NATIONAL MARINE FISHERIES SERVICE REPORT

National Marine Fisheries Service (NMFS) Southwest Region and Science Center will briefly report on recent developments relevant to highly migratory species fisheries and issues of interest to the Council.

Attachment 2 is a letter sent by Mr. Rod McInnis, NMFS Southwest Regional Administrator, to Council Chair Hansen about the Council's recommendation to issue an exempted fishing permit for certain drift gillnet vessels.

Council Task:

Discussion.

Reference Materials:

1. Agenda Item F.1.a, Attachment 1, NMFS Southwest Region Report.
2. Agenda Item F.1.a, Attachment 2, Letter to Chair Hansen on Council exempted fishing permit recommendation.
3. Agenda Item F.1.c, HMSMT Report.
4. Agenda Item F.1.c, HMSAS Report.

Agenda Order:

a. Southwest Region Activity Report — Mark Helvey
b. Southwest Fishery Science Center Report — Gary Sakagawa
c. Reports and Comments of Advisory Bodies
d. Public Comment
e. Council Discussion

PFMC
08/23/07

Agenda Item F.1.a
Attachment 1
September 2007

NMFS SWR Report

I. Regulatory Activities

CPFV Vessel Markings: NMFS issued a final rule to amend vessel identification regulations of the Fishery Management Plan (FMP) for U.S. West Coast Fisheries for Highly Migratory Species (HMS) on August 6, 2007 and effective September 5, 2007. The current regulatory text requires all commercial fishing vessels and recreational charter vessels fishing under the HMS FMP to display their official numbers on the port and starboard sides of the deckhouse or hull so as to be visible from enforcement vessels and aircraft. The final rule exempts HMS recreational charter vessels from complying with the vessel identification requirements. The regulation relieves a restriction for which the costs outweigh the benefits. Current state and U.S. Coast Guard marking requirements are sufficient for law enforcement personnel to adequately identify HMS recreational charter vessels at sea.

Tropical Tuna 2007 Conservation Measures: NMFS published a final rule on June 4, 2007, and effective August 1, 2007, to implement the 2007 management measures to reduce overfishing of the eastern Pacific Ocean (EPO) tuna stocks in 2007, consistent with recommendations by the Inter-American Tropical Tuna Commission (IATTC) that have been approved by the Department of State under the Tuna Conventions Act. The U.S. purse seine fishery for yellowfin, bigeye, and skipjack tunas in the EPO closed for a 6–week period beginning August 1, 2007, through September 11, 2007. The longline fishery for bigeye tuna will close when a 500 metric ton (mt) limit has been reached. These actions are taken to limit fishing mortality caused by purse seine fishing and longline fishing in the EPO and contribute to long-term conservation of the tuna stocks at levels that support healthy fisheries.

Tuna Bag Limits: NMFS issued a proposed rule on June 27, 2007, to implement daily bag limits for sport-caught albacore and bluefin tuna in the Exclusive Economic Zone off California under the HMS FMP. The proposed rule would be implemented as a conservation measure as part of the 2007–2009 biennial management cycle as established in the HMS FMP Framework provisions for changes to routine management measures. The comment period ended July 27, 2007 and the final rule package was to be submitted late August.

II. Other Activities:

Drift Gillnet Leatherback Sea Turtle Conservation Area: When NMFS denied the Drift Gillnet Exempted Fishing Permit in June, 2007, it did not foreclose a reexamination of the seasonal closure using fishery independent information. The agency recognizes that considerable information on leatherback turtle distribution and migratory routes has been collected since the closure went into effect in 2001 including data from the most recent field season. Southwest Fisheries Science Center turtle experts are preparing to meet in November with Southwest Region staff to examine the baseline of what is currently known about the migration of leatherback sea turtles along the West Coast and determine whether there is sufficient information to reconfigure the seasonal closure. NMFS staff will also use the workshop to identify what additional data needs are required and use that to prepare a research plan. NMFS intends to submit a report of their results to the Council in spring 2008.

Shallow-Set Longline Exempted Fishing Permit (EFP): The SWR was notified on August 7, 2007, by way of a letter from Mr. David Kennedy, Director of NOAA's Office of Ocean and Coastal Resource Management (OCRM), to Mr. Peter Douglas, Executive Director of the California Coastal Commission (CCC), that OCRM had approved CCC's request to review the EFP. Accordingly, the applicant, Mr. Pete Dupuy, must provide the CCC with a consistency certification pursuant to the Coastal Zone Management Act. The State of California must complete its review within three months from receipt of Mr. Dupuy's consistency certification and accompanying necessary data and information. In addition, NMFS may approve the EFP only if consistency with the California Coastal Act is resolved under NOAA regulation implementing the Coastal Zone Management Act. As a result of this delay, NMFS requests that the Council recommend that the EFP be approved for the 2008 fishing season as originally submitted for the 2007 fishing season.

HMS Permit Fees: When the HMS FMP was implemented in 2004, a federal permit for HMS vessels was required but a fee for the permit was not included. The authority for NMFS to charge permit fees to recover its administrative costs is contained in five statutes. Historically, each NMFS permit program individually decided whether or not to use this authority to charge an administrative fee for the recovery of permit processing and issuance expenses. Based on NMFS national policy on permit fees, NMFS intends to begin the process to undertake a regulatory amendment to allow for the collection of HMS permit fees.

III. Meeting Summaries

Inter-American Tuna Tropical Commission (IATTC): The IATTC held its 75th annual meeting, June 25-29, 2007, in Cancun, Mexico. Subsidiary meetings also conducted included the Joint Working Group on Fishing by Non-Parties, the Permanent Working Group on Compliance, and the Working Group on Finance.

Selection of a new Director to the IATTC was confirmed. Dr. Guillermo Compean from Mexico will head the IATTC staff.

Tuna Conservation Measures for yellowfin and bigeye beyond 2007 were not adopted.

IV. Upcoming Meetings

Northern Committee of the Commission for the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean. September 11-13, 2007, Tokyo, Japan.

The IATTC will meet in a special session in October 22-24, 2007 to resolve the issue of tuna conservation measures for 2008 and beyond.

A meeting of the General Advisory Committee to the U.S. Section to the IATTC will be held November 2, 2007, in La Jolla, California, at the NMFS Southwest Fisheries Science Center Large Conference Room.

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Region
501 West Ocean Boulevard, Suite 4200
Long Beach, California 90802- 4213

JUN 0 5 2007

150413SWR2006SF00311:MH

Mr. Donald Hansen, Chairman
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 101
Portland, Oregon 97220-1384

RECEIVED
JUN 0 7 2007
PFMC

Dear Mr. Hansen:

NOAA's National Marine Fisheries Service (NMFS) is in receipt of the Pacific Fishery Management Council's (Council) November 30, 2006, letter communicating its recommendation to issue the exempted fishing permit (EFP) for the drift gillnet fishery (DGN) for the 2007 fishing season. The proposed EFP was originally submitted by the Federation of Independent Seafood Harvesters to the Council for the 2006 fishing season but the permit was never issued by NMFS. The EFP would allow DGN fishing under specified conditions in the Pacific Leatherback Conservation Area (PLCA) from August 15 to November 15, 2007, when this area is normally closed to the DGN fishery.

NMFS recognizes that the DGN fishery is the primary fishery for swordfish and thresher sharks landed in west coast ports. To that extent, the agency was initially supportive of using the DGN EFP for generating new information pertaining to the question of whether the original time/area closure may have been excessive. However, a recent peer-reviewed scientific article by NMFS and California State University scientists presents the results of a study spanning over a decade of research that documents the importance of nearshore waters off the U. S. West Coast for foraging leatherback turtles[1]. The study indicates that due to a combination of oceanographic processes supporting favorable habitat for leatherback turtle prey such as jellyfish, nearshore waters off California are a vital foraging area for some western Pacific leatherbacks from one of the two largest of the remaining breeding populations in the Pacific. The article also notes that similar processes that concentrate dense and larger jellyfish in nearshore retention areas have been reported off Oregon.

NMFS is concerned about threats to leatherback sea turtles within the migratory pathways to and from these apparently critical nearshore waters if the DGN EFP were to be issued. The PLCA includes waters utilized by leatherbacks traveling to and from these nearshore foraging areas Currently, the migratory paths of leatherbacks are not sufficiently defined to allow for modification of the PLCA. Further, of the 23 observed

---

[1] Benson, S. R, K. A. Forney , J. T. Harvey, J. V. Carretta, and P. H. Dutton. In press. Abundance, distribution, and habitat of leatherback turtles (Dermochelys coriacea) off California, 1990-2003. Fishery Bulletin.

leatherback entanglements in the DGN fishery from 1990 through the present, 19 occurred within the PLCA. Sixty percent of the entanglements resulted in immediate mortality. Based on the condition reported by NMFS observers of those leatherbacks disentangled and released alive, NMFS estimates another 10 percent estimated mortality. Thus, NMFS approximates a total mortality rate for leatherbacks in the DGN fishery at 70 percent.

I am mindful of the innovative technical modifications the DGN industry has undertaken over the years to limit bycatch and reduce marine mammal bycatch including suspending nets 36 feet below the surface and adding pingers. While these efforts have effectively reduced marine mammal bycatch, there is no direct evidence suggesting that these measures have successfully reduced leatherback turtle bycatch.

In consideration of the potential for leatherback sea turtle mortalities that would result if the EFP were approved, NMFS does not intend to issue the proposed DGN EFP. At the same time, NMFS is aware of the strong demand for swordfish by U. S. consumers. Similarly, it also recognizes that efforts to inhibit U. S. fisheries targeting high market value species such as swordfish may only transfer ecosystem impacts to other, possibly less regulated fisheries and areas of the world. Consequently, NMFS encourages the Council to support those fisheries in its West Coast Highly Migratory Species (HMS) Fishery Management Plan that provide swordfish and other HMS managed species to U.S. consumers by utilizing areas where bycatch is minimized or using more conservative yet economically viable fishing methods. We will also continue to work with industry to find ways to assist them in adopting more conservative methods to meet U. S. demand for competitively priced fresh seafood while conserving protected species.

Sincerely,

Rodney R McInnis

Rodney R. McInnis
Regional Administrator

Cc: William Fox – SWFSC
Bob Lohn - NWR

Agenda Item F.1.c
HMSAS Report
September 2007

HIGHLY MIGRATORY SPECIES ADVISORY SUBPANEL REPORT ON NATIONAL MARINE FISHERIES SERVICE REPORT

NMFS's Rejection of the Drift Gillnet (DGN) Exempted Fishing Permit (EFP)

A majority of the Highly Migratory Species Advisory Subpanel (HMSAS) requests that the Council ask NMFS to reconsider their denial of the DGN EFP. Also, the HMSAS requests that the Council invite Dr. Bill Hogarth to the next HMSAS meeting to answer questions and clarify NMFS's position in regards to the EFP denial.

In the interim consideration should be made of any new modifications to either the EFP or the Pacific Leatherback Conservation Area to mitigate potential problems. The HMSAS also reiterates that the DGN EFP should refocus on economic feasibility.

A minority of the HMSAS (Bob Osborn, United Anglers of Southern California, and Meghan Jeans, Ocean Conservancy) supported NMFS's decision not to issue the DGN EFP recommended by the Council. Instead of further pursuing EFP issuance, the minority recommends that the Council and NMFS explore broader policy options for addressing protected species takes in the DGN fishery.

California Coastal Commission Hearing on the Shallow-set Longline EFP

A majority of the HMSAS is very concerned by the action of the California Coastal Commission (CCC) in determining that the shallow-set longline EFP is not consistent with their goal of protecting coastal marine resources.

The HMSAS received input at their August 14, 2007, meeting and had considerable discussion on the process, managing authority, and validity of the information used by the CCC in making their decision.

The HMSAS brings the following concerns to your attention and requests responses to the issues raised:

1. Who or which government entity is responsible for management of fisheries off the coast of California?

2. Where does the jurisdiction of the CCC extend to in regards to the HMS FMP?

3. The HMSAS requests that NMFS provide the Council with a report on how the science presentation on the proposed shallow-set longline EFP was used by the CCC.

4. HMSAS members at the CCC hearing reported that the CCC and their staff were indifferent to input from both NMFS and industry representatives before and during the EFP consideration. The Highly Migratory Species Management Team (HMSMT) requests that NMFS provide a report on how CCC and their staff reacted to their input. The HMSMT also encourages industry representatives who were at the CCC hearing to report to the Council their views on how the hearing was conducted.

5. Going forward, what system of communication should be established between our government agencies so the public view us working together and not against each other.

A minority of the HMSAS (Bob Osborn, United Anglers of Southern California, and Meghan Jeans, Ocean Conservancy) felt that the CCC consistency hearing on the proposed shallow-set longline EFP was warranted and conducted in a balanced and open manner.

PFMC
08/23/07

Agenda Item F.1.c
HMSMT Report
September 2007

HIGHLY MIGRATORY SPECIES MANAGEMENT TEAM REPORT ON NATIONAL MARINE FISHERIES SERVICE REPORT

The Highly Migratory Species Management Team (HMSMT) discussed the recent decision by the California Coastal Commission (Commission) to unanimously reject the shallow-set longline exempted fishing permit (EFP) application as inconsistent with the California Coastal Zone Management Act. The HMSMT strongly disagrees with the Commission's decision based on the testimony presented at the August 10, 2007, Commission hearing by NMFS staff, the EFP applicant Pete Dupuy, and other supportive testimony. The HMSMT is concerned over the precedent that this decision might set and recommends that the Council send a letter to the Commission requesting that the factual basis and analytical criteria used to reach their final decision be explained in writing to the Council.

The HMSMT also recommends that the Council request a full briefing from the appropriate DOC and/or NOAA legal counsel on the ramifications that may stem from this decision and the potential next course of action. These ramifications include increased Commission scrutiny on present and future Council and/or NMFS fishery management actions. The HMSMT recommends that the Council also request an explanation of the role that NOAA's National Ocean Service played in the review and decision making process for this action. In particular, the Service's decision granting the Commission permission to undertake a full review of this action even though the proposed action area (40-200 nautical miles offshore) is well outside the Commission's state waters jurisdiction (0-3 nm).

After reviewing the pertinent correspondence and discussions related to the Commission's review, it was apparent to the HMSMT that the facts and merits of the EFP application and associated draft Environmental Assessment document were not appropriately considered nor summarized in the final Commission staff report. As a result, the HMSMT believes that the Commission's staff report was flawed, including a number of serious factual errors, and that a full reconsideration of the EFP application by the Commission, based strictly on the merits and impacts of the proposed action, should be granted. The HMSMT recommends that the Council convey this desire in writing to the Commission at their earliest convenience.

The HMSMT was briefed by NMFS staff on pre-hearing meetings that took place between NMFS scientists and managers and Commission staff to provide a comprehensive and well-documented response to a lengthy list of Commission staff questions relating to the proposed action. Based on review of the documented response, the HMSMT believes that the NMFS staff addressed all of the technical and scientific concerns raised. The HMSMT concluded that the final decision by the Commission was based largely on speculation and discounted the scientific and technical merits and precautionary and conservative measures built into the proposed action. The HMSMT believes that the Commission inappropriately expanded the scope of the proposed action to include considerations of global longlining and protected species impacts and the hypothetical full-scale development and expansion of a West Coast based shallow-set longline fishery within and beyond the U.S. EEZ. That was neither the intent nor the scope of the proposed action that was before the Commission for review.

Even after being fully briefed by NMFS scientists and fisheries managers, the Commission staff continually provided erroneous and misleading information upon which the final decision was likely based. For example, the Commission staff report stated that the level of take of protected species was not adequately established in the proposed action and therefore the EFP would pose a real risk to endangered species. The facts state otherwise. The exposure analysis provided in the environmental assessment (EA) detailed why marine mammal and other protected species interactions would not be reasonably expected to occur under the proposed action based on the best available information. Scientifically-based caps on protected species were included as part of the proposed action thereby establishing exactly what the risks would be.

Further indicative of the misinformation that the Commission staff propagated, a letter was sent to the NOS's Office of Ocean and Coastal Resource Management[1] stating that short-fin pilot whales have been observed entangled in the Hawaii shallow-set longline fishery using identical gear that would be used under the proposed action. The facts state otherwise. Since the Hawaii shallow-set longline fishery switched to circle hooks and mackerel bait beginning mid-season in 2004, there have been no recorded takes of short-fin pilot whales based on 100 percent observer coverage. (Takes have occurred only in the deep-set component of the longline fishery.) The Commission staff report goes on to state that given that short-fin pilot whales are found in same area as would be fished under the EFP, and that they are routinely taken, a high potential for the EFP to take short-fin pilot whales exists. The Commission's assertion that entanglements of short-fin pilot whales are very likely is an erroneous conclusion based on an erroneous assumption.

The Commission staff's report states that the potential biological removal of short-finned pilot whales is 0.98. This is not true and has been addressed in NMFS's response to the Commission staff's request for further information.

The Commission staff report references the 2004 Biological Opinion for the U.S. West Coast HMS Fishery Management Plan and the jeopardy finding for loggerheads due to anticipated takes in the shallow-set longline fishery. The report also mentions that the closure of the shallow-set longline fishery was necessary to conserve leatherbacks. This is misleading. The opinion determined that the then proposed HMS shallow-set longline fishing outside of the U.S. West Coast would jeopardize loggerhead sea turtles, but found no jeopardy to leatherbacks, even with old style gear (i.e., J hooks and squid bait with the associated higher turtle interaction rates). The Commission report fails to mention the 2004 Biological Opinion written for the Hawaii-based shallow-set longline fishery, which found no jeopardy to any sea turtle species for that fishery using gear techniques and methods identical to those in the proposed EFP.

In numerous statements the Commission staff has given the impression that the Pacific Leatherback Conservation Area is a permanent sea turtle marine protected area for all commercial fishery gear types. The facts state otherwise. The Conservation Area was put in place following a Section 7 consultation done in 2000 on the then California and Oregon Drift gillnet fishery. The time and area closure was considered necessary to avoid jeopardizing

[1] July 13, 2007 Letter from Peter Douglas, Executive Director of the California Coastal Commission to David Kennedy, Peter Dupuy, and Rodney McInnis

endangered leatherbacks and applies only to drift gillnet gear. This again highlights the fact that the Commission inappropriately expanded the scope of the proposed action and did not base its final decision on the scientific and technical merits of the proposed action before them. These merits included, among other things, 100 percent observer coverage, limited effort, and very conservative protected species take caps.

PFMC
08/23/07

G:\!PFMC\MEETING\2007\September\HMS\F1 NMFS Rpt HMSMT report.doc

HIGH SEAS LIMITED ENTRY LONGLINE FISHERY

In 2003, the Council submitted the Fishery Management Plan for U.S. West Coast Fisheries for Highly Migratory Species (HMS FMP) to National Marine Fisheries Service (NMFS) for Secretarial Review; it was approved, with the exception of one provision in the FMP that was disapproved: allowing shallow-set longline fishing east of 150° W longitude. (Shallow-set refers to the deployment of the gear so that hooks are at depths of 100 m or less, and is done to target swordfish.) The disapproval was based on the results of a Section 7 consultation and biological opinion pursuant to the Endangered Species Act (ESA), which found that the take of sea turtles, and specifically the leatherback sea turtles, would constitute a jeopardy condition. As a result, regulations were promulgated under the ESA to prohibit this activity.

Around the time of final Council action on the FMP, the Council directed the Highly Migratory Species Management Team (HMSMT) to begin developing options for a limited entry program for the shallow-set longline fishery, principally to address the ESA-related concerns that led to disapproval of the shallow-set longline management measures in the FMP. The HMSMT began work on developing information for a limited entry program, reporting back to the Council twice in 2004. However, since then, the attention of the Council and the HMSMT has been diverted to other issues. The Council last revisited this issue at their June 2005 meeting, establishing an ad hoc Highly Migratory Species Management Committee, composed of Council members, which met once with the HMSMT in October 2005. At the April 2007 Council meeting, the NMFS representative on the Council, Mr. Mark Helvey, requested the Council again take up consideration of measures that would lead to an approvable management framework for the shallow-set longline fishery.

Attachment 1 is a Council staff white paper which reviews past Council action with respect to longline fisheries, describes current management of the West Coast and Hawaii-based fisheries, discusses protected species issues, and lays out some alternatives for addressing the current situation. This information is intended to help the Council to consider whether and how to reinitiate development of approvable management measures for a West Coast shallow-set longline fishery.

Attachment 2 is a Federal Register notice that the Western Pacific Fishery Management Council intends to prepare a supplemental environmental impact statement (SEIS) on federal management of the Hawaii-based shallow-set pelagic longline fishery in the western Pacific. The SEIS will consider alternatives that include elimination of the current effort cap on the fishery and changing the current system of caps on the take of leatherback and loggerhead sea turtles. The action is likely to trigger a reinitiation of consultation under Section 7 of the ESA. If the proposed modifications result in higher sea turtle take levels in the Hawaii fishery, and is not found to cause jeopardy under the ESA, this could affect the approvability of any action the Pacific Council might propose to establish a management framework for a West Coast shallow-set longline fishery. According to the notice, written scoping comments must be received by September 20, 2007.

Council Task:

1. **Decide whether to reinitiate development of management measures for the high seas shallow-set longline fishery.**
2. **Discuss general schedule for Council decision-making.**
3. **Provide direction to the HMSMT and Highly Migratory Species Advisory Subpanel (HMSAS) on a range of preliminary alternatives, including the development of a limited entry program.**

Reference Materials:

1. Agenda Item F.2.a, Attachment 1: Implementing a Management Framework for a High Seas Shallow-set Longline Fishery; A PFMC Staff White Paper.
2. Agenda Item F.2.a, Attachment 2: 72 FR 46608, Notice of Intent to Prepare a Supplemental Environmental Impact Statement.
3. Agenda Item F.2.b, HMSMT Report.
4. Agenda Item F.2.b, HMSAS Report.

Agenda Order:

a. Agenda Item Overview — Kit Dahl
b. Reports and Comments of Advisory Bodies
c. Public Comment
d. **Council Action**: Consider Need, Planning and Potential Options Necessary to Include this Fishery in the HMS FMP

PFMC
08/23/07

Implementing a Management Framework for a High Seas Shallow-set Longline Fishery A PFMC Staff White Paper

Introduction

At the April 2007 Council meeting the NMFS representative, Mark Helvey, requested the Council again consider developing measures to address the portion of the Fishery Management Plan for U.S. West Coast Fisheries for Highly Migratory Species (HMS FMP) that was disapproved by National Marine Fisheries Service (NMFS), which relates to shallow-set longline fishing on the high seas outside of the West Coast EEZ. Shallow-set refers to the deployment of the gear so that hooks are at depths of 100 m or less, and is done to target swordfish. (This contrasts with deep-set longline where the gear is set deeper than 100 meters to target tunas, see 50 CFR 660.712(a)(9).[1]) As a result of the disapproval shallow-set longline fishing is currently prohibited under the HMS FMP. (The FMP and pursuant regulations prohibit all longline fishing within the West Coast EEZ. This was an element of Council's preferred alternative which was approved by NMFS.)

This paper reviews Council action with respect to longline fisheries, describes current management of the West Coast and Hawaii-based fisheries, discusses protected species issues, and lays out alternatives for addressing the current situation.

Chronology of PFMC Activities Related to the High Seas Shallow-set Longline Fishery

The Council began work on the HMS FMP in 2001. Prior to adoption of the HMS FMP, management of the West-Coast-based shallow-set longline (SSLL) fishery outside the EEZ was limited to the High Seas Fishing Compliance Act and fishermen were not subject to restrictions applied to Hawaii-based longline vessels. The Council adopted preferred alternatives defining elements of the FMP in November 2002. For longline fishing outside the EEZ they adopted Alternative 2 as their preferred alternative:

> …[A]ll of the restrictions applied to Hawaii-based longline vessels would also apply to West Coast based longline vessels when fishing west of 150° W longitude. However, West Coast-based longline vessels fishing east of 150° W longitude would only be subject to *selected* restrictions. This would allow West Coast-based vessels to target swordfish east of that line… (HMS FMP FEIS, Ch.8 Pg. 32)

At that time (2002) the restrictions applied to Hawaii-based vessels included a prohibition on shallow-set longline to target swordfish. (Hawaii-based vessels are those fishing under a limited entry permit issued pursuant to the Western Pacific Fishery Management Council's [WPFMC] FMP for the Pelagic Fisheries of the Western Pacific Region, referred to as a Hawaii permit.)

---

[1] Regulations governing the Hawaii-based longline fishery define *deep-set or deep-setting* without specifying deployment below 100 m., see 50 CFR 660.12.

Thus the Council's intent was to prohibit shallow set longline fishing west of 150° W longitude but permit it east of that line.[2] At the time of the Council action the NMFS representative on the Council warned that the provision to allow shallow-set longlining on the high seas east of 150° W longitude might not be approved because of potential impacts to sea turtles, particularly loggerhead sea turtles, which are listed as threatened under the Endangered Species Act (ESA). Based on a request from the NMFS Southwest Region Administrator, the Council agreed to delay submission of the FMP for Secretarial review while more information was developed about incidental take rates of turtles by SSLL gear on either side of the 150° W longitude line. This information was presented to the Council in June 2003 by Jim Carretta of the NMFS Southwest Fisheries Science Center (Carretta 2003). After discussion at the June 2003 meeting, the Council chose not to modify the preferred alternative. The HMS FMP FEIS was published in August 2003 and submitted for Secretarial review. On February 4, 2004, NMFS notified the Council that it had partially approved the FMP, disapproving the provision allowing shallow-set longlining on the high seas east of 150° W longitude, based on the results of a section 7 consultation and BO pursuant to the ESA:

> The Biological Opinion (BO) resulting from the consultation concluded that, if allowed to make shallow sets in the waters east of 150° W longitude at recent effort levels, the longline fishery would take turtles at levels that would appreciably reduce the likelihood of survival and recovery of at least one species of sea turtle. Therefore, that provision has been disapproved as not being consistent with the ESA, meaning the FMP does not comply with "other applicable law." (Letter from Rodney McInnis to Donald Hanson, February 4, 2004, Attachment 1 to this paper)

NMFS took two actions it considered necessary to protect ESA-listed sea turtles, in conformance with the BO. Concurrently to partially approving the HMS FMP, NMFS also promulgated regulations pursuant to the ESA implementing the prohibition on shallow-set longline fishing east of 150° W longitude by anyone "not operating under a western Pacific longline permit under §660.21" (50 CFR 223.206(d)(9)). The ESA-related regulations became effective April 12, 2004 (69 FR 11540), shortly before the HMS FMP regulations came into place (69 FR 18444, effective date May 7, 2004). As discussed in more detail below, at this time the WPFMC established a regulatory framework for a "model fishery," which again allowed shallow-set longline fishing for Hawaii-permitted vessels, subject to a variety of mitigation measures (69 FR 17329; effective date April 2, 2004). Thus, almost simultaneously the legal status of the Hawaii- and West Coast-based fisheries reversed: As of April 2004 only Hawaii permit holders were permitted to deploy shallow-set longline gear; fishers required to have an HMS FMP permit were prohibited from shallow-set fishing. (Prior to HMS FMP implementation there were no regulations prohibiting shallow-set longline fishing by vessels not registered to a Hawaii permit. Their activities were only regulated under the High Seas Fishing Compliance Act. As a consequence, prior to 2004, many Hawaii vessels de-registered from their permits and moved to the West Coast, where they could legally shallow-set longline.) Furthermore, the current regulations allow Hawaii permit holders to land swordfish (caught with shallow-set longline) on the West Coast and even to make trips that both originate from and return to West Coast ports. Given that a significant component of historical landings of longline-caught swordfish on the West Coast was made by fishermen possessing a Hawaii permit, some of the practical impediments to a West Coast fishery may be alleviated if willing Hawaii permit holders can prosecute a fishery that delivers product into West

[2] As discussed below, the management regime for the Hawaii-based shallow-set fishery subsequently changed. This raises the question of whether the current FMP-based prohibition on shallow-set longline fishing *west* of 150° W longitude is consistent with the intent of the alternative as then proposed.

Coast markets. (There is still a logistical problem because Hawaii-permitted vessels using SSLL gear are subject to 100 percent observer coverage in the shallow-set fishery. The observer program is administered by the NMFS Pacific Regional Office and such activity could require transporting embarking/disembarking observers to/from the West Coast.[3])

The Hawaii model fishery employs mitigation measures tested in the Atlantic 2001–03, which showed substantial reduction in the incidental take of sea turtles (Watson, *et al.* 2005). In the February 4, 2004, letter partially approving the HMS FMP, Rodney McInnnis noted the results of those studies and the pending regulatory amendment opening the Hawaii fishery and stated:

> I recommend that the Council direct its management team to review this information and to begin developing and analyzing alternative sets of comparable conservation measures under which a longline fishery off the west coast might be able to target swordfish with low levels of marine turtle takes. This could include consideration of limited longline fishing for swordfish with effort limits, gear and bait requirements, time/area limits, turtle take limits, or other measures that would limit sea turtle mortality to low levels approximating those that had previously been found in the drift gillnet fishery not to result in jeopardy to any listed sea turtles.

As described above, at their June 2003 meeting, the Council decided not to modify the preferred alternative; however, understanding that the SSLL component may be disapproved, they also directed the HMSMT (then the HMSPDT) to:

> …look at a limited entry program for the California-based high seas pelagic longline fishery and report their findings to the Council at the November 2003 meeting. The scope of the initial work should include a control date, qualifying period, qualifying landings, the issue of a capacity goal, and permit transferability issues. (Minutes of the 169th Council meeting, page 53)

The HMSMT reported to the Council in November 2003 on their initial findings (Exhibit G.2.c, HMSMT Report, November 2003, Attachment 2 to this paper). They pointed out that the rationale for a limited entry program is principally to address ESA-related issues (the projected sea turtle incidental takes that prompted subsequent partial disapproval of the HMS FMP). They recommended development of a "joint Biological Opinion" covering both a West Coast fishery and a Hawaii permitted fishery and "joint program design and cooperative management of these shared HMS and turtle stocks and vessels between the Council and the WPFMC" (HMSMT Report, page 2). The Council formally initiated an FMP amendment process to consider a limited entry program at this meeting. The HMSMT again reported at the April and September 2004 Council meetings with additional information relevant to the development of a limited entry program. At these two meetings, discussion turned to several related issues that diluted the effort to further develop a limited entry program. Foremost, HMS FMP funding support was uncertain, calling into question whether resources were available to pursue these activities. Recognizing the difficulty inherent in implementing a limited entry program, the Council discussed developing a regulatory framework to allow a shallow-set longline fishery outside the EEZ without license

[3] Only one Hawaii-permitted vessel has made a West Coast landing since 2004. This occurred in March 2006 when the fishery closed due to sea turtle interactions (Pers. Comm. Kevin Busscher, PIRO Observer Program). Upon closure of the fishery the skipper decided to land in Los Angeles because market prices were better. However, a March 9, 2007, letter from John Gibbs to Rodney McInnnis indicated his interest in fishing out of the West Coast for swordfish and tuna. He possesses a Hawaii permit and could therefore do so.

limitation. Management of the drift gillnet (DGN) fishery also became a concern because the 2001 implementation of a time-area closure to mitigate takes of leatherback sea turtles was having a substantial economic impact on the fishery. Related to this, there was some discussion of developing mechanisms to allow a switch from drift gillnet to longline gear, recognizing that DGN gear likely results in higher incidental mortality of protected species. (Both gear types principally target swordfish.) Any such mechanism would necessarily require a framework to allow shallow-set longlining outside the EEZ. However, the size and configuration of drift gillnet vessels makes it unlikely that existing vessels could be fitted for distant water fishing beyond the EEZ. Public comments indicated few DGN fishermen would likely switch gear types to fish outside the EEZ.

The last time the Council revisited the question of establishing a regulatory framework for the shallow-set fishery was at the June 2005 meeting. Council discussion mainly revolved around increasing cooperation and communication with the WPFMC in order to address the issue jointly. Although the HMSMT proposed a schedule for Council decision-making on a limited entry program, the Council was not inclined to pursue the issue unilaterally and aggressively. An ad hoc committee was formed, the Highly Migratory Species Management Committee (Mr. Phil Anderson, Mr. Donald K. Hansen, Mr. Mark Helvey, Ms. Marija Vojkovich), which met jointly with the HMSMT on October 4, 2005. The group developed several recommendations, which are summarized here:

- Investigate combined WPFMC and PFMC management of pelagic fisheries with assistance from NMFS (HQ, SWR, PIRO) to coordinate such an effort.

- Evaluate the feasibility of an area-restricted high seas SSLL fishery, such as east of 140° W longitude (as was suggested in previously in reports and recommendations), using the types of gear modifications and other mitigation measures used in the Hawaii model fishery. Such an approach could be initially evaluated with an EFP or addressed directly through an FMP/regulatory amendment.

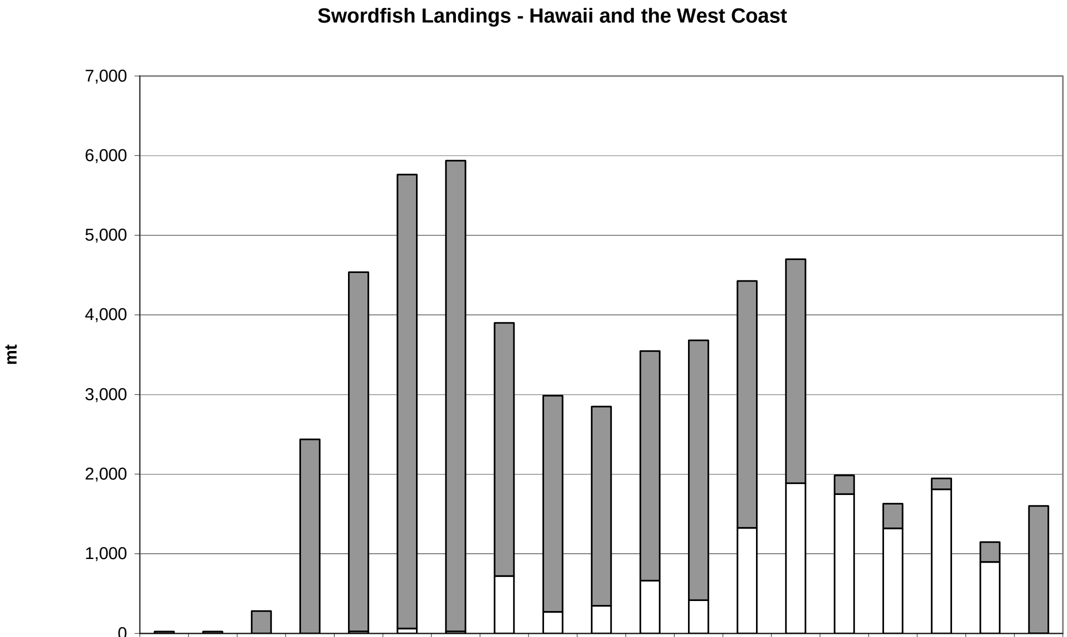
- Evaluate the utility of limited entry for the longline fishery (both shallow and deep set).

The Council has not subsequently pursued the issue of establishing a viable regulatory framework for a shallow-set fishery or development of a limited entry program. This is due to several factors: Council and advisory body workload, with other issues taking precedence; the problems of developing and coordinating an ESA-driven management framework covering both the West Coast and Hawaii; and the lack of strong pressure from longline fishers to re-open a West Coast opportunity. The last factor may be due to the re-opening of the Hawaii fishery—with Hawaii-permitted vessels traditionally being a large component of the West Coast fleet—and their ability to landings on the West Coast if they choose to do so.

