending on supply and demand, purse seine–caught fish from the western Pacific can be sent to canneries in South America and as far away as Europe, in addition to canneries in Thailand and within the Pacific Island region.

A major aspect of the purse seine fishery worldwide in recent years has been the increase in productivity brought about by larger vessel sizes, an increase in the number of vessels actively fishing and significant advances in fishing technology. However, the markets for processed products, primarily canned tuna, have not simultaneously increased to keep pace with the increased productivity, resulting in oversupply that has had adverse affects on raw material prices paid to vessel owners and operators. Severe economic consequences resulted in 1999 and 2000, where ex-vessel prices for skipjack in Bangkok plummeted to as low as US$400 per mt. Previous average prices had been in the US$750–$1,000+ range since mid-1995. Figure 3.1-3 shows monthly price trends for skipjack tuna delivered to Bangkok from 1984 to mid-2003 in nominal dollars (data collected and compiled by Forum Fisheries Agency [FFA]). The figures reflect midpoint estimates of prices paid during the respective month as obtained from a range of sources. The thin line shows monthly prices, and the thick line indicates a 12-month moving average (Reid, 2003).



Source: FFA

Figure 3.1-3: Indicative Monthly Price Trends for Skipjack Tuna Delivered to Bangkok, 1984 to mid-2003

Faced with deteriorating economic conditions in the fishery in 2000, several of the fleets operating in the WCPO combined with European operators and others elsewhere to form the World Tuna Purse Seine Organization (WTPO), with the goal of better balancing supply and demand. This organization, whose membership includes the Japanese, Korean, and Taiwanese fleets in the WCPO, attempts to better regulate supply from its members by invoking voluntary efforts to reduce supply to the market, such as extending the time each member vessel must stay in port after unloading (Morón, 2002).

The U.S. fleet does not participate in the WTPO. Several industry sources have stated that their lack of participation is the result of legal advice that membership in the WTPO could be construed as violation of federal U.S. antitrust laws (Gillett et al., 2002). Although the U.S. fleet does not actively participate in the activities of the WTPO, they have nonetheless taken action on their own initiative, notably in mid- and late 2000 when vessels stayed in port to protest low prices.

The following subchapters describe three of the four major DWFN purse seine fleets in the WCPO. The U.S. fleet is described separately in Subchapter 3.3.

3.1.2.1 Foreign Purse Seine Fleets in the WCPO

Japanese Fleet. The Japanese distant-water purse seine fleet consists of 35 vessels with an average length of approximately 63 meters. The average age of fleet vessels is 14 years, with 20% of the fleet less than 10 years old and 23% older than 20 years (Gillett and Lewis, 2003). The estimated catch for the fleet in 2001 was approximately 226,000 mt, somewhat lower than the historical high of 275,000 mt in 1998 (SPC, 2002b).[37]

As with all Japanese fisheries, the purse seine industry exists in a highly structured domestic regulatory environment. Japanese government assistance to its domestic fishing industry includes the sponsorship of research aimed at improving or expanding fishing grounds and techniques. The government has built and operated several purse seiners as dedicated research vessels. Through the larger fishery associations, the government authorizes and supports fish purchase and storage during times of glut. Although not directly involving purse seiners, this intervention in the market tends to stabilize the overall domestic market for the purse seine catch.

The Japanese purse seine fleet initially limited its fishing activities to sets on logs, other flotsam, or drifting FADs. The fleet gradually adapted to fishing on free-swimming schools, utilizing technological advances such as larger winches and deeper nets originally developed by the U.S. fleet. The overall pattern throughout the last decade was for an approximately equal proportion of sets made on unassociated schools and logs. Greater use of drifting FADs began in 1998, but current indications are of a return to more sets on unassociated schools.

The Japanese fleet delivers its entire catch directly back to Japan. Most of the skipjack catch is consumed domestically and is used for the preparation of *katsuobushi*, with a small proportion used in canning. In times of surplus, some skipjack is exported to Thailand. Large yellowfin are used mainly in the domestic canning market.

The ability of the Japanese fleet to adjust and survive in less-than-optimum access conditions is noteworthy. Although they have not had access to Papua New Guinea's lucrative fishing grounds since 1988 and have been restricted somewhat in their ability to seek access in the Pacific Islands region, the fleet has managed to maintain its production at economically viable levels.

Taiwanese Fleet. The Taiwanese distant-water purse seine fleet has operated since the late 1980s, using Japanese vessel designs, technical expertise, and fishing techniques. A large increase in the number of vessels between 1988 and 1991 resulted in a fleet of 45 purse seiners in 1992. A second increase in vessel numbers has been underway for the last several years, with the current fleet size estimated to be 60–64 vessels in mid-2003, based on information from the FFA Regional Register and other sources. Most vessels in the Taiwanese fleet are approximately 1,000 gross registered tons (GRT), with an average length of approximately 60–65 meters. All vessels are domestically built, and in the last 6 years, one Taiwan shipyard has built several U.S.-style "super seiners." The Taiwanese fleet is still a relatively new fleet by most standards, with an average hull age of 14 years.

Several of the newer and larger Taiwanese-owned vessels operate under flags other than Taiwan. It is believed that of the 60–64 vessels owned by Taiwanese interests, approximately 24 are registered in Vanuatu and the Marshall Islands. Many people familiar with the purse seine fishery in the western Pacific consider the Taiwanese fleet to be the most efficient in overall terms. Most

[37] Both totals include some catch in the temperate-water Japan home islands fishery.

Taiwanese purse seine vessels are designed to offload their catch quickly and minimize turnaround time in port.

The total catch of the Taiwanese fleet has continued to grow on an annual basis in recent years. The peak catch of around 258,000 mt occurred in 1998. In 2000 and 2001, the catch level stabilized at approximately 230,000 mt, then increased to approximately 258,000 mt in 2002.[38] The fleet initially followed the lead of the Japanese, fishing on a mix of logs and unassociated schools. Some use was made of drifting FADs in 1999, but in recent years, most sets have been made on unassociated schools.

The continued increase in Taiwanese-owned and operated vessels (including those not under Taiwan flag) is of concern to some in the industry, who see the large increases in fishing capacity and resultant fish production as a destabilizing force.

Korean Fleet. In 2003, the Korean tuna purse seine fleet consisted of 27 vessels with an average length of approximately 63 meters. The fleet's size was greatest in 1990, when it reached 39 vessels, including many that had been acquired from the U.S. fleet. The average age of the vessels in the 2003 fleet listed on the FFA's Regional Register is 22 years. The catch in 2002 was approximately 195,000 mt. Whereas the Taiwanese followed the Japanese model in construction and operation of purse seine vessels, the Korean fleet closely resembles the U.S. fleet in many respects. Almost all Korean vessels are former U.S. boats or vessels built for Korean owners using U.S. designs.

When the Korean fleet first began in the early 1980s, their fishing involved a mixture of setting on logs and unassociated schools. Proficiency in setting on unassociated schools gradually increased and the fleet currently focuses on that technique. Since 1998, even when other fleets switched to setting on drifting FADs, more than 80% of Korean sets have been made on unassociated schools.

The Korean fleet operates in the Exclusive Economic Zones (EEZs) of several countries with significant tuna fishing grounds in the western Pacific, including FSM, Nauru, Papua New Guinea, and Kiribati.

Like the Taiwanese, the Korean fleet transships almost all its catch. In recent years, it has transshipped in ports in FSM, Papua New Guinea, Solomon Islands, and Kiribati.

3.1.2.2 Factors Affecting the Distribution of Purse Seine Fishing Effort and Catch

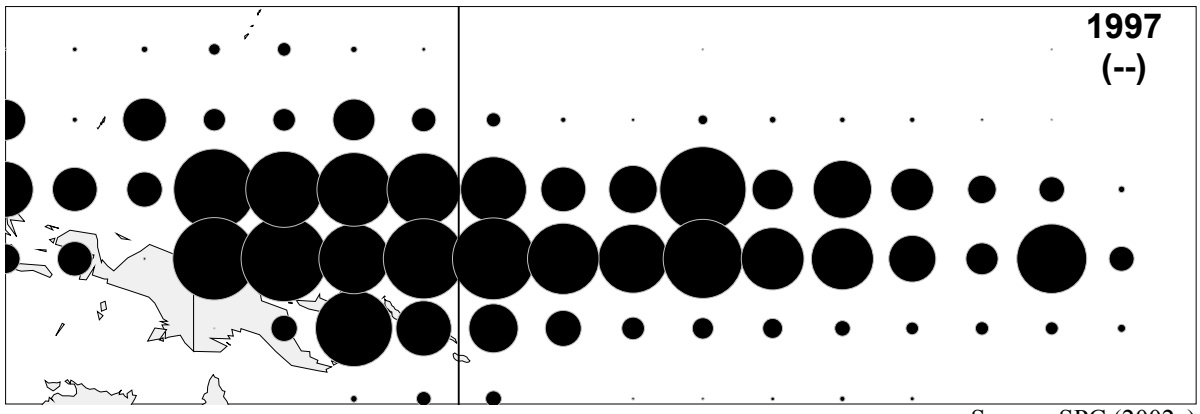
Since the early 1980s, it has been recognized that the catch distribution of tunas in tropical areas of the WCPO is strongly influenced by El Niño Southern Oscillation (ENSO) events.[39] Generally, purse

[38] The figures given are for the Taiwan-flag fleet only.

[39] ENSO events include the full range of variability observed between El Niño and La Niña events. El Niño is characterized by a large-scale weakening of the tradewinds and warming of the surface layers in the eastern and central equatorial Pacific. El Niño events occur irregularly at intervals of 2–7 years, although the average is about once every 3–4 years. They typically last 12–18 months, and are accompanied by swings in the Southern Oscillation, an interannual see-saw in tropical sea level pressure between the eastern and western hemispheres. During El Niño, unusually high atmospheric sea level pressures develop in the western tropical Pacific and Indian Ocean regions, and unusually low sea level pressures develop in the southeastern tropical Pacific. Southern Oscillation tendencies for unusually low pressures west of the dateline and high pressures east of the dateline have also been linked to periods of anomalously cold equatorial Pacific sea surface temperatures sometimes referred to as La Niña (NOAA, 2004)

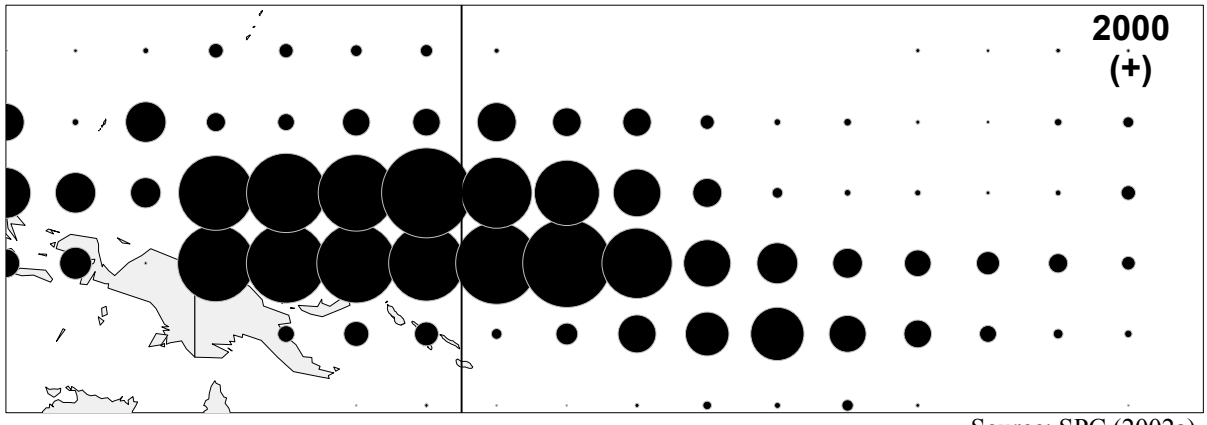
seine fishing takes place further to the east during El Niño years, and contracts westward during periods of La Niña. Fishing can move as far east as the Line Islands in Kiribati, around 150°W during a strong El Niño year. The so-called transitional (or normal) periods can see a greater distribution of effort in the central and western portions of the region, sometimes centered at 160°E.

During El Niño periods, waters of the WCPO equatorial region experience consistent westerly winds that result in wind-generated, eastward-flowing currents. The wind and currents tend to move natural debris (logs and other flotsam) from large landmasses of Papua New Guinea and eastern Indonesia further eastward than usual. This natural debris tends to aggregate tuna, and is generally not as prevalent in eastern areas except during an El Niño. Figure 3.1-4 shows the effect on the distribution of purse seine effort for all fleets during 1997, which was considered to be a strong El Niño year. The contrast in the distribution of purse seine effort during the El Nino and La Nina periods is provided in Figure 3.1-4 and Figure 3.1-5. In both figures, the larger black circles represent largest amounts of effort, with smaller black circles representing proportionally smaller amounts of effort.



Source: SPC (2002a)

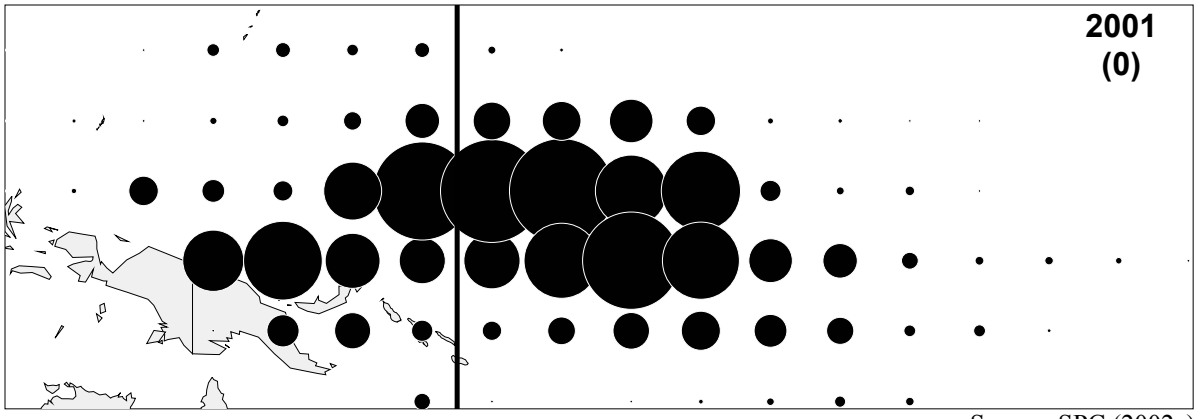
Figure 3.1-4: Distribution of Purse Seine Effort (All Fleets) in 1997, a Strong El Niño Year



Source: SPC (2002a)

Figure 3.1-5: Distribution of Purse Seine Effort (All Fleets) in 2000, a La Niña Year

The WCPO experienced a transitional or "normal" period during 2001, depicted in Figure 3.1-6, and an El Niño period during 2002. Fishing activity thus occurred more to the east during 2001 and 2002 than in 2000. In early 2003, the current El Niño began to wane, and fishing effort once again moved to the west.



Source: SPC (2002a)

Figure 3.1-6: Distribution of Purse Seine Effort (All Fleets) in 2001, a Transitional Year

The ENSO impacts on the fishery are still the subject of much study and are not completely understood. The relative strength of an ENSO event, coupled with other factors such as a fleet's ability to obtain fishery access to the EEZs of countries in the eastern portion of the WCPO, have an impact on the distribution of effort. Catch by purse seiners in some areas, notably the Bismarck Sea region of Papua New Guinea, do not seem to be as greatly affected by ENSO events as are more high seas regions far from large land masses in the WCPO.

3.1.3 Longline

Longline fishing accounts for approximately 14% of the world catch of tuna (Joseph, 2002). In the WCPO, longlining accounts for approximately 10–12% of the total WCPO catch (Lawson, 2003). Although the longline catch is only approximately 20% of the purse seine catch by weight, its landed value rivals that of purse seine because higher-value tuna are generally sought by longline method (Williams, 2003c).

Longline fishing gear uses a horizontally deployed main line that can be more than 100 kilometers (km) in length with as many as 3,000 branch lines, each with a baited hook, spaced out over the length of the line. The line is kept afloat by a series of buoys attached with their own branch lines at intervals along the mainline, so that the horizontal mainline sinks below the surface and enables the hooks to reach the depth preferred by the target species. A key aspect of the gear type is that the depth at which the hooks are intended to fish can be adjusted by one or more means, including the following:

- The length of buoy and branch lines.
- The number of hooks between the floats (the more hooks, the deeper the set).
- The speed at which the line is set (the more line in relation to vessel speed, the deeper the set).[40]

[40] Other variables, including composition of the line, added weighted swivels, and ocean current, can also contribute to actual hook depth.

Although this type of "passive" gear can result in the capture of fish other than the target species of tuna, (the bait may attract various species that share the same habitat as tuna), the depth of the gear can be adjusted to target habitat depths of longline species.

An estimated 1,500–2,000 active longline vessels currently fish in the western Pacific. Overall, the trend has been for an increase in the number of domestic longliners and a commensurate decline in the number of distant-water fishing vessels. Domestic vessels, defined as those based in the Pacific Islands, number approximately 500. Approximately 15,000 mt of fresh fish were exported from the Pacific Islands in 2001 (SPC, 2003a).

Two main types of longline operation are involved in the tuna longline fishery in the WCPO. The first is distant-water longlining conducted by large freezer vessels (typically over 200 GRT) that make trips lasting several months or more in duration. The main participants in the distant-water longline fishery are Korea, Japan, and Taiwan, with some of the vessels operating under flags other than their own. Although the main target of these vessels is primarily bigeye tuna in tropical areas for the sashimi market, the Taiwanese in particular may also target albacore in subtropical areas for the canning market. On vessels that target sashimi-grade fish, the catch is frozen and held onboard at very low temperatures, usually minus 45–50 degrees Celsius or greater.[41]

The second type of longline operation consists of smaller offshore vessels of under approximately 100 GRT that are based in the Pacific Island region and typically use ice or refrigerated seawater to preserve their catch. A relatively recent development has been the use of small boat longlining fleets composed of vessels primarily under 10 meters in length in Samoa and American Samoa; these boats fish primarily for the cannery market.

According to Williams (2003a), the provisional 2002 longline catch of nearly 222,000 mt was the highest on record, but only slightly above (500 mt) the 2001 catch. The bigeye catch, at approximately 64,000 mt, was the largest longline catch of that species in the past four years, and the albacore catch of almost 77,000 mt in the WCPO was the second highest on record after the 2001 catch. The 2002 yellowfin catch of just over 77,000 mt was the highest in seven years.

3.1.3.1 Distant-Water Longline

The Japanese distant-water ultra-low temperature (ULT) fleet operating in the Pacific Ocean is the largest of the three major fleets (the other two being the Korean and Taiwanese).[42] One of the defining characteristics of the Asian distant-water longline fleets is the capability to move from ocean to ocean, depending on season, catch rates, and markets. Generally, the Japanese and Taiwanese fleets are more mobile, sometimes switching numbers of vessels among the Pacific, Indian, and Atlantic oceans. The Korean fleet tends to focus their activities in the eastern and central Pacific. All fleets target bigeye tuna, although larger yellowfin, some billfish, and shortfin mako shark are also often retained. The relatively high cost of transshipping fish on ULT fish carriers

[41] Vessels equipped for this type of fishing are often termed "ULT" longliners to distinguish their ultra-low temperature fish-holding capabilities. Vessels solely targeting albacore for the canning market usually hold their catch at around –10° C to –20° C.

[42] A relatively large number of vessels are also classified as illegal, unregulated, and unreported. The International Commission for the Conservation of Atlantic Tunas estimated these vessels numbered 236 worldwide in 2000 (Joseph, 2002). Because of the nature of their activities, it is not possible to determine how many of these vessels are active in the WCPO.

likely encourages the practice of "high-grading," whereby only the higher-valued fish are retained to conserve storage space on the fishing vessel.

Longline vessels fishing far from the major sashimi markets freeze and hold their catch at very low temperatures for transfer, either at sea or in foreign ports, to special refrigerated carrier vessels ("reefer carriers") that service the fleets. The reefer carriers also provide frozen bait and other supplies to the longliners in the fishery. The Japanese pioneered these activities and still control the transportation and marketing channels.

The market for the sashimi-grade catch of all three fleets has traditionally been exclusively Japan. During the 1990s, however, Korea developed an alternative domestic market for sashimi tuna that uses approximately 13,000 mt of sashimi-grade tuna annually (Lee, 1998). This new Korean market was developed by four major fishing companies that own a combined total of more than 400 sashimi restaurants and an undetermined number of vessels in the Korean high seas fleet.

The Korean ULT fleet worldwide numbers around 200 vessels, with 176 vessels reported to be operating in the Pacific (SPC, 2002b). Vessels are typical of the other fleets, being approximately 50 meters in length, with a hold capacity of approximately 280 mt and carrying a crew of 25 (Lightfoot and Friberg, 1997). Although the Korean vessels may be home-ported in Pusan, Korea, they reportedly stay at sea for periods of six to eight months or more, obtaining fuel and supplies from tankers at-sea. Their catch is transshipped on the high seas or at island locations. They return to Korea only once every two to three years for major refit or repair. Many of the Korean ULT vessels are owned by large fishing or food processing companies in Korea.

The Japanese ULT fleet worldwide contains slightly more than 500 vessels (Joseph, 2002). The overall number of Japanese fishing vessels has been declining steadily during the last 20 years. Reduction of the Japanese ULT fleet was mandated by the Japanese government in the late 1990s, when 20% of vessels were taken out of the fishery to improve the economic importance of the fleet as a whole. Vessels are home-ported in various regions of Japan, but spend up to 2 years fishing before returning to their homeports. The vessels use mainly overseas ports, including Honolulu, Hawaii, as well as the high seas for resupplying and refueling.

In the WCPO, the Korean fleet operates in an area from northern French Polynesia westward as far as Nauru and the Gilbert Islands of Kiribati. The Japanese fleet tends to spend more effort in the eastern Pacific Ocean than does the Korean fleet. Operations for both fleets shift from year to year to take into account oceanographic factors and resource availability. The percentages of catch taken in the eastern Pacific Ocean and WCPO are highly variable.

The Taiwanese fleet operating in the Pacific has been smaller than the Korean and Japanese fleets, varying from approximately 60 to 100 vessels in each of the last five years. In recent years, some older vessels that targeted albacore for the cannery market have been replaced by larger, more versatile longliners that have ULT capability and can alternately target albacore or bigeye, depending on economic conditions. Some vessels, however, still target albacore exclusively and deliver to canneries in American Samoa and Fiji, with some transshipment in Tahiti. Provisional 2002 data from the SPC indicate an increase in the Taiwanese fleet operating in the Pacific to 133 vessels, due to mostly ULT vessels shifting from other oceans (Williams, 2003d).

The Korean fleet's aggregate catch in the WCPO is estimated by SPC to have been just under 30,000 mt per annum from 1999 to 2001. The published Japanese catch data make it difficult to determine the catch of distant-water longliners in the WCPO, because the data are aggregated with catch from smaller offshore vessels as well as catch in temperate waters of both hemispheres. In

2000, the total catch for all these vessels combined was approximately 54,000 mt (SPC, 2002b). The Taiwanese distant-water catch in the WCPO increased from approximately 15,000 mt in 1998 to almost 24,000 mt in 2001. A shift toward targeting the sashimi market is evident, with the percentage of albacore in the Taiwanese catch dropping from 83% in 1998 to approximately 50% in 2001.

3.1.3.2 Locally Based Longline

Two types of locally based operations exist, distinguished by location:

- Those in areas north of the equator (Guam, FSM, Palau, and the Marshall Islands) and in the countries of the Southern Hemisphere closest to the equator (Papua New Guinea and Solomon Islands) tend to focus on the sashimi market via air transshipment.

- Fleets in Samoa, American Samoa, Fiji, and New Caledonia tend to operate in subtropical waters and target albacore, although bigeye and yellowfin are also taken and can be exported by air as well. The Cook Islands also commenced a locally based tuna longline fishery in 2002.

For 2002, the number of active vessels, total catch, and albacore as a percentage of the total catch for locally based longliners in Pacific Island countries are listed in Table 3.1-3.[43]

Table 3.1-3: Number of Locally Based Longline Vessels in Pacific Island Countries of the South Pacific in 2001, Total Catch (mt), and Albacore as a Percentage of Total Catch

	Number of Vessels	Total Catch (mt)	Albacore as Percentage of Total Catch (%)
Fiji	101	12,219	65
New Caledonia	18	2,064	49
Papua New Guinea	38	3,877	1
Samoa	148	6,180	78
Solomon Islands	8	408	13
Tonga	21	1,988	64
Total	334	26,736	57

Source: SPC (2002b)

Fishing trips that are conducted for the sashimi market generally last one to three weeks, while albacore trips can last for one month or more. The following discussion refers to non-U.S. flag fleets in the WCPO. The U.S. fleets based in Hawaii and American Samoa are discussed in detail in Subchapter 3.4.

No full-time U.S.-flag (domestic) longline vessels are based in Guam; however, two distinct groups of foreign longline vessels operating from Guam fish in the adjacent and nearby EEZs of Palau and FSM. The Japanese fleet consists of mainly small (under 20 GRT) fiberglass vessels from Okinawa

[43] *Locally based* does not necessarily mean vessels are registered in the country noted. For example, Fiji is host to longline vessels from several nationalities, including China, Korea, and Taiwan that operate under various charter or joint venture arrangements.

or the southern main islands of Japan. The second fleet is composed of fiberglass Taiwanese vessels, of two size classes: one under 20 GRT, and the second somewhat larger at up to 50 GRT.

The overall number of Taiwanese vessels in the WCPO offshore fleet is estimated at more than 200, with vessels also operating occasionally from ports in the FSM, Palau, Philippines, Marshall Islands, and various ports in Indonesia. Moreover, between 25–50 Taiwanese vessels might operate from Guam at any one time. On the other hand, the number of Japanese vessels that use Guam as a base is believed to be somewhat smaller.

Although both the Japanese and Taiwanese fleets target sashimi-quality bigeye and yellowfin tunas that are transshipped by air to Japan, important differences exist in their fishing operations. The Japanese fleet, for example, uses both monofilament and the heavier *kuronawa* black tarred-and-stranded nylon as the mainline; the Taiwanese fleet uses monofilament exclusively. The Japanese set their line deep in the water column in the morning with the aid of a hydraulic-powered mechanism called a line "shooter" that deploys the line from the stern of the vessel at a rate greater than the vessel's speed, thus ensuring the line sinks more quickly than if pulled from the vessel by its movement through the water. The line is then "hauled" back onboard, commencing in the early evening.

The Taiwanese fleet, on the other hand, fish in almost exactly the opposite manner, to take advantage of vertical movements of the target species during nighttime. Using monofilament line, the Taiwanese fleet set their gear shallower in the water column than the Japanese fleet. The gear is set in the evening and is hauled in the morning. Although the techniques, skill, and equipment of the Japanese vessels generally allow them to set more hooks in a given set (1,800 to 2,400 hooks) than the Taiwanese (1,000 to 1,400), Taiwanese vessels tend to capture a greater number of associated species (including sharks and billfish) than do the Japanese.

The published catch data for the entire Taiwanese offshore fleet in 2001 east of 130°E was approximately 13,000 mt (SPC, 2002b). This includes all vessels that might have been based in or transshipped from Guam, Palau, FSM and perhaps other ports identified above. Similar data for the Japanese offshore fleet are not available because those data are combined with data from their distant-water fishery.

The Chinese locally based longline fleet operating north of the equator also targets the sashimi market. In 2002, approximately 95 Chinese vessels were active with 25 based in FSM, 40 in Palau and 30 in the Marshall Islands. The vessels in this fleet are approximately 25–30 meters in length. Trips usually last one to two weeks, with fishing practices and gear mirroring the Taiwanese fleet, except that the number of hooks fished is usually 800–1,000 per set. The published catch and effort data for Chinese vessels includes that for larger-scale longliners targeting albacore in the north Pacific (Xu, 2002). It is thus not possible to determine the catch from tropical areas, although it is believed to be significantly less than the Taiwanese vessels catch in the same general areas cited above.

3.1.4 Pole-and-Line

The commercial pole-and-line technique accounts for approximately 14% of the world tuna catch (Joseph, 2002). In the WCPO, the preliminary pole-and-line catch estimate for 2002 represents approximately 17% of the total (Williams, 2003a). Skipjack accounts for 84% of the pole-and-line catch in the WCPO. Of the total pole-and-line catch taken in the temperate north Pacific, albacore represents 9%, yellowfin 5% and bigeye 1%.

The pole-and-line technique involves fishing for surface schools with the use of a barbless hook and line attached to the end of a stout pole. The pole assists the fisher in gaining leverage to land the fish

quickly. Most commercial pole-and-line vessels are equipped with live bait tanks that enable the carriage of live bait to the fishing grounds. Fishermen "chum" the live bait to attract and hold the schools close to the vessel, where they are caught by fishermen lining the rails of the boat and deploying their gear.

Japan has both an offshore pole-and-line fleet that fishes within its own EEZ, and a distant-water fleet that conducts activities in both temperate waters (for albacore) and tropical areas (for skipjack). The Japanese distant-water fleet consists of approximately 40 vessels whose catch is combined with that of the Japanese offshore fleet of perhaps 100 smaller vessels (according to SPC-published statistics). The combined total catch of both these fleets in 2000 was approximately 150,000 mt. A unique feature of the Japanese distant-water pole-and-line catch is its utilization in both sashimi and value-added products other than canned tuna.

In the Pacific Islands, pole-and-line fleets have been active at one time or another during the past two decades in Fiji, Kiribati, New Caledonia, Palau, Papua New Guinea, and Solomon Islands. In each of these countries, the catch was exported or used locally as canned tuna. Economic factors, mainly high labor costs and a lower catch per unit of effort (CPUE) in comparison with purse seiners, has led to a gradual decline in the number of active pole-and-line vessels. By 2001, only Fiji (two vessels) and Solomon Islands (twelve vessels) continued to operate. The combined catch of these two fleets in 2001 was approximately 5,200 mt, of which 95% was skipjack (SPC, 2002b). A small fleet of pole-and-line vessels operates in Hawaiian waters, based mainly in Honolulu. Fishing activity for six vessels was recorded in 2002, with a total catch of about 340 mt valued at US$750,000 (WPFMC, 2004).

3.2 Fishery Management and Access

Management of the relevant tuna fisheries under the Treaty is undertaken by the U.S. as well as by the Pacific Island Countries (PICs).[44] In many cases, the granting of access to foreign vessels by the PICs on a bilateral basis is often motivated by the desire to generate national revenue. The following discussion of fishery management focuses on the Treaty and the PICs. Management by the U.S. of its domestic longline fleet is discussed in Subchapter 3.4.

All U.S. vessels that fish on the high seas[45] are required to have a permit issued by National Oceanic and Atmospheric Administration (NOAA) Fisheries in accordance with the High Seas Fishing Compliance Act of 1995[46]. Permits are valid for five years and require that vessels fish on the high seas in accordance with international conservation and management measures recognized by the U.S. (NMFS, 1996).

The PICs have developed a set of Harmonized Minimum Terms and Conditions for Foreign Fishing Vessel Access (MTCs) that apply to all foreign fishing vessels seeking access to EEZs of the Pacific Island Countries (FFA, 2003a). The MTCs were developed by member countries of the FFA for consideration in drafting of national legislation. Currently, the application of these MTCs is both

[44] As used here, the term *fishery management* is taken to mean the controls that government places on a fishery in support of established objectives.

[45] The term "high seas" is defined in the High Seas Fishing Compliance Act as waters beyond the territorial sea or EEZ of any nation to the extent that such territorial sea or EEZ is recognized by the U.S.

[46] 16 United States Code §5501–5509.

widespread and comprehensive by PICs in areas under their respective national jurisdictions. The MTCs provide the following guidance to PICs in licensing foreign fishing vessels:

- Use of a common regional license form;
- Vessels are required to be in "good standing" on the Regional Register of Foreign Fishing Vessels and Vessel Monitoring System (VMS) Register of Foreign Fishing Vessels as a condition of licensing;
- Monitoring and control of transshipment;
- Maintenance and submission of prescribed forms reporting all catch and by-catch taken in EEZs and on the high seas;
- Vessel reporting requirements;
- Observers and observer coverage;
- Appointment of an agent in the relevant PIC licensing country;
- Requirements for foreign fishing vessels to stow gear when transiting fisheries zones;
- Application of MTC in port and exercise of port State authority;
- Enforcement cooperation;
- Flag State or Fishermen's Associations Responsibility;
- Requirement to implement regional VMS;
- Identification of fish aggregating devices;
- Pre-fishing inspections.

The FFA Secretariat maintains the Regional Register of Foreign Fishing Vessels. All foreign fishing vessels seeking licenses from a PIC must be in "good standing", as determined by registration on the Regional Register. Good standing is automatically granted upon application, and is removed only when circumstances require. Removal of good standing, for example, may result from non-payment of judgments imposed on a foreign vessel by a PIC for a serious offense. Such action would effectively prohibit other PICs from licensing that vessel. The Regional Register requirement is also applicable to a PIC fishing vessel that seeks access in another PIC EEZ other than its own.

3.2.1 Purse Seine

In addition to the Treaty, two other management agreements exist in the western Pacific region. These are the 1992 Palau Arrangement for the Management of the Western Pacific Purse Seine Fishery (Palau Arrangement) and the 1994 Federated States of Micronesia Arrangement for Regional Fisheries Access (FSM Arrangement). Both of these agreements exist with the framework of the Nauru Agreement Concerning Cooperation in the Management of Fisheries of Common Interest

(Nauru Agreement), the members of which are collectively known as the Parties to the Nauru Agreement (PNA):[47]

3.2.1.1 Palau Arrangement

The Palau Arrangement limits the number of purse seiners that can be licensed to fish in the EEZs of the eight PIC Parties to the Arrangement. The agreed limit of 205 licenses has been in place since the Arrangement's inception. Adjustments to the allocations within categories are undertaken by the PNA at its annual meeting.

The Palau Arrangement consists of four categories of vessel licenses totaling 205. These are multilateral access, bilateral foreign access, domestic/locally-based access, and new bilateral access. If a qualifying vessel wishes to commence operation above the agreed cap in one category, an adjustment must be agreed upon by the PNA that requires a like reduction in a different category.

Since the Palau Arrangement's inception in 1992, the U.S. has been ensured an adequate number of licenses for its flag vessels wishing to operate under the Treaty, although such allocations are not necessarily "reserved." For example, the present allocation for U.S. vessels is 40, with an additional five licenses available only if the 40 were taken and applications for the additional five represented "fishing activity designed to advance broader cooperation" as envisaged under Article 2 of the Treaty. When the maximum number of vessels allowed under the Treaty is reduced as it has been under the third extension, the PNA decides on a reallocation under the established cap.

Table 3.2-1 identifies the number of purse seine licenses available by category and nationality, and compares the distribution of the number of licenses made available at the inception of the Palau Arrangement in April 1992[48] with the distribution in April 2002. A shift toward an increase in the number of licenses available for the domestic/locally-based category is clearly visible.

Table 3.2-1: Purse Seine Licenses Available under the Palau Arrangement

Category	April 1992	April 2002
Multilateral Access		
U.S. Treaty	55	40
Bilateral Foreign Access		
Japan	39	35
Taiwan	44	41
South Korea	37	27
Philippines	11	10
Australia	6	0
Indonesia	3	0
Domestic/Locally Based		
All parties	10	45

[47] The PNA are a sub-regional group of countries within the FFA with the largest stake in the tuna resource, in terms of size of national EEZs and productivity of fishing grounds. The member countries are Palau, Nauru, Federated States of Micronesia, Solomon Islands, Marshall Islands, Kiribati, Tuvalu, and Papua New Guinea.

[48] The categories and numbers in 1992 represent those vessels licensed by PNA parties at that time.

Category	April 1992	April 2002
New Bilateral Access		
China	0	3
European Union	0	4
Total	205	205

Source: FFA (2002)

According to the FFA (2002), several vessels are permitted under "special arrangements." These include nine Spanish vessels and two European Union vessels allowed part-time in Kiribati waters only.

The Palau Arrangement is currently undergoing major modification, with an initiative underway to limit fishing days, rather than the number of licenses. Notwithstanding this modification to the Arrangement, the number of U.S. vessels currently allowed under the Treaty will likely remain unchanged in the revised Palau Arrangement.

3.2.1.2 FSM Arrangement

The 1994 FSM Arrangement operates within the limits imposed by the Palau Arrangement. The objective of the FSM Arrangement is to encourage purse seine vessels to base their operations in the PNA countries. Access is granted under a point system, with points given for vessels meeting certain requirements such as local investment in the enterprise, use of local management, contribution to local government revenue, local offloading, purchasing of fuel and employment of PIC nationals. Points are awarded on a sliding scale for each criterion, with a required minimum of points to qualify for access. Access to the fishery zones of the PNA countries is granted on an annual basis only, with license fees currently roughly equivalent to those paid by the U.S. industry under the Treaty.

The FSM Arrangement was put in place prior to policy and legal changes in several of the PNA countries that now make it somewhat easier for vessels to qualify for access under that Arrangement. To date, in addition to a few vessels actually owned by interests in the PNA countries themselves, some vessels with beneficial ownership in the U.S., Japan and Taiwan are licensed under the Arrangement.

3.2.1.3 Non–Pacific Island Fleets

The Treaty is the only multilateral access regime currently in place in the western Pacific tuna fishery providing access for a non–Pacific Island fleet. Fishery access for DWFN fleets other than the U.S. is usually granted under bilateral agreements that specify a maximum number of licenses to be issued. The three major Asian purse seine fleets have gained access to fishing grounds in most PICs through the direct payment of access fees. With the exception of Japan's lack of access to the EEZ of Papua New Guinea, these fleets purchase multiple licenses in the PICs containing major fishing grounds. The trend in several PICs has been to conclude access agreements for multiple years with the various DWFN, thus eliminating some of the uncertainty for both parties.

Components of the Taiwanese and Philippine fleets have gained access in Papua New Guinea through commitments to shore-based development. Unlike the established Asian fleets, several of the newer entrants, including the European Union, New Zealand, and China rely on bilateral arrangements with only a few PICs and the high seas to satisfy their requirements for access to viable fishing grounds.

3.2.2 Longline

Foreign longline vessels are granted access to the EEZs of the PICs under a variety of arrangements, often related to the basing[49] of vessels in a particular PIC. For example, under arrangements with the FSM, licensed foreign longline vessels that offload in Guam or elsewhere must pay a separate fee for each such offloading. Some countries, such as the Cook Islands, do not license foreign vessels except under arrangements where the vessel is chartered to a domestic company. A small number of PICs license DWFN longliners on a per-vessel or lump-sum basis and do not require any such ties to the PIC. Such arrangements are usually for the larger ULT fleets that also fish on the high seas and have little need to use PIC ports. U.S. longline effort on the high seas is considered to be a very small portion of overall effort expended by all fleets, especially as compared to those from Asia.

3.2.3 Observers and Port Sampling

Fishing access agreements typically contain provisions for placing observers onboard vessels to collect data, monitor fishing activity and record compliance with conservation and management measures. Some access agreements limit observer roles to scientific tasks involving the collection and verification of fishery-related data while at sea and at the conclusion of a voyage. In addition to being in the Harmonized MTCs, domestic legislation and fishing access agreements generally contain provisions on observer coverage as follows:

- Vessel operator and crew shall provide the observer full access to the bridge of the vessel; the vessel's records, including its logs and documentation for the purpose of records inspection and copying; catch on board; and areas which may be used to hold, process, weigh, and store fish;

- Providing the observer while on board the vessel, at no expense to the licensing country, with officer-level accommodation, food, and medical facilities;

- The vessel operator meets costs of travel, salary, and insurance for the observer.

In actual practice, other than vessels licensed under the Treaty and the FSM Arrangement, very few of the PICs place observers on DWFN vessels. This is primarily because only these two licensing regimes have built-in observer programs that operate with the assistance of either the DWFN (the U.S. in the case of the Treaty) or FFA, as is the case in the FSM Arrangement.

In 1995, a regional observer program was established at SPC with the intention of improving observer coverage in specific target fisheries. It later adapted to the training and support of PIC observer and port sampling programs. Nevertheless, very few PICs operate their own observer programs with the intention of placing a significant number of observers on licensed DWFN fishing vessels. At the current time, only the FSM and Papua New Guinea operate observer programs. Kiribati, Marshall Islands, Solomon Islands, and Cook Islands are now commencing or

[49] The definition of the concept of a foreign fishing vessel as "based" in a port other than its own registered home port is an elusive one. In the WCPO, the term "base" is used quite loosely and can mean several things: the main port used where the bulk of the supplies are obtained, where the catch is offloaded, or varying degrees of both in combination. It can also include the location where the business of the vessel is conducted, i.e., its management office, or even the home port of a particular country adopted for business, taxation, fishery access, or other reasons. In this usage, the application of licensing provisions relating to basing are usually spelled out in the relevant legislation or licensing agreement.

reestablishing small programs, while Fiji, Tuvalu, Tonga, Samoa, Tokelau, Palau, and Nauru have no such program in place (OFP, 2004).

Regional observer coverage, therefore, is currently very low for all fleets except the U.S. purse seine fleet and vessels licensed under the FSM Arrangement. The target observer level coverage of 20% for U.S. vessels operating under the Treaty (Annex 1) has resulted in more than 400 observer trips on U.S. purse seiners (FFA and SPC, 2003). In comparison, the SPC-established regional observer program has covered less than 1% of the longline effort annually and 4% of the purse seine effort in the WCPO since 1995 (Lawson, 2001a).

Part 7 of Annex I of the Treaty sets out the requirement for the use of onboard observers in the Treaty Area. In general, observers can provide useful information that is independent of vessel operators and is obtained during actual fishing operations. Data typically collected by observers include catch composition by species, effort, location, environmental conditions, gear type and information on bycatch.

The Treaty observer program slightly expands the observer role beyond collection of scientific information to include functions relating to compliance and monitoring. In Annex I of the Treaty, observers shall "board the vessel for scientific, compliance, monitoring and other functions…" The goal of the observer program as further stated in Annex I is, "…to provide an effective program for compliance by targeting 20% coverage..."[50] Although the observer program is operated by the FFA Secretariat on behalf of the PICs, the U.S. tuna industry is responsible for meeting the full costs of the program, including training costs. Logistic and other support is provided to the observer program by NOAA Fisheries through its office in American Samoa.

The costs of the Treaty observer program are estimated to be approximately US$120,000–$150,000 annually, depending on the number of vessels and the average number of trips per vessel for the latest licensing period for which information is available.[51] The U.S. and the PICs have agreed that the FFA Secretariat may carry-over unused funds from a prior year into current year activities.

Observers are recruited from the PICs and usually have some experience in either fishing or their own domestic observer programs before entering the Treaty program. The FFA Secretariat conducts periodic observer training courses, using a US$15,000 training fund provided by the U.S. under the Treaty. In addition, the U.S. industry provides US$30,000 to offset FFA's administrative costs associated with supporting the program.

Regionally, the SPC's OFP Port Sampling Program collects data on catch in several Pacific Island countries where significant offloading or transshipping of tuna from commercial vessels occurs. Of greatest relevance to the U.S. purse seine fleet is the port sampling program undertaken by two NOAA Fisheries staff in Pago Pago, American Samoa. The sampling strategy is to sample from a minimum of one set type per month per sampling area per vessel (OFP, 2004). Port sampling activities are overseen by a fishery biologist from NOAA Fisheries, who is also responsible for facilitating the placement of PIC observers aboard U.S. purse seiners and collecting the various reports required under the Treaty.

[50] This coverage refers to the number of trips taken by U.S. purse seine vessels fishing under the Treaty.

[51] Part 7 of Annex 1 provides for such costs to be mutually determined at the Treaty annual meeting.

3.2.4 Surveillance and Enforcement

Surveillance refers to the degree and types of observations required to maintain compliance with regulatory controls imposed on fishing activities (FAO, 1981). Enforcement relates to the direct imposition of controls, i.e., the regulatory conditions under which the exploitation of the resource may be conducted.

Both the PICs and the U.S conduct surveillance in the WCPO tuna fishery. It is important to recognize that in practically all countries, including the U.S., fishery surveillance is but one component of a greater maritime surveillance mission that includes aspects of immigration, drug interdiction and other related activities. The PICs use a number of methods to physically monitor the fishing activities within their respective EEZs, including aerial surveillance and sea patrols.

Aerial surveillance on behalf of the PICs is generally limited to that provided to the FFA member countries on a regional basis by Australia, New Zealand and to a lesser extent, France. Australia and New Zealand periodically deploy military planes specifically equipped for aerial surveillance within the FFA region, typically visiting several countries and providing overflights of EEZs. To maximize the value of such flights, they are often integrated into pre-planned surveillance exercises that coordinate air and sea assets on either a single- or a multi-country basis. No data on the frequency of such exercises are available, but it is believed the exercises occur three to four times per year per country, with perhaps more intensive operations in the EEZs of countries having the most foreign fishing activity.

By far the largest at-sea components applied to fishery surveillance and enforcement are the assets provided to the PICs under the Australian Pacific Patrol Boat Project. Since its inception in 1987, 22 Pacific patrol boats have been provided to twelve of the PICs.[52] Under terms of the Australian program supplying these vessels, in-country technical and professional support is provided to the relevant agencies operating the patrol boats. Arrangements for operation of the patrol boats vary by country, but generally require the recipient country to fund all or a major portion of recurrent operating costs.

While maritime surveillance is a priority for the use of patrol boats in most recipient countries, search and rescue, humanitarian assistance and administrative support missions are also included and often take precedence over fishery surveillance activities.

In the U.S., maritime surveillance is carried out by multiple government agencies, including the military and the U.S. Coast Guard (USCG), employing a variety of means. The USCG's District 14, headquartered in Honolulu, Hawaii, has primary responsibility for fishery surveillance in the WCPO, including the Treaty Area. The EEZs surrounding the Hawaiian Islands and U.S. Pacific Insular Areas (e.g., Guam, Northern Mariana Islands, American Samoa, and Wake Island) represent more than 40% of the U.S. EEZ. The area is considered by the USCG to be "at high risk to poaching from a multi-national fleet targeting highly migratory species such as tuna" (Faircourt, 2002).

The USCG notes that surveillance of these areas is resource-intensive. Aircraft currently used include C-130 and HH-65 helicopters, the latter deployed from high-endurance cutters. The USCG is assisted in its enforcement of domestic tuna fishing activities by the requirement of the Hawaii-based longline fleet

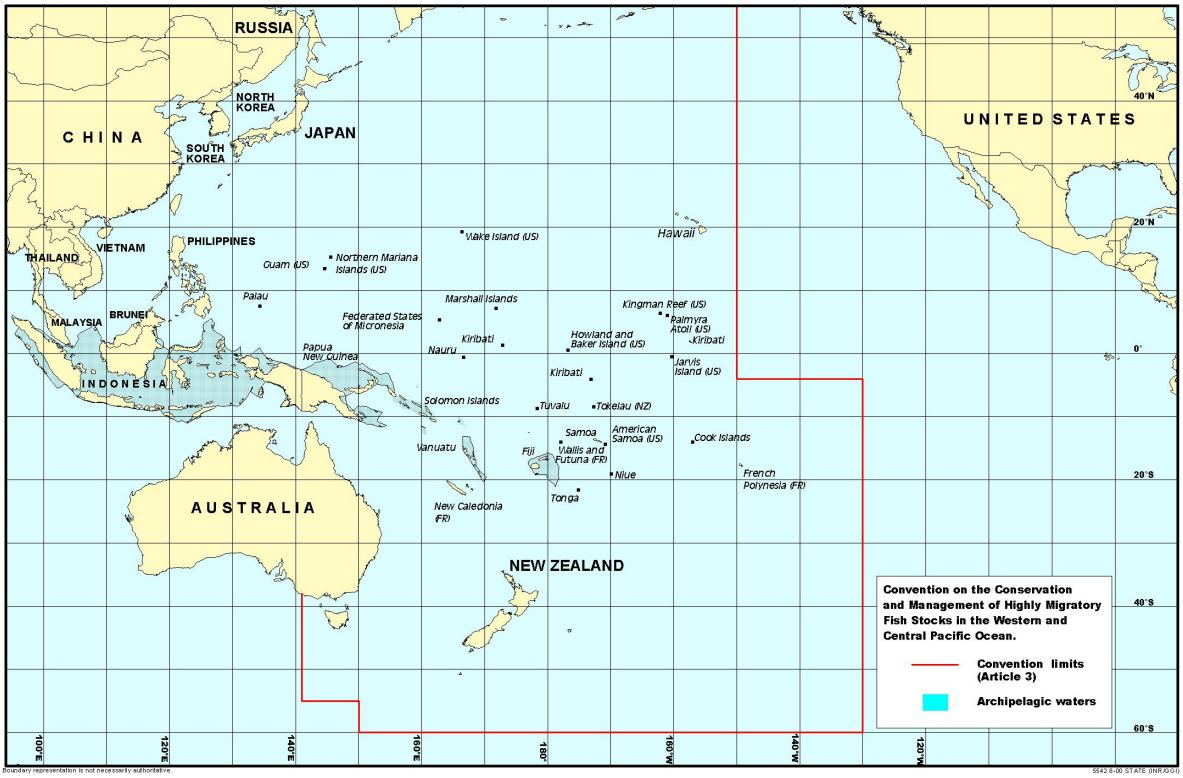
[52] Vessels have been provided to Papua New Guinea (four), Tonga (three), Solomon Islands (two), Federated States of Micronesia (three), Fiji (three), and one each to Marshall Islands, Cook Islands, Samoa, Vanuatu, Kiribati, Tuvalu, and Palau.

(100-plus boats) to carry VMS units and participate in the NOAA Fisheries VMS program headquartered in Honolulu. This VMS system is used primarily to enforce time and area closures. Each permit holder in the Hawaii-based longline fishery is required to maintain and operate VMS units on their vessels, with NOAA Fisheries providing and installing the units at no cost to the permit holders.[53]

Article 5 of the Treaty addresses compliance powers to enforce the terms of the Treaty. The PICs enforce the provisions of the Treaty and licenses issued pursuant to the Treaty in waters of their respective national jurisdictions. The U.S. enforces the Treaty in accordance with the South Pacific Tuna Act, which requires vessel operators to comply with each of the applicable national laws and specifically makes it unlawful for persons to fish in a Closed Area or a Limited Area.

3.2.5 Western and Central Pacific Fisheries Convention (WCPFC or Convention)

A new regime that will affect the management of tuna fisheries in the WCPO is the 2000 Convention on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean. The Convention establishes a Commission that will convene its first meeting in December 2004, following the Convention's entry into force in June 2004. The Commission will be responsible for establishing conservation and management measures for highly migratory fish stocks of the WCPO. A map of the Convention Area is shown in Figure 3.2-1.



Source: NOAA Fisheries, Pacific Islands Region

Figure 3.2-1: Convention Area, Convention on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean

[53] 50 CFR §660.25

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 United Nations Fish Stocks Agreement (Article 2, WCPFC).

The Convention applies to all species of highly migratory fish stocks (defined as all fish stocks of the species listed in Annex I of the 1982 Convention occurring in the Convention Area and such other species of fish as the Commission may determine) within the Convention Area.[54] As defined, the Commission's mandate includes management of not only tuna species but also species caught incidentally to tuna, such as sharks, billfish, and other highly migratory species. Conservation and management measures adopted by the Commission will be applied throughout the range of the stocks, or to specific areas within the Convention Area (PrepCon, 2002).

The status of the Treaty with respect to conservation and management measures adopted under the new Convention is still evolving. It is anticipated that all parties, including the PICs, will seek to ensure such a regional licensing arrangement becomes an important component of any fisheries management undertaken by the Convention.

3.3 The U.S. Purse Seine Fleet

3.3.1 Background and Fishery Development

The U.S. purse seine fleet in the western Pacific originated in California, or more generally, the eastern Pacific Ocean, where a tuna fishery has operated since the 1920s. Fishing was primarily an occupation of the various immigrant communities, the most active being the Portuguese, Italian, Slavic, and Japanese. The family unit has been and continues to be an important factor in the operation and continuity of the U.S. fleet. Several factors, including unilateral implementation of 200-mile (322-km) extended jurisdictions by Latin American countries, expansion of fishing fleets in several of those countries and U.S. domestic legislation protecting dolphins, motivated vessel owners to look elsewhere for productive fishing areas (Doulman, 1987).

The western Pacific became increasingly attractive after the development of a seasonal fishery in New Zealand, reports of successful Japanese ventures in equatorial regions and some positive results from exploratory fishing cruises funded largely by the U.S. Government (Hinds, 1974; Eggleston, 1976; Habib et al., 1980; Felando, 1987). Japanese research cruises in the 1970s led to joint-venture operations between Japan and Papua New Guinea (NMFS, 1974; SPC, 1984). The purse seine fishery in the equatorial WCPO began to grow after U.S.-style Japanese purse seiners successfully developed techniques to capture tuna schools found in association with natural drift objects, primarily in the waters between Papua New Guinea and the FSM (Watanabe, 1983).

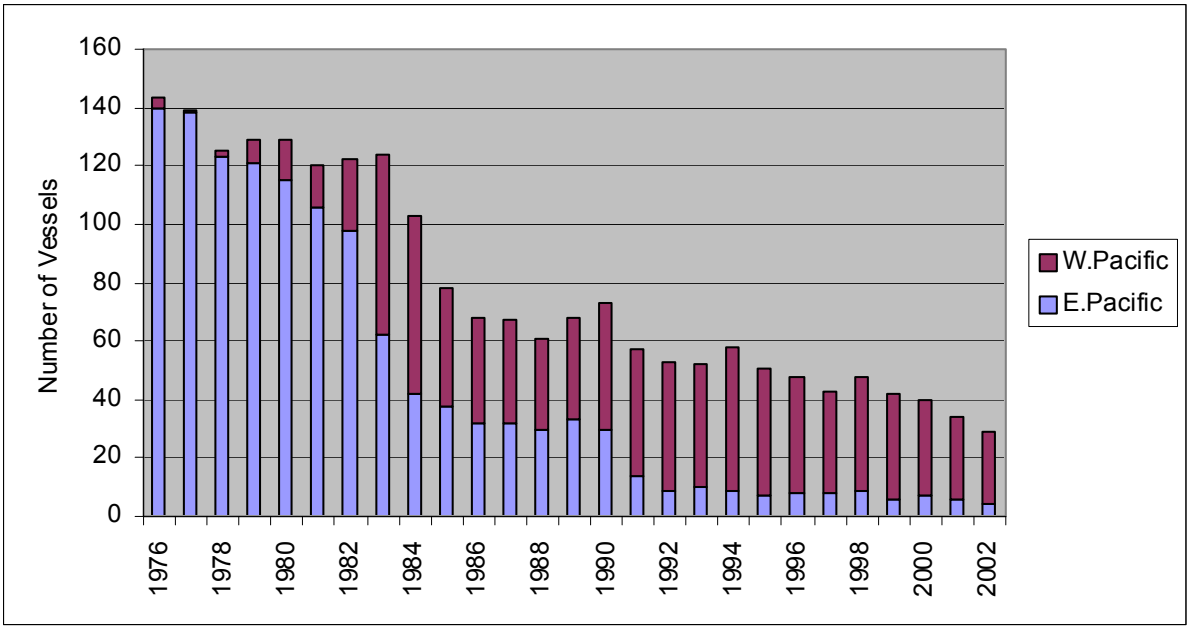
A major turning point for the U.S. fleet came during the intense 1982–1983 El Niño, when many of the U.S. eastern Pacific purse seiners moved to the WCPO. In subsequent years, vessel numbers in the overall Pacific fleet decreased; however, more vessels were active in the western Pacific than in the eastern Pacific.

[54] Sauries (family *Scomberesocidae*) are exempted from the Convention (Article 3, Paragraph 1), although no reason is given in the Convention for the exemptions.

During strong ENSO events, thermocline depths increase and overall productivity decreases in the eastern Pacific, greatly reducing purse seine catch rates in that part of the region.[55] Conversely, thermocline depths are shallow in the WCPO during ENSO events, increasing the efficiency of fishing gear. Strong ENSO events also appear to enhance localized tuna baitfish concentrations and the recruitment of tropical tuna species in the WCPO (Lehodey et al., 1998; Lehodey, 2000).

In the El Niño year of 1983, 62 vessels that had operated all or part of the year in the WCPO caught 179,000 mt with a CPUE of 20.7 mt per set, a catch total that this fleet did not exceed until 1991, when 43 vessels took 216,000 mt with a CPUE of 30.5 mt per set (SPC, 2003a).

By the mid-1990s, only a handful of vessels operated in the eastern Pacific and by mid-2002, it was estimated that only one or two would fish in that area. Figure 3.3-1 depicts the size and general geographic location of the U.S. purse seine fleet in the Pacific from 1976 to 2002.



Source: Gillett et al. (2002)

Figure 3.3-1: Numbers of Vessels in the U.S. Purse Seine Fleet

Gillett et al. (2002) provide a detailed description of the development and expansion of the U.S. WCPO purse seine fleet. The vessels essentially left the highly seasonal New Zealand fishery after the 1982–83 season due to depressed ex-vessel skipjack prices and regulations excluding them from the more productive inshore fishing grounds. The U.S. fleet then concentrated on developing a year-round fishery along the equator, generally within a rectangular area bounded by 10°N–10°S and 135°E–170°E, and encompassing the EEZs of Palau, FSM, Papua New Guinea, Solomon Islands, Nauru, Marshall Islands, and the Gilbert Islands group of Kiribati.

Initially, U.S. purse seiners adopted and refined successful seining techniques used by the Japanese to purse seine mixed aggregations of skipjack and yellowfin tuna found in association with drifting

[55] The thermocline is a layer of the water column where water temperature changes rapidly with depth, from the warm, less-dense surface water layer to colder, denser deep water.

logs and flotsam. The technique required setting and pursing before or close to sunrise, as the fish concentrated closer to the surface but could not see and avoid the net (Hampton and Bailey, 1999). Due to the heavy reliance on locating schools in association with natural drifting objects, the fleet tended to concentrate within the noted area, which is relatively close to or down current from large, high islands that are the source of most of the large drift logs (Gillett, 1986).

