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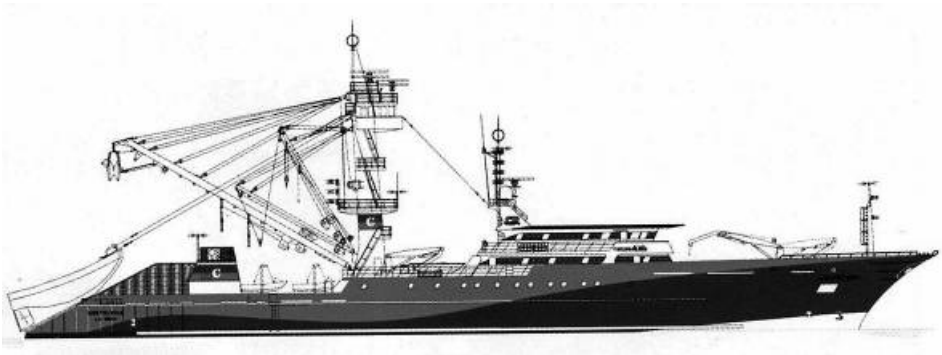
The transition and evolution of the Fishing Technology Working Group of the SCTB into the structure of the WCPFC Scientific Committee



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The transition and evolution of the Fishing Technology Working Group of the SCTB into the structure of the WCPFC Scientific Committee, including an annotated summary of FTWG research of relevance to the WCPFC

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1. Introduction

The **Fishing Technology Working Group** officially formed in 2001 following recommendations made during the 13th Meeting of the Standing Committed on Tuna and Billfish (Noumea, New Caledonia 5-12 July 2000). During this meeting, it became apparent that several existing SCTB working groups had overlapping and similar research needs that may be better addressed by a new and separate body of researchers with technical expertise and experience. In particular, the heavy reliance on the use of drifting FADs (DFADs) and anchored FADs (AFADs) by regional purse seine fleets was of common concern during the SCTB 13 meeting.

The record of discussions as documented in the SCTB 13 Report of Meeting contained the following recommendations:

page 38, section 211 of the Skipjack Research Group

- *… collect and examine more detailed information on use of moored and drifting FADs and other technological improvements in regional purse seine fisheries;*
- *… examine subsequent influences on purse-seine CPUE analyses and effort indices;*

page 43, section 232 of Bigeye Research Group

- *(investigate) Impact of FADs on biology of tuna*

page 43, section 252 of Bigeye research and coordination planning

- *better document and understand the use and biological/ecological impacts of new technology (such as how the FADs were used) in the purse-seine fishery.*

The Yellowfin Research Group (YRG) of the 13th SCTB, statistics, research and coordination planning section made the following recommendation to SCTB 13:

"*Organize a working group to document current status and recent developments in purse seine technology with particular emphasis on those developments with significant potential to impact sampling programs, catch and effort analyses and other data sources necessary for management related research. The Working Group will also monitor developments in the use of moored and drifting FADs and work in collaboration with appropriate members of the Skipjack and Bigeye Working Groups through e-mail correspondence, and meet one day prior to the next SCTB meeting."*

The need for a group as suggested above was endorsed by the Meeting and officially debuted at SCTB 14. Through email correspondence, the group was formed and named the Fishing Technology Working Group on 5 February 2001.

2. Research and priorities of the FTWG

The FTWG met in a Preparatory Meeting to SCTB 14 where draft **Terms of Reference** (TOR) were discussed and developed. These TORs were further presented and modified during the SCTB 14 plenary session and are reproduced in **Appendix I.**

The FTWG arrived at SCTB 14 with thirteen working papers on variety of topics, e.g. gear and vessel attributes, operational characteristics of tuna vessels, fishing capacity, estimates of effective fishing effort and FAD based fisheries.

Appendix II lists every FTWG **Working and Information Paper** in chronological order that includes submissions to SCTB 14, 15, 16 and 17.

3. FTWG related research by the SCTB

Work relevant to the FTWG Terms of Reference has been carried out throughout the SCTB process long before the arrival of the group. **Appendix III** lists in chronological order, **non-FTWG papers** submitted to SCTB of relevance to the FTWG mandate spanning SCTB 11 – 17.

examples:

Interest in the need for current information on large-scale fisheries within the WCPO was generated at SCTB 11 with **WP 48**[1] outlining the sophistication and efficiency of purse seine vessels then operating in the region.

During SCTB 12, a paper was submitted by Williams (**MHLC-2/SCTB12**)[2] that outlines the relative abundance and CPUE of fish species by area and gear type encompassing the WCPO region. Information is also available on marine turtles, marine mammals and seabirds.

Preliminary work to examine the gear and operational characteristics that may influence purse seine efficiency were submitted to SCTB 13 by Japanese scientists (**RG-3, RG-7**)

During SCTB 14, Mr Park representing the FSM Micronesian Maritime Authority tabled a significant document titled "**Vessel Operating Profile Report**". This report has no SCTB number or official designation but contains a wealth of information on the operational characteristics of purse seine vessels (FSM, Japan, Korea, Taiwan, US) and longline vessels (China, FSM, Japan, Taiwan, US Guam-based) that operated in the WCPO during the 1990s.

[1] **WP 48**. Itano, D. **Notes on the improvement of fishing power and efficiency in the western tropical Pacific tuna purse seine fishery**.

[2] **MHLC-2 (SCTB12)**: Williams, P.G. **Species encountered in the western and central Pacific longline and purse-seine fisheries.** Oceanic Fisheries Programme, Secretariat of the Pacific Community, Noumea, New Caledonia.

4. Summary of Research priorities of the FTWG

Appendix IV lists all FTWG or FTWG related research submitted since SCTB 11 (Honolulu, Hawaii, 1998) **sorted by broad categories**. In sorting all 101 papers, nine categories emerged that, in effect define the work and research priorities of the FTWG. These categories include:

- **Effort standardization and estimation of effective fishing effort**
- **Fishing strategy and influences on effective fishing effort**
- **Vessel and gear attributes**
- **Documentation of fishing gear and technology**
- **Fish Aggregation Devices**
- **Training and information materials in support of improved catch and effort data**
- **Gear modifications for bycatch reduction and increased targeting**
- **Fleet characterization, recent developments and innovations**
- **Fishing capacity**

A brief discussion of each category with examples is provided below:

4.1 Effort standardization and estimation of effective fishing effort

Research to assist or actually estimate fishing effort has been one of the primary tasks before the FTWG, particularly for purse seine fisheries. A basic examination of effective effort and fishing capacity was conducted **by Williams (FTWG-3 (17)** who examined per vessel annual production of purse seine vessels over the period 1980- 2003 for major WCPO fleets. After a period of establishment, the study indicated steadily increasing trends in annual per vessel production by the Korean and Taiwanese fleets with relatively stable trends for the Japanese and US distant water purse seine vessels. Consistently high producing vessels were noted within fleets.

The FTWG sought to expand links with similar programs, and has showcased the efforts of the European Union (EU) project **Efficiency of the tuna purse seiners and effective effort (ESTHER)**. This project examined and defined factors contributing to the steadily increasing effective effort of EU purse seiners operating in the Atlantic and Indian Oceans. Many of the project documents were published in Spanish or French for which English translations or summaries were provided to the FTWG and SCTB meetings.

Unfortunately, additional studies attempting to estimate effort standardization have been few and the problem of purse seine standardization remains for consideration by the Scientific Committee.

4.2 Fishing strategy and influences on effective fishing effort

These studies have primarily documented recent developments in regional longline and purse seine fisheries with implications to increasing efficiency, e.g. **FTWG-10 (14)** Beverly, Steve. **Longline Fishing Perspectives: Techniques, Gear, Boats, Bait and Recent Trends**. Langley (**FTWG-4 from SCTB 17**) examined specific factors that may influence the take of juvenile bigeye tuna from drifting FAD sets.