Background on the Hawaii and West Coast Longline Fisheries and Current Situation

Section 2.2.5 from the HMS FMP FEIS (PFMC 2003) describes the development of longline fisheries in Hawaii and on the West Coast through 2001. Longline fisheries in both Hawaii and California expanded substantially in the 1990s with the arrival of vessels from the East Coast and Gulf of Mexico. As shown in Figure 1, throughout the 1990s longline-caught swordfish landings in Hawaii were larger than West Coast landings. Looking at combined landings, on average Hawaii accounted for 90 percent of annual landings from 1990 to 1999. Table 1 and Figure 2 show the species composition of longline landings on the West Coast. Swordfish accounted for 65 percent of annual landings, on average, for the same period, although the proportion increased from 2000 through 2004, likely representing the shift of the Hawaii fleet to California in response to litigation-induced regulatory changes in Hawaii. The HMS FMP summarizes these developments as follows:

> In August 2000, as the result of the case *Center for Marine Conservation vs. NMFS*, a federal district court issued an order directing the NMFS to complete an Environmental Impact Statement (EIS) to assess the environmental impacts of fishing activities conducted under the Fishery Management Plan for Pelagic Fisheries of the Western Pacific Region by April 1, 2001, and ordered restrictions and closures over millions of square miles of the Hawaiian longline fishery's usual and accustomed fishing grounds. These court ordered closures effectively eliminated the swordfish fishery. As a result, some Hawaiian longline permit holders de-registered their vessels from the permit, and proceeded to fish from California ports, as was their custom during this time of year [generally, the fourth and first quarters].
>
> NMFS completed the EIS in March, 2001, and, consistent with a Biological Opinion that was issued at the same time, NMFS found it necessary to implement measures for the protection of endangered and threatened sea turtles. Such measures included a prohibition against targeting swordfish north of the equator by Hawaiian longline vessels, and prohibits longline fishing by Hawaiian longline vessels in waters south of the Hawaiian Islands from 15^{o} N latitude to the equator, and from 145^{o} W longitude to 180^{o} longitude during the months of April and May. This decision is being challenged in a lawsuit filed by the Hawaiian Longline Association. As of July 2001, about 20 Hawaiian longline vessels sit idle in San Pedro Harbor. (PFMC 2003, Ch 2, Pg 21)



	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Hawaii	23.59	24	281	2437	4508	5700	5909	3176	2713	2502	2881	3263	3100	2813	235	309	136	249	1600
West Coast		1			27	63	27	722	271	346	663	418	1325	1885	1749	1320	1810	898	1

Year

Figure 1. Hawaii and West Coast swordfish landings. (Sources: 2006 HMS SAFE, 2006 Pelagics Annual Report.)

Table 1. West Coast landings in the high seas longline fishery. (Source: 2006 HMS SAFE, Table 4–13.)

	Swordfish		Sharks		Tunas		Dorado		Non-HMS		Total
	Mt	% total	Mt	% total	Mt	% total	Mt	% total	Mt	% total	Mt
1981	0.5	0.4%	75.8%	91	26	21.7%	0	0.0%	2.5	2.1%	120
1982	0.5	0.7%	35.7%	25	43	61.4%	0.5	0.7%	1	1.4%	70
1983	0.5	2.6%	18.4%	3.5	9	47.4%	0.5	2.6%	5.5	28.9%	19
1984	12	40.0%	18.3%	5.5	4	13.3%	3	10.0%	5.5	18.3%	30
1985	0.5	4.2%	16.7%	2	0.5	4.2%	0	0.0%	9	75.0%	12
1986	0	0.0%	26.9%	3.5	0	0.0%	0	0.0%	9.5	73.1%	13
1987	0	0.0%	8.2%	4	0.5	1.0%	0	0.0%	44.5	90.8%	49
1988	0.5	0.3%	82.8%	154	0.5	0.3%	0	0.0%	31	16.7%	186
1989	0	0.0%	92.3%	6	0	0.0%	0	0.0%	0.5	7.7%	5
1990	0	0.0%	86.7%	19.5	1.5	6.7%	0	0.0%	1.5	6.7%	20
1991	27	37.0%	32.9%	24	2.5	3.4%	0.5	0.7%	19	26.0%	73
1992	63	69.2%	5.5%	5	1.5	1.6%	0	0.0%	21.5	23.6%	91
1993	27	71.1%	5.3%	2	5.5	14.5%	1	2.6%	2.5	6.6%	38
1994	722	77.5%	5.8%	54	105	11.3%	32	3.4%	19	2.0%	932
1995	271	72.1%	6.4%	24	62	16.5%	5	1.3%	14	3.7%	376
1996	346	77.9%	1.7%	7.5	71	16.0%	9	2.0%	10.5	2.4%	444
1997	663	83.3%	1.2%	9.5	89	11.2%	1	0.1%	33.5	4.2%	796
1998	418	74.5%	1.3%	7.5	105	18.7%	1	0.2%	29.5	5.3%	561
1999	1325	83.5%	0.8%	12	227	14.3%	17	1.1%	5	0.3%	1586
2000	1885	90.5%	0.6%	12.5	121	5.8%	41	2.0%	24.5	1.2%	2084
2001	1749	89.7%	1.5%	30	95	4.9%	15	0.8%	60	3.1%	1949
2002	1320	94.8%	3.3%	46	13	0.9%	0.5	0.0%	13.5	1.0%	1393
2003	1810	97.7%	0.2%	3.5	31	1.7%	1	0.1%	7.5	0.4%	1853
2004	898	94.4%	0.4%	3.5	33	3.5%	1	0.1%	15.5	1.6%	951
2005	[redacted]										

2005 data redacted for confidentiality reasons.

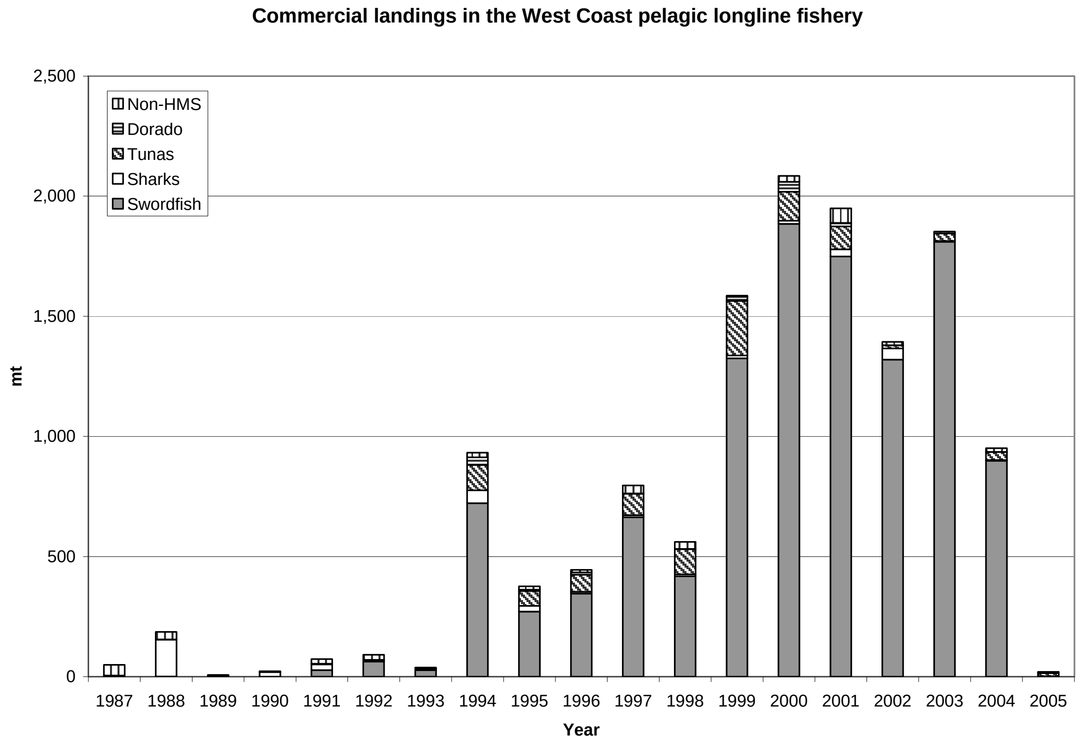


Figure 2. West Coast landings in the high seas longline fishery.

In response to the litigation referenced above, in 2003 the Federal Court vacated on procedural grounds a BO upon which the then current shallow-set longline closure was based. In October the Court stayed the execution of their order until April 1, 2004, in order to give NMFS time to develop a new BO and institute a more permanent regulatory framework. Concurrently, the WPFMC was preparing an EIS to evaluate new measures for the longline fishery, based on the results of trials in the Atlantic demonstrating that the use of offset circle hooks, mackerel-type bait, and other measures (such as setting in water below 68° F) could substantially reduce sea turtle takes. Along with limits on total annual effort these measures would constitute the model fishery intended to test their efficacy for the Hawaii fleet. Initially the WPFMC developed this proposal as an emergency action, but with the Court's stay, the Council shifted this effort to a regulatory amendment to implement a long-term management framework. As discussed above this regulatory framework was implemented on April 2, 2004. Attachment 3 excerpts the summary section of the regulatory amendment, describing the measures put in place.

In addition to the gear restrictions, the Hawaii regulatory framework for its shallow-set fishery established take caps for leatherback and loggerhead sea turtles and a limit on the number sets that could be made annually. The take caps were based on the incidental take statement prepared pursuant to the section 7 consultation on the regulatory amendment. Table 2 shows the caps and the number of takes in each year since 2004. The fishery reached the take cap for loggerheads early in 2006 and shut down in March due to high level of fishing effort in the first quarter (Gilman, *et al.* 2006). Fishing effort is limited to 2,120 sets annually; this effort limit is distributed equally to all permit holders responding to an annual solicitation in the form of certificates, which are freely tradable among permit holders.

Table 2. Leatherback and loggerhead sea turtle interactions in the shallow-set component of the Hawaii-based longline fishery.

	Leatherback	Loggerhead
Annual limit	16	17
2007 (as of July 2)	6	14
2006	1	17*
2005	8	12
2004	1	1

***The Hawaii shallow-set longline fishery reached the 2006 annual interaction limit of 17 loggerheads. As a result, the fishery was closed on March 20, 2006.
Source: http://www.fpir.noaa.gov/SFD/SFD_turtleint.html#numberscaught, accessed July 11, 2007.

A recent development relevant to the shallow-set fishery is the Council's recommendation, at their April 2007 meeting, that NMFS issue an exempted fishing permit (EFP) for a single vessel to fish with shallow-set longline gear inside the West Coast EEZ. The purpose is to test longline gear as a viable alternative to DGN gear. This proposal originates from Alternative 4 for pelagic longline fishery management measures inside the West Coast EEZ in the HMS FMP FEIS (PFMC 2003, Ch. 8 Pp. 31-32). The proposal under that alternative (which was not adopted as preferred) would have allowed a "limited entry pelagic longline fishery for tunas and swordfish within the EEZ, with effort and area restrictions, to evaluate longline gear as an alternative to drift gillnet gear to reduce bycatch or bycatch mortality and protected species interactions," with the limited entry provision addressed in a separate plan amendment. A maximum of 10 DGN-permitted vessels would have been allowed in the SSLL EFP fishery as described in the FEIS. The EFP currently under consideration is a more modest proposal involving a single vessel fishing within a single year (September to December 2007), although the results from the first year would be used to consider subsequent EFPs, presumably with more vessels participating. The vessel participating in the EFP fishery would be subject to the same sorts of mitigation measures under which the Hawaii fishery operates (e.g., offset circle hooks, mackerel-type bait, night setting, an effort limit, caps on sea turtle takes). Ultimately, the results could be used to establish some sort of limited shallow-set longline fishery targeting swordfish within the EEZ as an alternative to the current DGN fishery, similar to what was proposed in Alternative 4.

ESA Issues Related to Implementing a Management Framework for a West Coast Shallow-set Longline Fishery

A West Coast shallow-set longline fishery is currently constrained because of the potential for incidental take of ESA-listed sea turtles, specifically loggerheads and leatherbacks. As noted above, and stated in the BO for the HMS FMP, the closure of this fishery is pursuant to the ESA:

> NOAA Fisheries, Protected Resources Division, Southwest Region proposes to use Secretarial authority under 11(f) of the ESA … to promulgate regulations in the West Coast-based longline fishery … to ensure the fishery complies with the ESA. (Biological Opinion, p. 40)

The BO also states:

> We begin our analyses with an implicit understanding that the sea turtles considered in this Opinion are threatened with global extinction by a wide array of human activities and natural phenomena … We also recognize that some of these other human activities and natural phenomena pose a much larger and more serious threat to the survival and

> recovery of threatened and endangered species than the HMS [FMP] fisheries. For example, many foreign fishing fleets have substantially larger, adverse effects on threatened and endangered sea turtle populations in the Pacific Ocean than U.S. fishing fleets. We recognize that we will not be able to recover threatened and endangered species without addressing the full range of human activities and natural phenomena that have caused these species to decline or could cause these species to become extinct in the foreseeable future….
>
> Nevertheless, our task in this consultation is not to identify the various risks contributing to the endangerment of listed marine species, rank them according to relative significance, and address them according to ranked order. Our task in a consultation is simpler: identify the direct and indirect effects of the HMS fisheries managed under the HMS FMP to determine if the proposed management regime is likely to *contribute* to the endangerment of threatened and endangered species by appreciably reducing their likelihood of both surviving and recovering in the wild. (Pp. 46–47, emphasis in original)

A BO is prepared under section 7 of the ESA, which requires federal agencies, in consultation with and with the assistance of the Secretary of Commerce,[4] to insure that their actions are not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of critical habitat that has been designated for those species (section 7(a)(2)).[5] Regulations implementing section 7 of the ESA define the term "jeopardize the continued existence of," to paraphrase, as reduce appreciably the likelihood of survival and recovery of a species in the wild by reducing reproduction, population size, or distribution of a listed species (50 CFR 402.02). The BO is "a written statement setting forth the Secretary's opinion" as to whether a Federal action is likely to jeopardize listed species or destroy or adversely modify critical habitat as described in section 7(b) of the ESA. The BO may set forth reasonable and prudent measures or alternatives that *must* be complied with, and as noted above, section 11(f) authorizes the Secretary to promulgate regulations "as may be appropriate to enforce this act."

These facts underscore several points related to how the process of implementing a shallow-set management regime could interact with the ESA:

- An agency must propose an action and determine whether the action is likely to adversely affect listed species; if it does, formal section 7 consultation is triggered. Thus when the Council takes final action (by choosing a preferred alternative for example) there may be some uncertainty as to whether that action is approvable (i.e., whether or not it is likely to result in jeopardy to listed species). Consultation within NMFS is required of any action likely to adversely affect marine mammals, sea turtles, or salmonids, and for seabirds, the U.S. Fish and Wildlife Service. There are mechanisms available to provide preliminary information about the approvability of an action if NMFS is the consulting agency. Also, a BO cannot be prepared independent of an agency proposing some federal action.

- A consultation only considers the effects of the subject proposed action (when added to the environmental baseline and considering the status of the species); it is not a

[4] In the case of most marine species; NMFS' Protected Resources Division (PRD) is the consulting agency. Thus the Sustainable Fisheries Division consults with PRD in the case of fisheries actions. Marine birds and otters are covered by FWS.

[5] According the HMS FMP Biological Opinion, no critical habitat for any sea turtles occurs within the action area of the FMP.

mechanism to initiate other, separate actions. However, the consultation can impose reasonable and prudent alternatives to the proposed action to avoid jeopardy. For example, a consultation on an action under the HMS FMP may consider the effects of other U.S. fisheries (such as the Hawaii longline fishery) but cannot trigger changes in the management of those other fisheries (i.e., to reduce expected takes of ESA-listed species).

- A consultation for a new proposed action considers both existing sources of mortality (as part of the environmental baseline and status of the species evaluation) and any additional mortality estimated to occur as a result of the new action. Thus, a Council proposed action for the SSLL fishery would be considered as "new" mortality added to the existing level of "no jeopardy" take in other U.S. fisheries for which consultations have been completed (and non-U.S. actions not subject to the ESA). Depending on the increase in mortality that is estimated, the outcome of the jeopardy analysis in the consultation for the new action could result in it not being approved under the ESA. Thus the ESA framework, in a sense, favors those actions that are first through the door since a new action adds to the morality already estimated for the baseline, which includes existing actions. On the other hand, evidence of lower than expected mortality from actions considered in the baseline or an overall improvement in the status of the stock (for example improved reproductive success) could also affect the jeopardy analysis, making a given level of mortality estimated for the proposed action less likely to result in a jeopardy determination.

- Currently, the only regulations applicable to SSLL fishery east of 150° W longitude are promulgated pursuant to section 11(f) of the ESA—50 CFR 223.206(d)(9) prohibiting shallow-set longlining east of 150° W longitude. A proposed action to complete the HMS FMP, applicable to SSLL fishing east of 150° W longitude, would be promulgated under the Magnuson-Stevens Act (MSA) and implementing regulations would then be published at 50 CFR, part 660, subpart K. If the action contained sufficient mitigation measures so as to not cause jeopardy, as determined by consultation, the MSA action would be approved under Secretarial review, the HMS FMP would be amended, pursuant regulations implemented, and the ESA regulations removed, as they would no longer be necessary.

The provision in the Hawaii model fishery establishing take caps for leatherback and loggerhead sea turtles tends to lead fishery managers to the issue of allocation. In other words, is there a way to consider how the "pool" of sea turtle mortality can be divided (or re-divided) amongst various fisheries? However, this line of reasoning may be ultimately unproductive because of the difference between the MSA's mandate to "prevent overfishing while achieving … optimum yield" versus the ESA's mandate to insure an action is "not likely to jeopardize the continued existence" of ESA-listed species.[6] In the one instance mortality is "optimized" and allocation represents a decision about the resulting division of the social benefits of harvest. In the other, mortality is an unintended consequence that is determined acceptable within the legal mandate. There is thus no legal and procedural framework within which "allocation" of ESA-listed species takes can be considered. Furthermore, without closely coordinated action there is no way to effect changes that trigger an evaluation (consultation) under ESA that could have an effect similar to allocation (e.g., proposed measures resulting in a reduction in expected takes in one

[6] Of note, section 7 of the ESA also mandates that federal agencies utilize their authority in furtherance of the purposes of the ESA and carry out programs for the conservation of listed species (section 7(a)).

fishery affecting the no jeopardy take level in the other fishery). For fisheries under different jurisdictions this is likely to be impossible.

Alternative Management Frameworks for a West Coast Shallow-set Longline Fishery

Broadly, the Council has three options in considering a management framework for the shallow-set longline fishery. First, all management could be effectively ceded to the WPFMC, which is the status quo. Second, the Council could independently propose a management framework containing measures judged to result in a no jeopardy determination. Third, the Council could seek to develop a formal decision-making framework for joint management of a shallow-set longline fishery by the PFMC and WPFMC.

Status Quo

The status quo has been described above. Vessels in possession of a Hawaii limited entry permit may land fish on the West Coast. This offers at least the potential for a West Coast based fishery should any Hawaii permit holders wish to make deliveries into West Coast ports. Furthermore, there are latent permits; in theory an individual wishing to prosecute a West Coast fishery could purchase one of these permits in order to participate.

The main constraint to fishing under the status quo relates to the seasonality of a West Coast fishery, which normally occurs in the fall and winter quarters. Because of the sea turtle take caps and set limits applied to the Hawaii fishery, in which most effort occurs in the first and second quarters of the year, it is unlikely that there will be much fishing opportunity available by the last two quarters of the year. For example, in 2006, the Hawaii based SSLL fishery was closed in March because it reached the loggerhead cap (see Table 2). As of July 11, 2007, 14 loggerheads have been taken in the Hawaii SSLL, three below the cap of 17 loggerheads. Although an individual could accumulate set certificates (the mechanism for limiting effort) to fish SSLL in the fall from the U.S. West Coast, there is no guarantee of when the remaining three loggerheads may be taken, thus shutting down the fishery either before the last quarter of the year or before fishermen can use the certificates. Furthermore, because set certificates are tradable, there may have some monetary value that would be lost if the turtle take cap is reached before the certificates can be utilized. This creates the potential for “derby” conditions where fishermen will seek to maximize their fishing opportunity before the take caps are reached.

Under status quo the Pacific Council has no authority to modify the management measures for the Hawaii SSLL fishery. However, the PFMC could request the WPFMC to make modifications, such as allocating the take caps and/or set certificates on a seasonal basis. To some degree this is a chicken and egg problem. If there is not a substantial segment of fishery participants desiring the opportunity to land into the West Coast there will be little pressure to modify the management framework to accommodate them. On the other hand, without such an opportunity in hand there may be little interest in committing to such a fishing strategy. Furthermore, such a change could trigger a reinitiation of the section 7 consultation with uncertain consequences.

A West Coast Model Fishery without License Limitation

A West Coast model shallow-set fishery would likely include the same mitigation measures as the Hawaii-based fishery. These include:

- 100 percent observer coverage

- Use of 18/0 or larger circle hooks with 10 degree offset

- Use of mackerel-type bait

- Updating current sea turtle take mitigation measures at 50 CFR 660.712(b) to be consistent with like mitigation measures for the Hawaii fishery at 50 CFR 660.32, including the turtle de-hooking device requirement

- Require night setting

- Manage the effort with take caps for sea turtles (and for other protected species if appropriate)

- Direct effort limits implemented through set certificates or similar mechanism, likely based on some measure historical effort, recognizing West Coast participation by Hawaii-permitted vessels

In general some form of effort limitation must be implemented to establish a viable and approvable West Coast fishery. Without any limits there would be greater uncertainty about the likely number of incidental sea turtle takes, which would be a factor in a section 7 consultation. In lieu of limited entry indirect measures, such as time and/or area limits, could be investigated as a way of reducing expected sea turtle takes to a no jeopardy level.[7] The problem with indirect measures is that there would be a much higher likelihood of derby-style conditions as discussed above, assuming that take caps were a feature of the management framework, since participation would be unconstrained. Furthermore, a relatively small pool of potential revenue would likely be dissipated across a larger, less optimal number of participants. Another approach would be to limit participation directly through the use of set certificates, which could be distributed annually to HMS permit holders meeting specified qualifications. The qualifications would likely be similar to those that would be used to establish a limited entry program, such as West Coast landings history. In evaluating this option one consideration would be whether such qualifying criteria would be any easier to establish than implementing a full-blown limited entry program. Alternatively an aggregate effort cap could be established with the fishery closing for the season when effort by all participants reaches the cap. However, this would likely promote derby conditions with “fishing against the effort cap.”

A key issue would be the approvability of the action in terms of the ESA jeopardy standard. As discussed above, one question would be whether any expected increase in sea turtle mortalities from current levels would pass the no jeopardy standard. The level of takes in the Hawaii SSLL fishery would be part of the baseline against which a Pacific Council SSLL proposed action would be considered. Thus, even if the estimated mortality from a West Coast SSLL fishery was lower than that occurring in the Hawaii fishery, its additive effect could still factor in a jeopardy determination. As discussed above, the Hawaii fishery is “first through the door” in terms of the jeopardy analysis. One question is whether there could be any element in a Pacific Council proposed action that would either trigger a simultaneous re-initiation of consultation for the Hawaii fishery or a joint consultation covering both fisheries. This type of process could result in

7 Time-area closures as a mitigation measure—for example to close known sea turtle “hotspots”—also could be used in conjunction with a limited entry program.

adjustments in the management framework for the Hawaii SSLL fishery to compensate for the effects of a new West Coast SSLL fishing opportunity. However, there is no obvious mechanism whereby unilateral action by the Pacific Council would trigger such a re-initiation or joint consultation covering the Hawaii fishery. Although the NMFS Pacific Island Regional Office could request re-initiation in response to Pacific Council action, because of changed circumstances in the action area for the Hawaii SSLL fishery, it would be extremely unlikely that they would do so.

A West Coast Model Fishery with License Limitation

A limited entry program would include the same features of a model fishery described above and also license limitation. A key consideration in developing a limited entry program is establishing the qualifying criteria for who will get a license. The HMSMT's 2004 report referenced above provides a good starting point for developing alternatives, although the data would need to be updated. The basic decision in developing a limited entry program is establishing qualifying criteria; such criteria may include a window period (a time period during which landings must have been made) and a minimum landing requirement during the window period. These two basic concepts can be elaborated with further qualifications, such as the number of years in which landings were made, formulae for determining minimum landings that include dropping low-catch years, etc. (The reader is referred to options in the groundfish trawl rationalization process for examples of various qualifications.) For example, a recent participation provision could be added based on the HMS control date of March 9, 2000.

According to the HMSMT report, the baseline is 92 vessels meeting the criteria established at that time. (Of these 92, ninety made landings in the 1993–2002 period; the criteria that would account for the additional two vessels is not explained.) (Since the West Coast fishery closed in 2004 an option would be to extend the window period through 2003, although this is unlikely to increase the baseline count of vessels.) Of these, 37 were registered for a Hawaii permit in 2002. (Since a number of vessels deregistered from their Hawaii permit in order to fish out of the West Coast during the 2001–03 period when the Hawaii shallow-set fishery was closed, this may under-represent the number of Hawaii-permitted vessels that made landings on the West Coast during the window period.) A West Coast limited entry permit would be required to land longline-caught swordfish on the West Coast, but if the qualifying criteria are independent of permit status (e.g., based on historical landings), it is likely that most Hawaii-permitted vessels that participated in a West Coast fishery would qualify. Alternatively, the West Coast limited entry program could be parallel to the Hawaii permits, i.e., Hawaii permit holders would be specifically excluded from qualifying for a West Coast permit, but would still be permitted to land swordfish on the West Coast. This arrangement would basically add a pool of license holders to the current number of Hawaii permit holders, who can legally land shallow-set-caught swordfish on the West Coast. According to the HMSMT report, 53 vessels not holding a Hawaii permit in 2002 made landings during the window period. This gives an indication of the pool that could potentially qualify for such a parallel license.

Table 3 shows the number of vessels by total landings in the window period grouped in 25 mt increments. For each increment the table shows the number of vessels, cumulative number of vessels and percent, and the number of vessels with landings above the minimum value for each increment (the inverse of the cumulative number). This last column gives an indication of the number of vessels that could qualify with increasing minimum landings requirements and is a rough-and-ready estimate of how a minimum landings requirement would affect the number qualifying for permits.

Table 3. Number of vessels by landings category. (Data source: Exhibit G.3.a, Attachment 1, April 2004.)

Total landings 1993-2002 (mt)	Number of vessels	Cumulative number of vessels	Cumulative percent	Number of vessels with landings above category minimum
0-24	36	36	40%	90
25-49	14	50	56%	54
50-74	5	55	61%	40
75-99	10	65	72%	35
100-124	5	70	78%	25
125-149	2	72	80%	20
150-174	2	74	82%	18
175-199	1	75	83%	16
200-224	0	75	83%	15
225-249	3	78	87%	15
250-274	6	84	93%	12
275-299	1	85	94%	6
300-324	3	88	98%	5
325-349	0	88	98%	2
350-374	1	89	99%	2
375-400	1	90	100%	1

Another consideration is whether the limited entry program applies to longline fishing generally, including deep-setting (targeting tunas) or only to a shallow-set fishery. Historically, there has been little or no deep-set longline fishing out of the West Coast, although currently a single vessel is doing so. Given the lack, historically, of a very active fishery using this strategy and the lower protected species impacts, the rationale for license limitation for this segment is weaker. On the other hand, from an administrative and enforcement standpoint it may make more sense to apply the license limitation to the gear type generally rather than trying to distinguish between shallow- and deep-set components. Another alternative would be to endorse permits so that the different segments could be managed accordingly (this would be consistent with the proposal, discussed below, for creating a special class of permits for current DGN limited entry permit holders). If a limited entry permit were to apply to longline gear generally the qualification criteria might need to modified, if there are any potential participants having a history of substantial longline-caught landings of species other than swordfish.

DGN Options for a Limited Entry Program

The California DGN fishery also targets swordfish. DGN gear is fished within the West Coast EEZ, while the HMS FMP only allows longline gear to be used outside the EEZ. Observer records from both of these fisheries indicate that the numbers of marine mammal species and individuals interacting with DGN gear are higher than the numbers of species and individuals interacting with longline gear, although this may be linked to the differences in areas fished (i.e., higher abundance of marine mammals within the EEZ than outside the EEZ). Observed mortality rates of sea turtles are quite a bit higher in the DGN fishery than in the modified SSLL fisheries being prosecuted in Hawaii and the Atlantic. There is thus a reason to encourage willing participants to transition from one gear type to the other. However, as noted above, most DGN vessels are not big enough or configured properly to readily fish far offshore, outside the EEZ. (According to the data in the 2004 HMSMT report, seven of the 92 vessels making longline landings also possessed a 2002 MMPA DGN authorization and of these seven, two were also registered for a Hawaii longline permit in 2002.) The investment required to retrofit a vessel, or purchase a new one, may not be justified by the economic return of fishing with longline gear on the high seas. In relation to this issue the Council recommended NMFS issue an EFP to test the feasibility of shallow-set longline within the EEZ as a viable alternative to DGN gear. The long-term objective is to determine whether willing DGN participants could transition to longline gear for fishing inside the EEZ. Use of longline gear inside the West Coast EEZ is currently prohibited under the HMS FMP, thus necessitating an EFP to gather information to determine whether fishing inside the EEZ would be feasible. This suggests an option with a phase-in period. A special class of limited entry permits could be created; to qualify one would have to possess a California DGN limited entry permit which they would have to surrender to obtain the limited entry longline permit. Initially this special class would be no different than the general limited entry permit, only allowing the permit holder to fish with shallow-set longline gear outside the EEZ. However, if the Council were to amend the FMP to set up such a framework, this class of permit holders would be allowed to also fish inside the EEZ. Initially few, if any, DGN permit holders would be willing to surrender a DGN permit for a longline limited entry permit. However, if the program allowed permit conversion to occur at any time, DGN permit holders might consider conversion at a time when the permit class they qualify for allows fishing inside the EEZ.

A number of issues would have to be resolved to further develop this concept. First, if, as is likely, there is a substantial pool of latent DGN permits, a permit holder could surrender a DGN permit and then purchase another, unless further restrictions could be applied. Since the underlying premise in establishing such a scheme is to permanently transition DGN gear to longline gear, the intent would be to prevent holding dual permits. A second related issue is the design of such conditions. If made too onerous there would be little incentive to transition. In particular, the advantages of fishing with longline gear inside the EEZ would have to be amply demonstrated in order for DGN permit holders to be willing to surrender their permit.

If the hypothesis that shallow-set longline gear results in a lower take and mortality rate for sea turtles and if a transition from DGN to longline gear were large enough, such a management action could reduce overall U.S. sea turtle takes in the eastern Pacific. Thus, even though this scheme could increase the pool of those eligible to fish with shallow-set longline gear (i.e., both those with a history of shallow-set fishing and those using DGN but with no shallow-set history) it might be approvable under the ESA. (Obviously, considerably more analysis would be required to get a better indication of whether such an action would be approvable.)

Joint Management

The third, and possibly most difficult, approach would be to seek joint management of the shallow-set fishery by the WPFMC and the PFMC. As an example from another region, the New England and Mid-Atlantic Councils jointly administer a monkfish FMP (see http://www.nefmc.org/monk/summary/fmp.pdf). A special committee comprising members from each council administers the plan. Since both the WPFMC and PFMC have already implemented FMPs that deal with a shallow-set fishery this approach would likely require a coordinated effort to amend the respective FMPs to establish a common decision-making framework. Because there is no active West Coast SSLL fishery and the WPFMC recently established their model fishery the impetus for the WPFMC to cede some amount of management authority over what is effectively a Hawaii-based fishery would seem to be low. Even if there was a willingness to explore joint management it would be costly to set up and administer, given the travel distances involved. On the other hand, a joint management framework would be more seamless, with a single set of rules and procedures covering what would likely be a single fishery with a common set of participants.

An important adjunct to the WPFMC's model SSLL fishery is their Sea Turtle Program, intended to foster research- and conservation-related activities. This is a form of mitigation to address other sources of sea turtle mortality, recognizing that the Hawaii SSLL has sea turtle takes. The WPFMC employs a program coordinator, and established a Turtle Advisor Committee comprising scientific experts who make recommendations on research and conservation activities. The program has also sponsored a series of workshops to bring together experts and develop conservation initiatives. As stated in a program description,[8] "…the [Turtle Advisory Committee] concluded that the [Western Pacific] Council's conservation efforts be directed towards international projects with a focus on those species which are of greatest likelihood to interact with the Hawaii-based longline fishery, namely loggerhead and leatherback turtles." As part of a joint management program, or implementation of unilateral management measures for a West Coast SSLL fishery, the Pacific Council could consider a similar mitigation that would complement or supplement the WPFMC program.

Questions to be Answered and Additional Information Needed to Further Develop Alternatives

- Update data/analysis in the April 2004 HMSMT Report (see Exhibit G.3.a, Attachment 1).

- What is the historical seasonality of West Coast longline swordfish catch and landings (e.g., monthly cpue/landings totals during window period)? This would help inform decisions about establishing seasonal closures to concentrate effort during the period of highest catch/landings.

- What information is there about the distribution of sea turtles ("hotspots") that could be used to consider closed areas to lower the risk of incidental takes?

- What was the historical effort level in the West Coast fishery? This would help inform a decision on an effort cap similar to the Hawaii model fishery.

- Is there sufficient data to re-conduct the analysis of geographic distribution (east versus west of 150° W longitude) of sea turtle take rates provided by Jim Carretta at the June 2003 Council meeting (see Exhibit F.2.b, NMFS Report)? This could inform decisions about possible area restrictions.

- What would be the appropriate number of participants and/or effort cap based on best estimates of sea turtle bycatch rates in a model fishery?

- What procedures and circumstances would lead to a joint section 7 consultation covering both a new West Coast SSLL fishery and the existing Hawaii SSLL fishery? What are the implications or possible outcomes of such a consultation?

- What are the views of DGN fishers with respect to switching to SSLL gear and fishing either outside or inside the West Coast EEZ?

[8] http://www.wpcouncil.org/protected/Documents/WPCouncilTurtleProgramArticle.pdf

Attachments

Attachment 1: February 4, 2004 letter from Rodney McInnis to Donald Hanson describing partial approval of the HMS FMP.

Attachment 2: Exhibit G.2.c, HMSMT Report, November 2003

Attachment 3: Executive Summary from the WPFMC's regulatory amendment, Management Measures to Implement New Technologies for the Western Pacific Pelagic Longline Fisheries

References

Gilman, E., .D.Kobayashi, T Swenartion, P.Dalzell, I.Kinan, and N.Brothers. 2006. Analyses of observer data fro the Hawaii-based longline fishery. Pohnpei, FSM: Western and Central Pacific Fisheries Commission. WCPFC-SC2-2006/EB IP-1.

PFMC (Pacific Fishery Management Council). 2003. Final management plan and environmental impact statement for U.S. west coast fisheries for highly migratory species. Portland, OR: PFMC. Aug. 2003.

Watson, J. W., Sheryan P.Epperly, Arvind K.Shah, and Daniel G.Foster. 2005. Fishing methods to reduce sea turtle mortality associated with pelagic longlines. Can. J. Fish. Aquat. Sci. 62:965-981.

Attachment 1

Exhibit G.2.a
Attachment 1
April 2004

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Region
501 West Ocean Boulevard, Suite 4200
Long Beach, California 90802- 4213

FEB - 4 2004

F/SWR2:SF

RECEIVED
FEB 12 2004
PFMC

Mr. Donald Hanson, Chairman
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 200
Portland, Oregon 97220-1384

Dear Mr. Hanson:

I am pleased to inform you that, with the exception of one provision, I have approved the Pacific Fishery Management Council's proposed Fishery Management Plan for U.S. West Coast Highly Migratory Species (FMP). There is broad agreement that this FMP is a major step forward toward effective management of these important west coast fisheries and resources. Notwithstanding the provision disapproved, I compliment you and the Council on both the quality of the FMP and the open and collaborative process by which the FMP was developed.

The provision that I have disapproved would have allowed shallow-set longline fishing by west coast-based vessels targeting swordfish in waters beyond the U.S. exclusive economic zone (EEZ) east of 150° W. longitude. The FMP would prohibit longline fishing in the EEZ off the west coast, and would prohibit the longline fishery from making shallow sets to target swordfish sets in waters beyond the EEZ and west of 150° W. longitude. At the time the Council adopted the FMP, the Council had been provided with information about potential impacts of the fishery on endangered and threatened sea turtles if fishing shallow set longline fishing strategy were adopted and about the likelihood of FMP disapproval on this basis.

During review of the proposed FMP, the National Marine Fisheries Service (NOAA Fisheries) initiated consultations under section 7 of the Endangered Species Act (ESA) to determine if the levels of takes and mortalities that were projected to occur in the fishery under the Council's proposed management program would appreciably reduce the likelihood of survival and recovery of listed species of sea turtles. Shallow-set longline fishing has been shown to have high rates of interaction with sea turtles (especially loggerhead and leatherback sea turtles). Currently, all west coast longline vessels (approximately 20 vessels) fish in this manner. The Biological Opinion (BO) resulting from the consultation concluded that, if allowed to make shallow sets in the waters east of 150° W. longitude at recent effort levels, the longline fishery would take turtles at levels that would appreciably reduce the likelihood of survival and recovery of at least one species of sea turtle. Therefore, that provision has been disapproved as not being consistent with the ESA, meaning that the FMP does not comply with "other applicable law" (section 303(a)(1)(C) of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act)). A copy of the BO will be provided to the Council under separate cover.

NOAA Fisheries has separately published (68 FR 70219, December 17, 2003) a proposed rule under the authority of the ESA that would prohibit shallow sets in the waters east of 150° W. longitude. This was published prior to action on the FMP to ensure that, if the review of the Council's FMP concluded that its proposed management program would be inadequate, then NOAA Fisheries would have corrective regulations in place until the Council could make the necessary changes to its management program. Under this approach, the ESA regulations could be implemented at the same time as the FMP implementing regulations if they were deemed necessary after the section 7 consultation and action on the proposed FMP. In fact, this rule is now deemed necessary. The BO concluded that the fisheries as they would operate under the conservation and management measures of the FMP, and the ESA companion rule would not jeopardize the continued existence of any species of sea turtle. NOAA Fisheries will therefore proceed to finalize this rule on the same time track as the final rule for the FMP.