Despite higher success rates when setting on schools associated with large drift logs and flotsam, the U.S. fleet actively pursued unassociated schools of large yellowfin and skipjack. Actually, these schools are almost always found in association with and actively feeding on surface baitfish concentrations that slow and stabilize the schools, facilitating their capture (Hampton and Bailey, 1999). With time, improvements in fishing technology and accumulated experience led to improved success rates on unassociated sets, where larger, higher-value yellowfin or large schools of mature skipjack could be targeted. Fishing grounds continued to expand eastward in line with these developments throughout the 1980s, eventually encompassing the Phoenix and Line Islands (Kiribati); the U.S. possessions of Howland, Baker, and Jarvis; Tokelau; and the high seas between these EEZ areas. Unassociated school sets accounted for 80% of fishing effort by the U.S. fleet by 1988 (Coan et al., 1999).

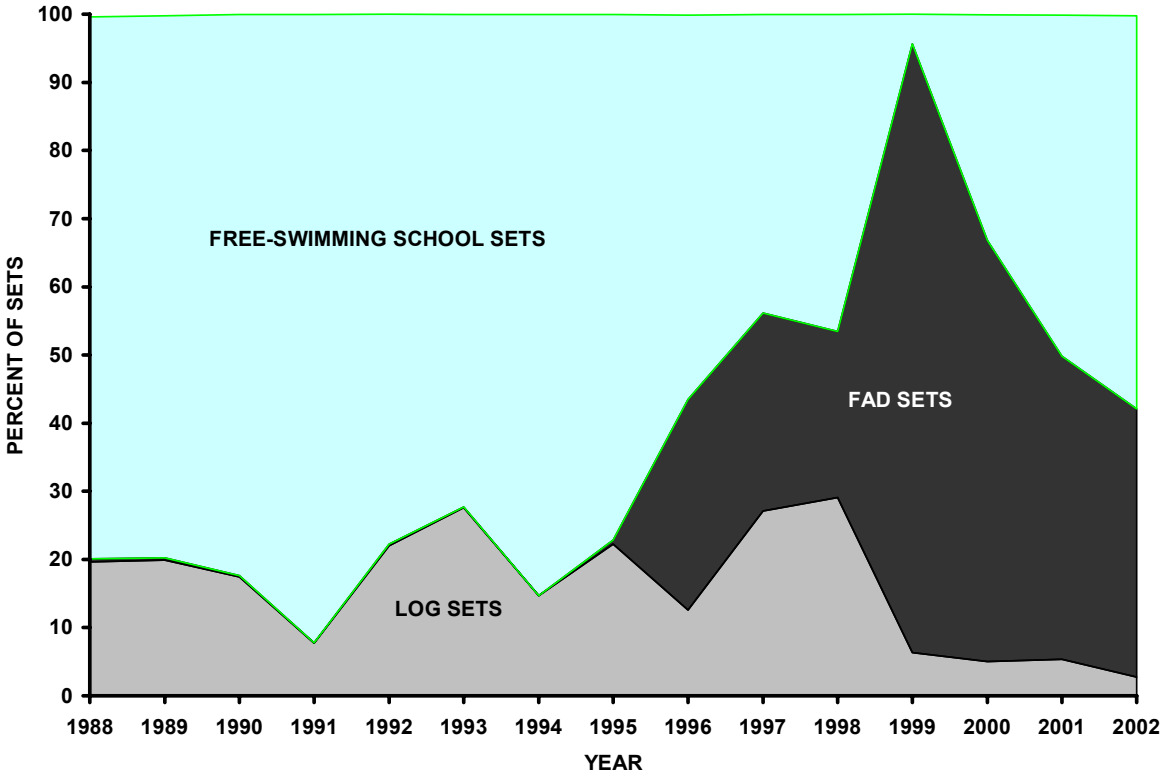
The trend in unassociated setting by the U.S. fleet peaked in 1991 when 43 vessels achieved the highest annual catch to date of 216,000 mt and a near-record CPUE of 30.5 mt per day (SPC, 2003b). During the 1980s and early 1990s, it became apparent that purse seine effort shifted east or west in response to ENSO events: eastward during El Niño events and westward during La Niña periods (Williams, 2003d).

In 1995–96, the fishing strategy of the U.S. fleet began to change, shifting to a higher reliance on associated setting and the utilization of drifting FADs. This trend increased steadily and peaked in 1999, when 90% of all sets were made on drifting FADs, 6% on natural drifting objects such as logs, and 4% on unassociated schools (Coan et al., 2000); see Figure 3.3-2 (from Coan and Itano, 2003).

The use of drifting FADs allowed the U.S. fleet to operate in the eastern area of the fishery, where natural logs are scarce, even during non–El Niño periods when the fishery traditionally shifted west toward Papua New Guinea and the FSM. These associated catches tend to contain high proportions of smaller tunas and bycatch species, with the effect of depressing ex-vessel value on a per-ton and per-trip basis (Coan and Itano, 2003). Depressed cannery prices for small skipjack and yellowfin/bigeye since 2000 encouraged much of the fleet to reduce their reliance on drifting FADs and pursue unassociated schools of larger fish, when available.

3.3.2 Fleet Description

More than 50% of the U.S. fleet is still owned by people who belong to “fishing families” from Southern California that have been involved in tuna fisheries for at least two generations. These owners are often directly involved in the management and operation of the vessel, and generate personal income in the form of vessel management fees. In the organizations with strong family participation, employment can also be generated for close relatives who may serve as captain or senior crew. The financial details of vessel ownership in the U.S. fleet are not fully known; however, it is believed that most vessels are currently owned by members of families with a long history in the fishery and are not believed to be heavily mortgaged. Vessel ownership in recent years has been a dynamic situation, with a fluctuating mix of corporate and family-based ownership.



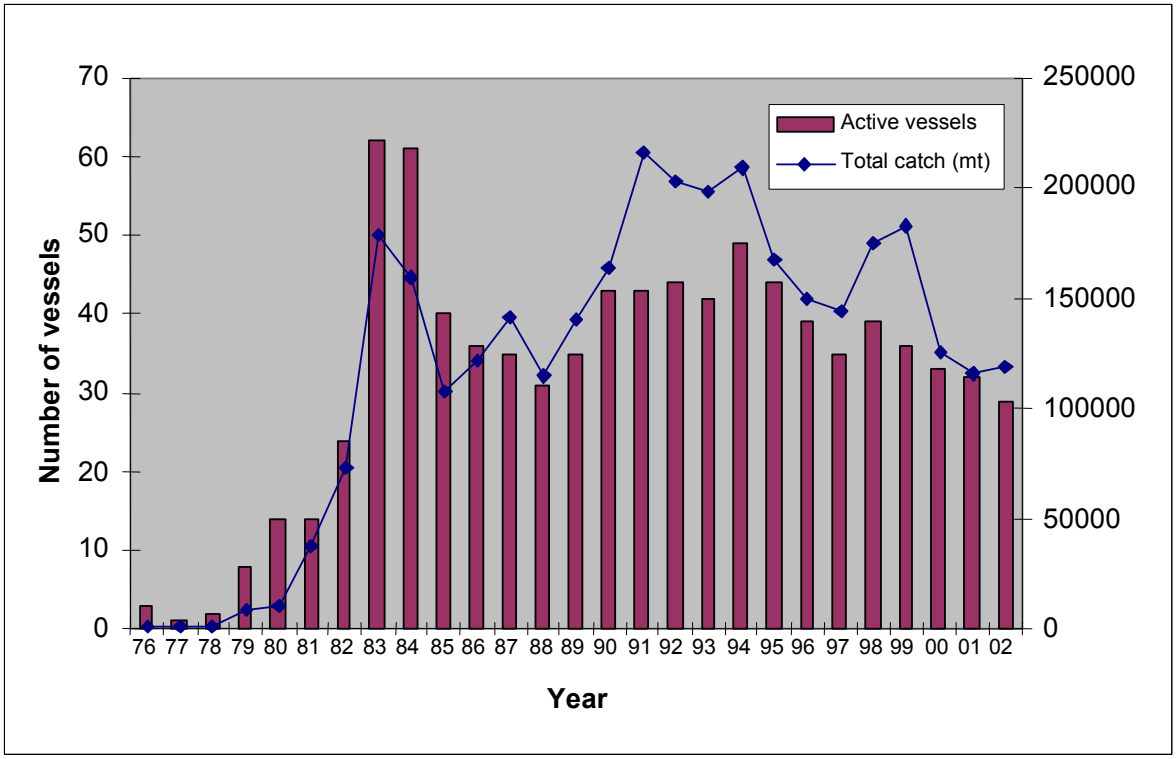
Source: Coan and Itano (2003b)

Figure 3.3-2: Proportion of Set Types for the U.S. WCPO Fleet, 1988–2002

Crew composition of the fleet changed dramatically when the vessels first shifted operations from their traditional homeport of San Diego, California, to Pago Pago (American Samoa) and Guam. When based in southern California, the industry relied heavily on U.S. and foreign nationals of their own ethnic group if not their own extended families. Crew compositions were filled out with a broad mix of nationals from the various regions where their operations took them, consisting of U.S. citizens, Mexicans, Peruvians, and representatives of most Central American countries.

When operations shifted to the western Pacific, many of these groups were eventually replaced with citizens of the Pacific Islands, New Zealand, and the Philippines. Due to reduced profit margins, low fish prices, and steadily increasing fixed costs, many vessels now operate with a minimum of higher-paid U.S. citizens on board (Gillett et al., 2002).

NOAA Fisheries maintains catch and effort data for the western Pacific U.S. purse seine fleet as reported by the SPC, with records dating back to 1976, when three vessels reported a total catch of 700 mt (SPC, 2003a). Vessel participation remained low throughout the 1970s, rose sharply in the early 1980s in response to a strong El Niño event and developing New Zealand and western equatorial fisheries, and peaked in 1983 when catch and effort data were submitted from 62 vessels (see Figure 3.3-3).



Data source: SPC (2003a)

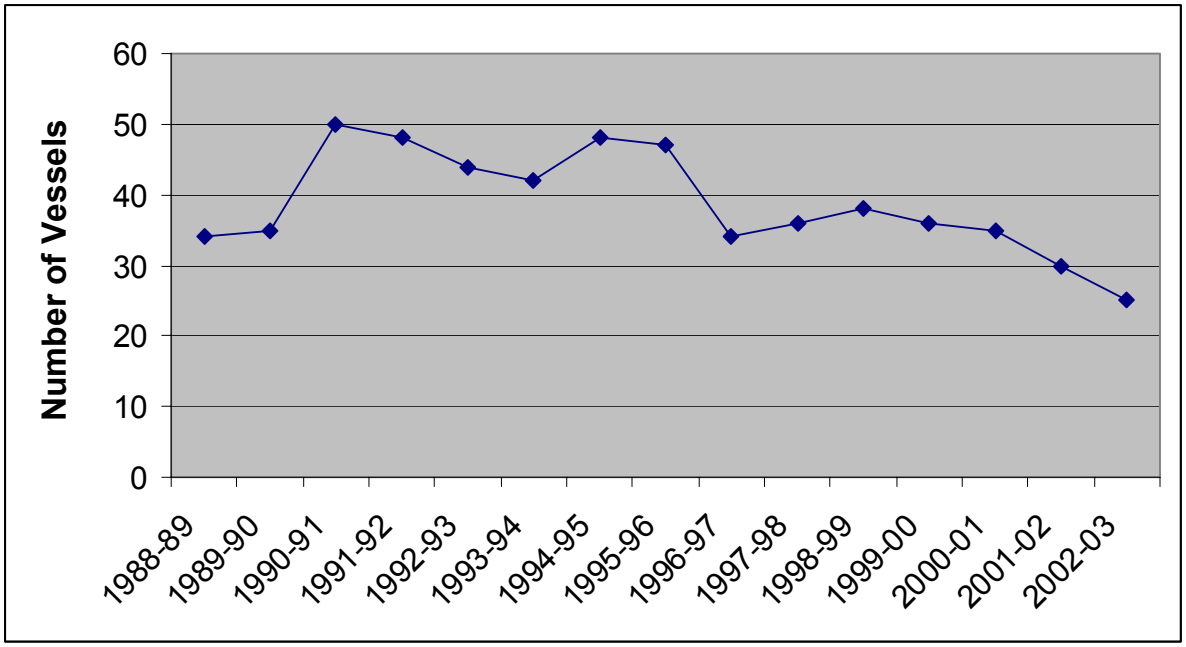
Figure 3.3-3: Number of U.S. Purse Seiners for WCPO Catch and Effort and Total Annual Catch (mt) for 1976–2002

During 1987–88, thirty-two U.S. vessels were fishing in the WCPO. Effort increased above 40 vessels per year from 1990 to 1995, peaking at 49 active vessels in 1994. Fleet numbers have gradually decreased since the late 1990s. By August 2003, 26 vessels were listed on the FFA Regional Register and only 20 were actively fishing. From a historical high catch of 216,000 mt/year in 1991 at 30.5 mt per set, the catch has fallen to below 120,000 mt/year at 21.4 mt per day in 2002 (Gillett and Lewis, 2003; SPC, 2003b).[56]

As of February 2004, the U.S.-flagged tuna purse seine fleet in the WCPO consisted of 22 vessels. The exact number of vessels that will engage in the western Pacific fishery during the current year may be slightly higher because some U.S. vessels are licensed to fish in the WCPO and the eastern tropical Pacific.

The licensing year under the U.S. Tuna Treaty runs from 15 June of one year to 14 June of the following year. The number of vessels issued licenses per licensing year since the commencement of the Treaty in 1988 is shown in Figure 3.3-4.

[56] A drop in catch per day does not by itself necessarily fully indicate the reasons for the reduction in vessel numbers cited. Changing economics of the fishery, including reductions in fish prices, as well as other factors discussed in Gillett et al. (2002) all contributed to the decline.



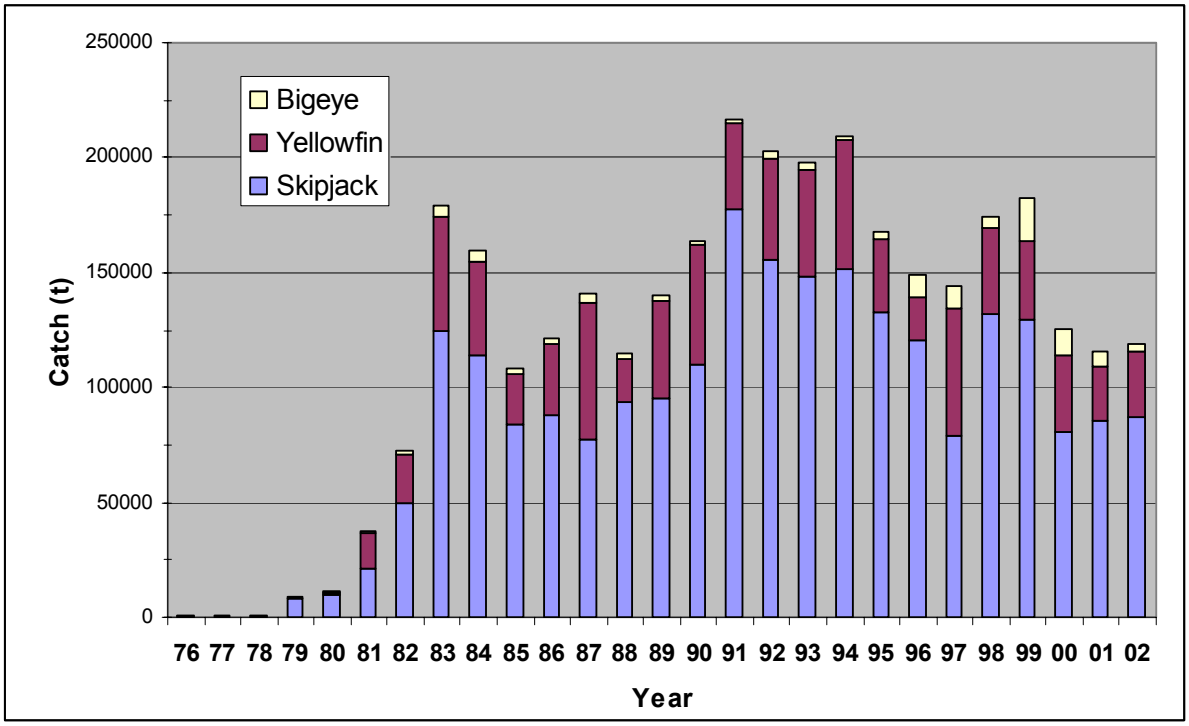
Source: FFA, unpublished data

Figure 3.3-4: Number of Vessels Licensed under U.S. Tuna Treaty, 1988–2003 by License Year (June 15 – June 14)

3.3.3 Catch and Effort

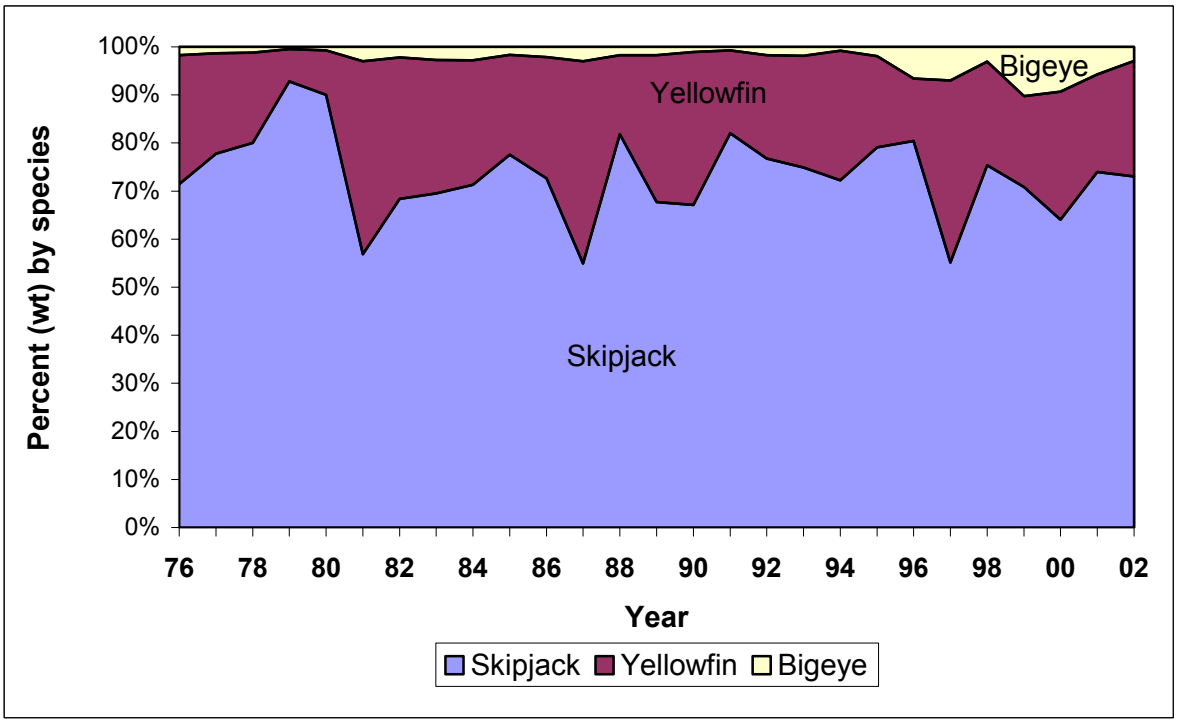
The highest catch rates were achieved during or following strong ENSO events as in 1983–84, 199192, and 1998–99. High catch rates in the 1998–99 period were also driven by a high percentage of drifting FAD sets that increased vessel efficiency. Total catch by the fleet peaked in 1991 at 216,269 mt taken by 43 vessels, driven by high catch rates of skipjack taken in unassociated sets. During the recent period 1999–2002, total catch has fluctuated between 182,485 and 115,525 mt taken by 29 to 36 vessels (SPC, 2003b). While vessel participation fell by three vessels between 2001 and 2002, total fleet catches increased 3%. Figure 3.3-5 indicates catch by species for the U.S. fleet (SPC 2003b).

Historically, the U.S. WCPO purse seine fishery is based on skipjack, with around 20–25% yellowfin by weight and small landings of juvenile bigeye tuna (Figure 3.3-6**)**. The 27-year mean values (years 1976–2002) for species composition taken by the U.S. fleet are 73.3% skipjack, 23.8% yellowfin, and 2.9% bigeye. During this period, skipjack rates have ranged from a low of 54.9% in 1987 (when high catch rates of yellowfin occurred) to 92.8% in 1979. Yellowfin landings have contributed between 6.7% and 42.8% of landings, but are usually close to the long-term mean of 23.8%. The estimated landings of bigeye peaked in 1999 at 10.2% of the catch, generally attributed to the high percentage of associated sets made that year.



Source: SPC (2003b)

Figure 3.3-5: Total Catch (mt) by Species for the U.S. Purse Seine Fleet in the WCPO



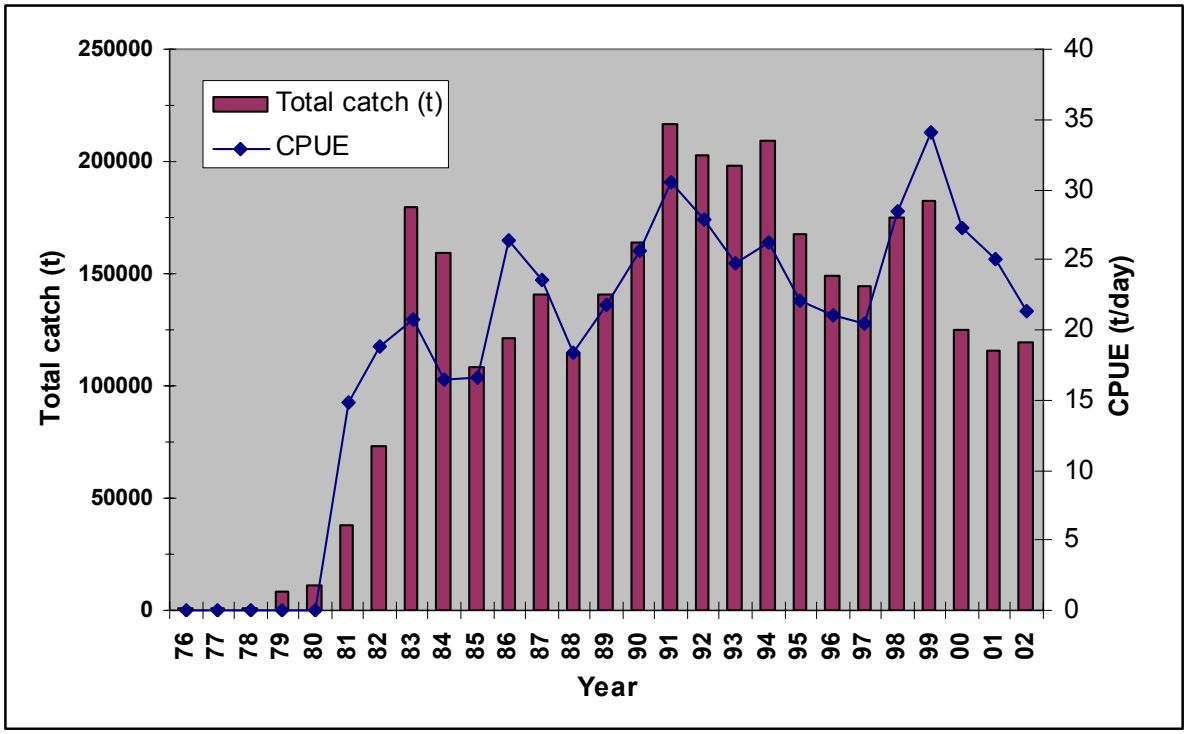
Source: SPC (2003b)

Figure 3.3-6: Percent Species Composition of Landings for the U.S. Purse Seine Fleet in the WCPO, 1976–2002

Although purse seine gear targets skipjack tuna, juvenile bigeye and yellowfin are also frequently captured. As both juvenile bigeye and yellowfin tend to yield the same ex-vessel price, discrepancies exist in accurate reporting for these species. Due to the importance of bigeye, in particular, to regional longline fisheries, accurate species specific reporting of bigeye is now a priority for the SPC and other regional fishery agencies (Lawson, 2003). Juvenile bigeye tuna strongly associate with drifting objects, however, and in line with the decreasing use of drifting FADs by the purse seine fleet, catches have decreased in recent years.

In 2003, NOAA Fisheries-Southwest Fisheries Science Center conducted an audit of purse seine port samplers employed by the NOAA Fisheries American Samoa Field Station in Pago Pago (Itano and Coan, 2003). The two NOAA-employed port samplers were evaluated at 100% accuracy when identifying a wide size range of yellowfin and bigeye tuna. Sampling protocols and accuracy were found to be satisfactory during dock and onboard sampling.

The SPC OFP compiles fishery CPUE in mt of catch per day engaged in fishing or actively searching on the fishing grounds. Skipjack CPUE data are available since 1981, with a mean value of 16.7 mt per day for the period 1981–2002 (SPC 2003a). CPUE values ranged from 7.3 mt per day to a high of 26.8 mt per day in 1999, when the U.S. fleet relied heavily on drifting FADs. Yellowfin CPUE for the fishery is characteristically lower, ranging from 3.0 to 12.0 mt per day and averaging 6.5 mt per day for the same period. High catch rates were achieved in 1991, driven by large catches of unassociated skipjack schools (Figure 3.3-7). However, the highest total CPUE of 34.1 mt per day was recorded in 1999, achieved by a heavy utilization of drifting FADs as discussed in Coan and Itano (2003b).



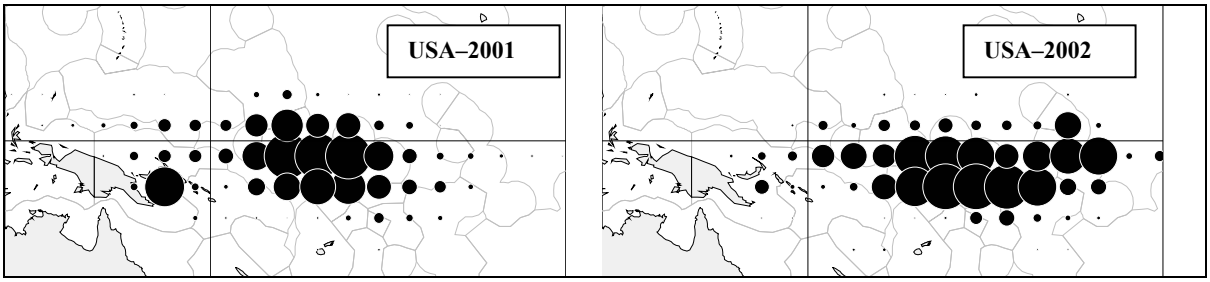
Source: SPC (2003a)

Figure 3.3-7: Total Catch (mt) and CPUE of the U.S. WCPO Purse Seine Fleet, 1979–2002

3.3.3.1 Spatial Distribution of the Fishery

The distribution of catch by the WCPO purse seine fishery is strongly influenced by ENSO events, traditionally shifting east of 160°E during El Niño events and west of 160°E during La Niña periods. El Niño–related eastward shifts of nearly 4,000 km have been noted during periods of only six months. Lehodey et al. (1997, 1998) suggests that skipjack abundance is linked to east–west movements of warm water and an associated frontal region of high productivity and tuna forage. El Niño conditions also produce unusual westerly winds and surface drift in the WCPO that transport drifting debris further eastward than usual. The result is that log-associated purse seining also increases purse seine effort in the eastern portion of the fishery during these El Niño events (Williams, 2003d).

Figure 3.3-8 indicates U.S. purse seine effort during a transitional year between an El Niño and La Niña period (2001) and an El Niño period (2002). Effort in strong La Niña conditions normally shifts west of the vertical line indicating 160°E longitude. However, in recent years, the U.S. fleet has been able to maintain high catch rates in the eastern region through the deployment of drifting FADs close to their homeport of Pago Pago (Gillett et al., 2002).



(The largest circle size indicates ≥ 360 days fishing or searching.) Source: Williams (2003d)

Figure 3.3-8: Distribution of U.S. Purse Seine Effort during 2001 and 2002

3.3.4 Operational Characteristics

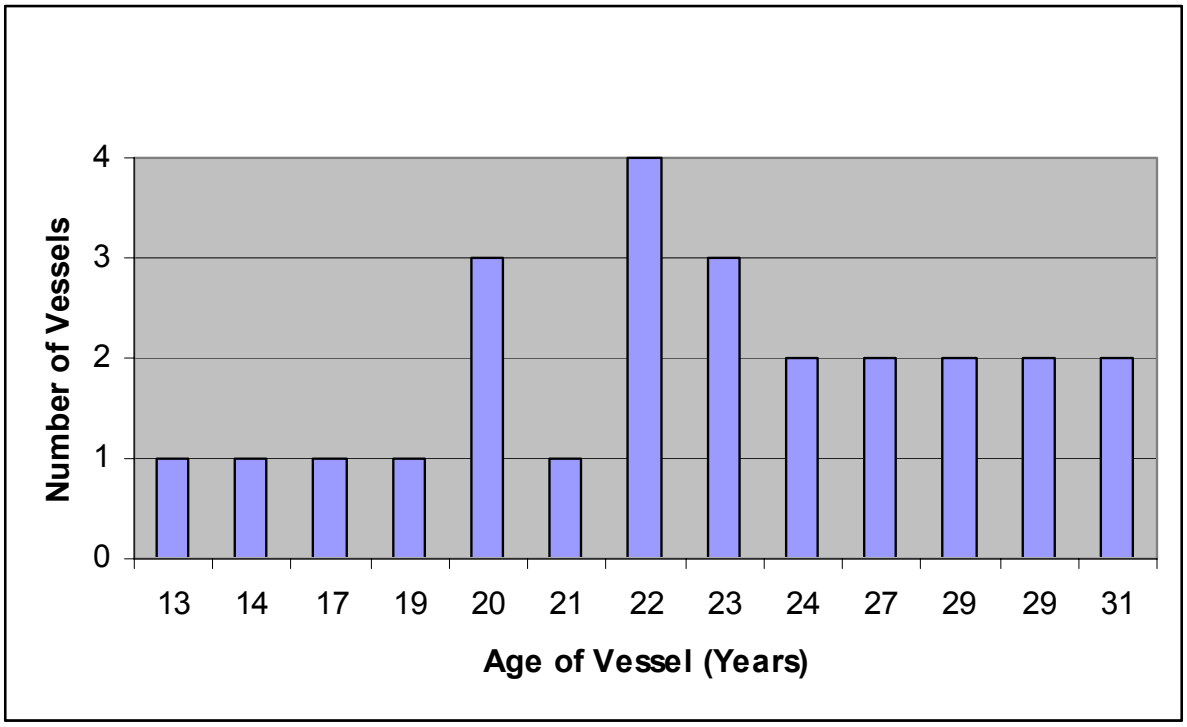
3.3.4.1 Vessel Size and Age

The U.S. fleet was the most innovative fleet during the developmental phase of the fishery, with great variation in vessel size and design. In 1995, the average GRT was 1,181 with an overall length of 64.1 meters. By 2003, the average GRT had risen to 1,241, and overall length to 73.2 meters. Fish-carrying capacity, an estimate of tonnage that can vary with the size and species of fish loaded onto the vessel, is estimated to be approximately 31,600 mt for the fleet as a whole, with an average capacity of 1,264 mt (Gillett and Lewis, 2003).

The increase in overall capacity of the fleet can be explained partially by some owners increasing the physical size of existing vessels. Ten U.S. purse seiners have been "stretched," which involves cutting the ship aft of the deckhouse and adding hull and fish wells to increase carrying capacity. These capacity increases can be very significant, with some vessels increasing their hold capacity by more than 50%. Currently, vessels in the U.S. fleet can carry approximately 1,000–1,770 mt, depending on the mix and sizes of species in the catch.

In 2002, the average vessel age of the U.S. western Pacific fleet was approximately 24 years. Just over half of the vessels were built in the 1970s, with most of the others built in the 1980s. The oldest

vessels in the fleet are 32 years old, and the last new vessel to enter the fleet was in 1990. The distribution of vessel age in the fleet in 2002 is shown in Figure 3.3-9. However, vessel age is just one factor, as the vessels have undergone continual upgrading and outfitting to maintain their viability in the fishery.



Source: FFA, unpublished data

Figure 3.3-9: Age Distribution of the Vessels in the U.S. Tuna Purse Seine Fleet, 2002

3.3.4.2 Fishing Operations

Although fishing operations initially focused effort on log-associated schools, by 1988, approximately 80% of sets occurred on unassociated schools. A shift to FAD fishing emerged in 1996 and by 1999, FAD fishing accounted for 90% of sets. Recent years have seen a return to unassociated setting, which accounted for 60% of sets in 2002 (Gillett and Lewis, 2003).

Increased efficiency when targeting unassociated schools relates mainly to locating a school of tuna and pursing deeper nets faster to increase success rates on individual sets. Unassociated sets are actually large surface concentrations of tuna actively feeding on baitfish that can also draw huge concentrations of seabirds. The adoption of bird-detecting radar greatly facilitated the location and tracking of schools suitable for unassociated sets. Accumulated experience and remote sensing technologies aided vessel operators to move to general areas where such schools may be present.

FAD-assisted purse seining is heavily reliant on advances in marine electronics to monitor the FAD's position, local abundance of fish near the FAD and the setting of the school before dawn. The U.S. fleet has adopted many of these technologies, including radio or satellite transmitting buoys that mark drifting FADs capable of sending information to the vessel on the exact Global Positioning System position, sea surface temperature, biomass estimate of fish below the FAD, battery condition

of the unit, current speed and other parameters useful to the fishing captain. The U.S. fleet has remained technologically competitive in the WCPO fishery by implementing the following measures:

- Continual upgrading of nets, net hauling, fish-loading techniques and machinery;
- Upgrading of marine electronics;
- Upgrading of refrigeration systems to maintain large individual sets;
- Adoption of high tech drifting FAD technology;
- Adoption of remote sensing technologies in fishing operations.

Fishing operations for the U.S. WCPO fleet will likely remain a mix of unassociated, log-associated, and drifting FAD–associated seining, depending on ex-vessel prices of small tuna, ENSO conditions, and inter-annual variability in the availability of tropical tuna species. The evolution and recent status of fishing technology utilized by the fleet are documented in Itano (1998, 2000a, 2002, 2003).

3.3.5 Landing Points and Disposition of Catch

Historically, the U.S. fleet has unloaded mainly at the two canneries in Pago Pago, American Samoa. American Samoa is located just beyond the southeastern limit of the purse seine fishery, and continues to be the principle port of the U.S. fleet. From 1980 to the early 1990s, a significant component of the fleet (14 vessels) transhipped from Guam and Tinian (located in the Northern Mariana Islands, considered to be the western limit of the WCPO purse fishery). The company involved in these operations became insolvent in 1995, and the vessels have since been purchased by U.S. and other interests. Small amounts of transhipment take place in Kiribati and the Marshall Islands, particularly during El Niño periods. Sporadic offloading directly to processors has also occurred in the Philippines, Thailand, and Australia, and to a lesser extent in Fiji and the Marshall Islands.

3.3.6 Key Economic Considerations

The indicative costs and revenue estimates on a per vessel basis for the U.S. purse seine fleet based in American Samoa are summarized in Table 3.3-1.

A few comments are necessary to put the indicative costs of Table 3.3-1 into context. First, the revenue and low profitability numbers reflect the cannery prices[57] being offered at the time of the survey in the late 1990s (see Figure 3.1-3). Current revenue and profitability have eroded considerably since the late 1990s. While profitability of the fleet as a whole is indicated by its reduced size, a corollary of the average age of American seiners (illustrated in Figure 3.3-9) is that capital charges and debt payments are probably relatively modest for the fleet at large.[58] Where this is true, the ability of individual vessels to persevere is largely due to their ability to meet all trip or

[57] While no published cannery prices are available for fish landed in American Samoa, the global nature of the industry tends to cancel out major discrepancies between various markets. See Squires et al. (in press).

[58] Although this assumption may be generally valid for the American fleet, individual vessels may carry high debt burdens as a result of reselling or refitting / refurbishment borrowing.

variable costs. It is likely that the break-even economics for the U.S. fleet could thus be lower than for newer fleets used by other DWFN countries in the Pacific.

Table 3.3-1: Operational Economics Costs of the U.S. Purse Seine Fleet Based in American Samoa – (1998 dollars)

Component	Annual Value (Thousands of US$)	Percentage of Total Costs
Gross Revenue	$4,700	—
Fixed Costs	$2,557	57
Variable Costs	$1,921	43
Labor Costs	$1,055	24
Fuel	$700	16
Total Costs	$4,478	100
Net Revenue / Income	$222	—

Source: McCoy and Gillett (1998)

3.4 The U.S. Longline Fleet

3.4.1 American Samoa Longline Fleet

3.4.1.1 Background and Fishery Development

The domestic longline fishery of American Samoa was established in 1995, based originally on small-scale longline techniques that had been developed in neighboring independent Samoa with assistance from the SPC (WPFMC, 2003a; Chapman, 1998). The longline fisheries in American Samoa and Samoa target deep-swimming albacore, supplying fresh or frozen catches to the two Pago Pago canneries.

The American Samoa albacore longline fleet was originally based on 9.0-meter aluminum-hulled *alia* catamarans fitted with manual longline reels setting approximately 300 hooks per day on 4.5–6 km of monofilament mainline. Larger *alia*-style vessels and monohull vessels of various styles and sizes (generally longer than 12 meters) have since entered the fishery. Albacore landings have expanded in response to increasing effort from 27 mt in 1995 to 626 mt in 2000, corresponding to an increase in number of vessels from 5 to 37 (Ito et al., 2003; WPFMC, 2003b).

In 2001, 25 large monohull vessels greater than 15 meters in length entered the fishery. These vessels (known locally as "big boats" and referred to as such in this Environmental Assessment) are equipped with larger, hydraulically driven longline reels, modern marine electronics for communication and fish finding and mechanical refrigeration (O'Malley and Pooley, 2002). Only three vessels in the big boat category were active during the previous year. Effective effort in the fishery rose sharply in response to these new entrants, some of which were capable of setting more than 2,500 hooks per day and operating trips in excess of three weeks. The estimated effort in numbers of hooks fished per year rose rapidly from 1.3 million in 2000 to 5.8 and 13.1 million hooks in 2001 and 2002, respectively. Corresponding albacore catches increased from 624 mt in 2000 to 3,253 mt and 5,944 mt in 2001 and 2002, respectively (Ito et al., 2003; WPFMC, 2004; WPacFIN, 2004). Preliminary data for 2003 indicate a slight increase in effort to 13.9 million hooks set, with a significant decline in catch to around 3,853 mt (WPacFIN, 2004).

Regulations and Permitting. The Government of American Samoa does not specifically regulate pelagic fishing activity within the Territory; rather, the fishery is managed under a federal fishery management plan (FMP). The FMP creates the basis for regulations as promulgated by the Western Pacific Fishery Management Council (WPFMC) and implemented by NOAA Fisheries. NOAA Fisheries and the American Samoa Department of Marine and Wildlife Resources (DMWR) are responsible for monitoring the fishery. Vessels deploying longline gear in the U.S. EEZ surrounding American Samoa must be registered for use with a western Pacific general longline permit or a Hawaii longline permit. In January 1996, a federal longline logbook system was implemented that requires operators to record daily catch and effort by set and species, related time and area information and interactions with protected species. Longline gear must be marked with the official number of the permitted vessel.

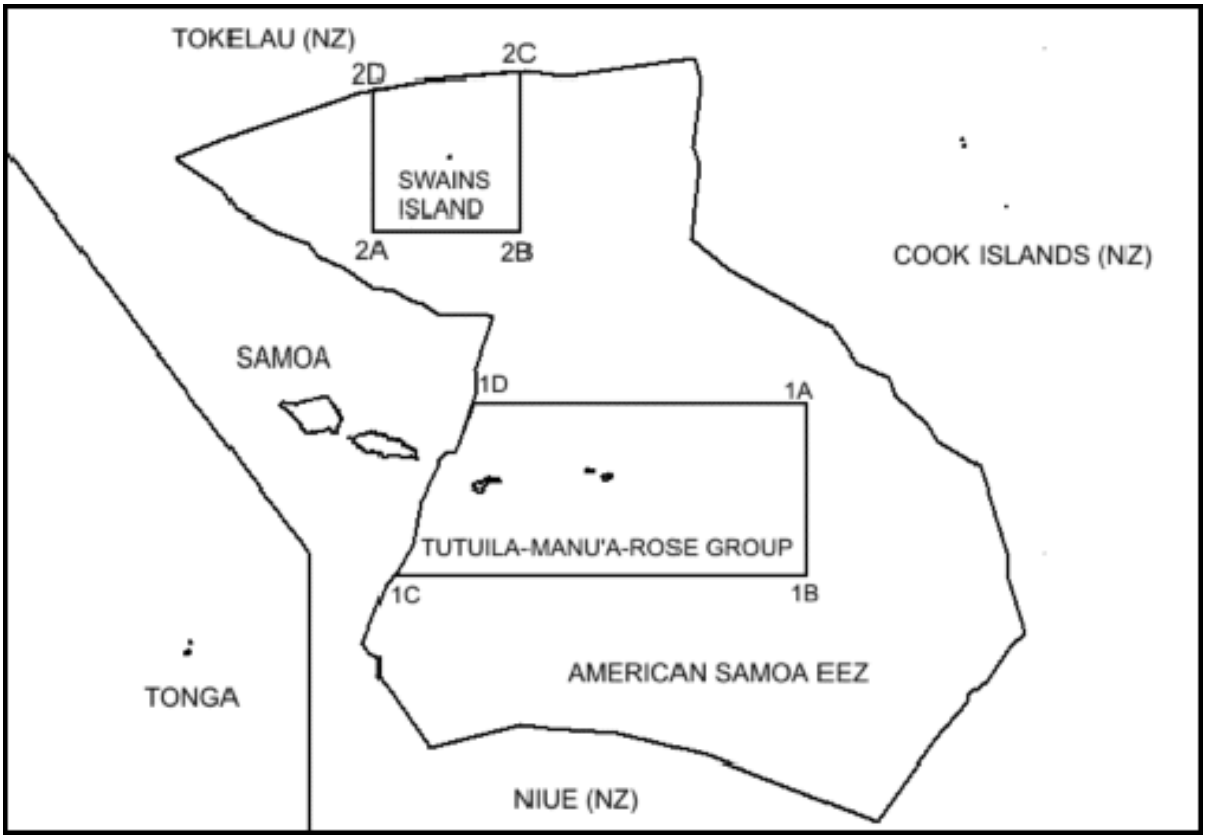
Longline logbook data is collected in American Samoa by the DMWR, entered, and periodically sent to NOAA Fisheries in Hawaii. The DMWR initiated a Daily Effort Census program in 1999 to monitor and promote timely submission of logbooks by vessel operators. Crosschecks and verification of these forms with cannery reports are made to further improve reporting.

Federal regulations prohibit these vessels from engaging in shark finning, possessing shark fins on board a U.S. vessel without a corresponding shark carcass or landing shark fins without a carcass. Vessels operating with a Hawaii limited-entry permit are also required to carry line clippers and bolt or wire cutters in compliance with federal sea turtle mitigation measures as stipulated under the *Fishery Management Plan for the Pelagic Fisheries* developed by the WPFMC (1986). These regulations require that specific handling, resuscitation and release methods be employed in the event of accidental hooking or entangling of sea turtles, and vessel operators are required to attend a protected species interaction workshop conducted by NOAA Fisheries on an annual basis. As of April 2, 2004, vessel operators using a General Longline Permit are exempted from attending protected species interaction workshops and the requirement to employ the sea turtle handling measures listed above.[59]

During 2002, 27 *alias*, 5 monohull vessels less than 15 meters (50 feet) in length and 29 big boats longer than 15 meters were engaged in the American Samoa longline fishery (WPFMC, 2004). Considerable potential for gear conflict existed within and between the small and larger vessels because these boats were focused on fishing areas within the U.S. EEZ surrounding American Samoa. On January 30, 2002, final regulations were published in the *Federal Register* prohibiting the big boats longer than 15 meters from fishing within 50 nautical miles (93 km) of the shore in American Samoa.[60] A final rule establishing the closed zones went into effect on March 1, 2002. The regulations effectively prohibit the big boats from operating within a contiguous zone encompassing Tutuila, the Manu‘a Islands, Rose Atoll, and a separate area surrounding Swains Atoll (Figure 3.4-1). This has meant that the area where large longliners can fish has been reduced to approximately two-thirds of the U.S. EEZ surrounding American Samoa, or 260,000 square km (WPFMC, 2003a).

[59] 50 CFR (660) *Federal Register,* Vol. 69, No. 64 (April 2, 2004)

[60] 50 CFR (660)



Source: PIRO 2004

Figure 3.4-1: American Samoa 50-Nautical Mile (93-km) Closed Zones for Pelagic Longline Vessels Longer than 15 Meters

The American Samoa domestic longline fishery developed very rapidly, raising concern over the potential for unsustainable expansion leading to overcapacity and localized depletion. Participants and managers agree that legislative measures are necessary to control effort in the fishery to achieve the following management-related objectives (WPFMC, 2003a):

- Prevent local depletion of the stocks;
- Maintain and protect local community participation;
- Ensure a sustainable fishery for the benefit of the indigenous American Samoa community;
- Reduce gear interaction;
- Minimize finfish bycatch and wastage.

The WPFMC developed Amendment 11 to the Pelagic FMP,[61] detailing the implications of 10 alternative management strategies for the fishery (WPFMC, 2003a). In August 2002, the WPFMC

[61] Measure to limit pelagic longline fishing effort in the EEZ around American Samoa

members voted to approve a limited-entry program for the pelagic longline fishery of American Samoa. When fully enacted, the recommended management option will contain the following conditions:

- Permit holders must have owned a longline vessel and made landings in American Samoa prior to 21 March 2002;
- No single entity may own more than 10% of total effort (permits);
- Permit holders must attend annual vessel safety and protected species workshops;
- Permits would be transferable for vessels longer than 12 meters (40 feet) to persons with prior documented longline landings;
- Permits for smaller vessels could be transferred only to immediate family or community groups;
- Allows for limited upgrading to larger vessel class.

Unlike the Hawaii longline fishery, vessels in American Samoa do not carry observers. However, NOAA Fisheries Pacific Islands Regional Office (PIRO) is in the process of developing a seagoing observer program to monitor American Samoa longline vessels. The emphasis of the program will be to document protected species interactions, in addition to collecting detailed information on operational and catch characteristics of the fishery. Due to the cramped quarters and limited payload on the smaller *alias*, the program will be based initially on the big boats longer than 15 meters.

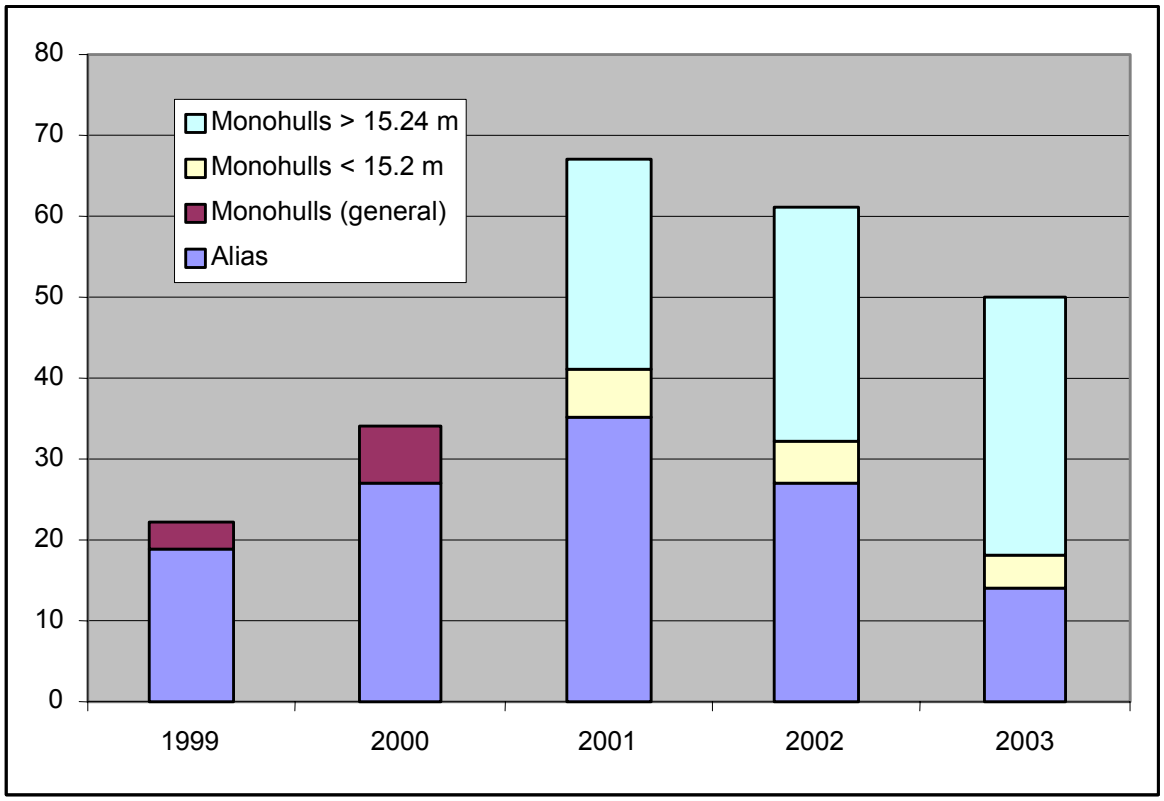
3.4.1.2 Current Fishery Description

During 2002, 61 longline vessels accounted for 99.8% of all tuna landings by American Samoa pelagic fisheries, landing a total of 7,121.4 mt of all pelagic species combined (WPFMC, 2004). Albacore is the target species, accounting for 83% of total pelagic landings valued at US$11.6 million. Participation in the fishery continues to be divided between small *alia* catamarans and larger, mechanized monohull vessels, although effort is clearly dominated by the big boats. Data kept for the fishery indicates that 27 *alias*, 5 monohull vessels less than 15 meters (50 feet) in length, and 29 monohull vessels longer than 15 meters were active during 2002 (WPFMC, 2004). The larger, purpose-built mechanized longline vessels accounted for 90% of the effort in numbers of hooks set, with smaller monohull vessels and *alias* accounting for 7% and 3%, respectively, of effort in numbers of hooks deployed.

Preliminary data indicate that 14 *alias* and 4 monohull vessels less than 15 meters were active during 2003, while large vessel participation increased to 32 vessels (WPacFIN, 2004). Total effort increased slightly (13,078,000 to 13,853,000 hooks) while albacore catches declined significantly (332,425 to 227,087 fish) between 2003 and 2004 (WPacFIN, 2004).

Virtually all of the owners of vessels less than 15 meters in length are indigenous Samoans and residents of American Samoa. It is estimated that 90% of the crews working on the *alias* are from independent Samoa (WPFMC, 2003a). Approximately one-third of longline permit holders for monohull vessels longer than 15 meters are indigenous Samoans, with the remaining permit holders coming from outside areas. Among 18 large vessels entering the fishery, three came from Hawaii, six from the continental U.S. Pacific coast, three from the U.S. Gulf of Mexico and four were foreign-built U.S.-owned vessels (O'Malley and Pooley, 2002).

Catch and Effort. Domestic longline effort commenced in 1995 with five *alia* catamarans, expanding to 12 vessels in 1996 and 21 in 1997 (WPFMC, 2003b). In 1997, the first large monohull vessel began to operate multi-day trips in the American Samoa longline fishery. Since then, vessel participation increased gradually until 2001 with the influx of 25 large, mechanized monohull vessels. Figure 3.4-2 indicates vessel participation in the fishery by vessel class, clearly indicating the shift towards large monohull boats since 2001.



Data source: WPacFIN (2004)

Figure 3.4-2: Fleet Composition by Vessel Type for the American Samoa Longline Fishery, 1999–2003

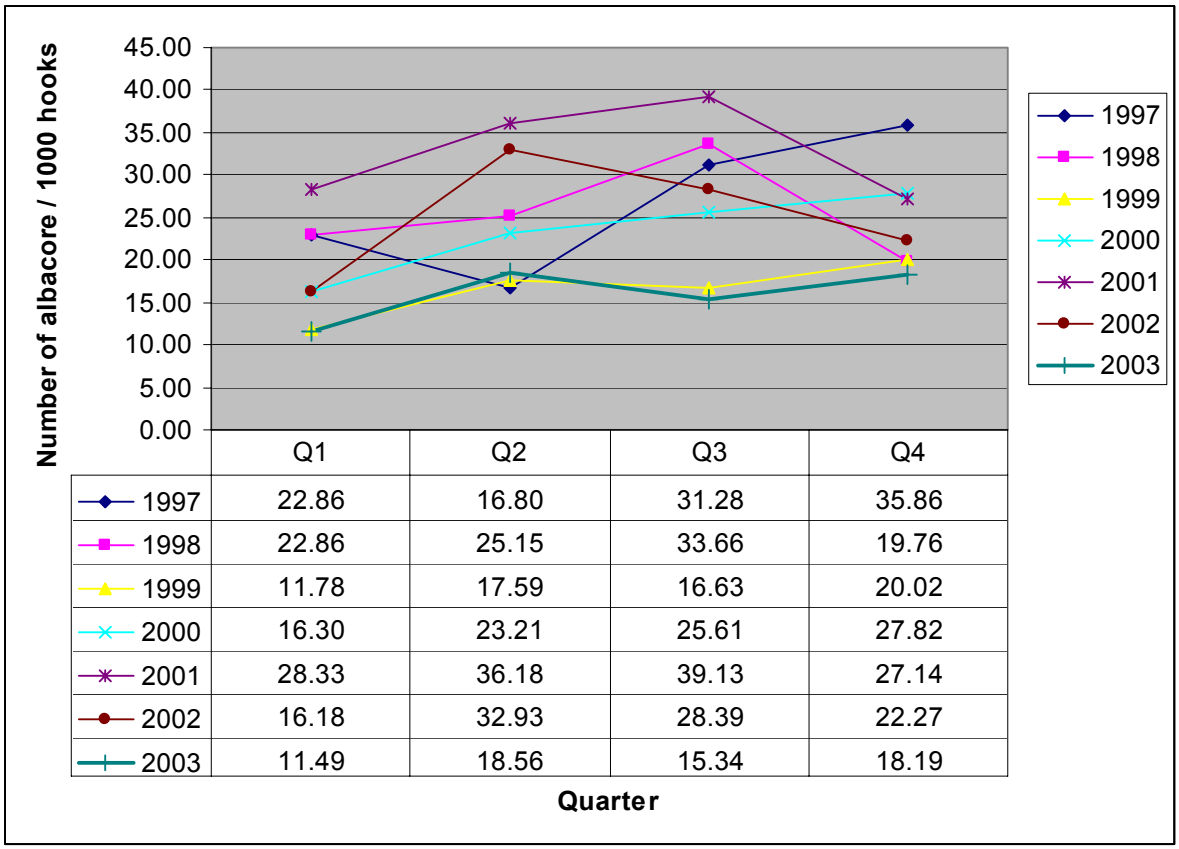
Increased effort in 2001 led to a sharp increase in total landings to 3,689 mt, and nearly doubling in 2002 (Table 3.4-1). The principal tuna market species of albacore, bigeye, skipjack and yellowfin constituted 84–97% of total landings during the 1998–2002 period. Albacore accounted for 87% of all tuna landings and 84% of total landings for 2002, while yellowfin, skipjack and bigeye tuna constitute approximately 7%, 3% and 3%, respectively, of both tuna and total landings by weight in recent years.

Table 3.4-1: Landings of Tuna Species (mt) by the American Samoa Longline Fleet, 1998–2002

Year	Number of Vessels	Albacore	Bigeye	Skipjack	Yellowfin	All Tuna	Other Finfish	Total Landings
1998	25	446	10	18	42	516	74	590
1999	29	338	9	25	64	436	81	517
2000	37	624	21	14	86	745	75	820
2001	67	3,253	74	60	183	3,570	119	3,689
2002	60	5,944	196	231	484	6,855	257	7,112

Source: Ito et al. (2003)

The average size of landed albacore appears to be quite uniform, with mean annual values ranging from 18.1 to 20.7 kilograms (kg) for the years 1996–2002 (WPRFMC, 2004). Albacore catch rates in the U.S. EEZ surrounding American Samoa are typically lowest during the first quarter, rising in the second and third quarters, and falling off at the end of the fourth quarter (Figure 3.4-3). However, as the fishery is relatively new, these trends are not yet well established. Data for the 2003 season indicate the lowest catch rates for the fishery since 1999.



	Q1	Q2	Q3	Q4
1997	22.86	16.80	31.28	35.86
1998	22.86	25.15	33.66	19.76
1999	11.78	17.59	16.63	20.02
2000	16.30	23.21	25.61	27.82
2001	28.33	36.18	39.13	27.14
2002	16.18	32.93	28.39	22.27
2003	11.49	18.56	15.34	18.19

Source: WPacFIN (2004)

Figure 3.4-3: Quarterly Albacore Catch Rates of the American Samoa Longline Fishery in Numbers of Fish per 1,000 Hooks Set

Mahimahi and wahoo are significant non-target species of the fishery, accounting for 39 mt and 162 mt of landings, respectively, in 2002. Billfish landings, consisting primarily of blue marlin, form a relatively minor component of the catch with total billfish landings reaching 47 mt in 2002 (Table 3.4-2). For 2002, 3 mt of mixed shark landings were reported. Blue shark is the most abundant, followed by oceanic white tip. No protected species were reported taken during 2002 by the American Samoa–based longline fishery.