4.3 Vessel and gear attributes

Several reports have documented the type and quantity of gear and vessel attributes that have been collected by various programs in the region, e.g. Millar, C **FTWG–1 (14)**. Other contributions have examined or proposed specific gear and vessel attributes that may be useful for fishery monitoring and effort standardization purposes. The subject of which parameters to collect and for what purpose continues is discussed in **FTWG-9 (15)** Itano, D. **Vessel and gear attributes in the Forum Fisheries Agency Regional Register of Vessels: How much is enough?**

4.4 Documentation of fishing gear and technology

One aspect of FTWG work that has been well accepted by SCTB has been the basic documentation of fishing gear, new technology and fishing strategies by different segments of the fishery. Typical examples include: **FTWG-11 (14)** Morón,, J., J. Areso, and P. Pallarés. **Statistics and Technical Information about the Spanish Purse-Seine Fleet in the Pacific**, and **INF–FTWG–2 (17)** Swenarton, T. & S. Beverly. **Documentation and classification of fishing gear and technology on board pelagic longline vessels – Hawaii module**. This paper was meant to be the start of documenting other longline fleets currently operating in the WCPO.

4.5 Fish Aggregation Devices

The rapidly expanding use of both anchored and drifting FADs to assist industrial tuna fisheries was one of the principal justifications for the formation of a specific research group like the FTWG. Concern over the use of FADs, particularly by purse seine fleets, span biological, economic and social issues. The FTWG has received papers describing large-scale FAD networks (e.g. **FTWG–4 (16)** Kumoru, L. **Notes on the use of FADs in the PNG purse seine fishery**), descriptions of anchored and drifting FAD designs (**INF–FTWG–3 (17)** Itano, D, Fukofuka., S., & D. Brogan. **The development, design and current status of anchored and drifting FADs in the WCPO**), and analyses related to the catch characteristics of purse seine gear on FADs (e.g. **FTWG–4 (17)** Langley, A. **An analysis of the main factors influencing the catch of bigeye tuna in purse seine drifting FAD sets**).

4.6 Training and information materials in support of improved catch and effort data

Observer and port sampling programs are often in need of detailed, region-specific training materials and guides. One of the key issues facing WCPO stock assessment efforts is the need for accurate, species-specific catch and effort data for bigeye and yellowfin tuna that are often confused or mixed together. The FTWG has provided training guides and interactive training materials to assist more accurate species identification by fishermen and sampling programs (e.g. **INF–FTWG–4 (17)** Itano, D.G. **Handbook for the identification of yellowfin and bigeye tunas in frozen condition**). The accuracy of species identification by port sampling programs has also been audited and reported to the FTWG/SCTB as an example of how this sort of program may help to improve regional data collection (**FTWG–1 (16)** Itano, D. G. and A.L. Coan Jr. **An assessment of the accuracy of yellowfin and bigeye tuna species identification: by American Samoa port samplers**).

4.7 Gear modifications for bycatch reduction and increased targeting

Issues related to bycatch reduction and improving efficiency on target species have become extremely important in the past decade and will continue to be the primary impetus for restrictive management of some fisheries. Many of the proposed or adopted solutions to reducing non-target catch are technologically based, e.g. the use of circle vs. “J” hooks, or the design of sorting grids for juvenile tuna escapement. The FTWG has actively solicited project descriptions and research on bycatch reduction that is of a technical nature, e.g. **FTWG–7 (16)** Nelson, P. **Reducing the take of undersize tuna and bycatch in drifting FAD sets: project description.** **FTWG–7 (17)** describes five technically oriented solutions to reducing the bycatch of juvenile tuna, seabirds, marine turtles and epipelagic sharks and billfish.

4.8 Fleet characterization, recent developments and innovations

The characterization of major pelagic fleets in the WCPO has been a primary responsibility taken on by the FTWG with particular attention drawn to recent expansions/contractions in regional fisheries and the adoption of new fishing gears and strategies. Several submissions have been received that describe distant water and domestic longline and purse seine fleets as to gear employed, fishing

strategy, catch conservation, markets, etc. Most valuable within this category was an unreferenced document previously described by **Park (2001)** that provides a historical reporting of the operational characteristics of several key longline and purse seine fleets that have operated in the EEZ of the Federated States of Micronesia. Studies comparing several different fleets are uncommon and particularly valuable if the fleets share the same spatial and temporal characteristics.

Individual fleet characterizations are also very useful, e.g. **INF–FTWG–2 (17)** Swenarton, T. & S. Beverly**. Documentation and classification of fishing gear and technology on board pelagic longline vessels – Hawaii module**. Reports such as this provide snapshots of a fishery that can be later reviewed to examine changes in targeting and methodology over time and area. It was envisioned that this report could serve as an initial template to characterize major distant water and domestic longline fleets operating in the Commission Area.

A great deal of information on the characterization of fleets and fisheries is contained within the individual **National Fishery Reports (NFRs)** as submitted by individual countries to every SCTB. **Appendix IV** lists **every NFR submitted to SCTB 14 – 17** from major distant water fishing nations, including selected Pacific Island countries and territories with developing domestic tuna targeting fleets.

4.9 Fishing capacity

The issue of fishing capacity in world tuna fisheries has been flagged as an area of major concern by fisheries management organizations. Discussions on fishing capacity and capacity issues do not fit in well with the statistical, biological or stock assessment groups to SCTB. The FTWG has provided a place for documents, reports and studies relating to capacity issues to be submitted and discussed, e.g. **FTWG–6 (16)** Joseph, J. **Managing fishing capacity of the world tuna fleet [Executive Summary of FAO Fisheries Circular. No. 982]**. In particular, updates on the status of the **Palau Arrangement**[3] and initiatives to limit effort in other regions have been submitted, e.g. **FTWG-9 (14)** Morón, J. **Report on Management Measures for the European Tuna Purse Seine Fleet.** The most specific study submitted to the FTWG on capacity examined purse seine capacity in the WCPO by Gillett and Lewis 2003: **A survey of purse seine fishing capacity in the western and central Pacific Ocean, 1988 to 2003: Executive Summary.** The study noted steadily increasing numbers of active purse seine vessels and vessel hold capacities resulting in market increases in carrying capacity over the past 15 year period. This has occurred despite a total vessel cap on the fishery imposed by the Palau Arrangement.

[3] **FTWG–6 (17)** Rodwell, L. **FFA initiatives related to the Palau Arrangement, purse seine management and the management of bigeye fishing mortality in the WCPO**

5. Transition of the FTWG into the WCPFC structure

The working group structure of SCTB 17 was similar to the proposed structure of the Specialist Working Groups (SWGs) to the Scientific Committee, with minor restructuring of some duties. **Table 1** lists the SCTB format in relation to the Commission's SWG format that was recommended by the Scientific Coordinating Group 3 (SCG3) meeting (Majuro, August 2004) and adopted by the Commission (Pohnpei, December 2004).

Table 1. SCTB working groups and comparable Specialist Working Groups of the Scientific Committee

Working Groups – SCTB format	SCTB acronym	Specialist Working Groups – Scientific Committee	SC acronym
Statistics Working Group	SWG	Statistics Specialist Working Group	ST SWG
Methods Working Group	MWG	Methods Specialist Working Group	ME SWG
HMS Biology Working Group	BIO WG	Biology Specialist Working Group	BI SWG
HMS Stock Assessment Working Group	SA WG	Stock Assessment Specialist Working Group	SA SWG
Ecosystems Working Group	ECO WG	Ecosystems and Bycatch Specialist Working Group	EB SWG
Fishing Technology Working Group	FTWG	Fishing Technology Specialist Working Group	FT SWG
National Tuna Fishery Reports	NFR	Fishery Reports by members and observers	FR

The nine categories of work conducted in the past by the FTWG remain as important areas of further or ongoing work that faces the Commission in 2005. They also fully represent the former Terms of Reference to the FTWG suggesting they would form a sound foundation for Terms of Reference for the new Fishing Technology SWG.