The Magnuson-Stevens Act (section 304(a)(1)) requires that, if an FMP is disapproved in part or in whole, the Council must be advised of actions it can take to correct the FMP. The following information is provided to satisfy this requirement.

First, NOAA Fisheries is very pleased with the results of recent research in the Atlantic Ocean regarding the use of alternative gear and bait combinations in longline fishing to reduce sea turtle interactions and consequent injury or mortality to sea turtles. A copy of the news release summarizing the achievements of that research is enclosed. The research concluded that encounters with leatherback and loggerhead turtles in the Atlantic Ocean can be reduced by 65 to 90 percent by switching the type of hook and bait from the traditional "J" style hook with squid to a large, circular hook with mackerel. In addition, the nature of hookings is less damaging as the large hooks are far less likely to be deeply swallowed and lethal. In addition, new de-hooking and release devices and techniques have been developed, further reducing the likelihood of major injury to or death of turtles. NOAA Fisheries is actively promoting adoption of this new gear in the international arena given that this is a global problem. NOAA Fisheries also plans to undertake additional research into the use of this gear in longline tuna fishing, which also is known to have sea turtle interactions.

Second, in January 2004, NOAA Fisheries convened 17 experts in the areas of biology, veterinary medicine, anatomy/physiology, satellite telemetry, and longline gear deployment for a Workshop on Marine Turtle Longline Post-Interaction Mortality. These experts presented and discussed recent data available on the survival and mortality of sea turtles subsequent to being hooked by fishing gear. Based on the data gathered during that workshop, NOAA Fisheries revised its February 2001 post-hooking mortality criteria. The Southwest Region will work with its observer contractor to make sure that future observers collect more detailed interaction information to better support application of this new policy.

Third, new regulations to govern the longline fishery for the Hawaii-based fleet are needed by April 1, 2004, in response to a court decision. The Western Pacific Fishery Management Council has submitted a proposal (summary enclosed) that would allow shallow longline sets targeting swordfish but that proposes to limit sea turtle takes and mortality through a combination of fleet effort limits, transferable vessel effort limits, a requirement to use circle hooks and mackerel bait, a limit on estimated sea turtle takes, in the fishery based on observer records, and other measures. This proposal is being reviewed by NOAA Fisheries, and a section 7 consultation is underway. I will advise the Pacific Council of the results of the consultation and NOAA Fisheries' action on this proposal.

I believe this information will be very useful to the Council in considering adjustments to its fishery management regime that can allow fishing without jeopardizing any ESA listed species. NOAA Fisheries' action on the Western Pacific Council's proposal has implications for potential approvability of similar approaches for the west coast longline fishery. I recommend that the Council direct its management team to review this information and to begin developing and analyzing alternative sets of comparable conservation and management measures under which the longline fishery off the west coast might be able to target swordfish with low levels of marine turtle takes. This could include consideration of limited longline fishing for swordfish with effort limits, gear and bait requirements, time/area limits, turtle take limits, or other measures that would limit sea turtle mortality to low levels approximating those that had previously been found in the drift gillnet fishery not to result in jeopardy to any listed sea turtles. I commit the Southwest Region to work closely with the Council and its advisory bodies as well as to coordinate with the Pacific Islands Region and the Office of Protected Resources to the extent possible to ensure that the best scientific information available is used in developing and evaluating the potential impacts of alternative approaches.

Again, congratulations to the Council on developing this new FMP. I look forward to working closely with you and your staff and the states to implement this FMP, and will report on our progress as it occurs.

Sincerely,

Rodney R McInnis

Rodney R. McInnis
Acting Regional Administrator

Enclosures
cc: F - W. Hogarth
F/NWR - B. Lohn
GCSW - J. Feder
GCNW - E. Cooney
F/NWR - B. Robinson
F/PIR - S. Pooley

HIGHLY MIGRATORY SPECIES MANAGEMENT TEAM REPORT REGARDING HIGH SEAS LONGLINE LIMITED ENTRY AND OTHER ISSUES

The Highly Migratory Species Management Team (HMSMT) met October 1-2, 2003 to discuss initial considerations for a limited entry program for the high seas longline fishery. The HMSMT provides the following comments about considerations for and development of limited entry.

1. Limited Entry Considerations

The Pacific Fishery Management Council (Council) had charged the HMSMT to evaluate limited entry for the West Coast pelagic longline fishery. Dr. Sam Herrick provided an initial evaluation to the HMSMT on a range of potential qualifying window periods and minimum landing requirements. It was suggested that qualifying periods ending on the Council established control date, March 9, 2000, be included.

The initial information included records of vessels with landings of highly migratory species (HMS) in the PacFIN database. This includes the years 1981-2002. The HMSMT discussed the need to resolve PacFIN data issues, notably given the apparently very high number of vessels with HMS landing during the 1981-2002 period (i.e., 402 vessels). It was noted that some of these could be mis-recorded landings from the California-based setnet fishery.

The HMSMT discussed additional information that would be needed, including allowable take of sea turtles (from the section 7 consultation), target catch, vessel size, gear used, length of gear, and number of hooks.

In addition to landings history, permits held by a vessel could be a measure used to determine eligibility. It was noted that most vessels landing HMS into West Coast ports hold (or held) Western Pacific Fishery Management Council (WPFMC) pelagic fishery permits. Before the Biological Opinion for the WPFMC-managed fishery, WPFMC permitted vessels could land swordfish into West Coast ports (generally, California). After the Biological Opinion prohibited WPFMC permitted vessels from targeting swordfish, many of these vessels surrendered/transferred their permits. These vessels continued to target swordfish, which were then landed into West Coast ports (generally, California).

If the main qualifying criteria were past West Coast HMS landings and possession of a WPFMC-permit, California-based drift gillnet fishermen (without longline landings history) and WPFMC-permitted vessels without landings history would not qualify.

The HMSMT notes that the limited entry program will be predicated on turtle interactions, rather than on swordfish or tuna resource concerns or economic considerations. The range of options must be predicated on sea turtle conservation.

The HMSMT also notes:

- A time line is needed for initial analysis and development of preliminary alternatives.

- The first measure of eligibility could be based on West Coast landings history.

- Measures of fishing capacity should include total number of hooks, not just vessel hold capacity or gross tonnage.

- The relevant capacity concern may be turtles rather than swordfish or tunas.

- Limited entry might first limit the number of vessels and then distribute the number of hooks.

- There is a need for a reciprocal landings agreement with WPFMC. Currently, Hawaii-based vessels can land on the West Coast, but West Coast vessels land into WPFMC management area ports.

The HMSMT briefly discussed management alternatives that could provide for drift gillnet fishers to switch to pelagic longline on the high seas. This could be a way for the two fisheries to operate without a net increase in turtle impacts. However, switching would be limited to those drift gillnet vessels large enough to work on the high seas.

2. Common Biological Opinion between Council and WPFMC

The HMSMT reiterates the recommendation made at the June 2003 Council meeting that a joint Biological Opinion is necessary between the West Coast and Western Pacific (Hawaii). The HMSMT also recommends joint program design and cooperative management of these shared HMS and turtle stocks and vessels between the Council and WPFMC. The current approach of separate Biological Opinion treats fisheries in isolation, which is inappropriate given the characteristics of the fishery – many of the same vessels in both fisheries, same gear used, same markets, same stocks of fish, same stocks of sea turtles. All Council and WPFMC fisheries that impact sea turtles should be considered.

A Biological Opinion for a specific fishery considers the full range of impacts (including other fisheries) on the sea turtle population. However, reasonable and prudent alternatives are set for the specific fishery. It might be better to develop comprehensive reasonable and prudent alternatives for the suite of fisheries. The lack of comprehensive alternatives results in an implicit allocation of allowable turtle takes among the various fisheries. Balancing allowable turtle takes among various fisheries appears hindered by the fishery-specific Biological Opinion process. There also exists a potential for double counting of effort and turtle takes with the Council and WPFMC Biological Opinions if there is not a common Biological Opinion.

This appears to be a prime opportunity for a joint/comprehensive Biological Opinion. The recent decision in the Hawaii Longline Association lawsuit vacated the previous WPFMC Biological

Opinion. A Biological Opinion is needed for the HMS fishery management plan (FMP). These two factors provide an incentive to conduct a Biological Opinion that covers the full range of HMS fisheries that impact the same stock of turtles.

NMFS appears resistant to the comprehensive Biological Opinion approach. Clarification as to whether this is true, and if yes, would be helpful.

3. Data Sources

The HMSMT noted that, while discussing operational aspects of a limited entry fishery and the Biological Opinions is interesting and useful, it is premature to formulate specific options. The first task is to identify, compile, refine, and analyze the available data. The available data, in large part, will dictate the types of management options that could be analyzed. To that end, the HMSMT discussed what data are available.

- PacFIN (1981-present). Based on fish tickets. Needs to be refined/filtered to focus on high seas pelagic longline participants with Pacific Coast landings. For example, there is no gear code for California-based pelagic longline landings. This necessitates the use of proxies, such as gear/area/species landed. It was also suggested to use some measure of species composition percentage as and estimate of what species or species groups were targeted.

- NMFS observer data (Fall 2002 - May 2003). Provides species composition, number of hooks, number of sets, bycatch, area fished, and length of set (miles of gear). There is information from 13 observed trips from one season. This includes some cost and earnings data.

- California and High Seas Fishing Compliance Act (HSFCA) high seas longline logbooks (1995 - present). These could provide information on recent versus historic effort.

- WPFMC-based longline logbooks.

- Recent (informal) socioeconomic survey information.

4. Qualifying Criteria Measures

The following could be used to determining eligibility:

- Participation over time – landings, number of trips, years, number of hooks, etc.

- Fishery dependence.

- Catch composition (possibly including protected species takes) over time.

- Vessel size/capacity.

5. Data Necessary for Analysis

The time series of vessels and landings into West Coast ports from high seas longline fishing up to control date (and to present) would be used. Time series should also include information before and after WPFMC swordfish-style set prohibition. Data needed to perform the analysis include:

- Landings per trip – broken out by swordfish, tuna (other than albacore), albacore, and other HMS (dorado, sharks).
- Vessel size/length.
- U.S. Coast Guard documented – yes/no.
- Number of hooks per trip.
- Length of gear per trip.
- Number of trips by year.
- Amount (mt) landed per trip.
- WPFMC permit – yes/no.
- Revenue information.
- Measures of relative dependence – by vessel. For example, revenues derived from HMS as part of total Pacific Coast landings; and Pacific Coast HMS landings as part of total HMS landings (WPFMC and Council).
- Time line of management events that could have influenced participation.

6. Other Items Discussed

Specific to the March 9, 2000 control date, fishing patterns before and after the control date should be reviewed to determine effect on participation. It is possible, given other events and actions affecting Pacific-based HMS fisheries, the control date had relatively little effect.

In developing the limited entry program, the HMSMT will need to have access to data used for the Biological Opinion and its underlying assumptions and analytical methods. There is a need to know how the Biological Opinion defines "current" fleet. There should be consistent data used in Biological Opinion and HMSMT limited entry program analysis.

The need to account for the combined impacts on sea turtles from the various fisheries was discussed extensively. For example, it is conceivable that, under the current Biological Opinion process, the section 7 consultation and jeopardy determination for Council-based longline fishery could result in reasonable and prudent alternatives that do not provide for any additional allowable takes of sea turtles (relative to what is provided for the current fisheries). This would effectively eliminate the Council-based swordfish fishery. Thus, it was suggested there is a strong need for a comprehensive Biological Opinion that covers all areas and all fisheries, and provides take allowances for all fisheries, if possible.

Conversely, at the HMSMT meeting, some members of the public opined that the California-based drift gill net (DGN) fishery and the WPFMC pelagic longline fisheries could be characterized as traditional fisheries. And, thus, should be given priority in take allowances.

7. Summary

The primary need for a limited entry program is driven by protected resources, not economic nor fishery resource concerns.

There is compelling need for the Biological Opinion to be completed prior to development of a limited entry program. First, because the opinion may result in prohibition of swordfish style-sets, which would close the fishery and negate need for limited entry. Second, because the principle driver for limited entry program is to prevent increased sea turtle takes; need results of Biological Opinion to know what allowable levels of takes would be.

Given the nature of the WPFMC and Council fisheries there is a compelling need for a coordinated Biological Opinion, coordinated management, and a coordinated limited entry program. For example, most of the vessels landing HMS into West Coast ports hold (or held) WPFMC pelagic fishery permits. It is unclear under whose jurisdiction these vessels truly fall.

Given that several HMS fisheries (e.g., WPFMC longline, Council longline, Council drift gill net) interact with turtles, there are allocation implications that should be addressed.

Reciprocal fishing arrangements are needed – WPFMC vessels can land into West Coast ports, Council boats can not land into Hawaii.

PFMC
10/21/03

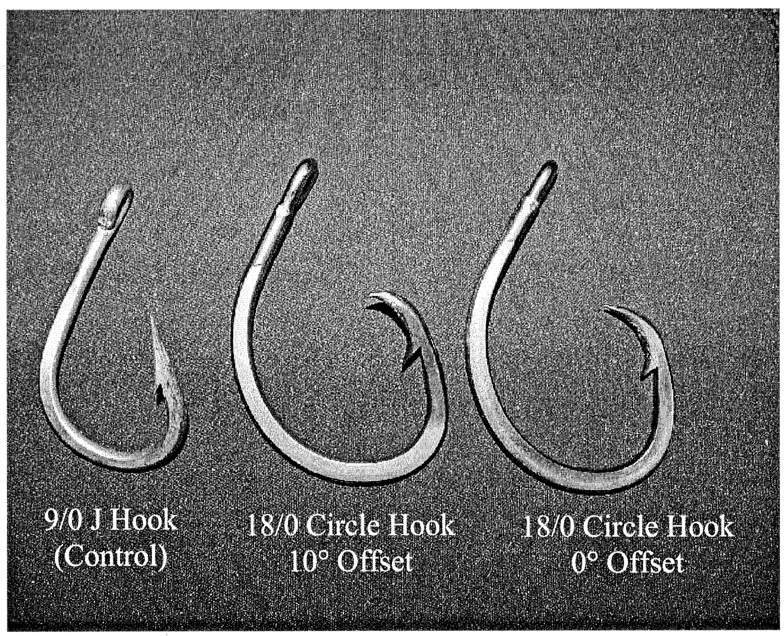
Attachment 3

Western Pacific
Regional Fishery
Management Council

MANAGEMENT MEASURES TO IMPLEMENT NEW TECHNOLOGIES FOR THE WESTERN PACIFIC PELAGIC LONGLINE FISHERIES

A REGULATORY AMENDMENT TO THE FISHERY MANAGEMENT PLAN FOR THE PELAGIC FISHERIES OF THE WESTERN PACIFIC REGION

INCLUDING A FINAL SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT



March 5, 2004

Western Pacific Regional Fishery Management Council
1164 Bishop St, Suite 1400
Honolulu, HI 96813
Telephone: (808) 522-8220
Fax: (808) 522-8226

Western Pacific
Regional Fishery
Management Council

Award #NA03NMF4410017

MANAGEMENT MEASURES TO IMPLEMENT NEW TECHNOLOGIES FOR THE WESTERN PACIFIC PELAGIC LONGLINE FISHERIES

A REGULATORY AMENDMENT
TO THE FISHERY MANAGEMENT PLAN FOR THE
PELAGIC FISHERIES OF THE WESTERN PACIFIC REGION

INCLUDING A FINAL SUPPLEMENTAL
ENVIRONMENTAL IMPACT STATEMENT

Lead Agency:	National Oceanic and Atmospheric Administration National Marine Fisheries Service Pacific Islands Regional Office Honolulu, Hawaii	
Responsible Official:	Samuel Pooley Acting Regional Administrator Pacific Islands Regional Office	
For Further Information Contact:	Alvin Katekaru National Marine Fisheries Service Pacific Islands Regional Office 1601 Kapiolani Blvd., Suite 1110 Honolulu, HI 96814 (808) 973-2937	Kitty Simonds Western Pacific Regional Fishery Management Council 1164 Bishop St., Suite 1400 Honolulu, HI 96813 (808) 522-8220

Abstract: This document considers management measures for the longline fisheries managed under the Pelagic Fisheries Management Plan of the Western Pacific Region, with the objective of achieving optimum yields from these fisheries without being likely to jeopardize the continued existence of sea turtles or other listed species. The range of alternatives includes time/area closures, as well as the implementation of a limited model shallow-set swordfish fishery using circle hooks with mackerel bait which in combination have been found to reduce interactions with leatherback and loggerhead turtles by 67% and 92% respectively in the U.S. Atlantic longline fishery. In addition the document considers a suite of conservation projects to protect sea turtles in their nesting and coastal habitats.

March 5, 2004

2.0 Summary

The regulatory aspects of this amendment to the regulations implementing the Fishery Management Plan for the Pelagics Fisheries of the Western Pacific Region would:

1) Establish an annual limit on the amount of shallow-set longline fishing effort north of the equator that may be collectively exerted by Hawaii-based longline vessels (2,120 shallow-sets per year);
2) divide and distribute this shallow-set effort limit each calendar year in equal portions (in the form of transferable single-set certificates valid for a single calendar year) to all holders of Hawaii longline limited access permits that respond positively to an annual solicitation of interest from NMFS;
3) prohibit any Hawaii-based longline vessel from making more shallow-sets north of the equator during a trip than the number of valid shallow-set certificates on board the vessel;
4) require that operators of Hawaii-based longline vessels submit to the Regional Administrator within 72 hours of each landing of pelagic management unit species one valid shallow-set certificate for every shallow-set made north of the equator during the trip;
5) require that Hawaii-based longline vessels, when making shallow-sets north of the equator, use only circle hooks sized 18/0 or larger with a 10-degree offset;
6) require that Hawaii-based longline vessels, when making shallow-sets north of the equator, use only mackerel-type bait;
7) establish annual limits on the numbers of interactions between leatherback and loggerhead sea turtles and Hawaii-based longline vessels while engaged in shallow-setting (set equal to the annual estimated incidental take for the respective species in the shallow-set component of the Hawaii-based fishery, as established in the prevailing biological opinion issued by the National Marine Fisheries Service (NMFS, also known as NOAA Fisheries) pursuant to section 7 of the Endangered Species Act);
8) establish a procedure for closing the shallow-setting component of the Hawaii-based longline fishery for the remainder of the calendar year when either of the two limits is reached, after giving 1 week advanced notice of such closure to all holders of Hawaii longline limited access permits (the numbers of interactions will be monitored with respect to the limits using year-to-date estimates derived from data recorded by NMFS vessel observers);
9) require that operators of Hawaii-based longline vessels notify NMFS in advance of every trip whether the longline sets made during the trip will involve shallow-setting or deep-setting and require that Hawaii-based longline vessels make sets only of the type declared (i.e., shallow-sets or deep-sets);
10) require that operators of Hawaii-based longline vessels carry and use NMFS-approved de-hooking devices; and
11) require that Hawaii-based longline vessels, when making shallow-sets north of 23° N. start and complete the line-setting procedure during the nighttime (specifically, no earlier than one hour after local sunset and no later than local sunrise).

On March 29, 2001, the National Marine Fisheries Service (NMFS) issued a Biological Opinion under section 7 of the Endangered Species Act for the authorization of fisheries under the Pelagics Fishery Management Plan (FMP) of the Western Pacific Region. The Biological Opinion (BiOp) contained a series of non-discretionary actions (Reasonable and Prudent Alternative) to mitigate interactions between the Hawaii-based longline fishery and sea turtles. At the 110th Council Meeting held June 18-21, 2001, staff of the Western Pacific Regional Fishery Management Council (WPRFMC or Council) were directed to prepare a regulatory amendment recommending implementation of the Reasonable and Prudent Alternative (RPA) as required under the Endangered Species Act (ESA). This recommendation was prepared, and it was implemented by NMFS on June 12, 2002. New measures included a ban on the use of shallow-set swordfish longline fishing north of the equator and a seasonal area closure from 15° N. lat. to the equator and from 145° W. long. to 180° long. during April and May for any longline vessel fishing under the authority of the FMP.

On December 12, 2001, NMFS reinitiated section 7 consultation on the Western Pacific Region's pelagic fishery. This reinitiation was based on new information that could improve the agency's ability to quantify and evaluate the effects of the fishery on listed sea turtle populations, as well the economic impacts of the implementation of the March 2001 RPA. At the conclusion of this reconsultation NMFS issued a new BiOp (November 15, 2002), which maintained the June 12, 2002 regulations including the ban on shallow-setting north of the equator and the April-May southern area closure.

At its 118th meeting in June 2003, the Council reviewed a number of potential modifications to the southern area closure to determine whether modifications could be made to support the economic viability of the fleet without jeopardizing sea turtles. The Council subsequently directed its staff to continue its preparation of a regulatory amendment to the Pelagics FMP containing a further range of alternatives and the impacts of those alternatives on sea turtles, fisheries, and the environment. The Council anticipated selecting a final preferred alternative at its 119th Council meeting, which would then be transmitted to NMFS for review and approval with the intention of implementing this change prior to the 2004 seasonal longline area closure.

However, on August 31, 2003, the Federal Court vacated the 2002 BiOp and the regulations put in place in June 2002. Consequently at its 119th meeting on September 23, 2003, the Council voted to recommend an emergency action which would allow a model swordfish longline fishery north of the equator at 75% of historic (1994-1998 average annual) swordfish levels of effort (sets) in conjunction with fishing experiments that stay within the anticipated takes in the model fishery. The fishery would only be allowed to operate with circle hooks instead of J-hooks and mackerel bait instead of squid, measures proven successful in minimizing leatherback and loggerhead interactions in the Atlantic Ocean. The emergency action would also require mandatory night setting for vessels shallow-setting fishing north of 23° N, implement a "hard limit" for turtle interactions, and would not include any time/area closures. Under this approach, the swordfish fishery would be closed annually upon exceeding its incidental take statement (rather than just reinitiating consultation) or when it reaches its effort limit (75% of historic effort or 3,200 sets). In addition, the Hawaii-based tuna and swordfish fisheries would have separate incidental take statements, the hard limit detailed above would apply only to the swordfish fishery. All longline vessels (tuna and sword) would be obliged to carry and use effective dehooking devices. Finally, a series of non-regulatory conservation measures designed to protect sea turtles on nesting beaches and in coastal waters would be pursued to mitigate fishery impacts. Looking ahead, the Council also created a special advisory committee to include scientists, managers, industry and conservation groups who would work together to develop and recommend to the Council measures for the long-term management of this fishery.

On October 6, 2003, the Federal Court stayed the execution of the August 31, 2003 order until April 1, 2004 to allow NMFS time to develop a new BiOp and hopefully render a more permanent solution than interim or emergency measures. The purpose of this amendment is thus to provide recommended measures for the long-term management of the Hawaii-based longline fishery.

At its 120th meeting (October 20, 2003), the Council rejected a request from NMFS that it withdraw its recommendation for emergency measures (transmitted to NMFS for implementation on October 10, 2003) on the basis that the stay through April 1, 2004 eliminated the need for emergency action. NMFS also requested that the Council work to develop and transmit a complete long-term rule package to NMFS by December 1, 2003 so that it could be processed and implemented by April 1, 2004. In response, the Council directed its staff to continue development of this long-term rule package through a series of meetings of the special advisory committee, workshops and seminars, and preparation of an appropriate NEPA document, with the goal of meeting the December 1 deadline. However, given the abbreviated time available, the Council declined to withdraw the emergency rule package, instead recommended that if the long-term rule package is not completed according to NMFS' schedule, NMFS should process the Council's emergency rule for implementation by April 1, 2004.

The Council's Sea Turtle Conservation Special Advisory Committee held a series of three meetings to craft recommendations for further analysis and possible Council action. Committee membership included representation from fishery managers, scientists, industry, and environmental organizations. The Committee's first two meetings resulted in five potential alternatives that were submitted to NMFS' Office of Protected Resources (OPR) for their review and feedback. At the Committee's third and last meeting, OPR's comments were circulated and discussed. In summary, OPR ranked the proposed action as representing the second lowest risk of the five alternatives considered. This assessment was based on the fact that although other alternatives would have similar anticipated interactions, under the proposed action a greater percent of loggerhead and green turtle interactions would be expected to involve shallow-set longline gear (with circle hooks and mackerel-type bait) which would minimize potential harm to these species.

Because the impetus for this action is concern for fishery interactions with sea turtles, and because the FMP's Hawaii-based longline fishery is the only one thought to interact significantly with sea turtles (see Sections 9.1.4.9 to 9.1.4.11) these alternatives focus on that fishery. No alternatives would allow general longline permit holders to participate in the Hawaii-based longline fishery (meaning to fish in Hawaii's EEZ or to land fish in Hawaii) without obtaining a Hawaii longline limited access permit. Thus, under all alternatives, the management of all other fisheries would remain unchanged, except for general longline permit holders.

This document includes a range of alternatives for the long-term management of the longline fisheries managed under the Council's Pelagics Fishery Management Plan. These alternatives supplement those described in NMFS' 2001 Final Environment Impact Statement (FEIS) for the Pelagic Fisheries of the Western Pacific Region through the examination of an additional range of levels of swordfish fishing, in conjunction with circle hooks and mackerel-type bait which have recently been shown to be effective in reducing sea turtle interactions, while maintaining swordfish catch rates.

A number of alternatives previously considered by the Council are also described in this document, but not analyzed in detail, as the Council's focus for final action at its 121st meeting was those alternatives recently recommended by its Turtle Conservation Special Advisory Committee. Please see the Council's October 9, 2003 document *Emergency Rule Package of the Management of Pelagic Fisheries under the Pelagic Fisheries Management Plan of the Western Pacific Region* for a detailed description and analysis of 18 additional action alternatives recently considered by the Council. A total of six alternatives were recommended for detailed analysis by Committee members, and a seventh, a 'no action' alternative, was added at the request of NMFS' acting Regional Administrator for the Pacific Islands Region. These seven alternatives are the subject of this document. These alternatives range from a tuna only (no swordfish fishing) fishery (Committee Alternative 6), to one in which there are no constraints on swordfish fishing beyond the existing limited entry program and maximum vessel size limits (Alternative 7, the no action alternative). Those aspects of the alternatives related to fishery management are summarized in Table 1, while the non-regulatory continuing conservation measures that are part of all action alternatives are presented in Section 8.2.

On November 25, 2003, the Council held its 121st meeting via teleconference at the Council's Honolulu office. This was an emergency meeting and the measures discussed here were its sole focus. The Council's November 18, 2003 draft document *An Amendment to the Pelagics Fishery Management Plan of the Western Pacific Region, Long-Term Management Measures of the Western Pacific Pelagic Fisheries (Including a Draft Preliminary Draft Supplemental Environmental Impact Statement)* was distributed at this meeting as well as made available on the Council's website. The Council also reviewed the Committee's alternatives and estimates of their relative impacts. The Council's final action on this measure was to recommend that NMFS now allow 2,120 swordfish sets to be made annually by Hawaii longline limited access permit holders to model the use of circle hooks with mackerel-type bait, dehookers and other new technologies shown to reduce and mitigate interactions with sea turtles, in addition to a continued

Table 1. Summary of Hawaii longline fishery management alternatives analyzed in detail for consideration by the Council

Committee Alternative	Tuna Fishery?	Model Swordfish Fishery - with circle hooks and mackerel bait?	Dehooker, (and line cutter, dip net and bolt cutters) required?	Conservation measures?
1	Yes, with no time/area closure	Yes, 1,060 sets annually	Yes	Yes
2	Yes, with no time/area closure	Yes, 1,560 sets	Yes	Yes
3	Yes, with recent time/area closure except for EEZ waters around Palmyra	Yes, 2,120 sets annually	Yes	Yes
4 Preferred Alternative	Yes, with no time/area closure	Yes, 2,120 sets annually	Yes	Yes
5	Yes, with no time/area closure	Yes, 3,179 sets annually	Yes	Yes
6 Current Fishery	Yes, with recent time/area closure	No	Yes, except for dehooker	Yes
7 No Action	Yes, with no time/area closure	Yes, no specific limits	Yes, except for dehooker	No

tuna fishery with no time/area closures, the mandated use of dehookers, and the continuation of a suite of conservation measures (Alternative 4). These conservation measures include protection of potentially affected turtles and eggs at nesting beaches and in coastal foraging waters in various areas throughout the Pacific. Based on information from NMFS' Pacific Islands Fishery Science Center and NMFS' Office of Protected Resources, as well as consideration of the conservation measures that are part of Alternative 4, the Council believes this alternative will best meet this action's objective of achieving optimum yields from the fisheries without jeopardizing sea turtles or other listed species.

All alternatives, apart from Alternative 6, would permit shallow-set swordfish style fishing by vessels with a Western Pacific general longline permit. American Samoa longline vessels currently fish under a general permit, but a limited entry program for this fishery is currently nearing completion. American Samoa vessels could conceivably fish north of the equator and make shallow sets for swordfish but have no history of doing so. Moreover, the American Samoa fleet targets primarily albacore for the two fish canneries in Pago Pago, and there is little to no market for fresh swordfish in American Samoa. More importantly, there is no easy access to markets elsewhere on the U.S. mainland, unlike Hawaii, where most of the swordfish catch was sent. Two general longline permits have been issued in the Mariana Islands, one in Guam and the other in Commonwealth of the Northern Mariana Islands (CNMI). Neither permit is being used to conduct longline fishing from these locations. Based on historical data from other fleets, any longline fishing conducted around the Marianas would target tunas and not swordfish. Vessels with a Western Pacific general permit may not land longline caught fish in Hawaii.

On December 3, 2003 (68 FR 67640), the Council and NMFS published a Supplemental Notice of Intent to prepare the SEIS for this action, along with public notice of a compressed schedule under alternative procedures approved by the Council on Environmental Quality (CEQ). This notice furnished additional information on the need for expedited management action on proposed management measures for the Hawaii-based longline fishery and it's potential impact on protected sea turtle populations. The accelerated management action schedule avoids a lapse in appropriate management measures after April 1, 2004. It further announced the Council and NMFS' intent to apply alternative procedures approved by the CEQ to facilitate completion of the SEIS on the proposed management measures for the Hawaii-based longline fishery for implementation of rules effective by April 1, 2004.

Since the completion of the Draft SEIS for this action, NMFS' Office of Protected Resources completed its section 7 consultation and issued a Biological Opinion on the preferred alternative presented here. That Opinion (attached as Appendix V) concluded that the preferred alternative, in conjunction with three measures which are expected to be implemented through future rule-making within the next year, is not likely to jeopardize the continued existence of sea turtles or other species listed as threatened or endangered under the Endangered Species Act. This process is described in detail in Section 14.0.

opportunity for additional public input: Biloxi, MS, on September 10, 2007; New Orleans, LA, on September 10, 2007; Orange Beach, AL, on September 11, 2007; Galveston, TX, on September 11, 2007; Panama City, FL, on September 12, 2007; Palacios, TX, on September 12, 2007; Corpus Christi, TX, on September 13, 2007; Madeira Beach, FL, on September 17, 2007; and Fort Myers Beach, FL, on September 18, 2007.

Copies of an information packet will be available at the meetings and are available prior to the meetings from the Council (see **ADDRESSES**).

All scoping meetings will begin at 7 p.m. The meetings will be physically accessible to people with disabilities. Requests for sign language interpretation or other auxiliary aids should be directed to the Council (see **ADDRESSES**).

Once the DEIS associated with Amendment 29 is completed, it will be filed with the Environmental Protection Agency (EPA). The EPA will publish a notice of availability of the DEIS for public comment in the **Federal Register**. The DEIS will have a 45-day comment period. This procedure is pursuant to regulations issued by the Council on Environmental Quality (CEQ) for implementing the procedural provisions of the National Environmental Policy Act (NEPA; 40 CFR parts 1500–1508) and to NOAA's Administrative Order 216–6 regarding NOAA's compliance with NEPA and the CEQ regulations.

NMFS will consider public comments received on the DEIS in developing the final environmental impact statement (FEIS) and before adopting final management measures for the amendment. NMFS will submit both the final amendment and the supporting FEIS to the Secretary of Commerce (Secretary) for review as per the Magnuson-Stevens Fishery Conservation and Management Act.

NMFS will announce, through a notice published in the **Federal Register**, the availability of the final amendment for public review during the Secretarial review period. During Secretarial review, NMFS will also file the FEIS with the EPA and the EPA will publish a notice of availability for the FEIS in the **Federal Register**. This comment period will be concurrent with the Secretarial review period and will end prior to final agency action to approve, disapprove, or partially approve the amendment.

NMFS will announce, through a notice published in the **Federal Register**, all public comment periods on the final amendment, its proposed implementing regulations, and the availability of its associated FEIS. NMFS will consider all public comments received during the Secretarial review period, whether they are on the final amendment, the proposed regulations, or the FEIS, prior to final agency action.

Authority: 16 U.S.C. 1801 *et seq.*

Dated: August 14, 2007.

James P. Burgess,

Acting Director, Office of Sustainable Fisheries, National Marine Fisheries Service.

[FR Doc. E7–16359 Filed 8–20–07; 8:45 am]

BILLING CODE 3510–22–S

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

RIN 0648–XC10

Western Pacific Pelagic Fisheries, Hawaii-based Longline Swordfish Fishery; Scoping Process

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Notice of intent to prepare a supplemental environmental impact statement and notice of initiation of scoping process; request for comments.

SUMMARY: The Western Pacific Fishery Management Council (WPFMC) and NMFS announce their intent to prepare a Supplemental Environmental Impact Statement (SEIS) in accordance with the National Environmental Policy Act of 1969 (NEPA) on the federal management of the Hawaii-based shallow-set pelagic longline fishery in the western Pacific. The SEIS will supplement the March 30, 2001, Final EIS on the Fishery Management Plan for Pelagic Fisheries of the Western Pacific Region as well as the March 5, 2004, Final SEIS on Management Measures to Implement New Technologies for the Western Pacific Longline Fisheries.

DATES: The WPFMC and NMFS will discuss alternatives and take scoping comments at a public meeting on August 30, 2007, from 6–9 p.m.

Written scoping comments must be received by September 20, 2007.

ADDRESSES: The public meeting will be held at the Ala Moana Hotel, 410 Atkinson Dr., Honolulu, HI 96815.

Written comments may be submitted by any of the following methods:

- Mail: William L. Robinson, Regional Administrator, Pacific Islands Region, NMFS, 1601 Kapiolani Blvd., Suite 1110, Honolulu, HI 96814. Please write on the envelope: ''Scoping Comments on HI Swordfish SEIS''; or
- E-mail: *HILonglineScoping@noaa.gov*.

FOR FURTHER INFORMATION CONTACT: Kitty Simonds, Executive Director, WPFMC, (808) 522–8220, or William L. Robinson, Regional Administrator, NMFS, (808) 944–2200.

SUPPLEMENTARY INFORMATION: The SEIS will consider alternatives for modifying the current regulatory structure for the Hawaii-based shallow-set pelagic longline fishery (''the fishery'') to provide increased opportunities to harvest swordfish while continuing to avoid, to the extent practicable, the incidental catch of seabirds, marine mammals, and threatened and endangered sea turtles. Potential regulatory changes to be analyzed in the SEIS include: modifying or eliminating the existing limit on fishing effort; maintaining or eliminating longline ''set certificates'' that limit the amount of fishing effort in the fishery; retaining or eliminating hard ''caps'' (limits) on the incidental take of sea turtles which, if reached, close the fishery for the remainder of the year; the use of time and/or area restrictions in combination with caps on interactions with loggerhead and leatherback sea turtles; modifications to assessment methodologies; changes in observer coverage; and other management alternatives designed to increase incentives to avoid interactions with sea turtles and other protected resources. The SEIS will analyze the impacts of the range of reasonable alternatives on the affected human environment, including the No Action alternative, and the potential impacts on affected populations of sea turtles. The SEIS will include an update on the status of the biological and economic factors affecting the fishery, analysis of the impacts of regulatory measures currently in effect in the shallow-set fishery since 2004, summary of information on international conservation efforts, and a discussion of the potential transferred effects on both target- and incidentally-caught species to other national fishing fleets from regulatory restrictions in the domestic fishery.

Under the Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. 1801 *et seq.*), the United States has exclusive management authority over all living marine resources found within the Exclusive Economic Zone (EEZ). Management of these marine resources, with the exception of seabirds and some marine mammals, is vested in the Secretary of Commerce (Secretary). Eight Regional Fishery Management Councils prepare fishery management plans which are reviewed for approval and implementation by the Secretary. The WPFMC has the responsibility to prepare fishery management plans for fishery resources in the EEZ of the western Pacific.