Table 3.4-2: Landings of All Tuna Species and Non-target Species (mt) by the American Samoa Longline Fleet, 1998–2002

Year	Number of Vessels	All Tuna	Billfish	Sharks	Mahimahi	Wahoo	Misc.	Total Landings
1998	25	516	27	11	15	18	3	590
1999	29	436	25	13	16	22	5	517
2000	37	745	26	4	19	21	5	820
2001	67	3,570	27	1	34	49	8	3,689
2002	60	6,855	47	3	39	162	6	7,112

Source: Ito et al. (2003)

More recent data (WPFMC, 2004) contains greater detail on non-target catch and effort for the American Samoa longline fishery for 2002. The fishery retained 34 mt of blue marlin, 17 mt of swordfish and, in descending order of landings, small amounts of sailfish, striped marlin, shortbill spearfish and black marlin. Also recorded were 5 mt of opah, pomfrets and oilfish. More than 2 mt of other species were noted, including barracudas, rainbow runner and dogtooth tuna.

Longline logbook data for recent years are available on the number of fish kept and released by three size classes of longline vessels operating in the fishery: *alias*, monohull vessels less than 15 meters in length and monohull vessels longer than 15 meters (WPFMC, 2003b, 2004a). The larger monohull longline vessels account for the majority of the effort in the fishery, taking 90% of all pelagics in 2002. The smaller monohull vessels and *alias* accounted for only 6% and 3.8%, respectively, of the catch.

Data on released fish supports the notion that the indigenous fishermen on *alias* seldom if ever release non-target species, as they all have some value either for subsistence or to fulfill cultural obligations (WPFMC, 2003a). However, data for the larger monohull vessels indicate significant releases of lower-value species such as skipjack, mahimahi, and marlins. Even bigeye and yellowfin tuna are at times released due to their low value at the cannery and limited opportunities for export.

Table 3.4-3 summarizes catch and effort for primary target species of the fishery for years 1995–2002 in mt caught per 1,000 hooks set. The number of hooks set per year was estimated from logbook and adjusted creel-survey data,[62] and is considered by DMWR to be more accurate than logbook data alone. The dramatic increase in large vessel participation and overall effort is notable between 2000 and 2001 (WPFMC, 2004).

[62] Expanded number of longline fishing hooks for interviewed vessels plus the sum of hooks reported in longline logbooks for non-interviewed vessels.

Table 3.4-3: Catch and Effort Data for the American Samoa Longline Fleet (mt per hooks set × 1,000 hooks), 1995–2002

Year	Thousand Hooks Set	Albacore	Bigeye	Skipjack	Yellowfin	Wahoo	Mahimahi	Blue Marlin	Sailfish
1995	45	26.5	1.0	0.1	1.8	0.7	1.0	2.4	1.4
1996	157	85.8	3.9	0.2	11.6	3.1	2.4	9.7	1.4
1997	512	308.8	3.8	1.1	21.8	7.1	15.0	14.5	3.1
1998	1,042	445.9	10.1	18.4	41.9	18.3	15.2	20.6	3.3
1999	1,229	337.9	8.7	25.5	63.5	21.9	16.3	15.9	3.4
2000	1,567	626.0	21.3	14.5	85.7	21.5	19.3	25.9	1.0
2001	5,806	3,232.1	75.0	62.6	187.8	51.9	39.5	14.9	2.5
2002	13,219	5,944.0	195.8	231.0	484.2	162.3	38.9	33.7	3.2

Sources: Ito et al. (2003); WPRFMC (2004a)

Several reports quoted in WPFMC (2003a) have identified deep-setting for larger albacore as a characteristic of the American Samoa fleet. The larger vessels use mainline shooters, leaded swivels, and weighted branch lines to deploy hooks in deep sets below 300 meters (100 fathoms) (WPFMC, 2003a).

Catch rates and trends are difficult to discern in mt per 1,000 hooks due to the relatively low landings of all species except albacore. Table 3.4-4 converts catch rates for the same species to kg per 1,000 hooks set, as it is originally reported by WPFMC in pounds per 1,000 hooks. Albacore catch rates vary between 275 and 603 kg per 1,000 hooks, showing a decreasing trend after 1997, rising to former levels in 2001, and then declining slightly. Catch rates of mahimahi, blue marlin, and sailfish show significant decreases in recent years. The causes for these decreases are not known, but may be related to changes brought about by the increase in large longline vessels after 2000; i.e., deeper-set gear. Fish caught but released are supposed to be accounted for by logbook reporting, but it is not known how accurately fishermen record released or discarded catch.

Table 3.4-4: Catch and Effort Data for the American Samoa Longline Fleet (kg per Hooks Set × 1,000 Hooks), 1995–2002

Year	Thousand Hooks Set	Albacore	Bigeye	Skipjack	Yellowfin	Wahoo	Mahimahi	Blue Marlin	Sailfish
1995	45	589.1	22.1	1.6	40.5	15.9	23.2	53.1	30.7
1996	157	546.7	25.0	1.3	74.1	20.0	15.6	62.0	9.1
1997	512	603.1	7.4	2.2	42.5	13.8	29.3	28.2	6.0
1998	1,042	427.9	9.7	17.7	40.2	17.6	14.6	19.8	3.1
1999	1,229	275.0	7.1	20.7	51.7	17.8	13.3	12.9	2.7
2000	1,567	399.5	13.6	9.2	54.7	13.7	12.3	16.5	0.6
2001	5,806	556.7	12.9	10.8	32.3	8.9	6.8	2.6	0.4
2002	13,219	449.7	14.8	17.5	36.6	12.3	2.9	2.5	0.2

Source: WPRFMC (2004a)

In recent years, the Pelagic Fisheries of the Western Pacific Region Annual Report has published catch rates for the fishery for numbers of fish taken by different vessel size categories. Table 3.4-5 reproduces logbook data representing 2002 catch rates (numbers of fish kept + released per 1,000 hooks) for longline *alias*, monohull vessels less than 15 meters in length, and monohull vessels longer than 15 meters. The larger monohull vessels appear to more successfully target the deep-swimming albacore, while the smaller *alias* have higher catch rates for yellowfin tuna, mahimahi and wahoo, which normally forage higher in the water column.

Table 3.4-5: 2002 Catch and Effort Data by Vessel Size Class for the American Samoa Longline Fleet (Number of Fish Kept + Released per 1,000 Hooks)

Species	*Alias*	Monohull < 15.2 m	Monohull > 15.2 m
Albacore	17.07	23.18	25.99
Bigeye	0.58	0.44	0.95
Skipjack	5.87	2.13	5.11
Yellowfin	7.04	0.99	1.32
Wahoo	2.64	1.04	1.01
Mahimahi	3.99	0.91	0.56
Blue marlin	0.22	0.21	0.29
Sailfish	0.05	0.01	0.03
Striped marlin	0.05	0.00	0.03
Swordfish	0.11	0.05	0.04
Spearfish	0.02	0.02	0.02
Sharks	0.02	1.31	0.79
Opah	0.08	0.07	0.07
Oilfish	0.02	0.26	0.52
Pomfret	0.02	0.03	0.09
Other	0.02	0.00	0.36
Total	37.80	30.70	37.18

Source: WPRFMC (2004a)

3.4.1.3 Operational Characteristics

NOAA Fisheries holds data on 104 commercial fishing vessels that have or had a permit to engage in the American Samoa–based longline fishery (PIFSC, unpublished data). Not all of these vessels are currently active, but the database provides a unique source of detailed information on the general characteristics of the vessels and gear.

Existing literature on the fishery often segregates the vessels into three classes: *alia* catamarans, monohull vessels less than 15 meters in length and large vessels longer than 15 meters. However, the advent of the 12-meter (40-foot) "super *alia*" class of vessel with hydraulic mainline drum and larger, purpose-built fish holds has blurred the distinction between *alias* and mechanized monohull vessels. The permit structure proposed for the limited entry program for the fishery segregates three vessel size classes of less than 12 meters (40 feet), 12—15 meters (40–50 feet), and longer than 15 meters. Vessel length overall may not exceed 30 meters (100 feet).

The 104 vessels range in length from a seven-meter *alia* catamaran to a modern 30-meter steel-hulled longline vessel. Fishing capacity is distinct between vessels that use a manually powered mainline drum versus those with mechanically driven longline drums. However, all the vessels set a monofilament mainline and monofilament leaders equipped with 14/0 or 15/0 tuna circle hooks. Imported California sardines were recorded in use almost exclusively by the larger vessels, while the smaller boats appear to bait with a mixture of sardines, mackerel, sanma (saury) and locally caught skipjack (PIFSC, unpublished data).

The larger, mechanized vessels in the American Samoa fleet use hydraulically driven monofilament mainline reels with an average capacity of 65 km, setting an average of 2,041 hooks per day (PIFSC, unpublished data). These vessels range from 9.8 meters to 30.3 meters (mean 21.2 meters) with an average GRT of 96. Mean hold capacity is 44.45 mt (49 short tons), with most of the larger vessels equipped with blast or brine freeze systems.[63] Most of the larger boats are fitted with bunks to house an average crew size of 6.5 and are equipped with electronic fish finders, radar, radios, and Global Positioning System units. These vessels differ markedly from the smaller *alia* fleet in that multiple-day trips are the norm, and many of the vessels freeze catch on board. The increased autonomy of these vessels allows them to operate throughout the EEZ and into the adjacent high seas zones.

3.4.1.4 Catch Disposition

Virtually all of the albacore and a significant proportion of the wahoo, yellowfin, and smaller bigeye tuna are sold directly from the vessels to the canneries. However, the canneries will not purchase large bigeye tuna from the fishery due to the dark color of the meat and tendency to discolor during the canning process (J. Kaneko, pers. comm.). Non-target catch –bigeye tuna, yellowfin tuna, mahimahi and wahoo– is sold on the domestic market, enters various reciprocity networks within the community or is simply consumed by the fishermen themselves. A great deal of the non-target catch by *alia* fishermen is used to fulfill cultural obligations within the community. However, due to space limitations on the vessels, considerable amounts of these non-target species are released at sea, particularly by the non-indigenous fishermen.

The low-value, purse seine–grade price realized for large yellowfin and bigeye at the cannery and limited domestic market has prompted many operators to seek higher-value markets. Several attempts have been made to develop overseas outlets for sashimi-grade large tunas. Currently, at least two vessel operators are in the process of developing export markets for large tuna to Hawaii. Training workshops on fish quality and handling for export markets have been conducted, but with little positive effect due to the limited market opportunities at present (Blanc, 2003). As such, the fishery depends on the existing price for cannery-grade albacore at the dock in American Samoa. In 1999, some longline boats began to land albacore gilled and gutted at a higher price (WPFMC, 2003b).

3.4.1.5 Key Economic Considerations

Clearly, the economics of the American Samoa big boat longline industry are heavily dependent on albacore prices at the American Samoa canneries. These prices are not unilaterally set, but rather reflect supply from a variety of sources coupled with demand, primarily in the U.S. market. A recent study (O'Malley and Pooley, 2002) notes the following:

[63] Hold capacities are unverified.

> ". . .analysis suggests that at the current (May 2002) price of $1,884/mt, however, the fleet is barely meeting expenses and probably only generating income through landing of incidental species. If the price continues to drop to $1,500/mt the fleet will clearly be operating at a net loss."

Non-tuna incidental catch is sold in local markets. Those markets have been estimated at approximately 2 mt per week (WPFMC, 2003a) and are highly sensitive to supply. Historically, export markets for American Samoan fish have been very limited due to airfreight constraints.

An external factor of importance to the economics of the American Samoa longline fishery involves the apparent seasonal and inter-annual fluctuations in the abundance of the albacore. As noted, while the big boat albacore fishery continues year-round, the fish have been most abundant in the second half of the year.

3.4.2 Hawaii Longline Fleet

3.4.2.1 Background and Fishery Development

The Hawaii pelagic longline fishery began in 1917, based on tuna targeting techniques introduced by Japanese immigrants (Boggs and Ito, 1993). This early fishery used sampan-style wooden vessels adapted from the Hawaiian skipjack pole-and-line fleet, and targeted large yellowfin, bigeye and albacore (June, 1950). Landings were limited to domestic markets for fresh product and were secondary in importance to the skipjack pole-and-line fishery. The early phase of the longline fishery declined steadily into the 1970s due to low profitability and lack of new investment (Boggs and Ito, 1993).

During the 1980s, tuna longline effort began to expand in response to developing domestic and export markets for fresh, sashimi-grade product. In the late 1980s, the fishery changed completely with the rapid development of a Hawaii-based fishery for swordfish, concentrating on north Pacific stocks generally outside and north of the U.S. EEZ surrounding Hawaii. This development was initiated by the arrival of former participants in U.S. Atlantic swordfish and tuna fisheries. Participation in the longline increased rapidly from 37 vessels in 1987 to 138 vessels in 1990 (Ito and Machado, 2001). In 1985, the longline fishery surpassed landings of the skipjack pole-and-line fleet and has remained the largest Hawaii-based fishery to date. Swordfish landings rose rapidly from about 272 mt in 1989 to 5,942 mt in 1993 (WPFMC, 2003b).

The influx of new operators with large, steel-hulled vessels also promoted advances in fishing technology and geographic expansion of the fishery. Independent of the swordfish-targeted developments, Hawaii longline vessel operators began adopting new gear and methods to increase their effective effort on deep-swimming bigeye tuna (Kawamoto et al., 1989). This period recorded the increased use of sophisticated marine electronics to assist fishing operations and the adoption of continuous monofilament nylon mainline gear set and stored on hydraulic spools. Monofilament mainline-style gear allows captains to quickly modify gear configurations to target shallow-swimming swordfish at night or deep-swimming bigeye tuna during the day with the addition of a hydraulic "line shooter" to deploy excess mainline between floats. The size of fishing grounds expanded to encompass swordfish grounds to the north of Hawaii and capitalize on productive tuna fishing areas to the south.

The importance of swordfish to the longline fishery declined during the mid-1990s, following a 47% decrease in landings in 1994. This period (1995–1999) was characterized by a stabilization of swordfish landings at close to 2,948 mt per year, a large increase in shark catch (for the most part

primarily blue shark fins were retained), and a gradual increase in tuna fishing effort and landings. Effort continued to shift away from swordfish and back to tuna-targeted trips throughout the latter 1990s (WPFMC, 1997, 1998).

During the 1990s, the fishery was often characterized as being composed of three components: a tuna-directed group, a swordfish-targeted group and vessels classified as "mixed" that switched between swordfish and tuna throughout the year or even within a single trip. Generally speaking, tuna vessels set deep gear with more than 15 hooks between floats in the morning, begin hauling gear in the late afternoon or dusk, use a line shooter to deepen the set, use saury or sardine bait and make relatively short trips within 800 km of home port. Swordfish boats are generally larger than tuna boats, set shallow gear at dusk with an average of four hooks between floats, use chemical light sticks, haul gear at dawn, never use a line shooter, use large squid bait and make much longer trips beyond 1,126 km from port.

Hawaii-based longline fishing since 2000 can be characterized by substantial catch and effort decreases as a result of regulatory restrictions designed to mitigate interactions with sea turtles. Additional regulations specific to sea bird mitigation also apply. The turtle mitigation measures significantly restricted and eventually eliminated directed longline effort toward swordfish, principally by banning all shallow-set swordfish-style longline gear. A seasonal area closure was also imposed south of 15°N during April and May. Some swordfish-targeting vessels left the Hawaii-based fishery, while others switched to targeting tuna to remain in Hawaii. The basic gear cost for conversion from swordfish to tuna longline gear has been estimated at US$35,925 per vessel, excluding labor costs (O'Malley and Pooley, 2003). Additional losses have been incurred by loss of time to effect conversions and the significant but difficult-to-quantify impact of having to learn and compete in an entirely different fishery. Losses associated with conversion from swordfish to tuna fishing were in part offset by payments under a NOAA Fisheries Direct Economic Assistance Program in 2001.[64] On April 2, 2004, NOAA Fisheries approved a regulatory amendment under the Pelagic Species FMP to re-open the Hawaii based swordfish fishery through the repeal of restrictions on specific gear and setting techniques. The seasonal southern water closures were also lifted at this time with implementation of 100% observer coverage on swordfish-targeted trips.

The total ex-vessel revenues from the longline fishery follows the trends in catch, significantly increasing in the late 1980s and early 1990s, growing slowly throughout the 1990s, and decreasing sharply in 2001. These changes were strongly influenced by changes in swordfish-directed effort. NOAA Fisheries (2001a) provides a detailed description of the Hawaii longline fishery as it existed with both tuna- and swordfish-directed components.

3.4.2.2 Regulations, Permits and Impacts on Fishing Effort

The rapid influx of large swordfish and tuna longliners from other U.S. fisheries prompted the WPFMC to institute an emergency moratorium on longline effort in April 1991. Since that time, growth and contraction of longline catch and effort has been largely dictated by regulatory action. During the same year, pelagic longline gear[65] was restricted from a buffer zone surrounding the main

[64] *Federal Register* notice, Vol. 66, No. 225, November 21, 2001.

[65] *Longline gear* means a type of fishing gear consisting of a main line that exceeds 1.85 km (1 nautical mile) in length, is suspended horizontally in the water column either anchored, floating, or attached to a vessel, and from which branch or dropper lines with hooks are attached; except that, within the protected species zone, longline gear means a type of fishing gear consisting of a main line of any length that is suspended horizontally

Hawaiian Islands to mitigate interaction with small gear types, and was further prohibited within a radius of 50 nautical miles (93 km) surrounding the Northwest Hawaiian Islands to reduce interactions with endangered Hawaiian monk seals.[66] This area is generally known as the "protected species zone."

In 1994, a limited-access program was instituted for the Hawaii-based longline fishery that allowed for 164 transferable[67] vessel permits with vessels limited to a maximum of 30.8 meters (101 feet) in overall length.[68] NOAA Fisheries, Pacific Islands Region administers the permitting system, which requires that U.S. fishing vessels be registered with a valid Hawaii longline limited-access permit if that vessel is used to (a) fish for Pelagic Management Unit Species with longline gear in the U.S. EEZ surrounding Hawaii, or (b) land or transship Pelagic Management Unit Species harvested with longline gear shoreward of the outer boundary of the U.S. EEZ surrounding Hawaii. Longline vessels that fish in U.S. EEZ waters around the U.S. Pacific Island areas must be registered under a general longline permit or a Hawaii longline limited-access permit.

Vessels operating with a Hawaii limited-access permit must bear markings, identify fishing gear, submit accurate logbook data, carry NOAA Fisheries–sanctioned VMS equipment and comply with the boarding and housing of observers as stipulated in 50 CFR, Chapter VI, 660, Subpart C for Western Pacific Pelagic Fisheries. Each year, vessel operators must attend a protected species workshop conducted by NOAA Fisheries on mitigation, handling, and release techniques for sea turtles, seabirds and other protected species.

In February 1994, NOAA Fisheries instituted a mandatory at-sea observer program for the fishery, primarily to monitor interactions with sea turtles and other protected species (WPFMC, 1995).[69] This program has grown to be the largest pelagic longline observer program in the Pacific. For the past four years, NOAA Fisheries has targeted a 20% observer coverage rate in this fishery. NOAA Fisheries-PIRO manages the program and trains and certifies observers, but uses private observer service providers to employ contracted observers. During 2002, the Hawaii-based longline fishery made 1,210 trips (Ito et al., 2003).

Observer records were examined for the calendar year 2002 representing 291 observed longline trips, which represents a 24% coverage rate for the year (PIRO, 2003). These observed trips were made on 98 of the 100 Hawaii longline permit holders that were active during 2002, producing data on 3,431 individual sets. The trips were conducted throughout the year and within a broad geographical area of 33°N–2°S and 142°–168°W. The coverage is not complete, but the large sample is considered representative of current fleet operations. Some of the operating characteristics described in Subchapter 3.4.2.4 are based on this data set from the PIRO observer program.

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in the water column either anchored, floating, or attached to a vessel, and from which branch or dropper lines with hooks are attached.

[66] 50 CFR 660.26

[67] Transferable to a different person for use with the same or another person; or for registration for use with another U.S. vessel under the same ownership.

[68] Amendment 7 to the Pelagic Species Fisheries Management Plan. 50 CFR 660.21

[69] 50 CFR 660.28

In December 1999, an area north of the Hawaiian Islands was closed to the Hawaii-based pelagic longline fishery by federal court action to protect sea turtles. In mid-2000, Hawaii state law and a similar U.S. federal law were passed that prohibit the possession or landing of shark fins by U.S. vessels without the corresponding carcass, greatly reducing shark take by the Hawaii-based fleet.[70]

Hawaii-permitted vessels must also comply with measures to mitigate interactions with seabirds when operating north of 23°N. Mitigation measures include the use of a line-setting machine, weighted branch lines, thawed blue-dyed bait and strategic offal and waste fish discharge. Vessels are also recommended to set gear from the side of the vessel to make hooks less accessible to birds. If a seabird is accidentally captured, specific handling, reporting, and release techniques must be employed.[71]

In response to the court injunctions limiting longline effort to reduce turtle interactions, NOAA Fisheries prepared an Environmental Impact Statement for Pelagic Fisheries of the Western Pacific Region, implementing the Preferred Alternative in April 2001 (NMFS, 2001a). Regulations were adopted to prohibit swordfish-targeted longline effort, impose a two-month time/area closure south of Hawaii to all longline effort (0°–15°N and 145°W–180°W), prohibit the use of chemical light sticks, stipulate specific gear configurations to ensure deep-set gear and limit each longline vessel to no more than ten swordfish per trip.[72]

Additional regulations stipulate the carrying and use of line clippers, wire or bolt cutters, and/or dip nets to facilitate release and, if necessary, resuscitation of hooked or entangled sea turtles.[73]

In April 2004, the restrictions on swordfish-style longlining by Hawaii permitted vessels were lifted, reopening the swordfish fishery under a new set of conditions (*Federal Register,* April 2, 2004 [Volume 69, Number 64]). NOAA Fisheries approved these changes through a regulatory amendment to the Pelagics FMP submitted by the WPFMC. The amendment eliminated the seasonal southern water closure during April and May, removed restrictions on the setting of shallow-set gear and the bag limit of ten swordfish per trip. However, the fishery reopened under strict monitoring of sea turtle interactions and an annual limit of 16 leatherback and 17 loggerhead turtle interactions. A total quota of 2,120 shallow sets per year was set for the entire fishery and requirements to use size 18/0 circle hooks with a 10-degree offset of the point of the hook and mackerel bait for all shallow sets.

3.4.2.3 Current Fishery Description

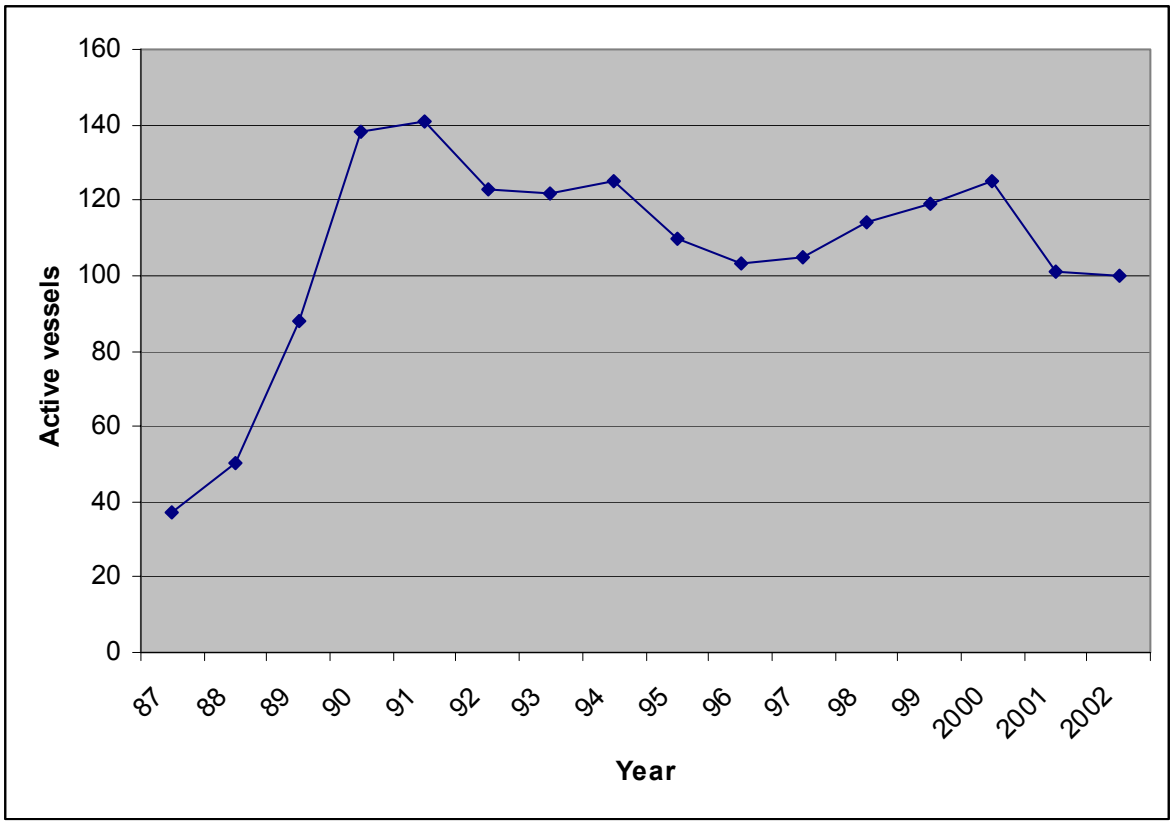
The Hawaii-based longline fishery is described in detail in the *Final Environmental Impact Study for Pelagic Fisheries of the Western Pacific Region* (NMFS, 2001a). While 164 transferable permits are allowed in the fishery, an average of 112 vessels were active in any given year during the decade 1993–2002 (WPRFMC, 2004). Vessel participation rose rapidly in the late 1980s, peaking at 141 vessels in 1991, leveled off during the 1990s, and has declined in recent years to approximately 100 boats per year (Figure 3.4-4).

[70] 50 CFR 600, Subpart M

[71] 50 CFR 660.35

[72] 50 CFR 660.33

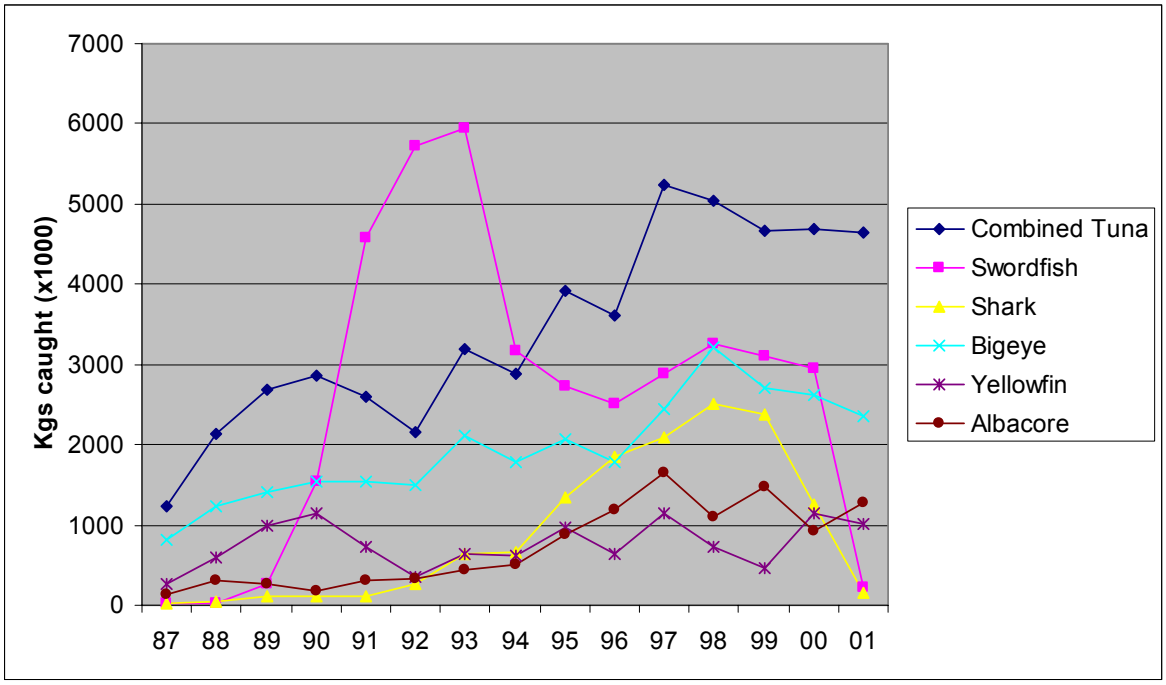
[73] 50 CFR 660.32



(source: WPRFMC 2004a)

Figure 3.4-4: Number of Active Hawaii-Based Longline Vessels, 1987–2002

Figure 3.4-5 provides a useful illustration of the development of the Hawaii longline fishery from 1987 to 2001. The figure indicates the sharply rising swordfish landings in the early 1990s, a significant decrease and leveling off after 1994, and near-complete bottoming out of landings in 2001 due to regulatory action. Shark catch, driven by a steadily increasing practice of finning sharks during the 1990s, also falls to very low levels after legislation prohibited the possession or landing of shark fins without a corresponding carcass in 2000–2001. After this point, only small quantities of mako and thresher shark trunks have been retained, as was the practice before and during the period of widespread finning. Combined tuna landings (bigeye, yellowfin and albacore only) show a steady increase throughout the time series to 1997, followed by a slow decline apparently caused by a leveling off of albacore catches and a decreasing trend in bigeye catches since that year. Yellowfin catches appear to be relatively stable, although time and area effects are not examined here.



Source: PIFSC, NMFS)

Figure 3.4-5: Total Landings (mt) of Major Pelagic Target Species and Sharks by the Hawaii-Based Pelagic Longline Fishery, 1987–2001

Active vessel participation in the Hawaii-based fishery dropped from 125 in 2000 to 101 in 2001, the lowest number of active vessels since 1989 (Figure 3.4-5). The 101 vessels that participated in the Hawaii fishery during 2001 conducted 1,034 trips, setting 22,350,000 hooks (WPRFMC, 2003b). Of the 1,034 trips, only four were classified as swordfish targeting, and 43 were classified as mixed trips. The fishery essentially became a tuna-only longline fishery from 2001 onward.

The decline in Hawaii-based effort has been attributed to the decision of several Hawaii vessels to target north Pacific swordfish from California ports and avoid the swordfish-targeting prohibitions imposed on the Hawaii vessels. In 2001, 36 longline vessels operated out of California, almost all of which continued to target swordfish. Almost all of these vessels operated under Hawaii limited-access longline permits during previous years (WPFMC, 2003b).

In 2001, the total catch of all species was 7,055 mt, with an ex-vessel value of US$33.0 million. This represented a 65.5% decrease in landings (–3,719 mt) and a 65.7% decrease in revenue (US$–17.2 million) from 2000, attributed to the decrease in swordfish and shark landings. Swordfish revenues alone decreased US$11.6 million between 2000 and 2001. The total revenue from the fishery was the lowest recorded since 1989. Weak economic conditions in the U.S. and Japan as well as negative effects from the September 2001 terrorist activity on the Hawaii tourist-based economy were also thought to have impacts on revenues (WPFMC, 2003b).

The decrease in swordfish trips means that a higher proportion of effort has been directed closer to Hawaii on tuna within the U.S. EEZ surrounding the main Hawaiian Islands. During 2001, almost equal numbers of hooks were deployed in the main group EEZ as in international waters (39.4% versus 38.5%), with 9.1% deployed in the U.S. EEZ surrounding the northwest Hawaiian Islands,

and 12.9% in the EEZs of U.S. possessions (Johnston Atoll, Palmyra, Kingman Reef and Jarvis Island).

With the dramatic reduction in swordfish trips, bigeye, yellowfin and albacore reemerged as the primary longline market species in the Hawaii fishery. Table 3.4-6 summarizes landings and ex-vessel revenue generated by major species or species groups taken by the Hawaii-based longline fishery during 2001. Bigeye, the traditional mainstay of the Hawaii longline fishery, accounted for 35.5% of total landings and 55.2% of revenues, worth US$18.2 million. Yellowfin is next in value, followed by albacore. Swordfish accounted for only 3.1% of catch and 3.6% of revenues. Mahimahi, wahoo, and opah remain important retained non-target catch of the fishery. Bluefin catch, which was a minor but valuable bycatch from the North Pacific swordfish grounds, has dropped to insignificant levels. Conversely, combined marlin catches exceeded the level of swordfish landings for the first time since 1989.

Table 3.4-6: Catch and Ex-Vessel Revenue of the Hawaii-Based Longline Fishery during 2001

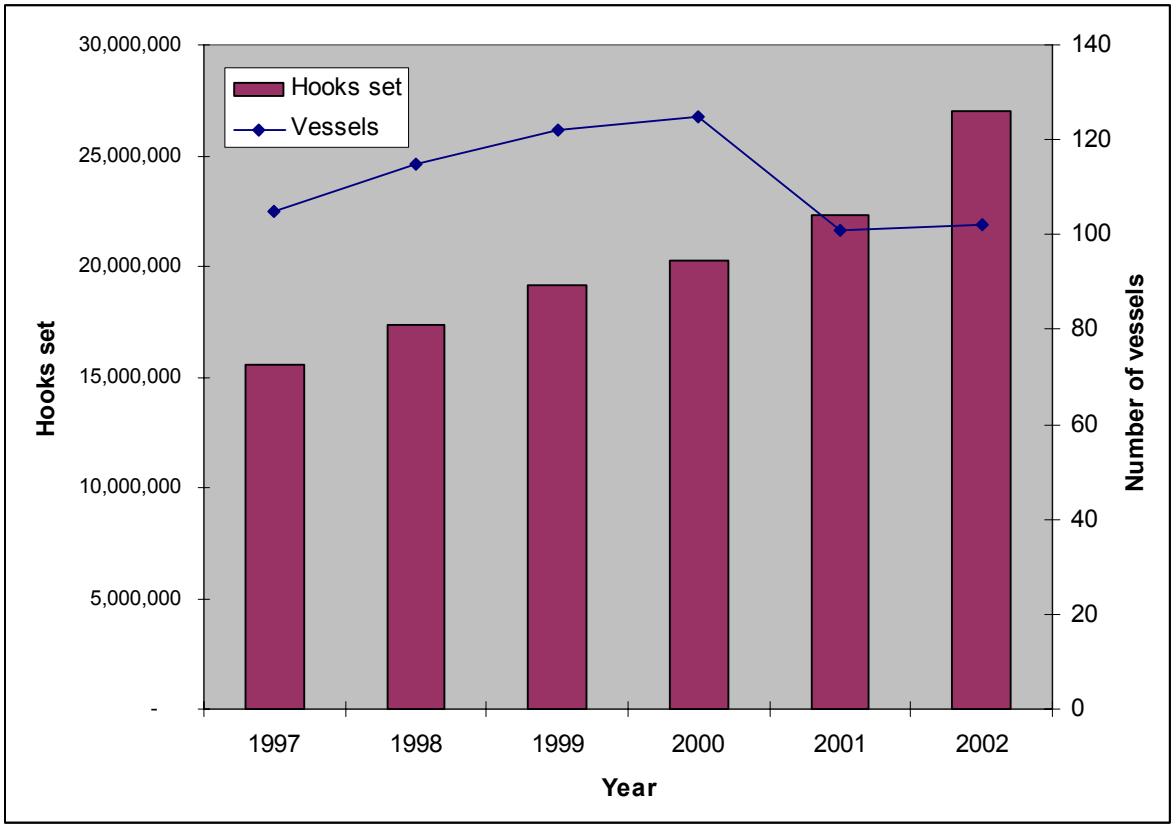
	Catch		Revenue	
Species	Thousands of kg	Percent	Thousands of US$	Percent
Non-Tuna Species				
Swordfish	220.0	3.1	$1,193	3.6
Other billfish	885.9	12.6	$1,817	5.5
Mahimahi	240.4	3.4	$662	2.0
Wahoo	153.3	2.2	$563	1.7
Opah	342.9	4.9	$930	2.8
Sharks	148.3	2.1	$119	0.4
Other	179.2	2.5	$529	1.6
Non-tuna subtotal	2,192.7	31.1	$5,813	17.6
Tuna Species				
Bigeye	2,366.4	33.5	$18,208	55.2
Albacore	1,271.0	18.0	$3,222	9.8
Yellowfin	1,012.9	14.4	$5,516	16.7
Skipjack	211.4	3.0	$238	0.7
Bluefin	0.9	0.0	$10	0.0
Tuna subtotal	4,862.5	68.9	$27,194	82.4
Total	7,055.2		$33,007	

Source: PIFSC, unpublished data

The fleet is based out of Honolulu Harbor and Kewalo Basin on the south shore of the island of Oahu. The vessels typically operate in areas ranging from 40 to beyond 1,600 km from the main Hawaiian Islands. A brief summary of seasonality by species is presented in NMFS (2001a) from detailed information available in Curran et al. (1996). Landings of bigeye tuna, the primary target species, peak during the first and fourth quarters close to and north of the main Hawaiian Islands. Second quarter landings move south of the islands and catches traditionally taper off during the third quarter for all areas. Conversely, yellowfin catches peak close to the islands during the summer

months. Swordfish and albacore catch rates peak to the north of Hawaii during the fourth and first quarters. In 2001, the mean distance from port to the start of first setting operation was 568 km, or slightly less than the long-term average of 658 km.

Figure 3.4-6 depicts vessel participation and total effort (number of hooks set) for the Hawaii-based longline fleet in recent years. Vessel numbers rose steadily from 1997 (105) to peak at 125 active vessels in 2000. In 2001, vessel participation fell sharply when the swordfish-targeting component of the fishery relocated to the west coast of the continental U.S. in response to restrictive management in Hawaii in response to the incidental take of sea turtles. However, despite the decline in vessel numbers, the total effort in number of hooks set continued to rise steadily, peaking in 2002 at 27 million hooks. This is because the remaining vessels switched to targeting tuna, where a high number of hooks are deployed per set. During 1997, 105 vessels set an average of 1,314 hooks per set, whereas in 2002, 102 vessels set an average of 1,942 hooks per set.

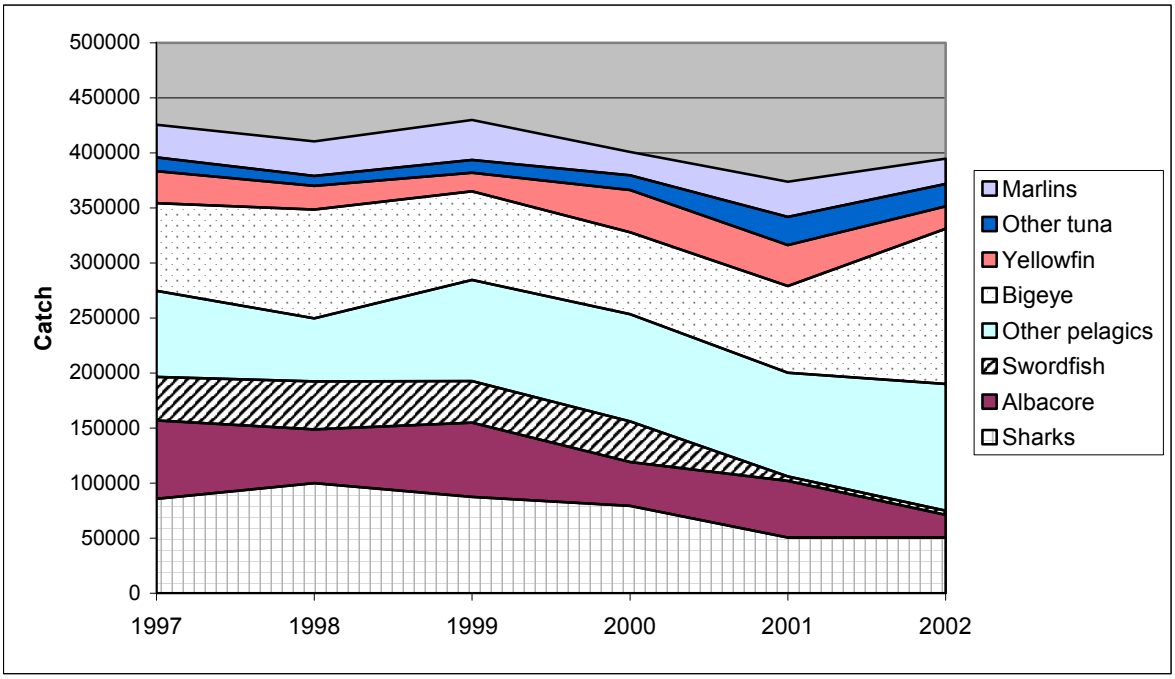


Source: NMFS (unpublished data)

Figure 3.4-6: Number of Vessels and Hooks Set by the Hawaii Longline Fleet, 1997–2002

The general trend in species composition of the catch by the entire fleet also reflects these differences in targeting. The numbers of swordfish landed dropped dramatically from 37,023 fish in 2000 to 4,169 fish in 2001 (Figure 3.4-7). Related to the reduction in swordfish effort in cooler waters to the north of Hawaii were noted reductions in the take of albacore and catch rates for some shark species (e.g., blue shark). An increase in bigeye landings is apparent in 2002, with the shift away from swordfish-targeting and increased effort on high-grade tuna. Increases in the take of other

tropical tuna and other pelagics[74] and a continuation of marlin[75] catch are consistent with the tuna-targeting strategy during recent years.



Source: NMFS (unpublished data)

Figure 3.4-7: Composition of Catch by Hawaii Longline Fleet, 1997–2002 (Numbers of Fish)

Fishery Participants. The composition of Hawaii longline vessel owners, captains, and crew reflect the racial and cultural diversity of Hawaii, particularly of Oahu. Hamilton et al. (1996) conducted baseline surveys of the Hawaii-based longline fishery as it existed in 1993. The study divided fishing groups into categories of Tuna Targeting (every trip and set targeted tuna), Swordfish Targeting (every trip and set targeted swordfish), Mixed Targeting (each set was made in hopes of catching whatever they could) and Varied Targeting (target varied set by set). Self-reported survey data indicated that the majority of tuna-targeting vessels were owned and operated by persons of Korean heritage, the Mixed and Varied targeting vessel owner/operators were of Vietnamese ancestry and most of the self-proclaimed swordfish-targeting boats were owned/operated by Caucasians.[76] Vessel operators of Japanese and Hawaiian ancestry, who participate heavily in other Hawaii-based

[74] Mahimahi, wahoo, moonfish, oilfish, and pomfret.

[75] Blue marlin, shortbill spearfish, striped marlin, sailfish, and black marlin.

[76] O'Malley and Pooley (2003) suggest that the Mixed and Varied targeting categories were really swordfish boats, as they deployed shallow-set gear at night and used squid bait. The self-proclaimed definitions of their targeting may have had more to do with cultural differences than real targeting differences. The Caucasians who claimed to be full-time swordfish-targeting fishermen were most likely from the portion of the fishery that had emigrated to Hawaii from east coast ports of the continental United States, where they had previously targeted swordfish in the Atlantic.

commercial fisheries, were not well represented in the survey findings. Japanese Americans were the main group that introduced longlining to Hawaii, but have since left the fishery.

A later survey of 130 longline permit holders was conducted in 1999 (NMFS, 2001a). The following ethnic groups were recorded: Vietnamese (48), Caucasian (45), Korean (25), Hawaiian (3), Japanese (2), Samoan (1), and mixed heritage (6). However, the composition of participants has likely changed somewhat in recent years with the elimination of swordfish targeting by the fleet.

The stated residence of the 164 holders of Hawaii limited-access longline permits (as of October 2000) showed most permit holders are from Hawaii, with 38 permit holder addresses listed outside Hawaii in the states of Washington (9), New Jersey (8), California (7), Florida (6), Oregon (4), and other states (4). Most vessel crew was noted as coming from the island of Oahu (NMFS, 2001a).

A more recent study conducted personal interviews with representatives of 64 Hawaii-based longline vessels during the period of March 2001 through January 2002 (O'Malley and Pooley, 2003). This rate of coverage corresponded to approximately 50% of the vessels engaged in the fishery at that time. Due to language and communication problems with swordfish-targeting Vietnamese vessel owners, this group may be under-represented in the study in comparison with the tuna-targeting vessel owners/operators.[77] Results of the study showed that participants in the fishery are composed of Korean Americans targeting tuna, Caucasian Americans targeting tuna and Vietnamese Americans primarily targeting swordfish but some tuna as well. Apparently, the Caucasian swordfish-targeting fishermen interviewed by Hamilton et al. (1996) have either left the fishery, converted to tuna targeting or were not interviewed in the more recent study. A significant development in the fishery is the hiring of vessel crews from different ethnic groups than the vessel owner/operators, namely contracted nationals from the Philippines.

A current and ongoing study funded by the University of Hawaii, Pelagic Fisheries Research Program, is developing a sociological database of the Hawaii-based longline fishery. Direct interviews with 160 individuals representing 50% of the longline fleet provide some preliminary information. The majority of vessels that berth at Pier 17 in Honolulu Harbor are Vietnamese-owned and -operated, and the Korean-owned and -operated vessels tie up in Kewalo Basin (S. Allen, pers. comm.). The majority of crewmembers at both locations are contracted laborers from the Philippines (A. Gough, pers. comm.). A significant number of crewmembers from Micronesia are also in the industry.

The 1996 study by Hamilton et al. indicated that tuna vessels operated with an average crew size of four and swordfish vessels required a crew of four–five persons (both figures excluding captain).

3.4.2.4 Operational Characteristics

The Hawaii-based longline fishery traditionally targets deep-swimming bigeye tuna, although yellowfin tuna and albacore contribute significantly to landings and revenue. After the influx of swordfish-targeting vessels to Hawaii in the early 1990s, a distinct swordfish-targeting component developed. Although some mixing of targeting may occasionally occur, the fishery can be effectively characterized into two operationally distinct categories: a tuna-targeting component setting deep gear that fishes or "soaks" primarily during the daytime, and a swordfish-targeting component that deploys shallow gear at night that also takes some tuna or may fish for tuna on occasion (NMFS,

[77] This may make the study even more relevant to the current situation, with 100% tuna targeting in place.

2001a). The swordfish-targeting component disappeared from the scene in 2002–2003 due to court action in relation to issues related to protected species interactions, but was reinitiated during the second quarter of 2004 (see Subchapter 3.4.2.2). A general description of swordfish-style gear compared to tuna-style gear is described first, followed by a more detailed examination of tuna-targeted operations.

The swordfish-targeting vessels that joined the Hawaii fishery during the early 1990s were typically larger vessels using continuous monofilament mainline gear and were more fully equipped with marine electronics compared to tuna-targeting vessels of that period. Tuna-targeting vessels quickly adopted monofilament mainline gear and upgraded fish-finding electronics. However, swordfish boats are typically larger in size due to the greater distances traveled to fishing grounds and longer trips necessary to effectively target swordfish in waters to the north of Hawaii.

Swordfish boats have been characterized as setting four–five hooks "per basket" (number of hooks between floats), with leader lengths (branch lines) of 22–27 meters (NOAA 2001a). The mainline is suspended high in the water column by relatively short lines attached to the floats (float lines) that are 9–12 meters in length. Floats are set approximately 300 meters apart. This configuration is designed to achieve a shallow hook depth of approximately 20–30 meters. Typically, squid bait is used on "J"-style hooks with chemical light sticks for attraction. Lines fish or "soak" at night when swordfish rise close to the surface to feed. Swordfish gear is quite standardized in configuration and fishing depth.

Tuna gear is designed to fish much deeper, targeting depths close to or below the thermocline where large bigeye tuna feed during the day. In the Hawaii fishery, roughly 20–40 hooks are set per basket between floats that are approximately 800 meters apart (NMFS, 2001a). Longer float lines suspend the mainline to deploy hooks at a depth range of close to 90–360 meters. The gear is set using a "line shooter," a hydraulic device that deploys large quantities of mainline at a rate faster than the forward motion of the vessel to achieve a pronounced sag between float lines to sink the lines even deeper. Chemical light sticks are not normally used for tuna fishing. A combination of J- and heavy-gauge tuna hooks are used, with small fish for bait. Tuna-style gear is normally set in the morning, allowed to soak during the day, and retrieved in the afternoon and evening. Actual gear configurations are somewhat variable between tuna longline vessels but all are significantly different in every way from swordfish gear.

The physical and operational characteristics of Hawaii-based longline vessels were summarized from interviews and NOAA Fisheries data by O'Malley and Pooley (2003) for the 2000 season. This is the last full year that the Hawaii swordfish fleet operated relatively free of court-mandated restrictions, thereby providing a good example of both fleets under normal operating conditions. According to the interviews, swordfish vessels compared to tuna vessels were on average, newer, larger, had larger fish hold capacities, carried more fuel and had more powerful engines (Table 3.4-7).

Table 3.4-7: Average Physical and Operational Characteristics of Hawaii-Based Swordfish and Tuna Longline Vessels in 2000

Physical Characteristics	Swordfish Targeting	Number Examined	Tuna Targeting	Number Examined
Vessel age	14	18	23	42
Length overall (m)	74	18	65	42
Fish hold capacity (kg)	17,130	17	15,407	42

Physical Characteristics	Swordfish Targeting	Number Examined	Tuna Targeting	Number Examined
Operational Characteristics				
Trips per year	10	19	11	43
Sets per trip	15	50	11	72
Hooks per float	4.4	12	29	43
Hooks per set	932	12	2069	43
Mainline deployed (km)	72	14	53	43
Mean distance to sets from Honolulu (km)	1,175	50	743	72

Source: adapted from O'Malley and Pooley (2003)

On average, swordfish vessels made less frequent longer trips and set more times per trip than tuna vessels. Tuna-targeting vessels averaged eleven trips per year and eleven sets per trip, set gear that averaged 29 hooks per basket, and set an average of 2,069 hooks per set on 53 km of monofilament mainline. In comparison, vessels targeting swordfish averaged 10 trips per year and 15 sets per trip, set gear that averaged 4.4 hooks per basket, and set an average of 932 hooks per set on 72 km of monofilament mainline. Vessels targeting tuna averaged a travel distance of 743 km to their fishing location compared to 1,175 km for swordfish-targeting boats (O'Malley and Pooley, 2003).

The physical and operational characteristics of Hawaiian longliners were examined in finer detail for three size categories of tuna vessel and two size categories of swordfish boats (O'Malley and Pooley, 2003). The largest swordfish boats made fewer, longer trips than the smaller swordfish boats and traveled farther to fish. Small (15-meter), medium (20-meter), and large (25-meter) tuna vessels (average length overall) set an average of 1,769, 2,116, and 2,338 hooks per set, respectively. Medium (21-meter) and large (24-meter) swordfish vessels (average length overall) fished an average of 912 and 959 hooks per set, respectively.

The NOAA Fisheries PIRO Hawaii Longline Observer program collects detailed operational characteristics of the vessels and gear used by the Hawaii longline fleet. An examination of 291 observed trips conducted during 2002 on 98 of the 100 active vessels indicated that all but one vessel used monofilament mainline on a fixed hydraulic spool. The majority of these vessels used 3.6-millimeter or 3.8-mm heavy-gauge tuna hooks, but a few were still using 8/0 J-style swordfish hooks. Recorded bait usage was as follows: saury (47%), California sardine (28%), large squid (1%), and a mixture of mainly saury and sardines (24%).

Due to the prohibitions on the setting of swordfish-targeted gear, this dataset represents the operational characteristics of the Hawaii longline fishery during 2002 while targeting tuna. Table 3.4-8 summarizes these data from the 97 observed vessels deploying monofilament mainline gear, representing 289 individual trips making 3,409 individual, observed longline sets (PIRO, 2003).

Table 3.4-8: Setting Characteristics of Hawaii Tuna-Targeting Pelagic Longliners from 289 Observed Trips for 2002

Parameter	Mean	Median	Mode	Range	No. of Sets Examined
Mainline length (km)	62.4	62.4	64.4	8–121	2,261
No. of hooks/set	1,935.1	1,958.0	2,100.0	66–3,016	3,409
No. of hooks/basket	27.5	28.0	30.0	14–38	3,403
Float line length (meters)	24.4	24.0	20.0	11–50	3,409
Dropper length (meters)	13.3	13.0	13.0	5–36	3,400

Source: PIRO 2003

Sets averaged 62.4 km in reported length, with an average of 1,935 hooks per set, ranging up to an observed 3,016 hooks per set. The vessels set an average of 27.5 hooks between floats, but sets ranged from 14 to 38 hooks between floats. The gear was suspended from float lines having a mean length of 24.4 meters, with branch lines averaging 13.3 meters in length.

3.4.2.5 Catch Disposition

Almost all of the Hawaii-based longline catch is sold at the United Fishing Agency auction in Honolulu (Ito et al., 2003). Currently, vessel operators make no sustained effort to market their catch directly to the public, as may be practiced by some continental U.S.-based fisheries. It is believed that very little of the longline catch is directly marketed to retailers or exported by the fishermen.

Tuna are normally bled and iced whole, arriving at the auction essentially intact. Most tuna vessels carry fresh water flake ice to preserve their catch. In addition, a few vessels are equipped with machinery to convert seawater to fresh, which is used to make freshwater ice onboard the vessel.

Bigeye tuna has the highest value on the local market, followed by yellowfin and skipjack tuna. In 1996, the average daily consumption of tuna in Hawaii was approximately 10 mt per day or roughly 3,500 mt for the year (Bartram et al., 1996). It is estimated that at least 40% of local tuna sales are consumed raw as sashimi or *poke* (raw fish cubed with relishes). The larger, generally longline-caught tunas are valued as sashimi, but the strength of the Hawaii market is related to the complex and diversified range of seafood markets available. Frozen steaks or loins are in less demand in the Hawaiian market than in mainland markets due mainly to product devaluation as a result of the freezing process.

Lower-grade bigeye and yellowfin tuna may enter export markets in the continental U.S., but a great deal is consumed locally. Smaller or lower-grade tunas may enter local niche markets for *poke*, seared tuna, dried product, or for grilling. Generally, fish price and desirability depends on the species, size, harvesting method and quality grade in conjunction with supply and demand. Bluefin tuna are the highest grade of tuna on the world market, but have never figured significantly in the Hawaii-based fishery. Swordfish boats operating in the cooler waters north of Hawaii occasionally catch Pacific bluefin tuna (*Thunnus orientalis*) that are sometimes exported to the Japanese market.

Billfish (non-swordfish species) are popular food fish in Hawaii and often retained for sale by commercial fisheries. In Hawaii, striped marlin, shortbill spearfish, and blue marlin have specific markets and provide an inexpensive alternative to higher-priced species.

Mahimahi, wahoo, and opah are landed in significant quantities by the Hawaii longline fishery and are an important component of domestic consumption of fresh seafood. Even pomfrets, escolar, and oilfish have market value in Hawaii due to a culturally diverse population.

3.4.2.6 Key Economic Considerations

In contrast to the American Samoa longlining fishery, longliners operating from Hawaii are entirely focused on providing fresh fish for substantial local and tourist markets. In addition, prior to the 2001 ban on swordfish longlining, the pelagic fleet in Hawaii was segregated by target species (tuna or swordfish), because each species required its own specialized gear and employed different fishing techniques.

A key economic parameter within the longline fleet is vessel size. O'Malley and Pooley suggest that the Hawaii longline fleet could be conveniently segmented into vessel classes of small (less than 17 meters), medium (17–22.5 meters), and large (greater than 22.5 meters).[78] Each vessel class enjoys differential voyage patterns, operational costs, and profitability.

Physically, most of the Hawaiian longline fleet is similar to the American Samoa big boats in size, range, and sophistication. However, because the nature of the fishery is different, the voyage patterns and economic parameters of the two fleets differ. Because Hawaiian longliners fish exclusively for the fresh fish market, their voyage patterns are determined by their ability to capture and return to port with quality fresh fish. Accordingly, range and transit times to and from the fishing grounds is limited. Table 3.4-9 compares the voyage patterns of the American Samoa big boats with the Hawaii-based longline fleet.[79]

Table 3.4-9: Operational Comparison of American Samoa and Hawaiian Longline Fleets

Characteristic	Am. Samoa Big Boats	Hawaii Small Tuna	Hawaii Medium Tuna	Hawaii Large Tuna	Hawaii Medium Swordfish	Hawaii Large Swordfish
No. of boats in fleet [a]	25	11	37	19	18	33
Length	69	48	66	84	69	78
Fuel/day (liters)	818	526	882	1,454	901	1,257
Trips/year	17	12	11	12	11	8
Sets/trip	Unknown	11	11	11	13	16
Hooks/set	2,141	1,769	2,116	2,338	912	956
Km to first set [b]	<370	526	909	1,028	1,065	1,513

[a] Hawaii data for 2000: O'Malley & Pooley (2003, 5);
American Samoa data for 2001: O'Malley & Pooley (2003, 6)
[b] From home port (Honolulu or Pago Pago)

[78] The same size designation pertains to both tuna and swordfish boats, but no "small" swordfish vessels operated from Hawaii in 2000.

[79] In considering this comparison, note that the American Samoa operational data is based on fishing exclusively within the 200-mile EEZ of American Samoa and does not include (extended) voyages to areas that might be accessed under a revised tuna treaty.

In considering the fleet comparisons of Table 3.4-9, it is interesting to note that although the annual number of trips is comparable, the distance traveled to the first set is considerably further for the Hawaiian fleet than for the American Samoa fleet. This fact, no doubt, reflects that the American Samoa longline fleet is operationally constrained by the existence of other EEZs neighboring the U.S. EEZ surrounding American Samoa, and the Hawaii longline fleet has access to a much larger fishing area outside the U.S. EEZ surrounding Hawaii. Likewise, a very considerable difference exists within the Hawaiian fleet, with the small vessels deploying their first set at less than one-half the distance of the larger tuna and swordfish vessels. This clearly has a dramatic effect on fuel consumption. Table 3.4-10 summarizes the financial parameters for each of the longline Hawaii fleets as well as the American Samoa big boats.