- **Effort standardization and estimation of effective fishing effort**
- **Fishing strategy and influences on effective fishing effort**
- **Vessel and gear attributes**
- **Documentation of fishing gear and technology**
- **Fish Aggregation Devices**
- **Training and information materials in support of improved catch and effort data**
- **Gear modifications for bycatch reduction and increased targeting**
- **Fleet characterization, recent developments and innovations**
- **Fishing capacity**

In review of directives and work recommendations from the MHLC, SCG and the Convention, certain issues arise repeatedly. Steadily increasing fishing capacity in both longline and purse seine fisheries in conjunction with declining stock condition supports the importance of accommodating changes in effective effort in stock assessment analyses. Common recommendations arising from several meetings include the need to:

- **reconstruct early catch and effort histories for all fisheries;**
- **improve historic and current estimates of catch and effort from Indonesia, the Philippines and Vietnam;**
- **develop and improve methods to standardize effort, including better use of vessel operational details;**
- **reduce levels of uncertainty in stock assessments through improved data inputs;**
- **reduce bycatch levels in pelagic fisheries and improve targeting;**
- **obtain more detailed operational data in relation to the use of FADs by large-scale fisheries.**

Annex IV to the **Convention** clearly outlines gear attributes that vessels will be required to supply for operation within the Convention Area (listed in **Appendix V**). However, additional gear and vessel attributes will likely be required to assist various studies and projects necessary for the long-term management of WCPO fisheries. **The Fishing Technology SWG** would be the logical body within the SC process to continue to work on the selection of relevant gear and vessel attributes.

6. SUMMARY AND RECOMMENDATIONS

At the conclusion of SCTB 17, it was acknowledged that the future of the FTWG, or an FTWG-like group was uncertain, but that the work conducted by the group would not disappear with the close of the last SCTB meeting. It is clear that the other SWGs listed in **Table 1** do not have a clear mandate within their Terms of Reference to pursue many of these issues. In many respects, the work required has not only disappeared but become more important to pursue in light of possible declining stock condition for major tuna species within the region.

It is recommended that the Fishing Technology SWG continue this work and take on additional work or re-prioritize issues as directed by the Scientific Committee and the needs of the region. In particular, it is recommended that in the FT SWG address the following as priority issues:

- **characterization and comparison between fleets and their fishing modes in relation to target and non-target species (particularly for juvenile bigeye and yellowfin tuna);**

- **characterization of anchored and drifting FADs and FAD monitoring technology, particularly in relation to their size and species specific aggregative qualities (both target and non-target species);**

- **the production and distribution of high quality training materials to foster species-specific reporting;**

- **promoting the regular and broad based auditing of port sampling and observer programs to improve data quality throughout the region;**

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Appendix I. Terms of Reference of the FTWG (from Report of the Fourteenth Meeting of the Standing Committee on Tuna and Billfish, 9 – 16 August 2001, Noumea, New Caledonia. pp 49 – 50).

1. The primary region of focus for the FTWG is the WCPO, currently monitored by the SCTB. However, advance in fishing technology move rapidly between ocean basins, reinforcing the need for the FTWG to work closely with research and monitoring organisations from the Atlantic, Indian and Eastern Pacific Oceans.

2. Participation: as with the SCTB and its affiliated Research and Working Parties, membership to the FTWG is open to all scientists or other parties with an interest in tuna fisheries of the WCPO.
    a. Promote membership and participation with national fisheries organisations and regional tuna management and research bodies.
    b. Promote membership and participation with key DWFN entities with purse seine and longline fleets operating in the region.
    c. Promote membership and participation with tuna industry sectors, i.e. vessel owners, fishing masters, vessel/gear manufacturers, processors, etc.
    d. Foster close collaboration with the IRD/IEO research project ESTHER and SCTB species working groups on issues related to FTWG concerns.
    e. Promote collaboration with regional tuna industry organisations, such as the World Tuna Purse Seine Organisation (WTPSO) and regional longline associations.

3. Emphasis of FTWG will be prioritised toward fisheries, gear types or recent developments in regional fisheries considered of high management concern by the FTWG and SCTB members. FTWG data collection, research and analysis will be on developments in regional fisheries with potential to significantly influence sampling programs, catch and effort analyses and any data sources useful to management related research. However, new developments in any surface fishery world-wide may be examined and reported.

4. Promote and conduct research and analysis on innovative fishing methods and technology to reduce bycatch levels.

5. Promote and conduct and research and analyses of an innovative nature to estimate increases and impacts of advancing effective fishing effort that do not require the collection of detailed technical data on gear and methods.

6. Document current status and recent innovations (previous SCTB to current SCTB) in fishing technology in categories to include but not be limited to:
    a. Fishing gear and methods, catch loading, storage, freezing, unloading and processing technologies;
    b. Drifting FADs (design, electronics, utilisation, quantities etc);
    c. Fish detection, communication and marine electronics;
    d. Remote sensing technologies.

7. Monitor and summarize recent expansions or contraction of fishing effort (vessels and fleets) in the region.

8. Examine socio-economic and other factors that may influence fishing power; i.e. experience of captain, crew composition and remuneration, vessel age, changes in vessel flag and registry, effort restrictions imposed by vessel flag state, price structure fluctuations, market shifts, etc.
9. Monitor the status of large-scaled moored FAD arrays used by industrial fishing gears.

10. Conduct analyses of existing technical data relevant to changes in effective fishing effort.

Appendix II. Chronological list of FTWG Working and Information Papers

FOURTEENTH MEETING OF THE STANDING COMMITTEE ON TUNA AND BILLFISH, Noumea, New Caledonia, 9th-16 August 2001

FT–1 Millar, C. **Review of vessel attributes in the FFA Regional Register.** Oceanic Fisheries Programme, Secretariat of the Pacific Community, Noumea, New Caledonia.

FT-2 Fonteneau, A., Gaertner, D. & V. Nordstrom. **An overview of problems in the catch per unit of effort and abundance relationship for the tropical purse seine fisheries.** Coll. Vol. Sci. Pap. ICCAT 49 (3) : 258-278.

FT-3 Coan, A. & D. Itano. **Factors that may have affected U.S. purse seine catch rates in the central-western Pacific Ocean: an examination of fishing strategy and effective fishing effort**. National Marine Fisheries Service, SWFSC and Joint Institute for Marine and Atmospheric Research

FT-4 Itano, D. **A fishing technology working group to the Standing Committee on Tuna and Billfish**. Joint Institute for Marine and Atmospheric Research, Univ. of Hawaii.

FT-5 Opnai, J. & L. Clark. **Status of the review of the Palau Arrangement**. Forum Fisheries Agency, Honiara, Solomon Islands

FT-6 Gaertner, D. & P. Pallares. **The European Union research project "Efficiency of the tuna purse seiners and effective efforts" (ESTHER)**. Institut de Recherche pour le Développement (IRD) and Instituto Español de Oceanoggrafia (IEO).

FT-7 Honda, M. **Status report of the World Tuna Purse Seine Organization (WTPO)**. Forum Fisheries Agency, Honiara, Solomon Islands.

FT-8 Brogan, D. **Status of SPC's Observer Data Collection, Standardisation and Accessibility with regard to Gear and Vessel Attributes.** Oceanic Fisheries Programme, Secretariat of the Pacific Community, Noumea, New Caledonia.

FT-9 Morón, J. **Report on Management Measures for the European Tuna Purse Seine Fleet.** APAGAC, Madrid, Spain.

FT-10 Beverly, Steve. **Longline Fishing Perspectives: Techniques, Gear, Boats, Bait and Recent Trends**. Coastal Fisheries Programme, Secretariat of the Pacific Community.

FT-11 Morón,, J., J. Areso, and P. Pallarés. **Statistics and Technical Information about the Spanish Purse-Seine Fleet in the Pacific**. APAGAC, Madrid, Spain, Spanish Fisheries Office in Seychelles, Mahé, Seychelles and Instituto Español de Oceanoggrafia (IEO), Madrid, Spain.

FT-12 Wu, R.F. & S.B. Wang. **A Brief Overview In Recent Development of Purse Seine Fishery in Taiwan.** Overseas Fisheries Development Council of the Republic of China, R.O.C.