Pelagic fisheries in the EEZ and on the high seas of the western Pacific have been managed under the Fishery Management Plan for the Pelagics Fisheries of the Western Pacific Region (FMP) and its amendments since 1986. Managed resources include both marketable (primarily billfishes and tunas), and non-marketable (primarily sharks) species. Fisheries managed under the FMP include pelagic longline, troll, handline, pole-and-line (bait boat), and charter-boat fisheries. Management measures include gear restrictions, vessel size limitations, time and area closures, access limitations, and other measures.

Longline fisheries of the western Pacific are further regulated under two classifications: (1) The ''shallow-set'' component that targets swordfish, and (2) the ''deep-set'' component that targets that targets tuna. The shallow-set component of the Hawaii-based longline fishery currently operates under the following regulations: an annual set limit of 2,120 shallow-sets (half of the 1994–99 historical average); mandatory night setting; the required use of 18/0 circle hooks or larger (with a 10 degree offset) and blue-dyed mackerel-type bait; closure of the fishery if sea turtle interaction limits are reached for loggerhead (17) or leatherback (16) sea turtles; and other measures. The sea turtle interaction limits were established based on a biological opinion issued by NMFS on February 23, 2004, associated with management measures to implement new technologies for the western Pacific longline fisheries. The biological opinion also requires 100 percent federal observer coverage in the shallow-set fishery.

In February 2007, the WPFMC and NMFS received a proposal from the Hawaii Longline Association (HLA) requesting an amendment to the Pelagics FMP and related MSA regulations concerning the Hawaii-based shallow-set longline fishery. The proposal requests that the WPFMC consider amending the Pelagics FMP to eliminate the existing annual fishing effort limit of 2,120 sets. The HLA proposal is premised on new information obtained since the implementation of the existing shallow-set fishery regime in early 2004 (Gilman and Kobayashi [1]). The new information pertains primarily to sea turtle interaction and mortality rates. The analysis done by Gilman and Kobayashi indicate a reduction in sea turtle capture rates and in the type of incidental hookings (lightly hooked vs. deeply hooked in the mouth or swallowed) observed during sea turtle interactions with longline gear. Combined sea turtle capture rates have declined by 89 percent in comparison to historical capture rates in the shallow-set fishery. Deep hooking (thought to result in sea turtle mortality) rates have also declined to 15 percent of all loggerhead sea turtle captures and zero percent of leatherback sea turtle captures. Prior to requiring the use of circle hooks and mackerel-type bait in the Hawaii-based longline shallow-set fishery, 51 percent of the sea turtles were believed to have been deeply hooked. No green or olive ridley sea turtles have been incidentally caught in the current shallow-set fishery.

The WPFMC and NMFS will consider a range of alternatives that may modify the current regulatory structure for the Hawaii-based pelagic longline shallow-set fishery. Preliminary alternatives that may be analyzed in the SEIS and considered by the WPFMC and NMFS include the following:

Longline Fishing Effort:
1. No action - keep 2120 set limit;
2. Allow 3,000 sets;
3. Allow 4,000 sets; and
4. Do not limit sets.

Time-Area Closures:
1. No action - no time-area closures;
2. Implement pre-season monthly closure of waters in designated sea turtle ''hot spots'' based on historical and contemporary sea surface temperature data; and
3. Implement in-season closure of waters based on analysis of sea surface temperature data.

Interaction Hard Cap for Loggerhead and Leatherback Sea Turtles:
1. No action - continue limitations of sea turtle interactions using caps set by NMFS; and
2. Discontinue limitations of sea turtle interactions using caps set by NMFS.

Fishery Participation:
1. No action - keep set certificates; and
2. Remove set certificates.

Assessment Methodology:
1. No action - annual (1 year) cap on interactions with loggerhead and leatherback turtles (numbers of sea turtle interactions to be determined by NMFS); and
2. Multi-year cap on interactions with loggerhead and leatherback turtles (numbers of sea turtle interactions to be determined by NMFS).

Sea Turtle Avoidance Incentives:
1. No action - do not implement individual vessel sea turtle interaction ''limits'';
2. Individual vessel ''limits'' for loggerhead and leatherback turtles will be available on an annual basis (calendar or fishing year) to individual vessels. These ''limits'' will be transferable among vessels; and
3. Any shallow-set vessel in the fleet that interacts with a certain (unspecified at this time) number of sea turtles during the calendar year or fishing year will be precluded from shallow-set fishing for a certain period (unspecified at this time).

Observer Coverage:
1. No action - 100 percent coverage;
2. A reduced level of observer coverage that achieves an appropriate extrapolation of interactions between sea turtles and the fishery;
3. NMFS covers costs for 100 percent coverage at current effort limit (2,120 longline sets), and fishing industry pays for observer costs for additional shallow-set effort beyond current limit; and
4. Fishing industry pays all on-board observer costs associated with monitoring of the Hawaii-based shallow-set longline fishery.

Public Involvement

Public scoping is an early and open process for determining the scope of issues to be addressed. A principal objective of the scoping and public involvement process is to identify a reasonable range of management alternatives that, with adequate analysis, will delineate critical issues and provide a clear basis for distinguishing between those alternatives and selecting a preferred alternative.

In addition to the public meeting (see **DATES** and **ADDRESSES**), other opportunities for public involvement will be available at WPFMC's Science and Statistical Committee meeting on September 25–27, 2007, at the WPFMC office, 1164 Bishop St, Suite 1400, Honolulu, HI 96813, and at the 139th WPFMC meeting on October 9–12, 2007, at the Ala Moana Hotel, 410 Atkinson Dr., Honolulu, HI 96815.

Special Accommodations

These meetings are physically accessible to people with disabilities. Requests for sign language interpretation or other auxiliary aids should be directed to Kitty M. Simonds, (808) 522–8220 (voice) or (808) 522–

[1] Gilman, E., and D. Kobayashi. In press. Sea turtle interactions in the Hawaii-based swordfish fishery first quarter 2007 and comparison to previous periods.

8226 (fax), at least five days prior to the meeting date.

Authority: 16 U.S.C. 1801 *et seq.*

Dated: August 15, 2007.

James P. Burgess,

Acting Director, Office of Sustainable Fisheries, National Marine Fisheries Service.

[FR Doc. E7–16358 Filed 8–20–07; 8:45 am]

BILLING CODE 3510–22–S

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

RIN 0648–XC11

Marine Mammals; File No. 1128–1922

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Notice; receipt of application.

SUMMARY: Notice is hereby given that Eduardo Mercado III, Ph.D, Department of Psychology, 350 Park Hall, University at Buffalo, SUNY, Buffalo, New York, 14260, has applied in due form for a permit to conduct research on humpback whales (*Megaptera novaeangliae*).

DATES: Written, telefaxed, or e-mail comments must be received on or before September 20, 2007.

ADDRESSES: The application and related documents are available for review upon written request or by appointment in the following offices:

Permits, Conservation and Education Division, Office of Protected Resources, NMFS, 1315 East-West Highway, Room 13705, Silver Spring, MD 20910; phone (301) 713–2289; fax (301) 427–2521; and

Southeast Region, NMFS, 263 13th Avenue South, Saint Petersburg, Florida 33701; phone (727) 824–5301; fax (727) 824–5320.

Written comments or requests for a public hearing on this application should be mailed to the Chief, Permits, Conservation and Education Division, F/PR1, Office of Protected Resources, NMFS, 1315 East-West Highway, Room 13705, Silver Spring, MD 20910. Those individuals requesting a hearing should set forth the specific reasons why a hearing on this particular request would be appropriate.

Comments may also be submitted by facsimile at (301) 427–2521, provided the facsimile is confirmed by hard copy submitted by mail and postmarked no later than the closing date of the comment period.

Comments may also be submitted by e-mail. The mailbox address for providing e-mail comments is *NMFS.Pr1Comments@noaa.gov*. Include in the subject line of the e-mail comment the following document identifier: File No. 1128–1922.

FOR FURTHER INFORMATION CONTACT: Amy Hapeman or Carrie Hubard, (301) 713–2289.

SUPPLEMENTARY INFORMATION: The subject permit is requested under the authority of the Marine Mammal Protection Act of 1972, as amended (MMPA; 16 U.S.C. 1361 *et seq.*), the regulations governing the taking and importing of marine mammals (50 CFR part 216), the Endangered Species Act of 1973, as amended (ESA; 16 U.S.C. 1531 *et seq.*), and the regulations governing the taking, importing, and exporting of endangered and threatened species (50 CFR parts 222–226).

Dr. Mercado is requesting a five-year scientific research permit to expose humpback whales to playback sessions in the coastal waters of Puerto Rico. The purpose of this research is to develop methods for testing the hearing and auditory perceptual capabilities of humpback whales in order to better predict when anthropogenic sounds may interfere with social behaviors, particularly mating and group feeding. Up to 200 humpback whales would be harassed by playback experiments (active acoustics) and up to 30 additional humpbacks would be harassed by close approach during vessel surveys for passive acoustic recordings annually. In addition, up to 45 Stenellid dolphins (*Stenella* spp.), 45 bottlenose dolphins (*Tursiops truncatus*), 5 sperm whales (*Physeter macrocephalus*), and 5 Cuvier's beaked whales (*Ziphius cavirostris*) may be incidentally harassed annually during playback sessions.

Concurrent with the publication of this notice in the **Federal Register**, NMFS is forwarding copies of this application to the Marine Mammal Commission and its Committee of Scientific Advisors.

Dated: August 15, 2007.

P. Michael Payne,

Chief, Permits, Conservation and Education Division, Office of Protected Resources, National Marine Fisheries Service.

[FR Doc. E7–16462 Filed 8–20–07; 8:45 am]

BILLING CODE 3510–22–S

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

RIN XC06

U.S. Climate Change Science Program Synthesis and Assessment Product Draft Report 4.4: ''Preliminary Review of Adaptation Options for Climate-Sensitive Ecosystems and Resources''

AGENCY: National Oceanic and Atmospheric Administration (NOAA),Department of Commerce.

ACTION: Notice of availability and request for public comments.

SUMMARY: The National Oceanic and Atmospheric Administration publishes this notice to announce the availability for public comments for the draft document titled, U.S. Climate Change Science Program Synthesis and Assessment Product 4.4: ''Preliminary Review of Adaptation Options for Climate-Sensitive Ecosystems and Resources.'' This Synthesis and Assessment Product (SAP) analyzes information on the state of knowledge of adaptation options for key, representative ecosystems and resources that may be sensitive to climate variability and change.

This draft document is being released solely for the purpose of pre-dissemination peer review under applicable information quality guidelines. This document has not been formally disseminated by NOAA. It does not represent and should not be construed to represent any Agency policy or determination. Any public comments submitted in accordance with this notice will be considered when revising the document.

DATES: Comments must be received by October 5, 2007.

ADDRESSES: The draft of Synthesis and Assessment Product 4.4: ''Preliminary Review of Adaptation Options for Climate-Sensitive Ecosystems and Resources'' is posted on the CCSP Web site at:*www.climatescience.gov/Library/sap/sap4–4/default.php* Detailed instructions for making comments on the draft Report is provided on the SAP 4.4 webpage (see link here). Comments should be prepared and submitted in accordance with these instructions.

FOR FURTHER INFORMATION CONTACT: Dr. Fabien Laurier, Climate Change Science Program Office, 1717 Pennsylvania Avenue NW, Suite 250, Washington, DC 20006, Telephone: (202) 419 3481.

SUPPLEMENTARY INFORMATION: The Climate Change Science Program (CCSP)

HIGHLY MIGRATORY SPECIES ADVISORY SUBPANEL REPORT ON HIGH SEAS SHALLOW-SET LIMITED ENTRY LONGLINE FISHERY

A majority of the Highly Migratory Species Advisory Subpanel (HMSAS) agreed that there is enough interest by West Coast based vessels for further effort to be taken by the Council and other regulatory bodies in exploring the feasibility of a highly migratory species shallow set longline fishery outside of 200 nm. Some of the HMSAS members suggested that such a fishery could involve or be limited to a certain number of vessels based on certain criteria to be established, and the fishery could operate under the same type of rules as does the Hawaii shallow-set longline fishery that at this time can fish to within 200 nm of the West Coast. Concern was expressed over the process required to implement a management framework and how the time and effort thus expended could be thwarted at the very end, as has occurred with other proposals. The HMSAS recommends establishing a transparent set of standards on how to create a fishery.

Developing a coordinated conservation and management strategy and a joint pelagic fisheries management plan with the Western Pacific Fishery Management Council (WPFMC) would be helpful, but not a necessary prerequisite to establishing a high seas shallow set longline fishery of the U.S. West Coast.

A minority of the HMSAS (Bob Osborn, United Anglers of Southern California, and Meghan Jeans, Ocean Conservancy) recommend that the Pacific Council not take unilateral action to establish a high seas shallow-set longline fishery but instead should only pursue collaboration with the WPFMC to establish a common management framework for the fishery.

PFMC
08/23/07

HIGHLY MIGRATORY SPECIES MANAGEMENT TEAM REPORT ON HIGH SEAS LIMITED ENTRY LONGLINE FISHERY

The Highly Migratory Species Management Team (HMSMT) discussed a possible management framework for a West Coast-based high seas shallow-set longline fishery with members of the Highly Migratory Species Advisory Subpanel (HMSAS) during the joint HMSMT/HMSAS meeting in La Jolla on August 14-15, 2007. The HMSMT solicited comments from industry representatives who were present at the meeting regarding their possible interest in moving forward with measures to establish a high seas shallow-set longline fishery under the Fishery Management Plan for U.S. West Coast Fisheries for Highly Migratory Species (HMS FMP).

A white paper summarizing a chronology of events leading up to the current state of affairs and compiling previous HMSMT work on this subject was presented to the joint bodies (Agenda Item F.2.a, Attachment 1). The paper proposed a number of alternatives, including a status quo option along with various possible configurations of a West Coast-based high seas shallow set longline (SSLL) fishery. Industry representatives in attendance suggested a small and tightly controlled West Coast-based SSLL fishery could involve a limited number of vessels, for example ten, based on a qualifying point system similar to one that was established to identify eligible fishers in Alaska's limited entry fisheries. The fishery could operate under a similar set of conservation measures as those used in the Hawaii SSLL fishery to reduce the risk of interactions with protected species, including ESA listed sea turtles and seabirds.

Meeting participants discussed the possible role of combined Western Pacific Fishery Management Council (WPFMC) and Pacific Council management of the pelagic fisheries. A longline fishing industry member in attendance, with experience in fishing under the WPFMC's Pelagics FMP, pointed out that it is not in WPFMC's interest to coordinate management with the Pacific Council. He opined that engaging in joint management would potentially place WPFMC-managed commercial fisheries at risk of curtailment of effort along the lines of conservation measures which currently constrain pelagic longline and drift-gillnet fishing effort in the West Coast EEZ.

The HMSMT wishes to call to the Council's attention that a Notice of Intent was published in the Federal Register on August 21, 2007, by the WPFMC and NMFS Pacific Islands Region Office (PIRO) for the preparation of a Supplemental Environmental Impact Statement (SEIS) for consideration of federal management of the Hawaii SSLL fishery. (Agenda Item F.2.a, Attachment 2). (As noted in the situation summary, written scoping comments on the SEIS must be received by September 20, 2007.) The SEIS will analyze, among other options, the possibility of removing the overall effort limit and increasing the allowable number of turtle interactions which currently constrains Hawaii-based SSLL fishing effort. Given that the populations of leatherback and loggerhead turtles, which are potentially impacted by the Hawaii-based SSLL fishery, would also be potentially impacted by a future West Coast-based SSLL fishery, any increase in allowable turtle take that would result from this proposed action could indirectly impose stringent conservation limits on any potential expansion of a West Coast-based SSLL fishery. The HMSMT recommends that the Council request from both the WPFMC and

NMFS PIRO that future considerations into increasing fishing effort and allowable turtle interactions take into consideration a West Coast-based SSLL fishery. The HMSMT has been informed that the NMFS Southwest Region Assistant Regional Administrator for Sustainable Fisheries has undertaken preliminary discussions with his counterpart at NMFS PIRO on the feasibility of a joint SEIS approach for a Pacific-wide SSLL fishery framework recognizing fleets and interests for both Council-managed HMS fisheries. The HMSMT supports these discussions and requests that a timely decision is made to address, among other things, the issue of the first-come first-serve framework that currently exists in regards to the available turtle interaction caps.

Provided there is sufficient interest by West Coast-based vessels, the HMSMT requests guidance from the Council in setting its future work plan to develop the necessary criteria to establish a West Coast-based SSLL fishery. These criteria include, but are not limited to, the development of limited entry and/or effort controls, HMS FMP regulatory measures to ensure compliance with all applicable state and federal statutes, and the implementation of best conservation practices that have been recently developed. The HMSMT notes that the start of the SEIS scoping process by WPFMC and NMFS PIRO underscores the urgency for taking prompt action on this issue.

PFMC
08/23/07

G:\!PFMC\MEETING\2007\September\HMS\F2 SSLL HMSMT Report_High Seas SSLL.doc

Agenda Item F.2.d
Supplemental WDFW Motion
September 2007

MOTION ON HIGH SEAS LIMITED ENTRY LONGLINE FISHERY

The staff white paper (Agenda Item F.2.a, Attachment 1) describes the following alternatives:

1. Status quo – Shallow-set longline fishing seaward of 200 nm and east of 150 deg W longitude allowed by Hawaii-permitted vessels only; landings can occur on the West Coast by Hawaii-permitted vessels.

2. Use management measures, such as take caps or set certificates, rather than license limitation, to limit shallow-set longline effort seaward of 200 nm.

3. Implement a West Coast limited entry program for shallow-set longline fishery seaward of 200 nm subject to regulations, which would include sea turtle protection measures.

4. Implement a West Coast limited entry program for shallow-set longline fishery seaward of 200 nm (same as Alternative 3) and require a drift gillnet permit to participate.

5. Pursue joint management efforts with the Western Pacific Fishery Management Council.

Motion:

1. Adopt a preliminary purpose and need statement as follows:

   The proposed action is to implement a limited West Coast-based shallow-set longline fishery to target swordfish on the high seas, which would be subject to conservation and management measures to protect, among other things, listed sea turtles, seabirds, and marine mammals.

2. Adopt Alternatives 1, 3, 4, and 5 described in the staff white paper as a preliminary range of alternatives for further exploration. (Note: Alternative 4 could be a sub-option of Alternative 3—e.g., Alternative 3a.)

   Rationale – There are problems with Alternative 2 relative to creating a derby-style fishery and a level of fishing effort that could potentially result in a jeopardy finding under the Endangered Species Act. With regard to Alternative 3, while the majority of drift gillnet permitted vessels are not big enough or configured properly to fish long-distance, the feasibility of Alternative 3 should be further explored. While there may be higher costs associated with Alternative 5, the cooperative nature of this approach also warrants further consideration.

3. The HMSMT and HMSAS could develop sub-options for Alternative 3 with different conservation and management measures.

4. Suggested Process and Timeline:

   a. March 2008 – Council consider draft range of alternatives for public review and preliminary guidance on qualifying criteria for analysis

   b. July-Aug 2008 – HMS Management Committee meet with HMSMT and HMSAS to provide further guidance (if needed)

   c. November 2008 – Council adopt a preferred alternative

YELLOWFIN TUNA OVERFISHING

In 2006 the Council was notified that the Eastern Pacific Ocean (EPO) yellowfin tuna stock is subject to overfishing, requiring a Council response under the Magnuson-Stevens Act (MSA). In April 2007 the Council was briefed on new provisions in the MSA at §304(i) applicable to international overfishing. The Council also received a letter from Mr. Rod McInnis, National Marine Fisheries Service Southwest Regional Administrator, informing the Council that these provisions are applicable to yellowfin tuna. Based on this letter, the Council has until March 30, 2008 to (1) develop recommendations for domestic regulations to address the relative impact of United States fishing vessels on the stock, and (2) develop and submit recommendations to the Secretary of State and Congress for international actions to end overfishing and rebuild the stocks, recognizing the relative impact of foreign vessels and U.S. vessels.

According to data from the Inter-American Tropical Tuna Commission (IATTC), U.S. catches of yellowfin tuna amounted to 3,698 mt in 2004, 1.3 percent of the total catch (291,471 mt) recorded by the IATTC in the EPO for that year. Of the U.S. catch, recreational fishing accounted for 1,159 mt. The Council may wish to consider whether current domestic conservation and management measures pursuant to the Fishery Management Plan for U.S. West Coast Fisheries for Highly Migratory Species (50 CFR 660, subpart K) are sufficient to address MSA §304(i)(2)(A), or new measures should be proposed. If new measures are proposed, they would be promulgated under the standard rulemaking process and associated review requirements.

With respect to any recommendations for international actions the Council may develop to address MSA §304(i)(2)(B), it is likely that they would be categorically excluded from further analysis under the National Environmental Policy Act. That being the case, the Council would not be required to develop a range of alternatives when considering recommendations, although for the purposes of public review and input the Council may wish to do so. Presuming the identification of a proposal or alternatives at this meeting, the Council is scheduled for final action at the March 2008 Council Meeting in Sacramento, California.

At the April 2007 meeting the Council made recommendations to the U.S. Section of the IATTC on measures they should communicate during the 75th IATTC meeting (June 25–29, 2007). Attachment 1 is the letter sent to Mr. Rod McInnis containing these recommendations. The IATTC subsequently prepared a new yellowfin tuna stock assessment in May 2007, which the Scientific and Statistical Committee is scheduled to review and report on to the Council at the September 2007 meeting. (The stock assessment is provided in electronic format as Attachment 2.) Attachments 3 and 4 are papers prepared by IATTC staff evaluating conservation proposals and making recommendations in advance of the 75th meeting. Attachment 5 is a U.S. proposal for tuna conservation measures tabled at the meeting but not adopted. These materials provide background information that can help in the formulation of recommendations for international measures to address yellowfin tuna overfishing per MSA §304(i)(2)(B).

At the 75th meeting the IATTC did not adopt any new resolutions for the conservation of yellowfin and bigeye tuna for the period after 2007. Resolution C-04-09, replacing Resolution C-06-02, is in effect through the end of 2007. The principal measure applicable to yellowfin tuna contained in this Resolution is a closure of purse seine fisheries for either the period August

1-September 11 or November 20 to December 31, the choice of period being at the discretion of IATTC Parties. The 76th IATTC meeting is scheduled for October 22–24, 2007, in La Jolla, California. The main purpose of this meeting is to adopt conservation recommendations for 2008 and beyond.

Council Task:

1. **Consider the need for additional domestic regulations to address MSA §304(i)(2)(A); if needed, identify preliminary proposal or alternatives for public review.**
2. **Identify recommendations for international actions to address MSA §304(i)(2)(B), in the form of a proposal or alternatives, for public review.**
3. **Consider recommendations to the U.S. delegation to the October 22–24, 2007, IATTC meeting for tuna conservation measures to adopted by the Commission for 2008 and beyond.**

Reference Materials:

1. Agenda Item F3.a, Attachment 1: May 1, 2007, letter from Mr. Donald Hanson to Mr. Rod McInnis containing recommendations to the U.S. Section of the IATTC on conservation measures
2. Agenda Item F3.a, Attachment 2: Status of Yellowfin Tuna in the Eastern Pacific Ocean, IATTC Document SAR-08-08a (*CD-ROM and Web only*)
3. Agenda Item F3.a, Attachment 3: Staff Response to Request from *Ad Hoc* Meeting, February 2007, Document IATTC-75-05a
4. Agenda Item F3.a, Attachment 4: Conservation Recommendations, Document IATTC-75-07b
5. Agenda Item F.3.a, Attachment 5: Proposal D1 Submitted by the United States; Resolution on a Multi-Annual Program on the Conservation of Tuna in the Eastern Pacific Ocean for 2008, 2009, and 2010
6. Agenda Item F.3.b, Highly Migratory Species Management Team Report
7. Agenda Item F.3.b, Highly Migratory Species Advisory Subpanel Report

Agenda Order:

a. Agenda Item Overview — Kit Dahl
b. Reports and Comments of Advisory Bodies
c. Public Comment
d. **Council Action**: Adopt Alternatives for Public Review to Address Yellowfin Tuna Overfishing

PFMC
8/14/07

Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 101, Portland, OR 97220-1384
Phone 503-820-2280 | Toll free 866-806-7204 | Fax 503-820-2299 | www.pcouncil.org

May 1, 2007

Mr. Rodney McInnis
Regional Administrator
National Marine Fisheries Service Southwest Region
501 West Ocean Blvd.
Long Beach, CA 90802-4213

Dear Mr. McInnis,

At our April 1–6, 2007, meeting, the Council discussed management measures that should be taken at the international level to address overfishing of Pacific-wide bigeye and eastern Pacific yellowfin tuna stocks. For the eastern Pacific Ocean such management measures would have to be adopted by the Inter-American Tropical Tuna Commission (IATTC) by resolutions committing members to implement domestic measures. The Council discussed possible recommendations they would like to forward to the U.S. Section to the IATTC for consideration in the development of a U.S. position for the June 25–29, 2007, IATTC meeting in Cancun, Mexico. Recognizing that the General Advisory Committee has a statutory role to advise the U.S. Section, this letter is copied to its Chair.

The Council has a direct interest in the status of these stocks because they are part of the management unit in our Fishery Management Plan for U.S. West Coast Fisheries for Highly Migratory Species. As such, the Council was previously notified by you of the Secretarial determination for these two stocks, which obligates a response. For bigeye tuna, the Council submitted an amendment to our fishery management plan (FMP) in response to the requirements of the Magnuson-Stevens Fishery Conservation and Management Act at §304(e)(3). However, we recognize the limits of unilateral action; furthermore, new provisions in the Magnuson-Stevens Reauthorization Act of 2006 (§406(a)) expressly call on Councils to develop and submit recommendations to the Secretary of State and Congress for international actions to end overfishing. If, at their next meetings, the IATTC and, for bigeye tuna, the Western and Central Pacific Fisheries Commission (WCPFC) are unable to adopt conservation measures that demonstrably end overfishing, we expect to continue making recommendations on a U.S. position in subsequent years.

At their April meeting, the Council was informed that significant new information in relation to these stocks and the efficacy of potential conservation measures will become available at the 8th Meeting of the Working Group on Stock Assessment (May 7–11, 2007). Although the Council will meet again in June, this offers scant time to transmit a formal recommendation to the U.S. Section prior to the IATTC meeting. In addition, the General Advisory Committee will meet on May 30 and we would like to offer this input for that meeting as well. Recognizing the limitation on information available to the Council at the time of their meeting, the Council identified the following general recommendations for the U.S. Section to consider for this year's IATTC meeting, based on input from our Highly Migratory Species Management Team and

Highly Migratory Species Advisory Subpanel (the Highly Migratory Species Management Team's report is attached for your information).

Controlling fishing capacity is an important precursor to implementing catch controls that achieve F_{MSY}. The IATTC has made progress in controlling capacity through the adoption of Resolution C-98-11 (Resolution on Fleet Capacity), Resolution C-00-01 (Resolution on the Capacity of the Tuna Fleet Operating in the Eastern Pacific Ocean) and Resolution C-02-03 (Resolution on the Capacity of the Tuna Fleet Operating in the Eastern Pacific Ocean [Revised]). The Council encourages the U.S. Section to continue to work with the IATTC to implement effective capacity limits, such as the Capacity Plan identified in Resolution C-02-03. Capacity limits should first focus on purse seine vessels. If capacity reduction measures are identified and implemented they should take into account patterns of historical participation.

Depending on recruitment to the stocks, conservation measures that limit total catch may be necessary. The most direct mechanism would be to establish a total allowable catch (TAC) level, which is a measure identified by the IATTC at the February 5–6, 2007, Ad Hoc meeting for analysis by the Working Group on Stock Assessment. The IATTC has previous experience with the application of a TAC and the U.S. Section should propose a workable formula that could end overfishing. If appropriate, allocation or subdivision of the TAC by fleet; area; or Contracting Parties, cooperating non-Parties, fishing entities and regional economic integration organizations (CPCs) should be considered.

Time-area closures are an indirect method to limit catch. The time-area closure for purse seine vessels implemented under Resolution C-06-02 may not be sufficient to end overfishing on the two stocks (in concert with other, existing conservation measures). At the February Ad Hoc IATTC meeting the U.S. recommended, for analysis, an ongoing closed area for purse seine vessels focused to an area from which slightly less than half the 2001–05 bigeye tuna catch originated. While not advocating, without further analysis, the specific closed area identified by the U.S., the Council recognizes that area closures can be an effective tool to limit catch and encourages the consideration of closed area proposals that would have a demonstrable effect on reducing or ending overfishing on the two stocks; any analysis of closed area proposals should consider the effect on the U.S. fleet. In order to monitor compliance, the IATTC should implement a vessel monitoring system (VMS) that would require uniform participation by subject vessels. The VMS should consolidate data originated from national VMS programs or operate transnationally and independently. Such a consolidated VMS should be administered by a neutral third party to ensure transparency and enhance accountability.

One source of overfishing, particularly for yellowfin tuna, is the catch of fish of lower average weight, reducing yield-per-recruit below a level that could achieve average maximum sustainable yield (AMSY). In general, the floating-object, unassociated, and pole-and-line fisheries capture younger, smaller fish than do the dolphin-associated and longline fisheries. The floating object segment has shown the largest decline in average weight of yellowfin tuna caught, 2001–06, of about 70 percent. Conservation measures should address these catches, and catches of juvenile bigye tuna, directly. At the February Ad Hoc IATTC meeting, the U.S. proposed area closures to limit fishing in areas with high catch of juvenile fish. The Council encourages further development of this proposal.

Increased use of artificial fish aggregating devices (FADs) may be contributing to high catches of juvenile fish. Free-floating FADs may be deployed for long periods and intentionally or inadvertently fished on by multiple vessels. As with fishing vessels overall, the number, or "capacity," of FADs may be an issue. The U.S. should propose a requirement that all FADs be appropriately marked to allow identification by deploying vessel and/or nation of origin. A marking requirement could be linked to a registry system in order to account for the number of FADs in use. In concert with, or as an alternative to, the closed area proposals discussed above, the U.S. should press for the implementation of measures to limit the use of FADs in areas of high juvenile catch.

The development of conservation measures should be guided by catch or effort targets corresponding to a level of fishing mortality at or below F_{MSY} for the two stocks. Such targets should be based on actual or proxy reference points derived from the most recent stock assessments, periodically updated upon the receipt of new information, and used, in addition to identifying measures, to assess the efficacy of any measures that have been implemented. As appropriate, such targets should be established for different fishery segments, recognizing differences in the age composition of catches. In the case of bigeye tuna, which is considered a single, Pacific-wide stock, any such targets should take into account fishing in the Western Pacific and be coordinated with the WCPFC.

The Council recognizes the challenges of negotiating agreements among sovereign entities, since it is the CPCs who will actually implement most control measures for their fleets. For this reason, conservation measures should also be adjudged according to the practibility of monitoring and enforcement, and their transparency at the international level. Without effective compliance even the most well-crafted conservation measures cannot end overfishing.

In addition to communicating the Council's recommendations, with this letter I would like to indicate the Council's ongoing commitment to engage with regional fishery management organizations to encourage effective management of highly migratory species. To this end, we wish to strengthen our relationship with the U.S. Section to the IATTC and engage with the WCPFC through our Commissioner.

Sincerely,

Donald K. Hansen
Chairman

Enclosure (1)

cc: Peter Flournoy, Chairman, General Advisory Committee
David Hogan, Department of State
Edwin Ebisui, Chair, Western Pacific Fishery Management Council
Kitty Simonds, Executive Director, Western Pacific Fishery Management Council
Paul Dalzell, Pelagics Program Coordinator, Western Pacific Fishery Management Council

F:\!master\Corr-draft\HMS\McInnis re IATTC recommendations.doc

INTER-AMERICAN TROPICAL TUNA COMMISSION
COMISIÓN INTERAMERICANA DEL ATÚN TROPICAL

75TH MEETING

CANCUN (MEXICO)
25-29 JUNE 2007

DOCUMENT IATTC-75-05a

STAFF RESPONSE TO REQUESTS FROM *AD HOC* MEETING, FEBRUARY 2007

The *ad hoc* meeting of the IATTC in February 2007 recommended that Commission staff provide the following information and analysis for consideration by the Parties in June:

1. work to refine critical areas for juvenile bigeye tuna and juvenile yellowfin tuna and consider the conservation value of closing these areas to purse-seine fishing for a period or year-round;
2. produce estimates of total allowable catch (TAC);
3. compile a list of the practical and administrative issues raised regarding potential use of national catch allocations or individual fishing quotas (IFQs) for vessels;
4. estimate the conservation measures that would be necessary if the Commission implemented the *Plan for regional management of fishing capacity*[1] and reduced the purse-seine fleet to the target capacity levels;
5. investigate the impact of fishing effort on adult stocks of yellowfin tuna during recent years;
6. summarize available information on the impacts of the use of FADs, describe areas where FADs should not be placed because of the probability of catching juvenile tunas, determine the increase in vulnerability of tunas since the introduction of the FAD fishery, and determine the number of FADs placed.

1. CONSERVATION VALUE OF CLOSING CRITICAL AREAS FOR JUVENILE YELLOWFIN AND BIGEYE TUNA

The staff recommendations in Document IATTC-75-07b address the conservation value of closing critical areas for juvenile yellowfin and bigeye tuna. The staff believes that closing coastal areas would significantly reduce the catch of juvenile yellowfin and may not have adverse consequences for the catches of skipjack and bigeye. On the other hand, closures designed to reduce catches of juvenile bigeye would be likely to lead to significant increases in yellowfin catches and reductions in skipjack catches.

2. ESTIMATES OF TOTAL ALLOWABLE CATCH

The staff recommendations in Document IATTC-75-07b include options for total allowable catches of yellowfin and bigeye tuna.

3. ISSUES REGARDING THE USE OF NATIONAL QUOTAS OR INDIVIDUAL FISHING QUOTAS

The allocation of either national quotas or individual quotas raises issues of criteria for allocation, monitoring of catches against quotas, and transferability.

3.1. Allocation

Allocation of national quotas could be negotiated, possibly after agreeing on criteria for allocation. The simplest allocation is based on recent catches, but this methodis often seen as unfair by states that have

[1] http://www.iattc.org/PDFFiles2/IATTC-73-EPO-Capacity-Plan.pdf

aspirations to develop their tuna industries. Following a consideration of criteria for allocating purse-seine capacity, the Commission adopted Resolution C-98-11, in which allocation of capacity took into account various factors, including: the catch of national fleets during the 1985-1998 period; the amount of catch historically taken within the zones where each state exercises sovereignty or national jurisdiction; the landings of tuna in each nation; and the contribution of each state to the IATTC conservation program, including the reduction of dolphin mortality.

Allocating quotas to individual vessels or vessel owners can also be based on individual catch histories. Catch histories may be reduced by factors such as breakdowns, recent purchases of vessels, *etc.*, and it may be necessary to establish a system for compensating for such factors. Under the AIDCP, the total annual dolphin mortality limit is simply divided equally among the qualified vessels, but it is unlikely that such a system would be acceptable for catch quotas.

3.2. Monitoring of catch against quota

Currently, various catch reporting systems are used within the IATTC. Purse-seine vessels and some other vessels based in coastal countries report catches to the IATTC staff, distant-water longline and troll vessels generally report nationally. Some reporting systems are too slow to be used to monitor catch against quotas. Modern technologies, for example vessel monitoring systems (VMS), can provide real-time catch reports.

The consequences of exceeding either national or individual quotas need to be considered. One option is to deduct the excess catch from the next year's quota, possibly with the addition of a penalty.

In addition to monitoring national or individual catches, there must be a record of the quotas. This is more complex if excess catches are deducted from the quota next year..

3.3. Transferability

Some form of transferability is likely to be necessary to allow for new entrants and to allow retirement of those who wish to leave the industry. Without transferability, changes in the distribution of quota could only come about as a result of reallocation of quota.

Transferability of individual quotas requires a very complex system for recording ownership of quotas, and makes monitoring, management and enforcement much more difficult.