Table 3.4-10: Average Financial Performance by Longline Fleet (in thousands of US$)

Characteristic	Am. Samoa Big Boats	Hawaii Small Tuna	Hawaii Medium Tuna	Hawaii Large Tuna	Hawaii Medium Swordfish	Hawaii Large Swordfish
Gross revenue	$657	$502	$496	$485	$459	$526
Fixed costs	$101	$66	$93	$84	$81	$105
Variable costs	$201	$147	$183	$240	$240	$221
Labor costs	$178	$188	$167	$143	$114	$161
Fuel costs	$73	$25	$42	$57	$64	$58
Total costs	$479	$401	$443	$467	$435	$487
Net revenue	$177	$101	$53	$18	$24	$39

Sources: American Samoa data: O'Malley and Pooley (2003); Hawaii data: O'Malley and Pooley (2002)

The O'Malley and Pooley (2002, 2003) economic and operational analysis presents several important findings about the economics of Hawaii-based longline vessels:

- Small tuna vessels are the most profitable group. These vessels had higher gross revenues and high labor costs but lower fixed and variable costs;
- If distance-to-first-set is used as a proxy for operating range, then only small, if any, revenue gains are associated with expanded fishing range;
- Labor cost variations reflect both the nationality of crews and their method of remuneration. Approximately 54% of the Hawaii-based vessels employed foreign crews that were paid a monthly salary. Labor costs for vessels using the traditional "share method" (crew gets a portion of the catch revenue) were more than three times the costs for salaried crews (US$152,097 versus $44,333).

As is the case with all published estimates of vessels' economic condition, the net revenue estimates presented in Table 3.4-10 should be approached with caution. For example, if the three vessels with the highest net revenue are excluded, the remainder of both the Hawaii small tuna and the Hawaii medium swordfish fleets, *on average*, lost money in 2000–2001 (O'Malley and Pooley, 2003). Table 3.4-11 illustrates the relationship of the top three vessels in each category to the average performance of the rest of the fleet segment.

Table 3.4-11: Financial Performance of Top Vessels to Rest of Fleet (Average Annual Net Return for 2000)

Vessel class	Small Tuna	Medium Tuna	Large Tuna	Medium Swordfish	Large Swordfish	All Tuna	All Swordfish
Top 3 vessels	$287,989	$275,124	$319,555	$213,290	$328,585	$322,652	$376,617
Rest of fleet	–$1,440	$33,367	$19,188	–$33,791	$73,819	$25,761	$62,464

Source: O'Malley and Pooley, 2002

These economic and operational surveys suggest that, *on average,* all longline vessels enjoyed profitable operations in 2000–2001. However, the sensitivity of gross profit in American Samoa to albacore prices and the considerable variation in profitability between and within segments of the Hawaii-based fresh tuna fleets suggest that in general, longlining is a marginal economic activity.

3.5 Albacore Troll Fishery

The reported landings for vessels trolling for albacore tuna are provided in Table 3.5-1. All of the reported catch is from west coast-based albacore trollers that transit from the Northern Hemisphere to participate in the South Pacific albacore fishery. The South Pacific albacore fishery is an austral summer/fall fishery that typically operates east of New Zealand. This fishery complements an off-shore North Pacific albacore fishery that operates west of the U.S. west coast EEZ and may stretch as far as the International Date Line. The North Pacific fishery is typically a spring/eraly summer (Northern hemisphere) fishery, following the fish moving east to the U.S. west coast.

Since 1988, no more than seven albacore troll vessels have operated in the Treaty Area in any one year. The total number of vessels participating in the South Pacific albacore fishery ranges from 12 to 55 (Table 3.5-1). Catch totals are based on data from logbooks. However, it should be noted that there has never been complete logbook coverage in the South Pacific albacore fishery and landings may be up to twice that presented here. Although in at least two years there have been significant landings from the Treaty Area, overall there is very limited effort in the Treaty Area and typically catch is less than a metric ton. In the two years that there were significant landings (>30 mt), catches came from a broad area from 155° E longitude west to the dateline and 38–40° S latitude. This area, although technically in the Treaty Area, is well south of the usual theater of the purse seine fleet.

Table 3.5-1: Participation of trollers and reported catch of Albacore tuna within the Treaty Area, 1988-2002.

Year	# of vessels[a]	Weight (kg)	Total Vessels[b]	% coverage[c]
1988	1	N/A[d]	43	31
1989	6	30,874	42	59
1990	4	2,495	39	86
1991	4	1,795	55	92
1992	2	N/A	55	63
1993	3	1,517	44	19
1994	3	33,927	13	13
1995	3	577	21	59
1996	2	N/A	53	59
1997	5	257	26	64

Year	# of vessels[a]	Weight (kg)	Total Vessels[b]	% coverage[c]
1998	2	N/A	36	70
1999	4	135	21	53
2000	2	N/A	36	68
2001	7	472	33	72
2002	4	1,148	12	34
				Average: 56

[a] Number of albacore vessels that reported trolling in the Treaty Area
[b] Number of vessels that reported albacore catch in the South Pacific albacore fishery
[c] Percent coverage of logbooks for the reported catch
[d] Less than 3 vessels reporting, therefore data is considered confidential
Source: Unpublished data from the Southwest Fisheries Science Center

3.6 Biological Resources

Fishing activity under the Treaty primarily affects the target tuna species. Occasionally, some interaction occurs with protected resources. For the purpose of this review, protected species include marine mammals, sea birds, and sea turtles. The status of the target tuna stocks is described below followed by discussion of known or potential interaction with protected resources.

3.6.1 Status of Tuna Stocks

Biological research and stock assessment have been undertaken by several U.S. Government agencies in the western Pacific, including NOAA Fisheries and the WPFMC. Regionally, research and stock assessments are conducted by the SPC's OFP in Noumea, New Caledonia. The most comprehensive assessments are those undertaken by the SPC OFP who collaborates with scientists through a regional forum known as the Standing Committee on Tuna and Billfish.[80] The SPC utilizes a stock assessment methodology known as MULTIFAN-CL. According to SPC OFP, fishing effort data, such as CPUE, are used in the model as independent variables. The statistical fitting procedure of MULTIFAN-CL allows confidence intervals to be determined for model parameters and for quantities of interest that are functions of the model parameters.

The collection and compilation of tuna fisheries data within the western and central Pacific region is the responsibility of the SPC OFP[81], whose data-related activities include the collection, verification, storage and analysis of logsheet, unloading, length frequency, tagging and observer data. The OFP coordinate port sampling and observer programs throughout the region for the Pacific Island nations who collectively comprise the Pacific Community. In addition, NOAA Fisheries collects catch and effort data from U.S. purse seiners operating under the Treaty and forwards these data first to the FFA Secretariat and then to SPC OFP for compilation, long-term storage, and summary. SPC OFP, in conjunction with NOAA Fisheries and American Samoa DMWR staff, collects port sampling data of Asian longline vessels unloading in American Samoa. Lawson (2003c) provides a detailed document on the status of data collection from all pelagic fleets and fisheries in the region.

[80] U.S. scientists from NOAA Fisheries in La Jolla, California, and Honolulu, Hawaii, are regular participants at and contributors to SCTB.

[81] http://www.spc.org.nc/oceanfish/Html/Statistics/Index.htm

The SPC OFP presents stock assessments annually to the SCTB, the most recent one taking place in Australia in July 2003 (SCTB 16). A stock assessment report is prepared for each of the four main tuna species (skipjack, yellowfin, bigeye and albacore). Other SCTB working groups review and discuss related work on statistics, analytical methods, billfish and bycatch, and fishing technology. At the conclusion of the meeting, an Executive Summary is developed that includes a preliminary summary statement from each of the species research groups addressing the current status of each stock. Summary statements from the ancillary working groups are also drafted (NOAA Fisheries, 2003b).[82] All summary statements and the final report of the meeting are available to the public.[83] The information presented in the following discussion is taken primarily from the SCTB 2003 summary statements and builds on information presented at SCTB in 2002. Catch statistics relate to the WCPO, specifically the area of the Pacific Ocean west of 150°W longitude, including the domestic pelagic fisheries of Japan, the Philippines, and Indonesia (Figure 3.6-1).

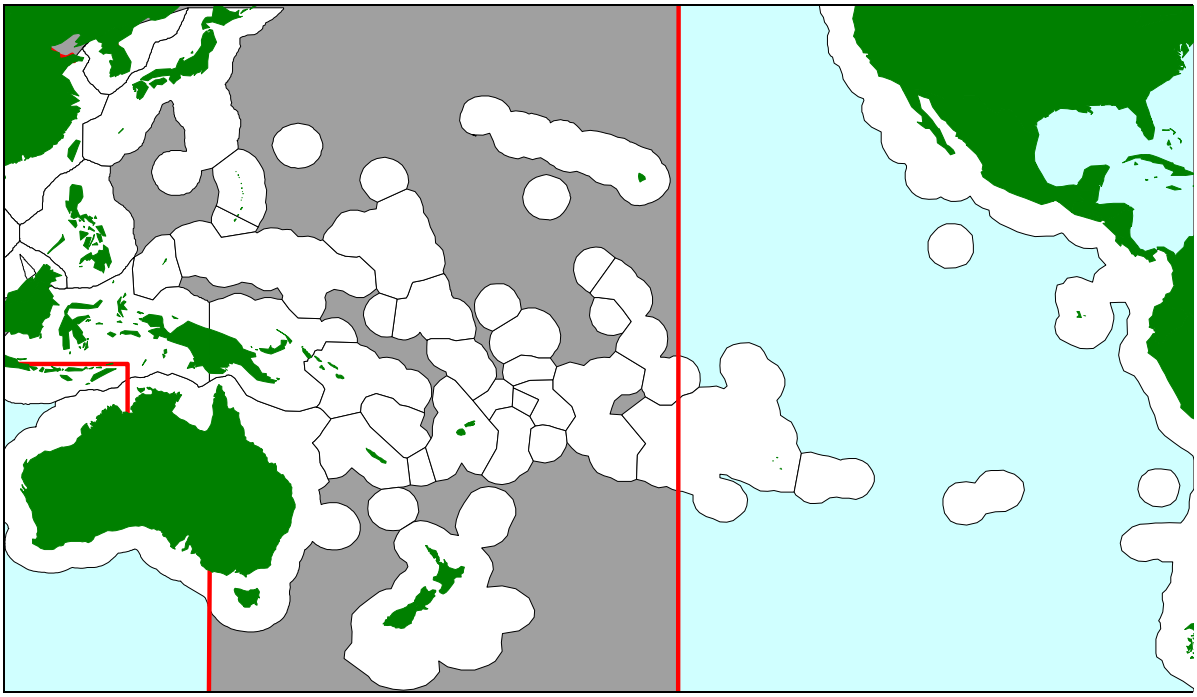


Figure 3.6-1: Division Point of Eastern Pacific Ocean (at 150°W longitude) and WCPO (dark gray). Provisional 200-mile zones are also depicted.

3.6.1.1 Skipjack

Skipjack tuna (*Katsuwonus pelamis*) are concentrated mostly in tropical waters; they also seasonally expand into subtropical waters in both the north and south Pacific. The main characteristics of a skipjack are fast growth, early maturity, high fecundity, year-round spawning over broad tropical regions, a relatively short life span compared to bigeye, albacore and bluefin tunas, high and variable

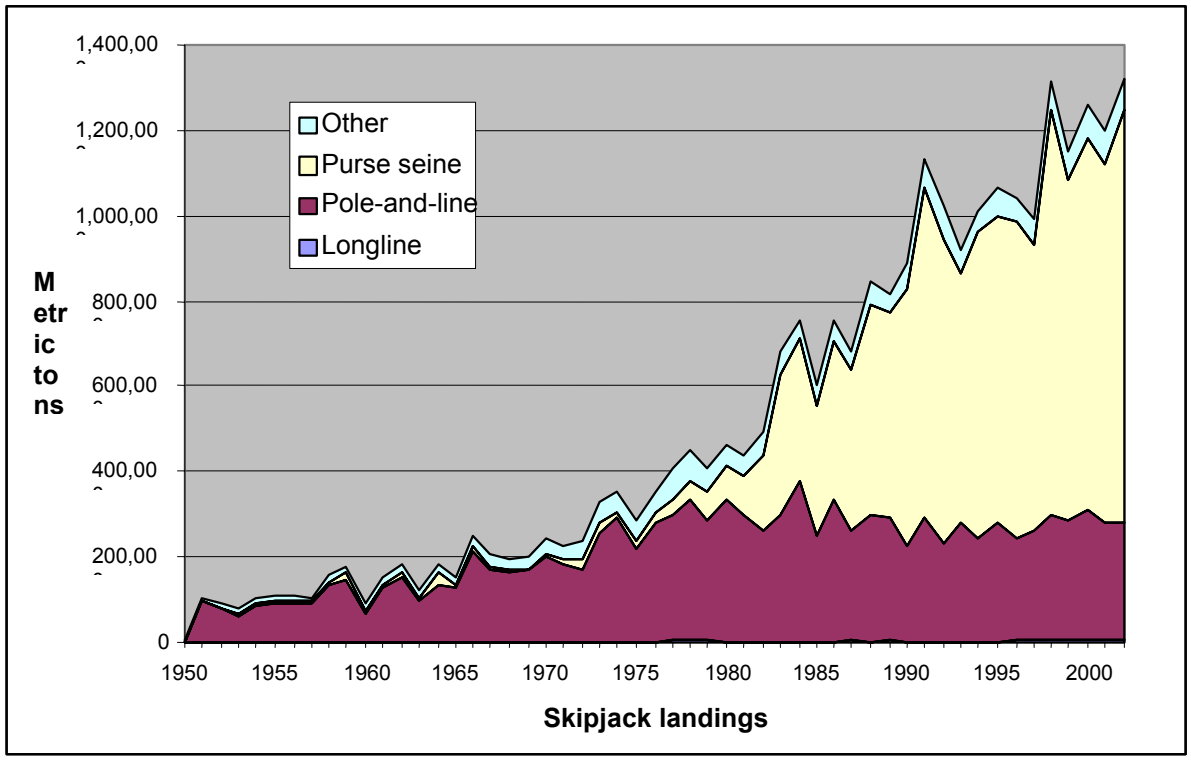
[82] The summary statement also recommends immediate further action for fisheries administrations and scientific institutions involved in the collection and analysis of tuna fishery data in the WCPO.

[83] Downloadable PDFs at http://www.spc.org.nc/oceanfish/Html/SCTB/index.htm.

recruitment and few age classes on which the fishery depends. In describing the attributes of the species, Joseph (2002) states:

> "These characteristics, together with their wide distribution, results in a huge biomass of fish, and very high levels of potential production. Ever since the beginning of heavy commercial exploitation in the early 1970s, the consensus among scientists had been that the populations of skipjack in all oceans of the world were lightly exploited and capable of sustaining much higher catches. This has been borne out by the fact that annual (global) catches increased from approximately 400 000 tons in 1970 to approximately 1.9 million tons in 1998. They remained near that level during 1999 and 2000."

In 2002, the estimated skipjack catch in the WCPO exceeded 1.3 million mt, the highest catch on record. The bulk of the skipjack catch in the WCPO is taken in equatorial waters and accounted for 67% of total landings of the four major market species in the region (Williams, 2003d). The high 2002 catch follows high catch levels of around 1.2 million mt for the period 1997-2001. During 2002, purse seine gear accounted for 73% of landings, followed by 21% by pole-and-line fleets and 6% by other gears. Figure 3.6-2 shows the annual skipjack catch by gear type since 1950.



Data source: SPC (2003b)

Figure 3.6-2: Annual Catch (mt) of Skipjack Tuna in the Western and Central Pacific Ocean (WCPO) by Fishing Method

Nominal purse seine CPUE trends are generally upward, reaching a record mean rate of 30 mt per day in 2002 (Williams, 2003c). Increased efficiency associated with the use of FAD technology and

increases in vessel efficiency are believed to be contributing factors (Coan and Itano, 2003; Itano, 2003). CPUE (standardized) trends for the Japanese high seas pole-and-line fleet show no change. The bulk of the catch consists of 50–60 centimeter (cm) fork length (FL) fish taken by purse seine gear.

Genetic studies of the Pacific population of skipjack suggest that some mixing of fish occurs across the Pacific Ocean, but for management purposes, the stocks in the western Pacific have been considered by most scientists to be independent of those in the eastern Pacific. Tagging data showing limited movement of skipjack from the eastern Pacific to the western Pacific support the same conclusion (Joseph, 2002). Recent research suggests that fast-growing, short-lived species like skipjack and yellowfin may have median lifetime displacements on the order of 644–805 km, supporting the idea of "regional fidelity" (Sibert and Hampton, 2003). The possibility of restricted movements of skipjack in the WCPO suggests the possibility for local depletion despite the large total biomass.

Recruitment, as determined by MULTIFAN-CL, has been on an upward trend since the mid-1980s and has remained high since then. These elevated recruitment levels are believed to be positively linked to the frequency and strength of El Niño events during that period (Langley et al., 2003). Biomass trends are largely driven by recruitment, with the model suggesting record high biomass levels in recent years for the WCPO.[84] Fishing mortality rates have also been on the increase since 1972, with current overall fishing mortality estimated at 20–25% per year.

The SCTB Methods Working Group has expressed concern over the model's ability to reliably estimate some parameters. In response, the Skipjack Research Group relied largely on trends and ratios instead of actual point estimates in developing the current stock assessment. Basic biological- and fishery-related reference points were used, such as biomass, exploitable stock size, maximum sustainable yield (MSY), and total fishing mortality, which represents all removals from the skipjack population as a result of fishing activity.

Current model outputs estimate skipjack biomass levels in the WCPO at levels higher than the theoretical biomass at MSY. This factor, coupled with an estimated fishing mortality below fishing levels at MSY, suggests the skipjack stock of the WCPO is neither being overfished nor is in an overfished state. It has been suggested that the population has been able to withstand high levels of catch due to relatively high recruitment levels in recent years that equate to moderate exploitation rates relative to biomass (NOAA Fisheries, 2003a). The model suggested catches of 1.2 million mt annually would be sustainable within the current high recruitment regime, but cautioned that the assessment would change considerably if a lower recruitment regime were to develop in the future. The SCTB Methods Working Group concluded that WCPO skipjack abundance is dependent primarily on environmental factors and recruitment, rather than a strong relationship between the spawning stock size and recruitment.

However, some concern was expressed at SCTB 16 that unadjusted increases in effective fishing effort may be artificially inflating recruitment as predicted by the model. These concerns applied to the yellowfin and bigeye stock assessments as well.

[84] Over past 30-year period.

3.6.1.2 Yellowfin

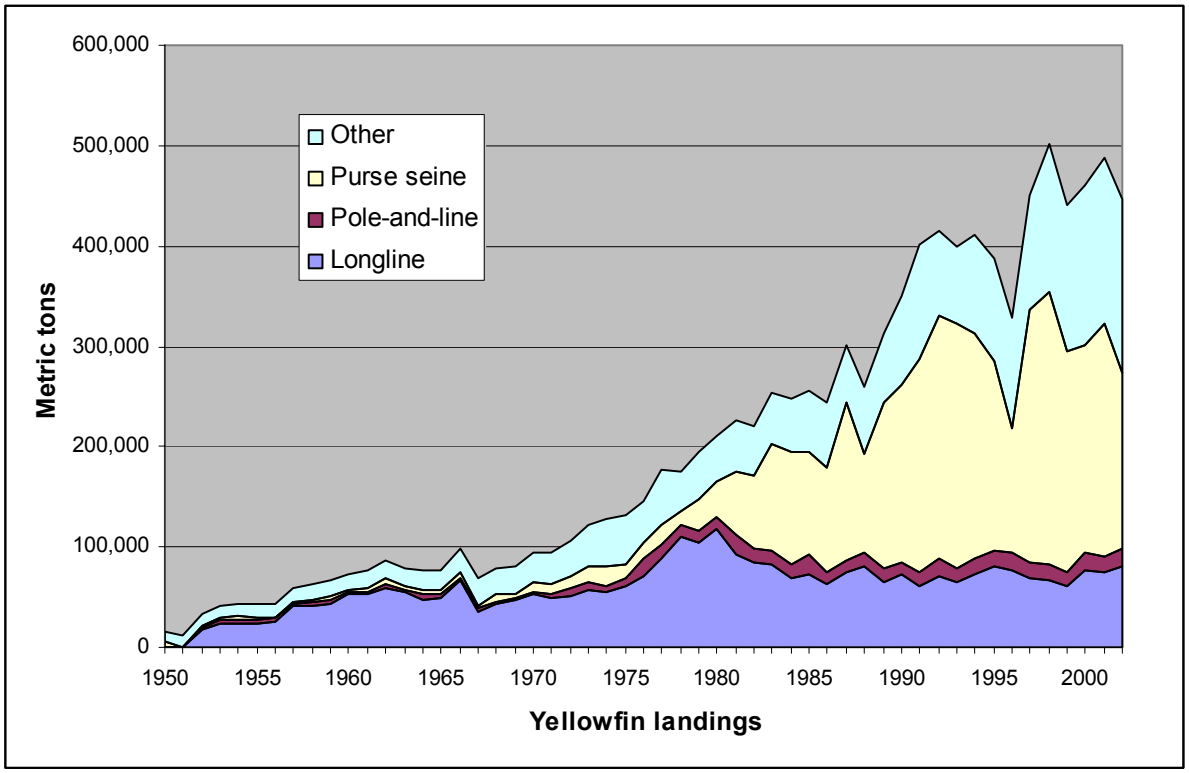
Yellowfin tuna (*Thunnus albacares*) are distributed throughout the tropical and subtropical waters of the Pacific Ocean. Ward et al. (1994) note that some indication exists of restricted mixing between the western and eastern Pacific, based on analysis of genetic samples and tagging data. However, for stock assessment purposes, yellowfin tuna are considered to constitute a single stock in the WCPO region (NOAA Fisheries, 2003a).

Yellowfin are relatively fast growing, reach a maximum FL of approximately 180 cm, mature at approximately 2 years of age and are highly productive. Suzuki (1994) provides a thorough review of the biology and fisheries of WCPO yellowfin. It is believed that adults (defined as those larger than approximately 100 cm FL) in the WCPO are capable of spawning year-round in waters greater than 26°C (Itano, 2000b). The estimated natural mortality rate varies strongly with size (Hampton, 2000). Yellowfin live longer and reach larger sizes than skipjack. Most of the commercial catch is used for canning and fish over 10 kg are considered prime for this purpose. Purse-seine vessels take most yellowfin at the surface, along with the target skipjack species. Unlike skipjack, however, significant catches, particularly of large fish, are also made in subsurface waters by longline vessels (Joseph, 2002).

In the WCPO, yellowfin are targeted by the purse seine and longline fisheries. Since 1990, the total yellowfin catch in the WCPO has been between 320,000 and 485,000 mt per year. Purse seiners catch a wide size range of yellowfin tuna including those considered to be juveniles, whereas the longline fishery takes mostly adult fish. Total catches during the last five years have been at historic levels, averaging approximately 464,000 mt per year. During 2002, yellowfin tuna landings were close to 438,000 mt, representing 22% of WCPO tuna landings (Williams, 2003e). Figure 3.6-3 depicts the annual yellowfin catch by gear type since 1950. Purse seiners harvested the majority of the yellowfin catch, or approximately 47% by weight, during the years 1998–2002 (NOAA Fisheries, 2003b).

Yellowfin usually represent approximately 20–25% of the overall purse seine catch, although the composition of individual purse seine sets can be much higher. Large yellowfin that typically occur in unassociated schools are directly targeted by purse seiners due to their high ex-vessel value (relative to skipjack). Strong interannual variability exists in catch rates of yellowfin by purse seiners. This is believed to be associated with ENSO-driven variability in recruitment and catchability.

Increased use of both anchored and drifting FADs since 1990 by purse seine fleets has contributed to significant increases in fishing mortality on juvenile yellowfin. Concurrent increases in juvenile yellowfin landings by the domestic (non–purse seine) Philippine and Indonesian fisheries have also occurred during the same period. Catches peaked in 1998 at 0.5 million mt, decreasing in recent years primarily due to decreases in purse seine landings. During 2002, purse seine gear accounted for 39% of the yellowfin catch, longline 18%, and pole-and-line 4%. The “Other” category in Figure 3.6-3 refers mainly to the large domestic fisheries of the Philippines and Indonesia that take a large proportion of the annual yellowfin catch in the WCPO. However, reporting from these fisheries is incomplete and poorly documented. Therefore, catches may vary considerably from those suggested in the figure. These unreliable data remain a significant problem to regional stock assessment efforts.



Data source: SPC (2003a)

Figure 3.6-3: Annual Catch (mt) of Yellowfin Tuna in the Western and Central Pacific Ocean by Fishing Method

Fishing mortality for both juveniles and adult yellowfin is estimated to have increased continuously since the start of the time series. The 2002 SCTB yellowfin assessment incorporated data back to 1950 (Hampton and Kleiber, 2003). Catch and effort increased more steeply since 1990 in concert with developing purse seine fisheries, increased use of FADs, and increased landings by the mixed-gear fisheries of the Philippines and Indonesia.

Recruitment estimates varied depending on how standardized effort series were derived. A general linear model–derived index indicated no overall recruitment trend since the early 1950s. Using a habitat–based model, recruitment is estimated to have nearly doubled sometime between the mid-1970s and mid-1980s. This change in recruitment may represent a large-scale "regime shift" in general oceanographic conditions, or may be a misleading artifact produced in the model by increasing catches of juvenile yellowfin during this period. Current biomass trends generally agree on decreasing overall biomass, with current biomass levels being 20–35% less than would have occurred in the absence of fishing. However, the estimated depletion levels in the equatorial model regions, where the bulk of the biomass and fishery exist, are close to 50%.

SCTB 16 concluded that while the WCPO yellowfin stock is not currently overfished or in an overfished state, the stock is likely to be nearing full exploitation (SCTB, 2004). The meeting noted that any further increases in fishing mortality would not result in long-term increases in overall yield and may push the stock into an overfished condition. Of particular concern is the hypothesis that the equatorial region where the fishery exists on a large scale (and where the bulk of the spawning stock biomass exists) is likely to be fully exploited. This could be an example of "localized" depletion due

to limited overall movement of the stock as discussed by Sibert and Hampton (2003). In addition, if the predicted regime shift of elevated productivity in recent decades were real, then a shift back to a lower regime would make current catches unsustainable.

Due to the uncertain estimates of recruitment and biomass, uncertainties with repsect to productivity regimes and a fully exploited equatorial stock, the SCTB again recommended no further increases in fishing mortality for yellowfin in the WCPO, particularly for juvenile yellowfin (SCTB, 2004).

3.6.1.3 Bigeye

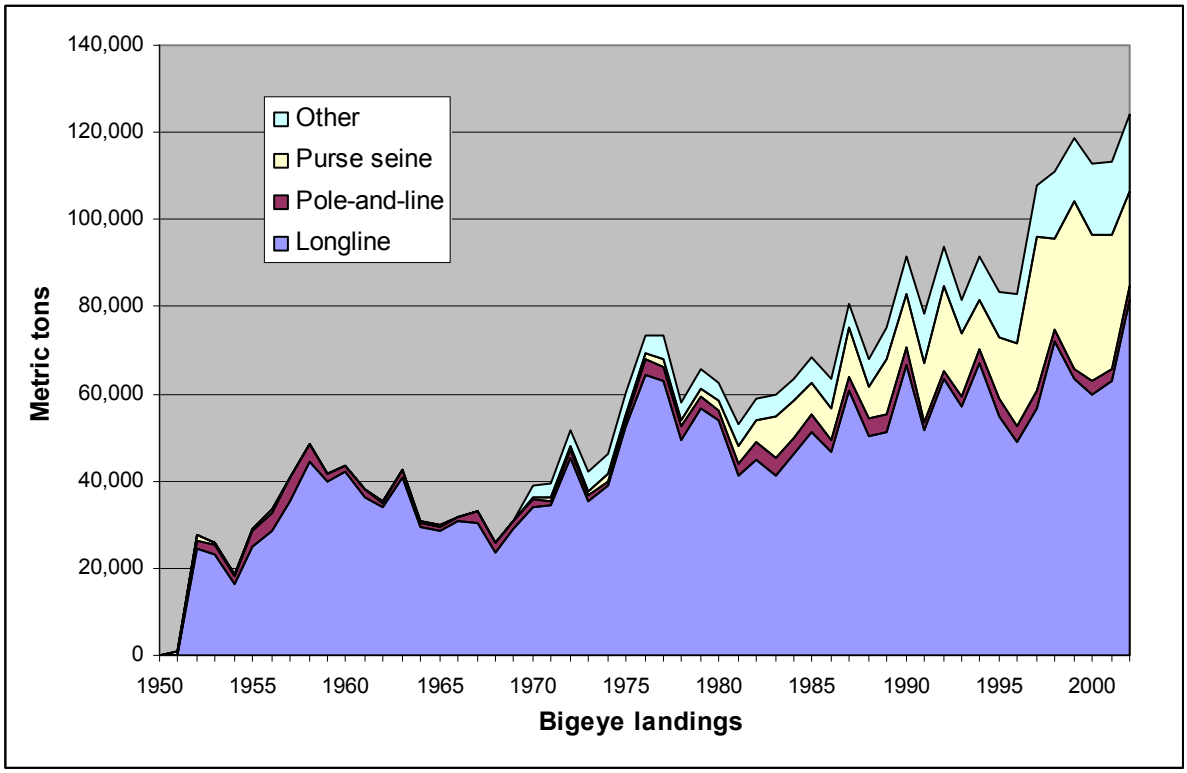
Bigeye tuna (*Thunnus obesus*) have a widespread distribution throughout the Pacific and occur from 45°N to 40°S in the western Pacific (Miyabe, 1994). The species range widely throughout the water column, regularly descending to 400 meters with occasional dives below 1,000 meters (Schaefer and Fuller, 2002). Some deep diving has been linked to foraging behavior, as the species feeds heavily on organisms of the deep scattering layer (Dagorn et al., 2000). Bigeye tuna are uniquely adapted to adjust rapidly to a wide range of temperatures, pressure and dissolved oxygen levels encountered on deep foraging excursions (Brill, 1996; Lowe et al., 2000). Another adaptation to life at greater depth and low ambient temperature is a layer of subcutaneous fat, which insulates them from the cold. This fat makes them very valuable in the sashimi market and has made them the main target of most subsurface longline fisheries (Joseph, 2002).

No clear evidence exists of separate Pacific bigeye stocks, and Pacific-wide stock assessments are being conducted. However, based on two major surface fishing areas of the Pacific, stock assessments have been conducted for eastern Pacific and WCPO stock. For the purposes of this review, the application of MULTIFAN CL to the WCPO stock as was discussed at SCTB 16 is presented (Hampton et al., 2003).

Although similar in appearance, bigeye differs significantly from yellowfin in life history parameters. The bigeye species attains similar size, growing to approximately 200 cm, but is a relatively slow-growing and slowly maturing tuna species, reaching maturity at 3–4 years of age. Large fish are caught by longline fisheries that target sub-adult and adult fish, and juveniles are typically caught by purse seine in mixed-species aggregations, primarily on floating objects (Whitelaw and Unnithan, 1997). Natural mortality is believed to be similar to yellowfin at very small sizes but relatively low during latter stages (Hampton, 2000).

The 2002 bigeye catch was slightly higher than 2001 at 108,000 mt, and contributed 5% to total WCPO tuna landings by weight (Williams, 2003b). Approximately 60% of the catch was taken by longline gear, with most of the remaining catch taken by purse seine (21%) and the domestic fisheries of the Philippines and Indonesia (18%). Figure 3.6-4 depicts the annual bigeye catch by major gear type since 1950.

Fishing mortality on juvenile bigeye increased with the development of large-scale purse seining in the region and the adoption of anchored and drifting FAD-based seining. The MULTIFAN CL model suggests that the impact of fisheries on the stock has been much higher in the tropical regions where the bulk of the catch is taken (Hampton et al., 2003). However, estimates of bigeye catch by most purse seine fleets are somewhat uncertain, as juvenile bigeye are not systematically separated or reported separately from yellowfin landings. In addition, estimates of bigeye landings (both juvenile and adult) in the Philippines and Indonesia are highly uncertain for a number of reasons. These areas are known to land a considerable proportion of yellowfin and bigeye from the WCPO, and the lack of certainty of bigeye landing is believed to have significant impact on regional assessments.



Source: SPC (2003b)

Figure 3.6-4: Annual Catch (mt) of Bigeye Tuna in the Western and Central Pacific Ocean by Fishing Method

Biomass estimates from the MULTIFAN CL model indicate a sharp decline (approximately 30%) in bigeye stocks during the early years of the fishery, followed by a leveling off to the present. Recruitment is portrayed as remaining fairly level until the early 1980s, after which a steadily increasing trend is evident. Estimated recruitment levels peaked in 1999 at approximately 2.5–3 times the levels recorded prior to 1980. The predicted increases in recruitment mirror the development of large-scale purse seine fisheries and FAD-based seining in the region, with related increases in juvenile bigeye fishing mortality. The assessment biologists considered these issues to be of concern and recommended the model outputs be viewed with caution especially in regard to recruitment and biomass estimates.

The conclusions of the 2003 bigeye assessment differed significantly from the 2002 assessment by stating that overfishing of the bigeye stock was occurring, with current harvests exceeding the recommended level of take at the predicted MSY level. WCPO bigeye landings in 2002 were 108,000 mt, while current MSY estimates are in the range of 40,000–80,000 mt. However, the apparent overfishing was in part mitigated by the model's predicted high biomass levels resulting from the recent high levels of recruitment. Therefore, although overfishing was occurring, the stock was not in an overfished state due to the predicted high levels of recruitment.

However, it seems highly unlikely that such dramatic changes in basic model parameters could occur during a single year when no significant changes in the fishery or standard indicators were noted, such as changes in CPUE. These factors, along with the results from SCTB 15, cast doubt on both assessments, suggesting greater caution in adopting either 2001 or 2002 assessment results as the

sole basis for management purposes. Nevertheless, it seems clear that although the longline fishery had the largest impact on the bigeye tuna stock, the purse seine fishery, FAD-related developments, and increasing catches in the Philippines and Indonesia have significantly impacted the juvenile segment of the population. These observations seem to support other ongoing Pacific-wide bigeye assessments and in particular recent stock assessment results for the eastern Pacific.

The SCTB concluded that current levels of exploitation could not be sustainable in the long-term unless above-average recruitment levels were real and maintained into the future. They therefore recommended no further increases in fishing mortality for all size classes of bigeye in the WCPO. There was also a recommendation to review and carry out further refinements of the models to confirm the results derived in 2003. If future stock assessments confirm the stated concern over bigeye stocks in the region, particularly for those populations in the main equatorial areas, the SCTB suggested that restrictive management of the fishery might be required.

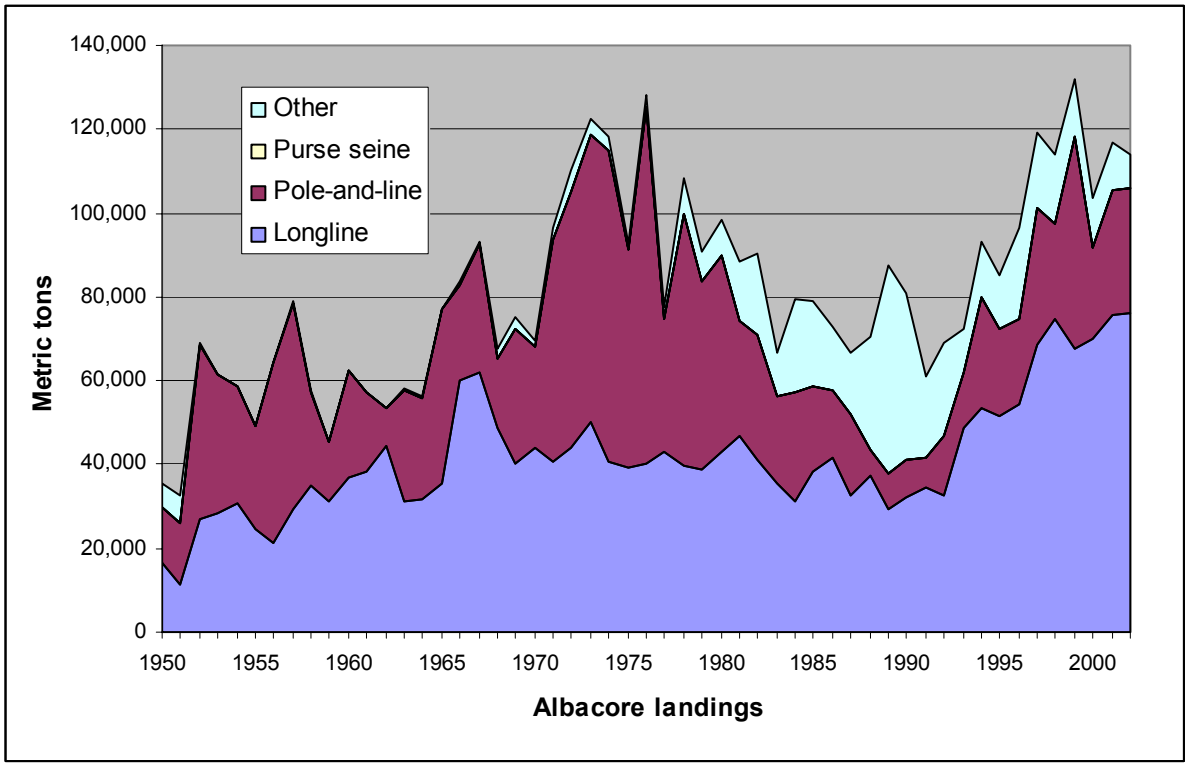
3.6.1.4 Albacore

Albacore tuna (*Thunnus alalunga*) is a temperate water species, concentrated mainly in the cooler temperate and subtropical waters of the world's oceans. Albacore also undertake extensive migrations, seeking optimum conditions for feeding and reproduction. Surface fishing with hooks and lines in temperate and subtropical regions accounts for most of the catch of younger fish, whereas longline fisheries in more tropical waters capture the older fish. Purse-seining accounts for a very small portion of the total albacore catch. The wide distribution and highly migratory characteristic of albacore results in greatly varied catch levels from year to year (Joseph, 2002).

In the Pacific, a northern stock of albacore occurs between the equator and approximately 40°N, from Japan to North America, and a southern stock is concentrated between 10°S and 45°S (Murray, 1994; Williams, 2003a). Total catches for these two stocks have fluctuated between 90,000 and 150,000 mt during the last 20 years, with no visible upward or downward trend. On average, approximately 60% of the catches come from the northern stock. Most of the albacore harvested commercially in the Pacific Ocean are captured by surface trolling gear and by longlines (Joseph, 2002).

WCPO albacore catch for 2002 was 113,916 mt, or 6% of WCPO landings of the four principal market species (SPC, 2003a).[85] Figure 3.6-5 depicts annual albacore catch by major gear type in the WCPO since 1950. The "Other" category consists primarily of surface troll catches, but is combined with surface driftnet catches during the 1982–1992 period.

[85] Includes catches of north and south Pacific albacore stocks west of 150°W.



Source: SPC (2003b)

Figure 3.6-5: Annual Catch (mt) of Albacore Tuna in the Western and Central Pacific Ocean by Fishing Method

The SPC monitors albacore that form a discrete stock in the south Pacific Ocean. Natural mortality is relatively low compared to the tropical tunas. The biology and fisheries for south Pacific albacore are reviewed by Murray (1994). Albacore are relatively slow growing and reach maturity in four to five years. Mature south Pacific albacore (> 80 cm) spawn in tropical and subtropical waters between around 10°S and 25°S during the Southern Hemisphere summer (Ramon and Bailey, 1966). Juveniles recruit to surface troll fisheries in coastal New Zealand waters and regions to the east in the subtropical convergence zone at 45–50 cm, later recruiting to longline fisheries at higher latitudes (Labelle and Hampton, 2003)

The south Pacific stock is harvested primarily as adult fish by longline gear between 10° S and 40° S with total landings at close to 60,000 mt in 2002 (Labelle and Hampton, 2003). Historically, distant-water Taiwanese longliners took most of the catch with significant landings by distant-water Japanese and Korean longline fleets. In recent years, domestic, small-scale longline fisheries have developed to the point where currently, 50% of the longline catch is taken by Pacific Island countries and territories, most notably in Samoa, American Samoa, Fiji, Tonga, Cook Islands, New Caledonia, and French Polynesia. Longline-caught south Pacific albacore are measured at various ports throughout the south Pacific region by port sampling programs. A single multiple-age length class mode is usually evident in the data between 90–100 cm (Williams, 2003a).

South Pacific albacore are also harvested as juvenile fish, primarily by New Zealand and U.S. troll vessels, south of 30°S in and near the subtropical convergence zone east of New Zealand. The troll fishery operates primarily during the austral summer (January–March), targeting surface swimming

juveniles ranging from 45–80 cm FL (Williams, 2003a). An Asian monofilament driftnet fishery persisted in the same area as the troll fishery from the 1982–83 season to 1992, and targeted the same juvenile-size fish.

The MULTIFAN CL model incorporates a negative correlation between south Pacific albacore recruitment and ENSO events, resulting in low predicted recruitment rates in the 1980s and 1990s. The application of a spatial environmental population dynamic model to south Pacific albacore has provided some preliminary information on possible mechanisms for recruitment variability (Lehodey, 2003).

Longline is the primary fishing gear exploiting the population resulting in a higher fishing mortality for adults than for juveniles. Overall, estimates of total fishing mortality appear to be lower than natural mortality, which is relatively low as well.

The stock assessment for south Pacific albacore presented at SCTB 16 arrived at the following conclusions:

- Biomass estimates peak in the late 1950s and 1970s, with current biomass estimated at approximately one-half of maximum levels and 60% of the estimated unfished level.
- Recruitment was on average higher prior to 1980, with low predicted recruitment in recent years.
- While the impact of fisheries has increased over time, it is estimated to be quite low, at approximately 3% of unexploited levels.

The assessment continues to be hampered by the low catch and effort rates, small amount of tag/recapture data, and no reliable means to estimate tag reporting rates (Labelle and Hampton, 2003). The model consistently indicates that current levels of harvest are well below MSY levels. It is assumed that the fisheries have little impact on stock biomass, which appears to be more responsive to environmental factors than influence recruitment. The SCTB 16 meeting considered it was highly unlikely that the stock was currently being overfished or in an overfished condition.

3.6.2 Protected Resources

3.6.2.1 Marine Mammals

Marine mammals of the WCPO region fall into three groups: sirenians (e.g., dugongs), pinnipeds (e.g., seals and sea lions), and cetaceans (e.g., dolphins and whales). Within the order Sirenia, only the dugong (*Dugong dugon*) is found in the coastal waters of some countries in the Treaty Area where tropical tuna fisheries take place (e.g., Palau, Solomon Islands, and Papua New Guinea). Dugongs are strictly marine animals and are found in nearshore areas, but are known to venture in deeper offshore waters. They have an herbivorous diet, grazing on sea grass in shallow, coastal areas. No known interaction occurs between the WCPO tuna fisheries and dugongs.

Sightings of pinniped species in the tropical tuna fisheries areas of the WCPO tuna fisheries region are considered extremely rare events. An unidentified marine mammal thought to have been a Hawaiian monk seal was reported from Mejit Island in the Marshall Islands in 1997 (National Biodiversity Team, 2000).

The most diverse of the group of marine mammals is Cetacea, and the waters of the Pacific are rich with cetacean species. Of 83 recognized species of cetaceans worldwide, 44 species are known to inhabit, permanently or seasonally, the region covered by the Treaty Area. Many of these are

offshore species and are very rarely seen in the coastal waters of the island nations. However, due to their ranging distributions, many species have a large overlap with the areas encompassing tuna fisheries in the WCPO region. Insufficient information exists, however, to confirm either the presence or absence of species that may be present in the area where most of the tuna purse seine fishing takes place (between 10°N and 10°S).

The order Cetacea consists of three sub-orders:

- **Odontoceti** (toothed whales): includes sperm whales, beaked whales, ocean dolphins, river dolphins, and porpoises. Distinguishing features are the presence of teeth, a single blowhole, and the ability to echolocate.
- **Mysticeti** (baleen whales): has baleen plates instead of teeth and has two blowholes.
- **Archaeoceti** (all extinct).

Odontecetes feed on a wide variety of fish, elasmobranchs (e.g., sharks), and cephalopod (e.g., squid) species. In Table 3.6-1, four categories of toothed whales known to visit or reside in the WCPO are listed. Only the sperm whale, *Physteter macrocephalus*, is listed as endangered under the U.S. Endangered Species Act (ESA). None of the other species listed are "threatened" under the ESA.

Table 3.6-1: Toothed Whales Known to Visit or Reside in the Western and Central Pacific Ocean

Common Name	Scientific Name
Sperm Whales	
Dwarf sperm whale	*Kogia simus*
Pygmy sperm whale	*Kogia breviceps*
Sperm whale	*Physteter macrocephalus*
Beaked Whales	
Andrew's beaked whale	*Mesoplodon bowdoini*
Arnoux's beaked whale	*Berardius arnuxii*
Cuvier's beaked whale	*Ziphius cavirostris*
Dense-beaked dolphin	*Mesoplodon densirostris*
Gray's beaked whale	*Mesoplodon grayi*
Hector's beaked whale	*Mesoplodono hectori*
Shepherd's beaked whale	*Tasmacetus shepherdi*
Southern bottlenose whale	*Hyperoodon planifrons*
Strap-toothed whale	*Mesoplodon layardii*
Dolphins	
False killer whale	*Pseudorca crassidens*
Killer whale	*Orcinus orca*
Longfin pilot whale	*Globicephala melas*
Melon-headed whale	*Peponocephala electra*
Pygmy killer whale	*Feresa attenuata*
Shortfin pilot whale	*Globicephala macrorhynchus*

Common Name	Scientific Name
Bottlenose dolphin	*Tursiops truncatus*
Common dolphin	*Delphinus delphis*
Dusky dolphin	*Lagenorhynchus obscurus*
Fraser's dolphin	*Lagenodelphis hosei*
Hector's dolphin	*Cephalorhynchus hectori*
Hourglass dolphin	*Lagenorhynchus cruciger*
Indo-Pacific bottlenose dolphin	*Tursiops aduncus*
Irrawaddy dolphin	*Orcaella brevirostris*
Long-beaked common dolphin	*Delphinus capensis*
Pantropical spotted dolphin	*Stenella attenuata*
Risso's dolphin	*Grampus griseus*
Rough-toothed dolphin	*Steno bredanensis*
Short-beaked common dolphin	*Delphinus delphis*
Southern right whale dolphin	*Lissodelphis peronii*
Spinner dolphin	*Stenella longirostris*
Striped dolphin	*Stenella coeruleoalba*

Note: Information based upon coordination with marine mammal experts and published reports.

The less-diverse suborder of mysticetes or baleen whales contains at least 13 species (although much debate occurs over the actual number of species in this suborder). Baleen whales are typically large whales and feed by filtering zooplankton and small fish from the water. Baleen whales are widely distributed throughout the world's oceans, and many species undertake long migrations from summer feeding grounds in the high latitudes to winter breeding grounds in the tropics. The WCPO hosts 10 species of baleen whales, detailed in Table 3.6-2. Only five are considered common to tropical and subtropical waters (shown in bold in the table). Of the species shown in the table, those that are listed as endangered under the ESA are the blue whale, the fin whale, humpback whale, and the sei whale (NOAA Fisheries, 2004).

Table 3.6-2: Baleen Whales Found in the Western and Central Pacific Ocean

Common Name	Scientific Name
Antarctic minke whale	*Balaenoptera bonaerensis*
Blue whale	***Balaenoptera musculus***
Brydes whale	***Balaenopotera edeni***
Dwarf minke whale	*Balaenoptera acutorostrata (subspecies)*
Fin whale	*Balaenoptera physalus*
Humpback whale	***Megaptera novaeanglaie***
Minke whale	***Balaenoptera acutorostrata***
Pygmy right whale	*Caperea marginata*
Sei whale	***Balaenoptera borealis***
Southern right whale	*Eubalaena australis*

Note: Information based upon coordination with marine mammal experts and published reports.
Bold: Species common to tropical and subtropical waters.

Longline Tuna Fishery Interactions with Cetaceans. The three most common types of interactions between cetaceans and the longline tuna fishery are depredation (the removal of or damage to hooked fish from longlines by marine mammals[86]), bait removal, and entanglement (including cetaceans becoming hooked on the lines). The reporting of the incidence of depredation and bait removal appears to have increased in recent years in the WCPO region (Donaghue et al. 2002). However, it is unknown if this reflects an increase in the occurrence of depredation, the effort in the tuna longline fisheries, the changes in cetacean population or just increased reporting. There has been no longlining by U.S. vessels in the high seas portions of the Treaty Area until the third extension – given that such fishing was effectively prohibited. Due to the economics and logisticial consideration (e.g, distance from port to first set) associated with fishing in the high seas portion of the Treaty Area, it is not likely that there will be any substantial effort by U.S. longline vessels in the area. Thus, it is not likely that there will be any takings of marine mammals by U.S. longline vessels in the high seas portions of the Treaty area as a result of the access to these waters.

Depredation. Depredation is not a new phenomenon to the longline tuna industry. It has been recognized as a worldwide problem for the industry since the early 1950s. The extent and nature of depredation varies by target species, region, gear deployment, and gear hauling methods (Donoghue et al., 2002).

Although several species of cetaceans are thought to depredate hooked fish in the WCPO, a problem exists with the accuracy of reporting of the species by fishermen or vessel operators and crew. Knowledge of cetacean species by fishermen appears to be limited within the region's fishing industry, and hence descriptions of the whale or dolphin involved does not always match the species identified on fishery generated reports. The most common cetacean species known to be involved in depredation are the killer whale, false killer whale, and pilot whale. Depredation is also known to be carried out by some shark species.[87]

The major source of information on interactions of the longline tuna fishery with cetaceans in the Treaty Area is observer data collected by the SPC by their own observers, as well as observers from a very few PICs that have their own observer programs.[88] Observer data from 1995 and 2002 found a similar geographic distribution of depredation by sharks and whales, and that shark damage (2.1%) was greater than whale damage (0.8%). It was also observed that depredation by whales was more frequent on yellowfin and bigeye tuna, whereas shark damage was less discriminate and spread across many target species (wahoo, yellowfin and skipjack tuna, blue and striped marlin, spearfish, and swordfish). It was also reported that no significant difference existed in damage between tropical and subtropical areas of the WCPO (Lawson, 2001b).

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[86] Some authors choose to include the removal of baitfish from the longline in this definition; however, because different species of cetaceans tend to undertake these two behaviors, they are treated here as separate types of interactions.

[87] Shark depredation can be distinguished from that of cetaceans because sharks have a tendency to take small bites of the hooked fish, damaging the catch. Cetaceans tear at the fish, frequently leaving behind only the head or jaws, removing the fish totally from the hook (Lawson, 2001b).

[88] In general, the longline fleets operating in the WCPO (except the Hawaii-based fleet) have very low observer coverage rates, and it is believed that in areas where observers do exist, they are not well-trained in the identification of specific marine mammal species.

Bait Removal. Removal of baitfish from the hooks on the longline is usually undertaken during the line-setting procedure. Bait removal is usually practiced by small cetaceans only. Eight species of dolphins have been observed in the vicinity of longline sets in the south Pacific, but it is uncertain if all of these species participate in bait removal. Again, the problem exists of fishermen's ability to accurately identify the species involved. Species thought to associate with the tuna fishery are the bottlenose, common, Fraser's, pan-tropical spotted, Risso's, rough-toothed, spinner and striped dolphin. As with depredation, the problem of bait removal is known to occur in the WCPO tuna longline fishery, but its extent is currently unclear.

Entanglement. Entanglement of small cetaceans in the longlines often results in the death of the individual, as it is unable to surface or breathe. Larger cetaceans more commonly break the line and escape, although the entangled line may remain wrapped around the individual and impair their movement and ability to feed. This may result in the death of larger cetaceans, depending on the position of the entangled lines.

Cetaceans may become entangled in the longline while removing the hooked catch, removing the baitfish, or preying on the free-swimming fish in the vicinity of the longline. The cetaceans are typically hooked only while removing bait from the longline hooks. Of those species of dolphin incidentally taken in the Taiwan-based longline fishery that operates in the western regions of the WCPO, bottlenose and rough-toothed dolphins were the most commonly hooked, possibly suggesting they are the species most frequently involved in bait removal. Spinner and striped dolphins were more likely to be found entangled in the lines (Wang and Yang, 2002).

Other Interactions. Additional interactions specific to the longline fishery and cetaceans are harassment and fish herding.

Harassment occurs when fishermen attempt to frighten the animals from the vicinity of their lines. To do this, the fishermen may try to harpoon animals, shoot at them, poke them with headless harpoon poles, make loud noises, and drive the animals away by moving toward them with their vessels.

It has been reported that on rare occasions, cetaceans will herd fish toward the longline. On such occasions, it is common for the fishermen to experience an increase in catch, as long as they haul the line before the cetaceans feed on the hooked fish (Wang and Yang, 2002).

Purse Seine Tuna Fishery Interactions with Cetaceans. The published literature on purse seine tuna fishery interactions with cetaceans in the WCPO is sparse, and most information comes from Bailey et al. (1996). The only other documented sources are reports by Treaty observers onboard U.S. vessels engaged in the purse seine fishery.[89]

Observers record information gathered onboard on various forms contained in an observer workbook jointly issued by SPC and FFA (SPC and FFA, n.d.). Observers are required to collect a range of information and data for each trip on 10 separate forms, as well as complete a narrative report. In addition, a daily log (form PS-2) is kept that includes recording of each fish school sighting and whether it was unassociated (free swimming or feeding on baitfish) or associated with FADs,

[89] Information required of vessel captains on protected species is contained in Schedule 5 of Appendix I, the purse seine logsheet, and is limited. The only reference to protected species in Schedule 5 is in the "school type" column, which lists nine choices, including "whale" and "porpoise."

flotsam, or a variety of living organisms (including whales). Details (form PS-3) are recorded for each set of the purse seine net, including whether any marine mammals are caught. Observers are instructed to record all marine mammals with the same code on this form, although a column for comments is provided, where specific species identifications could be recorded. A form for species of special interest (form Gen-2) is also provided for recording details of interactions with turtles, birds, marine mammals and whale sharks. The Gen-2 form (revised in early 2003) provides for identification of marine mammals with a code denoting one of the following categories:

- All marine mammals (presumably if species identification is not possible);
- Toothed whales;
- One of four whale species: false killer, short-finned pilot, pygmy killer, or melon head;
- One of six dolphin species: Risso's, bottlenose, common, spinner, spotted, or striped.

Observers also keep a vessel trip compliance record (form Gen-3) where it is noted, among other things, if the vessel caught or attempted to catch whales, dolphins, turtles, dugongs, or seals. If the vessel deliberately set on any marine mammal, the observer is required to write a short report on the fate of the animal(s). At the conclusion of the trip, the observer is required to complete a trip report form, which asks for a concise description of every species of special interest that was landed and its condition when discarded. A separate section is provided to record species of special interest that were not landed onboard, whether there were any marine mammals seen before the set, inside the net or hanging around the net after the set, if the observer was able to identify the species and if the species was harmed in any way.

Beyond the information in Bailey et al. (1996) and data obtained from observers, much of what is known about cetacean interaction with purse seine is anecdotal. For example, an SPC OFP–deployed biologist who was aboard a Japanese tuna purse seiner as a fisheries observer in 1983 reports that both the captain and fishing master of that vessel said that Japanese tuna fishers recognized a "whale season" in the western portion of the Pacific straddling the equator. According to the Japanese, the season when whales are relatively common lasts from October to December, between 140°E and 147°E and from 02°N to 02°S (R. Gillett, pers. comm.).

Unlike the eastern Pacific, where large yellowfin frequently associate with several species of dolphins (*Stenella attenuata, S. longirostris, Delphinus delphis*), the association between such mammals and tuna schools in the western Pacific is thought to be extremely rare. This has been ascribed to perhaps the low abundance of such dolphin schools in the main fishing grounds, and the fact that certain oceanographic and biological conditions (e.g., shallow thermocline, abundance of ommastrephid squid) that may promote association between dolphins and tuna in the eastern Pacific are usually not present in the WCPO (Bailey et al., 1996).

Some indication exists that tuna in the western Pacific can form short-term associations with at least two species of baleen whales: sei whales (*Balaenoptera borealis*) and to a lesser extent minke whales (*Balaenoptera acutorostrata*). It is believed that the tuna and whales come together only to feed on pelagic baitfish schools and separate once the feeding activity is finished (Bailey et al., 1996).

Sei whales have a worldwide distribution but are mainly found in cold temperate and higher sub-polar latitudes. Their occurrence in the tropics is not well documented, and most observations in the Southern Hemisphere have been south of 30°S. Sei whales feed primarily on surface plankton, copepods, and euphausiids (e.g., krill), but are also thought to feed opportunistically on surface

schools of small fish or squid. In the tropics, the existence of large, dense aggregations of copepods and euphausiids but general absence of particularly surface schools of squid may account for the short-term associations that have been reported. The status of stocks is uncertain and the biology and ecology of sei whales has been poorly studied compared to many other species of whales. Thus, information of sei whale behavior, migrations, and populations is scarce.

Although not confirmed in the literature, the few observations of sei whales in connection with tuna fishing may actually be those of Bryde's whales, *B. edeni.*[90] Bryde's whales are unique among baleen whales because they never visit cold waters, and spend the entire year in tropical and subtropical waters above 20°C.

Unpublished U.S. purse seine logbook data from FFA and held at SPC indicate that during the period January 1997–June 2002, 24,166 sets were made during 31,870 vessel days recorded by vessels licensed to fish under the Treaty. A separate FFA data set, also held at SPC, shows that during the same period, observer coverage was 8,462 vessel days (26.5% of total) in which the same vessels made 6,058 sets (25% of total) with observers present. Forty sets (0.66%) involving 15 different vessels were recorded by observers as being "associated with a live whale."