FT-13 Kumoru, L. **Purse-Seine Operations in Papua New Guinea.** National Fisheries Authority. Papua New Guinea.

FIFTEENTH MEETING OF THE STANDING COMMITTEE ON TUNA AND BILLFISH, Hawaii Convention Center, 22-27 July 2002

FTWG-1. Coan, A. and G. Sakagawa. **The 2001 U.S. purse seine fishery for tropical tunas in the central-western Pacific**. National Marine Fisheries Service (NMFS), Southwest Fisheries Science Center, La Jolla, and National Marine Fisheries Service (NMFS), Southwest Regional Office, Pago Pago.(460k)

FTWG-2. Coan, A. and D. Itano**. An update of factors that may have affected U.S. purse seine catch rates in the central-western Pacific Ocean: An examination of fishing strategy and effective fishing effort**. National Marine Fisheries Service (NMFS), Southwest Fisheries Science Center, La Jolla, and Joint Institute for Marine and Atmospheric Research, University of Hawaii.(454k)

FTWG-3. Gaertner, D. and P. Pallares. **The European Union Research Project, Efficiency of Tuna Purse-Seiners and Effective Effort (ESTHER): Scientific report of project**. Institute of Research for Development (IRD-UR 109), Sete Cedex, France, and Spanish Institute of Oceanography (IEO), Madrid, Spain.(381k)

FTWG-4. Gaertner, D. and P. Pallares. **The European Union Research Project, Efficiency of Tuna Purse-Seiners and Effective Effort (ESTHER): ESTHER scientific documents and abstracts**. Institute of Research for Development (IRD-UR 109), Sete Cedex, France, and Spanish Institute of Oceanography (IEO), Madrid, Spain.(52k)

FTWG-5. Reales, M. **Efficiency of Tuna Purse-Seiners and Effective Effort (ESTHER): Selected annotated bibliography**. Institute of Research for Development (IRD-UR 109), Sete Cedex, France.(657k)

FTWG-6. Morón, J. **The WTPO and its significance in the world tuna purse seine fishery**. World Tuna Purse Seine Organization.(329k)

FTWG-7. World Tuna Purse Seine Organization (WTPO). **WTPO Resolution, WTPO Declaration (2nd Interim Evaluation Meeting, Kaohsiung, Taiwan, 18 June 2002)**.(300k)

FTWG-8. **Wu, R. An overview of Taiwan distant water purse seine fishery - 2001.** Overseas Fisheries Development Council of the Republic of China, Taipei, Taiwan.(2133k)

FTWG-9. Itano, D. **Vessel and gear attributes in the Forum Fisheries Agency Regional Register of Vessels: How much is enough?** Joint Institute for Marine and Atmospheric Research, University of Hawaii. (470k)

FTWG-10. Itano, D.G. **Super Superseiner**. Joint Institute for Marine and Atmospheric Research, University of Hawaii

FTWG-11 Beverly, S. **State of the Art Longliner.** Oceanic Fisheries Programme, Secretariat of the Pacific Community, Noumea, New Caledonia

FTWG-12. Kumoru, L. **Status of fish aggregating devices in Papua New Guinea**. National Fisheries Authority, Port Moresby, Papua New Guinea.(234k)

SIXTEENTH MEETING OF THE STANDING COMMITTEE ON TUNA AND BILLFISH, Mooloolaba, Queensland, Australia, 9-16 July 2003

FTWG–1 Itano, D. G. and A.L. Coan Jr. **An assessment of the accuracy of yellowfin and bigeye tuna species identification: by American Samoa port samplers.** (610k)

FTWG–2 Coan Jr., A. L. and D.G. Itano **Updates (2003) of factors that may have affected U.S. purse seine catch rates in the central-western Pacific Ocean: an examination of fishing strategy and effective fishing effort**. (358k)

FTWG–3 Itano, D. G. **Documentation and classification of fishing gear and technology on board tuna purse seine vessels**. (4,993k)

FTWG–4 Kumoru, L. **Notes on the use of FADs in the PNG purse seine fishery**. (432k)

FTWG–5 Coan Jr., A. , Crone, P. **Fishery-related attributes associated with FAD and log fishing practices conducted by the U.S. purse seine fleet in the central-western Pacific Ocean, 1997–2002.** (533k)

FTWG–6 Joseph, J. **Managing fishing capacity of the world tuna fleet [Executive Summary of FAO Fisheries Circular. No. 982]** (81k)

FTWG–7 Nelson, P. **Reducing the take of undersize tuna and bycatch in drifting FAD sets: project description.** (55k)

FTWG–8 Moron Ayala, J. **Review of activities of the World Tuna Purse-seine Organisation (June 2002–June 2003).** (629k)

FTWG–9 Beverly, S. **Proposal for a deep setting technique for longline fishing to enhance target CPUE and to avoid certain bycatch species.** Oceanic Fisheries Programme, Secretariat of the Pacific Community, Noumea, New Caledonia (95k)

SEVENTEENTH MEETING OF THE STANDING COMMITTEE ON TUNA AND BILLFISH, Majuro, Republic of Marshall Islands, 9-18 August 2004

FTWG–1 Millar C. & E. Schneiter, **Review of vessel and gear attribute data held by SPC and FFA.** Oceanic Fisheries Programme, Secretariat of the Pacific Community, Noumea, New Caledonia. (319kb)

FTWG–2 Itano, D.G. **Vessel and gear attributes useful for the long-term monitoring and management of WCPO tropical tuna fisheries**. Pelagic Fisheries Research Program. JIMAR. University of Hawaii. USA. (150kb)

FTWG–3 Williams, P.G. **Average purse seine vessel production in the Western and Central Pacific Ocean (WCPO) by fleet for the period 1980 – 2003**. Oceanic Fisheries Programme, Secretariat of the Pacific Community, Noumea, New Caledonia. (222kb)

FTWG–4 Langley, A. **An analysis of the main factors influencing the catch of bigeye tuna in purse seine drifting FAD sets.** Oceanic Fisheries Programme, Secretariat of the Pacific Community, Noumea, New Caledonia. (637kb)

FTWG–5 Squires, D. & C. Reid. **Using Malmquist indices to measure changes in total factor productivity of purse-seine vessels while accounting for changes in capacity utilisation, the resource stock and the environment.** National Marine Fisheries Service, USA. Forum Fisheries Agency, Honiara, Solomon Islands. (206kb)

FTWG–6 Rodwell, L. **FFA initiatives related to the Palau Arrangement, purse seine management and the management of bigeye fishing mortality in the WCPO.** Forum Fisheries Agency, Honiara, Solomon Islands. (58kb)

FTWG–7 Misc. **Technology related projects and proposals to mitigate bycatch levels in longline and purse seine fisheries.**

a. Trial setting of deep longline techniques to reduce bycatch and increase targeting of deep-swimming tunas. (S. Beverly and D. Itano) (1430kb)

b. **Assessment of methods to minimize seabird mortality in Hawaii pelagic longline fisheries – abstract.** [in review] (Gilman E., Brothers N., Kobayashi D) (115kb)

c. **Performance assessment of an underwater setting chute to mitigate seabird bycatch in the Hawaii pelagic longline tuna fishery – abstract**. (Gilman, E., C. Boggs, and N. Brothers) (115kb)

d. **State of knowledge for minimizing turtle bycatch in pelagic longline fisheries – abstract.** [in review] (Gilman, E., J. Watson, C. Boggs) (115kb)

e. **Effects of bait color on sea turtle-longline fishing gear interactions: Can blue bait reduce turtle bycatch in commercial fisheries?** (Y. Swimmer, R. Arauz, J. Ballestero, L. McNaughton, B. Higgins, M. McCracken, R. Brill) (111kb)

f. **Survivorship and dive behavior of olive ridley (Lepidochelys olivacea) sea turtles after their release from longline fishing gear off Costa Rica**. (Y. Swimmer, R. Arauz, M. Musyl, L. M c Naughton, J. Ballestero, R. Brill) (115kb)

g. **Reducing juvenile bigeye tuna mortality in FAD sets.** (P. Nelson). Inter-American Tropical Tuna Commission. (423kb)