4. CONSERVATION MEASURES NECESSARY IF THE COMMISSION IMPLEMENTED THE PLAN FOR REGIONAL MANAGEMENT OF FISHING CAPACITY

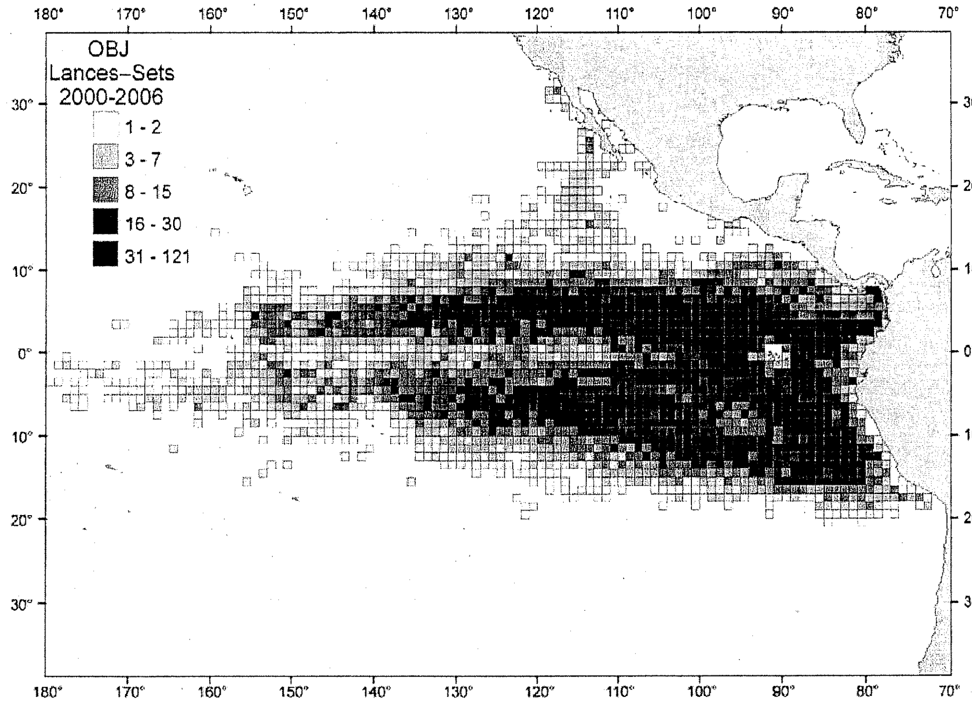
The target for the purse-seine fleet capacity in the *Plan for regional management of fishing capacity* was calculated with the intention that other management measures would not be necessary if the purse-seine fleet was reduced to the target size and other fleets were not increased. However, some economic studies have shown that there may be a significant difference between measurements of fishing capacity contemplated in the regional plan of action, and actual harvest (excess capacity) that the fleet in the eastern Pacific is capable of. It is possible that a reduction of the fleet size would lead to more efficient use of the remaining vessels, and if so, additional measures may be required.

5. IMPACT OF FISHING EFFORT ON ADULT STOCKS OF YELLOWFIN TUNA DURING RECENT YEARS

The yellowfin stock assessment summarized in Document IATTC-75-06 considers the effect of fishing effort on adult stocks of yellowfin tuna during recent years.

6. AVAILABLE INFORMATION ON THE IMPACT OF FADs

The figure below shows the distribution of sets on floating objects (most of which are FADs) during the 2000-2006 period.



The number of sets and the catches in those years are as follows.

	Number of sets—Número de lances			Retained catch—Captura retenida		
	Vessel capacity-Capacidad del buque		Total	YFT	SKJ	BET
	≤ 363 t	> 363 t				
OBJ	**Sets on fish associated with floating objects Lances sobre peces asociados con objetos flotantes**					
2000	504	3,916	4,420	42,688	121,036	91,474
2001	801	5,744	6,545	66,353	122,752	60,627
2002	857	5,781	6,638	37,797	116,656	55,916
2003	704	5,497	6,201	29,798	181,326	52,705
2004	615	5,083	5,698	27,595	117,669	65,829
2005	641	5,122	5,763	26,238	132,483	67,510
2006	1,086	7,140	8,226	35,642	194,679	69,564

What is not known for the fleet as a whole is how many FADs are placed at sea, where they are deployed and for how long.

INTER-AMERICAN TROPICAL TUNA COMMISSION
COMISIÓN INTERAMERICANA DEL ATÚN TROPICAL

75TH MEETING

CANCUN (MEXICO)
25-29 JUNE 2007

DOCUMENT IATTC-75-07b REV

CONSERVATION RECOMMENDATIONS

Resolutions C-04-09 and C-06-02 on the conservation of tunas in the eastern Pacific Ocean (EPO) establish measures for the conservation of yellowfin and bigeye tuna during 2004-2007. This paper makes recommendations for yellowfin and bigeye for 2007-2009 and for an annual limit on the catch of swordfish in the southeastern Pacific Ocean, and suggests clarification of Resolution C-05-02 concerning northern albacore tuna. It also recommends that the growing capacity of the purse-seine fleet be addressed. Summaries of the stock assessments for all species are provided in Document IATTC-75-06, *Tunas and billfishes in the eastern Pacific Ocean in 2006*.

The *ad hoc* meeting of the Commission in February 2007 asked the staff to provide information on possible area closures that would reduce catches of juvenile yellowfin and bigeye tuna, and to estimate the total allowable catches (TACs) for each species. These recommendations, therefore, include those measures, in addition to the seasonal closure that has been in effect during 2004-2007. Two points suggested by individual delegations at the February meeting, a closure of a large area to all fishing and measures affecting fish-aggregating devices (FADs), are also addressed.

1. FLEET CAPACITY

The major issue that must be addressed to facilitate conservation of the stocks and the economic viability of the fisheries for yellowfin and bigeye tunas is that of the size of the purse-seine fleet. On May 13, 2007, the carrying capacity of the purse-seine fleet fishing or expected to fish in the EPO was 228,157 m^3. While Resolution C-02-03 on capacity has limited entry, there is still room for some additional vessels to enter the fishery within the terms of the Resolution.

The staff recommends that the Commission examine means to reduce the fleet size toward the Commission's target of 158,000 m^3 as soon as possible.

2. YELLOWFIN TUNA

The stock assessment for yellowfin is similar to that of 2006. The base case assessment indicates that the spawning stock size has declined from a high point in 2001 to about 95% of the level corresponding to the average maximum sustainable yield (AMSY). The fishing mortality corresponding to the AMSY is 0.96 (*F multiplier*) times the average fishing mortality rate for the last three years. The historical status of the stock is shown in the plot in Figure 1. The trajectory starts in 1977, near the edge of the green section of the graph, and the large red dot at the end represents the average of 2004-2006.

Since 2002 recruitment has been less than the average for 1985-2002. It is possible that this lesser recruitment will persist in the future, which would produce reduced catches relative to those possible during 1987-2003.

At the beginning of 2007 the carrying capacity of the purse-seine fleet was 7% greater than the average for 2004-2006. To simply maintain the effect of Resolution C-04-09, the period during which purse-seining was permitted (46 weeks) should be reduced.[1]

The base case assessment did not include a stock-recruitment relationship; if that were incorporated (the alternative assessment) the *F multiplier* would be 0.65. The staff has attributed the increase in

[1] closure = 365 – *F multiplier* × (365 – 42)/(1 + capacity increase)

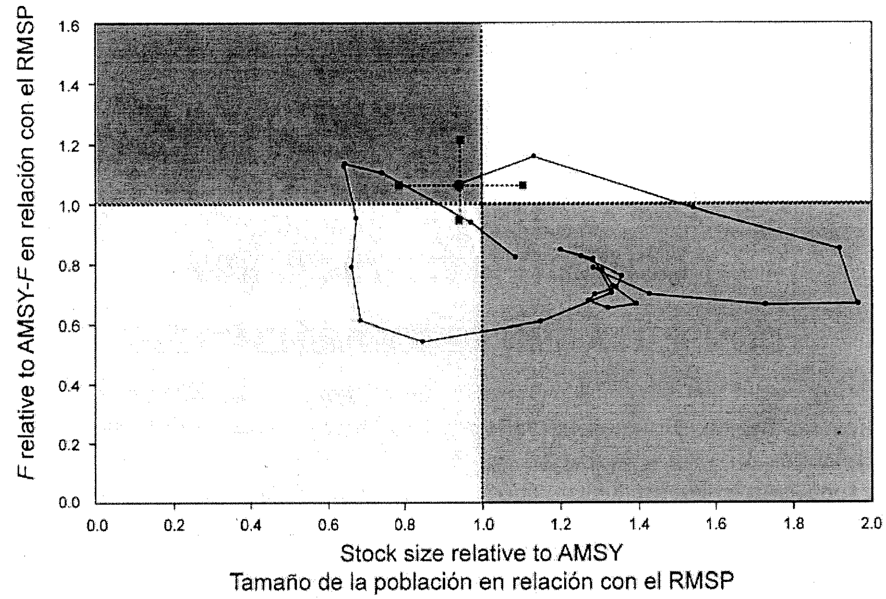


FIGURE 1.

recruitment and stock size after 1985 to a regime change that led to greater spawning biomasses, rather than to dependence of recruitment on spawning stock size. Nevertheless, it is possible that this interpretation is wrong, and that the increase in recruitment after 1985 was related to a stock-recruitment relationship, in which moderate stock reductions cause recruitment to decline. If that were the case, the stock would currently be overfished.

Regardless of the recruitment, the total catch and stock size could be increased if the average size of the yellowfin in the catch were increased. The longline fishery catches the largest fish, but takes less than 5% of the total catch. The purse-seine fishery takes yellowfin of a wide range of sizes, depending on set type. Increasing the proportion of the catch made by longlines or by purse-seine sets on tunas associated with dolphins, particularly offshore, would increase the sustainable yields and the biomass. Area closures might be used to increase the yield per recruit of yellowfin, but their effect cannot be precisely forecast. Juvenile yellowfin tuna are taken mostly in inshore areas, and restricting fishing by vessels carrying observers in an area such as that shown in Figure 2 would increase the yield per recruit of yellowfin tuna, but would not on its own resolve the issue of too much fishing. The proposal is for large vessels only as it might be difficult for small vessels to fish in offshore areas. The Appendix gives the catches of large vessels inside the proposed area and an indication of its possible effect.

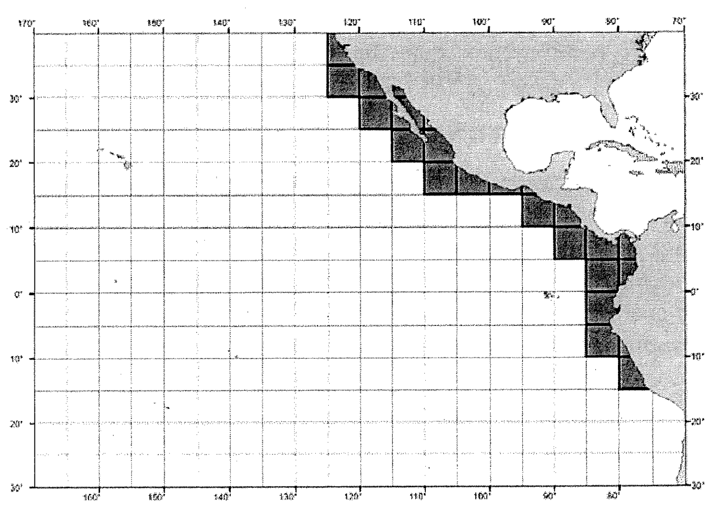


FIGURE 2.

The staff recommends that the

Commission:

1. (a) Extend the closure periods for the purse-seine fishery in Resolution C-06-02 by an additional 32 days, to 74 days, and that the closure period be extended further if the carrying capacity of the purse-seine fleet continues to increase; or

   (b) Set a TAC of 200,000 metric tons [2] (t) for yellowfin taken by purse seine in the EPO, but that the Director be authorized to increase the limit by up to four increments of 30,000 t each if he concludes, from examination of available data, that such increments would pose no significant risk to the stock. If the limit, including any increments authorized by the Director, is reached, purse-seining for tunas will cease.

2. Examine the effectiveness of closing coastal areas, such as that shown in Figure 2 to purse-seine vessels fishing for tropical tunas that are required by the AIDCP to carry observers, with the objective of improving the yield per recruit of yellowfin tuna. The examination might include closing an area for one quarter of the year and evaluating the result.

In case of Option 1(b), the Director should give CPCs one month's notice of the date on which he estimates that the catch limit will be reached.

3. BIGEYE TUNA

The stock assessment results are generally similar to those of previous assessments, except that the recruitments in 2001 and 2002 are now estimated to be less than they were estimated to be in 2006.

The stock remains below the AMSY level, but a recent large recruitment has mitigated the overfishing. The stock is expected to approach the level corresponding to the AMSY in 2010, and subsequently to decline. The fishing mortality corresponding to the AMSY is 0.83 times the average fishing mortality rate during 2004-2006. The historical status of the stock is shown in the plot in Figure 3. The trajectory starts in 1977, at the lower right of the graph, and the large red dot at the end represents the average of 2004-2006.

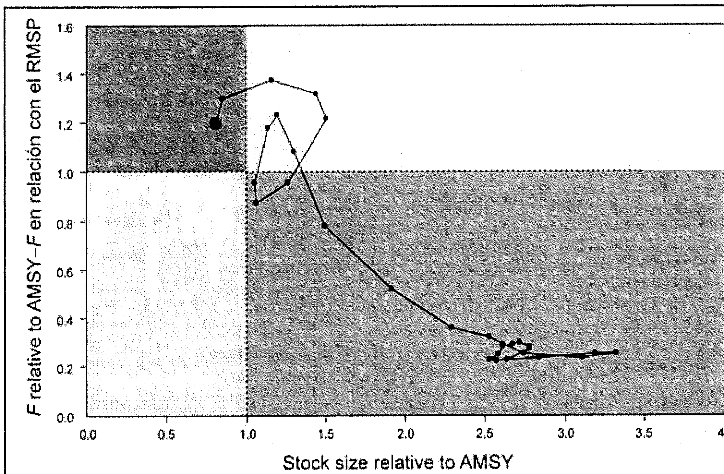


FIGURE 3.

The base case assessment did not include a stock-recruitment relationship; if that were incorporated (the alternative assessment) the *F multiplie*r would be 0.59.

The staff recommendation is based on the base case assessment. In contrast to yellowfin, there is no information in the history of the fishery that supports a stock-recruitment relationship in which moderate stock reductions cause recruitment to decline. However, the steepness of the stock-recruitment relationship is difficult to estimate, and there remains a possibility that inferences made using the base case assessment underestimate the extent to which the stock is overfished.

[2] The initial TAC and range for yellowfin tuna are calculated as the AMSY during the period of low recruitment (1975-1982), with the increments such that four increments would produce a TAC equal to the AMSY during the period of high recruitment (1983–2001).

The staff has made an evaluation of the effect of closing the area shown in Figure 4 to fishing by large purse-seiners. The absolute effect is uncertain because the response of fishermen, the variability of the stocks, and the variability of the environment cannot be predicted, but it would be likely to lead to a reduction of bigeye and skipjack catches and to increased catches of yellowfin. If that were coupled with restrictions in fishing inshore (Figure 1), at least some of the increase in yellowfin catches would probably be made up of large fish taken in association with dolphins. An indicative evaluation of the effect of closing the area for a year is given in the Appendix.

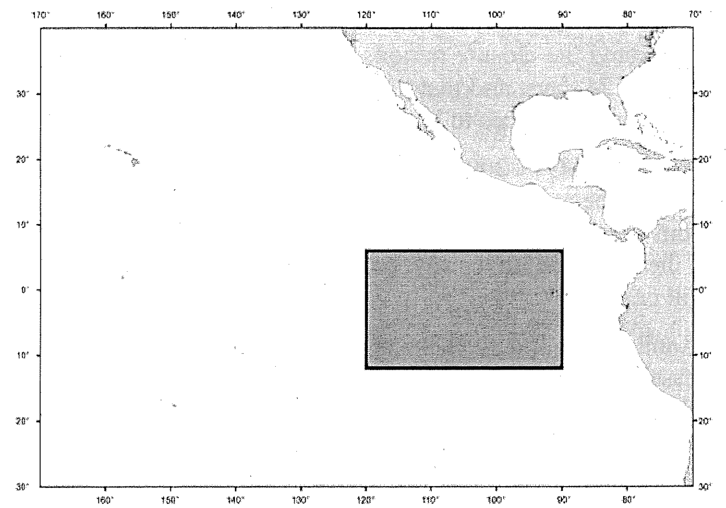


FIGURE 4.

Longline catches have declined to less than the levels allowed by Resolution C-06-02, making the impact of this fishery less than envisaged in the Resolution. On the other hand, the growth in the carrying capacity of the purse-seine fleet has militated against the effect of the Resolution in limiting purse-seine catches.

Recent catches of bigeye tuna		
	Purse-seine	Longline
2003	54,509	59,666
2004	67,337	43,354
2005	68,699	43,433
2006	71,195	30,271

Further measures are necessary to allow the stock to be maintained at or above the AMSY level.

The AMSY has been significantly reduced by purse-seine catches of small bigeye, and measures that encourage purse-seine vessels to avoid catching bigeye while fishing for skipjack would be beneficial. The aggregation of fish by FADs is a major part of the fishing effort for that fishery, but there is little information available about deployment and disposition of FADs. Such information is critical as a basis for any decisions about management of the use of FADs.

The combined fishing effort (longline and purse-seine) should be reduced to 83% of the level of 2004-2006. Reductions of differing amounts for each of the two fleets could also achieve the goal of producing the AMSY, as shown in Figure 5.

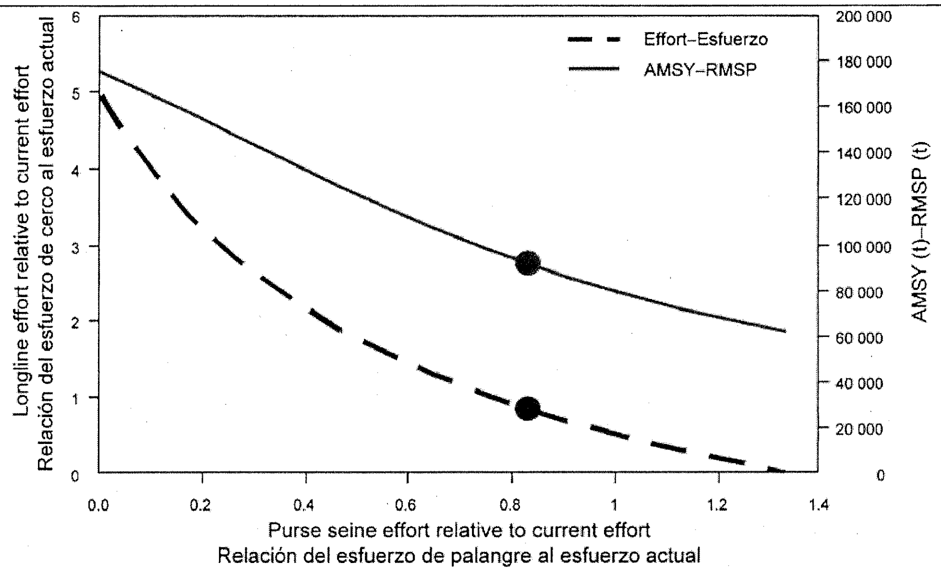


FIGURE 5. The dashed line shows combinations of longline and purse-seine fishing effort (compared to 2004-2006 levels) that will produce the AMSY. The solid line shows the relationship between the AMSY for the whole fishery and purse-seine effort when longline effort is adjusted appropriately to produce the AMSY.

The staff recommends that the Commission:

1. Determine the appropriate adjustments to the balance of the longline and purse-seine fisheries, and note the following three examples of different reductions in each of the two fisheries that would achieve an AMSY level with a different mix of the two gears.

Purse-seine : longline reduction – *F multipliers*	73% : 1.06%	83% : 83%	93% : 0.66%
Longline catch at AMSY	50,229	38,210	28,828
Purse-seine catch at AMSY	49,476	53,308	56,109
AMSY	99,704	91,518	84,937

2. If it wishes to make equal reductions (83%:83%) compared to the provisions of Resolution C-06-02

2.1. Reduce the catch limits for longline fishing to 83% of their previous values, to:

China	2,190
Japan	28,283
Korea	10,438
Chinese Taipei	6,601

and, for other CPCs, to the greater of 83% of the 2001 catches or 500 t, <u>and</u>

2.2. Choose one of the three following options for purse-seine limits:

2.2.1. In addition to the yellowfin closure in 1 (a) above, close the purse-seine fishery on floating objects in the EPO for an additional 35 days[3]; <u>or</u>

2.2.2. Set a TAC for bigeye tuna taken by purse-seine, and prohibit sets on floating objects after the catch limit has been reached. The initial TAC would be 48,000 t[4], but the Director

[3] Closure = 365 – *F multiplier* × (365 – 42)/(1 + capacity increase)

[4] The initial value of the TAC is 90% of the AMSY for the purse-seine catches. Four increments would provide a TAC of 70,000 t, to accommodate uncertainty in the most recent estimates of recruitment.

would be authorized to increase the limit by up to four increments of 5,500 t each, if he concludes, from examination of available data, that such increases would pose no significant risk to the stock; or

2.2.3. Limit the total annual catch of bigeye tuna by each purse-seine vessel in such a way that the sum of the individual-vessel limits equals 68,000 t[5], and prohibit further sets on floating objects by any vessel that reaches its limit. A vessel's catch of bigeye would be estimated either by the observer or, at the request of the captain, by sampling of the vessel's catch conducted by IATTC staff members at the time of unloading. If the latter option is chosen, the vessel would be responsible for reasonable costs of the sampling.

3. Require that vessels that use FADs mark the FADs in accordance with international standards for marking fishing gear, and maintain a record of the numbers of FADs on board at the beginning and end of each fishing trip and of the numbers and positions of FADs deployed at sea, and make this information available to the Commission.

The estimates of the bigeye catches referred to in section 2.2, except for the observer estimate in 2.2.3, should be calculated on the basis of species composition sampling of unloadings, and the Director should give the CPCs one month's notice of the date on which he estimates that the catch limit will be reached.

4. SOUTHEASTERN PACIFIC SWORDFISH

The stock assessment for southeastern Pacific swordfish (east of 150°W and south of 5°S) indicates that the stock is currently above the level corresponding to the AMSY, but that the current catches are slightly above the AMSY level. The staff assessment for 2004 suggested that the stock was overfished. As a precautionary measure, **the staff recommends that** the annual catches be limited to 13,000 t, by allocating limits to the CPCs involved in the fishery.

5. NORTHERN ALBACORE TUNA

The staff's assessment for northern albacore has not been updated. For clarity, **the staff recommends that** the meaning of the words "current levels" in paragraph 1 of Resolution C-05-02 should be specified.

[5] It is likely that individual vessel limits will produce a total catch less than the sum of the individual limits, and this would reduce catches by more than the initial TAC plus two increments.

APPENDIX: CATCHES INSIDE AND OUTSIDE TWO POTENTIAL CLOSED AREAS

Catches, expressed in metric tons (t), are based on estimates by observers aboard purse-seine vessels >363 t, and include both retained and discarded catch. The catch data from a trip were not used if the observer reports did not contain estimated stratification of catch by size category (<2.5kg, 2.5-15 kg, and >15 kg); this excluded about 15% of the trips, mostly from the northern part of the fishing area (Figure A-1). Section 1 contains estimates of the average purse-seine catches of tunas during 1994-2006 inside and outside the coastal closure area proposed by the staff (Figure 2); Section 2 contains estimates of average purse-seine catches of tunas during 1994-2006 inside and outside the offshore closure area at 90°W-120°W - 6°N-12°S proposed at the *ad hoc* meeting in February 2007 (Figure 4). Each section provides an estimate of changes in catches if the area were closed and an equivalent amount of fishing was carried out outside the area.

1. COASTAL CLOSURE AREA

Figure A-1 shows the distribution of catches of yellowfin (YFT) and bigeye (BET) tuna <15 kg in sets on unassociated schools (NOA) and on floating objects (OBJ) in the EPO.

The average annual purse-seine catches, including discards, of yellowfin, bigeye, and skipjack tunas in the EPO, by size category, inside and outside the proposed coastal closure area during 1994-2006 are shown in Table A-1.

For the purposes of this analysis, the area in which the catches illustrated in Figure A-1 were made was divided into northern and southern coastal areas (covering the coastal closure area in Figure 2) and northern and southern offshore areas (Figure A-2).

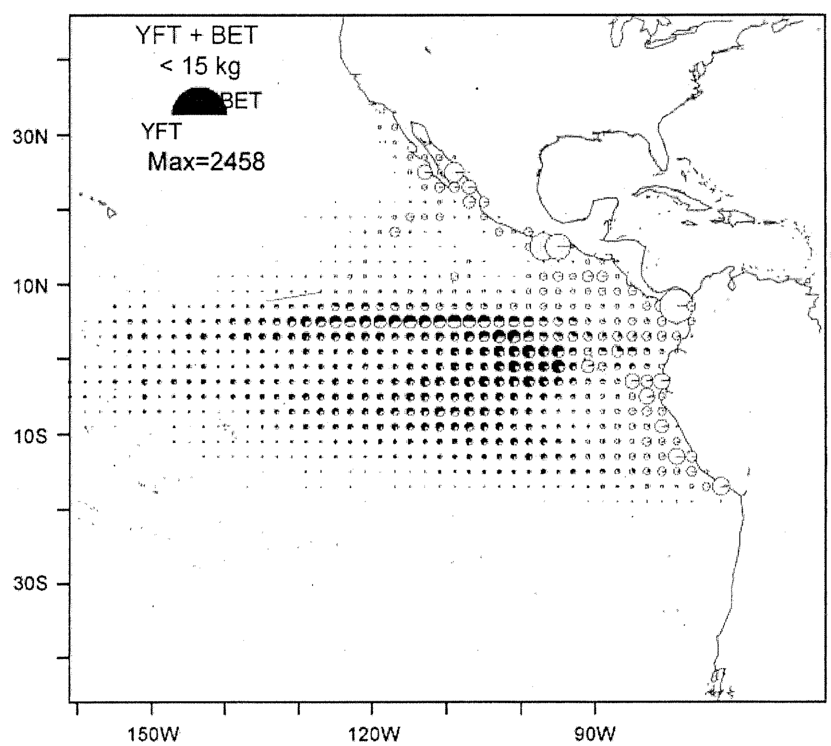


FIGURE A-1.

An approximation of the effect of a closure was made by allocating sets made within the coastal closure area to sets in the offshore areas. The allocations were restricted so that sets associated with dolphins (DEL) or floating objects did not change to the other mode, and that sets on unassociated schools in the northern and southern coastal areas were restricted to the fishing modes shown in the table below.

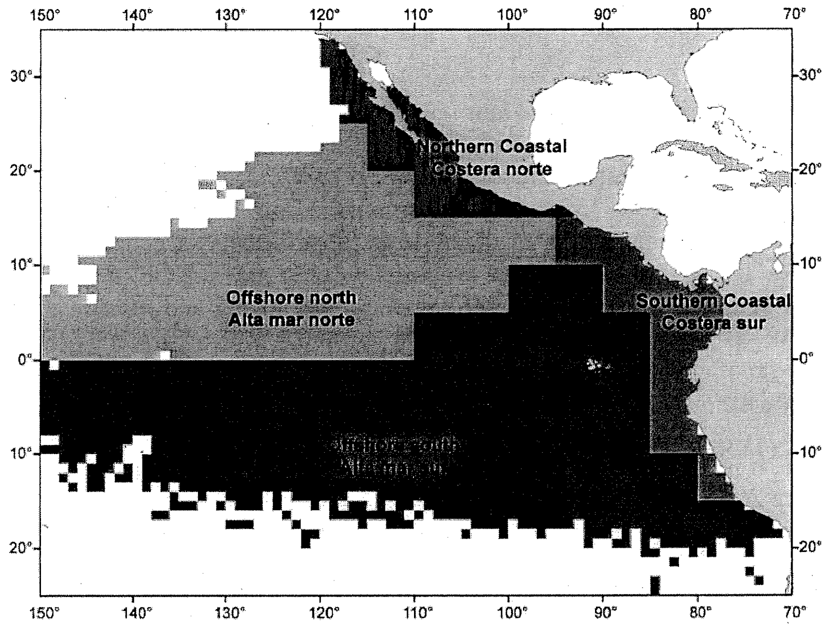


FIGURE A-2.

Set type within coastal closure area	Set type(s) in offshore areas	North or South coastal areas
DEL	DEL or NOA	Both
OBJ	OBJ or NOA	Both
NOA	NOA or DEL	North
NOA	NOA or OBJ	South

The technical details of the approximation are as follows. The sets transferred to the offshore area are apportioned among set types in the average proportion of those set types during 1994-2006; thus, if 40% of sets in the offshore area during that period were made on dolphins, 40% on floating objects, and 20% on unassociated tunas, 100 sets made on dolphins transferred from the coastal area would be apportioned as 67 dolphin sets, 33 unassociated sets, and 0 floating-object sets. In addition, it is assumed that the catch per set by the apportioned sets will equal the average catch per set by the set type to which the set is transferred.

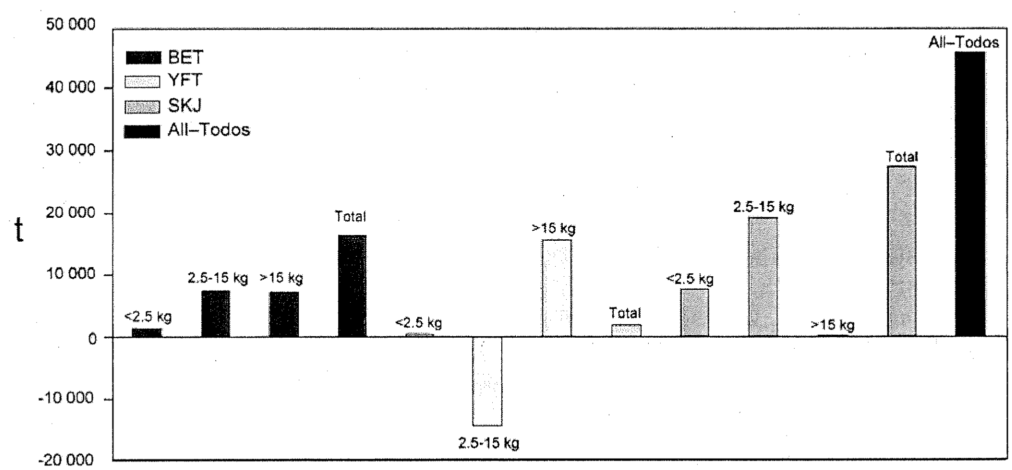


FIGURE A-3. Average change in annual catch, by species, with closure of coastal area

As shown in Figure A-3, a year-long closure of the coastal fishery could result in lower catches of yellowfin <15 kg and higher catches of >15 kg yellowfin, accompanied by some increases in the catches of bigeye and skipjack for that year. The increase in the catch of yellowfin is underestimated because no yield-per-recruit analyses have been made. The increase in catches of bigeye < 15 kg should be examined further.

The majority of yellowfin catches inside the coastal area are taken in the southern coastal area (Table A-2), and most of those catches are taken in the first and second quarters of the year (Table A-3).

2. OFFSHORE CLOSURE AREA

This section presents estimates of the catches of tunas during 1994-2006 inside and outside the proposed offshore closure area (Figure 4).

Table A-4 shows the average annual purse-seine catches of yellowfin, bigeye, and skipjack tunas, by size category, inside and outside the offshore closure area illustrated in Figure 4 during 1994-2006. Overall, 62% of all bigeye caught in the EPO is taken inside this area, but only about half the bigeye <2.5 kg. However, only 18% of the catches of yellowfin and 44% of the catches of skipjack are made in this area.

An approximation of the effect of a closure of the offshore area was made by allocating sets inside the area to sets outside of the area in proportion to the average proportion of those sets in the 1994-2006 time period. In addition, the assumption is made that the catch per set by the displaced sets will equal the average catch per set by the set type to which the set is transferred.

As shown in Figure A-4, the catches of bigeye and skipjack would be likely to be reduced by closing the area, but catches of yellowfin would be increased.

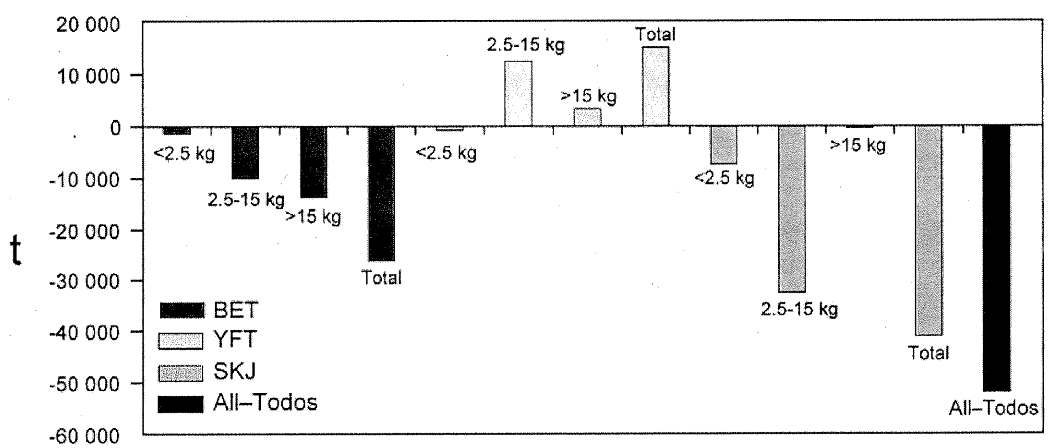


FIGURE A-4. Average change in annual catch, by species, with closure of offshore area

TABLE A-1. Average annual purse-seine catches, including discards, of tunas, by size category, inside and outside the coastal closure area (Figure 2), 1994-2006.

		Inside	Outside	% inside
Bigeye	<2.5 kg	105	4,375	2
	2.5-15 kg	305	23,782	1
	>15 kg	537	23,046	2
	Total	946	51,203	2
Yellowfin	<2.5 kg	1,354	5,158	21
	2.5-15 kg	32,795	39,947	45
	>15 kg	24,896	80,515	24
	Total	59,045	125,620	32
Skipjack	<2.5 kg	6,300	41,088	13
	2.5-15 kg	15,371	93,777	14
	>15 kg	68	1,209	5
	Total	21,739	136,075	14
Grand total		**81,730**	**312,897**	**21**

TABLE A-2. Average annual purse-seine catches, including discards, of tunas, by size category, in the four areas illustrated in Figure A-2, 1994-2006.

	Northern Coastal				Southern Coastal			
	Bigeye	**Skipjack**	**Yellowfin**	**Total**	**Bigeye**	**Skipjack**	**Yellowfin**	**Total**
<2.5 kg	0	496	207	703	105	5,804	1,147	7,056
2.5-15 kg	0	2,257	11,315	13,571	305	13,114	21,481	34,899
> 15 kg	0	0	5,297	5,297	537	68	19,598	20,203
All	0	2,753	16,819	19,572	946	18,986	42,226	62,158
	Northern Offshore				**Southern Offshore**			
	Bigeye	**Skipjack**	**Yellowfin**	**Total**	**Bigeye**	**Skipjack**	**Yellowfin**	**Total**
<2.5 kg	1,311	10,193	1,666	13,170	2,912	29,098	3,388	35,398
2.5-15 kg	6,073	22,139	21,781	49,993	16,900	69,805	17,870	104,574
> 15 kg	3,428	290	33,381	37,099	19,293	918	46,643	66,853
All	10,812	32,621	56,829	100,261	39,105	99,820	67,900	206,825

TABLE A-3. Catches of tunas, by species and quarter, inside and outside the coastal closure area (Figure 2).

	Quarter	Inside	Outside	% inside
Bigeye	1	189	10,622	2
	2	384	12,846	3
	3	250	13,114	2
	4	124	14,620	1
	Total	946	51,203	2
Yellowfin	1	19,048	37,327	34
	2	17,863	32,705	35
	3	12,539	30,161	29
	4	9,595	25,426	27
	Total	59,045	125,620	32
Skipjack	1	8,071	35,830	18
	2	7,088	31,711	18
	3	4,018	32,562	11
	4	2,562	35,973	7
	Total	21,739	136,075	14
Grand total		**81,730**	**312,897**	**21**

TABLE A-4. Average annual purse-seine catches of tunas, by species and size category, inside and outside the offshore closure area (Figure 4), 1994-2006.