Interpretation or extrapolation of this information, however, is dubious. According to the SPC OFP, no clear-cut instructions or protocols are established for the observer to use in determining what constitutes a set "associated with a live whale" (P. Williams, pers. comm.). In addition, the data do not indicate the level of proximity of the whale(s) to the fish school, or even when the whale was sighted during the course of fishing.

Observers trained by FFA and SPC are supposed to differentiate in their records between sets "associated with a live whale" and when the school is associated with "drifting log, debris or dead animal." According to Bailey et al. (1996), purse seine vessels rarely encounter dead whales, but when they do, the specimen is typically marked with a radio buoy for tracking and used in the same manner as logs. Important to note, however, is that as is the case with logs and other flotsam, not all dead whales found drifting in the purse seine fishing grounds aggregate and hold tuna.[91]

The unpublished observer data from FFA held at SPC covering the period January 1997–June 2002 show 11 sets (0.18% of observed sets) by seven different U.S. purse seine vessels over the 53-month span where the set resulted in a reported interaction with a marine mammal. Six of the sets involved one animal, four involved more than one animal, and one was listed as "0" animals involved.[92] No indication exists from the available observer data whether the sets were made with the knowledge that marine mammals were in the vicinity.[93]

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[90] At least one expert in the region, an ecologist who works with the United Nations Development Programme in Apia, Samoa, agrees that whales observed by tuna fishermen in the WCPO are probably Bryde's whales and not sei whales as is sometimes reported (R. Gillett, pers. comm.).

[91] In 1978, one such dead whale was encountered by a purse seiner, and despite monitoring its position for several days (including winching portions of the whale on deck and deploying them in other areas), no tuna were found in association with the carcass (S. Weinberg, pers. comm.).

[92] OFP suggests the set recording no mammals may have been an entry error.

[93] The means of detecting marine mammals prior to a set include visual observation where possible, and possible appearance of marine mammals on sonar during regular monitoring of the target school's location.

Although observers are provided with a long list of species codes with which to identify captured animals, identification of whales and other marine mammals reported in the observer data comprise the following species codes only:

- WLE unidentified whale
- MAM unidentified marine mammal
- DLP dolphin, porpoises (not identified to species level)

While fishery observers undergo extensive training in species identification for both the target and bycatch species, it is the opinion of the head of the SPC OFP Observer Program that most observers are not able to differentiate between the various species of whales and dolphins (P. Sharples, pers. comm.).

Of the eleven sets in question that resulted in the capture of marine mammals, four identified the animals involved as WLE, two as MAM and five as DLP.

The fate of marine mammals caught in the eleven sets was also recorded. All were listed as discarded protected species. The observers are also required to list the condition of animals caught when discarded, using the following condition codes:

- A1 alive and healthy
- D dead
- U condition unknown

Nine of the eleven sets listed the discarded protected species condition as U, condition unknown. In one set, the condition was listed as A1. In one set, observer records show the capture of 23 whales, of which 20 animals were noted as released in A1 condition and three released in D condition. No identifications were made as to species.

An analysis of the set time for these eleven sets shows that seven (64%) were made between 0455 and 0522 hours (local time), including one set where mortalities were recorded. This indicates that commencement of the set was made before daylight on either a log or FAD, as the usual practice is to set the net in the dark and have the school encircled and aware of the net only after it is pursed as it becomes light. The other four sets occurred between 1444 and 1946 hours local time, indicating the sets commenced during daylight hours.

Interestingly, none of these observed sets by U.S. purse seiners occurred in the area or months described by the Japanese fishermen in 1983 as containing a "whale season."[94] They occurred during the months of February–September, spanning four years, from 149°E to 179°E.

The degree to which marine mammals could be seen on the sonar during any one incident is unknown, particularly because all attention would presumably be paid to the location of the target school.

[94] It is not known if the description of a "season" by Japanese vessel operators was based on the limited amount of activity of the tuna purse seine fishery in the tropical Pacific that rarely stretched east of approximately

In addition to the observer data, data are also collected by FFA and held at SPC from the Regional Purse Seine Logsheet. During the period January 1997–June 2002, seven instances were reported on the submitted logsheets where sets were made on schools associated with whales. All seven sets took place during a 15-month span from November 1997 to January 1999 and involved the same vessel. Six of the seven sets were made within 1 degree of latitude from the equator, from approximately 158°E to 163°E. Recorded times of the sets indicate that five were commenced during daylight hours and two during early morning. Again, no indication exists in the data as to proximity of the animals or the definition of "associated."

Interactions with Cetaceans Common to Longline and Purse Seine. Some interactions between tuna fishing and cetaceans in the WCPO are common to both longline and purse seine methods. These are more general interactions that are universal to other fishing methods as well, and include noise, vessel collisions and prey depletion/competition.

The possible impacts and long-term effects on cetaceans of increases in the level of man-made noise in the world's oceans is unknown. Cetaceans are highly acoustic animals and many species rely on audible feedback to locate prey and to navigate within their environment (Dawson et al., 1998). Increases in size of the tuna fleets in the WCPO region, particularly large purse seiners, could mean that the level of man-made noise in the regions of the ocean where tuna fisheries and cetaceans cross paths has also increased. The noise originates not only from the vessels' engines, but also from line haulers, winches, and other equipment on the vessels, as well as the actual noise of the gear and captured prey in the water. Some purse seine fishermen also use loud noises to keep the school inside the net before it is pursed.

The incidence of accidental boat collision with cetaceans in the tuna fisheries is thought to be very low, as no reported incidence of such collisions exists. If they did occur, they would most likely affect large whales, which are more prone to this type of interaction due to their slower movements and large size.

The level of removal of tuna from the WCPO through fisheries activity may have an impact on cetaceans by means of prey depletion and competition for the remaining stocks. To date the effect of prey removal has not been investigated, and it is unclear whether any resulting negative effects exist from tuna fishing activities in the WCPO.

3.6.2.2 Seabirds

Almost 300 species of seabirds are reported worldwide.[95] Seabirds breed in divergent locations, from the most isolated oceanic islands to rooftops in urban areas of Europe and North America (Nettleship et al., 1994). Geographically, the United Nations Environmental Programme (2000) reports that the atoll of Bokak (Taongi), at 14.5°N in the northern Marshall Islands, "is one of the most important breeding sites for seabirds in the Pacific with at least fourteen breeding species." An earlier categorization by Pratt et al. (1987) lists 15 species of seabirds as resident all year in the Marshall

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155°E in the late 1970s and early 1980s, or if such a season was known to either skipjack pole-and-line or tuna longline fishermen from Japan with extensive experience in the WCPO.

[95] There is no singular definition of seabirds (also called marine birds). Generally, it is accepted that seabirds are those living in deriving their food from the marine environment, including coastal areas, islands, estuaries, wetlands, and oceanic islands (Schreiber and Burger, 2002).

Islands, but not necessarily breeding. Thomas (1989) later conclusively reported nesting of the black-footed albatross at Bokak atoll, raising the number of species to sixteen.

In recent years, fisheries interaction with seabirds such as albatross in subtropical regions of the Pacific near Hawaii has been the subject of much research[96] and the subsequent promulgation of regulatory measures designed to minimize adverse impacts between longline fisheries and seabirds several species of seabirds. Although these efforts have focused on subtropical fisheries, very little has been written specifically about seabirds and tropical tuna fisheries in the Pacific Islands. The OFP commissioned a report by Watling (2002) to help address this shortcoming and the report, along with references to seabirds in such reports as Thomas (1989), remains one of the few available on the subject.[97]

The most endangered seabird population in the Pacific, the short-tailed albatross (*Phoebastria albatrus*), is thought to consist of approximately 1,100 animals that are resident on and breed only at one small island, Izu Torishima, near Japan. The species is usually found in high northern latitudes and would not be expected to be present in tropical tuna fishing grounds of the western Pacific.

Some 39 species of seabirds are known to breed in the tropical Pacific islands of the region covered by the SPC (which encompasses the Treaty Area), and an additional 17 species visit or pass through the region on annual migration. In describing further the situation in the Southern Hemisphere, Watling (2002) notes that "an analysis of the seabird avifauna of the tropical Pacific in comparison with the seabird avifauna of New Zealand (and higher latitudes Australia) indicates that there is very little overlap in species."

Seabirds are an important indicator of tuna schools in the western and central Pacific. In fact, advanced types of radar (designated "bird radar" by fishermen and manufacturers alike) have been developed and are commonly employed on purse seiners to detect such birds at great distances. One of the complexities of potential effects of fisheries on seabirds noted by Montevecchi (2002) is that overfishing large pelagic fishes in tropical oceans can have a negative effect on marine birds that are dependent on them to drive small fishes to the surface where the birds can access them.

Traditional indigenous navigators and seafarers have used certain species of seabirds –particularly noddies, terns, boobies, and frigate birds– for centuries to assist in finding land during canoe voyages and fishing expeditions. Because these species are known to depart from and return to land each evening, observing their behavior during those periods of the day while at sea will always indicate the direction of land (Lewis, 1994).[98]

Seabird Interaction with Purse Seine. The fishing gear employed in purse seine fisheries does not present opportunities for adverse interactions with seabirds. Although seabirds are often present and actively feeding during some purse seine fishing activity (during sets on school fish, for example), no

[96] For example, WPFMC (2002), Cousins et al. (2000), Cousins and Cooper (2000), and Gilman et al. (2002).

[97] Fishery observers in the SPC region are not well-trained in bird identification, and all birds are listed under one coded category in observer logbooks when encountered.

[98] Noddies and white terns provide reliable and consistent indication of land, morning and evening, at up to 30 km offshore, or twice the sight range of an atoll. Boobies are the most favored of all bird guides, consistently indicating land from 50 to 80 km away. Frigate birds, although sometimes more erratic, can provide indications of land from 120 to 240 km away.

recorded accidental catches of seabirds in the tuna purse seine fishery have been reported by the ongoing observer programs operated by the Pacific Island countries in the region. Bailey et al. (1996) noted that, "There are no records in either the RTFD [Regional Tuna Fisheries Database] or in the literature of seabirds occurring as bycatch of purse seiners operating in the WPO [western Pacific Ocean]." A more recent report on bycatch issues prepared for the Preparatory Conference for the WCPFC stated that, "Available data provide no evidence of seabirds taken in purse seines" (MRAG, 2002).

Seabird Interaction with Longline. Attempted bait stealing by seabirds has been recognized as causing mortality among seabirds in several temperate-water longline fisheries (Montevecchi, 2002). Several techniques have been developed and employed by longliners to discourage seabirds from attempting to steal bait in tuna longline fisheries. These techniques include using of streamers as bird-scaring devices, releasing baited hooks at night and underwater, retaining offal onboard until fishing operations are concluded and increasing the sinking rate of baited hooks.

The region of greatest interaction between seabirds and the longline fisheries of concern to this document (in the Northern Hemisphere) is a band between 25°N and 40°N, where vessels targeting swordfish incidentally have caught a larger number of seabirds than vessels targeting tuna.[99] This difference is due to swordfish targeting vessels being more likely to operate within the foraging range of the seabirds, and the shallower gear configuration which is in the late afternoon or at dusk when foraging activity of seabirds may be higher (NOAA Fisheries, 2001a). Recent work in the Hawaii-based longline fleet indicates that improvement in reducing mortality among seabirds may be possible by setting the longline from the side of the vessel rather than from the stern (WPFMC 2004).

Watling (2002) confirms that with the exception of Hawaii, "very little appears to have been published on incidental seabird bycatch in the tropical Pacific." Brothers et al. (1999) cite the report by Bailey et al. (1996) that "based on observer data, there was no reported seabird mortality from the longline fishery for tuna in the tropical western Pacific," and note that another source (Garnett, 1984) "found no records of incidental mortality from commercial tuna longlining in the south Pacific, defined as between 160 ° E and 125 °W." A final source quoted by Brothers et al. cites Heberer (1997) as reporting "only one bird (species not recorded) caught out of 700,000 observed hooks on 51 fishing trips in the Federated States of Micronesia tuna fishery in the tropical Pacific Ocean during the period 1993–1994."

Watling makes the point that species affected by longlines in areas other than the tropical Pacific are all "large or medium-large seabirds, all over 500 grams weight," and that because of the size of baits (100–110 grams) and hooks (7 × 4 cm) used in the SPC region (excluding Australia and New Zealand), "it would seem unlikely that any seabird under 400 grams will be seriously vulnerable in the longline fishery..."

Watling's subsequent analysis of larger species "potentially vulnerable to longline fishing" identifies 28 species of albatrosses, shearwaters, petrels, boobies, and skuas. This conclusion is of somewhat limited value in the context of this Environmental Assessment, as it covers the entire SPC region (excluding Australia and New Zealand), and is not specific to either of the regions where the Hawaii or American Samoa longline fleets might operate.

[99] The northernmost latitude of high seas areas in the Treaty Area that might be accessed by Hawaii-based longliners is 7°N.

With respect to potential longline interaction with these larger species of seabirds in the entire SPC region, the Watling study concludes that although observer coverage is by no means comprehensive or anywhere near adequate to definitively report on the issue, nonetheless, the data from observer sources indicates quite clearly that incidents of seabird bycatch are very infrequent.

3.6.2.3 Sea Turtles

All sea turtle species found in the Pacific are listed under the Endangered Species Act as either threatened or endangered. The breeding populations of Mexico olive ridley turtles (*Lepidochelys olivacea*) are currently listed as endangered, while all other olive ridley populations are listed as threatened. Leatherback turtles (*Dermochelys coriacea*) and hawksbill turtles (*Eretmochelys imbricata*) are also classified as endangered. The loggerhead turtles (*Caretta caretta*) and the green turtles (*Chelonia mydas*) are listed as threatened throughout its Pacific range, except for the nesting population on the Pacific coast of Mexico, where they are endangered (NOAA Fisheries, 2001a).

Except where otherwise cited, the descriptions of sea turtle species in the following five subchapters is provided primarily by NOAA Fisheries (NMFS, 2001b) and WPFMC (2004c). Detailed descriptions of population status, reproduction, maturity, lifespan, foraging behavior, migration, and movements is provided by NOAA Fisheries (2001a).

Leatherback. The leatherback turtle species is listed as endangered throughout its range. Capable of reaching weights as high as 900kg, the leatherback turtle is considered to be the largest and most pelagic of the marine turtles. The leatherback turtle also has the most extensive range of all marine turtles, being found throughout the Pacific in both high latitudes as well as the tropics. Nesting populations on the eastern Pacific coast of Mexico and Costa Rica have greatly declined in the last two decades and are said to have declined from an estimated 50,000 in the early 1980s to no more than 1,700 adult females at the end of the last decade (Spotila et al., 2000). Leatherbacks are typically found in convergence zones and upwelling areas in the open ocean, along continental margins and in archipelagic waters. They are highly mobile and rarely stop swimming, sometimes more than 10,000 km in a single year.

The major nesting areas in the western Pacific occur along the northern coast of Papua, Indonesia (formerly known as Irian Jaya), Papua New Guinea, Solomon Islands, and eastern Australia. Other nesting is known to occur in western Australia and along the eastern peninsular coast of Malaysia. Long-distance migrations, such as one from Papua New Guinea to California, have been verified through satellite tracking, and it is possible that animals present in many places in the WCPO may originate in Indonesia, Papua New Guinea, or Solomon Islands (NMFS, 2001b). Information on post-nesting movements is not available for leatherbacks from the western Pacific nesting colonies, however, genetic research data suggest that Pacific leatherback stocks mix in high seas foraging areas. In addition, leatherbacks from breeding colonies located in Indonesia and in the eastern Pacific (e.g. Mexico, Costa Rica) have been found in waters surrounding the Hawaiian Islands.

Declines in nesting populations in the Pacific are commonly attributed to both egg harvesting on nesting beaches and high seas fisheries such as longline and drift net fisheries. The drift net fishery was most active in the north Pacific during the 1980s. Other likely sources of mortality include the ingestion of plastics (particularly plastic bags mistaken for jellyfish) and tar balls. The status of nesting colonies in Papua Indonesia, Papua New Guinea (except for one site on the northern coast where an ongoing village-level program is collecting data), and Solomon Islands is poorly understood.

Leatherback reproduction is seasonal, with females returning to breeding grounds every two to three years and peak nesting times in May/June in the western Pacific. Marine biologists still do not agree on the age at which the species is sexually mature.

The leatherback turtle diet generally consists of cnidarians (e.g., medusae and siphonophores[100]) in the pelagic environment. Areas in California and the southeast Pacific off Chile and Peru appear to be important seasonal foraging areas, however, no systematic study of leatherback turtle foraging grounds in the Pacific has been conducted. Leatherbacks are capable of diving to depths of more than 1,000 meters, with routine dives at between 50 and 84 meters while in tropical waters (NMFS, 2001a).

Green. Along with the hawksbill, the green turtle is perhaps one of the most well known to Pacific Island residents in the WCPO. Although the only major nesting population (defined as those populations with more than 2,000 nesting females) is in northern Australia, it is known to nest on some of the smaller islands and atolls in the region where tropical tuna fishing takes place. It is also the turtle most highly prized as a food source by many Pacific islanders.

Green turtles are known to migrate extensively and to possess a good sense of location that enables them to return to the same foraging areas and nesting locations. They can often be found foraging in larger lagoons or outside fringing reefs where their main food sources of marine algae and grasses occur.[101] Important nesting sites north of the equator exist in the outer atolls of the FSM, Palau, and the Marshall Islands. Green turtles are also known to nest in Papua New Guinea, Kiribati, Tuvalu, Tokelau, and Rose Atoll in American Samoa.

Several migrations by green turtles to/from nesting locations and foraging areas in the Pacific have been documented in the literature, but many of these locations exist outside the usual fishing areas for tuna purse seiners.[102] In the FSM, however, turtles that nested on atolls relatively near fishing grounds have been recovered by residents in the Philippines, Taiwan, Marshall Islands, Japan, and Papua New Guinea (S. Kolinski, pers. comm.).

Other nesting populations of green turtles exist in Hawaii along the coastlines of all islands, but more than 90% of the breeding and nesting activity occurs at French Frigate Shoals in the Northwest Hawaiian Islands. The Hawaiian population is one of the best-studied green turtle populations in the Pacific, with recent documentation showing a substantial long-term increase in the population (Balazs and Chaloupka, 2004).

In the eastern Pacific the primary nesting grounds are located in Mexico and in the Galapagos Islands of Ecuador.

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[100] Medusae include various types of jellyfish, while siphonophores are floating or swimming colonies of smaller but similar organisms.

[101] Certain mangroves have also been identified as an important part of green sea turtle diet in Australia. Jellyfish, sponges, and small mollusks have been found to also form part of the diet of green turtles in Mexico and Peru.

[102] It is not known, however, if migrations such as those from Scilly Atoll in French Polynesia to Fiji, Tonga, Vanuatu, and New Caledonia included passage of turtles through areas where tuna purse seiners tend to operate.

Green turtles tend to utilize underwater resting sites in coral reefs that can hide them from natural predators, including recesses in the coral, the undersides of ledges and sand bottom areas. These resting sites in coral atolls of the western Pacific are usually near foraging areas or feeding pastures.

Olive Ridley. The olive ridley is the smallest living sea turtle species, with adult carapace length usually 60–70 cm. The olive ridley occurs within the tropical regions of the Pacific and Indian Oceans and is thought to be the most abundant sea turtle species in the world. In the Pacific, it nests primarily on beaches from Mexico south to at least Colombia, and in some areas of Malaysia. Little or no nesting takes place in the WCPO.

Fisheries in Mexico and Ecuador during the 1960s and 1970s were set up primarily for the production of turtle leather for the European market. The meat and eggs are still harvested in several countries bordering the eastern Pacific.

Nesting aggregations occur in Mexico and Costa Rica. On some beaches population densities are high enough that nesting takes place in synchronized aggregations known as *arribadas*. Such nesting occurrences result in upwards of 400,000–500,000 females nesting annually in Costa Rica and southern Mexico, with significant egg loss being caused by turtles inadvertently digging up previously laid nests.

The nesting on the eastern and western coasts of Malaysia has declined significantly in the past decade.

Olive ridleys are primarily carnivores, although their diet can include algae and sea grass. In at least the eastern Pacific, they readily associate with floating logs, plastic debris, and other flotsam. The species leads a highly pelagic existence and while there appears to be strong evidence for moderate seasonal movements of olive ridleys within the eastern Pacific, regular transoceanic migrations are unknown (NMFS and USFWS, 1998c). Olive ridleys can also forage at deep depths, having been seen foraging for crabs at a depth of 300 meters (cited in NMFS 2001a).

Although olive ridleys are practically unknown to most residents of the PICs,[103] they have been taken incidentally by tuna longline vessels in the WCPO. For example, Heberer (1997) reported that in 496 longline sets monitored by onboard observers from the Micronesian Maritime Authority during the period 1993–1995, 44% or fifteen of the total 34 turtles incidentally caught during tuna longline operations were identified as olive ridley turtles.

Hawksbill. The hawksbill turtle is circumtropical in distribution and listed as endangered throughout its range. The species is threatened (under U.S. law, threatened with extinction is less severe than in danger of extinction) with extinction and is also included in Appendix 1 ("most endangered") of the Convention on International Trade in Endangered Species of Wild Fauna and Flora. Within the central Pacific, nesting is widely distributed but scattered and in very low numbers. The species has long been under pressure from harvesting for its meat, eggs, and shell and from the destruction of its nesting habitat.

[103] A lack of familiarity is indicated by the absence of vernacular names for the species in the tropical areas where most tuna fishing under the Treaty takes place.

Hawksbills are known to nest in low-density colonies on the islands and mainland of Southeast Asia from China to Japan, and in the Philippines, Malaysia, Indonesia, Papua New Guinea, Solomon Islands, and Australia.

Foraging hawksbills have been reported from virtually all of the island groups of Oceania, from the Galapagos Islands to Palau in the western Pacific (NMFS and USFWS, 1998a). Such recorded occurrences are at extremely low densities, however, and no areas of consistent nesting by relatively large numbers have been recorded.

The largest remaining concentrations of nesting hawksbills in the WCPO occur on remote islands of the Torres Strait in Australia. Palau has probably the highest hawksbill nesting activity in the region north of the equator, but this may number as few as 20–45 nesting females per year. The current population of nesting female hawksbills in the Solomon Islands, where a large amount of "tortoise shell" was collected in the mid-twentieth century, is thought to now number in the hundreds, down from estimates of tens of thousands in the past (NMFS and USFWS, 1998a).

Little is actually known about the migration and movements of hawksbill turtles, and the geographic proximity of an adult's foraging habitat in relation to its natal beach is not known. Although thought to be opportunistic feeders on a wide variety of marine invertebrates and algae, hawksbills are also known to feed on encrusting organisms, particularly certain sponges, in rock or reef habitats of several types.[104]

Due to the economics and logisticial consideration (e.g, distance from port to first set) associated with fishing in the high seas portion of the Treaty Area, it is not likely that there will be any substantial effort by U.S. longline vessels in the area. Thus it is not likely that there will be any takings of sea turtles by U.S. longline vessels in the high seas portions of the Treaty area as a result of the access to these waters.

Loggerhead. Loggerhead turtles are described as circumglobal in their distribution, but are thought to be rare in the tropical WCPO, particularly in island areas north of the equator. Major nesting grounds are generally located in warm temperate and subtropical regions, generally above 25° latitude in both Northern and Southern Hemispheres. The major rookery in the WCPO is in Queensland, Australia, where an estimated 3,000 females nest each year at three major rookery areas (NOAA Fisheries and USFWS, 1998b). Nesting is also reported from the Trobriand Islands in Papua New Guinea and perhaps in parts of Indonesia. Other nesting in the western Pacific outside the tropics takes place in Japan, and perhaps on the Chinese Island of Hainan in the South China Sea. In the Pacific islands, sightings and familiarity with the turtle have been reported by the inhabitants of parts of Papua New Guinea, southern New Caledonia and Solomon Islands.

The "normal range" of this species is thought to include both coastal and pelagic waters. Its occurrence offshore of Baja California on the opposite side of the Pacific from known nesting areas in Australia and Japan indicate long migrations. The occurrence of incidental loggerhead capture by tuna longlines and drift nets in the northern Pacific has been linked to feeding and migratory patterns that follow oceanic fronts (17° and 20°C isotherms) in the north Pacific north of Hawaii (Polovina et al., 2000).

[104] The tapering "beak" that gives the turtle its common English name would appear suitable for this kind of foraging.

The dispersal of loggerhead hatchlings from natal beaches in the Pacific is theorized to likely include passive transport. Owing to an absence of nesting beaches in the eastern Pacific, a unique feature of the species is its foraging near places such as Baja California, far from known nesting beaches in the western Pacific, Japan in particular.

Mean age at sexual maturity for loggerheads seems to range between 25 and 35 years of age, depending on the stock. Adults typically weigh between 80 and 150 kg. For the first several years of life, loggerheads forage in open ocean pelagic habitats. Both juvenile and subadult loggerheads feed on pelagic crustaceans, mollusks, fish, and algae. As they age, loggerheads begin to move into shallower waters where they forage over a variety of bottom habitats as adults. They are also known to feed on gooseneck barnacles, pelagic purple snails and jellyfish (north Pacific), as well as benthic invertebrates such as gastropods, squid, shrimp, sea stars, and occasional fish (Queensland, Australia). The maximum recorded dive depth for a post-nesting female was 211–233 meters, while mean dive depths for both a post-nesting female and a subadult were 9–22 meters (NMFS, 2001a).

The majority of loggerhead turtles encountered in the Hawaii-based longline fishery have been shown by genetic analysis to be derived from nesting populations in Japan (NMFS, 2001a).

Longline Tuna Fisheries Interaction with Sea Turtles. Incidental catch of sea turtles can occur in longline fisheries when turtles are either accidentally tangled with the deployed fishing gear[105] or when turtles feed on baited longline hooks. Mortalities to sea turtles are usually from drowning in either case.

The largest source of sea turtle-longline interaction data in the WCPO comes from the NOAA Fisheries' observer program in the Hawaii-based longline fishery.[106] Observers in this program collect large amounts of information on interactions in the fishery with sea turtles, as well as specific biological information, deploy conventional and archival tags on released sea turtles and collect information on target and other incidental catch species as well. In operation since the mid-1990s, the program has mandated 20% overall coverage when averaged through the year (FFA and SPC, 2003). In 2002, the number of trips covered was equivalent to 24.6% of all trips (Wetherall, 2003). In May 2002, NOAA Fisheries installed a new protocol for placing observers based on a systematic sampling scheme, with trips stratified by quarter. The new protocol allows for the estimation of turtle takes using probability sampling methods, with the intent of achieving fairly even coverage in all quarters (Wetherall, 2003).

Little information exists for interaction between longline tuna fisheries and sea turtles in the tropical regions of the Treaty Area where most fishing takes place. Whereas significant research has been undertaken on turtles and pelagic longline fishing in the northern Pacific,[107] the review by SPC (2001) based on available observer data remains the only synthesis of information in the tuna longline fishery from the EEZs of the PICs. However, there are limitations to the data used in the SPC review. While observers have covered most of the fleets in the PICs EEZs, there is a very low

[105] From observations in the Hawaii-based longline fishery, leatherback turtles appear to be taken primarily by being hooked externally or entangled in the fishing gear rather than by ingesting the hook. This is probably due to their foraging strategy as well as their physiology (NMFS, 2001a).

[106] Existing regulations require all Hawaii-based longline vessels to accept observers if required by NMFS (Federal Register Vol. 69, No. 64, p 17329–17354).

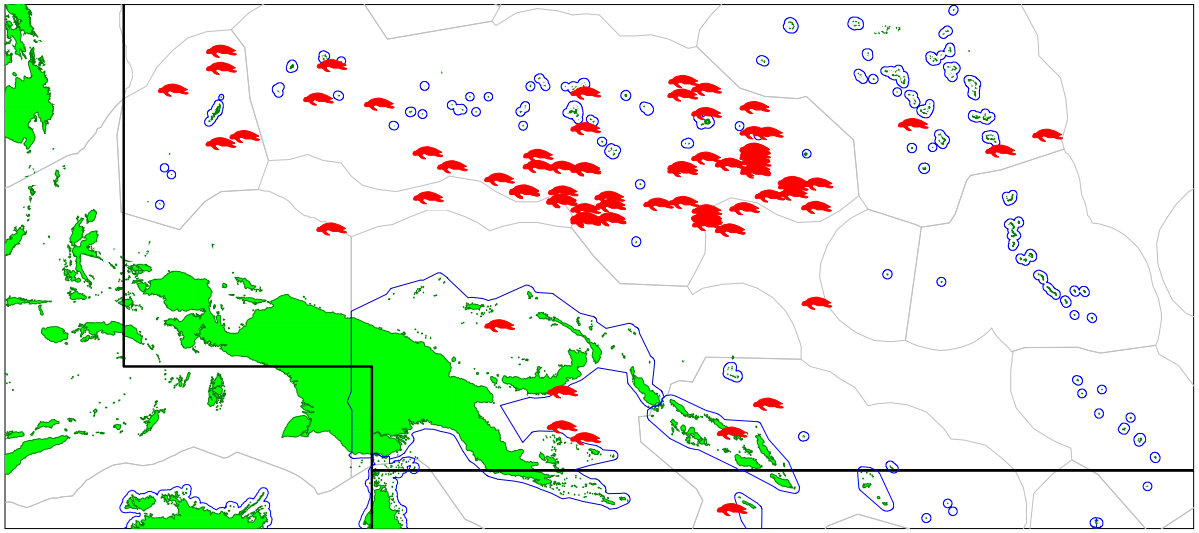
[107] For example, see Polovina et al. (2000) and Parker et al. (2001).

coverage level of overall effort (< 1%), and there is no observer data collection in regards to sea turtle encounters in the Japanese and Korean distant-water longline fleets operating in the eastern areas of the WCPO (SPC, 2001).

Little species-specific information exists on turtle interactions with tuna longliners in the tropical regions of the Treaty area. Although observers in some PICs national observer programs are now better trained, some of the earlier observer data collected during the 1990s either did not include species identification or, when included, is thought to have been unreliably applied.

The incidental catch of turtles by longline occurs when opportunistically feeding sea turtles either encounter baited longline hooks or become entangled in the gear. Turtle mortalities, when they occur, are often directly related to entanglement or hooking with the longline gear that results in drowning. Post-release mortality can occur due to the piercing of internal organs by ingestion of the hook (SPC, 2001).

SPC (2001) analyzed 2,143 observed longline sets from 10°N to 10°S in the western tropical Pacific during the decade 1990–2000.[108] A total of 83 turtles were recorded, with all but one released.[109] Of those released, 27% were released dead, while 58% were described as alive and healthy, 8% injured/stressed and 6% barely alive (SPC, 2001). However, observer coverage was not uniform, with most occurring in the western areas of the fishery, as shown in Figure 3.6-6. Whether or not the relative abundance of turtles is the same in all areas covered by the fishery is unknown, but it is possible that relatively fewer marine turtles are encountered in the eastern areas because they are far from known nesting and feeding areas.



(Straight lines represent the western and southern boundaries of a statistical sub-area used by SPC to describe target tuna fisheries.) Source: SPC (2001)

Figure 3.6-6: Distribution of Observed Marine Turtle Encounters in the Western Tropical Pacific Tuna Longline Fisheries

[108] No figure for total sets in those latitudes during the decade is provided in SPC (2001); however, it is believed that the number of observed longline sets represent a very small percentage (less than 1%) of total sets.

[109] One dead turtle was retained for crew consumption.

Further analysis of the data by fleet showed that those vessels employing shallow night sets had the highest turtle CPUE, and those vessels making deep day sets had the lowest turtle CPUE. In its analysis, SPC (2001) stated that, "No conclusions can be drawn from the available data at this stage, although it is clear that most marine turtles encountered by observers are typically released alive."

Purse Seine Tuna Fisheries Interaction with Sea Turtles. The most comprehensive review of data relating to marine turtle interactions with the purse seine fishery in the western Pacific is also found in SPC (2001). The authors used data primarily from fisheries observer reports during the period 1990–2000 and noted that although observer effort generally covers the geographic extent of purse seine activity in the fishery, the level of coverage provided by the data is acknowledged to be low and insufficient to provide definitive estimates of marine turtle encounters in WCPO purse seine fisheries (SPC 2001). No description of the fleets as sources of data is provided in the document. However, Lawson (2001a) does provide summaries of observer data held at SPC. While the observer data from the U.S. Treaty represents the bulk of information used in SPC (2001), other observer data held at SPC originates from the fleets of FSM, Marshall Islands, Kiribati, and Papua New Guinea operating under the FSM Arrangement, as well as observer data obtained from Taiwanese and Korean purse seine vessels.

In general, when interaction occurs with marine turtles in the purse seine fishery, it is during the pursing of the net following encirclement of the tuna school. Turtles can sometimes be found near floating logs and other flotsam, apparently because of the existence of food in the vicinity or the potential protection that such floating debris might afford. It is consequently this type of set that is the main factor contributing to interaction with turtles in the purse seine fishery. According to SPC, animal-associated, drifting log and anchored FAD sets have the greatest incidence of interaction with marine turtles, with less from drifting FAD sets and sets on free-swimming schools (SPC, 2001).

In the event that a turtle mortality does occur, it is apparently due to drowning as a result of entanglement in the net. According to the SPC publication, turtles are encountered alive in the net in most cases, and are subsequently scooped up and released by the fishermen. Citing observer data from all fleets from 1990 to 2000, SPC concludes that the overall mortality rate in the WCPO purse seine fishery was 17%, but a breakdown of factors for mortality was not possible due to a lack of information. Those limited data indicate that purse seine interactions with turtles are more prevalent in the western areas of the WCPO. SPC has made a "very preliminary estimate" of 105 marine turtle encounters per year in the entire WCPO purse seine fishery, with less than 20 resulting in turtle mortality.[110] By comparison, mortalities of olive ridley turtles that are incidentally captured by the purse seine fishery in the eastern Pacific are estimated by the Inter-American Tropical Tuna Commission to have been from 82 to 288 turtles between 1993 and 1998 (IATTC, cited in NMFS 2001a).[111]

Purse seine fishermen are reportedly motivated to remove turtles from the net prior to pursing, because entangled animals hoisted by the power block could fall back onto the net pile and cause

[110] SPC notes that this estimate contains wide confidence intervals, because observer coverage is less than 5%. Consequently, these results are only indicative at best.

[111] The characteristics of the ecosystem in the eastern Pacific where this purse seine fishery takes place is somewhat different than that of the WCPO in that in the eastern Pacific generally a shallower thermocline exists, and tuna purse seine fishing often is centered on large yellowfin that frequently associate with several species of dolphin.

serious injury. The fishermen also want to prevent turtles from being pulled through the power block because this could damage the equipment.

SPC reports that there has yet to be an observed report of a marine turtle being kept for crew consumption on purse seine vessels, although they note that it may occur on vessels without observers. Marine turtle encounters in the purse seine fishery (all fleets) based on observer data for the period 1990–2000 are summarized by SPC and shown in Table 3.6-3.

Unpublished observer data from FFA held at SPC covering the 5-year period 1997–2002 for 6,058 sets (25% of all sets during the period) by U.S. purse seine vessels fishing under the Treaty show three interactions with marine turtles. None of the three turtles was identified as to species, and all were released. One turtle was noted as "alive and healthy," while the condition of the other two were listed as "condition unknown."

Table 3.6-3: Marine Turtles Encountered in the Western Pacific Purse Seine Fishery, by Set Type and Species Category (based on observer data, 1990–2000)

School Association	Observed Sets	Marine Turtles (Unspecified)		Green Turtle		Hawksbill		Olive Ridley	
		No.	Nominal CPUE	No.	Nominal CPUE	No.	Nominal CPUE	No.	Nominal CPUE
Unassociated/ feeding on baitfish	5,582	6	0.10749	—	—	—	—	—	—
Drifting log, debris, dead animal	2,107	10	0.47461	—	—	3	0.14238	4	0.18984
Drifting raft, FAD, or payao	2,975	1	0.03361	—	—		—	1	0.03361
Anchored raft, FAD, or payao	325	1	0.30769	1	0.30769		—	—	—
Animal-associated	307	—	—	—	—		0.32573	2	0.65147
Total	11,296	18	0.15935	1	0.00885	3	0.03541	7	0.06197

Source: SPC (2001)

4 ENVIRONMENTAL CONSEQUENCES

This section discusses the environmental consequences of the three alternatives presented in Chapter 2, including the U.S. tuna purse seine fleet, the U.S. tuna longline fleet, western Pacific tuna fisheries, tuna stocks and protected species. The three alternatives can be characterized as follows:

- A: National Marine Fisheries Service (NOAA Fisheries) does not propose a regulation to implement the changes proposed for the Third Extension of the Treaty (No Action Alternative).

- B: NOAA Fisheries proposes a regulation to implement the changes proposed for the Third Extension of the Treaty (Preferred Alternative).

- C: The termination of United States (U.S.) purse seine industry participation in the Treaty.

4.1 Alternative A: NOAA Fisheries Does Not Propose a Regulation to Implement the Changes Proposed for the Third Extension of the Treaty (No Action Alternative)

Under Alternative A, NOAA Fisheries would not propose a regulation to implement the changes for the third extension of the Treaty; the second extension of the Treaty would continue in force pursuant to the Memorandum of Understanding (MOU) signed on May 9, 2002 (Appendix C). Although the MOU is a not a legally binding document, it represents the political commitment of the signatories to apply the amendments to Treaty articles and Annexes that were not in force by June 15, 2003.[112] This alternative would generally enable the U.S. to meet its obligations under the existing Treaty. Through ongoing application of the MOU, U.S. tuna purse seine fishing vessels would continue to operate in the Treaty Area, including the agreed changes to the Licensing Area in Solomon Islands and Papua New Guinea.

Continued operation of the Treaty under the MOU would not provide the appropriate legal environment for the U.S. to enforce new key provisions of the Treaty. Specifically, this alternative would compromise the ability of the U.S. to enforce important new provisionally agreed portions of the Treaty, as described in Subchapter 2.1 of this Environmental Assessment (EA). The lack of enforcement would detract from U.S. credibility and might encourage fishing behavior by U.S. vessels in contravention of the Treaty. Such a situation could have negative effects on the operation of the Treaty and relations between the U.S. and the Pacifis Island Countries (PICs). Although it is expected that the U.S. purse seine fleet will comply with the new provisions of the third extension of the Treaty as embodied in the MOU, it is preferable for the U.S. to have access to the appropriate management tools (such as fines or other sanctions) that will enable enforcement of the third extension of the Treaty. By not enacting regulations, this alternative does not provide those tools.

If the activities under the Treaty were to continue under the MOU, there would be an inability to enact the agreed changes to Article 9 of the Treaty, because these are not covered by the MOU. Article 9 enables countries to more quickly concur on proposed changes to annexes to the Treaty, including those involving access to areas within their jurisdiction under the Treaty (e.g., adding or removing closed or limited areas). As a matter of national sovereignty, this ability is undisputed in the Treaty. The manner in which the current Article 9 enables such changes to become effective is cumbersome, however, and the parties have agreed to a more streamlined means of implementation.

[112] Except for Amendments to Article 9 described in Subchapter 1.1.3 of this EA.

4.1.1 U.S. Purse Seine Fleet

4.1.1.1 Vessel Reporting Requirements

The new vessel reporting requirements are not onerous, but nonetheless require captains to make some changes to the manner in which they may have recorded and reported vessel and fishing activities in the past. The requirement to provide dates and times in Universal Coordinated Time (UTC)/Greenwich Mean Time should not cause confusion in recordkeeping, as captains will be able to apply the UTC time system to their activities.

The change to metric tons is a short-term transitional issue of limited long-term consequence. It may cause some initial dismay linked to previous practice in the industry of estimating "hail weights" in short tons.[113] Some captains accustomed to "thinking" in short tons when estimating weights of the catch by visual inspection of the net may continue to think in short tons and make the correction through mental or written calculation afterward.[114] Others may find it easier to switch and "think" in metric tons, simplifying the process. Although there has been no survey undertaken to determine the degree to which this requirement will affect accuracy of reported catches, it can be assumed that captains are fully capable of producing the calculations in metric tons and that over time the slight burden, if any, will disappear.

The elimination of the weekly report to the Forum Fisheries Agency (FFA) is not anticipated to result in significant timesaving, particularly because a weekly report to national authorities is still required. The inclusion in the weekly report of notification to national authorities of the presence of an observer on board is a straightforward task of minimal effort.[115]

The new requirement to provide the report indicating the estimated date and time of arrival in port for unloading 24 hours prior to arrival is linked to FFA's need to schedule observer placement. In American Samoa, where more than 85% of the unloading takes place, this requirement is considered less onerous than current U.S. port security regulations that require at least 72 hours' notification prior to port entry. The requirement to provide FFA with an estimated date and time of departure, again for observer placement needs, is easy to fulfill. As vessel departures are oftentimes subjected to factors such as weather, lack of crew, spare parts, or other supplies, it is understood that such notification is an estimate.

As explained in Subchapter 1.1.4, PICs and the U.S. have differences in opinion on what information is required to be provided in Schedule 5 of Annex I, the logsheet report. The U.S. Government has taken the position that purse seine vessel operators are required to report all information agreed to in the articles, annexes, and schedules only as they appear in the Treaty. The U.S. has further agreed that it is acceptable for the PICs to use the current Regional Purse Seine Logsheet (see Subchapter 1.1.4). Only those elements agreed to in Schedule 5 of Annex I are required to be completed by U.S.

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[113] Hail weights are the estimates made by the captain of catch, either by species or in aggregate, prior to actual weighing at the cannery.

[114] The likely reason that captains continue to "think" in short tons is that the canneries in American Samoa use short tons to pay for fish delivered there.

[115] FFA has indicated that the elimination of the weekly report to FFA makes it more difficult for them to keep in contact with observers, and as a result have requested that observers onboard U.S. purse seiners be allowed to communicate with FFA directly on a weekly basis (K. Ruaia, pers. comm.).

purse seine operators. Additional fields found on later versions of the Regional Purse Seine Logsheet are considered voluntary. The degree to which U.S. captains would volunteer all the requested (but not required) information is unknown. Indications in late 2002 were that about half of the logsheets compiled by the Secretariat of the Pacific Community (SPC) from FFA indicated the number of FADs used (FFA and SPC 2003).

4.1.1.2 Fishing Area Modifications

The third extension of the Treaty would change the closed areas within the Exclusive Economic Zones (EEZs) of Papua New Guinea and Solomon Islands. Both areas provide optimal habitat for skipjack, yellowfin and bigeye tuna that benefit from oceanographic enrichment events and nutrient inflow of terrestrial origin, particularly for the larger high islands of Papua New Guinea. The exploited biomass of all three species are not believed to represent discrete stocks between these regions and the greater Western and Central Pacific Ocean (WCPO), let alone between any smaller component within the EEZs of Papua New Guinea or the Solomon Islands (SCTB, 2004). Large-scale tagging studies conducted by the SPC over the past 25 years suggest a highly fluid resource in this region with high turnover rates and significant movement of tropical tunas in and out of the zones. Likewise, spawning of all three species appears to occur throughout the region on an opportunistic basis, based on examination of maturity of females, the collection of tuna larvae and the examination of the distribution of tuna juveniles in the stomachs of predators, typically adult tunas (Kikawa, 1966; Argue et al., 1983; Itano, 2000b). With no indication of discrete spawning or resident stocks combined with high turnover rates, the impact of fishing area modifications in this region are not expected to be significant. However, considering that tradeoffs in gross area of fishing grounds will be realized, some benefit or loss to the fishery may in effect be realized, but is impossible to determine here.

The economic impact of these modifications could not be determined until actual Catch Per Unit of Effort (CPUE) data from the American purse seine fleet is analyzed and compared with that from other locations.[116] Although both areas proposed to be opened are known to be highly productive for skipjack and yellowfin tuna, they are also subject to fluctuations associated with El Niño weather and oceanographic patterns (see Subchapter 3.3.3.1).

As discussed previously, catch distribution in tropical areas is strongly influenced by El Niño Southern Oscillation (ENSO) events, with fishing effort generally distributed to the east during El Niño years and contracting westward during transitional or La Niña periods. There is, however, some indication that the use of Fish Aggregation Devices (FADs) has dampened these effects, with more fishing in areas farther east during recent La Niña periods, typically involving drifting FAD sets, than in past La Niña years.

In years of transitional or neutral periods (the absence of either an El Niño or La Niña), the modifications to fishing areas that open up a portion of the eastern part of the Solomon Islands EEZ could result in less transit time to fishing grounds. For example, a U.S. purse seine vessel transiting from American Samoa to established fishing grounds in Papua New Guinea would likely pass through the Solomon Island waters where they could take advantage of the presence of fish schools in the Solomon Islands EEZ that they were formerly prohibited from accessing. The reduction in the

[116] Only fragmentary catch information on the Solomon Islands area is available from voyages under the 500-day limit agreed in the second tuna treaty extension, but these data are inconclusive. The experience of other purse seine fleets in these areas may not be indicative of capture rates for American vessels due to the use of different fish locating and the use or non-use of aggregating techniques.

Morgado Square "closed" area would facilitate access by U.S. purse seiners from other contiguous areas of the Treaty Licensing Area in Papua New Guinea. From an operational perspective, both changes would result in permitting the U.S. fleet greater freedom of movement in the pursuit of fish schools.

On the negative side, the exclusion of U.S. purse seine vessels from Papua New Guinea's archipelagic waters will limit operational flexibility. The degree to which this flexibility is hindered depends on variable oceanographic and other factors that contribute to the desirability of those fishing grounds. For example, as shown in Figure 3.3-8, one area of relatively large U.S. purse seine effort occurring near Papua New Guinea in 2001 had very little effort the following year. Anecdotal evidence from current vessel operators suggests that the inability to operate in archipelagic areas of Papua New Guinea is not offset by the opening of part of the EEZ of the Solomon Islands and that portion of the Morgado Square that lies in EEZ waters of Papua New Guinea.

In summary, these modifications give U.S. purse seiners greater operational flexibility in Papua New Guinea and Solomon Islands waters when fishing to the east, but limit flexibility in the west. Although there would likely be some modest savings on fuel costs[117] associated with travel and perhaps shorter voyage lengths when fishing in the eastern portion of the Solomon Islands EEZ, the long-term economic impact needs to be assessed over a number of El Niño/La Niña cycles.

4.1.1.3 Vessel Monitoring System

Within the proposed regulatory changes associated with the third extension of the Treaty, the application of the FFA regional Vessel Monitoring System (VMS) to the U.S. purse seine fleet generated considerable concern among U.S. vessel owners and U.S. officials responsible for renegotiation of the Treaty. The important issues[118] are as follows:

- Actions required of the vessel operator in situations where the onboard VMS unit ceases to function;
- Confidentiality of data;
- Cost to the fleet;
- An issue related to national sovereignty.[119]

A VMS requirement is included under Alternative A (the no action alternative) and Alternative B (the preferred alternative). It is discussed in further detail under Alternative B (Subchapter 4.2.1.1).

The implications for VMS use under the MOU scenario are identified in Subchapter 2.1 as the need to rely on alternative application of U.S. law to ensure compliance. The Lacey Act (16 United States

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[117] Fuel accounts for approximately 16% of total costs.

[118] Although cost to the fleet has been somewhat less of an issue, it is still considered for purposes of these analyses.

[119] The PICs and FFA as administrator are not entitled to VMS information generated while a U.S. vessel operates in an area of the U.S. EEZ, e.g., areas around Howland, Baker, Jarvis Island. Although these areas fall all or partly within the Treaty Area, they do not compose a part of the Licensing Area.

Code § 701) would be the statute most likely followed in the absence of specific legislation governing the application of VMS under the Treaty. The opportunity for the U.S. to apply the Lacey Act is limited to those countries where VMS is made a condition of licensing. According to the most recent FFA compendium of regional fishery legislation, only Palau, New Zealand (for Tokelau), and Fiji among the PICs have fishery statutes requiring VMS as a condition of licensing.[120]

The consequences to the U.S. purse seine fleet of ensuring compliance through the application of U.S. law under the no action alternative would thus be a suboptimal and confusing situation under which such laws applied only in some countries and not in others. The high seas areas would also not be covered under this scenario, further handicapping compliance efforts. The situation would be further complicated by the need to first determine if another country's laws were breached before charging a violator with breaching U.S. law. Given past concern of U.S. vessel operators with implementation of VMS, particularly with respect to the two major issues identified above, fully implementing an enforceable VMS in the absence of an established legal framework is considered unacceptable by NOAA Fisheries Enforcement.

This alternative would affect the ability of the U.S. to fully carry out its flag state responsibilities under Article 4 of the Treaty, which requires U.S. authorities to investigate an alleged infringement relating to any of the nine potential violations listed in Article 4.5, including unauthorized fishing in closed or limited areas.

4.1.1.4 Fishing Gear/Area Modifications

No consequences are anticipated to the U.S. purse seine fleet from the changes relating to fishing gear/area modification. The regulatory change currently would affect the U.S. longline fleets based in American Samoa and Hawaii by potentially enlarging their areas of operation. The potential for gear conflicts between U.S. longliners fishing in the high seas portions of the Treaty Area and U.S. purse seine vessel operations in those areas is deemed unlikely.

The high seas areas most likely accessed by U.S. longline vessels from the American Samoa fleet are those in more southerly latitudes, where albacore tuna is the primary target species and where purse seine fishing does not typically occur.

The high seas areas within the Treaty Area most likely to be accessed by longline vessels from the Hawaii-based fleet are those in tropical waters to the east of the Line Islands adjacent to the Kiribati EEZ, and to the west and southwest of Jarvis Island in the U.S. EEZ. These areas are at the extreme eastern end of purse seine fishing grounds and are usually accessed by purse seine vessels only during significant El Niño events (see Subchapter 3.1.2.2). No previous interaction has been reported between U.S. purse seine fishing vessels and U.S. longline vessels in adjacent areas where both fleets are capable of operating, including the U.S. EEZ around Kingman Reef, Palmyra Atoll, Howland Island, and Baker Island.

4.1.2 U.S. Longline Fleet

The one change with the greatest anticipated operational and economic consequence for the U.S. longline fleet is the modification of fishing gear/areas. This modification enables duly authorized U.S. longline vessels (fleets currently basing or home porting out of Hawaii and American Samoa) to

[120] All PICs have legislation that allows for VMS units to be required as a condition of access, but only those mentioned make VMS a legal requirement before a license can be issued.

operate in the high seas portions of the Treaty Area. In American Samoa, provisional application of access to the high seas portions of the Treaty Area under the MOU without a long-term guarantee to that access may result in vessel owners being reluctant to invest further in the fishery, either through expansion of the fleet or upgrading of existing vessels and/or equipment.

From a business-planning standpoint, guaranteed access for the long-term is highly desirable. The practical and operational linkage of access to the EEZs of neighboring countries to Treaty high seas could also discourage vessel owners in American Samoa from seeking access to neighboring EEZs on a mid- to long-term basis.

Duly-authorized U.S. longline vessels operating from Guam or the Commonwealth of the Northern Mariana Islands also would have access to the high seas areas within the Treaty Area under both Alternative A and Alternative B. However, an active U.S. commercial longline fleet (defined as more than two vessels) has never been based in either jurisdiction, and at the time of writing, there were no such active vessels. Thus, for purposes of this EA, only high seas portions of the Treaty Area likely to be accessed by Hawaii- and American Samoa–based U.S. longline vessels are considered.

Other impacts that are common to both Alternative A and Alternative B are discussed in Alternative B (Subchapter 4.2.2).

4.1.3 Western Pacific Tuna Fisheries

Analysis of catch and effort data from all fleets in the fishery would be somewhat simplified by the U.S. fleet reporting its tonnage in metric tons and using the UTC time system. Under the No Action Alternative, the Treaty would continue to produce a favorable environment with respect to collection of fisheries data through timely logbook reporting and the observer program. It is generally acknowledged that based on the information requirements of the Treaty, the U.S. purse seine fleet provide the highest quality and most complete data of any of the purse seine fleets in the region. Data provided by vessel operators are to some degree verified by the largest purse seine–based observer program in the region. The contributions to management of the fishery by these aspects of data collection, as described in Chapter 3, would thus continue.

VMS is used for monitoring fishing activity for compliance purposes. In order for VMS to be effective, vessel operators have to know that they are being monitored and that credible enforcement action will be taken in the event of illegal activity. Effective enforcement action undertaken under the no action alternative could be difficult under the existing U.S. legal framework, and the current laws of the PIC in which the alleged violation occur, as noted in Subchapter 4.1.1.3.

The impact of fishing gear/area modifications that would open the high seas areas within the Treaty Area boundaries to pelagic longlining by duly authorized U.S. vessels is difficult to quantify. Subchapter 4.2.2 (Alternative B) describes some of the possible scenarios under which U.S. longliners might operate and the consequences.

4.1.4 Biological Resources

4.1.4.1 Tuna Stocks

The direct consequence to tuna stocks from continued operation of the Treaty under the MOU would be the ongoing harvesting of those stocks by the U.S. tuna purse seine fleet. At current fleet size, capacity, and operational patterns (i.e., offloading of most of the catch at canneries in American Samoa), the total harvest is expected to be approximately 100,000–125,000 metric tons (mt) of all

species. Increases to fleet size, particularly if those increases come from vessels with larger capacity (> 1,400 mt), and changes in operational patterns (such as greater reliance on transshipment) could potentially increase those figures. Increased vessel capacity and changes in operational patterns would likely have a somewhat greater impact on total production, as opposed to the likelihood of increased number of vessels being added to the U.S. fleet.

The potential consequences to tuna stocks of modifying the fishing areas available to the U.S. fleet are unknown and impossible to quantify at this juncture due to the lack of any catch and effort history by the U.S. purse seine fleet in areas to be opened. However, these waters are known to be highly productive for tropical tunas in both the Papua New Guinea and Solomon Islands EEZs, with no indication of discrete stocks or barriers to migration. Tagging studies indicate rapid turnover rates in both zones, with significant two-way interchange of skipjack and yellowfin tuna between zones and between these areas and the greater WCPO. Larval tuna distributions, genetic studies and studies on the feeding, maturity, reproduction and morphometrics of tuna in the WCPO also suggest widespread mixing of tuna resources in the Papua New Guinea/Solomon Islands area.

The tuna resources of this region can thus be characterized by rapid turnover and exchange rates between zones and relatively uniform high productivity levels. These parameters suggest that fluctuations in overall catch by the U.S. fleet resulting from increased access in the Solomon Islands and decreased effort in the archipelagic waters of Papua New Guinea may produce no net impact to WCPO tuna stocks. However, it is possible that U.S. catch rates may increase or decline if the geographic areas gained differ in actual size or regional productivity when compared to the areas lost.

Another significant factor in this sub-region of the WCPO relates to the use of large-scale anchored FAD networks in both the Solomon Islands and the archipelagic waters of Papua New Guinea. Extensive FAD networks exist on both areas and FADs are believed to increase the local retention of skipjack resources in the Solomon Islands (Kleiber and Hampton, 1994). Papua New Guinea supports domestic and joint venture purse seine fisheries that deploy thousands of anchored FADs in archipelagic waters (Kumoru, 2003). The impact of these large FAD networks on tuna movement and stocks is still not well understood.

The WCPO tuna purse seine fishery continues to attract non-U.S. new entrants and continued increases in effort, due mainly to the healthy state of the skipjack resource. For the years 2000–2002, the U.S. purse seine fleet landed between 80,000–87,000 mt per annum, or between 6.1% and 7.25% of the total reported for all WCPO fleets. This does not represent a high significant portion of the overall catch, and no negative environmental consequence to the stock by the harvest of the U.S. purse seine fleet is anticipated to occur.[121]

The catch of yellowfin by the U.S. purse seine fleet in 2000–2002 was 23,500–33,400 mt per annum, or 4.8–7.2% of the total catch by all nations and gear types. The catch, although relatively small, should be noted in light of the 2003 SCTB recommendation that there be no further increases in yellowfin fishing mortality in the WCPO, particularly for *juvenile yellowfin.*

[121] U.S. purse seiners tend to target the larger, more valuable sizes of skipjack for canning purposes that coincide with the spawning sizes. The Standing Committee on Tuna and Billfish (SCTB) has indicated that WCPO skipjack abundance is dependent primarily on environmental factors and recruitment, rather than a strong relationship between the spawning stock size and recruitment. Environmental factors (mainly ENSO events) could be seen as having a greater impact on the stock than the catch by U.S. purse seiners.

Annual bigeye catches by the U.S. fleet during the years 2000–2002 fluctuated from a low of 3,500 mt to a high of 11,700 mt per annum, or 2.8–10.3% of the total WCPO reported landings. The highest catch was made during a year when the use of floating FADs predominated, (see Chapter 3). The SCTB has recommended there be no further increases in fishing mortality for all size classes of bigeye in the WCPO.

The vast majority of juvenile yellowfin and bigeye landings are the result of purse seine captures either in log or FAD sets, making the type of set employed a strong determinant in the quantity of juveniles of both species captured. Whether or not there are negative consequences for both bigeye and yellowfin from the fishing activities of U.S. vessels depends on the degree to which they employ such sets, the size of the U.S. catch relative to other fleets and the size class caught (not necessarily landed) by the fleet. It has been suggested that fish price is directly linked to landings by species type or fish size (see for example McCoy and Gillett, 1998) and that the impact of log and/or FAD sets may be directly linked to oversupply in the marketplace and resultant low fish prices (Coan and Itano, 2003). With the appearance of lower prices (circa 2000), especially for smaller sizes of all species, U.S. purse seine vessels have responded by significantly reducing the number of FAD sets (see Coan and Crone, 2003). They have shifted to sets on unassociated schools, which tend to capture larger sizes of the target species[122] that command significantly higher prices. Therefore, beyond the environmental factors, such as oceanographic events like El Nino, the aggregate supply of tuna delivered to canneries as well as the ex-vessel price for the various size classes appear to be strong determinants in the sustainability of the WCPO tuna stocks.