INF–FTWG–1 Misc. **UPDATE OF TUNA HARVESTING CAPACITY ISSUES RELEVANT TO WCPO PELAGIC FISHERIES.**

a. **Extracts from "BRIEF REVIEW OF WORLD TUNA FISHERIES" – abstract and summary.** (P. M. Miyake) (287kb)

b. **Abstract from "REVIEW OF LONGLINE FLEET CAPACITY OF THE WORLD"** (P. M. Miyake) (187kb)

c. **A survey of purse seine fishing capacity in the western and central Pacific Ocean, 1988 to 2003: Executive Summary.** (R. Gillett and A.D. Lewis). Administrative Report AR-PIR-03-04, National Marine Fisheries Service, Pacific Islands Region. (137kb)

d. Report of the Second Meeting of the Technical Advisory Committee (TAC) GCP/INT/851/JPN. Madrid, Spain, 15-18 March 2004. **MANAGEMENT OF TUNA FISHING CAPACITY: CONSERVATION AND SOCIO-ECONOMICS**. FAO/Government of Japan Cooperative Programme. Meeting Report No. 2. Food and Agriculture Organization of the United Nations. Rome, April 2004. (412kb)

INF–FTWG–2 Swenarton, T. & S. Beverly**. Documentation and classification of fishing gear and technology on board pelagic longline vessels – Hawaii module**. NOAA Fisheries, Pacific Islands Regional Office, Honolulu, Hawaii. Oceanic Fisheries Programme, Secretariat of the Pacific Community, Noumea, New Caledonia. (1,165kb)

INF–FTWG–3 Fukofuka, S., D. Brogan & D. Itano. **The development, design and current status of anchored and drifting FADs in the WCPO.** Oceanic Fisheries Programme, Secretariat of the Pacific Community, Noumea, New Caledonia. Pelagic Fisheries Research Program. JIMAR. University of Hawaii. USA. (2,186 kb)

INF–FTWG–4 Itano, D.G. **Handbook for the identification of yellowfin and bigeye tunas in frozen condition.** Pelagic Fisheries Research Program. JIMAR. University of Hawaii. USA. Oceanic Fisheries Programme, Secretariat of the Pacific Community, Noumea, New Caledonia. (3,198kb)

INF–FTWG–5 Itano, D.G. **Handbook for the identification of yellowfin and bigeye tunas in fresh condition.** Pelagic Fisheries Research Program. JIMAR. University of Hawaii. USA. Oceanic Fisheries Programme, Secretariat of the Pacific Community, Noumea, New Caledonia. (2,954kb)

Appendix III. Miscellaneous FTWG related papers from SCTB Meetings

SCTB 11

WP 8. Park, Y.C., D.Y. Moon & S.J. Hwang. **Review of changes for the Korean tuna purse seine fleet and fishing methods.** National Research and Development Institute, Pusan, Korea. 7 pp.

WP 48. Itano, D. **Notes on the improvement of fishing power and efficiency in the western tropical Pacific tuna purse seine fishery**. Pelagic Fisheries Research Program, Joint Institute of Marine and Atmospheric Research, University of Hawaii at Manoa, Honolulu, Hawaii, United States of America. 8 pp.

SCTB 12

MHLC-2 (SCTB12): Williams, P.G. **Species encountered in the western and central Pacific longline and purse-seine fisheries.** Oceanic Fisheries Programme, Secretariat of the Pacific Community, Noumea, New Caledonia.

SCTB 13

RG–3 Shono H., T. Matsumoto, M. Ogura & N. Miyabe. **Preliminary analysis of effect of fishing gears on catch rate for the Japanese purse seine fishery.** National Research Institute of Far Seas Fisheries. Japan.

RG–7 Matsumoto, T., M. Ogura, N. Miyabe & H. Shono. **Creation of a database to identify factors affecting CPUE of the Japanese equatorial purse seine fishery.** National Research Institute of Far Seas Fisheries. Japan.

BBRG–6 Matsumoto, T., Y. Uozumi, K. Uosaki, & M.Okazaki. **Preliminary review of billfish hooking depth measured by small bathythermograph systems attached to longline gear.** National Research Institute of Far Seas Fisheries. Japan.

SCTB 14

SWG-7 Millar, C. **Classification of purse-seine effort by school association.** Oceanic Fisheries Programme, Secretariat of the Pacific Community, Noumea, New Caledonia.

SWG-11 Millar, C & P. Williams**. Taiwanese distant-water longline catch characteristics with regard to albacore targeting**. Oceanic Fisheries Programme, Secretariat of the Pacific Community, Noumea, New Caledonia

No reference. Park, T. 2001. **Vessel Operating Profile Report**. Internal report to the Micronesian Maritime Authority, Pohnpei, Federated States of Micronesia. 133 pp.

NFR-1 Australia Ward, P. & C. Robins. **Tuna and billfish fisheries of the north-eastern Australian Fishing Zone.** Bureau of Resource Sciences. Australia.

NFR-3 CHINA Dai Xiaojie. **National Report of China.** Department of Marine Fishery Science and Technology, College of Oceanography, Shanghai Fisheries University

NFR–8 Korea Koh, J. **Korean tuna fisheries in the western Pacific Ocean.** National Fisheries Research and Development Institute (NFRDI). Republic of Korea.

NFR–10 New Zealand Murray, T. & L. Griggs. **NATIONAL TUNA FISHERY REPORT 2001 – NEW ZEALAND.** National Institute of Water and Atmospheric Research Ltd. (NIWA), Wellington.

NFR–13 Taiwan Wang, S-B, & C-L. Kuo. **Update on tuna Fisheries of Taiwan in the Pacific Region.** Overseas Fisheries Development Council of the Republic of China and Fisheries Administration, Council of Agriculture, R.O.C.

NFR-15 USA Coan, A., J. Childers, R. Ito, B. Kikkawa & D. Hamm. **Summary of U.S. fisheries statistics for highly migratory species in the central-western Pacific, 1996-2000**. National Marine Fisheries Service. USA

SCTB 15

GEN-2 O'Malley, J. and S. Pooley. **Description and Economic Analysis of Large American Samoa Longline Fleets.** National Marine Fisheries Service (NMFS), Honolulu Laboratory, Hawaii.(328k)

GEN-3. O'Malley, J. and S. Pooley. **Economic and operational characteristics of the Hawaii longline fleet in 2000.** National Marine Fisheries Service (NMFS), Honolulu Laboratory, Hawaii.(333k)

NFR-4. Xu Liuxiong. National report of China. Ocean College, Shanghai Fisheries University, Shanghai, P.R. China.(231k)

NFR-2. Bromhead D., Findlay J. National tuna fishery report. Tuna and billfish fisheries of the eastern Australian fishing zone. Fisheries and Marine Science, Bureau of rural science, Canberra, Australia (855k)

NFR-4. Xu Liuxiong. National report of China. Ocean College, Shanghai Fisheries University, Shanghai, P.R. China.(231k)

NFR-9. Retnowati, D. Tuna and Tuna-like fisheries in Indonesia. Directorate General of Capture Fishery, Sub directorate of data and statistics, Jakarta, Indonesia.(680k)

NFR-10. Koh J.R, Moon D.Y, An D.H. National tuna fisheries report for 2002 - Korea. National Fisheries Research Development Institute, Pusan, Republic of Korea (221k)

NFR-13. Murray, T., Griggs, L., and P. Wallis. New Zealand Domestic Tuna Fisheries, 1990 - 2001. National Institute of Water and Atmospheric Research Ltd., Wellington and Ministry of Fisheries, Wellington.(258k)

NFR-18.Barut, N. National tuna fishery report - Philippines. Marine Fishery Research Division, National Fisheries Research and Development Institute, Quezon city, Philippines.(635k)

NFR-22. Wang, S-H, S-B Wang, and C-L Kuo. National report: Update on tuna fisheries of Taiwan in the Pacific Region. Overseas Fisheries Development Council of the Republic of China and Fisheries Administration, Council of Agriculture, R.O.C.(1150k)