		Inside	Outside	% inside
Bigeye	>2.5 kg	2,274	2,203	51
	2.5 kg–12.5 kg	13,603	10,481	56
	>15 kg	16,251	7,328	69
	Total	32,435	20,176	62
Yellowfin	>2.5 kg	2,317	4,189	36
	2.5 kg–15 kg	7,806	64,929	11
	>15 kg	22,890	82,513	22
	Total	33,212	153,045	18
Skipjack	>2.5 kg	17,014	30,368	36
	2.5 kg–15 kg	50,953	58,188	47
	>15 kg	770	504	60
	Total	69,258	89,860	44
Grand total		**134,907**	**263,089**	**34**

INTER-AMERICAN TROPICAL TUNA COMMISSION

75TH MEETING

CANCUN (MEXICO)
25-29 JUNE 2007

PROPOSAL D1

SUBMITTED BY THE UNITED STATES

RESOLUTION ON A MULTI-ANNUAL PROGRAM ON THE CONSERVATION OF TUNA IN THE EASTERN PACIFIC OCEAN FOR 2008, 2009, AND 2010

The Inter-American Tropical Tuna Commission (IATTC), at its 75th Meeting in Cancun, Mexico, in June 2007:

Having responsibility for the scientific study of the tunas and tuna-like species of the eastern Pacific Ocean (EPO), defined as the area bounded by the coastline of the Americas, the 40°N parallel, the 150°W meridian, and the 40°S parallel, and for the formulation of recommendations to Contracting Parties, cooperating non-Parties, fishing entities and regional economic integration organizations (collectively "CPCs") with regard to these tuna resources, and having maintained since 1950 a continuous scientific program directed toward the study of tuna resources;

Recognizes, based on past experience in the fishery, that the potential production from the tuna resource can be reduced by excessive fishing effort;

Being aware with grave concern that, despite the previous conservation and management measures adopted by the Commission, although the catches of bigeye and yellowfin tunas have declined recently, capacity continues to increase and overfishing of bigeye tuna and yellowfin tuna is occurring;

Notes that the tuna resource of the EPO supports one of the most significant surface fisheries for tunas in the world;

Notes the staff's recommendation that the conservation measures for tunas for 2008 should include a closure of the purse-seine fishery of 109 days in order to conserve the stocks of yellowfin and bigeye in the EPO;

Taking into account the best scientific information available, as reflected in the recommendations of the staff and the report of the meeting of the Working Group on Stock Assessments in May 2007; and

Considering that the studies of yellowfin and bigeye tunas presented at this meeting show that the stocks are at a level below that which would produce the average maximum sustainable yield (AMSY);

Resolves as follows:

1. This resolution is applicable in the years 2008, 2009, and 2010 to all purse-seine vessels and all longline vessels fishing for yellowfin, bigeye, and skipjack tunas in the EPO.
2. The objective of this Resolution is to reduce fishing levels to levels that will produce the AMSY of yellowfin tuna within three years, and of bigeye tuna within five years.
3. Pole-and-line, troll, and sportfishing vessels are not subject to this resolution.
4. In each one of the years covered by this resolution, the fishery for tunas by purse-seine vessels in the EPO shall be closed for the rest of that year when a total allowable catch (TAC) of 200,000 metric

tons of yellowfin tuna is reached. The Director will be authorized to decrease or increase the TAC by no more than four reductions or increments of 30,000 metric tons each, if the Director concludes, from examination of available data, that any such decreases are required to increase the stock to the level producing AMSY or any such increases will pose no significant risk to the stock so as not to fall below the level producing AMSY. Any reduction or increase shall go into effect 30 days after the Director has notified each CPC that the Director has determined such change is appropriate and provided the information upon which the Director's determination was based.

5. In addition, during 2008, 2009, and 2010, each CPC shall limit the annual catch of bigeye tuna by each one of its purse-seine vessels to no more than 500 metric tons per vessel.

6. Each CPC shall, for purse-seine fisheries:

   a. Before the date of entry into force of the closure, take the legal and administrative measures necessary to implement the closure;

   b. Inform all interested parties in its national tuna industry of the closure;

   c. Inform the Director that these steps have been taken;

   d. Ensure that at the time a closure begins, and for the entire duration of the closure, all purse-seine vessels fishing for yellowfin, bigeye, or skipjack tunas flying its flag, or operating under its jurisdiction, in the EPO are in port, except that vessels carrying an observer from the AIDCP On-Board Observer Program may remain at sea, provided they do not fish in the EPO. The only other exception to this provision shall be that vessels carrying an observer from the AIDCP On-Board Observer Program may leave port during the closure, provided they do not fish in the EPO.

7. Each CPC shall take the measures necessary to control the total annual longline catch of bigeye tuna in the EPO during 2008, 2009, and 2010 by longline vessels fishing under its jurisdiction.

8. China, Japan, Korea, and Chinese Taipei shall take the measures necessary to ensure that their total annual longline catches of bigeye tuna in the EPO during 2008, 2009, and 2010 does not exceed the following levels:

China	2,190 metric tons
Japan	28,283 metric tons
Korea	10,438 metric tons
Chinese Taipei	6,601 metric tons

9. Other CPCs shall take the measures necessary to ensure that their total annual longline catches of bigeye tuna in the EPO during 2008, 2009, and 2010 do not exceed 500 metric tons or their respective catches of bigeye tuna in 2001, whichever is higher[1].

10. To prohibit landings, transshipments and commercial transactions in tuna or tuna products that have been positively identified as originating from fishing activities that contravene this resolution. The Director shall provide relevant information to the Parties to assist them in this regard. The Commission shall develop transparent and non-discriminatory criteria and procedures to promote compliance in the EPO, consistent with international law, including World Trade Organization agreements and other applicable trade agreements.

11. Catches of bigeye tuna by large-scale longline vessels (> 24 meters in length) that are not landed in ports in the EPO will be verified for the purpose of paragraphs 8-11 through either Commission-approved port sampling programs or at-sea observers. The Director shall determine, and announce to the CPCs, the appropriate level of observer coverage.

12. Each CPC shall, in each of the years covered by this resolution, notify the Director by 15 July of national actions taken to implement this Resolution, including any controls it has imposed on its fleets

and any monitoring, control, and compliance measures it has established to ensure compliance with such controls.

13. Each CPC with tuna longline vessels shall provide monthly of reports of longline catches of bigeye tuna to the Director.

14. To evaluate progress towards the objectives of paragraph 2 of this Resolution, in 2008 the IATTC Scientific Working Group will analyze the effects on the stocks of the implementation of Resolution C-06-02, Resolution C-04-09, and previous conservation and management measures, and will propose to the Commission, if necessary, appropriate measures to be applied in 2009 and thereafter.

15. Each CPC shall comply with this resolution.

---

[1] The Parties acknowledge that France, as a coastal State, is developing a tuna longline fleet on behalf of its overseas territories in the EPO.

Agenda Item F.3.b
HMSAS Report
September 2007

HIGHLY MIGRATORY SPECIES ADVISORY SUBPANEL REPORT ON YELLOWFIN TUNA OVERFISHING

The Highly Migratory Species Advisory Subpanel (HMSAS) recognizes that yellowfin tuna overfishing needs to be addressed. The HMSAS agrees that all present U.S. domestic measures are adequate as they apply to the U.S. fisheries. The HMSAS also recognizes that the U.S. fishery for yellowfin tuna both commercially and recreationally could be viable in the future and would like to see regulatory measures addressing present overfishing have some flexibility in this regard.

International measures to address the present overfishing could include capacity reduction, fish aggregation device fishing reductions, area closures, and other measures to address the immediate problem.

PFMC
08/23/07

HIGHLY MIGRATORY SPECIES MANAGEMENT TEAM REPORT ON YELLOWFIN TUNA OVERFISHING

As outlined in the Situation Summary, the Magnuson Stevens Act (MSA) includes new Council requirements related to international overfishing. For overfishing of yellowfin tuna in the Eastern Pacific Ocean (EPO), the Council has until March 30, 2008, to meet these requirements. Specifically, the Council is required to develop recommendations for domestic regulations to address the relative impact of United States vessels on the stock (MSA Section 304(i)(2)(A)) and to submit recommendations to the Secretary of State and Congress for international actions to end overfishing and rebuild the stock (MSA Section 304(i)(2)(B)).

The Highly Migratory Species Management Team (HMSMT) is uncertain whether these MSA requirements are fully satisfied with the Council's recommendations due on March 30, 2008, or they are on-going requirements for the Council. If they are on-going requirements, what are the frequency and schedule for complying with them? For example, are these annual requirements due every March 30 until overfishing of yellowfin tuna ends and stocks are rebuilt?

The HMSMT considered information on the status of yellowfin tuna and potential management measures contained in Attachments 1 through 5 to the Situation Summary. Given the short time period allowed to develop recommendations, the HMSMT has relied on recommendations and proposals already developed by the United States, the International Scientific Committee for Tuna and Tuna-like Species (ISC) and the Inter-American Tropical Tuna Commission (IATTC) to address yellowfin tuna overfishing. The HMSMT would also like to incorporate relevant outcomes from the October 2007 IATTC meeting into the draft report to Congress and the State Department; the Council is scheduled to consider for final action at its March 2008 meeting. Upon Council direction, the HMSMT could conduct a more in-depth analysis and potentially recommend other management measures in the future if MSA poses an on-going requirement.

For domestic regulations, the HMSMT does not recommend new management measures. The HMSMT considers current measures included in the HMS fishery management plan adequate to address the very low impact of U.S. fisheries on the stock. Based on the best available estimates, U.S. domestic fisheries account for a very small portion (about 1 percent) of the total yellowfin tuna catch. Of particular note, the sport fishery is a significant component of the U.S. domestic fishery and accounts for about one-third of the U.S. catch. The full complement of domestic regulations (federal and state) for U.S. fisheries catching EPO yellowfin tuna will be included in the draft report provided for Council consideration in March 2008.

For international measures, the HMSMT considers capacity reduction a key component to ending overfishing and rebuilding the EPO yellowfin tuna stock. Progress to reduce fishing capacity in the international fisheries arena has been slow. Decisions are heavily politicized and numerous regional fishery management organization (RFMO) staff recommendations to work at reducing capacity have been disregarded. The HMSMT encourages the Council to strongly support faster adoption and full implementation of recommended measures.

The HMSMT recommends the Council further evaluate the measures proposed by the IATTC and its staff in 2007 (Attachments 3 and 4) to be presented in March 2008. In February, IATTC staff noted that the *Plan for regional management of fishing capacity* has not been implemented and its target for purse seine capacity has not been reached. They indicated that the target may not be sufficient to meet conservation goals and other measures may be needed. Staff also identified several management tools to evaluate for potential conservation benefits, including closing critical areas for juvenile yellowfin, setting a total allowable catch, considering national quotas or individual fishing quotas, implementing the *Plan for regional management of fishing capacity,* and assessing the impacts of fish aggregation devices (FADs) and fishing on adult yellowfin tuna.

In June the IATTC staff further developed management recommendations. As described in Document IATTC 75-07b REV (Agenda Item F.3.a, Attachment 4) key management proposals are:

1. Extend the closure periods for the purse seine fishery to 74 days, and longer if the capacity of the purse seine fleet continues to increase.
2. Set a total allowable catch of 200,000 mt for the purse seine fleet in the EPO, with Director's discretion to increase or decrease the cap if conditions warrant.
3. Consider seasonal closures of coastal areas to purse seine vessels fishing for tropical tunas. The IATTC also noted some of the interactions and impacts of recommended measures for fisheries for bigeye and skipjack tunas. They recommended evaluating the impact of using FADs to address conservation of bigeye tunas which may also be beneficial for yellowfin tuna, especially juveniles.

The HMSMT recommends the Council also consider and evaluate the recommendations included in the U.S. proposal for the conservation of tuna in the EPO for 2008, 2009, and 2010 (Attachment 5). The objective of the U.S. proposal is to reduce fishing levels to those that will produce the average maximum sustainable yield of yellowfin tuna within three years. The recommendations would apply to all purse seine and longline vessels fishing for yellowfin, bigeye, and skipjack tunas, but pole-and-line, troll and sportfishing vessels would be exempt. The U.S. proposal includes the following measures beneficial for yellowfin tuna conservation:

1. Set a total allowable catch of 200,000 mt of yellowfin tuna with Director's discretion. This is the same as the IATTC proposal.
2. Indirectly reduce some purse seine effort on yellowfin tuna via catch caps for bigeye tuna. When bigeye catch caps on individual purse seine vessels are met, the vessel must remain in port or carry an observer and not fish in the EPO.
3. Prohibit landings, transshipments and commercial transactions in tuna products that have been identified as taken in contravention of the U.S. proposal.

In summary, the HMSMT suggests the Council consider the following to meet Magnuson-Stevens Act Section 304(i) requirements:

1. Clarify if MSA requirements are met in March 2008 for yellowfin tuna overfishing and if not, the schedule for any on-going requirements.

2. For U.S. domestic regulations (Section 304(i)(2)(A)), maintain that current domestic regulations are satisfactory and no new domestic regulations are needed to address overfishing of yellowfin tuna.

3. For international management measures (Section 304(i)(2)(B)), the HMSMT recommends evaluating the following conservation and management measures for public review, with final adoption of a suite of recommendations in March 2008:

    a) Specify further measures to limit capacity of the purse seine fleet as discussed in Document IATTC-75-7b REV and the Council's previous letter to the U.S. delegation (Agenda Item F.3.a, Attachment 1).

    b) Extend the current purse-seine time/area closure to 74 days, as discussed in Document IATTC-75-7b REV.

    c) Apply the additional coastal area closure discussed in Document IATTC-75-7b REV.

    d) Adopt the elements of the U.S. proposal (Agenda Item F.3.a, Attachment 5) for 2008–10 as may be modified in any proposal submitted at the October 22-24, 2007, IATTC meeting. These include an adjustable 200,000 mt TAC for purse seine catches, purse seine vessel catch limits of 500 mt for bigeye tuna, and extension of the current national quotas for longline catches of bigeye.

    e) Further develop proposals for a registry of FADs, FAD marking, and limits on the total number of FADs that may be deployed, as discussed in the Council's previous recommendations (Agenda Item F.3.a, Attachment 1).

4. Consider making specific recommendations to the U.S. delegation at the October 2007 IATTC meeting, based on the range of measures outlined above.

PFMC
08/23/07

Agenda Item F.3.b
Supplemental SSC Report
September 2007

SCIENTIFIC AND STATISTICAL COMMITTEE REPORT
ON YELLOWFIN TUNA OVERFISHING

Dr. Mark Maunder (Inter-American Tropical Tuna Commission [IATTC]) briefed the Scientific and Statistical Committee (SSC) on the stock assessment conducted for yellowfin tuna in the Eastern Tropical Pacific (Agenda Item F.3.a, Attachment 2). The SSC reviewed the assessment, noting that there is currently no terms of reference document for highly migratory species stock assessments. The report on the yellowfin tuna stock assessment, however, includes most of the information typically included in a stock assessment report used for Council decision-making and hence could be reviewed by the SSC. Based on its review of the assessment, the SSC endorses the assessment, and its use for status determination purposes.

The assessment indicates that the spawning stock biomass (SSB) has been relatively stable since 1984 with periodic fluctuation. For the base-case assessment, the stock is estimated to be slightly below SSB_{MSY} with a fishing mortality rate (F) slightly above F_{MSY}. Therefore, based on the point estimates from the base-case assessment, overfishing is occurring and the stock is in an overfished state under the terms of the IATTC treaty. However, it should be noted that there is considerable uncertainty in the “current” estimates of both F and SSB. Also, note that the “current” estimates reflect an average over 2003-2005.

The base-case assessment assumes that recruitment is independent of SSB (i.e. steepness is one). The extent to which “current” F exceeds F_{MSY} depends on the relationship between spawning biomass and recruitment; the lower the value of steepness, the greater the implied extent of overfishing. Dr. Maunder noted that steepness for yellowfin tuna was unlikely to be one, but that it was also unlikely to be much lower than one.

The recruitment used in the calculation of SSB_{MSY} is the average over the entire period considered in the assessment. However, Dr. Maunder noted that the results of the assessment are consistent with a change in average recruitment in about 1984. The value of SSB_{MSY} would have been higher had it been based on recent (post-1983) recruitment; and hence the current stock status determination would have been more pessimistic.

Finally, the SSC notes that, at present, very few U.S.-flagged vessels operate in the commercial fishery for yellowfin tuna and landings are minimal (approximately 1% of the total). Hence, multi-national management arrangements are needed to stop overfishing.

PFMC
09/11/07

NORTH PACIFIC ALBACORE TUNA STOCK ASSESSMENT

The International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean (ISC) held its plenary session July 25–30, 2007, in Busan, Korea. As part of its mandate to assess stocks and analyze fisheries occurring in the North Pacific, the ISC's Albacore Working Group finalized a stock assessment for North Pacific albacore tuna (Attachment 1 is the ISC plenary report. Printed excerpts are attached; the full report is available on CD-ROM and Web only. Attachment 2 is the Albacore Working Group Report, available on CD-ROM and Web only). The ISC assessment process involves collaboration by scientists from member nations on data contributions and model review but independent peer review is not part of the process. The Council's Scientific and Statistical Committee is scheduled to review the North Pacific albacore stock assessment and report to the Council. After evaluating the utility of the stock assessment, the Council is scheduled to consider recommendations for fishery management in the international arena.

The ISC and the Western and Central Pacific Fisheries Commission (WCPFC) have entered into a memorandum of understanding on the provision of scientific advice to the WCPFC and its Northern Committee. The Northern Committee is responsible for developing conservation and management recommendations for stocks occurring north of 20º N latitude in the Pacific Ocean and comprises members situated in the area or fishing on such stocks. The Commission may only accept or reject recommendations made by the Northern Committee. If the Commission rejects such advice it returns the matter to the Northern Committee. In effect, the Commission may only make an up or down vote on Northern Committee recommendations and cannot independently modify them. Thus the Northern Committee plays an important role in the international management of highly migratory species stocks in the northwest Pacific (north of 20° N latitude and west of 150° W longitude). The Northern Committee holds its third regular session September 11–13, 2007, in Tokyo, Japan, which is the same time as the September Council meeting. Therefore, Council input on conservation and management measures for North Pacific albacore would have to be immediately transmitted to the U.S. delegation at the Northern Committee meeting in Tokyo if they were to affect the formulation of their recommendations. (Attachment 3 is an April 2007 request to reschedule the Northern Committee meeting and a reply from Bill Robinson, National Marine Fisheries Service Pacific Islands Regional Administrator.)

The Council may also wish to develop conservation and management recommendations for the U.S. delegation to the fourth regular session of the WCPFC, scheduled for December 3–7, 2007, at this time. One of the Commissioner seats is designated for a Pacific Council member. Ms. Marija Vojkovich is being considered for Presidential appointment to this seat. Agenda Item B.1.a, Attachment 2, preliminary November Council meeting agenda, shows an agenda item to further refine recommendations to the WCPFC. This would be an opportunity to receive a report on the Northern Committee recommendations and comment on them in time for the December WCPFC fourth regular session, if the Council decides to keep this item on the November 2007 meeting agenda.

Council Action:

Review North Pacific Albacore stock assessment and develop recommendations to the U.S. delegation at the Northern Committee meeting and/or the WCPFC fourth regular session.

Reference Materials:

1. Agenda Item F.4.a, Attachment 1: Report of the Seventh Meeting of the International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean Plenary Session, 25-30 July 2007, Busan, Korea (*Printed excerpts; full document on CD-ROM and Web only*).
2. Agenda Item F.4.a, Attachment 2: Report of the Albacore Working Group Workshop, ISC, November 28-December 5, 2006, Shimizu, Japan (*on CD-Rom and Web only*).
3. Agenda Item F.4.a, Attachment 3: Letter to Bill Robinson and reply on scheduling of the WCPFC Northern Committee meeting.
4. Agenda Item F.4.c, HMSMT Report.
5. Agenda Item F.4.c, HMSAS Report.

Agenda Order:

a. Agenda Item Overview — Kit Dahl
b. Southwest Fishery Science Center Report — Paul Crone
c. Reports and Comments of Advisory Bodies
d. Public Comment
e. **Council Action:** Review Stock Assessment and Develop Recommendations to the U. S. delegation to the Western and Central Pacific Fisheries Commission (WCPFC)

PFMC
08/23/07

Agenda Item F.4.a
Attachment 1
September 2007

REPORT OF THE SEVENTH MEETING OF THE INTERNATIONAL SCIENTIFIC COMMITTEE FOR TUNA AND TUNA-LIKE SPECIES IN THE NORTH PACIFIC OCEAN

PLENARY SESSION

25-30 July 2007
Busan, Korea

TABLE OF CONTENTS

REPORT OF THE SEVENTH MEETING OF THE INTERNATIONAL SCIENTIFIC COMMITTEE FOR TUNA AND TUNA-LIKE SPECIES IN THE NORTH PACIFIC OCEAN

Busan, Korea
Plenary Session, July 25-30, 2007

LIST OF TABLES

LIST OF ANNEXES

REPORT OF THE SEVENTH MEETING OF THE INTERNATIONAL SCIENTIFIC COMMITTEE FOR TUNA AND TUNA-LIKE SPECIES IN THE NORTH PACIFIC OCEAN

Busan, Korea
Plenary Session, July 25-30, 2007

Highlights of the ISC7 Plenary Meeting

The ISC7 Plenary, held in Busan, Korea from 25-30 July 2007, was attended by delegations from Canada, Chinese Taipei, Japan, Korea, Mexico and the United States. The Plenary reached consensus on several important issues including stock status and conservation advice, as well as governance and data management procedures. Based on assessments carried out during the past year, recommendations regarding the reduction of fishing mortality rates for albacore and striped marlin were adopted. Plans for undertaking a Pacific bluefin tuna assessment in the next year were approved. Governance and operational procedures were updated and amended in the form of an Operations Manual which was approved by the members. Through discussion, data management procedures underwent continued development and improvement. The next Plenary will be held in July 2008 in either Japan or Chinese Taipei.

1 INTRODUCTION AND OPENING OF THE MEETING

1.1 Introduction

The ISC was established in 1995 through an intergovernmental agreement between the governments of Japan and the United States of America. Since its establishment and first meeting in 1996, the ISC has undergone a number of changes to its charter and name (from the Interim Scientific Committee to the International Scientific Committee) and has adopted guidelines for its operations. The two main goals of the ISC are to 1) to enhance scientific research and cooperation for conservation and rational utilization of the species of tuna and tuna-like fishes which inhabit the North Pacific Ocean during a part or all of their life cycle; and 2) to establish the scientific groundwork, if at some point in the future, it is decided to create a multilateral regime for the conservation and rational utilization of these species in this region. The Committee is made up of voting Members from coastal states and fishing entities of the region and coastal states and fishing entities with vessels fishing for highly migratory species in the region, and non-voting members from relevant intergovernmental fishery and marine science organizations, recognized by all voting Members.

The ISC provides scientific advice on the stocks and fisheries of tuna and tuna-like species in the North Pacific to the Member governments and regional fishery management organizations. The most recently available data for which complete statistics have been tabulated by ISC Members and reported for their fisheries operating in the North Pacific is 2005. The total landed amount was 643,568 metric tons (t) of the major species (albacore – *Thunnus alalunga*, bigeye tuna – *T. obesus*, Pacific bluefin tuna – *T. orientalis*, yellowfin tuna – *T. albacares*, skipjack tuna – *Katsuwonus pelamis*, swordfish – *Xiphias gladius*, striped marlin – *Tetrapterus audax*, and blue marlin- *Makaira nigricans*). This represents an increase in catch of just over 15% in comparison to 2004 data. In 2005 there were slight increases in Pacific bluefin and yellowfin tuna catches and swordfish catches, but the main contributor to the higher catches in 2005 was the increase in skipjack tuna catches from 243,128 t in 2004 to 328,146 t in the following year.

1.2 Opening of the Meeting

The Seventh Plenary meeting of the ISC was convened at 0900 on 25 July 2007 by the Chairman, G. Sakagawa. A role call confirmed the presence of delegates from Canada, Chinese Taipei, Japan, Korea, Mexico and the United States (U.S.) (*Annex 1*). Absent members were China, the Inter-American Tropical Tuna Commission (IATTC), the Secretariat for the Pacific Community (SPC) and the Food and Agriculture Organization (FAO). A Western and Central Pacific Fisheries Commission (WCPFC) representative attended as an Observer.

Deok-Bae Park, President of Korea's National Fisheries Research and Development Institute (NFRDI) officially welcomed the participants to Busan. He noted that this year marks the 50th anniversary of Korea's distant water fisheries, including the tuna longline fishery, and encouraged scientists in their important work toward providing conservation advice for the valuable tuna species that inhabit the North Pacific.

After some brief logistical announcements, the agenda for the meeting was tabled (*Annex 2*). S. Clarke was assigned lead rapporteur duties. Assistance was provided by J. Brodziak and K. Uosaki for Agenda Item 7 and G. DiNardo and Y. Takeuchi for Agenda Item 9.

2 ADOPTION OF AGENDA

One addition to the agenda involving a presentation by H. Honda regarding research on recruitment of Pacific bluefin tuna and opportunities for collaboration was proposed. The Chairman suggested this presentation could be scheduled between Agenda Items 8 and 9. With this change the agenda was adopted.

3 DELEGATION REPORTS ON FISHERY MONITORING, DATA COLLECTION AND RESEARCH

3.1 Canada

M. Stocker presented a summary of catch, effort, and catch per unit of effort (CPUE) data for the Canadian North Pacific albacore tuna fishery in 2006 (*ISC/07/PLENARY/04*). The Canadian fishery for albacore in the North Pacific is a troll fishery using tuna jigs. All Canadian vessels must carry logbooks while fishing for highly migratory species in any waters. Detailed analysis of a combination of sales slips, logbooks, phone-in and transhipment records are undertaken to report fisheries statistics for the Canadian albacore fishery.

In 2006, 171 Canadian vessels operated in the North Pacific Ocean and caught 5,819 t of albacore in 6,239 vessel days (v-d) of fishing for a CPUE of 0.93 t/v-d. Estimates for 2006 are considered preliminary. Both catch and CPUE have followed an increasing trend over the period 1995-2004 and then dropped in 2005. The catch and CPUE increased from 2005 to 2006. Almost all of the 2006 catch was taken within 200 miles of the North American coast. Access by Canadian albacore vessels to waters in the US Exclusive Economic Zone (EEZ) is governed by a US-Canada albacore treaty.

In terms of research activities, a project to document the existing relational database for the Canadian Pacific albacore catch and effort data has been completed. A technical report has been published and is available at http://www.dfo-mpo.gc.ca/Library/327827.pdf. The report describes the design of the entire database (including trip log, sales slip and hail components) based on a Venn diagram concept, and includes a figure that documents the structure of the relationships between these components.

Discussion

A question was raised regarding the reason for the continued increasing trend in CPUE in the albacore troll fishery. M. Stocker replied that this could be explained by the fact that the most skilled fishermen remain active in the industry. This creates a situation where the catch rate is increasing while the total catch and effort are decreasing.

3.2 Chinese-Taipei

Shyh-Jiun Wang presented the report for Chinese Taipei (*ISC/07/PLENARY/05*). There are two major Chinese Taipei tuna fisheries operating in the North Pacific. Distant water longliners (DWLL) >100 GRT usually operate in the high seas or under license in foreign EEZs. Offshore longliners (OSLL) are smaller than 100 GRT and generally operate in the waters of Chinese Taipei.

The number of DWLL vessels operating in the Pacific Ocean in 2005 was 133, but reduced to 117 in 2006. Catches of albacore in the North Pacific were estimated at about

4,000 t per year in 2004-2006, whereas Pacific bluefin tuna catches have been < 1 t per year since 2000. Catches of swordfish were <100 t before 2000, increased to more than 1,000 t in 2001 to 2003 due to increasing fishing efforts for bigeye tuna, but then declined to <1,000 t in 2004 to 2006. Most Chinese Taipei DWLL vessels operate in the North Pacific from September to the following March, then shift to the South Pacific to target southern albacore from April through August.

The OSLL vessels generally target bigeye tuna and yellowfin tuna with considerable swordfish and marlin bycatch. OSLL catch of albacore is 100-900 t since 2000. Catches of Pacific bluefin tuna peaked at 3,000 t in 1999 and reduced to a level of 1,500-2,000 t after 2000. The catch of swordfish was 1,813 t in 2005 and estimated at 2,587 t for 2006. These catch estimates do not include landings in frozen form. From logbooks collected between 2002 and 2005, it was observed that fishing activities have been primarily located in the area of 110 to 150^{o}E and 10-30^{o}N, i.e. in waters southeast of Chinese Taipei and northeast of the Philippines.

Size frequency data on major tuna and tuna-like species caught by DWLL and OSLL fisheries in the North Pacific region are available from 2004-2006. For DWLL fisheries, the catch size data is recorded in logbooks. For OSLL fisheries, the data were collected from port sampling in domestic tuna fishing ports under a sampling program begun in 1997. Port sampling was carried out in Pago Pago (American Samoa), Suva and Levuka (Fiji) in 2005 and American Samoa in 2006. An observer program was launched in 2001 and included 2 North Pacific trips in 2004-2005 and 3 North Pacific trips in 2006. VMS has been mandatory for all DWLLs operating in the Pacific since June 2004. VMS data are used to verify logbook data. National Taiwan University (NTU) has conducted stock assessments for swordfish and sailfish, and is currently undertaking a stock assessment of blue marlin. Biological studies are in progress on black and striped marlin and a billfish tagging program has been undertaken.

Discussion

Chinese Taipei delegates were asked about their efforts to improve data coverage and quality. R.F. Wu responded that in the past Category I catch data had relied on agent and trade slips only but that now logbooks and VMS records are being used to cross-check these data. Finer scale Category II data will be similarly cross-checked but the data for 2006 are still considered preliminary.

Clarification was requested as to the coverage of the catches reported in Table 1 of the Chinese Taipei national report and specifically whether catches landed in frozen form and foreign landings were included. R.F. Wu responded that frozen catch from OSLLs is difficult to classify by fishing ground since it may have come from the Indian Ocean. Chinese Taipei officials hope to be able to better deal with this issue in the future. Nevertheless, Chinese Taipei delegates consider that DWLL catches are not affected by this issue, and OSLL catches are not drastically affected because the frozen catch in the North Pacific is not very large.

A question was raised regarding the plans to increase North Pacific observer coverage in the future. This issue is still under discussion by Chinese Taipei authorities but efforts to increase the observer coverage will continue.

In response to a request for more details on the billfish tagging program, C.L. Sun replied that this research was conducted by the National Taiwan University in conjunction with the Fisheries Research Institute and Fisheries Agency. However, now that it is becoming an important research program, it will be taken over by the Fisheries Research Institute. Results have been good thus far and there are plans to add black and striped marlin to the program. Opportunities for collaboration are available.

The Plenary Chairman reminded the delegates that the report falls short of the ISC requirements because it implies that there are only two fisheries for tuna and tuna-like species. In reality, other coastal gears are being deployed and should be covered in a more comprehensive report. Complete information on billfishes taken by all fleets is also required. The Chairman noted that this comment was also raised last year.

Clarification of the coverage rate for the DWLL catch records was requested. R.F. Wu replied that the coverage rate is >80%. Chinese Taipei delegates were then asked to explain how it had been possible to incorporate the requirement to measure fish into their logbook regulations. R.F. Wu replied that it was a requirement to measure the first 30 fish caught each day regardless of species. Tunas are measured from snout to fork; billfish are measured from lower jaw to fork. As mentioned in the presentation, there is some port sampling and though this began only 3 years ago it has already been expanded to Mauritius and Trinidad-Tobago, and will be further expanded with the hiring of 17 new government employees with college degree assigned to domestic port sampling. It was pointed out, however, that under the current system there is no way to validate the fishermen's measurements with those of independent observers and this should be considered as an essential element of the port sampling in the future. Another suggestion was made to weight the length frequency data in Figure 3 by catch since this might reflect a different distribution than that shown by the un-raised length frequencies in Figure 3.

3.3 Korea

S.D. Hwang presented the national report for Korea (*ISC/07/PLENARY/11*). From 1995-2006 the annual total catch of fishes captured by the Korean distant-water longline fleet in the North Pacific ranged between 11,403 and 27,212 t (average 17,818 t). In 2006, the annual catch increased compared to recent years to 19,711 t compared with recent years. Major species caught by longlines in the North Pacific were bigeye tuna (11,152 t, 57%) and yellowfin tuna (5,079 t, 26%) in 2006. The catch of Pacific bluefin tuna was negligible.

Most Pacific bluefin tuna produced by Korea were by-catch in the domestic purse seine fishery targeting mackerels. The annual catch of Pacific bluefin tuna by 33 purse seiners and 4 trawlers fluctuated in 2001-2006 between 591 and 1,005 t. In 2006, the monthly catch was highest in the months of April (248 t, 30%) and August (285 t, 34%). In

Korean coastal areas, most Pacific bluefin tuna are small individuals of 26-100 cm fork length (FL). The 40-50 cm FL size class dominated in 2006 whereas the 50-60 cm FL class dominated in 2004 and 2005. Catches of Pacific bluefin tuna were mainly taken in the southern coastal waters of Korea near Jeju and Tsushima Islands. The distribution of Pacific bluefin tuna catch appears to depend on the distribution of the fishery fleet's target species and the degree of biological interaction among Pacific bluefin tuna, mackerels and squids.

NFRDI initiated an international fisheries observer program for distant-water fisheries in 2002. In 2006, nine observers were deployed on Korean fishing vessels. To reduce numbers of seabird and sea turtle by-catch in the tuna longline fishery, guidebooks and posters summarizing information on these species were distributed to fishing boats including tuna longliners.

Discussion

Several technical questions were raised regarding the data presented. In response Korean delegates replied that:

- data for "white marlin" is actually data for "black marlin";
- due to delays in compiling data 1-3 years are required to finalize the catch figures;
- the mackerel species being targeted by purse seines are the same species as those targeted in Japan;
- the observed relationships between Pacific bluefin tuna abundance and oceanographic conditions were based on surface water temperature data;
- there are no size data available for billfishes even though the flying squid gill net fishery may have caught billfishes as bycatch;
- the original information underlying Table 1 is collected in both number and weight; and
- Korean purse seiners use general purpose purse seine nets for targeting small pelagic fishes which have not been modified to target Pacific bluefin tuna.

Several data requests were raised including provisions of catch-by-size for Pacific bluefin tuna caught by the Korean purse seine fishery, and data similar to those in Table 1 but for billfish so that average weights can be calculated. To the latter request, D.H. An replied that since the Korean longline fishery is targeting yellowfin tuna and bigeye tuna they may not have data for billfishes.

A final question pertained to why Figure 2 shows a considerable change in fork length (FL) of Pacific bluefin tuna from 2000-2006 and whether this could indicate a change in fishing grounds. After discussion by the group it was concluded a change in fishing grounds was unlikely. Instead, the increase in sample size from <500 to nearly 5,000 was probably responsible for the change. S.D. Hwang noted that it is probably unrealistic to expect that the entire size range of Pacific bluefin tuna could be sampled from a fishery in which this species is not a target species.

3.4 Japan

The national report for Japan was presented by H. Yamada (*ISC/07/PLENARY/09*). Japanese tuna catches are collected by three major fisheries, i.e. longline, purse seine, pole-and-line, as well as other miscellaneous fisheries like troll, drift net and set net fisheries. Total landings of tunas, swordfish and billfishes in the Pacific Ocean were 543,000 t in 2005.

Total catch of longline vessels smaller than 20 GRT has continuously increased since the 1980s, and was 30,000 t in 2005. The effort of this fishery was relatively stable in the 1980s, but increased after that. The total catch and effort of longline vessels larger than 20 GRT was stable until 1990, but both catch and effort have shown decreasing trends since then. The total catch was 45,000 t in the North Pacific in 2005. Bigeye tuna has been the dominant species in the landings.

Total catch of the purse seine fishery in the waters north of 20ºN was variable during the documented period, ranging from 23,000 t to 102,000 t, and was 80,000 t in 2005. Skipjack tuna (skipjack) dominates in purse seine catch, followed by Pacific bluefin tuna and yellowfin tuna. The effort of this fishery was highest in the mid 1980s (> 4,000 sets) but has been about 2,500-3,000 sets in recent years.

Total catch of the offshore and distant water pole-and-line fishery in the waters north of 20ºN was variable ranging from 90,000 t to 199,000 t, and was 120,000 t in 2005. Skipjack and albacore dominate the pole-and-line catch. The effort of this fishery decreased during the 1980s due to a decrease in the number of vessels, but it has been relatively stable since the early 1990s.

The annual catches of Pacific bluefin tuna have been stable at an average of 13,000 t since 2000, except for a high catch of 21,000 t in 2005. Purse seines have the largest catches of Pacific bluefin tuna with a catch of 7,100 t in 2006. The catch of albacore by longline was 17,000 t in 2006. This catch is similar to the catch in 2005 which is the lowest level in the last decade. This is due to substantial reductions in the number of large longline vessels due to economic circumstances. Swordfish catch by offshore and distant water longliners in 2005 (5,714 t) in the North Pacific showed a 9% increase from that in 2004.

Research cruises for bigeye tuna and blue marlin tagging, research on early life history of tunas, and testing of bycatch mitigation measures in longline fisheries were conducted by the National Research Institute of Far Seas Fisheries. Tagging studies using conventional tags, archival tags and pop-up archival tags are carried out for many kinds of tunas and tuna-like species. Studies of biological parameters for skipjack and Pacific bluefin tuna were also conducted.

Discussion

In response to a question, K. Uosaki noted that preliminary results from the 2007 albacore pole and line fishery showed that the catch was more than 20,000 t, therefore an increase over the catch values from the past 2 years. However, the skipjack fishery is performing poorly this year.