Expansion of the American Samoa–based albacore longline fishery beyond the U.S. EEZ would not be expected to adversely impact the albacore stock in the south Pacific. The population assessment model used by SCTB is reported to consistently indicate that current overall levels of harvest are well below maximum systainable yield levels. Furthermore, evidence shows that the current fisheries have limited impact on stock biomass. The albacore stock appears to be more responsive to environmental factors that influence recruitment, as opposed to fishery-induced factors.

Two of the four categories of regulatory changes put into effect through continued operation of the Treaty under the MOU would assist in reporting on catch and effort by the U.S. fleet. Although difficult to quantify, or even prove a direct link, these are expected to have a net positive impact on the tuna resources in the WCPO. Regulatory changes to reporting that assist the FFA in further enhancing the activities of onboard observers would assist in collection of catch and effort data important for verification of logbook data used in stock assessment. The imposition of VMS without a sufficient legal compliance/enforcement framework would be of limited value. The lack of compliance/enforcement authority could compromise the technology's capability to enable fishery managers and enforcement personnel to better monitor fishing activities, rendering the VMS effectively useless.

4.1.4.2 Protected Species

The implementation of new reporting requirements under the MOU would have no major direct impacts on protected species dependent on, or associated with the WCPO purse fishery. The change to reporting a vessel's arrival into port for the purpose of unloading could potentially improve the

[122] Except large bigeye, which do not form schools.

ability of FFA to arrange for timely boarding of fishery observers who can contribute to the collection of data relating to interaction with protected species.[123]

Implementation of VMS on U.S. purse seine vessels would have a positive impact on protected species dependent on or associated with the WCPO purse fishery. The degree of this impact will depend on the degree to which the spatial and/or temporal movements of such protected species are protected through specific time or area closures enacted by the PICs. The ability of VMS to either act as a deterrent or to identify unauthorized activities would be compromised under this alternative, as has been noted elsewhere. The potential consequences to protected species of modifying the fishing areas available to the U.S. fleet are unknown and impossible to quantify at this time. The lack of knowledge regarding important life history traits such as seasonality or migratory patterns (if any), for marine mammals in particular, in the areas concerned make it impossible to accurately determine impacts on those species. Several turtle species present in the modified fishing areas are known to originate from nesting colonies in the western Pacific. Information on migration and post-nesting movements is not available for some species (e.g., leatherback, olive ridley) and only poorly understood for others (hawksbill, green, loggerhead).

Due to the economics and logisticial consideration (e.g, distance from port to first set) associated with fishing in the high seas portion of the Treaty Area, it is not likely that there will be any substantial effort by U.S. longline vessels in the area. Thus, it is not likely that there will be any takings of listed species by U.S. longline vessels in the high seas portions of the Treaty area as a result of the access to these waters.

Seabirds. The no action alternative does not have an impact on seabirds from tuna purse seine fishing by U.S. purse seiners in the WCPO. There have been no recorded interactions between U.S. tuna purse seiners and seabirds in the portions of the Treaty Area used for tuna purse seine fishing, i.e., between 10° N and 10° S. Information on the avifauna present in these operational areas is sparse, however. One potential secondary negative effect on seabirds from all the fisheries active in tropical oceans would be a reduction in the fish that drive smaller fish to the surface so that birds can access them. However, the generally healthy condition of surface tuna stocks in the WCPO does not make this a major concern at present.

The potential for interaction between longline gear and seabirds is difficult to assess due to the limited information available. The only study to assess the subject of interaction with longline fisheries in general throughout the south Pacific region concludes, “incidents of seabird bycatch are of very infrequent occurrence” (Watling, 2002). The activities of Hawaii-based longline vessels in the equatorial high seas portions of the Treaty Area would not likely include interaction with seabirds. The northern limit of the high seas within the Treaty Area accessible to the Hawaii fleet reaches to only 8°N. Observed interaction with seabirds has been reported only above approximately 15°N (NMFS, 2001a).

No seabirds, including threatened or endangered species, are known to interact with American Samoa’s albacore longline fishery (WPFMC, 2003a). With the potential for expansion of fishing grounds for this fleet into extreme southerly high seas portions of the Treaty Area (southern limit of 26°S) it would not appear to take it into the range of some larger seabirds in the southern Pacific Ocean.

[123] Although observers collect data on protected species interactions, they are not authorized to enforce any U.S. laws, including those related to protected species.

Sea Turtles. In the areas where fishing gear/area modifications take place under this alternative, based on current practices of gear deployment it is believed that sea turtle resources would not experience adverse interactions with U.S. longliners. The big boats in the American Samoa longline fleet are said to typically deploy "deep sets" to target albacore that are not likely to catch sea turtles (WPFMC, 2003a). Vessels would be expected to continue this practice with expansion of the fishery to the high seas portions of the Treaty Area. Likewise, the Hawaii-based longline fleet uses deep sets that result in low to very low rates of interaction when targeting bigeye tuna, and would not be expected to change either target species or fishing techniques when fishing in more equatorial areas; if anything, sets may be deeper in these warmer waters. It is not anticipated that there will be a substantial amount of fishing by U.S. longline vessels in the high seas portions of the Treaty Area. The economics and logistical considerations (e.g., the vessels all use flake ice for storage of catch) are not condusive to operating on the high seas portions of the Treaty Area given the distance from port.

According to unpublished observer data covering 6,058 sets between January 1997 and June 2002, three takes of sea turtles occurred, all of which were released alive. Unfortunately, none of the three turtles was identified as to species. One turtle was noted as "alive and healthy," while the condition of the other two were listed as "condition unknown" (but not as "dead").

Observed sets represent 25.07% of all sets (n=24,166) during that period. On the basis of the observer data, no turtle mortalities would be expected from these interactions.

Marine Mammals. Information presented in Subchapter 3.6.2.1 of this EA indicates that interactions can occur between marine mammals and the longline and purse seine fisheries in the WCPO. The nature of those interactions is such that it is much more likely for marine mammals to be captured in the purse seine fishery than in the longline fishery.

Unpublished observer data covering a 53-month period (January 1997–2002) show that in 11 sets, unidentified marine mammals were taken. There is no indication that Alternative A would result in a different rate of takes (0.18% of sets).

Observed sets represent 25.07% of all sets (n=24,166). Using the same observer data noted in Subchapter 3.3.1 and extrapolation, mortality of marine mammals resulting from such interaction could have occurred in four sets during the 53-month period. At the same levels of effort, a set producing marine mammal mortality could be expected approximately once per year across the entire fleet, or approximately once for every 5,471 sets for the fleet as a whole.

4.2 Alternative B: NOAA Fisheries Proposes a Regulation to Implement the Changes Proposed for the Third Extension of the Treaty (Preferred Alternative)

Under Alternative B (the preferred alternative), NOAA Fisheries would propose regulations to implement the agreed regulatory changes in the third extension of the Treaty (as described in Subchapter 1.1.6). This alternative is essentially the same as Alternative A, except that regulatory action would supersede the MOU currently in place and enable enforcement of the regulations consistent with the Treaty obligations of the U.S.

In addition to proposing and implementing the necessary regulations, under this alternative, the U.S. would slightly amend the South Pacific Tuna Act of 1988 to authorize the regulatory changes relating to longline access to high seas portions of the Treaty Area and the VMS requirement for U.S. purse seine vessels.

Replacing the operation of the Treaty under the current MOU with amendments to the South Pacific Tuna Act of 1988 would also result in a positive impact through implementation of the agreed changes to Article 9 of the Treaty. Article 9 enables countries to unilaterally propose, and the relevant parties to agree to changes to things such as areas open or closed within their jurisdiction with respect to access under the Treaty. This would allow a streamlined means of implementation of actions involving issues relevant to only one PIC EEZ. PICs would be able to propose changes prior to the annual meeting of the parties and have proposed modifications adopted by consensus. Individual countries would then be responsible for implementing the change through their domestic procedures. This procedure would only be applied to issues relevant to a particular EEZ and is designed to enable a focus on such changes at the annual meeting, thus providing some impetus for a proposal to be adopted.

4.2.1 U.S. Purse Seine Fleet

4.2.1.1 Vessel Reporting Requirements

The discussion of vessel reporting requirements under Alternative A (Subchapter 4.1.1.1) applies to Alternative B as well. As described there, implementing the changes to vessel reporting requirements should be relatively easy to adopt.

4.2.1.2 Fishing Area Modifications

The discussion of fishing area modifications under Alternative A (Subchapter 4.1.1.2) applies to Alternative B as well. The modifications to fishing areas in Solomon Islands and Papua New Guinea could potentially give U.S. purse seiners greater operational flexibility in the waters of those countries when fishing to the east, but limited flexibility in the west. Any sustainable economic impact would need to be assessed over a number of oceanographic cycles. Effects on the human environment would essentially be the same as those outlined in Subchapter 4.1.1.2.

4.2.1.3 Vessel Monitoring System

Operational Impacts. The Treaty's VMS requirement means that the owner or operator of each vessel wishing to fish under the Treaty would be responsible for purchasing, installing and maintaining a VMS unit. To help guide this process, the FFA publishes *Guidelines for Installation and Registration of Automatic Location Communicators* (FFA, 2003b). Ten models from five manufacturers are currently approved along with the appropriate software versions, and U.S. purse seine vessels must have one of these approved models installed on board to comply with the requirements.

FFA notes that it expects additional VMS units to be approved in the future. While the agency does not mention if units will be removed from the list, the current list does show one software version that "expired" on October 24, 1999. The guidelines note the possibility of additional such action in the future, which would result in the need for vessel operators to update software.

A FFA-approved automatic location communicator installer must install all VMS units. Currently approved installers in the Pacific Islands region for the five manufacturers of type-approved VMS units are located in nine different Pacific Island ports, including Guam and American Samoa. With additional installers approved in Japan, Taiwan, China, Manila, Auckland, Queensland Singapore, and elsewhere, it should not be difficult for U.S. vessels to arrange for installation by an approved installer.

U.S. purse seiners carry a wide array of electronic equipment designed to aid navigation and facilitate fishing operations. Owners and operators are familiar with such electronic equipment on board their vessels and can be expected to readily incorporate the VMS unit into existing electronics inventories without major technical or operational problems. A typical unit, the Trimble Galaxy, is about the size of a large city phone book and weighs 3.2 kilograms, with an antenna weight of 1.8 kilograms. In fact, all U.S. vessels currently licensed under the Treaty as of September 2002 are already fitted with Inmarsat C units.

One area of ambiguity in the current Treaty is that it does not specifically address what actions would need to be taken by the vessel when or if the VMS unit malfunctions while the vessel is at sea. Some guidance is provided in Section 3 of the FFA's VMS guidelines, where reference is made to "likely VMS conditions of operation" that may be required of a vessel by a member country license. This refers to the Harmonized Minimum Terms and Conditions for Foreign Fishing Vessel Access that have been approved by FFA member states and applies to all foreign vessels obtaining access in the their EEZs (see Subchapter 3.2). The application of the Minimum Terms and Conditions in the region and their apparent consistency with the VMS requirement of the Treaty indicate the following requirements are likely to be unilaterally applied to a U.S. vessel by the Treaty Administrator (FFA) when transmission of automatic position reports has been interrupted while in the Treaty Area (FFA, 2003b):

- The vessel must ensure that reports containing the vessel's name, call sign, position and date and time of the report are communicated to the Administrator by radio, e-mail or telex, at intervals specified by the Administrator,[124] commencing from the time of notification of the failure of the VMS unit. Such reports must continue until such time the Administrator confirms the operational;

- If it is not possible to make any one or more of the further position reports as above, or when the Administrator so directs, the master of the vessel must immediately stow the fishing gear and take the vessel directly to a port identified by the Administrator, and as soon as possible report to the Administrator that the vessel is being, or has been, taken to port with gear stowed;

- After a fishing trip during which interruption of automatic position reports has occurred, the vessel's owner or operator must replace or repair the VMS unit in accordance with the specifications provided by the Administrator prior to the vessel's next trip.

Because each interruption of VMS signals would be assumed to be a result of equipment failure and occur in a unique situation, it is not possible to determine the circumstances under which a vessel would be directed to a "designated port" or allowed to continue its fishing trip. It can be assumed, however, that as long as the vessel continues to make the required periodic reports by other means as directed by the Administrator, normal fishing operations would continue on that specific trip.

Under this alternative, a burden could be placed on the vessel operator and affect or interrupt the vessel's ability to continue fishing activities in certain situations. If a situation requiring substitute reports arises, and the Treaty Administrator indicates a high frequency of reports to be made (every 10 minutes, for example), this might interfere with the vessel's ability to continue fishing activities.

[124] The intervals at which reporting would be required is still being discussed between the PICs and the United States (R. Clarke, pers. comm.).

This situation could exist where a vessel's last known position reported by VMS was near a Closed Area, for example. The degree to which such reporting might become a burden would depend on the vessel's activities at the time (e.g., fishing or steaming), and the availability of other resources on board (crew and equipment) to manually transmit the required reports.

It can be assumed that on most fishing trips where the vessel experiences VMS signal interruption, the owner or operator would try to continue the trip until returning to port for normal offloading. In most cases, the destination port would be American Samoa, a relatively large port with two companies that are FFA-approved repair facilities. VMS units are not the only electronic equipment items that might fail during a fishing trip, and repair or replacement of radios, radar, and other essential equipment in American Samoa is routine.[125]

Consequently, with some exceptions, delays in departure from American Samoa would not be caused by VMS problems alone. If, however, a vessel is directed to another port in the Pacific Islands region for reasons connected with operation of its VMS unit, delays could be experienced in returning to fishing activities. The FFA-approved installers in such places as Majuro have few spare parts or replacement units on hand, and parts or replacement units would have to be received via airfreight or other means.[126]

The low cost of VMS units relative to the financial gains of large purse seine sets does provide some incentive for vessels to cheat. The incentive is not totally quantifiable but could theoretically exist in a situation where, toward the end of a trip, a vessel decides to disable the VMS in a Closed Area and make a large set to end the trip.

Because the operation of regional VMS by FFA is predicated on a cost-recovery model that requires full compliance, the practical result of a failure in foreign fleets' participation might be a loss of revenue required to effectively operate the system. Although only speculative at present, if the FFA member countries follow through with full implementation of their stated requirements for VMS on all licensed vessels and refuse to license those who do not participate, the result might be an increase in fees for the remaining vessels to cover the system's fixed costs. It thus might well be in the best interests of the U.S. to encourage use of the system by fleets from other countries active in the fishery.

Financial Consequences. The direct cost implications for U.S. vessels participating in the FFA regional VMS consist of the following:

- Purchase and installation of the VMS unit;
- Annual registration on the FFA VMS Register;
- Maintenance of the VMS unit.

[125] At present, one of the major electronic gear suppliers reports that the VMS units most commonly carried by U.S. purse seine vessels have been highly susceptible to antenna failure, and that due to the manufacturer's cessation of support for those particular models, spare parts are in short supply.

[126] A common means of ensuring the timely receipt of urgently needed parts is to have them hand-carried by relief crew or others traveling by air to join the ship or otherwise conduct the ship's business.

Purchase and installation of the VMS unit is a one-time cost for the life of the unit, expected to be 4–5 years, while annual registration and maintenance are recurrent. The current costs for VMS units vary depending on the manufacturer, vendor and other factors such as whether or not the unit is part of a bulk purchase of multiple units. Current advertised prices for available units are approximately US$4,000–$8,000; an average price of $6,000 per unit is deemed reasonable.

Additional to initial equipment cost is cost of installation and activation. Costs charged by technicians such as those in American Samoa would depend on whether or not other work is being performed on the vessel. Hourly rates for such work can range from US$90 to $150 or more, depending such factors as location and time of day. Installation and activation is estimated at US$800 per unit. Other minor charges from satellite telecommunications providers would also apply and would typically include an initial registration fee of approximately US$25, in addition to other minor fees.

Electronic equipment typically installed on board a U.S. purse seiner operating in the western Pacific can easily exceed US$300,000. An Inmarsat-C VMS unit thus represents approximately 2% of the estimated cost of all vessel electronics installed on a typical U.S. purse seiner. Overall, there have been relatively few significant developments in marine electronics within the past 10 years. Steady improvements in design, however, and the integration of innovations such as use of satellite imagery results in many operators replacing existing equipment to maintain a competitive edge.

Vessels already fitted with approved Inmarsat-C units may nevertheless find reason to change or upgrade them within the next one to two years, due to advances in design and added features. When new models appear, limited spare parts availability for discontinued models can make it necessary to upgrade, to avoid the loss of valuable fishing time while waiting in port for parts. In the case of Inmarsat-C, some of the Trimble units now used by U.S. vessels have already been discontinued and purchase of new units will likely be required.[127]

The FFA annual VMS registration fee is currently set at US$845 per vessel. There is no pro-ration or refund of this fee for periods of less than one year. FFA notes that this annual fee is designed to recover the operational cost of the FFA member countries' VMS, including the cost of polling and response from VMS units on board all vessels participating in the system.

The impacts of the acquisition and operation of VMS to vessel profitability are difficult to assess, owing to the limited data on financial performance of the fleet, the assumed variation in such performance between vessels and external forces that would be expected to have a much greater affect on operating costs. Estimated annual budgeted operating costs for a "typical" U.S. purse seiner operating in the western Pacific tuna fishery, based on a similar projection by McCoy and Gillett (1998), are estimated to be on the order of US$3.9 million.

Consequences to Confidentiality of Data. One of the ongoing concerns of vessel owners and operators with the implementation of the FFA regional VMS has been the degree to which information collected through the system is treated as confidential. The reference to the application of VMS in the amended Treaty, Annex 1, Part 8, in part describes the manner in which this is to be addressed:

[127] In addition, the impending requirement for vessels such as U.S. purse seiners to use units approved for use with the worldwide Global Marine Distress and Safety System in the next 2–3 years will require changes and upgrading of communication equipment (including Inmarsat-C) and could affect the equipment used for VMS purposes.

> All data transmitted in accordance with this provision shall be treated as confidential business information and shall be distributed only to ensure that obligations under this Treaty are fulfilled. Technical matters, including financial implications related to the implementation of this Part, will be a matter for discussion between the parties.

The implications for confidentiality of data collected pursuant to Treaty requirements are not new. Since 1988, large amounts of catch and effort data, vessel location, observer reports, and other data have been provided to the PICs directly or through the FFA Secretariat as Treaty Administrator. For example, position reports to both FFA and the PICs are an integral part of the reporting requirements of Annex I of the Treaty. The near-real-time aspects of VMS data add a new aspect to these concerns, given that vessel location information could be of direct interest/benefit to others in the fishery.

The Parties have yet to agree on a specific, universally accepted definition of "confidential business data". The definition of "confidential data" that appears in the NOAA Fisheries Southwest Region's *Data Confidentiality Handbook* (Fougner and Coan, 1997) represents the U.S. view. The handbook defines confidential data as meaning "data that are identifiable with any person, that reveal the business practices of an individual, and that are prohibited by law from being disclosed to the public. The release of these data could place the supplier or subject of the data at a competitive disadvantage and could result in adverse impacts on that person's business."

The confidentiality issue is related to the concept of release of this information to parties other than the FFA Secretariat and the PIC. From the U.S. perspective, the NOAA Fisheries policies on the subject contained in the *Data Confidentiality Handbook* (Fougner and Coan, 1997) adequately address this issue. Concern exists over the potential for either the FFA Secretariat or the PICs to be unable to guarantee the confidentiality of the system or to willingly release such information to non-Treaty parties.

According to the FFA Secretariat, VMS implementation highlights the need for uniform confidentiality data handling protocols to be developed by the FFA Secretariat for use by its PIC members. The apparent absence of such protocols contributes to uncertainty on the part of U.S. industry in the way in which data generated by the fleet, including VMS data, are handled at the national (in-country) level.

With respect to "security of information," FFA addresses the issue in its VMS guidelines. FFA cites the "multiple in-built security features" of both Inmarsat-C technology and the Internet, and the fact that "the same communication protocols have also been used by fisheries agencies in Australia and New Zealand in their VMS" where they have "proved to be both reliable and secure" (Fougner and Coan, 1997). According to FFA, once information on vessel position is received at the VMS hub site in Honiara, "it is then partitioned by country location and sent out to the authorized country VMS site. Information is relayed by Inmarsat-C, international direct dial, or the Internet. Before transfer to the member country site, the information is encrypted by Smart Crypt, a highly secure encryption system" (FFA, 2003b).

FFA notes that any PIC VMS site requesting information from the VMS hub [128]must first have the appropriate security access and clearance classification in order for the system to recognize the

[128] Located at FFA headquarters in Honiara, Solomon Islands.

request and respond accordingly. FFA (2003b) further indicates that security passwords are changed regularly and all requests for information are logged and auditable.

A recent (2003) investigation was conducted on the technical capabilities, data security, and confidentiality policies among regional fishery management organizations for the Preparatory Conference for the WCPFC. With respect to the FFA Secretariat VMS hub, findings include the following (MRAG, 2003):

- Physical access to hardware and archived data is restricted to FFA personnel (VMS housed in separate building). Access to servers is restricted to defined FFA personnel (technicians, developers, data base manager).

- Logical security is maintained through restricted access based on a system of defined access "rights" or "privileges." The highest level of access is open to the database administrator, and access at lower tiers is permitted on strict user group definitions. FFA Security mechanisms are defined in the "Applications Development Standards and Guidelines document." A firewall protects data integrity against malicious attack/theft. The system also includes a subnet firewall that separates the VMS data from other aspects of the FFA data management system. VMS information is further protected through 16-bit encryption.

Although it appears that the FFA Secretariat has taken the necessary steps to ensure the confidentiality of data while it is within their system, no information is available on the level of security applied to data gathered by VMS once it is transferred to FFA member countries. Most FFA member countries are committed to the sharing of fisheries surveillance and enforcement information through their adherence to the Niue Treaty on Cooperation in Fisheries Surveillance and Law Enforcement in the South Pacific Region, which entered into force in 1993.[129] The Niue Treaty does not address the issues of security or confidentiality, but rather leaves the terms of exchange of information up to each party's national laws and regulations.

The inclusion of a clause acknowledging the confidential nature of data originating from a VMS source would strengthen the wording found in the current Treaty. The main obligations to be fulfilled that might be monitored by VMS have to do with a vessel's position, i.e. its location with respect to Closed Areas. Clearly, both the FFA member States and the U.S. Government have vested interests in obtaining this information.

The major confidentiality concern for the U.S. industry is the potential dissemination of fishing information, particularly vessel positions, because this information is considered most vulnerable at the national level. However, if a potential problem exists with the confidentiality of VMS data (and it is not certain that this is the case), it exists for all fleets covered by the FFA regional VMS and not just the U.S. fleet.

4.2.2 U.S. Longline Fleets

The consequences of Alternative B to the U.S. longline fleets of American Samoa and Hawaii come from the modification to the Treaty enabling these fleets to access the high seas portions of the Treaty Area.

[129] As of January 2001, New Zealand, Tokelau, and Tuvalu among FFA members had not ratified the Treaty.

4.2.2.1 American Samoa

Expansion of the fishing areas available to the American Samoa fleet through expanded access to the high seas areas within the Treaty Area is expected to be of direct economic benefit to the fleet[130]. Operating solely in the high seas areas to the north and northeast of American Samoa could be viable for the American Samoa-based big boat fleet if the target species were to shift from albacore to yellowfin and/or bigeye. This in turn would require a shift from fishing for the cannery market to focusing on fresh fish sales and exports. However, this scenario is highly unlikely, given the restricted market for fresh fish in American Samoa and limited options currently available for exporting fresh tuna. Therefore, the potential impacts to the WCPO yellowfin and bigeye stocks are considered slight for this reason.

Historically, export markets for large quantities of fish from American Samoa have been limited due to airfreight constraints. As a result, no significant exports of fresh fish from American Samoa occur at present. The development of exporting fresh sashimi-grade fish for distant markets would have to take into account the economics of vessel operation in American Samoa, possible reconfiguration of some boats, increased ice supply ashore and the cost of providing significant air freight service.[131]

As noted in Chapter 3, the economics of the American Samoa big boat longline industry is heavily dependent on albacore prices at the American Samoa canneries. The international price of albacore is independent of the fishing grounds available to the big boat fleet, therefore the Treaty is unlikely to have any direct impact on these revenue sensitivities. Conversely, the availability of the expanded fishing grounds might have a substantial effect on total catch landed and on the operational cost structure of the big boat fleet.

The expanded fishing grounds available to big boats under the third extension of the Treaty may affect vessel costs in one or both of the following ways:

- Because longer voyages imply higher harvest rates per voyage, some of the fixed costs of vessel operation may be amortized over a greater production base. Fixed costs account for slightly more than 20% of total longliner costs (O'Malley and Pooley, 2002).

- If the expanded fishing grounds were more productive (e.g., increased CPUE) than the fishing grounds in the EEZ around American Samoa, then the capture rates of albacore would increase and the overall operating costs-per-ton-of-catch would improve for the big boat fleet.

Both of these factors could act to lower the breakeven ex-vessel price levels for the American Samoa–based longline big boats.

Another major factor of the fishery's current operation involves seasonal fluctuations in the abundance of the albacore. Whereas the big boat operations continue year-round, the fish are most abundant in the second half of the year (O'Malley and Pooley, 2002). If expanded fishing areas were

[130] This also linked to their ability to also expand fishing areas through bilateral licensing mainly in the neighboring EEZs of Niue and Cook Islands.

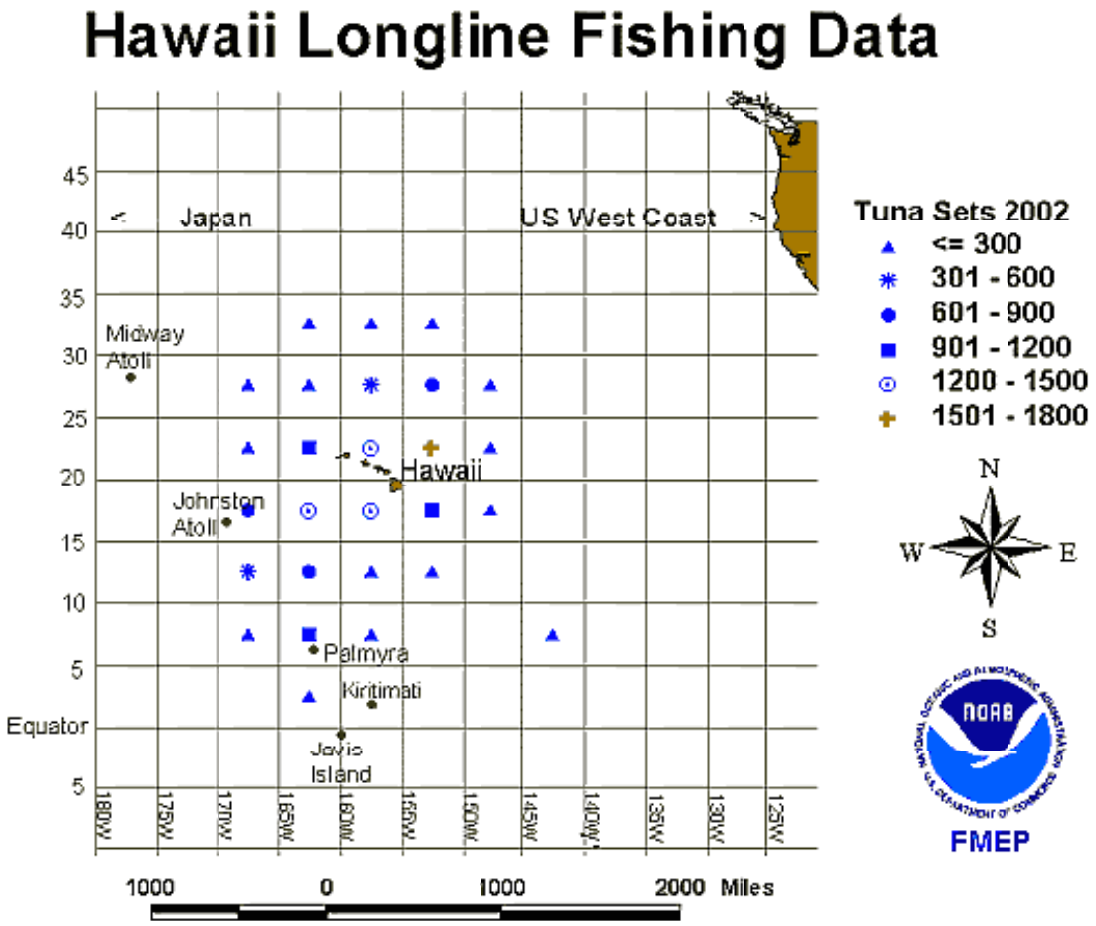
[131] While the viability of exporting fresh fish has been demonstrated in several neighboring countries, including Samoa, Tonga and Fiji, the economics of operating large longline vessels in those countries is believed to be very different from that in American Samoa, with labor costs being much higher in the latter.

available, it is possible that the big boats might overcome this seasonal factor and, as a result, both revenue patterns and vessel profit margins might be expected to improve.

With the above factors in mind, it can be stated that the effect of expanded fishing access could be to relieve fishing pressures in the U.S. EEZ around American Samoa and conceivably to improve vessel profitability. The benefits of such expanded access would not affect the *alia* fleet (see Subchapter 3.4.1.1), due to their small size and lack of range and refrigeration.

4.2.2.2 Hawaii

The Hawaii–based longline fleet targets bigeye tuna and, to a much lesser degree, yellowfin.[132] Spatial fishing effort (relative number of sets) by Hawaii longline vessels targeting tuna in 2002 is depicted in Figure 4.2-1. Most effort is directed north of 10°N, with some effort between 5°N and 10°N.



Source: NOAA Pacific Islands Fisheries Science Center

Figure 4.2-1: Sets Targeting Tuna by the Hawaii Longline Fleet, 2002

[132] Fishing for swordfish north of the equator by Hawaii-based longline vessels has not been permitted since April 2001; however, the fishery was reopened in April 2004 (see Subchapter 3.4.2.1)

At the current size and configuration of the Hawaii-based longline fleet, the ability of the fleet to utilize the portion of the Treaty high seas area closest to Hawaii is limited. Only the faster vessels with the longest range and greatest operating autonomy would be able to take advantage of fishing in most of these high seas areas (for example the Treaty high seas areas adjacent to the U.S. EEZ around Jarvis Island).

It is likely that even these larger, faster vessels would see only modest impacts to existing operations. The bulk of the effort by U.S. Hawaii-based longline vessels is in the U.S. EEZ of the Palmyra/Kingman Reef areas. The high seas areas falling within the Treaty Area, near Palmyra and Kingman Reef are not considered to offer expansive new fishing grounds. There may also be a need for U.S. vessels to obtain licenses from Kiribati to enable fishing in the Kiribati EEZ surrounding the Line Islands to maximize the value of the limited high seas areas within the Treaty Area.

Specific catch and effort data for the U.S. longline fleet in the U.S. EEZ around Palmyra Atoll, Kingman Reef, and Jarvis Island give an indication of levels of activity and potential value of adjacent high seas areas. With the exception of 1999, there was a slow yet steady increase in use of the U.S. EEZ around Palmyra Atoll and Kingman Reef during the years 1997–2002. The most recent complete catch and effort data for the U.S. EEZ around Jarvis Island are available only for 2002.

In 2002, total effort of the Hawaii-based fleet was 13,911 sets (27,018,673 hooks). Effort in the U.S. EEZ around Palmyra and Kingman represented approximately 7.5% (1,007 sets, 2,074,496 hooks) of total effort by the Hawaii-based longline fleet. Activity in the more distant area around Jarvis in 2002 represented just over 1% (141 sets, 323,230 hooks) of total effort by the fleet (R. Ito, pers. comm.). As shown in Figure 4.2-1, the bulk of effort by the fleet was undertaken above 15°N.

Although the trend appears to be toward greater effort in the U.S. EEZ around Palmyra and Kingman, two constraints are identified for fishing below 5°N during 10 months of the year. The first is the relatively long distance from Hawaii and resultant negative impact on fish quality, and secondly the existence of the large Kiribati EEZ surrounding the Line Islands of Washington, Fanning, and Christmas islands. The maximum duration of a fishing trip for vessels targeting tuna for the fresh fish market in Hawaii is three to four weeks. Some of the newer vessels in the fleet are larger and have onboard ice systems, providing greater range than in the past. This has allowed them to fish in the U.S. EEZ around Jarvis Island. This represents the outer range of Hawaii-based boats. The largest high seas portions of the Treaty Area to the west of Jarvis Island south of the equator are beyond the economic operating range of most of the Hawaii-based longline fleet at present (S. Martin, pers. comm.).

Hawaii longline vessels could make maximum use of the high seas portions of the Treaty Area if granted access to the Kiribati EEZ. Although there has been some limited effort in the past to obtain such access, the Hawaii-based fleet has generally limited itself to fishing within the U.S. EEZ around Palmyra Atoll and Kingman Reef.

4.2.3 Western Pacific Tuna Fisheries

Under the preferred Alternative B, the refinements to vessel reporting requirements would be beneficial to western Pacific tuna fisheries, as described in Subchapter 4.1.3.

The use of VMS should provide positive benefits to the fishery as a whole by enabling timely monitoring of vessel activities, including protecting the integrity of Closed Areas. Closed Areas have been declared for each of the PICs, and typically include the territorial seas, named banks, reefs, and seamounts. These areas are important to local economies in many of the PICs and support substantial

small-scale fisheries that contribute to domestic food supply and, in some cases, exports of fish and fishery products.

The effects of implementing the FFA regional VMS with the U.S. purse seine fleet is seen as positive, having a net benefit that includes enabling the U.S. to continue to act as a leader in consistently providing reliable data on the fishery. The use of VMS as a compliance tool would enhance the leadership reputation that the Treaty has provided over the past 15 years.[133] This leadership has been important as it tends to act as a yardstick by which the other tuna fleets of the region are measured and enhances the image of the U.S. as a responsible resource partner.

Should the American Samoa big boat fleet expand into high seas fishing grounds within the Treaty Area, a consequence would be the increased supply of non-tuna bycatch species. As noted, these species have little value to the canneries and are sold in local markets.[134] Given the small size of the local markets, estimated at approximately 2 mt per week (WPFMC, 2003a), increased by-catch supply can be expected to have a depressing effect on local fish prices. In 2001, before the build-up of the big boat fleet, the total value of the longline bycatch was estimated at US$628,000 per year (WPFMC, 2002).

To the degree that further increases in bycatch availability decreases local fish prices, conflicts between the big boats and the American Samoa *alia* fleet might surface. With expanded big boat fleet operations, the limited commercial market for these fish probably means that either new export markets would need to be found or an increasing proportion of the by-catch could be released at sea and never landed in American Samoa.

4.2.4 Biological Resources

4.2.4.1 Tuna Stocks

The consequences to tuna stocks under this alternative would be essentially the same as those described under Alternative A (Subchapter 4.1.4.1).

The impacts of the regulatory changes relating to reporting and VMS on tuna stocks would be positive. Timely and accurate reporting of catch and effort data would assist in management of the fishery by enabling accurate fishing location data to be obtained on a real-time basis. Catch location data and indications of vessel fishing activity provided through VMS would be important to fishery managers if controls are placed on specific types of fishing for the purpose of protecting certain size classes and species (such as limits on FAD fishing to minimize catch of smaller bigeye or yellowfin tuna).

4.2.4.2 Protected Species

The direct consequences to protected species under this alternative would essentially be the same as those described under Alternative A (Subchapter 4.1.4.2). Regulatory changes to reporting that assist the FFA Secretariat in further enhancing the placement of onboard observers would assist in collection of data on protected species, and for verification of logbook data.

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[133] Other examples of progressive Tuna Treaty leadership include the high levels of observer coverage; distribution of economic benefits, compliance, information on high seas fishing and flag State responsibility.

[134] Wahoo (ono, *Acanthocybium solandri*) are canned and commercially sold in very limited quantities within the Territory, but a secondary market for canned wahoo is emerging in Honolulu.

4.3 Alternative C: The Termination of U.S. Purse Seine Industry Participation in the Treaty

Under Alternative C the U.S. purse seine industry would cease to participate in the Treaty, indicated in several ways. The most acute would be lack of payment of the required annual industry payment of US$3 million. Such an event could come about because of adverse economic conditions inside or outside the tuna industry, or because of the vessels ceasing to exist in their present form as a U.S.-flagged fleet.

The organization of the Treaty could theoretically enable its continuation without the U.S. purse seine industry's participation or any authorized fishing by U.S. purse seine vessels, with the concurrence of the PICs. As long as the Treaty remained in effect, U.S. purse seine vessels could not seek alternative methods of gaining fishery access to either the Treaty Area or the Licensing Area. From a practical standpoint, this alternative would mean that the U.S. purse seine fleet in the Treaty Area not only ceases participation but also ceases to exist in the WCPO.

A scenario whereby the Treaty continued to exist but U.S. purse seine activity ceases would require the U.S. Government to continue its payment of US$18 million to economic development fund portion of the total agreed annual amount, and the acceptance of this amount by the PICs in lieu of any other Treaty payments from the purse seine industry.[135] There would then be no authorized fishing by U.S. purse seine vessels anywhere in the Treaty Area. Other aspects of the Treaty would continue, including the requirement for the U.S. to cooperate in assisting the PICs in achieving maximized benefits from the development of their fisheries resources (Article 2.1). The following discussion assumes that such an arrangement would be acceptable to the PICs.

4.3.1 U.S. Purse Seine Fleet

The consequences of ceasing participation in the Treaty would, for most owners, likely result in complete cessation of fishing operations by their vessels in the WCPO.[136] Because of the high cost of new vessel acquisition and the generally good condition with which U.S. owners keep their vessels, the fleet would most likely be sold to foreign buyers rather than being scrapped. The immediate consequences to the fleet would be the obvious discontinued payment of the collective US$3 million for license fees, the fixed cost component of the observer contribution, and other miscellaneous fees imposed by the PICs such as registration on the Regional Register and VMS Register. The total is estimated at US$125,000–$130,000 per year.

Re-flagging in countries other than the U.S. remains a viable option to U.S. vessel owners. A few U.S. owners have chosen to re-flag vessels elsewhere in the past and remain in the fishery through alternative access arrangements. This option continues to exist for current owners, but it is believed that the degree to which the Treaty facilitates the fleet's activities and the continued significant benefits to the industry reduce the potential for such actions occurring fleet-wide. It is assumed that if the fleet, as a whole, could not meet the payment requirements for access under the Treaty and ceased operation, those seeking to re-flag would encounter conditions

[135] The continued payment of US$18 million is required by the Treaty, and there would be no incentive for the PICs to continue the Treaty without such payment by the United States.

[136] A few owners might choose to permanently relocate their vessels to the Eastern Pacific; however, some U.S. vessels are already located there, and current regulation of that fishery limits participation of U.S. vessels to no more than 8,900 cubic meters carrying capacity, or no more than about six to eight vessels.

If all vessels ceased fishing operations completely, one of the major impacts would be on employment and loss of income, for both owners and crew. Using the estimate of a typical vessel's net profit (McCoy and Gillett, 1998), loss of income to owners could be around US$220,000. This is in addition to an estimated average of US$125,000 per vessel in management fees due the owner in his/her role as vessel manager, where applicable. The estimated loss of income to owners and/or managers for a fleet of 22 vessels could thus be on the order of US$7.6 million.

The total number of crew jobs lost due to a cessation of vessel operations would be 400–450. A comprehensive survey of employment aboard fishing vessels in the WCPO in 1997 found that approximately 28% of all crew on U.S. purse seiners were U.S. citizens (Gillett and McCoy, 1997). U.S. law mandates U.S. citizens as captains and chief engineers, and most of the key, higher-paid positions on board U.S. purse seiners are also held by U.S. citizens. Assuming a similar composition of crew nationality in 2004 and 18–20 crew per vessel, the cessation of fishing by 22 vessels would result in the loss of 111–123 jobs for U.S. citizens. These U.S. citizens are estimated to account for more than two-thirds of the annual payroll on U.S. vessels, or approximately US$10.7 million.[137]

In addition to the percentage of U.S. citizens who were employed in 1997 and would lose their jobs, approximately 15% of crew was Pacific Islanders. It is believed that this number may have increased somewhat in the last 7 years, so that the number of jobs lost on vessels would be approximately 60-65.

If some vessels were re-flagged, it is unlikely that many of the higher-paid U.S. citizens, particularly captains, navigators and engineers, would retain their jobs. Whether other crew would retain their positions depends on specific business arrangements and circumstances of each re-flagging.

4.3.2 U.S. Longline Fleet

No major direct short-term consequences relating to fishery access would occur from the cessation of participation in the Treaty by U.S. purse seiners to the areas of operation available to U.S. longline vessels. With the Treaty still in force, U.S. longliners based in Hawaii and American Samoa would retain access to the high seas areas of the Treaty Area, and their activities in those areas would continue to be governed by the relevant domestic U.S. FMP and applicable regulations.

Commercially however, there could be consequences to the operation of the longline fleet in American Samoa. It is understood that the U.S. purse seine fleet supplies approximately 65–70% of the raw canning material to the two canneries in American Samoa. The cessation of this supply would result in the need for realignment of the raw material sources for canning of light meat tuna in American Samoa. Most likely this would cause a shift to reliance on imported, cooked loins[138]. The processing of cooked loins into canned tuna is less labor intensive than the processing of whole fish, the result of which would be a reduction in the labor force at the canneries. Elimination of the fuel, ship repair and the various food and equipment supply needs of the purse seine fleet in American Samoa would also adversely affect the prices and level of these services for longliners based there.

[137] Some U.S. citizen captain/fishing masters might find positions on non-U.S. vessels, particularly if the vessel in question is a recently acquired former U.S. seiner and the sale includes the provision of short-term fishing expertise.

[138] In the loining process, whole fish are first filleted, and each of the two fillets is quartered, removing pinbones and red meat along the center of each fillet. The resulting four loins are then cooked, vacuum packed, and frozen before being shipped to the cannery for canning.

Indirectly, U.S. longliners targeting yellowfin and bigeye may experience longer-term consequences from the impacts on biological resources described below. It is not possible to predict all of the impacts to longliners, given the current state of understanding of fish recruitment, implications of possible ecological regime shifts, and the stock assessment models in use.

4.3.3 Western Pacific Tuna Fisheries

Cessation of U.S. fleet participation in the Treaty has several negative implications for the management of WCPO tuna fisheries. As noted in Subchapter 3.3, the U.S. fleet provides the highest quality data of any of the purse seine fleets of the region. Without U.S. purse seine vessels operating in the region, the amount and quality of scientific and operational data on the western Pacific purse seine fishery would decline substantially. In particular, the observer program that operates as an integral part of the Treaty would cease. The program results in the highest observer coverage among all fleets operating in the WCPO (always greater than 20% and reaching or exceeding 25% in recent years), and the data collected are important for verifying catch and effort data as well as for other fishery management purposes.

In addition to the loss of data from the observer program, the U.S. fleet's catch and effort data would no longer be available for stock assessments. In 2002, for example, these verified data represent approximately 10% of the total purse seine catch of all yellowfin, skipjack, and bigeye in the WCPO. With no catch from U.S. purse seiners offloaded at the canneries in American Samoa, the port sampling program operated by NOAA Fisheries at the canneries in American Samoa would also cease to be able to provide useful sampling data from purse seine fishing grounds in the WCPO.

With the cessation of fishing by U.S. vessels and the subsequent lack of payment for the Treaty observer program operated by the FFA Secretariat and assisted by NOAA Fisheries, approximately 12–15 Pacific Island fishery observers would lose their jobs. Depending on the manner in which FFA Secretariat staffing might be realigned in response to the cessation of fishing by U.S. purse seiners, additional core FFA staffing jobs may also be eliminated.

Although the PICs have expressed a desire to reduce overall fishing effort to increase returns realized from the fishery through license fees, experience suggests that a lack of solidarity between countries to do so could be a problem. It is likely that within the current management framework employed by some of the PICs under the Palau Arrangement, other vessels would move in to replace the U.S. fleet, especially those flagged in the PICs themselves, in addition to those from the Philippines and Europe (Gillett et al., 2002). This increase in fleet size could come about by the purchase of former U.S. vessels, new vessels or the importation of used vessels from other regions.

4.3.4 Biological Resources

4.3.4.1 Tuna Stocks

Two major significant implications for tuna stocks would result from a cessation of fishing by the U.S. tuna purse seine fleet in the WCPO:

- Should the U.S. fleet cease to either exist or fish in the WCPO, one of the future implications for tuna resources in the region may be an increase in the catch somewhat disproportionate to the number of replacement vessels that might enter the fishery. This is because newer entrants into the WCPO fishery appear to be highly productive or possess the capabilities to be so. For example, whereas the U.S. fleet had an overall CPUE of 21.36 mt in 2002, the Taiwanese CPUE was 28.92 mt, Korea 29.88 mt, and Marshall Islands 31.7 mt. In 2000, the

last year in which Spanish purse seiners reported significant catches in the WCPO, the CPUE reported was 39.69 mt (SPC, 2003b). This higher CPUE, coupled with the generally quicker turnaround times in port for fleets that transship their catch, often results in a higher annual catch per vessel for many of the non-U.S. fleets.

- A second result of the cessation of U.S. fishing would be a likely overall increase of fishing on FADs and log sets leading to higher catches of juvenile yellowfin and bigeye. These "associated" sets typically catch smaller tunas and larger quantities of bigeye tuna than unassociated sets, or those sets made on free-swimming schools (Sakagawa, 2000). Concern has been expressed that increasing fishing effort on FADs in order to increase the skipjack catch results in increased catches of small yellowfin and bigeye, which might affect the abundance and future catches of those species (Joseph, 2002).

Coan and Crone (2003) report a continued decline in the use of FAD sets by the U.S. fleet, from a high of almost 90% in 1999 to approximately 40% in 2002. In contrast, Williams (2003d) indicates that the use of FAD and log sets account for 65–70% of all sets by Papua New Guinea vessels during 2000–2002. Historically, the newer entrants to purse seining in the WCPO have fished on logs and floating objects, including FADs (a main fishing strategy), because it is less difficult to learn than fishing on free-swimming schools.

As discussed in Subchapter 3.6.1, FAD fishing has contributed significantly to the increased catch of the juveniles of yellowfin and bigeye tuna, with the most significant increases occurring since 1990. This has led the SCTB in 2002 and again in 2003, to recommend a reduction in fishing in the WCPO for yellowfin, including juveniles, and to suggest that restrictive management of fishing on bigeye may be necessary.

The most likely newer entrants to focus on FAD fishing are the newer entrants in the fishery, such as Philippines, China, and some PICs. In particular, the Philippine purse seine fleet's operation in the western Pacific is based almost exclusively on anchored FADs. They have already purchased third-hand former U.S. vessels from Korea, and have greatly increased their fleet capacity in recent years. With limited FAD fishing areas in the Bismarck and Solomon Seas areas of the western Pacific, it is probable that Philippine purse seine effort with an expanded fleet would extend eastward from their current fishing grounds and shift from anchored to drifting FADs.

4.3.4.2 Protected Species

Without an active U.S. purse seine fleet in the WCPO, the U.S. would be unable to provide an example to others in the fishery with respect to how interactions with protected species might be handled/avoided. Controls include both the relatively high observer coverage of the fleet's activities and the potential for strong U.S. legal sanctions for violations of protected species legislation.

Although these same controls may exist on paper in other fishery access agreements between distant-water fishing nations (DWFNs) and the PICs, they are often not highlighted to the degree they are under the Treaty. Further, it is believed that the U.S. fleet is the only fleet that can realistically expect flag State actions to be taken for violations of such provisions whether or not they exist in access agreements.

As discussed in Chapter 3, no direct interaction occurs between the purse seine fishery and sea birds, and little interaction occurs between the purse seine fishery and turtles. It is believed that when such interactions do occur with turtles, most interactions result in the release of the turtle alive.

The greatest impacts among protected species could therefore be on marine mammals. The impact of this alternative on marine mammals is based primarily on the assumption that the most likely new entrants into the fishery would be those fleets that tend to concentrate their fishing on FADs and in setting on logs. From the observer data depicting the 11 sets from the U.S. fleet, the admittedly sparse data suggest that more marine mammals were involved with FAD and log sets (seven sets or 64%) than in other types of sets (four sets or 36%).

4.4 Cumulative Effects

Cumulative effects[139] are considered for their impact on the environment, including the U.S. tuna purse seine fleet, the U.S. tuna longline fleet, western Pacific tuna fisheries, tuna stocks, and protected species. The area that would be affected by actions described in this document is the portion of the Treaty Area within which most tuna purse seine fishing occurs, i.e., within 10°N and 10°S, from 140°E to 150°W. The temporal limit applied to the analysis is equal to the planned extension for 10 years commencing in June 2003. Due to the nature of the subject matter being analyzed, cumulative effects described in this subchapter are primarily qualitative, not quantitative.

4.4.1 U.S. Tuna Purse Seine Fleet

Commencing with their arrival in the western Pacific, U.S. tuna purse seine vessel operators seeking access to tuna resources have faced increasingly stringent and progressively more detailed reporting requirements. These were first imposed under fishing arrangements with small groups of PICs, and later under the Treaty. The requirement to comply with the FFA regional VMS represents the largest single incremental change to these reporting requirements.

The VMS represents only a limited financial burden on the U.S. purse seine vessel owners and operators. The overall costs, while not insignificant is considered modest in terms of revenues and profits. Over time, the cumulative effects to the U.S. tuna purse seine fleet from this requirement are dependent somewhat on the future state of the technology applied to VMS. As more VMS units are used worldwide, the price for the technology should decrease and lessen or offset the cost of updating VMS units. In addition, as the monitoring system becomes functional on more non-U.S. seiners, the per-vessel cost will decline.

Of equal importance with the VMS requirement are the agreed modifications to the fishing areas in Papua New Guinea and Solomon Islands. Although these changes are geographically focused, the two countries have historically been major players in western Pacific tuna fishing. Although it is not possible to predict the net long-term impact of these changes,[140] it is useful to consider these changes from a resource location perspective.

Much of the cumulative impact on the fleet is related to changes in operational flexibility to find, pursue and capture tuna schools. As noted, the modifications could give U.S. purse seiners greater

[139] Cumulative effects are defined by the Council on Environmental Quality's regulations as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions (40 Code of Federal Regulations [CFR] 1508.7).

[140] As suggested above, estimating the impact is complicated by (1) the influence of El Niño weather patterns on the western Pacific tuna fishery, and (2) the limited catch and effort data available for the Solomon Island area.

operational flexibility in the waters of Papua New Guinea and Solomon Islands when fishing to the east (e.g., in El Niño years), but limited flexibility in the west (e.g., in La Niña years). Although increased operational flexibility does not automatically result in higher catch rates or increased profitability, the shifting of the fishing grounds toward (or away from) the American Samoa cannery location should have direct cost implications. Without a detailed analysis over several oceanographic cycles, any estimate of the cumulative effects would be speculative, but it is possible that the cost structure of the U.S. fleet may become more volatile because of the modified areas.

4.4.2 U.S. Longline Fleet

The fishing gear/area modification that affects the U.S. longline fleets in Hawaii and American Samoa would have slightly different cumulative effects for each fleet.

In Hawaii, growth and contraction of longline catch and effort has been largely dictated by regulatory action related to protected species. Although the third extension of the Treaty would result in more fishing area becoming available, the ability and interest of the current fleet to access those areas will depend on how the fishery is further regulated. The two regulatory actions that have directly affected the fleet's ability to operate in the high seas portions of the Treaty Area are those that created a two month time/area closure south of Hawaii to all longline fleets (0°–15°N, 180°–145°W) in 2001 and the 30-meter length limit placed on vessel size in 1994. A recent (April 2004) regulatory change opens the previously Closed Area and simultaneously opens the previously closed longline fishery for swordfish north of the equator. Although the opening of the previously closed area may result in greater access to the high seas portions of the Treaty Area during April and May, reopening the swordfish longline fishery to Hawaii-based vessels may tend to diminish the impact of this change by providing vessel operators with more options.

The portion of the longline fleet in American Samoa that would be most affected by the fishing gear/area modification is the big boat group described in Subchapter 3.4.1. The most significant regulatory action relating to available fishing areas for these vessels is the 2002 exclusion of vessels longer than 15 meters from fishing for pelagic species within 50 nautical miles (93 kilometers) of American Samoa islands. The cumulative effects of enabling access to the high seas portions of the Treaty Area for the big boat portion of the American Samoa longline fleet would be to provide greater potential areas of operation, and a reduction in the potential for gear conflict.

4.4.3 Western Pacific Tuna Fisheries

Management of the WCPO tuna fishery has undergone a series of changes since the late 1980s. The Treaty is considered by many as one of the most comprehensive and innovative fisheries management instruments developed during that period. The main consequence of these changes has been an increasingly greater and more accurate flow of information and data from vessel operators to authorities, and a subsequent greater ability of managers to keep track of activities in the fishery.

The cumulative effects of the new reporting requirements and VMS would be beneficial to the WCPO fishery, tuna stocks, and protected species. The regulatory changes for the third extension of the Treaty relating to reporting and VMS would provide managers with additional tools with which to manage the fishery. Reporting changes represent small refinements to requirements already successfully met by the U.S. tuna purse seine fleet during the first 15 years of the Treaty's existence. During that period, vessels were required to report on a weekly basis to the administrator on their position and catch on board, and upon port departure and entry for the purposes of unloading or transshipping. In addition, reports were made to national authorities upon entry and exit into national EEZs as well as weekly while in the zone.

The addition of VMS would eliminate the weekly reporting requirement to the administrator, but provide constant, additional information to the administrator and national authorities. The 10-year extension of the Treaty should provide more than adequate time for VMS to become a standard requirement throughout the fishery and to provide positive effects beyond that period. A successful VMS program would also likely have a considerable positive effect on PICs to aggressively pursue similar policies with other fleets.

The VMS requirement will deter contravention of the Treaty, while providing greater overall control of the fishery. Of particular importance would be the added ability through VMS implementation for managers to adequately monitor future management scenarios, including catch quotas limitations on effort and future time and area closures.[141] Over time, VMS could be expected to increase the efficiency of air and surface surveillance patrols and possibly act as a basis for enforcement actions.

4.4.4 Biological Resources, Tuna Stocks

Beyond better fisheries management information, the major resource benefit to be derived from the changes to the Treaty would be a possible decrease in fishing pressure from the longline fishery in the U.S. EEZ around American Samoa. The proposed Treaty provisions giving U.S. longliners access to high seas areas could alleviate some of the negative impacts on the big boats from the regulatory action excluding them from fishing for pelagic species within 50 nautical miles (93 km) of American Samoa islands. To the degree that American Samoa-based longliners find it economic to take advantage of this expanded access, they would begin fishing in international waters. The availability of these high seas areas within the Treaty Area would also encourage efforts of the big boats to gain access to tuna resources in neighboring EEZs. This would reduce (1) gear conflict with smaller *alia* vessels and (2) pressure on the tuna stocks in the U.S. EEZ around American Samoa.

Although the American Samoa longline fleet predominantly targets albacore, it is conceivable that high seas fishing may lead to the increased targeting of other species. Because both the yellowfin and bigeye stocks are becoming less robust than the albacore stock, increased (high seas) fishing from the American Samoa longline fleet may put additional strains on these species.

4.4.5 Biological Resources, Protected Species

Pursuant to a regulatory adjustment to the Pelagics FMP (WPFMC, 2002), Federal regulations require longline vessels operating under a Hawaii longline limited access permit to carry line clippers, large dip nets, and bolt or wire cutters in compliance with federal sea turtle mitigation measures. Required equipment as of April 2004 include those items plus a long and short de-hooking device, as well as specific items intended to be used to open the mouths of boated sea turtles, and to keep them open while removing ingested hooks.[142] The regulations also require that specific handling, resuscitation, and release methods be employed in the event of accidental hooking or entangling of sea turtles and seabirds, and that vessel owners and operators annually attend a protected species workshop conducted by NOAA Fisheries.

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[141] Such future management scenarios are probable, given (1) the continued use of FADs by some fleets resulting in the capture of significant amounts of juvenile yellowfin and bigeye, and (2) the warnings and recommendations from SCTB that there be no further increases in fishing mortality for these species at those sizes.

[142] *Federal Register*, Vol. 69, No. 64

The purse seine fishery is currently an uncategorized fishery under the Marine Mammal Protection Act. NOAA Fisheries has initiated action to include the purse seine fishery on the Marine Mammal Protection Act List of Fisheries.[143] Given the lack of definitive information on the species involved and the abundance of any marine mammal species that interact with the purse seine fishery, there has been a preliminary recommendation to classify the fishery as a Category II fishery. NOAA Fisheries will continue efforts to improve data gathering with regard to interactions with marine mammals.

NOAA Fisheries has initiated a formal consultation on the federal actions related to the Treaty Between the Governments of Certain Pacific Island States and the Government of the United States of America under the Endangered Species Act. At the conclusion of this consultation a biological opinion will be issued.

The cumulative effects of regulatory changes associated with implementing the Treaty on protected species are not expected to be significant, unless a large expansion of the Hawaii and American Samoa fleets takes place. Currently, such an expansion is considered very unlikely given the limited entry in place, marginal economic performance, and prospects of the industry.

Likewise, the cumulative effects of proposed regulatory changes on protected species encountered by the U.S. purse seine fleet in the WCPO are not expected to be significant. If, however, either the Treaty or the U.S. fleet ceases to exist, the cumulative effects on protected species would be negative for two reasons. First, those vessels entering the fishery would place greater emphasis on FAD fishing than the targeting of unassociated schools, and greater interaction with protected species can be expected to take place. Second, most of the fleets either now active or planning to enter the fishery do not have domestic laws prohibiting interactions with protected species, would not be operating under access regimes that will seriously consider penalties for interactions with protected species and will not have the close scrutiny of an observer program to verify such interactions.

4.5 Summary of Impacts

Impacts are summarized in Table 4.6-1. Impacts that are considered “Direct Impacts” are presented with bold type, those impacts that are considered “Indirect Impacts” are presented in regular type.[144]

4.6 Mitigative Measures

No mitigation measures are proposed at this time.