NFR-24. Ito, R., D. Hamm, A. Coan, and J. Childers. Summary of U.S. fisheries statistics for highly migratory species in the central-western Pacific, 1997-2001. National Marine Fisheries Service (NMFS), Honolulu Laboratory and National Marine Fisheries Service (NMFS), Southwest Fisheries Science Center, La Jolla.(647k)

NFR-26. Duong Long Tri. Vietnam fisheries report. Fisheries Information Centre (FICen),Ministry of Fisheries, Hanoi, Vietnam.(244k)

SCTB 16

NFR–2 AUSTRALIA - Bromhead, D. and J. Findlay. Tuna and billfish fisheries of the eastern Australian fishing zone and adjacent high seas. Bureau of Rural Sciences. Agriculture, Fisheries and Forestry – Australia. ACT, Australia. (139k)

NFR–4 CHINA - XU Liuxiong. National Tuna Fisheries Report of China in the WCPO. Shanghai Fisheries University. Peoples Republic of China. (111k)

NFR–10 INDONESIA - Merta, G. The status of tuna research in eastern part of Indonesia waters. Research Institute of Marine Fisheries. Indonesia. (71k)

NFR–11 JAPAN - Miyabe, N., M. Ogura, T. Matsumoto and Y. Nishikawa. National tuna fisheries report of Japan as of 2003. National Research Institute of Far Seas Fisheries, Shimizu, Japan. (1,855k)

NFR–13 KOREA - Koh, J-r, D-y Moon and D-h An. National Tuna Fisheries Report in 2003. National Fisheries Research and Development Institute, Busan, Korea (99k)

NFR–17 NEW ZEALAND Murray, T and Smith, N. New Zealand Domestic Tuna Fisheries in 2001. NIWA and Ministry of Fisheries, Wellington New Zealand

NFR-21 PAPUA NEW GUINEA Kumoru, L. and A. Lewis. **National fisheries report – Papua New Guinea.** Papua New Guinea National Fisheries Authority, Port Moresby, Papua New Guinea. (155k)

NFR–22 PHILIPPINES - Barut, N. National tuna fisheries report for the Philippines. National Fisheries Research Institute. Philippines. (91)

NFR–25 TAIWAN - National Report – Update on Tuna Fisheries of Taiwan in the Pacific Region. Overseas Fisheries Development Council. Fisheries Agency, Council of Agriculture, Taiwan. (817k - scanned)

NFR–29 USA - Ito, R., D. Hamm, A. Coan Jr. and J. Childers. Summary of U.S. fisheries for highly migratory species caught in the central-western Pacific, 1998-2002. National Marine Fisheries Service. Pacific Islands Fisheries Science Center. Hawaii. La Jolla. (365k)

SCTB 17

GEN–2 Molony, B.W. **Review of fleet capacity, catch and effort of the purse-seine fleets in the Western Central Pacific Ocean, with emphasis on the use of FADs.** Oceanic Fisheries Programme, Secretariat of the Pacific Community, Noumea, New Caledonia. (2,203kb)

GEN–3 Molony, B.W. **Review of fleet capacity, catch and effort of the long-line fleets in the Western Central Pacific Ocean.** Oceanic Fisheries Programme, Secretariat of the Pacific Community, Noumea, New Caledonia. (732kb)

NFR–2 AUSTRALIA - Ward, P., Bromhead, D. TUNA AND BILLFISH FISHERIES OF THE EASTERN AUSTRALIAN FISHING ZONE AND ADJACENT HIGH SEAS. Fisheries and Marine Sciences, Bureau of Rural Sciences, Dept. of Agriculture, Fisheries and Forestry, CANBERRA, AUSTRALIA (680kb)

NFR–4 CHINA - Song L., L. Xu, X. Dai. National Tuna Fishery Report of China in WCPO. Shanghai Fisheries University, Mainland China. (191kb)

NFR–11 JAPAN Miyabe, N., M. Ogura, T. Matsumoto and Y. Nishikawa. National Tuna Fisheries Report of Japan as of 2004. Fisheries Research Agency National Research Institute of Far Seas Fisheries (NRIFSF), Japan (1,388kb)

NFR–13 KOREA Moon, D-Y, Soon-Song Kim and J-R Koh. Korean Tuna Fisheries in the western and central Pacific Ocean. National Fisheries Research and Development Institute, Busan, Korea. (228kb)

NFR–17 NEW ZEALAND Kendrick, T. and Murray, T. New Zealand Domestic Tuna Fisheries in 2002 and 2003. National Institute of Water and Atmospheric Research, New Zealand. Ministry of Fisheries, New Zealand. (391kb)

NFR–25 TAIWAN - Update on Tuna Fisheries of Taiwan in the Western and Central Pacific Region. Overseas Fisheries Development Council of the Republic of China and Fisheries Agency, Council of Agriculture, R.O.C.(851kb)

NFR–29 USA Russell Y. Ito and David C. Hamm, Atilio L. Coan, Jr. and John Childers. Summary of U.S. fisheries for Highly Migratory Species in the Western-Central Pacific Ocean, 1999-2003. National Marine Fisheries Service, Pacific Islands Fisheries Science Center, Honolulu, Hawaii. National Marine Fisheries Service, Southwest Fisheries Science Center, La Jolla, USA. (653kb)

Appendix IV. Fishing Technology Working Group Working and Information Papers sorted by category.

General description of FTWG

FTWG-4 (14) Itano, D**. A fishing technology working group to the Standing Committee on Tuna and Billfish**. Joint Institute for Marine and Atmospheric Research, Univ. of Hawaii.

Effort standardization and estimation of effective fishing effort

RG–3 (13) RG–3 Shono H., T. Matsumoto, M. Ogura & N. Miyabe. **Preliminary analysis of effect of fishing gears on catch rate for the Japanese purse seine fishery.** National Research Institute of Far Seas Fisheries. Japan.

RG–7 (13) RG–7 Matsumoto, T., M. Ogura, N. Miyabe & H. Shono. **Creation of a database to identify factors affecting CPUE of the Japanese equatorial purse seine fishery.** National Research Institute of Far Seas Fisheries. Japan.

BBRG–6 (13) Matsumoto, T., Y. Uozumi, K. Uosaki, & M.Okazaki. **Preliminary review of billfish hooking depth measured by small bathythermograph systems attached to longline gear**. National Research Institute of Far Seas Fisheries. Japan.

FTWG-2 (14) Fonteneau, A., Gaertner, D. & V. Nordstrom. **An overview of problems in the catch per unit of effort and abundance relationship for the tropical purse seine fisheries.** Coll. Vol. Sci. Pap. ICCAT 49 (3) : 258-278.

FTWG-6 (14) Gaertner, D. & P. Pallares. **The European Union research project "Efficiency of the tuna purse seiners and effective efforts" (ESTHER)**. Institut de Recherche pour le Développement (IRD) and Instituto Español de Oceanoggrafia (IEO).

FTWG-3 (15) Gaertner, D. and P. Pallares. **The European Union Research Project, Efficiency of Tuna Purse-Seiners and Effective Effort (ESTHER): Scientific report of project**. Institute of Research for Development (IRD-UR 109), Sete Cedex, France, and Spanish Institute of Oceanography (IEO), Madrid, Spain.(381k)

FTWG-4 (15) Gaertner, D. and P. Pallares. **The European Union Research Project, Efficiency of Tuna Purse-Seiners and Effective Effort (ESTHER): ESTHER scientific documents and abstracts**. Institute of Research for Development (IRD-UR 109), Sete Cedex, France, and Spanish Institute of Oceanography (IEO), Madrid, Spain.(52k)

FTWG-5 (15) Reales, M. **Efficiency of Tuna Purse-Seiners and Effective Effort (ESTHER): Selected annotated bibliography**. Institute of Research for Development (IRD-UR 109), Sete Cedex, France.(657k)

FTWG–3 (17) Williams, P.G. **Average purse seine vessel production in the Western and Central Pacific Ocean (WCPO) by fleet for the period 1980 – 2003**. Oceanic Fisheries Programme, Secretariat of the Pacific Community, Noumea, New Caledonia. (222kb)

FTWG–5 (17) Squires, D. & C. Reid. **Using Malmquist indices to measure changes in total factor productivity of purse-seine vessels while accounting for changes in capacity utilisation, the resource stock and the environment.** National Marine Fisheries Service, USA. Forum Fisheries Agency, Honiara, Solomon Islands. (206kb)

Fishing strategy and influences on effective fishing effort

WP 8 (11). Park, Y.C., D.Y. Moon & S.J. Hwang. **Review of changes for the Korean tuna purse seine fleet and fishing methods.** National Research and Development Institute, Pusan, Korea. 7 pp.