Various technical questions relating to data and research were also raised. Clarification was requested regarding the size difference between bigeye tuna caught in temperate versus tropical areas. N. Miyabe confirmed that modal size (100 cm versus 120 cm FL) and average weight (30 kg versus 50 kg) were lower in temperate waters compared to tropical waters but he considered this might be due to a seasonal difference rather than location alone. Further details on the testing of mitigation measures were requested to be released so they can inform potential actions by WCPFC. These details are provided in the report of the Bycatch WG. A request was also raised for provision of data on the number of active vessels rather than just the registered number of vessels. This could indicate whether or not a smaller number of vessels are using a greater number of hooks. N. Miyabe considered that this issue was complex due to vessels moving from area to area and thus there was a potential for double-counting. VMS will be in place soon and may help to address this issue. However, since the scientific standard unit is number of hooks, the absence of data on the number of vessels should not impede assessments. When asked whether previous work on age 0 skipjack was continuing, it was confirmed that additional sampling was conducted west of the Marianas and south of the Federated States of Micronesia last year and analysis is underway.

A request was made to coordinate on future tagging studies with WCPFC. Because of its limited research budget, Japan welcomes such collaboration and has coordinated with SPC in the past. It was suggested that this issue can be discussed at the WCPFC Scientific Committee Meeting next month.

3.5 Mexico

M. Dreyfus presented the Mexican national report (*ISC/07/PLENARY/10*). The tuna fishery of Mexico developed to its present size in the 1970s when Mexico implemented its 200 mile EEZ. Catch is dominated by yellowfin tuna, and to a lesser extent skipjack. Since the beginning of Pacific bluefin tuna farming on the west coast of the Baja California peninsula, this species is also a target. The fleet is mainly composed of purse seine vessels with concessions to catch all tuna species. Pacific bluefin tuna farming is undertaken by Mexican as well as foreign investment companies, but Pacific bluefin tuna for farming must be caught by the tuna fleet. Although the number of farms is stable, there have been record catches in 2004 and 2006. Therefore these fluctuations are related to environmental conditions.

All vessels above 363 tons of carrying capacity have observers on board (from both IATTC and Mexican observer programs). In the case of the national program, sampling is routinely performed on board for yellowfin tuna and since 2005 also for Pacific bluefin tuna. The number of vessels and the capacity of the fleet are stable.

In the case of the swordfish fishery, there are less than 30 vessels operating off the west coast of the Baja California peninsula using gillnets as well as longlines. They are allowed to operate only outside a zone of 50 miles from the coast within which billfishes are reserved for the sport fishing fleet. Billfishes are more important for sport fishing activity, mainly located in the states of Baja California Sur and Sinaloa. Increases in sport fishing effort have been observed particularly in Cabo San Lucas. The catch and release rate in sport fisheries is estimated to be 75%.

Discussion

In the discussion it was confirmed that since all billfishes are reserved for the sport fishery within a zone of 50 nmi from the coast, the research programs conducted by the INP through monitoring the fishery are the main source of scientific information on these species, as long as they are the target species. All available catch, size and weight data have been reported to the swordfish and marlin WGs. Catches of Pacific bluefin tuna in 2006 were the highest on record and it appears 2007 will show a mid-range catch. However, since yellowfin tuna is also relatively scarce this year, there may be re-direction of effort to other species such as Pacific bluefin tuna as happens in years in which tropical tuna catches are low. Nevertheless, Pacific bluefin tuna fishing grounds are located to the north of the yellowfin tuna fishing grounds, therefore this deters some of the vessels which are searching for yellowfin tuna from shifting to the Pacific bluefin tuna fishing grounds. The area west of Baja California appears to be a productive area for both Pacific bluefin tuna and sardines and there is a predator-prey connection. Although 80% of the Pacific bluefin tuna catch is sent to the farms, M. Dreyfus confirmed that the rise in catches was not due to an expansion of the industry but instead due to an increase in availability of the resource. Those interested in more information about the Pacific bluefin tuna pen-rearing industry were referred to the report of the Pacific bluefin tuna WG.

3.6 United States of America

W. Fox presented the United States (U.S.) national report on behalf of A. Coan who could not attend the meeting (*ISC/07/PLENARY/06*). Various U.S. fisheries harvest tuna and tuna-like species in the North Pacific. Large-scale purse seine, albacore troll, and longline fisheries operate both in coastal waters and on the high seas. Small-scale gill net, harpoon, and pole-and-line fisheries and commercial and recreational troll and handline fisheries usually operate in coastal waters. Overall, the range of U.S. fisheries in the Pacific is extensive, from coastal waters of North America to Guam and the Commonwealth of the Northern Mariana Islands (CNMI) in the western Pacific, and from the equatorial region to the upper reaches of the North Pacific Transition Zone.

In U.S. Pacific fisheries for tunas and billfishes, fishery monitoring responsibilities are shared by the National Marine Fisheries Service (NMFS) and by partner fisheries agencies in the states of California, Oregon, Washington, Hawaii, and territories of American Samoa, Guam, and the CNMI. On the federal side, monitoring is conducted by the Southwest Regional Office (SWRO) and the Southwest Fisheries Science Center (SWFSC) in California and the Pacific Islands Regional Office (PIRO) and the Pacific Islands Fisheries Science Center (PIFSC) in Hawaii.

U.S. government research on tunas and tuna-like species of the North Pacific Ocean is shared between the SWFSC and PIFSC. Studies are largely carried out from laboratories in La Jolla, California for the SWFSC and in Honolulu, Hawaii for the PIFSC, and in collaboration with scientists of other government or university institutions, both in the U.S. and abroad. Both Centers have studies devoted to stock assessment, biological and oceanographic research, and fishery management issues, but each Center concentrates on different species and fisheries in order to minimize duplication.

Discussion

Further clarification on a proposed Pacific bluefin tuna tagging project was provided. The plan is for NMFS to hire the vessel and use the sales proceeds from non-tagged fish to offset the cost of the hire. The tagging will be conducted in conjunction with a Mexican farming operation but will take place in U.S. waters. The program is designed to take place at the end of the Pacific bluefin tuna season with the intended result that the tagged individuals will remain at liberty for some time (i.e. perhaps until the start of the next fishing season). Whether this occurs will depend on the degree to which tagged individuals move, but there is believed to be little effort on Pacific bluefin tuna in U.S. waters. This program differs from NMFS collaboration with the TOPP program because TOPP mostly deploys archival tags.

A question was raised as to why the U.S. purse seine fleet is catching a larger percentage of bigeye tuna than other purse seine fleets, e.g. most purse seiners, including Korea vessels very similar to U.S. vessels catch 6-7% bigeye tuna whereas the U.S. purse seiners catch around 10% bigeye tuna. Potential differences such as more setting on fish aggregating devices (FADs) or floating objects by the U.S. fleet, or use of helicopters by the U.S. fleet were discussed. However, it was concluded that the market value/prices, yield, species composition and abundance, and changes in fishing grounds, could also play a large part in determining catch rates. Furthermore, a species composition of >10% bigeye tuna is not unusual. In any case the U.S. purse seine fleet is shrinking and may soon reach an economic tipping point where fuel prices outweigh returns. Many of the vessels which have already left the fleet have been sold and moved into other fishing grounds such as the eastern Pacific.

There was also a discussion concerning the targeting strategy of the Hawaii longline fishery and why it appears to have shifted from albacore to bigeye tuna. It was clarified that the Hawaii longline fishery has always mainly targeted bigeye tuna but that a small portion of the fleet targeted swordfish and a subset of these targeted albacore. However, due to recent effort restrictions on swordfish effort, there is almost no albacore targeting occurring now. The hypothesis that the Hawaii longline fleet has shifted from albacore to bigeye tuna because of decline in albacore stocks is also not supported by the constancy of catch per unit effort in the U.S. albacore troll fishery.

4 REPORT OF CHAIRMAN

The Chairman reported that the Committee made progress in advancing research required to meet the objectives of the Committee. Since the Sixth Plenary Meeting in 2006, the ISC held eight working group workshops, completed two full stock assessments (albacore and striped marlin), developed work plans for completing full assessments for Pacific bluefin tuna and swordfish by 2010, concluded an agreement with the WCPFC for providing scientific advice to the Northern Committee of the WCPFC, prepared a penultimate draft of the ISC Procedures Manual, and completed a long list of action items identified by the Sixth Plenary.

Despite this significant progress, further gains are needed and at a more rapid pace than to date. Members were reminded that through cooperation, collaboration and increased investment of resources, this challenge can be effectively addressed. Cooperation, such as collection and exchange of complete and timely fishery statistics is required. Collaboration, such as full support of working group activities including participation in workshops is essential. Investment of resources, such as dedicated national budgets for projects listed as research gaps in working group reports needs to be made. Priority activities for the next two years should include supporting tasks required to complete full stock assessments for Pacific bluefin tuna and North Pacific swordfish; updated stock assessments for albacore and striped marlin; providing the resources and developing the infrastructure for a fully capable ISC data and information management system; upgrading the website to meet expanding needs; and increasing the scientific capacity of the members to address growing ISC stock assessment needs.

The Chairman thanked the members for supporting ISC activities during the past year, and looked forward to continued support in the coming year. He also thanked the working group Chairmen and active members of the working groups for their contributions to the progress made by the Committee during the year, especially in expanding the scientific knowledge on the biology, fisheries and stock condition of highly migratory species in the North Pacific Ocean.

5 INTERACTION WITH REGIONAL ORGANIZATIONS

5.1 Activities relating to WCPFC

S.K. Soh introduced the issue of the relationship between the ISC, the Northern Committee (NC) and the WCPFC's Scientific Committee (SC) with regard to northern stocks. According to the Memorandum of Understanding (MOU) between the ISC and the WCPFC, the ISC will provide scientific information and advice on the northern stocks to the WCPFC, the NC and the SC. Under the current agenda, both the NC and the SC will consider northern stocks at each of their regular sessions. In order to promote efficiency and cost-effectiveness of the WCPFC's work, the WCPFC Secretariat has prepared a discussion paper suggesting a review of the roles and responsibilities between the ISC, the NC and the SC in respect to the northern stocks (*WCPFC-SC3/GN WP-4*). This paper outlines 3 options as follows:

Option 1: The SC and NC will receive the same information on the northern stocks (currently swordfish, Pacific bluefin tuna and albacore but the issue of including striped marlin is under discussion), and other stocks as requested, by the NC from the ISC Plenary. This is the current situation. If the SC has opinions they may voice them to the NC and the NC will ask the ISC for clarification. The SC or the NC may request an independent assessment of the advice provided, if considered necessary.

Option 2: The NC provides management advice to the WCPFC regarding species in the list of 'northern stocks' based on the ISC's advice. The SC would only cover those species not formally identified in the list of 'northern stocks'.

Option 3: The SC reviews the details of the ISC work and reports it to the NC and the WCPFC for management decisions. This will duplicate the work of the ISC at the SC meeting.

It was acknowledged by S.K. Soh that Option 3 is not practical. The ISC was invited to provide any views on the proposed agenda item at the upcoming SC meeting in August 2007.

Discussion

All agreed that given the lack of staff capacity and research budgets in this field that duplication and redundancy should be avoided as a matter of priority. It was noted that the MOU between the ISC and the WCPFC which lays out procedures very similar to those in Option 1 was practical and could provide useful guidance. However, concerns were expressed regarding the process by which the SC would review the work of the ISC under Option 1, particularly given the extensive nature of the documentation produced by the ISC WGs, and the resource and timing implications for WCPFC should they decide to call for an independent review of the assessment(s). A related concern was voiced regarding the three-channel provision of ISC advice under Option 1 and its potential to create confusion or stalemate.

As an alternative, a fourth option was suggested in which the SC would nominate a representative to participate in the ISC WG assessments throughout the process. When the assessment is complete and provided to the SC, the representative would then be called upon to endorse the results to the SC or call for further review. It was acknowledged that this fourth option would create resource demands for the WCPFC but these demands are relatively minor compared to the demands triggered by a call for full-scale re-assessment. It was also pointed out that the WCPFC is routinely invited to participate in the ISC WG assessments which are scheduled to avoid other major RFMO activities. It may be necessary to formalize procedures through which the WCPFC is invited to participant under the fourth option, in order to specifically create the role of a "qualified representative".

The discussion concluded with consensus that the issue is complex and a decision should not be rushed. Several options under consideration, as well as potentially other options which have not yet been developed, appear to be viable. It was agreed that the best solution would need to promote efficiency, continue the sound science embodied in the ISC WG assessments, protect the interests of all members, and maintain productive relationships between all interacting RFMO bodies.

5.2 Activities relating to PICES

The Plenary Chairman called to the attention of the group that the PICES 16th annual meeting will be held in Victoria, Canada on Oct 26th to Nov 5th. PICES has invited the ISC to send a representative to speak about potential collaborative research and the ISC needs to respond to this invitation. No honorarium or travel funding can be made available but if members are interested in attending PICES as the ISC representative they should notify the Chairman. In a related note, members were also urged to consider attending the WCPFC SC meeting in Honolulu to be held 13-24 August.

6 REPORTS OF WORKING GROUPS

6.1 Albacore

M. Stocker presented a summary of the ISC Albacore Working Group (ALBWG) activities since the 6th ISC Plenary. The total catch of North Pacific albacore for all nations combined peaked at a record high of about 125,000 t in 1976, then declined to a low of about 37,000 t in 1991. In the early 1990s, catches increased again, peaking in 1999 at 125,000 t, and averaged about 88,000 t since the early 2000. The 2005 catch of about 62,000 t was the lowest observed since the early 1990s. During the past five years, fisheries based in Japan accounted for 66% of the total harvest, followed by fisheries in the United States (16%), Chinese Taipei (8%) and Canada (7%). Other countries targeting the North Pacific stock contributed 3% to the catch and included Korea, Mexico, Tonga, Belize, Cook Islands, and Ecuador. While various fishing gears have been employed over the years to harvest albacore in the North Pacific, the main gears used over the last five years were longline (36%), pole-and-line (37%), and troll (22%). Other gears used since the mid-1990s included purse seine, gill net, and recreational fishing gears, which in combination accounted for roughly 5% of the total catch of albacore from the North Pacific.

A Stock Assessment Task Group workshop was convened at the Pacific Biological Station in Nanaimo, B.C. July 13-17, 2006 for the purpose of data preparation for the full ISC ALBWG stock assessment workshop. The report of the Stock Assessment Task Group workshop is included in *Annex 5*.

The ALBWG stock assessment workshop was held at the National Research Institute of Far Seas Fisheries (NRIFSF) in Shimizu, Shizuoka, Japan from November 28 to December 5, 2006. A total of 16 participants from Canada, Japan, and the U.S. attended the workshop; regrettably there were no participants from Mexico, Chinese Taipei, IATTC and SPC. The charge for the workshop was to complete a full assessment of the North Pacific albacore stock with data from 1966 to 2005, and to develop scientific advice on biological reference points for consideration of management action and for recommending action. In addition to conducting a full assessment, the workshop reviewed recent fisheries, reviewed biological studies, considered alternative stock assessment models, made research recommendations, updated the work plan for 2007, and discussed administrative matters. The workshop report is included in *Annex 5*.

The time and place for the next ALBWG workshop is planned for early 2008 in La Jolla, California, U.S. The objectives of the workshop will be to: (1) update the catch (Table 1) to 2007; (2) conduct a thorough evaluation of the abundance indices; and (3) conduct further assessment modeling work using the Stock Synthesis-II (SS-II) model, with the goal of presenting sometime in 2008 a baseline model that can be used to develop WG-related consensus concerning the status of the albacore population in the North Pacific Ocean. Further efforts will be needed to ensure input data (time series) are the best available, and model assumptions and related parameterization issues are appropriate. It is expected that this work will be completed sometime in mid-2008 and presented at the ISC ALBWG workshop to be held in conjunction with the 8th meeting of the ISC Plenary in 2008. The next full assessment for North Pacific albacore will be carried out in 2009.

Discussion

A question was raised regarding the data available for incorporating estimates of Illegal, Unregulated and Unreported (IUU) fishing into the stock assessment models. A particular problem could be that if the number of active vessels is unknown, the number of vessels potentially engaged in IUU would be nearly impossible to estimate. M. Stocker agreed that these are important issues to consider and noted that the WG had yet to tackle them fully.

The Plenary Chairman then asked for a review of the ALBWG's progress against the action items that had been agreed last year. The main actions items pertained to commitments to review and rescue data from the early 1950s through the mid 1970s. M. Stocker replied that data starting in 1966 had been rescued and used in the assessment, thus extending the historical extent of the assessment backward from 1975 by 9 years. However, it was explained that problems had been encountered when attempting to rescue data from 1952-1966 since these data were mostly limited to annual catch values and were not useful for the kind of fine-scale assessment models being run by the ALBWG. In addition, much of these early data have problems with species identification. Therefore, in this case there is a trade-off between the length of the data series and its quality. Members were referred to the ALBWG report for detailed discussions of these issues. While members agreed there may be ways to work around these data deficiencies and still extend the historical extent of the model, it was also deemed important to continue efforts to rescue these data.

6.2 Pacific bluefin tuna

Y. Takeuchi, Chairman of the last two workshops of the Pacific Bluefin Tuna Working Group (PBFWG), summarized the efforts since the last Plenary meeting including a summary of the two PBFWG workshops held during this period. Catch of Pacific bluefin tuna fluctuated from a low of 8,500 t in 1990 to a peak catch of 38,000 t in 1956. Recent five-year (2002-2006) average catch is about 22,000 t, nearly the same as the historical average. Japanese catch continues to consist of about half or more of total Pacific bluefin tuna catch. In addition, the U.S. fishery caught substantial amounts of Pacific bluefin tuna until the 1980s. Mexico and Chinese Taipei have increased their catches in recent years although they remain relatively smaller than those of Japan. In response to a request from the Plenary in 2006, the current catch database held by the PBFWG was expanded to include the catch of New Zealand longline vessels operating in their EEZ. At the two intercessional workshops since the last Plenary, the WG have made significant progress in addressing both data gaps and model uncertainties. This work involved:

- Age and growth study from otoliths by scientists from Japan and Chinese Taipei;
- Comprehensive review of historical size data;
- Estimation of historical quarterly catches for the stock assessment model;
- Review of historical Japanese longline CPUE;
- Review of Pacific bluefin tuna catch in the pre-assessment period;
- Review of alternative stock assessment models (i.e. SS-II).

The PBFWG developed a schedule of intercessional workshops to complete a full stock assessment by the next ISC Plenary meeting. A workshop dedicated to data preparation and model development will be held from 11-18 December 2007 in Shimizu. That will be followed by a stock assessment workshop from May 28-June 4 2008. Key stock assessment scientists will meet one week before (21-27 May 2008) the assessment. This will ensure that preparations are in order for the assessment.

<u>Discussion</u>

Once again the discussion focused on progress of this WG with regard to previously agreed action items. Y. Takeuchi clarified that progress had been made with regard to obtaining relevant data from non-member countries including receipt of data from New Zealand and communication with the SPC regarding additional data. The Plenary Chairman acknowledged that originally there had been a desire to fast track the Pacific bluefin tuna stock assessment but that ultimately it was decided that more time was necessary to assemble the correct data. For this reason, the stock assessment is scheduled for completion in May-June 2008.

The IATTC requested that the assessment be held earlier to allow its staff to avoid workload conflicts in May and to allow IATTC to present the findings to peer review before its annual meeting in June. While members were sympathetic to IATTC's scheduling issues and appreciated IATTC's sincere interest in participating in the assessment, there was general agreement to support the Pacific bluefin tuna WG in its desire to adhere to the original schedule. The Plenary Chairman will contact R. Allen of the IATTC and inform him of the decision.

6.3 Marlin and Swordfish

G. DiNardo, Chairman of the Marlin, summarized the efforts of the Marlin (MARWG) and Swordfish (SWOWG) working groups since the last Plenary including a summary of the three joint MARWG-SWOWG workshops held during this period. Workshop goals included the review and update of fishery statistics, agreements on stock structure scenarios, estimation and agreement on standardized CPUE time series, and completion of a striped marlin stock assessment. In addition, the WGs discussed the need and timing for a World Swordfish Meeting which was identified as an action item for the SWOWG at the 2006 Plenary.

Significant progress was made to facilitate the goals, including the updating of Category I, II, and III data and standardization of CPUE time series. A request for Category I, II, and III data for all billfish caught by member countries in the North Pacific was approved by the WGs, and these data were submitted to the WG Chairmen. While significant improvements in catch statistics have occurred, most notably for the fisheries of Mexico and Chinese Taipei, further improvements from other member countries is still needed. A striped marlin stock assessment was completed and conservation advice proffered.

Administrative matters were presented including a proposal to merge the MARWG and SWOWG into a single Billfish WG (BILLWG). The rationale for this proposal was outlined to Plenary members, and a decision on the proposal was requested. Elections for WG Chairmen were also conducted and it was agreed that if the ISC Plenary supports the establishment of the BILLWG, then one chairman should be elected. Nominations were taken and a vote conducted, with Chinese Taipei, Mexico, Japan, and the USA all voting for the election of G. DiNardo as Chairman of the BILLWG. A proposed assessment schedule was presented which included the completion of a North Pacific swordfish stock assessment in July 2009 and a Pacific-wide blue marlin stock assessment in July 2010. It was pointed out that a collaborative approach will be required to complete the blue marlin assessment and efforts are currently underway to establish the necessary collaborations. The WG's recommendation for dealing with the requirement of a World Swordfish Meeting in 2008 was presented, and concurrence from the Plenary sought. Proposed dates and venues for upcoming intercessional workshops were presented and they include January 15-23, 2008, possibly in Hawaii, USA, and June 2008 in Hokkaido, Japan.

Problems impinging on the ability of the WG to complete it's goals were presented, including the lack of (1) sufficient data in the ISC database and (2) continued participation at WG workshops by member countries. Possible solutions to the problems were presented and guidance from the Plenary sought. Finally, it was pointed out that many of the WG's goals were achieved and that their successful completion is linked directly to the commitment and dedication of scientists from the member countries and organizations.

Discussion

The Plenary Chairman commended the MARWG and SWOWG for their excellent progress. Members agreed with the recommendation and rational of the WG to combine the MARWG and SWOWG into a single BILLWG. It also endorsed the election of G. DiNardo as the Chairman of this BILLWG.

Through discussion it was clarified that a special session on swordfish is being proposed for the World Fisheries Congress (WFC) in Yokohama in October 2008. Plans for a multi-day World Swordfish Symposium would be postponed until after the swordfish stock assessment workshops in May-June 2008. The WFC session would focus on resolving issues of stock structure for the Pacific. Members expressed support for the proposal to hold the special session at the WFC.

The possibility of accelerating the schedule of the planned assessment was discussed. However, the statistics currently in the ISC database are so incomplete that considerable time will be required to assemble the necessary data. It is therefore practically impossible to have a swordfish assessment ready for the July 2008 Plenary, although there will be stock condition determination conducted in Japan in June 2008 that will be reported to the July 2008 Plenary.

Related issues of capacity building through participation in WG workshops and data sharing to allow members to use WG data to test their own models were raised. It was clarified that members are strongly encouraged to participate in assessment WGs from the very beginning of the process to not only contribute data but to build capacity within their own staff. One of the early tasks of the WG will be to select the best model or models for the assessment and full participation in such exercises is encouraged. After model(s) have been selected, there is no prohibition on running other models for comparison but this should be done within the context of the WG workshops with the data being actively used in that workshop.

The final discussion point involved evaluating progress against the previously agreed Action Items. With reference to document *ISC/07/PLENARY/01*, the SWOWG accomplished all three of its action items and the Plenary Chairman considered that the MARWG had also undertaken all of the required actions.

6.4 Bycatch

G. DiNardo substituted for C. Boggs in presenting the report of the Bycatch Working Group (BCWG). The BCWG held an intercessional workshop from May 2-5, 2007 in Honolulu, Hawaii attended by scientists from Chinese Taipei, IATTC, Japan, Mexico, and the U.S. Members reviewed the WG Terms of Reference developed at the previous workshop and agreed that the WG would focus on highly migratory species (HMS) and their fisheries, specifically on fisheries interactions with sea turtles, seabirds, and sharks. In particular, the review of bycatch stock status would be a recurring group activity, but the group would not actually conduct assessments due to lack of expertise. Since the group provided a broad summary of bycatch stock status last year, it focused on new topics in 2007. One objective was to review bycatch estimates for HMS fisheries, but most attendees only had data on sea turtles or seabirds. Substantial data on shark catches may be forthcoming from several members, but an issue is whether or not these represent bycatch or targeted catch.

Methods for producing bycatch estimates were reviewed, beginning with the need for observer programs. The value of systematic observer sampling for producing unbiased estimates of fleet-wide bycatch was emphasized, as was the need to understand different operational styles that can greatly influence bycatch rates. Past attempts to produce global and Pacific estimates of longline sea turtle bycatch were reviewed and deemed unreliable. The extent of observer coverage was summarized, and with one exception (U.S.), past coverage was considered too low to provide useful bycatch data. However observer programs are being initiated or expanded by several members.

The WG requests guidance from the ISC Plenary as to whether the WG should examine only those fisheries targeting HMS in the North Pacific or should it also examine other fisheries which may interact with the same bycatch species of concern to the WG. The participants discussed this issue but could not reach consensus. Most participants believed that the WG's role is to examine just those fisheries which target HMS.

A detailed work plan was developed based on objectives agreed last year. For some elements it was not possible to identify parties to conduct the work, but most projects are underway. Salient activities include: the submission to the ISC of fisheries and bycatch statistics needed to initiate estimation of bycatch by fishery sectors; continuation of experiments on sea turtle, seabird and shark bycatch reduction; and analysis of trends in sea turtle abundance and trends in fisheries effort to look for any relationships between the two. Bycatch reduction research underway was reviewed. Although current and proposed conservation and management measures of various RFMOs were presented, there was resistance to proposing or discussing technical specifications or best practices for such measures.

Discussion

It was noted in the discussion that the BCWG will meet in May 2008 and then again in conjunction with the Plenary next year (July 2008). Members discussed the suggestion that the activities of the BCWG with respect to seabird and sea turtle bycatch mitigation measures are duplicative of other efforts underway by the IATTC and the WCPFC. Given the Terms of Reference of the BCWG, if the emphasis is shifted away from seabirds and sea turtles, this would lead to a greater focus on shark issues. While it was noted that the Plenary Chairman and the Chairman of the BCWG agree that the current seabird and sea turtle focus is redundant with other organizations, and that there is currently a vacuum concerning shark research in the Pacific, reservations were expressed about disengaging from seabird and sea turtle issues. Reasons cited included a loss of ISC expertise in handling these issues on a North Pacific-wide basis and ability to shape the debate with academic and non-governmental organizations who promote these issues; and the need to wait until further management measures (e.g. the IATTC has sea turtle measures (only) and the WCPFC has seabird measures (only)) are adopted before changing course. On the other hand, all members acknowledged the need to focus ISC efforts toward activities where a concrete contribution can be made, rather than simply reviewing information that is also being presented in other forums. Members reached consensus on a recommendation the BCWG review where it can best focus its work given its limited resources and the areas already being covered by other organizations. The WG's Terms of Reference will not be changed but it is expected that a shift in emphasis away from seabird and sea turtle issues, and toward shark issues, is likely to result.

The group also discussed a request from the WG to clarify whether it should be addressing only impacts from HMS fisheries, or all fisheries which impact the species in the WG's Terms of Reference. It was noted that it is quite difficult to obtain data for HMS fisheries and would likely be even harder to obtain data for non-HMS fisheries in the North Pacific. Several members stated that broadening the scope to non-HMS fisheries would exceed the mandate of the ISC. All members agreed that a holistic approach to evaluating impacts to bycatch species was necessary and that this requires taking into account not only HMS fishery impacts but also non-HMS fishery impacts, pollution, habitat impacts, etc. However, WG efforts should be focused on HMS fisheries since that is the primary area of ISC expertise. While beyond the remit of the ISC, a suggestion was noted that an international focus group for sea turtle issues in the North Pacific, i.e. one that meets regularly to coordinate new research/information and assess population status, is missing and could be established by interested nations.

7 STOCK STATUS AND CONSERVATION ADVICE

7.1 Albacore

M. Stocker presented an overview of the ALBWG stock assessment workshop (*Annex 5*). A total of 16 participants from Canada, Japan, and the United States, attended the Workshop. A total of 19 working documents were tabled. The 2006 stock assessment was conducted with the VPA-2BOX model.

A single catch-at-age matrix (1966-2005) applicable to all (inclusive) fisheries was developed by simply summing the completed catch-at-age matrices from the 'eastern' and 'western' North Pacific Ocean. The combined catch-at-age matrix served as the foundation for stock assessments based on the VPA-2BOX model analysis.

Seventeen abundance (CPUE) indices were used in the 2006 albacore assessment:

- U.S./Canada Troll (ages 2,3,4,5)
- U.S. Longline (age-aggregated 6-9+)
- Japan Pole-and-Line (ages 2,3,4,5)

- Japan Longline (age 3,4,5,6,7,8,9+)
- Chinese Taipei (age-aggregated)

The VPA team conducted VPA-2BOX model analysis (15) for this year's workshop using 'primary' sources of input data. Model Scenario D1 was selected by the WG to assess current stock status and project future stock conditions.

Spawning stock biomass (*SSB*, in tons) time series (1966-2006) for north Pacific albacore generated from Model D1 (based on 'May 1' estimates) show fluctuations around the modeled time series average of 100,000 t. The 2006 stock assessment indicated that *SSB* increased from 2002 (73,500 t) to 2006 (153,300 t) and is projected to increase to 165,800 t in 2007. The increase is attributable to strong year classes in 2001 and 2003. The estimated spawning stock size in 2006 of 153,300 t is approximately 53% above the overall time series average (1966-2005). Projections (2007-2020), using an average productivity of 27.75 million fish and F equal to 0.75, indicate that the SSB will reach equilibrium by 2015 at 92,600 t (90% CI=62,700-129,300).

The WG reviewed two documents relative to Biological Reference Points (BRPs): 1) computational methods; and 2) simulation and probability analysis. Computation of BRPs was limited to examination of current F levels relative to a suite of candidate F-level BRPs. Equilibrium yield-per-recruit analysis(*Y/R)* and spawning stock biomass-per-recruit (*SB/R)* calculations were conducted using similar vital rates (growth, maturity, and natural mortality) as used in Model D1 calculations. The population projections and associated uncertainty were used to construct probability profiles for *SSB*. Each profile presents the probability that the spawning stock biomass will fall below a specified threshold level during one or more years of the projection period.

In conclusion the WG noted the following:

- Retrospective analysis shows a noticeable trend of over-estimating current stock size; and conversely underestimating current fishing mortality rate;
- The population is being fished at roughly *F*17% (i.e., $F_{2002\text{-}2004}$ = 0.75); similar to the 2004 assessment;
- F_{cur} (0.75) is high relative to commonly used F reference points;
- The ALBWG expressed concern about the considerable decline in total albacore catch since 2002;
- The $F_{SSB\text{-}MIN}$ analysis indicates that at the 95% probability of success all of the threshold Fs would require reductions from F_{cur};
- Therefore, the ALBWG strongly recommends that all countries support precautionary-based fishing practices.

<u>Discussion</u>

Details of the 2006 albacore assessment were discussed:

- While it might appear contradictory that some fisheries show increasing CPUEs while others show decreasing CPUEs, this may be due to high catch rates for smaller fish in good years resulting in a fishing down of these year classes, leaving fewer fish left for fisheries targeting larger fish. It is thus consistent with population dynamics theory.
- The reason for a consistently overestimated spawning stock biomass/exploitable biomass in the most recent year (shown in retrospective analysis) is difficult to pinpoint. It might be possible that with the proposed use of the SS-II model in the future this problem can be avoided.
- As indicated by the broad confidence intervals in the projections of spawning stock biomass, there seems to be considerable uncertainty, particularly with respect to predicting future recruitment.
- It was pointed out that although several related scenarios were modelled, the assessment does not present a future projection with a constant catch scenario. It was suggested that in conjunction with future assessments, a suite of constant catch projections may be useful for managers.
- The WG decided the best approach was to model recruitment using an average for 1966-1998 with random variation. This is in contrast to the previous approach in which alternative low and high recruitment regimes were assumed. However, it was suggested that for future assessments it would be useful to examine alternative recruitment parameter forms. It was acknowledged that when recruitment varies a great deal and constant catch projection are made, it may be necessary to assume a relatively low catch in order to avoid population depletion within the projection model.
- An alternative suggestion to address uncertainties in recruitment was to have the Plenary invite further involvement of fisheries oceanographers in the WGs and thereby get better information on whether periodicity is present or regime shifts have occurred. However, any potential autocorrelation in recruitment was not considered to be a major issue for the scenarios run in the current assessment.
- Despite the discussion of uncertainties and the differing interpretations of the results, there was consensus that the assessment represented the scientists' best attempt at evaluating stock status. Future improvements to both data and models are necessary and anticipated.

A procedural question was raised about whether *Annex 5* requires an individual endorsement from the Plenary. The Chairman clarified that it was standard practice to endorse the annexes in conjunction with the adoption of the Plenary report.

In summary, members agreed that stock assessment results indicated that 2006 estimate of spawning stock biomass (SSB) is the second highest in history (roughly, 153,000 t). This high level of SSB is reflective of strong year classes in 1999, 2001 and 2003. On the other hand, it is also indicated that the current fishing mortality rate (F=0.75) is high relative to commonly used reference points. Projected levels of SSB are forecasted to decline from a high level of 166,000 t in 2007 to the equilibrium level of roughly 92,000 t by 2015, if the population is fished at the current F of 0.75, which is near the long-term average (1966-2005).

Conservation Advice

After discussion of the 2006 ALBWG's assessment report and comments raised by Plenary members, the ISC offers the following scientific advice:

Previous scientific advice, based on the 2004 stock assessment, recommended that current fishing mortality rate (F) should not be increased. It was noted that management objectives for the IATTC and WCPFC are based on maintaining population levels which produce maximum sustainable yield. Due to updating, and improvements and refinements in data and models used in the 2006 stock assessment, it is now recognized that F_{cur} (0.75) is high relative to most of the F reference points (see Table 5a in *Annex 5*). On the other hand, the same analysis indicates that the current estimate of the SSB is the second highest in history but that keeping the current F would gradually reduce the SSB to the long-term average by the mid 2010s. Therefore, the recommendation of not increasing F from current level (F_{cur}(2002-2004)=0.75) is still valid. However, with the projection based on the continued current high F, the fishing mortality rate will have to be reduced. The degree to which, when and how reductions should occur will depend on which reference points are selected and the desired probability and practicability of success of attaining these reference points in a timeframe to be agreed. The ISC requires additional guidance on these issues from the management authorities in a timely manner to work further on these issues.

7.2 Pacific Bluefin Tuna

Y. Takeuchi introduced the outlook for the stock in relation to the 2001 year class which was estimated to be exceptionally strong (*Annex 10*). The conclusion was as follows:

> *"WG planned to review recent trends in stock abundance at this workshop in addition to reviewing the strength of the 2001 year class. While the two topics are interrelated, the more general review of recent trends could not be undertaken using the data available to the WG at this workshop. A thorough review of recent trends will be undertaken in conjunction with the next stock assessment.*
>
> *Nonetheless, the WG noted that the last Pacific bluefin tuna stock assessment (Jan 2006) estimated an exceptionally strong 2001 year class. Based largely on the estimated size of this year class, the stock projections indicated that the current level of SSB (Spawning Stock Biomass) could be maintained at the current F level. Based on this assessment, the ISC6 Plenary recommended that F should not be increased from the current level.*
>
> *The WG agreed that preliminary analysis of the Japanese catch and size-frequency data that has become available since the last assessment (2005-2007) indicates that the 2001 year-class was not as strong as previously thought, but may have indeed been larger than the average year class.*

More importantly, however, the survivorship of this year class in 2007 is unclear and cannot be well estimated until the next stock assessment (2008). While the last well-estimated strong year-class (1994) appeared clearly in the JLL size frequency data in 2000 (i.e. at age 6), the 2001 year-class did not appear in the 2007 JLL fishery. Consequently, the conclusion of the last stock assessment regarding the likelihood that the 2001 year-class would maintain the bluefin SSB level now appears to have been optimistic in light of the new data that have become available since the last assessment. "

Discussion

In the discussion that followed the presentation, it was noted that no complete stock assessment has been performed since the last Plenary meeting. However, a stock assessment is scheduled for completion in the coming year. In clarifying the status of the Pacific bluefin tuna stock, Y. Takeuchi explained that it is supported by several strong year classes including the 1994 year class, the strongest in the time series. In the past, other strong year classes have had a major positive impact on the stock.