[143] Memorandum from Pacific Islands Regional Office Acting-Administrator to Director of Office of Protected Resources, dated 27 May 2004.

[144] Direct Impacts are those that are caused by the action and occur at the same time and place. Indirect Impacts are those that are caused by the action and are later in time or further removed in distance, but are still reasonably foreseeable.

Table 4.6-1: Summary of Impacts of the Regulatory Changes Alternatives from Subchapters 4.1-4.4

Consequences to:	Alternative A – NMFS Does Not Propose a Regulation to Implement the Changes Proposed for the Third Extension of the Treaty (No Action Alternative)	Alternative B – NMFS Proposes a Regulation to Implement the Changes Proposed for the Third Extension of the Treaty (Preferred Alternative)	Alternative C –The Termination of U.S. Purse Seine Industry Participation in the Treaty
U.S. tuna purse seine fleet	Same as Alternative B except: • **Creates suboptimal and potentially confusing situation that would not promote full compliance through absence of established legal (compliance) requirements for regulatory changes, particularly VMS.** • **May also affect ability of the United States to fully carry out its flag state responsibilities under Treaty Article 4 to investigate an alleged infringement.** • **No implementation of the agreed changes to Article 9 of the Treaty that provides a more streamlined means of implementation changes to the Licensing Area.**	• **New vessel reporting requirements are not considered onerous, but do require captains to make some changes to the manner in which they record and report vessel activities.** • **Purchase and installation costs for VMS unit of approximately US$6,000; installation and activation costs of approximately US$800.** • **Annual FFA VMS Registration fees of US$845.** • A burden could be placed on the vessel operator and affect or interrupt the vessel's ability to continue fishing activities in certain situations. • **Greater operational flexibility for U.S. purse seiners in Melanesian waters when fishing to the east, but flexibility more limited when fishing in the west.** • **Enforcement enabled that would enhance compliance with regulatory requirements.** • **Implementation of the agreed changes to Article 9 of the Treaty that would provide a more streamlined means of implementation changes to the Licensing Area.**	• **U.S. purse seine vessels could not seek alternative methods of gaining fishery access to either the Treaty Area or the Licensing Area and would thus cease to exist in the WCPO.** • **Loss of income to owners and managers of approximately US$7.6 million annually.** • **Estimated loss of crew wages to U.S. citizens of approximately US$10.7 million annually.**

Consequences to:	Alternative A – NMFS Does Not Propose a Regulation to Implement the Changes Proposed for the Third Extension of the Treaty (No Action Alternative)	Alternative B – NMFS Proposes a Regulation to Implement the Changes Proposed for the Third Extension of the Treaty (Preferred Alternative)	Alternative C –The Termination of U.S. Purse Seine Industry Participation in the Treaty
U.S. longline fleet	Same as Alternative B except: • Provisional application of access to the Treaty high seas areas under the MOU without a long-term guarantee to that access would discourage vessel owners in American Samoa who are reluctant to invest further in the fishery. • Provisional access would also discourage vessel operators in American Samoa from seeking longer-term access to neighboring EEZs, desirable for business planning.	• Expanded fishing access could relieve fishing pressures in the American Samoa EEZ. • Achievement of benefits through expanded fishing access beyond the U.S. EEZ around American Samoa contingent on willingness of neighboring nations to license U.S. longliners. • May require new markets for increased incidental catch by American Samoa longliners from expanded access areas. • **Access to small high seas areas north of the equator most useful to Hawaii longline fleet. Larger areas south of equator currently impractical due to vessel limitations and distance from Hawaii.** • **Specific vessels, primarily vessels with longest range and greater operating autonomy, would see modest positive impacts.**	• **No major direct short-term consequences for fishery access in high seas portions of Treaty Area.** • Elimination of the fuel, ship repair, and chandlery needs of the purse seine fleet in American Samoa could also adversely affect prices and level of these services for longliners based there. • Possible realignment of cannery raw material sources and greater reliance on loins could adversely affect market for whole albacore in American Samoa. • Indirectly, the fleet fishing in the high seas portions of the Treaty Area could experience consequences to bigeye and yellowfin stocks from an increase in unregulated FAD associated fishing.
Western Pacific tuna fisheries	Same as Alternative B, except: • Absence of established legal (compliance) requirements for regulatory changes would detract from U.S. credibility and might encourage fishing behavior in contravention of the Treaty and accepted international standards. • **Would not provide optimal environment with respect to collection of fisheries data.**	• **Fully enables the United States to meet its obligations under the third extension of the Treaty.** • **Continued production of a favorable environment with respect to the collection of fisheries data.** • **Optimal use of VMS as a compliance tool.** • **Timely monitoring of vessel activities, including protecting the integrity of closed areas important to PICs local fisheries and domestic food supply.** • **Continued involvement of United States in crucial fisheries management issues in WCPO tuna fisheries.**	• **Amount and quality of scientific and operational data on the western Pacific purse seine fishery would suffer a substantial decline.**

Consequences to:	Alternative A – NMFS Does Not Propose a Regulation to Implement the Changes Proposed for the Third Extension of the Treaty (No Action Alternative)	Alternative B – NMFS Proposes a Regulation to Implement the Changes Proposed for the Third Extension of the Treaty (Preferred Alternative)	Alternative C –The Termination of U.S. Purse Seine Industry Participation in the Treaty
Biological resources, status of tuna stocks	• **Continuation of ongoing harvesting of those stocks by the U.S. tuna purse seine fleet. At the current fleet size and capacity, total annual harvest is expected to be 100,000–125,000 mt.** • **U.S. purse seiners would continue to catch 6–7% of the skipjack, 5–8% of the yellowfin, and 4–26% of the bigeye by weight in the WCPO, with relative size of catches of yellowfin and bigeye highly dependent on type of set and fish price.** • **No adverse impact on MSY of south Pacific albacore by expansion of operations of U.S. longline fleet based in American Samoa to high seas portions of Treaty Area.**	Same as Alternative A plus: • **Optimal impacts on management of tuna stocks from regulatory changes relating to reporting and VMS.** • **If controls are placed on specific types of fishing for the purpose of protecting certain size classes and species, use of VMS as a management tool would be maximized.**	
Biological resources, protected species	• **Provisional implementation of new reporting requirements under the MOU would have no direct impact on protected species.** • **Positive impact from VMS to the degree that specific time or area closures are enacted by the PICs to protect such resources; however, full use of VMS to either act as a deterrent or to identify unauthorized activities would be compromised.** • **Expansion of fishing grounds for American Samoa longline fleet into more southerly high seas portions of the Treaty Area (southern limit of 26°S) may overlap with range of some larger seabirds in the southern Pacific Ocean and increase the potential for interaction.**	Same as Alternative A plus: • **Optimal impacts on management of tuna stocks from regulatory changes relating to reporting and VMS.**	

Consequences to:	Alternative A – NMFS Does Not Propose a Regulation to Implement the Changes Proposed for the Third Extension of the Treaty (No Action Alternative)	Alternative B – NMFS Proposes a Regulation to Implement the Changes Proposed for the Third Extension of the Treaty (Preferred Alternative)	Alternative C –The Termination of U.S. Purse Seine Industry Participation in the Treaty
Biological resources, protected species (cont'd)	• **Based on observer data, no turtle mortalities would be expected for the one interaction currently observed each year.** • **Interaction between U.S. purse vessels and marine mammals continue at the very low levels currently observed in the fishery.** • **Sets producing marine mammal mortality could be expected approximately once per year across the entire fleet.**		

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9 PUBLIC COMMENTS AND RESPONSES

Comment No.	Name	Comment	Response by Dr. Charles Karnela of NOAA Fisheries
San Diego Scoping Meeting 10/24/03			
1	Kaburoro Ruaia	Can the treaty be implemented if the three principal parties, Federated States of Micronesia (FSM), the Republic of Kiribati (Kir.) and Papua New Guinea (PNG) chose not to participate? The treaty provides that 10 parties, including the three principal parties of FSM, Kir. and PNG are needed for the treaty to function.	Yes, the treaty can continue to function if these states chose to terminate their participation. Termination requires 12 months advance notice. Article 12.4 of the treaty provides that entry into force of the treaty requires participation of 10 states, including the principal states of FSM, Kir., and PNG.
		It would be useful to have background information regarding what led to the area closings.	Detailed information regarding the area closings will be included in the EA.
2	Peter Flournoy	How does the treaty make a stable environment for U.S. purse seine operators?	For whatever number of years the treaty is effective, the U.S. vessels would know that they would be able to fish treaty waters uninterrupted without having to go through annual licensing applications and processing.
		Does an Environmental Assessment (EA) consider economic and social factors, like an Environmental Impact Statement (EIS)?	Yes, an EA examines the same factors as an EIS, the only difference is the level of detail provided. An EA is done to determine whether an EIS is necessary.
		Does this EA consider only the proposed changes to the treaty for 2003-2013, or does it consider implementation of the entire treaty?	This EA will address only those changes to the treaty to be implemented by NOAA Fisheries for 2003-2013.
		How will the EA address non-target species?	The EA will examine how the proposed changes may affect species that are not the target of the purse seine nets such as other finfish and sea birds.
Pago Pago Scoping Meeting 11/13/03			
3	Will Sword	I think the U.S. fleet is paying too high a price in order to gather scientific information for fisheries.	Comment noted.
		Other counties are using our own data against us – other fishing countries, (e.g. Japan, Korea, Taiwan) do not share data or require their boats to make data available or have the same restrictions.	Comment noted.
		We need a better treaty – or take this and not share the information.	Comment noted.

Comment No.	Name	Comment	Response by Dr. Charles Karnela of NOAA Fisheries
4	Carlos Sanchez	Has the treaty been signed until 2013? Can it be stopped?	Yes, the treaty has been renewed for 10 years, from 2003-2013, although the bill has not been signed. Congress has provided their advice and consent, but the Administration still needs to sign the treaty. Once the treaty has been signed, amendments can be made. Technically, the treaty can be stopped, but it is not likely because the Administration gave its support and blessing during treaty negotiations.
		It was a good treaty before, but not now because vessel owners are now required to pay $166,000 per year/per boat, and are at a financial disadvantage compared to foreign fleets. This is due largely to the required use of the VMS by U.S. fleet. Foreign fleets don't have to pay as much to fish and can follow U.S. fleets to find fish by VMS.	Fees paid by U.S. fleet were negotiated at levels set by U.S. fishing industry. Pacific Island Nations Treaty requires all purse seine vessels to use VMS.
		What is going to happen to American Samoa's economy when the purse seining boats don't come back?	Vessel attrition is a major concern of the industry. Fishing capacity is increasing in the Central West Pacific. The U.S. is making a big push to start discussing limits on capacity with an eye towards maintaining the economic viability of the fishery and preserving stocks.
		This treaty will have an impact one way or another on the industry, have you done any kind of analysis of what will happen if certain conditions are met?	We have not yet done an analysis, the analysis will be done as part of the EA process. We would not recommend changes, we would proved the information and concerns to the decision makers. Changes to treaty would require a renegotiation of the treaty.
		Have you done an analysis in reference to the fleet survivability?	We have not done that kind of analysis and would not be able to unless we were provided economic information by the industry on a voluntary basis.
		The U.S. should give the money that it gives to the FFA directly to the fishermen, so they can make their own fishing agreements. Why wasn't American Samoa, the home of the U.S. fleet, not consulted about treaty negotiations?	It would seem like a good idea to consult American Samoa as part of treaty negotiations. The U.S. does not get involved in the business aspects of the fishery. Part of the reason for the treaty is to keep the U.S. fleet fishing here.
5	Senator Stevens	Why aren't the purse seiners participating in the meeting? Do the purse seiners oppose the treaty?	I don't know why the purse seiners are not participating. Perhaps some of the vessel owners are upset with the way some of the things were dealt with by the FFA and individual countries.

Comment No.	Name	Comment	Response by Dr. Charles Karnela of NOAA Fisheries
6	Asiasi Tinae	I'm worried how the treaty will affect the livelihood of the people of American Samoa. The cost of the treaty to the fisherman must be analyzed as well as the impact to American Samoa. Who gets the $21 million that goes to the FFA?	Sixteen countries are part of the FFA. The FFA decides how the money is divided. The U.S. does not dictate nor decide how the money is divided. The U.S. has asked for a breakdown of how the money id divided.
7	Christinna Lutu	If the treaty has already gone to the State Department, what effect will the EA have on the signing of the treaty? What will this EA do to the signing of the treaty?	The U.S. cannot sign the treaty without going through a specific process. The State Department claims an exemption from NEPA as part of treaty negotiation process. Once the treaty gets to the U.S. Senate for approval, the Senate seeks consultation from Department of Commerce, which cannot claim a NEPA exemption and must conduct EA.
		What will happen to the comments we made tonight? Will they just be taken into consideration?	Comments will be passed on to decision-makers, and concerns noted, so that they can be factored into future decision-making.
		Are the two American Samoa canneries guaranteed to be here until 2013?	Some members of the canneries participated in some of the negotiations, and I'm not aware of the canneries staying or not staying.
		American Samoa should have been a part of the negotiations, do you know why they were not part of the negotiations?	I'm not aware why American Samoa was not involved in the negotiations.
		Is there a consideration to allow U.S. longliners to be part of the treaty inside of the EEZ of the island nations, or at least the U.S. longliners of American Samoa? The American Samoa longliners are interested in that.	The response from the Department of State is that if the longliners would need to have a single spokesperson to negotiate with the Department of State for the longliners and not numerous individuals. The Department of State would then negotiate the treaty. So far no spokesperson for the longliners as come forward.
8	Sina Solomona	American Samoa's concerns regarding the treaty should be brought to Senator Inouye.	Comment noted.
9	Michael Pulu	Foreign flag vessel crews do not purchase supplies in American Samoa, yet have advantage of lower license fees.	Comment noted.

Appendix A
Treaty on Fisheries Between the Governments of Certain Pacific Islands States and the Government of the United States of America

MULTI LATERAL

TREATY ON FISHERIES

TREATY ON FISHERIES
BETWEEN THE GOVERNMENTS OF CERTAIN
PACIFIC ISLAND STATES AND THE GOVERNMENT
OF THE UNITED STATES OF AMERICA

MULTI LATERAL

TREATY ON FISHERIES

TREATY ON FISHERIES BETWEEN THE GOVERNMENTS OF CERTAIN PACIFIC ISLAND STATES AND THE GOVERNMENT OF THE UNITED STATES OF AMERICA

TREATY ON FISHERIES BETWEEN THE GOVERNMENTS OF CERTAIN PACIFIC ISLAND STATES AND THE GOVERNMENT OF THE UNITED STATES OF AMERICA

Incorporating the Internal Agreement Between the Pacific Island Parties, the Agreement Between the Government of the U.S.A. and the South Pacific Forum Fisheries Agency and the Agreed Statement on the Observer Programme

This revised edition of the Multilateral Treaty on Fisheries incorporates all amendments agreed between the United States and the Pacific Island parties up to 15 June 1993

CERTIFICATE

I certify that this is a full and true text of amendments to the Treaty on Fisheries Between the Government of Certain Pacific Island States and the Government of the United States of America ("The Treaty") and its subsidiary agreements namely:-

* Agreement Among Pacific Island States Concerning The Implementation and Administration of the Treaty on Fisheries Between the Governments of Certain Pacific Island States and the Government of the United States of America ("The Internal Agreement");

* Agreement between the Government of the United States of America and the South Pacific Forum Fisheries Agency, and

* Agreed Statement on Observer Programme;

which amendments were the subject of negotiations among Parties and have been approved and ratified by their respective Governments and which have entered into force on 15 June 1993.

IN TESTIMONY WHEREOF, I, Gabriel Dusava, Secretary of the Department of Foreign Affairs and Trade of Papua New Guinea, in the Papua New Guinea Governments capacity as depositary to the Treaty, have caused the seal of this Department to be affixed hereto and have subscribed my name this 9th day of June, 1994.

Gabriel Dusava
Secretary for Foreign Affairs and Trade

TREATY ON FISHERIES BETWEEN THE GOVERNMENTS OF CERTAIN PACIFIC ISLAND STATES AND THE GOVERNMENT OF THE UNITED STATES OF AMERICA

The Governments of the Pacific Island States party to this Treaty and the Government of the United States of America.

ACKNOWLEDGING that in accordance with international law, coastal States have sovereign rights for the purposes of exploring and exploiting, conserving and managing the fisheries resources of their exclusive economic zones or fisheries zones;

RECOGNIZING the strong dependence of the Pacific Island parties on fisheries resources and the importance of the continued abundance of those resources;

BEARING IN MIND that some species of fish are found within and beyond the jurisdiction of any of the parties and range throughout a broad region; and

DESIRING to maximize benefits flowing from the development of the fisheries resources within the exclusive economic zones or fisheries zones of the Pacific Island parties;

HAVE AGREED AS FOLLOWS:

ARTICLE 1
DEFINITIONS AND INTERPRETATION

1.1 In this Treaty:

(a) "Administrator" means that person or organization designated by the Pacific Island parties to act as such on their behalf pursuant to this Treaty and notified to the Government of the United States;

(b) "final judgment" means a judgment from which no appeal proceedings have been initiated within sixty days;

(c) "fishing" means:

(i) searching for, catching, taking or harvesting fish;

(ii) attempting to search for, catch, take or harvest fish;

(iii) engaging in any other activity which can reasonably be expected to result in the locating, catching, taking or harvesting of fish;

(iv) placing, searching for or recovering fish aggregating devices or associated electronic equipment such as radio beacons;

(v) any operations at sea directly in support of, or in preparation for any activity described in this paragraph; or

(vi) aircraft use, relating to the activities described in this paragraph except for flights in emergencies involving the health or safety of crew members or the safety of a vessel;

(d) "fishing vessel of the United States" or "vessel" means any boat, ship or other craft which is used for, equipped to be used for, or of a type normally used for commercial fishing, which is documented under the laws of the United States;

(e) "Licensing Area" means all waters in the Treaty Area except for:

(i) waters subject to the jurisdiction of the United States in accordance with international law; and

(ii) waters closed to fishing by fishing vessels of the United States in accordance with Annex I;

(f) "operator": means any person who is in charge of, directs or controls a vessel, including the owner, charterer and master;

(g) "Pacific Island party" means a Pacific Island State party to this Treaty and "Pacific Island parties" means all such States from time to time;

(h) "Pacific Island State" means a party to the South Pacific Forum Fisheries Agency Convention, 1979;

(i) "party" mean a State party to this Treaty, and "parties" means all such States, from time to time;

(j) "this Treaty" means this Treaty, its Annexes and Schedules; and

(k) "Treaty Area" means all waters north of 60 degrees South latitude and east of 90 degrees East longitude, subject to the fisheries jurisdiction of Pacific Island parties, and all other waters within rhumb lines connecting the following geographic co-ordinates, designated for the purposes of this Treaty, except for waters subject to the jurisdiction in accordance with international law of a State which is not a party to this Treaty.

2°35'30"S	141°00'00"E
1°01'35"N	140°48'35"E
1°01'35"N	129°30'00"E
10°00'00"N	129°30'00"E
14°00'00"N	140°00'00"E
14°00'00"N	142°00'00"E
12°30'00"N	142°00'00"E
12°30'00"N	158°00'00"E
15°00'00"N	158°00'00"E
15°00'00"N	165°00'00"E

18°00'00"N	165°00'00"E
18°00'00"N	174°00'00"E
12°00'00"N	174°00'00"E
12°00'00"N	176°00'00"E
5°00'00"N	176°00'00"E
1°00'00"N	180°00'00"
1°00'00"N	164°00'00"W
8°00'00"N	164°00'00"W
8°00'00"N	158°00'00"W
0°00'00"	150°00'00"W
6°00'00"S	150°00'00"W
6°00'00"S	146°00'00"W
12°00'00"S	146°00'00"W
26°00'00"S	157°00'00"W
26°00'00"S	174°00'00"W
40°00'00"S	174°00'00"W
40°00'00"S	171°00'00"W
46°00'00"S	171°00'00"W
55°00'00"S	180°00'00"
59°00'00"S	160°00'00"E
59°00'00"S	152°00'00"E

and north along the 152 degrees of East longitude until intersecting the Australian 200 nautical mile limit.

1.2 Nothing in this Treaty shall be deemed to affect the applicability of any provision of a Pacific Island party's law which is not identified or otherwise described in this Treaty.

ARTICLE 2
BROADER COOPERATION

2.1 The Government of the United States shall, as appropriate, cooperate with the Pacific Island parties through the provision of technical and economic support to assist the Pacific Island parties to achieve the objective of maximizing benefits from the development of their fisheries resources.

2.2 The Government of the United States shall, as appropriate, promote the maximization of the benefits generated for the Pacific Island parties from the

operations of fishing vessels of the United States licensed pursuant to this Treaty, including:

(a) the use of canning, transhipment, slipping and repair facilities located in the Pacific Island parties;

(b) the purchase of equipment and supplies, including fuel supplies, from suppliers located in the Pacific Island parties; and

(c) the employment of nationals of the Pacific Island parties on board licensed fishing vessels of the United States.

ARTICLE 3
ACCESS TO THE TREATY AREA

3.1 Fishing vessels of the United States shall be permitted to engage in fishing in the Licensing Area in accordance with the terms and conditions referred to in Annex I and licences issued in accordance with the procedures set out in Annex II.

3.2 It shall be a condition of any licence issued pursuant to this Treaty that the vessel in respect of which the licence is issued is operated in accordance with the requirements of Annex I. No fishing vessel of the United States shall be used for fishing in the Licensing Area without a licence issued in accordance with Annex II or in waters closed to fishing pursuant to Annex I, except in accordance with paragraph 3 of this Article, or unless the vessel is used for fishing albacore tuna by the trolling method in high seas areas of the Treaty Area.

3.3 A Pacific Island party may permit fishing vessels of the United States to engage in fishing in waters under the jurisdiction of that party which are:

(a) within the Treaty Area but outside the Licensing Area;

(b) except for purse seine vessels, within the Licensing Area but otherwise than in accordance with the terms and conditions referred to in Annex I,

in accordance with such terms and conditions as may be agreed from time to time with the owners of the said vessels or their representatives. In such a case, if the Pacific Island party gives notice to the Government of the United States of such arrangements, and if the Government of the United States concurs, the procedures of Articles 4 and 5.6 shall be applicable to such arrangements.

ARTICLE 4
FLAG STATE RESPONSIBILITY

4.1 The Government of the United States shall enforce the provisions of this Treaty and licences issued thereunder. The Government of the United States shall take the necessary steps to ensure that nationals and fishing vessels of the United States refrain from fishing in the Licensing Area and in waters closed to fishing pursuant to Annex I, except as authorized in accordance with Article 3.

4.2 The Government of the United States shall, at the request of the Government of a Pacific Island party, take all reasonable measures to assist that party in the investigation of an alleged breach of this Treaty by a fishing vessel of the United States and promptly communicate all the requested information to that party.

4.3 The Government of the United States shall ensure that:

(a) each fishing vessel of the United States licensed pursuant to this Treaty is fully insured against all risks and liabilities;

(b) all measures are taken to facilitate:

(i) any claim arising out of the activities of a fishing vessel of the United States, including a claim for the total market value of any fish taken from the Licensing Area without authorization pursuant to this Treaty, and the prompt settlement of that claim;

(ii) the service of legal process by or on behalf of a national or the Government of a Pacific Island party in any action arising out of the activities of a fishing vessel of the United States;

(iii) the prompt and full adjudication in the United States of any claim made pursuant to this Treaty;

(iv) the prompt and full satisfaction of any final judgment or other final determination made pursuant to this Treaty; and

(v) the provision of a reasonable level of financial assurances, if, after consultation with the Government of the United States, all Pacific Island parties agree that the collection of any civil or criminal judgment or judgments or determination or determinations made pursuant to this Treaty has become a serious enforcement problem;

(c) an amount equivalent to the total value of any forfeiture, fine, penalty or other amount collected by the Government of the United States incurred as a result of any actions, judicial or otherwise, taken pursuant to this Article is paid to the Administrator as soon as possible following the date that the amount is collected.

4.4 The Government of the United States shall, at the request of the Government of a Pacific Island party, fully investigate any alleged infringement of this Treaty involving a vessel of the United States, and report as soon as practicable and in any case within two months to that Government on that investigation and on any action taken or proposed to be taken by the Government of the United States in relation to the alleged infringement.

4.5 In the event that a report provided pursuant to paragraph 4 of this Article shows that a fishing vessel of the United States:

(a) while fishing in the Licensing Area did not have a licence to fish in the Licensing Area, except in accordance with paragraph 2 of article 3; or

(b) was involved in any incident in which an authorized officer or observer was allegedly assaulted with resultant bodily harm, physically threatened, forcefully resisted, refused boarding or subjected to physical intimidation or physical interference in the performance of his or her duties as authorized pursuant to this Treaty; or

that there was probable cause to believe that a fishing vessel of the United States:

(c) was used for fishing in waters closed to fishing pursuant to Annex I, except as authorized in accordance with paragraph 3 of Article 3;

(d) was used for fishing in any Limited Area as described in Annex I, except as authorized in accordance with that Annex;

(e) was used for fishing by any method other than the purse seine method, except in accordance with paragraph 2 of Article 3;

(f) was used for directed fishing for Southern Bluefin Tuna or for fishing for any kinds of fish other than tunas, except that other kinds of fish may be caught as an incidental by-catch;

(g) used an aircraft for fishing which was not identified on a form provided pursuant to Schedule 1 of Annex II in relation to that vessel; or

(h) was involved in an incident in which evidence which otherwise could have been used in proceedings concerning the vessel has been intentionally destroyed;

and that such vessel has not submitted to the jurisdiction of the Pacific Island party concerned, the Government of the United States shall, at the request of that party, take all necessary measures to ensure that the vessel concerned leaves the Licensing Area and waters closed to fishing pursuant to Annex I immediately and does not return except for the purpose of submitting to the jurisdiction of the party, or after action has been taken by the Government of the United States to the satisfaction of that party.

4.6 In the event that a report provided pursuant to paragraph 4 of this Article shows that a fishing vessel of the United States has been involved in a probable infringement of this Treaty, including an infringement of an applicable national law as identified in Schedule 1 of Annex I, other than an infringement of the kind described in paragraph 5 of this Article, and that the vessel has not submitted to the jurisdiction of the Pacific Island party concerned, the Government of the United States shall, at the request of that party, take all necessary measures to ensure that the vessel concerned:

(a) Submits to the jurisdiction of that party; or

(b) is penalized by the Government of the United States at such level as may be provided for like violations in United States law relating to foreign fishing vessels licensed to fish in the exclusive economic zone of the United States but not to exceed the sum of US$250,000.

4.7 Financial assurances provided pursuant to this Treaty may be drawn against by any Pacific Island party to satisfy any civil or criminal judgment or other determination in favour of a national or the Government of a Pacific Island party.

4.8 Prior to instituting any legal proceedings pursuant to this Article concerning an alleged infringement of this Treaty in waters within the jurisdiction, for any purpose, as recognized by international law, of a Pacific Island party, the Government of the United States shall notify the Government of that Pacific Island party that such proceedings shall be instituted. Such notice shall include a statement of the facts believed to show an infringement of this Treaty and the nature of the proposed proceedings, including the proposed charges and the proposed penalties to be sought. The Government of the United States shall not institute such proceedings if the Government of that Pacific Island party objects within 30 days of the effective date of such notice.

4.9 The Government of the United States shall ensure that an agent is appointed and maintained in accordance with the requirements of subparagraphs (a) and (b) of this paragraph, with authority to receive and respond to any legal process issued by a Pacific Island party in respect of an operator of any fishing vessel of the United States (identified in the form set out in Schedule 1 of Annex II) and shall notify the Administrator of the name and address of such agent, who:

(a) shall be located in Port Moresby for the purpose of receiving and responding to any legal process issued in accordance with this Article; and

(b) shall, within 21 days of notification that legal process has been issued in accordance with this Article, travel to any Pacific Island party, at no expense to that party, for the purpose of receiving and responding to that process.

ARTICLE 5
COMPLIANCE POWERS

5.1 It is recognized that the respective Pacific Island parties may enforce the provisions of this Treaty and licences issued thereunder, including arrangements made pursuant to Article 3.3 and licences issued thereunder, in waters under their respective jurisdiction,

5.2 The Government of the Pacific Island parties shall promptly notify the Government of the United States of any arrest of a fishing vessel of the United States or any of its crew and of any charges filed or proceedings instituted following the arrest, in accordance with this Article.

5.3 Fishing vessels of the United States and their crews arrested for breach of this Treaty shall be promptly released upon the posting of a reasonable bond or other security. Penalties applied in accordance with this Treaty for fishing violations shall not be unreasonable in relation to the offence and shall not include imprisonment or corporal punishment.

5.4 The Government of the United States shall not apply sanctions of any kind including deductions, however effected, from any amounts which might otherwise have been paid to any Pacific Island party, and restrictions on trade with any Pacific Island party, as a result of any enforcement measure taken by a Pacific Island party in accordance with this Article.

5.5 The Governments of the parties shall adopt and inform the other parties of such provisions in their national laws as may be necessary to give effect to this Treaty.

5.6 Where legal proceedings have been instituted by the Government of the United States pursuant to Article 4, no Pacific Island party shall proceed with any legal action in respect of the same alleged infringement as long as such proceedings are maintained. Where penalties are levied or proceedings are otherwise concluded by the Government of the United States pursuant to Article 4, the Pacific Island party which has received notice of such final determination shall withdraw any legal charges or proceedings in respect of the same alleged infringement.

5.7 During any period in which a party is investigating any infringement of this Treaty involving a fishing vessel of the United States, being an infringement which is alleged to have taken place in waters within the jurisdiction, for any purpose, as recognized by international law, of a Pacific Island party, and if that Pacific Island party so notifies the other parties, any licence issued in respect of that vessel shall, for the purposes of Article 3, be deemed not to authorise fishing in the waters of that Pacific Island party.

5.8 If full payment of any amount due as a result of a final judgment or other final determination deriving from an occurrence in waters within the jurisdiction, for any purpose, of a Pacific Island party, is not made to that party within sixty (60) days, the licence for the vessel involved shall be suspended at the request of that party and that vessel shall not be authorized to fish in the Licensing Area until that amount is paid to that party.

ARTICLE 6
CONSULTATIONS AND DISPUTE SETTLEMENT

6.1 At the request of any party, consultations shall be held with any other party within sixty (60) days of the date of receipt of the request. All other parties shall be notified of the request for consultations and any party shall be permitted to participate in such consultations

6.2 Any dispute between the Government of the United States and the Government of one or more Pacific Island parties in relation to or arising out of this Treaty may be submitted by any such party to an arbitral tribunal for settlement by arbitration no earlier than one hundred and twenty (120) days following a request for consultations under Article 6.1. Unless the parties to the dispute agree otherwise, the Arbitration Rules of the United Nations Commission on International Trade Law as at present in force shall be used.

6.3 The Government or Governments of the Pacific Island party or parties to the dispute shall appoint one arbitrator and the Government of the United States shall appoint one arbitrator. The third arbitrator, who shall act as presiding arbitrator of the tribunal, shall be appointed by agreement of the parties to the dispute. In the event of a failure to appoint any arbitrator within the time period provided in the Rules, the arbitrator shall be appointed by the Secretary General of the Permanent Court of Arbitration at The Hague.

6.4 Unless the parties to the dispute agree otherwise, the place of arbitration shall be Port Moresby. The tribunal may hold meetings at such other place or places within the territory of a Pacific Island party or elsewhere within the Pacific Islands region as it may determine. An award or other decision shall be final and binding on the parties to the arbitration, and, unless the parties agree otherwise, shall be made public. The parties shall promptly carry out any award or other decision of the tribunal.

6.5 The fees and expenses of the tribunal shall be paid half by the Government or Government of the Pacific Island party or parties to the arbitration and half by the Government of the United States, unless the parties to the arbitration agree otherwise.

ARTICLE 7
REVIEW OF THE TREATY

7. The parties shall meet once each year for the purpose of reviewing the operation of this Treaty.

ARTICLE 8
AMENDMENT OF THE TREATY

8. The following procedures shall apply to the adoption and entry into force of any amendment to this Treaty.

(a) Any party may propose amendments to this Treaty.

(b) A proposed amendment shall be notified to the depositary not less than forty five (45) days before the meetings at which the proposed amendment will be considered.

(c) The depositary shall promptly notify all parties of such proposal.

(d) The parties shall consider proposed amendments to this Treaty at the annual meeting described in Article 7, or at any other time that may be agreed by all parties.

(e) Any amendment to this Treaty shall be adopted by the approval of all the parties, and shall enter into force upon receipt by the depositary of instruments of ratification, acceptance or approval by the parties.

(f) The depositary shall promptly notify all parties of the entry into force of the amendment.

ARTICLE 9
AMENDMENT OF ANNEXES

9. The following procedures may apply to the adoption and entry into force of any amendment to an Annex of this Treaty, at the request of the party proposing the amendment, in lieu of the procedure set out in Article 8, unless otherwise provided in the Annex.

(a) Any party may propose amendment to an Annex of this Treaty at any time by notifying such proposal to the depositary, which shall promptly notify all parties of the proposed amendment.

(b) A party approving a proposed amendment to an Annex shall notify its acceptance to the depositary, which shall promptly notify all the parties of each acceptance. Upon receipt by the depositary of notices of acceptance from all parties, such amendment shall be incorporated in the appropriate Annex and shall have effect from that date, or from such other date as may be specified in such amendment. The depositary shall promptly notify all parties of the adoption of the amendment and its effective date.

ARTICLE 10
NOTIFICATION

10.1 The Administrator and each party shall notify the depositary of their current addresses for the receipt of notices given pursuant to this Treaty, and the depositary shall notify the Administrator and each of the parties of such addresses or any changes thereof. Unless otherwise specified in this Treaty, any notice given in accordance with this Treaty shall be in writing and may be served by hand or sent by telex or, where either method cannot readily be effected, by registered airmail to the address of the party or the Administrator as currently listed with the depositary.

10.2 Delivery by hand shall be effective when made. Delivery shall be deemed to be effective on the business day following the day when the "answer back" appears on the sender's telex machine. Delivery by registered airmail shall be deemed to be effective twenty-one (21) days after posting.

ARTICLE 11
DEPOSITARY

11. The depositary for the Treaty shall be the Government of Papua New Guinea.

ARTICLE 12
FINAL CLAUSES

12.1 This Treaty shall be open for signature by the Governments of all the Pacific Island States and the Government of the United States of America.

12.2 This Treaty is subject to ratification by the States referred to in paragraph 1 of this Article. The instruments of ratification shall be deposited with the depositary.

12.3 This Treaty shall remain open for accession by States referred to in paragraph 1 of this Article. The instruments of accession shall be deposited with the depositary.

12.4 This Treaty shall enter into force upon receipt by the depositary of instruments of ratification by the Government of the United States and by the Governments of ten Pacific Island States which shall include the Federated States of Micronesia, the Republic of Kiribati and Papua New Guinea.

12.5 This Treaty shall enter into force for any State ratifying or acceding after the entry into force of this Treaty on the thirtieth day after the date on which its instrument of ratification or accession is received by the depositary.

12.6 This Treaty shall cease to have effect at the expiry of one year following the receipt by the depositary of an instrument signifying withdrawal or denunciation by the United States, any of the Pacific Island States named in Article 12.4, or such number of Pacific Islands States as would leave fewer than ten such States as parties.

12.7 This Treaty shall cease to have effect for a party at the expiry of the sixth month following the receipt by the depositary of an instrument signifying withdrawal or denunciation by that party, except that where this Treaty would cease to have effect under the last preceding paragraph as the result of the receipt of the said instrument, it shall cease to have effect for that party in the manner provided in the last preceding paragraph.

12.8 Any licence in force pursuant to this Treaty shall not cease to have effect as a result of this Treaty ceasing to have effect either generally or for any party, and Article 1,3, 4 and 5 shall be regarded as continuing in force between the United States and the Pacific Island State party in respect of such licence until such licence expires in accordance with its terms.

12.9 No reservations may be made to this Treaty.

12.10 Paragraph 9 of this Article does not preclude a State, when signing, ratifying or acceding to this Treaty, from making declarations or statements, provided that such declarations or statements do not purport to exclude or modify the legal effect of the provisions of this Treaty in their application to that State.

DONE at Port Moresby on the second day of April 1987

ANNEX I

PART 1
INTRODUCTORY

1. In this Annex:

(a) "applicable national law" means any provision of a law, however described, of a Pacific Island party which governs the fishing activities of foreign fishing vessels, being a law identified in Schedule 1, and which is not inconsistent with the requirements of this Treaty and shall be taken to exclude any provision which imposes a requirement which is also imposed by this Treaty;

(b) "Closed Area" means an area of a Pacific Island party as described in Schedule 2;

(c) "fishing trip" means any period commencing with the departure of the vessel from port for the purpose of beginning a fishing trip to such time as any or all of the fish on board the vessel are unloaded from the vessel, either ashore or onto another vessel except for the transfer of catch by a licensed group seiner to its licensed carrier vessel;

(d) "Limited Area" means an area described in Schedule 3;

(e) "the vessel" means the vessel in respect of which a licence is issued; and

(f) "transhipment" means the unloading of any or all of the fish on board a licensed vessel either ashore or onto another vessel.

2. Schedule 1 may be amended from time to time by the inclusion by any Pacific Island party of any applicable national law and, for the purposes of this Treaty, except as provided in this paragraph, the amendment shall take effect from the date that the amended Schedule has been notified to the Government of the United States. For the purposes of any obligation on the United States pursuant to paragraphs 4 and 5 of Article 4, the amendment shall take effect 60 days from the date that the amended Schedule has been notified to the Government of the United States. The Government of the Pacific Island party shall use its best endeavours to provide advance notice to the Government of the United States of the amendment.

3. Nothing in this Annex and its Schedules, nor acts or activities taking place thereunder, shall constitute recognition of the claims or the positions of any of the parties concerning the legal status and extent of waters and zones claimed by any party. In the claimed waters and zones, the freedoms of navigation and overflight and other uses of the sea related to such freedoms are to be exercised in accordance with international law.

PART 2
COMPLIANCE WITH APPLICABLE NATIONAL LAWS

4. The operator of the vessel shall comply with each of the applicable national laws, and shall be responsible for the compliance by the vessel and its crew with each of the applicable national laws, and the vessel shall be operated in accordance with those laws.

PART 3
PROHIBITIONS

5. The vessel shall not be used for directed fishing for Southern Bluefin Tuna, or for fishing for any kinds of fish other than tunas, except that other kinds of fish may be caught as an incidental by-catch.

6. The vessel shall not be used for fishing by any method, except the purse-seine method.

7. The vessel shall not be used for fishing in any Closed Area.

8. Except for circumstances involving force majeure and other emergencies involving the health or safety of crew members or the safety of the vessel, no aircraft may be used in association with the fishing activities of the vessel unless it is identified in item 6 or 7 of Schedule 1 of Annex II.

9. The vessel shall not be used for fishing in any Limited Area except in accordance with the requirements set out in Schedule 3, which are applicable to that Limited Area.

10. No fish on board the vessel shall be unloaded from the vessel at sea, except in a designated area in accordance with such terms and conditions as may be agreed between the operator of the vessel and the Pacific Island party in whose zone the transhipment is to take place. Provided that, notwithstanding any such additional terms and conditions, transhipment shall only take place in accordance with the conditions set out in Schedule 4 hereof and catch shall only be transhipped to a carrier vessel duly licensed in accordance with national laws.

PART 4
TRANSHIPMENT

11. The operator of a vessel shall:

(a) provide 48 hours notice to the Administrator and the Pacific Island party of an intent to tranship any or all of the fish on board and shall provide the name of the vessel, its international radio call sign, its position, the catch on board by species, and the time and place where such transhipment is requested to occur;

(b) only tranship at the time and place authorised for transhipment by the Pacific Island parties;

(c) submit full reports on the transhipment in the form set out in Schedule 6.

12. The master and each member of the crew of the vessel from which any fish taken in the Licensing Area is transhipped shall:

(a) allow and assist any person identified as an officer of the Pacific Island party to: have full access to the vessel and any place where such fish is being transhipped and the use of facilities and equipment which the officer may determine is necessary to carry out his or her duties; have full access to the bridge, fish on board and areas which may be used to hold, process, weigh and store fish; remove samples; have full access to the vessel's records including its log and documentation for the purpose of inspection and copying; and gather any other information required to fully monitor the activity without interfering unduly with the lawful operation of the vessel; and

(b) not assault, obstruct, resist, delay, refuse boarding to, intimidate or interfere with any such officer in the performance of his or her duties.

PART 5
REPORTING

13. Information relating to the position of and catch on board the vessel, as described in Part 1 of Schedule 4, shall be provided by telex to the Administrator at the following times:

(a) before departure from port for the purpose of beginning a fishing trip in the Licensing Area;

(b) each Wednesday while within the Licensing Area or a Closed Area; and

(c) before entry into port for the purpose of unloading fish from any trip involving fishing in the Licensing Area.

14. Information relating to the position of and catch on board the vessel, as described in Part 2 of Schedule 4, shall be provided to each Pacific Island party in the manner notified to the Government of the United States by that party as follows:

(a) at the time of entry into and of departure from waters which are, for any purpose, subject to the jurisdiction of the Pacific Island party;

(b) each Wednesday while within the waters of that party;

(c) at least 24 hours prior to the estimated time of entry into any port of that party; and

(d) as otherwise set out in Part 3 of Schedule 4.

15. At the end of each day that the vessel is in the Licensing Area, an entry or entries for that day shall be completed in ink in the English language on the catch report form as set out in Schedule 5, in accordance with the requirements of that form,

and such forms shall be posted by registered airmail to the Administrator within fourteen (14) days following the date of the next entry into a port for the purpose of unloading its fish catch.

16. Immediately following the unloading of any fish from the vessel, a report shall be completed in the form set out in Schedule 6 and shall be posted by registered airmail to the Administrator within fourteen (14) days following the date of the completion of that unloading operation, or, in the case of unloading by transhipment, within fourteen (14) days following unloading of that transhipment at the processing site.

PART 6
ENFORCEMENT

17. The master and each member of the crew of the vessel shall immediately comply with every instruction and direction given by an authorised and identified officer of a Pacific Island party, including to stop, to move to a specified location, and to facilitate safe boarding and inspection of the vessel, its licence, gear, equipment, records, facilities, fish and fish products. Such boarding and inspection shall be conducted as much as possible in a manner so as not to interfere unduly with the lawful operation of the vessel. The operator and each member of the crew shall facilitate and assist in any action by an authorised officer of a Pacific Island party and shall not assault, obstruct, resist, delay, refuse boarding to, intimidate or interfere with an authorised officer in the performance of his or her duties.

18. The operator shall ensure that a recent and up-to-date copy of the International Code of Signals (INTERCO) is on board and accessible at all times.

19. The international distress frequency, 2.182 MHz, and 156.8 MHz (Channel 16, VHF) shall be monitored continuously from the vessel for the purpose of facilitating communication with the fisheries management, surveillance and enforcement authorities of the parties.

20. The operator shall comply with the 1989 FAO standard specifications for the marking and identification of fishing vessels. In particular the international radio call sign of the vessel shall be painted in white on a black background, or in black on a white background in the following manner:

(a) on the vessel's hull or superstructure, with each letter and number being at least one metre high and having a stroke width of 16.7 centimetres, with the background extending to provide a border around the mark of not less than 16.7 centimetres;

(b) on the vessel's deck, on the body of any helicopter and on the hull of any skiff, with each letter and number being at least 30 centimetres high, and having a stroke width of 5 centimetres wide with the background extending to provide a border around the mark of not less than 5 centimetres; and

(c) on any other equipment being carried by and intended to be separated from the vessel during normal fishing operations, with each letter and

number being at least 10 centimetres high and having a stroke width of 1.7 centimetres, with the background extending to provide a border around the mark of not less than 1.7 centimetres;

and at all times while the vessel is within the Licensing Area or a Closed Area, all parts of these markings shall be clear, distinct and uncovered.

21. The licence or a duly certified copy, facsimile or telex confirmation thereof shall be carried on board the vessel at all times and produced at the request of an authorised enforcement official of any of the parties. Prior to receipt of the licence, the correct citation of the licence number shall satisfy this requirement.

PART 7
OBSERVERS

22. The operator and each member of the crew of the vessel shall allow and assist any person identified as an observer by the Pacific Island parties to:

(a) board the vessel for scientific, compliance, monitoring and other functions at the point and time notified by the Pacific Island parties to the Government of the United States;

(b) have full access to and the use of facilities and equipment on board the vessel which the observer may determine is necessary to carry out his or her duties; including full access to the bridge, fish on board and areas which may be used to hold, process, weigh and store fish; remove samples; have full access to the vessel's records, including its logs and documentation for the purpose of inspection and copying; reasonable access to navigation equipment, charts, and radios; and gather any other information relating to fisheries in the Licensing Area; without interfering unduly with the lawful operation of the vessel;

(c) disembark at the point and time notified by the Pacific Island parties to the Government of the United States; and

(d) carry out all duties safely,

and no operator or crew member of the vessel shall assault, obstruct, resist, delay, refuse boarding to, intimidate or interfere with an observer in the performance of his or her duties.

23. The operator shall provide the observer, while on board the vessel, at no expense to the Pacific Island parties, with food, accommodation and medical facilities of such reasonable standard as may be acceptable to the Pacific Island party whose representative is serving as the observer.

24. (a) The operators of United States vessels licensed to fish pursuant to the agreement shall

be responsible for the costs of observers on United States vessels including the full travel costs from the place notified by the Pacific Island parties to and from the vessel, salary and allowances, and full insurance coverage, and the cost of training those observers.

(b) The fees for the costs of the observers shall be provided in a lump sum on an annual basis to the Administrator. In the first licensing period following 15 June 1993, the lump sum shall be based on the following formula:

The number of licensed United States vessels multiplied by the average annual number of trips per vessel for the latest licensing period for which information is available multiplied by 20 percent multiplied by the cost per trip (US$4,000) equals lump sum payment. In addition in the first two years following 15 June 1993, an additional payment of US$15,000 per year for training shall be made to the Administrator.

(c) For subsequent licensing periods, the Parties may, as mutually determined at the annual meeting provided for in Article 7 of the Treaty adjust the amount of the fees to be paid under sub-paragraph (b), it being understood that:

- the goal of the observer programme is to provide an effective observer programme for compliance by targeting 20 percent coverage, which may be reviewed from time to time;
- any unused sums are carried forward to the next licensing period, with the annual fee to be reduced accordingly;
- the factor of inflation shall be taken into account; and
- the costs of training may be reviewed.

25. Any operator of the vessel from which any fish taken in the Licensing Area is unloaded shall allow, or arrange for, and assist any person authorised for this purpose by the Pacific Island parties to have full access to any place where such fish is unloaded, to remove samples and to gather any other information relating to fisheries in the Licensing Area.

26. An observer programme shall be conducted in accordance with this Treaty and provisions that may be agreed from time to time.

PART 8
MISCELLANEOUS REQUIREMENTS

27. At all times while the vessel is in a Closed Area, the fishing gear of the vessel shall be stowed in such a manner as not to be readily available for fishing. In particular, the boom shall be lowered as far as possible so that the vessel cannot be

used for fishing but so that the skiff is accessible for use in emergency situations; the helicopter, if any, shall be tied down; and launches shall be secured.

28. The vessel shall be operated in such a way that the activities of traditional and locally based fishermen and fishing vessels are not disrupted or in any other way adversely affected.

29. Any information required to be recorded, or to be notified, communicated or reported pursuant to a requirement of this Treaty shall be true, complete and correct. Any change in circumstances which has the effect of rendering any such information false, incomplete or misleading shall be notified to the Administrator immediately.

30. It is understood that a region-wide vessel tracking system applicable to all vessels licensed to fish in the Treaty Area may be established. United States vessels with a licence to fish under the Treaty shall participate in such a system and shall install and operate a transponder of a type and in such a manner as may be agreed by the Parties. It is understood that data derived through the system shall be treated as confidential business information and that the terms and conditions for access to that information shall be a matter of discussions between the Parties.

SCHEDULE 1
APPLICABLE NATIONAL LAWS

The following laws and any regulations or other instruments having the force of law which have been implemented pursuant to those laws, as amended at the time this Treaty enters into force, shall be considered as applicable national laws for the purposes of this Treaty.

AUSTRALIA

Antarctic Marine Living Resources Conservation Act, 1981
Fisheries Management Act, 1991
Fisheries Administration Act, 1991
Statutory Fishing Rights Charge Act, 1991
Fisheries Legislation (Consequential Provisions) Act, 1991
Foreign Fishing Licences Levy Act, 1991
Fishing Levy Act, 1991
Fisheries Agreements (Payments) Act, 1991
Torres Strait Fisheries Act, 1984
Whale Protection Act, 1980

COOK ISLANDS

Exclusive Economic Zone (Foreign Fishing Craft) Regulations, 1979
Territorial Sea and Exclusive Economic Zone Act, 1977
Marine Resources Act, 1989

FEDERATED STATES OF MICRONESIA

Titles 18 and 24 of the Code of the Federated States of Micronesia, as amended by Public Law Nos. 2-28, 2-31, 3-9, 3-10, 3-34, and 3-80

FIJI

Fisheries Act, (Cap.158)
Fisheries Regulations (Cap 158)
Marine Spaces Act, (Cap.158A)
Marine Spaces (Foreign Fishing Vessels) Regulations, 1979

KIRIBATI

Fisheries Ordinance, 1979
Fisheries (Amendment) Act, 1984
Marine Zones (Declaration) Act, 1983
Fisheries (Pacific Island States' Treaty with the United States) Act 1988

MARSHALL ISLANDS

Title 33, Marine Resources Act, as amended by P.L. 1989-56, P.L. 1991-43 and P.L. 1992-25 of the Marshall Islands Revised Code

NAURU

Interpretation Act, 1971
Interpretation Act (Amendment) Act No.1 1975
Interpretation Act (Amendment) Act No.2 1975
Marine Resources Act, 1978

NEW ZEALAND

Antarctic Marine Living Resources Act, 1981
Continental Shelf Act, 1964
Conservation Act, 1987
Driftnet Prohibition Act, 1991
Exclusive Economic Zone (Foreign Fishing Craft) Regulations, 1978
Fishing Industry Board Act, 1963
Fisheries Act, 1983
Marine Mammals Protection Act, 1978
Marine Reserves Act, 1971
Marine Pollution Act, 1974
Meat Act, 1964
Territorial Sea and Exclusive Economic Zone Act, 1977
Tokelau (Territorial Sea and Exclusive Economic Zone) Act, 1977
Submarine Cables and Pipelines Protection Act, 1966
Sugar Loaf Islands Marine Protected Area Act, 1991
Wildlife Act, 1953

NIUE

Niue Fish Protection Ordinance 1965
Sunday Fishing Prohibition Act 1980
Territorial Sea and Exclusive Economic Zone Act 1978

PALAU

Palau National Code, Title 27

PAPUA NEW GUINEA

Fisheries Act (Cap 214)
Fisheries Regulations (Cap 214)
Fisheries (Torres Strait Protected Zone) Act, 1984
National Seas Act, (Cap 361)
Tuna Resources Management Act, (Cap 224)
Whaling Act (Cap 225)

SOLOMON ISLANDS

Delimitation of Marine Waters Act, 1978
Fisheries Act, 1972
Fisheries Limits Act, 1977
Fisheries Regulations, 1972
Fisheries (Foreign Fishing Vessels) Regulations, 1981
Fisheries (United States of America) (Treaty) Act 1988

TONGA

Fisheries Act, 1989

TUVALU

Fisheries Act (Cap 45)
Fisheries (Foreign Fishing Vessel) Regulations, 1982
Marine Zones (Declaration) Act, 1983
Foreign Fishing Vessels Licensing (US Treaty) Order 1987

VANUATU

Fisheries Act 1982 (Cap 158)
Fisheries Regulations 1983
Maritime Zones Act 1981 (Cap 138)

WESTERN SAMOA

Exclusive Economic Zone Act, 1977
Territorial Sea Act, 1971
Fisheries Act, 1988

SCHEDULE 2
CLOSED AREAS

Australia All waters within the seaward boundary of the Australian Fishing Zone (AFZ) west of a line connecting the point of intersection of the outer limit of the AFZ by the parallel of latitude 25°30' south with the point of intersection of the meridian of longitude 151° East by the outer limit of the AFZ and all waters south of the parallel of latitude 25° 30' South.

Cook Islands Territorial Sea

Federated States of Micronesia Three nautical mile territorial sea and nine nautical mile exclusive fishery zone and on all named banks and reefs as depicted on the following charts:

DMAHTC NO 81019 (2nd. ed., Mar. 1945; revised 7/17/72. Corrected through NM 3/78 of June 21, 1978).

DMAHTC NO 81023 (3rd. ed., Aug. 7, 1976).

DMAHTC NO 81002 (4th. ed., Jan. 26, 1980; corrected through NM 4/80).

Fiji Internal waters, archipelagic waters and territorial seas of Fiji and Rotuma and its Dependencies.

Kiribati Within archipelagic waters as established in accordance with the Marine Zones (Declaration) Act 1983; within 12 nautical miles drawn from the baselines from which the territorial seas is measured; within 2 nautical miles of any anchored fish aggregating device for which notification of its location shall be given by geographical coordinates.

Marshall Islands 12 nautical mile territorial sea and area within two nautical miles of any anchored fish aggregating device for which notification of its location shall be given by geographical coordinates.

Nauru The territorial waters as defined by Nauru Interpretation Act, 1971, Section 2.

New Zealand Territorial waters; waters within 6 nautical miles of outer boundary of territorial waters; all waters to west of New Zealand main islands and south of 39° South latitude; all waters to east of New Zealand main islands south of 40° South latitude; and in respect of Tokelau: areas within 12 nautical miles of all island and reef baselines; twelve and one half nautical miles either side of a line joining Atafu and Nukunonu and Faka'ofo; and coordinates as follows:

Atafu:	8°35'10"S	172°29'30"W
Nukunonu:	9°06'25"S,	171°52'10"W
	9°11'30"S,	171°47'00"W
Faka'ofo:	9°22'30"S,	171°16'30"W

Niue Territorial sea and within 3 nautical miles of Beveridge Reef, Antiope Reef and Haran Reef as depicted by appropriate symbols on NZ 225F (chart showing the territorial sea and exclusive economic zone of Niue pursuant to the Niue Territorial Sea and Exclusive Economic Zone Act of 1978).

Palau Within 12 nautical miles of all island baselines in the Palau Islands; the area -

a) commencing at the north-easternmost intersection of the outer limit of the 12 nautical mile territorial sea of Palau by the arc of a circle having a radius of 50 nautical miles and its centre at Latitude 07°16'34" North, Longitude 134°28'25" East, being at about the centre of the reef entrance to Malakal Pass;

b) running thence generally south-easterly, southerly, south-westerly, westerly, north-westerly, northerly and north-easterly along that arc to its intersection by the outer limit of the 12 nautical mile territorial sea; and

c) thence generally northerly, north-easterly, easterly, south-easterly and southerly along that outer limit to the point of commencement.

NOTE: Where for the purpose of this paragraph it is necessary to determine the position on the surface of the Earth of a point, line or area it shall be determined by reference to the World Geodetic System 1984, that is to say, by reference to a spheroid having its centre at the centre of the Earth and a major (equatorial) radius of 6,378,137 metres and a flattening of 1/298.2572.

Papua New Guinea In addition to its territorial sea and internal waters, within the area bounded by the following parallels and meridians - from latitude 0°30' South to latitude 3°30' South, and from longitude 149° East to longitude 153° East.

Solomon Islands All waters within the fishery limits of the Solomon Islands (including internal waters, territorial sea and archipelagic waters) except that part of the fishery limits east and north of the following lines: commencing at a point 161° East, 4°20' South, then extending due south along 161° to a point 6°30' South, then by a line extending due east to a point 165° East, then by a line due south to a point 8° South, then by a line due east to a point 169° 55' East.

Tonga All waters with depths of not more than 1,000 metres, within the area bounded by the fifteenth and twenty third and one half degrees of south latitudes and the one hundred and seventy third and the one hundred and seventy seventh degrees of west longitudes; also within a radius of twelve nautical miles from the islands of Teleki Tonga and Teleki Tokelau.

Tuvalu Territorial sea and waters within two nautical miles of all named banks, i.e. Macau, Kosciusko, Rose, Bayonnaise and Hera, in Tuvalu EEZ, as depicted on the chart entitled "Tuvalu Fishery Limits" prepared by the United Kingdom Hydrographic Department, Taunton, January 11, 1981.

Vanuatu Archipelagic waters and the territorial sea, and internal waters.

Western Samoa Territorial sea; reefs, banks, sea-mounts and within 2 nautical miles of any anchored fish aggregating device within the EEZ for which notification of its location shall be given by geographical coordinates.

Only the Closed Areas, as described above, of Pacific Island States which are parties to this Treaty shall be applicable under the terms of this Treaty.

SCHEDULE 3
LIMITED AREAS

Solomon Islands

1. The Solomon Islands Limited Area is all of the Licensing Area within the fishery limits of Solomon Islands as described in the Fishery Limits Act 1977 of Solomon Islands.

2. "Fishing day" means any day or part of a day of the week in which a vessel is used for fishing in the Solomon Islands Limited Area.

3. There shall be no fishing in the Solomon Islands Limited Area after the expiry of the five hundredth fishing day from the earliest date on which any Licensing Period takes effect in any given year.