WP 48 (11). Itano, D. **Notes on the improvement of fishing power and efficiency in the western tropical Pacific tuna purse seine fishery**. Pelagic Fisheries Research Program, Joint Institute of Marine and Atmospheric Research, University of Hawaii at Manoa, Honolulu, Hawaii, United States of America. 8 pp.

SWG-7 (14) Millar, C. **Classification of purse-seine effort by school association.** Oceanic Fisheries Programme, Secretariat of the Pacific Community, Noumea, New Caledonia.

FTWG-10 (14) Beverly, Steve. **Longline Fishing Perspectives: Techniques, Gear, Boats, Bait and Recent Trends**. Coastal Fisheries Programme, Secretariat of the Pacific Community.

FTWG-3 (14) Coan, A. & D. Itano. **Factors that may have affected U.S. purse seine catch rates in the central-western Pacific Ocean: an examination of fishing strategy and effective fishing effort**. National Marine Fisheries Service, SWFSC and Joint Institute for Marine and Atmospheric Research

FTWG-2 (15) Coan, A. and D. Itano**. An update of factors that may have affected U.S. purse seine catch rates in the central-western Pacific Ocean: An examination of fishing strategy and effective fishing effort**. National Marine Fisheries Service (NMFS), Southwest Fisheries Science Center, La Jolla, and Joint Institute for Marine and Atmospheric Research, University of Hawaii.(454k)

FTWG–2 (16) Coan Jr., A. L. and D.G. Itano **Updates (2003) of factors that may have affected U.S. purse seine catch rates in the central-western Pacific Ocean: an examination of fishing strategy and effective fishing effort**. (358k)

FTWG–4 (17) Langley, A. **An analysis of the main factors influencing the catch of bigeye tuna in purse seine drifting FAD sets.** Oceanic Fisheries Programme, Secretariat of the Pacific Community, Noumea, New Caledonia. (637kb)

Vessel and gear attributes

FTWG–1 (14) Millar, C. **Review of vessel attributes in the FFA Regional Register.** Oceanic Fisheries Programme, Secretariat of the Pacific Community, Noumea, New Caledonia.

FTWG-8 (14) Brogan, D. **Status of SPC's Observer Data Collection, Standardisation and Accessibility with regard to Gear and Vessel Attributes.** Oceanic Fisheries Programme, Secretariat of the Pacific Community, Noumea, New Caledonia.

FTWG-9 (15) Itano, D. **Vessel and gear attributes in the Forum Fisheries Agency Regional Register of Vessels: How much is enough?** Joint Institute for Marine and Atmospheric Research, University of Hawaii. (470k)

FTWG–5 (16) Coan Jr., A. , Crone, P. **Fishery-related attributes associated with FAD and log fishing practices conducted by the U.S. purse seine fleet in the central-western Pacific Ocean, 1997–2002.** (533k)

FTWG–1 (17) Millar C. & E. Schneiter, **Review of vessel and gear attribute data held by SPC and FFA.** Oceanic Fisheries Programme, Secretariat of the Pacific Community, Noumea, New Caledonia. (319kb)

FTWG–2 (17) Itano, D.G. **Vessel and gear attributes useful for the long-term monitoring and management of WCPO tropical tuna fisheries**. Pelagic Fisheries Research Program. JIMAR. University of Hawaii. USA. (150kb)

Documentation of fishing gear and technology

FTWG-10 (14) Beverly, Steve. **Longline Fishing Perspectives: Techniques, Gear, Boats, Bait and Recent Trends**. Coastal Fisheries Programme, Secretariat of the Pacific Community.

FTWG-11 (14) Morón,, J., J. Areso, and P. Pallarés. **Statistics and Technical Information about the Spanish Purse-Seine Fleet in the Pacific**. APAGAC, Madrid, Spain, Spanish Fisheries Office in Seychelles, Mahé, Seychelles and Instituto Español de Oceanoggrafia (IEO), Madrid, Spain.

FTWG-10 (15). Itano, D.G. **Super Superseiner**. Joint Institute for Marine and Atmospheric Research, University of Hawaii

FTWG-11 (15) Beverly, S. **State of the Art Longliner.** Oceanic Fisheries Programme, Secretariat of the Pacific Community, Noumea, New Caledonia

FTWG–3 (16) Itano, D. G. **Documentation and classification of fishing gear and technology on board tuna purse seine vessels**. (4,993k)

FTWG–9 (16) Beverly, S. **Proposal for a deep setting technique for longline fishing to enhance target CPUE and to avoid certain bycatch species.** Oceanic Fisheries Programme, Secretariat of the Pacific Community, Noumea, New Caledonia (95k)

INF–FTWG–2 (17) Swenarton, T. & S. Beverly. **Documentation and classification of fishing gear and technology on board pelagic longline vessels – Hawaii module**. NOAA Fisheries, Pacific Islands Regional Office, Honolulu, Hawaii. Oceanic Fisheries Programme, Secretariat of the Pacific Community, Noumea, New Caledonia. (1,165kb)

Fish Aggregation Devices

FTWG-3 (14) Kumoru, L. **Purse-Seine Operations in Papua New Guinea.** National Fisheries Authority. Papua New Guinea.

FTWG-12.(15) Kumoru, L. **Status of fish aggregating devices in Papua New Guinea**. National Fisheries Authority, Port Moresby, Papua New Guinea.(234k)

FTWG–4 (16) Kumoru, L. **Notes on the use of FADs in the PNG purse seine fishery**. (432k)

FTWG–5 (16) Coan Jr., A. , Crone, P. **Fishery-related attributes associated with FAD and log fishing practices conducted by the U.S. purse seine fleet in the central-western Pacific Ocean, 1997–2002.** (533k)

FTWG–4 (17) Langley, A. **An analysis of the main factors influencing the catch of bigeye tuna in purse seine drifting FAD sets.** Oceanic Fisheries Programme, Secretariat of the Pacific Community, Noumea, New Caledonia. (637kb)

INF–FTWG–3 (17) Fukofuka, S., D. Brogan & D. Itano. **The development, design and current status of anchored and drifting FADs in the WCPO.** Oceanic Fisheries Programme, Secretariat of the Pacific Community, Noumea, New Caledonia. Pelagic Fisheries Research Program. JIMAR. University of Hawaii. USA. (2,186 kb)

GEN–2 (17) Molony, B.W. **Review of fleet capacity, catch and effort of the purse-seine fleets in the Western Central Pacific Ocean, with emphasis on the use of FADs.** Oceanic Fisheries Programme, Secretariat of the Pacific Community, Noumea, New Caledonia. (2,203kb)

GEN–3 (17) Molony, B.W. **Review of fleet capacity, catch and effort of the long-line fleets in the Western Central Pacific Ocean**. Oceanic Fisheries Programme, Secretariat of the Pacific Community, Noumea, New Caledonia. (732kb)

Training and information materials in support of improved catch and effort data

MHLC-2 (SCTB 12) : Williams, P.G. **Species encountered in the western and central Pacific longline and purse-seine fisheries.** Oceanic Fisheries Programme, Secretariat of the Pacific Community, Noumea, New Caledonia.

FTWG–1 (16) Itano, D. G. and A.L. Coan Jr. **An assessment of the accuracy of yellowfin and bigeye tuna species identification: by American Samoa port samplers.** (610k)

INF–FTWG–4 (17) Itano, D.G. **Handbook for the identification of yellowfin and bigeye tunas in frozen condition.** Pelagic Fisheries Research Program. JIMAR. University of Hawaii. USA. Oceanic Fisheries Programme, Secretariat of the Pacific Community, Noumea, New Caledonia. (3,198kb)

INF–FTWG–5 (17) Itano, D.G. **Handbook for the identification of yellowfin and bigeye tunas in fresh condition**. Pelagic Fisheries Research Program. JIMAR. University of Hawaii. USA. Oceanic Fisheries Programme, Secretariat of the Pacific Community, Noumea, New Caledonia. (2,954kb)

Gear modifications for bycatch reduction and increased targeting

SWG-11 (14) Millar, C & P. Williams**. Taiwanese distant-water longline catch characteristics with regard to albacore targeting**. Oceanic Fisheries Programme, Secretariat of the Pacific Community, Noumea, New Caledonia

FTWG–7 (16) Nelson, P. **Reducing the take of undersize tuna and bycatch in drifting FAD sets: project description.** (55k)

FTWG–9 (16) Beverly, S. **Proposal for a deep setting technique for longline fishing to enhance target CPUE and to avoid certain bycatch species.** Oceanic Fisheries Programme, Secretariat of the Pacific Community, Noumea, New Caledonia (95k)

FTWG–7 (17) Misc. **Technology related projects and proposals to mitigate bycatch levels in longline and purse seine fisheries.**

a. Trial setting of deep longline techniques to reduce bycatch and increase targeting of deep-swimming tunas. (S. Beverly and D. Itano) (1430kb)

b. **Assessment of methods to minimize seabird mortality in Hawaii pelagic longline fisheries – abstract.** [in review] (Gilman E., Brothers N., Kobayashi D) (115kb)

c. **Performance assessment of an underwater setting chute to mitigate seabird bycatch in the Hawaii pelagic longline tuna fishery – abstract**. (Gilman, E., C. Boggs, and N. Brothers) (115kb)

d. **State of knowledge for minimizing turtle bycatch in pelagic longline fisheries – abstract.** [in review] (Gilman, E., J. Watson, C. Boggs) (115kb)

e. **Effects of bait color on sea turtle-longline fishing gear interactions: Can blue bait reduce turtle bycatch in commercial fisheries?** (Y. Swimmer, R. Arauz, J. Ballestero, L. McNaughton, B. Higgins, M. McCracken, R. Brill) (111kb)

f. **Survivorship and dive behavior of olive ridley (Lepidochelys olivacea) sea turtles after their release from longline fishing gear off Costa Rica**. (Y. Swimmer, R. Arauz, M. Musyl, L. M c Naughton, J. Ballestero, R. Brill) (115kb)

g. **Reducing juvenile bigeye tuna mortality in FAD sets.** (P. Nelson). Inter-American Tropical Tuna Commission. (423kb)

Fleet characterization, recent developments and innovations

SWG-11 (14) Millar, C & P. Williams**. Taiwanese distant-water longline catch characteristics with regard to albacore targeting**. Oceanic Fisheries Programme, Secretariat of the Pacific Community, Noumea, New Caledonia

No reference. SCTB 14 Park, T. 2001. **Vessel Operating Profile Report**. Internal report to the Micronesian Maritime Authority, Pohnpei, Federated States of Micronesia. 133 pp.

FTWG2 (14) Wu, R.F. & S.B. Wang. **A Brief Overview In Recent Development of Purse Seine Fishery in Taiwan.** Overseas Fisheries Development Council of the Republic of China, R.O.C.

FTWG-1 (15) Coan, A. and G. Sakagawa. **The 2001 U.S. purse seine fishery for tropical tunas in the central-western Pacific**. National Marine Fisheries Service (NMFS), Southwest Fisheries Science Center, La Jolla, and National Marine Fisheries Service (NMFS), Southwest Regional Office, Pago Pago.(460k)

FTWG-8 (15) Wu, R. An overview of Taiwan distant water purse seine fishery - 2001. Overseas Fisheries Development Council of the Republic of China, Taipei, Taiwan.(2133k)

GEN-2 (15) O'Malley, J. and S. Pooley. **Description and Economic Analysis of Large American Samoa Longline Fleets.** National Marine Fisheries Service (NMFS), Honolulu Laboratory, Hawaii.(328k)

GEN-3.(15) O'Malley, J. and S. Pooley. **Economic and operational characteristics of the Hawaii longline fleet in 2000**. National Marine Fisheries Service (NMFS), Honolulu Laboratory, Hawaii.(333k)

FTWG–3 (17) Williams, P.G. **Average purse seine vessel production in the Western and Central Pacific Ocean (WCPO) by fleet for the period 1980 – 2003**. Oceanic Fisheries Programme, Secretariat of the Pacific Community, Noumea, New Caledonia. (222kb)

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SCTB 14

NFR-1 (14) Australia Ward, P. & C. Robins. **Tuna and billfish fisheries of the north-eastern Australian Fishing Zone.** Bureau of Resource Sciences. Australia.

NFR-3 (14) CHINA Dai Xiaojie. **National Report of China.** Department of Marine Fishery Science and Technology, College of Oceanography, Shanghai Fisheries University

NFR–8 (14) Korea Koh, J. **Korean tuna fisheries in the western Pacific Ocean.** National Fisheries Research and Development Institute (NFRDI). Republic of Korea.

NFR–10 (14) New Zealand Murray, T. & L. Griggs. **NATIONAL TUNA FISHERY REPORT 2001 – NEW ZEALAND.** National Institute of Water and Atmospheric Research Ltd. (NIWA), Wellington.

NFR–13 (14) Taiwan Wang, S-B, & C-L. Kuo. **Update on tuna Fisheries of Taiwan in the Pacific Region.** Overseas Fisheries Development Council of the Republic of China and Fisheries Administration, Council of Agriculture, R.O.C.

NFR-15 (14) USA Coan, A., J. Childers, R. Ito, B. Kikkawa & D. Hamm. **Summary of U.S. fisheries statistics for highly migratory species in the central-western Pacific, 1996-2000**. National Marine Fisheries Service. USA

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SCTB 15

NFR-4 (15) Xu Liuxiong. National report of China. Ocean College, Shanghai Fisheries University, Shanghai, P.R. China.(231k)

NFR-2 (15) Bromhead D., Findlay J. National tuna fishery report. Tuna and billfish fisheries of the eastern Australian fishing zone. Fisheries and Marine Science, Bureau of rural science, Canberra, Australia (855k)

NFR-4 (15) Xu Liuxiong. National report of China. Ocean College, Shanghai Fisheries University, Shanghai, P.R. China.(231k)

NFR-9 (15) Retnowati, D. Tuna and Tuna-like fisheries in Indonesia. Directorate General of Capture Fishery, Sub directorate of data and statistics, Jakarta, Indonesia.(680k)

NFR-10 (15) Koh J.R, Moon D.Y, An D.H. National tuna fisheries report for 2002 - Korea. National Fisheries Research Development Institute, Busan, Republic of Korea (221k)

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Appendix V. Annex IV to the Convention stipulating information required of each fishing vessel operating under conditions of the Convention

ANNEX IV. INFORMATION REQUIREMENTS

The following information shall be provided to the Commission in respect of each fishing vessel entered in the record required to be maintained under article 24, paragraph 4, of this Convention:

1. Name of fishing vessel, registration number, previous names (if known), and port of registry;
2. Name and address of owner or owners;
3. Name and nationality of master;
4. Previous flag (if any);
5. International Radio Call Sign;
6. Vessel communication types and numbers (INMARSAT A, B and C numbers and satellite telephone number);
7. Colour photograph of vessel;
8. Where and when built;
9. Type of vessel;
10. Normal crew complement;
11. Type of fishing method or methods;
12. Length;
13. Moulded depth;
14. Beam;
15. Gross register tonnage;
16. Power of main engine or engines;
17. The nature of the authorization to fish granted by the flag State;
18. Carrying capacity, including freezer type, capacity and number and fish hold capacity.

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