SCHEDULE 4
REPORTING DETAILS

PART 1
LICENSING AREA REPORTS TO THE ADMINISTRATOR

(a) Port departure and entry into port for unloading
- (1) report type (LBEG for port departure to begin fishing and LFIN for port entry for unloading)
- (2) Regional Register number
- (3) trip begin date
- (4) date and time (GMT)
- (5) international call sign
- (6) port name
- (7) catch on board by species (in short tons)
- (8) intended action

as: LBEG (or LFIN) / RREG# / TBD / ddmmyy / TIME / CALL SIGN / PORT / SJ xxx YF yyy OTH zzz / INTENDED ACTION

(b) Weekly reports
- (1) report type (WEEK)
- (2) Regional Register number
- (3) trip begin date
- (4) date and time (GMT)
- (5) international call sign

(6) position (to one minute of arc)
(7) catch on board by weight by species
(8) intended action

as: WEEK / RREG# / TBD / ddmmyy / TIME / CALL SIGN/ LA 1111 / LO 11111 / SJ xxx YF yyy OTH zzz / INTENDED ACTION

(c) Transhipment reports
(1) report type (TRANS)
(2) Regional Register number
(3) trip begin date
(4) date and time(GMT)
(5) international call sign
(6) position (to one minute of arc)
(7) catch transferred by weight by species
(8) name of carrier/Freezer
(9) destination of catch

as: TRANS/ RREG# / TBD / ddmmyy / TIME / CALL SIGN / LA 1111 / LO 11111 / SJ xxx YF yyy OTH zzz / CARRIER NAME / DESTINATION OF CATCH

PART 2
REPORTS TO NATIONAL AUTHORITIES

(a) Zone Entry and Exit
(1) report type (ZENT for entry and ZEXT for exit)
(2) Regional Register number
(3) trip begin date
(4) date and time (GMT)
(5) international call sign
(6) position (to one minute of arc)
(7) catch on board by weight by species
(8) intended action

as: ZENT (or ZEXT) / RREG# / TBD / ddmmyy / TIME / CALL SIGN / TIME / LA 1111 / LO 11111 / SJ xxx YF yyy OTH zzz / INTENDED ACTION

(b) Weekly Reports
(1) report type (WEEK)
(2) Regional Register number
(3) trip begin date
(4) date and time (GMT)
(5) international call sign
(6) position (to one minute of arc)
(7) catch on board by weight by species
(8) intended action

as: WEEK / RREG# / TBD / ddmmyy / TIME / CALL SIGN / LA 1111 / LO 11111 / SJ xxx YF yyy OTH zzz / INTENDED ACTION

(c) Port Entry Reports.

(1) report type (PENT)
(2) Regional Register number
(3) trip begin date
(4) date and time (GMT)
(5) international call sign
(6) position (to one minute of arc)
(7) catch on board by weight by species
(8) estimated time of entry into port (GMT)
(9) port name
(10) intended action

as: PENT / RREG# / TBD / ddmmyy / TIME / CALL SIGN / LA 1111 / LO 11111 / SJ xxx F yyy OTH zzz / ETA / PORT NAME / INTENDED ACTION

(d) Transhipment reports

(1) report type (TRANS)
(2) Regional Register number
(3) trip begin date
(4) date and time(GMT)
(5) international call sign
(6) position (to one minute of arc)
(7) catch transferred by weight by species
(8) name of carrier/Freezer
(9) destination of catch

as: TRANS / RREG# / TBD / ddmmyy / TIME / CALL SIGN / LA 1111 / LO 11111 / SJ xxx YF yyy OTH zzz / CARRIER NAME / DESTINATION OF CATCH

PART 3
OTHER NATIONAL REPORTING REQUIREMENTS

1. Australia

(a) Report of position and catch by species every day while within the Australian Fishing Zone;

(b) 24 hours notice of intention to enter the Australian Fishing Zone.

2. Fiji

(a) While in Fiji fisheries waters, daily position reporting of the name, call sign, and country of registration of the craft, and its position at that specified time; and

(b) While in Fiji fisheries waters, weekly report of catch by species.

3. Kiribati

(a) 24 hours prior to entry into a Closed Area, send a notice to the national authority containing the following information:
(1) vessel name
(2) call sign
(3) current position
(4) reason for entering the closed area
(5) estimated time of entry (GMT)
(6) estimated position of entry

(b) Immediately upon entry into or departure from a Closed Area:
(1) report type (CAENT for entry and CAEXT for exit)
(2) licence number
(3) call sign
(4) date and time (GMT)
(5) position (to one minute of arc)
(6) catch on board by weight by species
(7) status of gear (boom, net and skiff)

(c) 24 hours prior to refuelling from a licensed tanker, report the following information:
(1) report type (SBUNK)
(2) licence number
(3) call sign
(4) trip commencement date
(5) port of commencement
(6) catch on board by weight by species
(7) estimated time of bunkering
(8) estimated position of bunkering
(9) name of tanker

(d) Immediately after refuelling from a licensed tanker, and no later than 12.00 noon on the following day, report the following information:
(1) report type (FBUNK)
(2) licence number
(3) call sign
(4) starting time of bunkering
(5) starting position of bunkering
(6) ending time of bunkering
(7) amount of fuel received in kilolitres
(8) name of tanker

4. New Zealand

(a) 24 hours notice of intention to enter New Zealand's exclusive economic zone giving notice of -
name and call sign of craft;
position of point of entry;
species, quantity and condition of catch on board.

(b) While in the New Zealand exclusive economic zone;
notification of daily noon positions, to be received no later than noon on the following day;
a weekly report of catch taken in the New Zealand exclusive economic zone to cover the period 0001 hours on Monday to 2400 on the following Sunday and to be received by noon on the following Wednesday;
licensed craft are prohibited from transhipping within New Zealand fisheries waters, except at a port and time authorised by the Director General. 10 days notice of intention to tranship will be required.

(c) 24 hours notice of intention to exit New Zealand's exclusive economic zone giving notice of -
position at point of exit;
species, quantity and condition of catch on board.

5. Solomon Islands

Report on:

(a) Expected vessel position, date and time of entry at least 24 hours before entry into the Solomon Islands Fishery Limits;

(b) Entry to or exit from Solomon Islands Limited Area together with the catch on board by weight and volume; and

(c) A weekly report of catch taken and fishing days in the Solomon Islands exclusive economic zone to cover the period 0001 hours on a Monday to 2400 hours on the following Sunday and to be received by noon on the following Tuesday.

6. Tonga

While in the Tonga exclusive economic zone, daily position report by radio or telex.

7. Tuvalu

(a) Report not less than 24 hours before entry into the Tuvalu fishery limits on:

(i) the name, call sign and country of registration of the vessel;

(ii) the license number;

(iii) position on entry; and

(iv) catch by species.

(b) While inside Tuvalu fishery limits, report vessel position and total catch on board at the following times:

(i) every seventh day while the vessel is in the fishery limits; and

(ii) immediately upon departure from the fishery limits.

MULTILATERAL TREATY ON FISHERIES BETWEEN PACIFIC ISLAND STATES AND THE UNITED STATES

PURSE SEINE VESSEL— CATCH REPORT FORM

THIS FORM MUST BE COMPLETED IN INK IN THE ENGLISH LANGUAGE

D– 10001

Vessel name:		Call sign:	License/permit no.:	Departure From Port- Name:	DATE- YYMMDD:
Country of registration:	Registration no.:	Regional register no.:	Name of Master:	Arrival at Port- Name:	DATE- YYMMDD:
Gross registered tonnage:	Helicopter make and no.:	Vessel trip no.:	Vessel Master's Signature:	No. of Crew: MONTH:	YEAR:

DAY	NOON OR SET POSITION				School type (code)	SET NO.	TIME SET	YELLOWFIN		SKIPJACK		BIGEYE		OTHER SPECIES			WELL NO.	COMMENTS (code)	DISCARD						
	LAT		LONG																TUNA		MARLIN		OTHERS		
	DDMM	N S	DDDMM	E W				CATCH (st)	AVE. SIZE (lb)	CATCH (st)	AVE. SIZE (lb)	CATCH (st)	AVE. SIZE (lb)	SPECIES NAME	CATCH (st)	AVE. SIZE (lb)			Species	(st)	Species	No.	Species	(lbs)	REASON (code)

NUMERICAL EXPRESSION OF SCHOOL TYPE, COMMENTS, REASONS FOR DISCARD AND DETAILS OF TRANSSHIPMENT AT SEA, TRANSFER AND RECEIPT OF FISH.

SCHOOL TYPE (use code #)

1. Log
2. Foamer
3. Breezer
4. Whale
5. Porpoise
6. Raft
7. Other (Specify)
8. Boiler
9. Jumper

COMMENTS (use code #)

1. A full day in vanslt between fishing grounds to or from fishing grounds.
2. A full day not fishing due to breakdown.
3. A full day not fishing due to bad weather.
4. A full day searching for fish but no sets made.
5. Part of day searching for fish but no sets made.
6. Set unaccessful for any reason, e.g. fish dive, roll up.
7. Transshipping at sea (fill in details —).
8. Entering port. (Enter name)
9. Departing port. (Enter name)
10. Receiving/Transfer fish (Fill in details —)
11. Water Haul Set.

REASON FOR DISCARD (use code #)

1. Undesirable species.
2. Fish too small.
3. Vessel completely loaded.
4. Other reason- please specify:_____

TRANSSHIPMENT

Position (Lat/Long):_____

To Vessel/Carrier Name:_____

Date:_____

Catch Unloaded: (short tons)			
Skipjack	Yellowfin	Bigeye	Well No.

(Destination of transhipped catch):_____

TRANSFER OR RECEIPT OF CATCH

(A) TRANSFER FISH to:

WELL or set #	Skipjack	Yellowfin	Bigeye

(B) RECEIPT OF FISH from:

WELL or set #	Skipjack	Yellowfin	Bigeye

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SCHEDULE 6

PURSE SEINE UNLOADING AND TRANSHIPMENT LOGSHEET

(Separate form to be completed for each transhipment/unloading and each processing destination)

TRIP NO: _____ TRIP START DATE: _____

VESSEL NAME: _____ RADIO CALL SIGN: _____

(1) PORT: _____

OR POSITION: LAT: _____ LONG: _____

(2) DATES:

(a) AT UNLOADING POINT ARRIVAL: _____ DEPARTURE: _____

(b) AT UNLOADING START: _____ END: _____

(3) PARTIAL OR COMPLETE UNLOADING: _____

(4) UNLOADING TO:

(a) CARRIER VESSEL NAME: _____

and RADIO CALL SIGN OR REGIONAL REGISTER NO: _____

(b) NAME AND ADDRESS OF COMPANY ACCEPTING FISH _____

_____

(5) DESTINATION OF FISH: _____

FISH TO BE PROCESSED AT: _____

(6) QUANTITY UNLOADED:

	Yellowfin	Skipjack	Bigeye	Marlin	Other	Unit of Measurement
Accepted:						
Rejected:						
Transhipped:						

(7) SIGNATURES:

_____ _____

VESSEL MASTER RECEIVING AGENT

NB: An attachment to this form should include a signed copy of the size breakdown of catch as provided by the cannery.

ANNEX II

1. For the purposes of this Annex:

   (a) "Licensing Period" means the period of validity of licences issued in accordance with this Treaty.

2. The Government of the United States shall make application for a licence in respect of any fishing vessel of the United States intended by the operator to be used for purse seine fishing in the Licensing Area at any time in the Licensing Period by providing to the Administrator a complete application form as set out in Schedule 1.

3. Licences issued pursuant to this Treaty shall not take effect until the Administrator has received payment, free of any charges whatsoever, of the amounts set out in Schedule 2 for that Licensing Period in the manner described in that Schedule.

4. (a) The Administrator may suspend the good standing of a vessel on the Regional Register of Foreign Fishing Vessels where there is reasonable cause to believe that the vessel operator has violated the terms and conditions of access in Annex I including but not limited to:

   (i) failing to report entry into and exit from Zones;

   (ii) failing to report while in a Zone;

   (iii) misreporting position and catch on board; or

   (iv) improperly marking the vessel and gear.

   (b) The Administrator shall notify the Government of the United States and the operator not less than 30 days prior to the intended date of suspension of good standing. The notice shall include a statement of the facts which give reasonable cause to believe a violation has occurred, the corrective action required, and the effective date of the suspension of good standing; provided however that the corrective action required shall be limited to making the omitted report, correcting any misreporting, or correcting vessel markings or otherwise complying with the requirements of Annex I.

   (c) If the corrective action is taken within 30 days, the Administrator shall not suspend good standing.

   (d) Upon satisfactory completion of the required corrective action, the Administrator shall immediately reinstate the good standing of the vessel.

   (e) Any fishing vessel of the United States in respect of which good standing has been suspended shall not be eligible to receive a new licence upon the expiration of the current licence, until notified by the Administrator that good standing has been reinstated.

5. Subject to paragraph 6, a licence may be denied:

(a) where the application is not in accordance with the requirements of paragraph 2;

(b) where the owner or charterer is the subject of proceedings under the bankruptcy laws of the United States, unless reasonable financial assurances have been provided to the Administrator;

(c) where the vessel in respect of which application for a licence has been made does not have good standing on the Regional Register of Foreign Fishing Vessels, maintained by the South Pacific Forum Fisheries Agency, provided that:

(i) good standing is withdrawn only as a result of:

(A) the commission of a serious offence against fisheries laws or regulations of a Pacific Island State and the operator has not fully complied with any civil or criminal judgment rendered with respect to such an offence;

(B) evidence existing that gives reasonable cause to believe that the operator has committed a serious offence against the fisheries laws or regulations of any Pacific Island State and that it has not been possible to bring the vessel operator to trial;

(C) the vessel operator has failed to comply with the annual registration and information requirements for registration as notified by the Administrator to the Government of the United States; or

(D) the failure to satisfactorily complete the required corrective action of all outstanding requests, as a result of which the good standing of a vessel has continued in suspension for a period of more than 12 months;

(ii) the Pacific Island party requesting withdrawal of good standing has first consulted the Government of the United States and has made all reasonable efforts to resolve the dispute in question before utilising the procedures for withdrawal of good standing;

(iii) in the event of a request for withdrawal of good standing from the Regional Register of Foreign Fishing Vessels of a vessel licensed pursuant to this Treaty, the Pacific Island parties agree to take into consideration that vessel's compliance with the terms of this Treaty in determining whether to approve such a request; and

(iv) following a withdrawal of good standing the Pacific Island party involved promptly advises the Government of the United States in writing of the reason for the withdrawal and the requirements which must be fulfilled to reinstate good standing;

(d) where there has been a failure to satisfy a final judgment or other final determination for a breach of this Treaty by the owner, charterer or master of the vessel in respect of which application for a licence has been made, until such time as the final judgment or other final determination is satisfied, and subsequent change in ownership of a vessel shall not affect the application of this provision; or

(e) where an operator has committed, or the vessel has been used for:

(i) a violation of this Treaty, providing that the Pacific Island parties, following consultation with the Government of the United States, determine that the violation is of a serious nature; or

(ii) any violation of this Treaty on more than one occasion, providing that the Pacific Island parties, following consultation with the Government of the United States, determine that such multiple violations constitute a serious disregard of this Treaty.

6. Without prejudice to their rights under paragraph 4 of Article 4 of the Treaty, the Pacific Island parties shall consider notifying the Government of the United States of any alleged infringements of the Treaty by vessels of the United States 30 days prior to requesting an investigation under paragraph 4 of Article 4 of the Treaty. The Government of the United States shall inquire into the allegation. As appropriate, the Government of the United States, the operator concerned, the Administrator and the Pacific Island party concerned may engage in consultations with a view to settling the matter.

7. A maximum number of licences may be issued for any Licensing Period as set out in Schedule 2, and, upon request by the Government of the United States, the Pacific Island parties may agree to vary such number.

8. On receipt of an application for a licence in accordance with this Annex, the Administrator shall take the necessary steps to ensure that:

(a) a licence in the form set out in Schedule 3 in respect of the vessel identified in the application; or

(b) a statement setting out the reasons that a licence in respect of the vessel identified in the application is denied together with a refund of the amount or amounts provided with the application;

is promptly provided to the Government of the United States.

SCHEDULE 1

TREATY ON FISHERIES BETWEEN THE GOVERNMENTS OF CERTAIN PACIFIC ISLAND STATES AND THE GOVERNMENT OF THE UNITED STATES OF AMERICA

LICENCE APPLICATION FORM

Application is hereby made for a licence authorising the use of the vessel named in this application for fishing in the Licensing Area.

1. FULL NAME OF VESSEL: _____

2. RADIO CALL SIGN OF VESSEL: _____

3. REGIONAL REGISTER NUMBER OF VESSEL: _____
(If none, fill in and attach the FFA Regional Register form)

4. FULL NAME AND ADDRESS OF EACH PERSON WHO IS AN OPERATOR OF THE VESSEL AND STATE WHETHER OWNER, CHARTERER, MASTER OR OTHER. IF OTHER, SPECIFY DETAILS:

_____

_____

5. FULL NAME AND ADDRESS OF INSURER FOR PURPOSES OF ARTICLE 4.3(a) OF THE TREATY:

_____

_____

6. REGISTRATION NUMBER AND MAKE OF HELICOPTER, IF ANY, TO BE CARRIED ON VESSEL:

_____

7. REGISTRATION NUMBER, MAKE AND NAME AND ADDRESS OF OPERATOR OF ANY AIRCRAFT TO BE USED IN ASSOCIATION WITH FISHING ACTIVITIES:

_____

_____

8. STATE WHETHER OWNER OR CHARTERER IS INSOLVENT OR IN ANY BANKRUPTCY PROCEEDING UNDER THE BANKRUPTCY LAW OF THE UNITED STATES:

_____

9. STATE WHETHER OPERATOR OF VESSEL HAS BEEN INVOLVED IN A VIOLATION OF THE TREATY. IF YES, SPECIFY DETAILS:

_____

_____
Date of application

_____
Director of the Southwest Region
National Marine Fisheries Service
National Oceanic and Atmospheric
Administration

SCHEDULE 2
PAYMENTS AND REVIEW

1. The following amounts are payable annually for a period of ten (10) years from 15 June 1993 pursuant to paragraph 3 of Annex II -

(a) an annual industry payment of US$4 million, which shall cover -

(i) licence fees for up to 55 vessels as set forth in paragraph 2 below; and

(ii) technical assistance;

(b) costs to be paid by the industry for the observer programme set forth in Part 7 of Annex I; and

(c) sums pursuant to the related agreement between the South Pacific Forum Fisheries Agency and the Government of the United States.

2. During each licensing period, the Administrator shall make available a maximum of 55 licences to fishing vessels of the United States for fishing in the Licensing Area. Any licences issued beyond 50 shall only be available to fishing vessels of the United States engaged in fishing activity designed to advance broader cooperation with the Pacific Island parties as envisaged under Article 2. If the Administrator does not receive applications for the maximum of 55 licences during any of the first three licensing periods under this Schedule, the Pacific Island parties reserve the right at the end of the third licensing period to review the allocation of licences beyond 50 for the remaining licensing periods.

3. Prior to the beginning of the sixth licensing period under this Schedule, the Parties shall review the number of licences to be issued, the licence fees and any other issues which may be identified during the preceding Annual Consultations. During such review, the Parties shall determine the number of licences and the licence fees for the second five-year period under this Schedule. Any agreed changes in the number of licences or licence fees shall be reflected in the annual industry payment.

SCHEDULE 3
LICENCE FORM

TREATY ON FISHERIES BETWEEN THE GOVERNMENTS
OF CERTAIN
PACIFIC ISLAND STATES
AND THE GOVERNMENT OF THE UNITED STATES OF AMERICA

LICENCE

The vessel described in this licence is hereby authorised to engage in fishing in the Licensing Area for the period described in this licence, in accordance with the terms and conditions referred to in Annex 1.

FULL NAME OF VESSEL: _____

RADIO CALL SIGN OF VESSEL: _____

REGIONAL REGISTER NUMBER OF VESSEL: _____

HELICOPTER OR OTHER AIRCRAFT WHICH MAY BE USED IN ASSOCIATION WITH THE FISHING ACTIVITIES OF THE VESSEL:

_____

PERIOD OF VALIDITY:

The period of validity of this licence shall be no longer than one year:

FROM _____, 19 _____

TO _____, 19 _____

_____
FOR AND ON BEHALF OF THE PACIFIC ISLAND PARTIES

DATE OF ISSUE: _____

LICENCE NUMBER: _____

WARNING: IT IS AN OFFENCE AGAINST THE LAWS OF MANY NATIONS, INCLUDING THE UNITED STATES OF AMERICA, TO VIOLATE THE REQUIREMENTS OF ANNEX 1. PENALTIES MAY INCLUDE SUBSTANTIAL FINES AND VESSEL FORFEITURE.

AGREEMENT AMONG PACIFIC ISLAND STATES CONCERNING THE IMPLEMENTATION AND ADMINISTRATION OF THE TREATY ON FISHERIES BETWEEN THE GOVERNMENTS OF CERTAIN PACIFIC ISLAND STATES AND THE GOVERNMENT OF THE UNITED STATES OF AMERICA.

The Governments of the parties to this Agreement:

BEING PARTIES to the South Pacific Forum Fisheries Agency Convention under which they have agreed to cooperated through the Forum Fisheries Committee in respect of relations with the distant water fishing nations and for other related purposes;

HAVING RATIFIED the Principal Agreement pursuant to which the Pacific Island parties shall share in certain benefits and having collectively accepted certain obligations;

AND WHEREAS the Pacific Island parties wish to agree upon the manner in which these benefits shall be distributed and these obligations discharged.

HAVE AGREED AS FOLLOWS:

ARTICLE 1
INTERPRETATION

In this Agreement

(a) "Administrator: means the Administrator established in accordance with

(i) Article 2 of this Agreement; and

(ii) Article 1 of the Principal Agreement;

(b) "Closed Area" has the meaning described in Article 1 of the Principal Agreement;

(c) "Licensing Area" has the meaning described in Article 1 of the Principal Agreement;

(d) "Limited Area" has the meaning described in Article 1 of the Principal Agreement

(e) "Pacific Island party" has the meaning described in Article 1 of the Principal Agreement;

(f) "Pacific Island State" has the meaning described in Article 1 of the Principal Agreement;

(g) "Party" means a Pacific Island State party to this Agreement, and "parties" means all such States from time to time; and

(h) "Principal Agreement" means the Treaty on Fisheries between the Governments of Certain Pacific Island States and the Government of the United States of America, done in Port Moresby on 2 April, 1987.

ARTICLE 2
ADMINISTRATOR

2. The Administrator shall be the Director of the South Pacific Forum Fisheries Agency appointed in accordance with the South Pacific Forum Fisheries Agency Convention.

2.2 The Administrator shall be responsible to the parties for:

(a) performing the functions required by the Principal Agreement;

(b) receiving information, documents and payments in accordance with the terms of the Principal Agreement;

(c) convening meetings of the parties

(d) performing any other function in order to satisfy any requirement of the Principal Agreement, at the request of and upon notification by any party.

2.3 The Administrator shall perform the functions described in this Article consistently with any direction given by the Forum Fisheries Committee, constituted in accordance with the South Pacific Forum Fisheries Agency Convention.

ARTICLE 3
COOPERATION IN ANNEX RENEGOTIATIONS

3.1 Any party which proposes to establish or amend a Closed Area or Limited Area for the purposes of the Principal Agreement shall notify the Administrator of the details of its proposal at least four calendar months prior to any annual meeting held in accordance with Article 7 of the Principal Agreement. The Administrator shall promptly notify the other parties of such proposal.

3.2 Any proposal made in accordance with this Article shall be tabled as a non-negotiable amendment to Annex 1 of the Principal Agreement at the annual meeting held in accordance with Article 7 of the Principal Agreement, and no party shall propose any amendment thereto during that meeting, except with the consent of that party.

ARTICLE 4
PROVISION OF INFORMATION BY THE ADMINISTRATOR

4.1 The Administrator shall provide all information received pursuant to the Principal Agreement to parties in accordance with this Agreement, and in particular shall:

(a) provide all information relating to fishing activities in waters under the jurisdiction of any party to that party; and

(b) distribute such information, including high seas data, as may be agreed by the parties.

4.2 The Administrator shall maintain the confidentiality of all data which he receives pursuant to the Principal Agreement and this Agreement, unless:

(a) this Agreement provides otherwise;

(b) the parties agree otherwise; or

(c) he is authorized by a party to release information relating to fishing activities in waters under that party's jurisdiction.

4.3 Each party shall ensure that the confidentiality is maintained of any information received pursuant to the principal Agreement and this Agreement concerning fishing activity in the exclusive economic zone of any other party.

ARTICLE 5
PROVISION OF INFORMATION TO THE ADMINISTRATOR

5.1 Each party shall provide to the Administrator, as early as practicable:

(a) a copy of each national law as defined in Annex 1 of the Principal Agreement; and

(b) a description of any area within the Licensing Area considered by its Government to be subject to its fisheries jurisdiction.

5.2 Each party shall promptly notify the Administrator of any changes made to the information provided in accordance with this Article.

ARTICLE 6
MEETINGS

6. The Administrator shall, upon request by any party, convene a meeting at the date and place determined by the Administrator in consultation with the parties for the purposes of the Principal Agreement or this Agreement.

ARTICLE 7
ADMINISTRATIVE COSTS

7.1 The Administrator shall submit to the parties for their approval:

(a) a budget, prior to each Licensing Period, including the direct costs of performing functions and providing services in accordance with the Principal Agreement and this Agreement; and

(b) modifications to such budget as may be required from time to time during the Licensing Period.

7.2 The Administrator shall make quarterly deductions from the accrued money received pursuant to the Principal Agreement, equal to the administrative costs incurred during the previous quarter, provided that the total deductions for the Licensing Period shall not exceed the total amount approved in accordance with paragraph 1 of this Article.

ARTICLE 8
DISTRIBUTION OF PAYMENTS

8.1 Any payment received by the administrator pursuant to the Principal Agreement shall be deposited within one week of receipt in United States dollars in an insured or Government guaranteed bank account or accounts in the Pacific region, so the deposits will earn the highest amount of interest reasonably available.

8,2 The administrator shall distribute any amount received pursuant to the Treaty on Fisheries between the Government of Certain Pacific Island States and the Government of the United States of America in the manner described in Schedule 1.

ARTICLE 9
AUDITING OF ACCOUNTS

9.1 The Administrator shall arrange for the auditor of the South Pacific Forum Fisheries Agency to audit any account in which amounts deposited in accordance with Article 8 are held, prior to the distribution of any amount in accordance with this Agreement.

9.2 The Administrator shall permit each party to inspect any raw data, books and accounts which relate to the Administrator's functions pursuant to this Agreement.

ARTICLE 10
AMENDMENT OF THIS AGREEMENT

10.1 The following procedures shall apply to the adoption and entry into force of any amendment to this Agreement.

10.2 Any party may propose amendments to this Agreement.

10.3 A proposed amendment shall be notified to the depositary not less than forty five (45) days before the meeting at which the proposed amendment will be considered.

10.4 The depositary shall promptly notify all parties and the Administrator of such proposal.

10.5 The parties shall consider proposed amendments to this Agreement at the time of the annual meeting described in Article 7 of the Principal Agreement, or at any other time that may be agreed by all parties.

10.6 Any amendment to this Agreement shall be adopted by the approval of all the parties, and shall enter into force upon receipt by the depositary of instruments of ratification, acceptance or approval by the parties.

10.7 The depositary shall promptly notify all parties and the Administrator of the entry into force of the amendment.

ARTICLE 11
NOTIFICATION

11.1 The provisions of Article 10 of the Principal Agreement shall apply, mutatis mutandis, to the provisions of this Agreement.

ARTICLE 12
STATUS OF SCHEDULE

The Schedule forms an integral part of this Agreement, and, unless expressly provided otherwise, a reference to this Agreement includes a reference to the Schedule.

ARTICLE 13
DEPOSITARY

The depositary for this Agreement shall be the Government of Papua New Guinea.

ARTICLE 14
FINAL CLAUSES

14.1 This Agreement shall be open for signature by all parties.

14.2 This Agreement is subject to ratification by Pacific Island parties. The instruments of ratification shall be deposited with the Government of Papua New Guinea.

14.3 This Agreement shall remain open for accession by any Pacific Island party. The instruments of accession shall be deposited with the Government of Papua New Guinea.

14.4 This Agreement shall enter into force upon receipt by the depositary of instruments signifying ratification by all States which are Pacific Island parties on the date that the Principal Agreement enters into force.

14.5 This Agreement shall enter into force for any acceding State on the date that an instrument signifying accession by that State is received by the depositary.

14.6 If the Principal Agreement ceases to have effect for any Pacific Island party, this Agreement shall cease to have effect for that party from such time that all distributions are made, pursuant to Article 8, which affect that party.

14.7 The Agreement shall cease to have effect if the Principal Agreement ceases to have effect, upon the distribution of all amounts held by the Administrator pursuant to Article 8.

DONE at Port Moresby on the Second day of April, 1987

SCHEDULE 1
DISTRIBUTION OF PAYMENTS

The Administrator shall distribute any amounts received pursuant to the Principal Agreement in accordance with this Schedule.

1. From the total of the US$14 million cash payment by the United States Government pursuant to the agreement between the Government of the United States of America and FFA, and the US$4 million industry payment pursuant to Annex II, Schedule 2 of the Principal Agreement -

(a) the Administrator shall deduct administrative costs in accordance with Article 7.2;

(b) the balance remaining, after deduction of administrative costs in accordance with sub-paragraph (a), shall be distributed as follows -

(i) US$1,777,999.95 shall be paid to a fund (hereinafter referred to as the "Project Development Fund") administered by FFA in accordance with procedures agreed between the Pacific Island parties;

(ii) fifteen (15) per cent of the balance remaining after deduction of the Project Development Fund shall be distributed equally among the Pacific Island parties; and

(iii) eighty-five (85) per cent of the balance remaining after deduction of the Project Development Fund, including accrued interest thereon, shall be distributed according to the share of the volume of catches in the waters in the Licensing Area of the Principal Agreement reported by vessels fishing while licensed pursuant to the Principal Agreement.

2. All the Pacific Island parties shall have equal access to the sum of US$1,777,999.95 set aside for the Project Development Fund.

3. The Administrator shall, as soon as practicable after the beginning of each annual Licensing Period, distribute the fifteen (15) per cent shares referred to in paragraph 1(b)(ii) of all amounts received by the beginning of the Licensing Period.

4. The Administrator shall, as soon as practicable after all catch information for each annual Licensing Period is available, distribute all remaining funds for the Licensing Period in accordance with paragraph 1(b)(iii). Such payments shall be made not later than six months after the end of the Licensing Period unless all Pacific Island parties agree otherwise.

5. The Administrator shall maintain a separate fund for observer costs paid by the US industry in accordance with the formula set out in Annex I, Part 7 of the Principal Agreement and shall apply the fund in the manner directed by the Pacific Island parties at the annual consultations held pursuant to Article 7 of the Principal Agreement.

AGREEMENT BETWEEN THE GOVERNMENT OF THE UNITED STATES OF AMERICA AND THE SOUTH PACIFIC FORUM FISHERIES AGENCY

The Government of the United States of America and the South Pacific Forum Fisheries Agency:

DESIRING to continue and strengthen the ties of friendship, understanding and co-operation which have historically linked the United States and the peoples of the member States of the South Pacific Forum Fisheries Agency;

CONSCIOUS of the commitment of the member Governments of the South Pacific Forum Fisheries Agency to develop fully their economic resources and provide employment opportunities to meet the aspirations of their peoples;

BELIEVING that economic co-operation will benefit the peoples of the United States and the South Pacific region; and

CONVINCED of the desirability of encouraging and facilitating economic development in the South Pacific region;

HAVE AGREED AS FOLLOWS:

ARTICLE 1

The Government of the United States of America (hereinafter "the United States") and the South Pacific Forum Fisheries Agency (hereinafter "the FFA") agree to promote economic development in the South Pacific region.

ARTICLE 2

The FFA agrees to maintain the economic development fund (hereinafter "the fund") from which it shall administer payments made pursuant to this Agreement to the Pacific Island States party to the Treaty on Fisheries between the Governments of Certain Pacific Island States and the Government of the United States of America done at Port Moresby on 2nd April 1987.

ARTICLE 3

3.1 The fund shall be controlled and administered by the FFA which shall take appropriate measures as set forth in Article 4.2 below, to ensure that the fund is used solely to support economic development purposes in accordance with section 531(e) of the United States Foreign Assistance Act of 1961, as amended. A financial management system shall be mutually developed and agreed upon by the parties.

3.2 The FFA shall minimize operating and administration costs of the fund.

3.3 The FFA shall be responsible for establishing and maintaining, in accordance with generally accepted accounting principles, an internal system of record keeping with respect to the fund, including an annual audit report which shall, upon request, be made available to the Government of the United States. The

Comptroller General of the United States, or his duly authorized representative, shall be permitted to conduct such audits of the fund as necessary to ensure that the FFA is administering the fund in accordance with this Agreement.

3.4 The parties shall consult from time to time on the operation of the fund, and its effectiveness in accomplishing the purposes of this Agreement.

ARTICLE 4

4.1 During the time this Agreement is in force, the Government of the United States shall make annual cash payments to the FFA for the fund - from the Agency for International Development - in an average amount of fourteen million U.S. dollars (US$14,000,000), subject to the availability of funds for this purpose. The Government of the United States shall provide such funds in accordance with either of the following:

(a) fourteen million U.S. dollars (US$14,000,000) annually; or

(b) ten million U.S. dollars (US$10,000,000) for 1993, and fourteen million U.S. dollars (US$14,000,000) annually thereafter. An additional four million U.S. dollars (US$4,000,000), otherwise payable in respect of 1993, is payable in accordance with a schedule to be notified by the Government of the United States following the entry into force of this Agreement.

4.2 The FFA shall, in accordance with Article 3.1 above, obtain annual assurances from the Pacific Island States party to the Treaty on Fisheries referred to in Article 2 above that any payments made under this Agreement were used solely to support economic development purposes, and not for military or paramilitary uses. Nothing in this paragraph shall be construed to confer audit rights under this Agreement other than as provided in Article 3.3 above.

ARTICLE 5

5.1 This Agreement shall enter into force on June 15, 1993 and shall remain in force for a period of ten years. It may be terminated by written agreement, or by either party giving the other party one year written notice in advance.

5.2 This agreement may be amended or extended by written agreement of the parties.

5.3 Understandings designating representatives of the parties for the purpose of carrying out this Agreement and providing for its implementation will be set out in the annual grant documents and ancillary communications.

Done at Auckland on the day of April, 1992, and at Suva on the day of 1993.

FOR THE GOVERNMENT OF THE UNITED STATES OF AMERICA

FOR THE SOUTH PACIFIC FORUM FISHERIES AGENCY

AGREED STATEMENT ON OBSERVER PROGRAMME

Representatives of the Governments of the Pacific Island States and the Government of the United States of America have agreed on provisions relating to observers in Annex I, Part 6 of the Treaty on Fisheries between the Governments of Certain Pacific Island States and the Government of the United States of America.

The Representatives recognise that the provision for an observer programme is necessary to implement and achieve the objectives of the Treaty.

The Representatives also acknowledge the desirability of providing appropriate administrative measures pursuant to Annex I, Part 6 of the Treaty.

Therefore, the representatives agree as follows:

(a) observer operations would be based on the placement of observers at ports of trip origin for complete trips unless otherwise agreed at the outset of the trip;

(b) the United States Government would be notified of observer placements by an Observer Coordinator nominated by the Pacific Island parties;

(c) The Pacific Island parties would use their best endeavours to ensure that a reasonable period of notice was given, which should, wherever practicable, be at least fourteen (14) days;

(d) the United States Government would use its best endeavours to ensure that the Observer Coordinator is kept informed of the expected pattern of port departures and of the planned fishing activities of departing vessels;

(e) the United States Government would facilitate the placing of observers including the provision of visas;

(f) the United States Government would notify the Observer Coordinator of any difficulties involving the discharge of the duties of observers; and

(g) that it is anticipated observers will use the same range of equipment used by United States observers; and there will be a training program in the use of equipment, but crew will also be expected to assist observers in the use of equipment.

DONE at Port Moresby on the second day of April, 1987

Appendix B
Treaty Amendments

AGREED RECORD OF AMENDMENTS TO THE TREATY ON FISHERIES BETWEEN THE GOVERNMENTS OF CERTAIN PACIFIC ISLAND STATES AND THE GOVERNMENT OF THE UNITED STATES

THIS CONSTITUTES THE AGREED RECORD OF AMENDMENTS ADOPTED BY THE PARTIES TO THE TREATY

Done at Kiritimati, Kiribati, this 24th day of March 2002 in duplicate. One original of this Record shall be deposited with the Government of Papua New Guinea, as depositary for the Treaty. The second original shall be provided to the Government of the United States of America.

AMENDMENTS TO THE TREATY ON FISHERIES BETWEEN THE GOVERNMENTS OF CERTAIN PACIFIC ISLAND STATES AND THE GOVERNMENT OF THE UNITED STATES

1. New Preambular Paragraph 5:

"NOTING with satisfaction the successful conclusion of the Convention for the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean;"

2. New Article 1.1(b):

""Convention" means the Convention for the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean."

3. Amend Article 3.2 to read in its entirety as follows:

"3.2 It shall be a condition of any license issued pursuant to this Treaty that the vessel in respect of which the license is issued is operated in accordance with the requirements of Annex I. No fishing vessel of the United States shall be used for fishing in the Licensing Area without a license issued in accordance with Annex II or in waters closed to fishing pursuant to Annex I, except in accordance with paragraph 3 of this Article, or unless the vessel is used for fishing albacore tuna by the trolling method or for fishing by the longline method in high seas areas of the Treaty Area."

4. Amend Article 7 as follows:

Renumber Article 7 as Article 7.1.

Add a new Article 7.2 as follows:

"The parties shall, where appropriate, consider the extent to which adjustments to the provisions of the Treaty or measures adopted thereunder may be necessary to promote consistency with any measures adopted under the Convention."

Add a new Article 7.3 as follows:

"The parties may cooperate to address matters of common concern under the Convention."

Add a new Article 7.4 as follows:

"The parties shall, where appropriate, consider the issue of capacity in the Treaty Area."

5. Amend Article 9 to read in its entirety as follows:

"9. The following procedures shall apply to the adoption and entry into force of any amendment to an Annex of this Treaty unless otherwise provided in the Annex.

(a) Any party may propose an amendment to an Annex at any time by notifying such proposal to the depositary at least 120 days before the annual meeting. The depositary shall promptly notify all parties of the proposed amendment.

(b) Any amendment to an Annex shall be adopted by consensus. For each amendment that is adopted, it is expected that each party shall act expeditiously to obtain acceptance of the amendment and to notify that acceptance to the Depositary in accordance with Article 9(c). Pending the entry into force of any adopted amendment, the parties will, to the extent possible for them, apply the amendment provisionally.

(c) A party approving a proposed amendment to an Annex shall notify its acceptance to the Depositary, which shall promptly notify all the parties of each acceptance. Upon receipt by the Depositary of notices of acceptance from all parties, such amendment shall be incorporate in the appropriate Annex and shall have effect from that date, or from such other date as may be specified in such amendment. The Depositary shall promptly notify all parties of the adoption of the amendment and its effective date."

A Description of the Amendments to the Treaty

The first amendment, which was agreed in Koror, Palau on March 30, 1999, modifies paragraph 2 of Article 3 "Access to the Treaty Area" to allow U.S. longline vessels to fish in high seas portions of the area covered by the Treaty. The current Treaty excludes U.S. fishing vessels other than purse seine vessels from operating in the Treaty Area, except for albacore troll vessels, which may operate on the high seas within the Treaty Area. At the time the Treaty was negotiated in the late 1980's, the United States did not have a large longline fleet in the Pacific Ocean; thus no similar exception was included for these vessels. However, in recent years, the U.S. longline fleet has developed and would like to have the opportunity to fish in the high seas portion of the Treaty Area. This amendment is strongly supported by U.S. fishing interests in Hawaii and elsewhere in the region.

The second amendment adds a new preambular paragraph that notes with satisfaction the successful conclusion of the Convention for the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean ("the WCPFC Convention"). Once in force, the WCPFC Convention will establish a legal framework, and an organization for, conserving and managing highly migratory fish stocks in the same region covered by the Treaty. The United States actively participated in the negotiations that led to the adoption of the WCPFC Convention, is a signatory to the Convention, and the Department of State intends to submit it to the President for transmittal to the Senate for advice and consent to ratification within the next year. The WCPFC Convention is strongly supported by the U.S domestic fishery managers, the U.S. tuna industry, and the environmental community. Thus, reference to the Convention in the preamble to the Treaty is consistent with our broader policy interests in this area.

The third amendment adds a new paragraph in Article 1 ("Definitions and Interpretation") defining the term "Convention" as referring to the WCPFC Convention.

The fourth amendment adds three new paragraphs to Article 7 ("Review of the Treaty"). The first two amendments (the addition of new paragraphs 2 and 3) pertain to linkages between the Treaty and the WCPFC Convention, once the latter enters into force. The new paragraph 2 provides that parties to the Treaty shall, where appropriate, consider the extent to which adjustments to the provisions of the Treaty or measures adopted

thereunder may be necessary to promote consistency with measures adopted under the WCPFC Convention. The new paragraph 3 provides that parties to the Treaty may cooperate to address matters of common concern under the Convention. These amendments provide for cooperation and the promotion of consistency between the two treaties, without binding the United States to the WCPFC Convention or any future measures adopted under it prior to its entry into force for the United States. The third modification to Article 7 adds a new paragraph 4. The new paragraph 4 provides that the parties to the Treaty shall, where appropriate, consider the issue of capacity in the Treaty Area. The issue of "over capacity" of the fishing fleets in the region is important for the United States and the U.S. tuna industry because "over-capacity" can undermine management efforts and affect the economic viability of the fishery for all participants. The inclusion of a provision on fishing capacity was a key goal for the U.S. tuna industry in these negotiations.

The fifth and final amendment to the Treaty text is to Article 9 ("Amendments to the Annexes"). Article 9 would be amended in its entirety to provide for a more streamlined and efficient procedure to amend the annexes of the Treaty. Unlike the United States, where the Congress has authorized the Secretary of State to approve amendments to the Annexes on behalf of the United States Government (South Pacific Tuna Act of 1988, P.L. 100-330), nearly all of the Pacific Island Parties to the Treaty must submit any amendments to the Annexes to their legislative bodies for approval. This reality has resulted in substantial delays in the entry into force of important technical amendments to the Annexes desired by the United States and the U.S. tuna industry. The revisions to Article 9 would allow amendments to the Annexes to take effect more quickly. Specifically, any party may propose amendments by notifying the depositary at least 120 days before the annual meeting. Amendments will be adopted by consensus. After adoption, each party is to act expeditiously to accept the amendment, and parties will, to the extent possible for them, apply adopted amendments provisionally. This establishes a more streamlined procedure, while providing time and opportunity for the United States to undergo our internal procedures to develop our position on any proposed amendment.

The amendments do not have final clauses detailing their entry into force. Article 8 of the Treaty provides, however, for the Parties' consideration and adoption of amendments. Specifically, Article 8(e) provides: "Any amendment to this Treaty shall be adopted by the approval of all the parties, and

shall enter into force upon receipt by the depositary of instruments of ratification, acceptance or approval by the parties." Accordingly, these amendments will enter into force once all the Parties to the Treaty have consented to be bound by them.

Existing legislation, including the Magnuson-Stevens Fishery Conservation and Management Act, 16 U.S.C. § 1801 et seq. and the South Pacific Tuna Act of 1988, P.L. 100-330, provides sufficient legal authority to implement U.S. obligations under the amended Treaty. Therefore, no new legislation is necessary in order for the United States to ratify these amendments to the Treaty. However, minor amendments to Section 6 of the South Pacific Tuna Act of 1988, P.L. 100-330, will be necessary to take account of the Amendment to paragraph 2 of Article 3, "Access to the Treaty Area," which permits U.S. longline vessels to fish on the high seas of the Treaty Area.

AMENDMENTS TO THE ANNEXES TO THE TREATY ON FISHERIES BETWEEN THE GOVERNMENTS OF CERTAIN PACIFIC ISLAND STATES AND THE GOVERNMENT OF THE UNITED STATES

1. Amend Annex 1, Part 5, Paragraph 13 to read in its entirety as follows:

"13. Information relating to vessel position, catch and effort, as described in Part 1 of Schedule 4, shall be provided by telex, vessel monitoring system (VMS) transponder, electronic mail, or any other method of electronic reporting agreed to by the parties to the Administrator at the following times:

(a) before departure from port for the purpose of beginning a fishing trip in the Licensing Area;

(b) at least 24 hours before entry into port for the purpose of unloading fish from any trip involving fishing in the Licensing Area."

2. Amend Annex 1, Part 7, Paragraph 24(b) to read in its entirety as follows:

"(b) The fees for the cost of observers shall be provided in a lump sum on an annual basis from 15 June 2003 in accordance with the following formula:

The fixed cost component of US $55,000 plus the number of vessels licensed multiplied by 5 trips multiplied by 20 percent multiplied by the cost per trip (US $4,500) equals lump sum payment. The fixed cost component shall consist of the costs to the Administrator for training and management of the Observer and Crewing Programme."

3. Amend Annex 1, Part 7, Paragraph 24(c) to read in its entirety as follows:

"(c) The parties may, as mutually determined at the annual meeting provided for in Article 7.1 of the Treaty adjust the amount of the fees to be paid under sub-paragraph (b), it being understood that:

- the goal of the observer programme is to provide an effective observer programme for compliance by targeting 20 percent coverage, which may be reviewed from time to time;

- any unused sums are carried forward to the next licensing period; and

- the factor of inflation shall be taken into account."

4. Amend Annex 1, Part 8, Paragraph 30 to read in its entirety as follows:

"30. The vessel shall have its automatic locations communicator (ALC), as approved by the Forum Fisheries Agency (FFA), operational at all times while in the Treaty Area. Data collected through the vessel's ALC shall be transmitted in near real time both to the FFA and to the Government of the United States. While the vessel is in waters within the Treaty Area that are under the jurisdiction of the Government of the United States, viewing of the data transmitted shall be limited to the Government of the United States. All data transmitted in accordance with this provision shall be treated as confidential business information and shall be distributed only to ensure

that the obligations under this Treaty are fulfilled. Technical matters including financial implications related to the implementation of this Part will be a matter for discussion between the parties."

5. Replace all references to "GMT" in Annex 1, Schedule 4 to read "UTC".

6. Replace all references to "short tonnes" in Annex 1, Schedule 4 and Schedule 5 to read "metric tonnes".

7. Add new subparagraphs 9 and 10 to Annex 1, Schedule 4, Part 1(a)

"(9) estimated date/time of arrival"
"(10) estimated date of departure"

8. Delete paragraph (b) of Annex 1, Schedule 4, Part 1

9. Add new subparagraph 9 to Annex 1, Schedule 4, Part 2(b):

"(9) observer on-board Y/N"

10. Amend Annex II, Schedule 2, Paragraph 1 to read in its entirety as follows:

"1. The following amounts are payable annually for a period of ten (10) years from 15 June 2003 pursuant to paragraph 3 of Annex II –

(a) an annual industry payment of US $3 million, which shall cover –

(i) license fees for up to 45 vessels as set forth in paragraph 2 below; and
(ii) technical assistance;

(b) costs to be paid by the industry for the observer programme set forth in Part 7 of Annex I; and

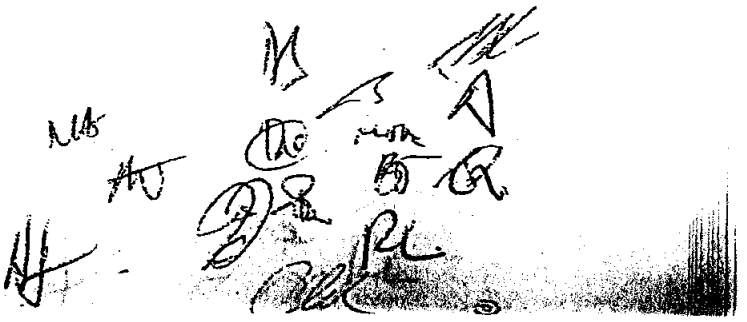
(c) sums pursuant to the related agreement between the South Pacific Forum Fisheries Agency and the Government of the United States."

11. Add new paragraph 2 to Annex II, Schedule 2 to read in its entirety as follows:

"2. The United States industry payment specified in paragraph 1(a) of this Schedule may be made in two separate instalments. One half of the payment shall be paid by June 15 of each year with the balance to be paid by December 15th of the same year. The second instalment will be paid with interest at an agreed rate."

12. Add new paragraph 3 to Annex II, Schedule 2 to read in its entirety as follows:

"3. In order to increase the benefits to the Pacific Island parties under the Treaty, the United States industry will develop with the Pacific Island parties a system for revenue sharing where the ex-vessel price is at or above a mutually agreed level. Payments made under such a system will be made quarterly and will be in addition to the amount specified in paragraph 1(a). "



13. Amend paragraph 2 to Annex II, Schedule 2 to read in its entirety as follows:

Renumber paragraph 2 as paragraph 4.

"4. During each licensing period, the Administrator shall make available a maximum of 45 licences to fishing vessels of the United States for fishing in the Licensing Area. Any licences issued beyond 40 shall only be available to fishing vessels of the United States engaged in fishing activity designed to advance broader cooperation with the Pacific Island parties as envisaged under Article 2. If the Administrator does not receive applications for the maximum of 45 licences during any of the first three licensing periods under this Schedule, the Pacific Island parties reserve the right at the end of the third licensing period to review the allocation of licences beyond 40 for the remaining licensing periods."

14. Amend paragraph 3 to Annex II, Schedule 2 to read in its entirety as follows:

Renumber paragraph 3 as paragraph 5.

"5. Prior to the beginning of the sixth licensing period under this Schedule, the parties shall review the number of licenses to be issued, the license fees, the potential impact of any existing or pending catch or effort limitations or other measures that may substantially affect the operations of the U.S. fleet and any other issues which may be identified during the preceding Annual Consultation. During such review, the parties shall determine the number of licenses and the license fees for the second five-year period under this Schedule. Any agreed changes in the number of licenses or license fees shall be reflected in the annual industry payment."

Appendix C
Memorandum of Understanding

MEMORANDUM OF UNDERSTANDING

BETWEEN THE

GOVERNMENTS OF CERTAIN PACIFIC ISLAND STATES

AND THE

GOVERNMENT OF THE UNITED STATES OF AMERICA

MEMORANDUM OF UNDERSTANDING BETWEEN THE GOVERNMENTS OF CERTAIN PACIFIC ISLAND STATES AND THE GOVERNMENT OF THE UNITED STATES OF AMERICA

The Parties, desiring to amend and extend the Treaty on Fisheries between the Governments of Certain Pacific Island States and the Government of the United States of America (the "Treaty"), intend from 15 June 2003 to apply provisionally any of the following amendments which are not in force by that date:

(1) the attached amendments to the Treaty on Fisheries Between the Governments of Certain Pacific Island States and the Government of the United States of America;

(2) the attached amendments to the Annexes to the Treaty on Fisheries Between the Governments of Certain Pacific Island States and the Government of the United States of America; and

(3) the attached amendments to the Treaty regarding

(a) longline fishing on the high seas of the Treaty Area;

(b) the closing of the archipelagic waters of Papua New Guinea; and

(c) the opening of the waters of Solomon Islands

as agreed to at the 11th Annual Treaty Consultations in Palau in 1999 until such time as those amendments enter into force.

DATED: 9TH MAY 2002

SIGNATURES

For the Government of Australia

For the Government of the United States of America

For the Government of the Cook Islands

For the Government of the Federated States of Micronesia

For the Government of the Republic of Fiji

For the Government of the Republic of Kiribati

For the Government of the Republic of the Marshall Islands

For the Government of the Republic of Nauru

For the Government of New Zealand

For the Government of Niue

For the Government of the Republic of Palau

For the Government of the Independent State of Papua New Guinea

For the Government of Samoa

For the Government of Solomon Islands

For the Government of the Kingdom of Tonga

For the Government of Tuvalu

For the Government of the Republic of Vanuatu

AMENDMENTS TO THE TREATY ON FISHERIES BETWEEN THE GOVERNMENTS OF CERTAIN PACIFIC ISLAND STATES AND THE GOVERNMENT OF THE UNITED STATES OF AMERICA EXCEPT ARTICLE 9 OF THE TREATY

1. New Preambular Paragraph 5:

"NOTING with satisfaction the successful conclusion of the Convention for the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean;"

2. New Article 1.1(b):

""Convention" means the Convention for the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean."

3. Amend Article 7 as follows:

Renumber Article 7 as Article 7.1.

Add a new Article 7.2 as follows:

"The parties shall, where appropriate, consider the extent to which adjustments to the provisions of the Treaty or measures adopted thereunder may be necessary to promote consistency with any measures adopted under the Convention."

Add a new Article 7.3 as follows:

"The parties may cooperate to address matters of common concern under the Convention."

Add a new Article 7.4 as follows:

"The parties shall, where appropriate, consider the issue of capacity in the Treaty Area."

AMENDMENTS TO THE ANNEXES TO THE TREATY ON FISHERIES BETWEEN THE GOVERNMENTS OF CERTAIN PACIFIC ISLAND STATES AND THE GOVERNMENT OF THE UNITED STATES

1. Amend Annex 1, Part 5, Paragraph 13 to read in its entirety as follows:

"13. Information relating to vessel position, catch and effort, as described in Part 1 of Schedule 4, shall be provided by telex, vessel monitoring system (VMS) transponder, electronic mail, or any other method of electronic reporting agreed to by the parties to the Administrator at the following times:

(a) before departure from port for the purpose of beginning a fishing trip in the Licensing Area;

(b) at least 24 hours before entry into port for the purpose of unloading fish from any trip involving fishing in the Licensing Area."

2. Amend Annex 1, Part 7, Paragraph 24(b) to read in its entirety as follows:

"(b) The fees for the cost of observers shall be provided in a lump sum on an annual basis from 15 June 2003 in accordance with the following formula:

The fixed cost component of US $55,000 plus the number of vessels licensed multiplied by 5 trips multiplied by 20 percent multiplied by the cost per trip (US $4,500) equals lump sum payment. The fixed cost component shall consist of the costs to the Administrator for training and management of the Observer and Crewing Programme."

3. Amend Annex 1, Part 7, Paragraph 24(c) to read in its entirety as follows:

"(c) The parties may, as mutually determined at the annual meeting provided for in Article 7.1 of the Treaty adjust the amount of the fees to be paid under sub-paragraph (b), it being understood that:

- the goal of the observer programme is to provide an effective observer programme for compliance by targeting 20 percent coverage, which may be reviewed from time to time;

- any unused sums are carried forward to the next licensing period; and

- the factor of inflation shall be taken into account."

4. Amend Annex 1, Part 8, Paragraph 30 to read in its entirety as follows:

"30. The vessel shall have its automatic locations communicator (ALC), as approved by the Forum Fisheries Agency (FFA), operational at all times while in the Treaty Area. Data collected through the vessel's ALC shall be transmitted in near real time both to the FFA and to the Government of the United States. While the vessel is in waters within the Treaty Area that are under the jurisdiction of the Government of the United States, viewing of the data transmitted shall be limited to the Government of the United States. All data transmitted in accordance with this provision shall be treated as confidential business information and shall be distributed only to ensure

that the obligations under this Treaty are fulfilled. Technical matters including financial implications related to the implementation of this Part will be a matter for discussion between the parties."

5. Replace all references to "GMT" in Annex 1, Schedule 4 to read "UTC".

6. Replace all references to "short tonnes" in Annex 1, Schedule 4 and Schedule 5 to read "metric tonnes".

7. Add new subparagraphs 9 and 10 to Annex 1, Schedule 4, Part 1(a)

"(9) estimated date/time of arrival"
"(10) estimated date of departure"

8. Delete paragraph (b) of Annex 1, Schedule 4, Part 1

9. Add new subparagraph 9 to Annex 1, Schedule 4, Part 2(b):

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(ii) technical assistance;

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13. Amend paragraph 2 to Annex II, Schedule 2 to read in its entirety as follows:

Renumber paragraph 2 as paragraph 4.

"4 During each licensing period, the Administrator shall make available a maximum of 45 licences to fishing vessels of the United States for fishing in the Licensing Area. Any licences issued beyond 40 shall only be available to fishing vessels of the United States engaged in fishing activity designed to advance broader cooperation with the Pacific Island parties as envisaged under Article 2. If the Administrator does not receive applications for the maximum of 45 licences during any of the first three licensing periods under this Schedule, the Pacific Island parties reserve the right at the end of the third licensing period to review the allocation of licences beyond 40 for the remaining licensing periods."

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THE AMENDMENTS TO THE TREATY REGARDING LONGLINE FISHING ON THE HIGH SEAS OF THE TREATY AREA, THE CLOSING OF THE ARCHIPELAGIC WATERS OF PAPUA NEW GUINEA, AND THE OPENING OF THE WATERS OF SOLOMON ISLANDS AS AGREED TO AT THE 11TH ANNUAL TREATY CONSULTATIONS IN PALAU IN 1999

1. Amend Article 3.2 to read in its entirety as follows:

"3.2 It shall be a condition of any license issued pursuant to this Treaty that the vessel in respect of which the license is issued is operated in accordance with the requirements of Annex I. No fishing vessel of the United States shall be used for fishing in the Licensing Area without a license issued in accordance with Annex II or in waters closed to fishing pursuant to Annex I, except in accordance with paragraph 3 of this Article, or unless the vessel is used for fishing albacore tuna by the trolling method or for fishing by the longline method in high seas areas of the Treaty Area."

2. Amend Annex 1, Schedule 2, 'Closed Areas', subheading "Papua New Guinea" to read in its entirety as follows:

"**Papua New Guinea** At all times, all territorial seas, archipelagic and internal waters."

3. Amend Annex 1, Schedule 2, 'Closed Area', subheading "Solomon Islands" to read in its entirety as follows:

"**Solomon Islands** At all times, all internal waters, territorial seas, and archipelagic waters together with all waters within the exclusive economic zone of the Solomon Islands that are west of the meridian of Longitude 163 degrees East."

4. Amend Annex 1, Schedule 3, Limited Areas as follows:

Delete the heading **Solomon Islands** and paragraphs 1, 2 and 3.