Conservation Advice

After discussion of the 2006 PBFWG's assessment report and consideration of comments raised by Plenary members, the ISC offers the following conservation advice:

It was concluded that the advice provided by the ISC Plenary in 2006 still holds. That is:

> ***"Noting the uncertainty in the assessments, the ISC Plenary agreed with the WG recommendation that bluefin tuna fishing mortality[*] not be increased above recent levels as a precautionary measure. "***

7.3 Swordfish

G. DiNardo informed the Plenary that the next North Pacific swordfish stock assessment is scheduled to be completed in 2009. Thus, no stock status and conservation advice was provided at this time.

Discussion

G. DiNardo explained that there was no assessment to present at this Plenary but that a plan to produce an assessment had been tabled under Agenda Item 6 (see Section 6.3). He clarified that no conservation advice has yet been provided to the Plenary.

[*] "fishing mortality" refers to a rate which can be converted into effort or catch in management

7.4 Striped Marlin

K. Piner and J. Brodziak presented a brief overview of a stock assessment of North Pacific striped marlin completed by the MARWG in March 2007 (*Annex 8*). This is an update of the previous assessment presented at last year's Plenary meeting. A total of 29 different fisheries, defined by region, country and gear were used in the assessment. Nine fisheries, all of them longline fisheries from the western or central Pacific, provided reasonable measures of abundance. One series was available from the Eastern Pacific but it was shorter and noisier. Size data were available from 13 fisheries from 1970 onward. A decline in catch since the 1960s was observed. CPUE indices were constructed by combining across gears and countries by area for fives areas in the Pacific. The main CPUE series showed a decline; coastal longlines from Japan and Hawaii showed similar trends. Most of the striped marlin catch comes from the northwest Pacific.

Catch, CPUE and length composition data from the sources described above were included in a SS-II model of the population dynamics. Due to uncertainty in the controlling factor of recruitment, two parallel hypotheses were forwarded as separate assessment models. In the first, recruitment was determined by a maternal effect described by a Beverton and Holt Spawner-Recruit curve with the steepness parameter set to h=0.7. In the second hypothesis, recruitment was driven by environmental conditions with recruitment variability around a mean level.

Both hypotheses indicated a stock depleted from historical levels, but assuming a maternal effect resulted in a more depleted stock (6% of 1952 levels for maternal effect versus 16% of 1952 levels for environmental effect). Additional forms of uncertainty were identified by the WG including the true nature of the stock delineation, constant catchability of the CPUE series (i.e. targeting and standardization issues), life-history parameters and the true level of catch in the North Pacific. It would be possible to model eastern and western sides of the Pacific in two separate models but the lack of data available for the eastern Pacific constrains this option. The basic data supporting biological parameters will be improved. Further CPUE standardization research will also continue.

Fishery selectivity estimates from the stock-recruitment and environmentally-driven recruitment models were used as alternative scenarios for calculating biological reference points. The reference points for the alternative scenarios were similar and as a result, reference points were robust to model selection uncertainty. The WG discussed the relative benefits of maintaining various levels of striped marlin spawning potential as a biological reference point and concluded that it would be useful to consider the 20% and 40% values of maximum spawning potential as candidate reference points.

The WG also considered the F_{Max} value as a potential reference point for striped marlin but observed that using this reference would diminish spawning potential ratio values to less than 1% of the maximum spawning potential. This, combined with the fact that the F_{Max} values for Model 1 and Model 2 were over 5-fold larger than the striped marlin natural mortality rate, indicated that using F_{Max} as a target or limit reference point was not appropriate for striped marlin given the model results. The WG also considered the current fishing mortality rate for striped marlin as a potential reference. In this case, the current fishing mortality rate was the average fishing mortality rate during 2001-2003, i.e. under Model 1, F_{Cur}=0.72 and under Model 2, F_{Cur}=0.64 per year.

The WG projected the management implications of applying the F_{Cur}, $F_{20\%}$ and $F_{40\%}$ reference points to the striped marlin stock during 2004-2009. Relative benefits were measured in terms of increasing spawning biomass and maintaining yield under the stock-recruitment and environmentally-driven recruitment models. This comparison emphasized the intrinsic trade-off between the biological conservation and fishery yield benefits of the alternative reference points. Overall, the relative merit of the F_{Cur} and $F_{20\%}$ reference points depends on whether the striped marlin stock can be sustainably fished at the current low spawning potential ratio of roughly 9%.

The WG concluded that there was a clear decline in striped marlin abundance since the 1970s. However the actual magnitude of decline may be under- or over-estimated given the noted uncertainties in assessment data and model structure (see *Annex 9*, Section 6.3). Additionally:

- The WG concluded that the stock-recruitment steepness parameter appeared to be the most important axis of uncertainty for evaluating stock status of striped marlin.
- The WG expressed concern that almost all of the CPUE data in the assessment, especially in the most recent years was from the western Pacific. The relatively short time series of CPUE values from the eastern Pacific was a limiting factor for assessing biomass trends in this region. To address the concern that the western Pacific data could be unduly influencing stock assessment results, it was suggested that a split area assessment could be conducted.
- The WG noted that there was limited empirical information on striped marlin life history characteristics across the species range in the North Pacific. This suggests that spatial variation in striped marlin growth may not be adequately approximated in the assessment model.
- The WG noted that the total enumeration of striped marlin catch, including discards and unreported landings, was a source of concern.
- The WG suggested that there should be further investigation of the use of aggregated fishery length frequency data for stock assessment.

The WG discussed how to characterize the status of the striped marlin stock in a way that reflected its concerns about the health of the population but also the uncertainty of the data used in the stock assessment. It was noted that declines in catch and declines in catch per unit effort from several different fisheries support the conclusion that the marlin population has declined, but the precise extent of the decline is uncertain.

The WG discussed what the objectives and responsibilities of the WG were with respect to providing management guidance. It was noted that the WG will need to know the management objectives to provide specific guidance. It was decided that a range of reference points would be presented, along with impacts to the stock and yield if that reference point were to be adopted. The WG recommended that projections be provided to the Plenary to clarify the impacts.

Discussion

Several technical points regarding the assessment were clarified through Plenary discussion as follows:

- It was pointed out that in some of the model projections; the yield from the current value of F is greater than simulations of a reduced value of F. This was attributed to arbitrarily selected starting values which do not actually affect the model fit. Although it was decided that such scenarios are not erroneous they were felt to be misleading and perhaps require better explanation.
- Since the model projections were only recently completed and circulated to the WG, there was not sufficient time to study the results thoroughly.
- Clarification was sought regarding the equilibrium yield and biomass as obtained from model projections when a stock-recruitment relationship was not assumed (Model 2). It was noted that the recent average yield of striped marlin could be sustainable, however, this may require an increase in F, since the average equilibrium yield at the annual current F (F=0.6) is about 500 t below the recent yield.
- Questions were raised regarding the WG's ability to account for different targeting strategies when standardizing the CPUE indices.
- Concerns were expressed that constraints on recruitment estimates prior to 1965 might introduce an underestimation bias to recruitment estimates in recent years.
- It was suggested that some reference points be chosen and a Kobe chart (i.e. two different reference points on two axes with the stock's position in each year plotted) produced. However, concerns were expressed that there is not sufficient clarity on which reference points to select.
- One suggestion was made to formulate a reference point based on maintaining the stock's spawning potential at 20-40%.
- Another area of uncertainty in the assessment is unaccounted for catch. This could occur due to under-reporting, lack of data for a fishery, mis-reporting by species, etc. While this is a concern, it is unlikely to be remedied in the near future.
- There was a lengthy discussion on different views regarding the interpretation of the assessment results. One interpretation is that the assessment results convey a clear message that the stock has declined precipitously and should be conserved through an immediate reduction in F. Another interpretation is that the uncertainties in the assessment are considerable and prevent full understanding of the state of the stock. Only by removing these uncertainties can the stock status be clarified.

Three procedural issues were raised. The first, regarding the access to data of participating scientists, was dealt with under Section 7.1. Another issue resulted in calls for clarification of the role of the Plenary in reviewing the WG's assessments and of the role of the WGs in formulating conservation advice. The final issue was a suggestion for a traffic light system (i.e. red, yellow and green colors), such as that used by the recent RFMO meeting in Kobe, to focus managers on the categories of interest in an easily understandable way.

<u>Conservation Advice</u>

After discussion of the 2007 MARWGs' report and comments raised by Plenary members, the ISC offers the following conservation advice:

While further guidance from the management authority is necessary, including guidance on reference points and the desirable degree of reduction, the fishing mortality rate of striped marlin (which can be converted into effort or catch in management) should be reduced from the current level (2003 or before), taking into consideration various factors associated with this species and its fishery. Until appropriate measures in this regard are taken, the fishing mortality rate should not be increased.

7.5 Bycatch

A report on bycatch was presented by G. DiNardo on behalf of C. Boggs, the Chairman of the BCWG. Guidance from the Plenary had been sought regarding which species and issues to address and with regard to taking a holistic approach to bycatch species impacts. Useful guidance was received on both topics. G. DiNardo informed the Plenary that no assessments were completed since the last Plenary meeting; therefore no conservation advice was offered.

8 REVIEW OF STOCK STATUS OF SECONDARY STOCKS

8.1 Eastern Pacific – Yellowfin and Bigeye Tunas

M. Dreyfus presented an overview of IATTC stock assessments for yellowfin and bigeye tunas (*ISC/07/PLENARY/INFO/03* and *ISC/07/PLENARY/INFO/04*). The fishery is predominantly a purse seine fishery (with sets on dolphins, free-swimming schools and floating objects), with longlines being the next most common gear type. In the case of the purse seine fishery, fleet capacity in cubic meters has recently reached a peak of over 200,000 cubic meters. For longlines, the number of hooks reached a peak in 2003 and has diminished since then. The catch composition is usually led by yellowfin tuna with skipjack in second place, but for 2005 and 2006, catches of the latter have surpassed catches of yellowfin tuna which are at their lowest level in more than two decades. Catches of bigeye, albacore and Pacific bluefin tuna comprise a smaller proportion of the fishery. Size composition of the catch varies depending on gear type. Longlines target adult tuna whereas the purse seine fishery also captures smaller tunas particularly when setting on floating objects. The average weight of tuna in the purse seine fishery has been decreasing over time and averaged 7.8 kg in 2006.

For yellowfin tuna, based on the assessment model (A-SCALA), the spawning biomass ratio is below the level corresponding to average maximum sustainable yield (AMSY), thus the stock is overfished. Effort levels are above the ones that would support AMSY. There were record catches in the early 2000s and recruitment was very high, but more recently recruitment has been similar to the long-term average. Recent catches are below AMSY and are now 44% of previous values. If a stock recruitment relationship is assumed, the results are more pessimistic. The fishing mortality rate has generally been below that required to support AMSY except in recent years.

Bigeye tuna catches have been predominantly from longline fisheries until 1994 when a FAD fishery in the southern part of the eastern Pacific at 10^{o}N and 20^{o}S latitude was developed. At the present time catches are higher in the surface fishery that focuses on juvenile bigeye tuna. The mean weight of bigeye tunas in the surface fishery in 2006 is 5.3 kg. Based on the assessment model (SS-II), the recent fishing mortality rate is about 20% greater than the corresponding AMSY. As a consequence, if fishing effort is not reduced, total biomass and spawning biomass will eventually decline. The current status and future projections are more pessimistic in terms of stock status if a stock recruitment relation is considered. Diagrams of stock size and fishing mortality rate relative to AMSY reference points show that overall the reference points have not been exceeded until recent years, but the two most recent estimates indicate the stock is overfished and overfishing is occurring.

Discussion

The group discussed what might be the reasons for recent, high skipjack catches in the coastal waters off Ecuador and Peru. It is possible that this phenomenon is due to an inverse relationship between yellowfin and skipjack which has previously seemed to be associated with El Niño events. It could be that the current large fleet size is causing the shift to be even more noticeable in this El Niño cycle. It is also possible that the low catch of yellowfin tuna in recent years is El Niño-related. In particular, following El Niño there is usually very good recruitment of small yellowfin tuna. This appears to have been taken into consideration in formulating IATTC's management recommendations. Another contributing factor could be that the segment of the purse seine fleet targeting floating objects has increased, and since fish size is smallest for floating object sets, this could lead to lower catches overall. It was noted that IATTC has just appointed a new Director of Investigations, Dr. Guillermo Compeán Jiménez, and it is hoped that Dr. Compeán will be able to participate in the ISC Plenary next year.

8.2 Western and Central Pacific – Yellowfin and Bigeye Tuna

Dr. S.K. Soh of the WCPFC presented the results of the assessments of western and central Pacific yellowfin and bigeye tuna that were presented at the WCPFC Scientific Committee meeting last August. MULTIFAN-CL was used to fit to catch, size and tagging data. The principal index came from longline CPUE (GLM standardized) and estimated parameters were selectivity, catchability, movement, recruitment, growth, and stock-recruitment relationship (SRR) steepness using fixed parameters of natural mortality-at-age, length-weight, and maturity-at-age. The total catch of yellowfin and bigeye tuna in the WCPO is about 400,000 t and 100,000 t, respectively. Data sources for the stock assessment were catch in number and weight, standardized and nominal effort, length and weight frequency, tag releases and recoveries, and other auxiliary information used to formulate priors, e.g. estimates of tag reporting rates.

In all analyses, recruitment of yellowfin increased from about 1970 and remained stable over the last two decades, whereas recruitment of bigeye increased from about 1980 and has been at high levels since the early 1990s. Both yellowfin and bigeye biomass declined to about half of its initial level by 1970 and has been fairly stable since then, except for a recent decline of biomass for yellowfin tuna. Biomass is currently 51% of unexploited levels for yellowfin and 30% for bigeye tuna. Kobe charts of both yellowfin and bigeye tuna show that their current biomass is not in an overfished state, but there is a high probability that overfishing is occurring.

Discussion

During the discussion, members remarked upon the usefulness of the Kobe charts of stock size and fishing mortality rate relative to reference points as used by both IATTC and WCPFC, and encouraged their use within ISC. It was remarked that although the stock assessments to be presented at next month's WCPFC Scientific Committee are not yet publicly available, the outlook for tuna stocks is improved in comparison to past assessments. G. DiNardo informed the group that the WCPFC yellowfin tuna assessment had been sent out for independent peer review and that comments received had been fed back to the SPC and considered in formulating this year's assessment. The same process is occurring for the WCPFC bigeye tuna assessment and comments are expected back in November. It was noted that due to a desire by the SPC to focus in detail on the yellowfin tuna assessment, a full assessment of bigeye tuna will occur next year.

9 REVIEW OF STATISTICS AND DATA BASE ISSUES

9.1 Report of the STATWG

The STATWG workshop was held prior to the Plenary on 22-24 July (*Annex 11*). All members except China, FAO, SPC and PICES were represented. One of the main tasks of the workshop was to review what data have been received and where gaps remain. Canada, Korea, Chinese Taipei, and the U.S. have submitted data for Categories I-III. Japan has submitted data for Categories I and II only, while Mexico has only submitted Category I data. No data have been received from China. Only Japan, Chinese Taipei and the U.S. have provided metadata.

One of the major issues for the STATWG is that data are passed by member's data correspondents to the WGs, bypassing the Database Administrator. In such cases, it is difficult for the Database Administrator to know when a submission has been made and what data are contained in the submission. A further difficulty is that WGs sometimes adjust data and do not feed the results of such adjustments back to the Database

Administrator. These and other issues have led, at times, to large discrepancies between WG and STATWG databases. It was concluded by the STATWG that the WG catch tables currently represent best available data for assessments and that these data should be used as the basis for the catch tables.

The STATWG discussed modifications to the ISC website, including a policy for loading working documents on the website and archiving information from the WGs. A future work plan was formulated which identifies several high priority action items for the group. These actions include preparing a timetable for the implementation of new functionality within the system including data quality control, enhancement of the website, storage of archival data from the WGs, and better procedures for WG and STATWG interaction. N. Miyabe stated that the appointment of a full-time database manager is essential to the success of the ISC database.

9.2 Database Administration

The status of the database was reviewed by H. Yamada. A data submission protocol was created at the STATWG workshop in 2002, and modified in the last workshop in 2006, at which point the modified protocol was distributed to the ISC members. Despite this, some submissions have contained missing and/or incorrect codes or missing columns which caused the rejection of some data when uploading into the main ISC database. In other cases, catch quantity units were rounded to the nearest metric ton rather than the required rounding to the nearest 0.1 t. In this case, if metadata are available it may be possible to correct this, but otherwise the true unit is unknown and the data cannot be rectified. H. Yamada encouraged all data correspondents to pay close attention to data submission procedures when providing data.

Discussion

In order to reduce duplication of effort between the WGs and the Database Administrator it was agreed that the flow of data should be from the data correspondents to the WGs and from the WGs to the Database Administrator. This would avoid current problems arising from WG modification of data. With regard to WG data, the primary function of the ISC main database would be to back-up and maintain the data from the WGs, including WG-prepared metadata. In addition, the Database Administrator would serve a coordinating function when a single gear type is catching a variety of species. There was consensus that better coordination between the WGs and the Database Administrator is required, and a periodic submission timetable for WGs to provide data to the Database Administrator was suggested.

In terms of overall responsibilities, the STATWG would have two main duties:

- Oversee production (i.e. compiling, checking and loading) of Category I data for comprehensive catch tables for highly migratory species (this would include not only the tunas but billfishes and bycatch species) in the North Pacific;

- Oversee the archiving of WG data, catch data, catch distribution maps for major species and metadata.

The current confidentiality policy in the ISC Rules of Procedures should be used as a guide.

This led to a discussion of what data should be held by the ISC main database. In this regard, it was noted that the WGs already have Category II and III data but at a finer scale, if required, for stock assessment purposes. These data are not available to the public. On the other hand, similar data of this type are being summarized and made available to interested individuals by other RFMOs.

It was decided that the remit of the Database Administrator will be changed to specify that he/she should receive data from the WGs through explicit procedures; store WG data and catch distribution maps, and produce Category I tables for tuna and tuna-like species of interest to the ISC. The ISC Rules of Procedures will be re-examined and modified as necessary to refine the role of the Database Administrator and the STATWG. New draft procedures will be trialed as a means of accelerating progress on data management systems.

N. Miyabe was asked to clarify the STATWG's position with regard to data exchange with the WCPFC. He referred to statements in the STATWG report which highlight the need to avoid redundancy, the importance of sharing public domain data, and the strong expertise of ISC members in understanding tuna and tuna-like species resources and fisheries in the North Pacific. The ISC welcomes the participation of WCPFC scientists in ISC stock assessment working group workshops.

A suggestion was made to develop a standing performance report for each member to show at a glance which data have and have not been submitted. It was believed this could serve as a useful prompt, and should be produced periodically.

Concerns regarding the slow pace of development of the ISC database system were expressed. Japan delegates were asked whether resourcing for the database work was sufficient. N. Miyabe replied that the Japanese government is providing a reasonable amount of funding for the task for which Japan has assumed responsibility. However, staffing will likely continue to be by contract sources owing to administrative constraints preventing the hiring of permanent staff. The current staff person is on contract through March 2008. While understanding was expressed for the administrative constraints, it was suggested that staff turnover with contractors could lead to inefficiencies and delays and thus a long-term, or permanent position would be preferred. In response to a question, N. Miyabe replied that outside assistance in the form of seconded staff, or similar, from members would certainly be helpful.

9.3 Data Rescue

The Plenary Chairman made a brief statement on data rescue issues. As discussed in the STATWG, Plenary was reminded that the first priority was to compile data from 1971 to the present, then work backward decade-by-decade until the 1950s. Since according to the Chairman of the STATWG, N. Miyabe, there are many data missing from the database, it is important to set data rescue goals and continuously work toward those goals.

9.4 Public Domain Data

H. Yamada made a brief presentation on public domain data. Category I data were confirmed to be public domain data. Differences in archived data between the WG databases and the ISC main database were identified. Noted discrepancies between the Category I data held in the main database and by the WGs were attributed to changes to data in the WGs which are not reported to the Database Administrator, different compilation methodologies, and data sets missing from one database or the other. An example, drawn from Pacific bluefin tuna catches, was used to illustrate the issue (*Annex 11*).

Catch tables were presented (*Tables 1* through *3*) for albacore, swordfish and striped marlin, respectively. As noted above, all of these data are derived from WG data rather than from the ISC main database and may be different from catches reported by members to other forums where “official statistics” are required. The catch table for bluefin tuna, as compiled by the Pacific bluefin tuna WG, is contained in *Annex 6*.

<u>Discussion</u>

Chairmen of the working groups clarified that the data shown in their WG catch tables represent data used in the most recent stock assessments or as of the most recent workshops. In some cases new data may have been received or modifications made to existing data since the last assessment, and those changes may be reflected in the catch tables. There was consensus that the table captions should clearly state that the data were provided by the species WG and could differ from the “officially submitted” statistics. The importance of adding a reference to each table to indicate the date of last update was also agreed.

The Plenary Chariman pointed out that in order to prepare Category I catch tables the STATWG will need more than WG data, e.g. data on yellowfin, bigeye, and skipjack tunas and bycatch will be required. It was explained that for catch distribution maps, the WGs should already be preparing these; therefore the WGs will submit them to the Data Administrator. A question was raised with regard to the WCPFC data exchange issue and further clarification was provided.

10 REVIEW OF SCHEDULE OF MEETINGS

10.1 Time and Place of ISC8

Provisional dates for ISC8 are 23-28 July 2008. Related working group workshops in conjunction with ISC8 will be held beginning 16 July 2008. Japan and the United States traditionally take turns hosting the meeting, and next year it is Japan's turn. Delegates from Japan announced that Japan would be pleased to host ISC8 but given the offer made earlier by the Chinese Taipei delegation to host ISC8, it would be better to defer the decision until after such time when the two members can discuss and settle the matter bilaterally. Chinese Taipei officials stated that they remain interested in holding the meeting but are open to further discussions with Japanese colleagues. The U.S. delegation indicated that should Japanese colleagues exercise their responsibility to host ISC8, the U.S. would be flexible and agreeable to allowing Chinese Taipei colleagues to host ISC9. The Plenary Chairman will be informed of the outcome of the consultation among concerned parties and members will be informed of the selected venue.

10.2 Working Group Intercessional Workshops

A tentative schedule of ISC workshops and other highly migratory species' RFMO meetings has been compiled for 2007-2009 (*Table 4*). Only one conflict emerged in the scheduling of ISC intercessional workshops, i.e. timing of the ISC swordfish and ISC Pacific bluefin tuna assessment workshops, but this was resolved by the Chairmen. Members are encouraged to participate as fully as possible in the WG workshops. The Plenary Chairman will distribute the schedule to other RFMOs so that they will be aware of ISC meetings and workshops.

11 ADMINISTRATIVE MATTERS

11.1 Operational Procedures Manual

The Plenary Chairman introduced a draft Operations Manual (*ISC/07/PLENARY/03*) as an important source of information about the ISC and how it operates. If the Plenary approves the document it will be a living document which will be updated as necessary to reflect evolving operational practice. A log of changes will be maintained.

Members discussed whether any additional amendments might be necessary to the tabled draft. The Chairman suggested that given the call for data on all billfishes to be submitted, the Chairman of the Billfish WG should update the species codes to include all relevant billfish species monitored by the ISC.

The Chairman called to members' attention the change in membership categories to include voting and non-voting members. The non-voting members are comprised of the U.N. Food and Agriculture Organization (FAO), the Inter-American Tropical Tuna Commission (IATTC), the North Pacific Marine Science Organization (PICES), and the Secretariat for the Pacific Community (SPC). It was clarified that there is also Observer and Invited Expert status which would allow non-members to attend meetings and workshops. The difference between the two is that the Invited Expert is nominated by a member, whereas an Observer may be self-nominated. Both must be approved by members.

In this context, the situation with respect to the WCPFC Scientific Committee was discussed. It was explained that this situation is specified in the MOU between the WCPFC and the ISC. Specifically, provisions are already specified by which a representative of the WCPFC is invited to observe the ISC Plenary meeting and WG workshops, and the Chairman, or designee, of the ISC is invited to observe the annual meetings of the WCPFC, the Northern Committee and the Scientific Committee. The possibility of a WCPFC representative becoming a non-voting member was discussed and it was resolved that it would be up to the WCPFC, only in the form of the Scientific Committee, to apply for non-voting member status. It was confirmed that under Observer status, there are no restrictions on the degree of participation by a WCPFC representative other than the restriction on voting (which would apply in the case of non-voting member as well) but it should be of a degree similar to that allowed by the WCPFC for the ISC observer.

With respect to the original ISC Guidelines which require simultaneous Japanese language translation of the Plenary session, the Chairman informed members that under the new wording of the Guidelines, this is now optional.

The U.S. delegation raised the idea of providing a glossary of standard terms within the ISC Operational Procedures Manual. This was advocated as means of maintaining agreement among the ISC members on the usage of common terminology.

11.2 Organization Structure

The Plenary Chairman tabled a document showing the ISC Organizational Structure (*ISC/07/PLENARY/08*). The following items were discussed
:

- The Mexican delegation leader will be M.A. Cisneros Mata;
- The Korean delegation leader and representative to all WGs is S.D. Hwang;
- Chinese Taipei will confirm all delegation names by September 2007;
- The IATTC representative to the albacore WG is Alexandre Aires-da-Silva;
- The swordfish and marlin WGs will be merged as agreed into a billfish WG;
- The names of data correspondents and email addresses for all names will be added.

A final diagram will be distributed to the head of each delegation and to each WG Chairman.

11.3 Election of Vice-Chairman

Given the resignation of J.R. Koh as Vice-Chairman of the ISC due to a change in job duties, the Chairman explained it is necessary to conduct a special election for Vice-Chairman to serve out the one remaining year of Dr. Koh's term. After rounds of balloting, in which each of the six members present cast one vote, H. Honda was elected as ISC Vice-Chairman. H. Honda thanked the members for their support and stressed the importance of cooperation among members, attention to the needs of industry and consumers, and the necessity of focusing on applied fishery science.

11.4 Website Design

After calling members' attention to the commitments to upgrade the ISC website (see *Annex 11* and Section 9 of this report), the Plenary Chairman asked H. Yamada to explain what plans are currently in place to progress with the necessary enhancements. H. Yamada replied that he was planning to add a box for Chairman's comments on the webpage and will begin searching for a new server (operated by a private company) that can accommodate and host the new requirements for the website. The U.S. delegation offered to assist by providing the services of web design contractor who has recently completed upgrades to the National Marine Fisheries Service Southwest Fisheries Science Center's website. The Japan delegation thanked the U.S. for their kind offer, but stated that the work on a new design and server has already been started by Japan. After receiving guidance on the conceptual design of the website, Japanese colleagues would first like to attempt construction of the website themselves but they would call upon the U.S. if any difficulties are encountered. A decision was made to continue as suggested by the Japan delegation but with the requirement that periodic updates on progress, including structural design, flow, functionality, and content be provided to the heads of delegations and WG Chairmen in order to ensure full participation and adequate consultation.

11.5 Preparations for meetings

The Plenary Chairman remarked that he would provide a list of requirements and organizational tools, such as meeting room configurations, distribution lists and logistics guidance, to whichever member will be hosting the next Plenary meeting as guidelines for hosting and organizing the ISC8 meeting.

11.6 Other matters

The use of Kobe charts to indicate whether stocks are overfished or whether overfishing is occurring was revisited. It was agreed that WGs should attempt to use such diagrams as much as is practical. If it is not clear which reference points should be used, multiple diagrams with various reference points should be prepared. The ALBWG agreed to trial use of these diagrams in their next assessment and will begin work in the interim, using the 2006 assessment results, to develop prototype diagrams.

H. Honda presented an outline of two major research programs for the sustainable use of tuna resources around Japan being undertaken by Japan's National Research Institute of Far Seas Fisheries. Both programs are being conducted over the period 2007-2009 with funding from the Japan Fisheries Research Agency. Outcomes of the studies will be applied to developing indicators or models for predicting recruitment strength in early life history stages for larvae and/or juveniles of Pacific bluefin tuna. The results will also be used to analyze long term fluctuations in natural stocks of tuna resources, especially Pacific bluefin tuna. The first of the two programs consists of basic research, using field surveys and modelling, on the recruitment strategy of Pacific bluefin tuna around Japan. The second program is an analytical study of long term fluctuations in tuna stocks around Japan, especially Pacific bluefin tuna, using historical data sets.

Discussion

The Mexico delegation remarked that they are developing a similar project on tuna recruitment which will use different methodology but complement Japan's work. Chinese Taipei officials complimented Japan on the project and stated their hopes of contributing to the study. The Chairman thanked H. Honda for his interesting presentation and expressed appreciation for the financial support of such studies by Japan.

12 ADOPTION OF REPORT

A draft Report of the Seventh Meeting of the International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean was prepared based on input and comment from all participants, and circulated to all members for review. The report was reviewed in its entirety, section by section, within the Plenary meeting and additional comments were incorporated. The report, including all of its annexes, was then adopted as a final document which will be distributed to all members within one week.

13 CLOSE OF MEETING

M. Dreyfus complimented the Plenary Chairman on his skillful and effective management of the meeting, and expressed his appreciation to the rapporteurs and meeting organizers. N. Miyabe, on behalf of the Japanese delegation, also thanked the Chairman for a useful meeting. The Plenary Chairman recognized the WG Chairs and the new ISC Vice-Chair, H. Honda, for their important work, and encouraged them to continue to try to resolve technical issues within their WGs. He thanked the Japan and U.S. delegations for their strong support of the ISC, noting that without interest from members it will be difficult to accomplish the goals of the ISC. Finally, he expressed his and the participants gratitude to the National Fisheries Research and Development Institute of Korea for hosting the meeting. D.Y. Moon responded on behalf of the Korea delegation with congratulations on a successful outcome. The meeting adjourned at 14:20 on July 31, 2007.

Table 1. North Pacific albacore catches (in metric tons) by fishery, 1952-2006. Blank indicates no effort. **--** indicates data not available. 0 indicates less than 1 metric ton. Provisional estimates in ( ). Data are from the Albacore Working Group catch tables as of 28 July 2007 and may differ from official statistics.

Year	Canada		Japan						Korea		Mexico
	Troll	Purse Seine	Gill Net	Long Line	Pole & Line	Purse Seine	Troll	Unsp. Gear	Gill Net	Long Line	Purse Seine
1952	71			26,687	41,787	154		237			
1953	5			27,777	32,921	38		132			
1954				20,958	28,069	23		38			
1955				16,277	24,236	8		136			
1956	17			14,341	42,810			57			
1957	8			21,053	49,500	83		151			
1958	74			18,432	22,175	8		124			
1959	212			15,802	14,252			67			
1960	5	136		17,369	25,156			76			
1961	4			17,437	18,639	7		268			0
1962	1			15,764	8,729	53		191			0
1963	5			13,464	26,420	59		218			0
1964	3			15,458	23,858	128		319			0
1965	15			13,701	41,491	11		121			0
1966	44			25,050	22,830	111		585			0
1967	161			28,869	30,481	89		520			
1968	1,028			23,961	16,597	267		1,109			
1969	1,365			18,006	31,912	521		935			0
1970	390			16,283	24,263	317		456			0
1971	1,746			11,524	52,957	902		308			0
1972	3,921		1	13,043	60,569	277		623			100
1973	1,400		39	16,795	68,767	1,353		495			0
1974	1,331		224	13,409	73,564	161		879			1
1975	111		166	10,318	52,152	159		228		2,463	1
1976	278		1,070	15,825	85,336	1,109		272		859	36
1977	53		688	15,696	31,934	669		355		792	0
1978	23		4,029	13,023	59,877	1,115		2,078		228	1
1979	521		2,856	14,215	44,662	125		1,126	0	259	1
1980	212		2,986	14,689	46,742	329		1,179	6	597	31
1981	200		10,348	17,922	27,426	252		663	16	459	8
1982	104		12,511	16,767	29,614	561		440	113	387	7
1983	225		6,852	15,097	21,098	350		118	233	454	33
1984	50		8,988	15,060	26,013	3,380		511	516	136	113
1985	56		11,204	14,351	20,714	1,533		305	576	291	49
1986	30		7,813	12,928	16,096	1,542		626	726	241	3
1987	104		6,698	14,702	19,082	1,205		155	817	549	7
1988	155		9,074	14,731	6,216	1,208		134	1,016	409	15
1989	140		7,437	13,104	8,629	2,521		393	1,023	150	2
1990	302		6,064	15,789	8,532	1,995		249	1,016	6	2
1991	139		3,401	17,046	7,103	2,652		392	852	3	2
1992	363		2,721	19,049	13,888	4,104		1,527	271	15	10
1993	494		287	29,966	12,797	2,889		867		32	11
1994	1,998		263	29,600	26,389	2,026		799		45	6
1995	1,763		282	29,075	20,981	1,177	856	81		440	5
1996	3,316		116	32,493	20,272	581	815	117		333	21
1997	2,168		359	38,951	32,238	1,068	1,585	123		319	53
1998	4,177		206	35,812	22,926	1,554	1,190	88		288	8
1999	2,734		289	33,364	50,369	6,872	891	127		107	23
2000	4,531		67	30,046	21,549	2,408	645	171		414	79
2001	5,248		117	28,819	29,430	974	416	96		82	22
2002	5,379		332	23,644	48,454	3,303	787	135		(113)	28
2003	6,861	0	126	20,954	36,114	627	922	106	(0)	(144)	28
2004	7,856	0	61	17,547	32,255	7,200	772	65	(0)	(68)	(104)
2005	4,829		154	21,020	16,133	850	665	316	(0)	(520)	(0)
2006	(5,819)		(154)	(21,020)	(16,133)	(850)	(665)	(316)	(0)	(520)	(109)

[1] Data are from the 1st ISC Albacore Working Group, November 28 - December 5, 2006 except as noted below.
Recent updates -- Childers added Hawaii troll/handline for US (7/3/2007), -- Uosaki updated figures in 2005 and 2006 for Japan (7/23/2007); Chinese Taipei updates for 2005 and 2006 received 28 July 2007.

Table 1. (cont.) North Pacific albacore catches (in metric tons) by fishery, 1952-2006. Blank indicates no effort. **--** indicates data not available. 0 indicates less than 1 metric ton. Provisional estimates in ( ). Data are from the Albacore Working Group catch tables as of 28 July 2007 and may differ from official statistics.

Year	Chinese Taipei		United States								Other		Grand Total
	Gill Net	Long Line[2]	Pole& Line	Gill Net	Long Line	Purse Seine	Sport	Troll	Troll/ Handline	Unsp. Gear	Long Line[3]	Troll	
1952					46		1,373	23,843					94,198
1953					23		171	15,740					76,807
1954					13		147	12,246					61,494
1955					9		577	13,264					54,507
1956					6		482	18,751					76,464
1957					4		304	21,165					92,268
1958					7		48	14,855					55,723
1959					5		0	20,990		0			51,328
1960					4		557	20,100		0			63,403
1961			2,837		5		1,355	12,055		1			52,608
1962			1,085		7		1,681	19,752		1			47,264
1963			2,432		7		1,161	25,140		0			68,906
1964			3,411		4		824	18,388		0			62,393
1965			417		3		731	16,542		0			73,032
1966			1,600		8		588	15,333		1			66,150
1967		330	4,113		12		707	17,814		0			83,096
1968		216	4,906		11		951	20,434		0			69,480
1969		65	2,996		14		358	18,827		0			74,999
1970		34	4,416		9		822	21,032		0			68,022
1971		20	2,071		11		1,175	20,526		0			91,240
1972		187	3,750		8		637	23,600		0			106,717
1973		--	2,236		14		84	15,653		0			106,836
1974		486	4,777		9		94	20,178		0			115,113
1975		1,240	3,243		33		640	18,932		10			89,696
1976		686	2,700		23		713	15,905		4			124,816
1977		572	1,497		37		537	9,969		0			62,799
1978		6	950		54		810	16,613		15			98,822
1979		81	303		--		74	6,781		0			71,004
1980	--	249	382		--		168	7,556		0			75,126
1981	--	143	748		25		195	12,637		0			71,042
1982	--	38	425		105		257	6,609		21			67,960
1983	--	8	607		6		87	9,359		0			54,527
1984	--	--	1,030		2	3,728	1,427	9,304		0			70,258
1985	--	--	1,498	2	0	26	1,176	6,415	7	0			58,203
1986	--	--	432	3		47	196	4,708	5	0			45,396
1987	2,514	--	158	5	150	1	74	2,766	6	0			48,994
1988	7,389	--	598	15	307	17	64	4,212	9	10			45,579
1989	8,350	40	54	4	248	1	160	1,860	36	23			44,176
1990	16,701	4	115	29	177	71	24	2,603	15	4			53,698
1991	3,398	12	0	17	312	0	6	1,845	72	71			37,324
1992	7,866	--	0	0	334	0	2	4,572	54	72			54,847
1993		5	0	0	438		25	6,254	71	0			54,136
1994		83	0	38	544		106	10,978	90	213		158	73,336
1995		4,280	80	52	882		102	8,045	177	1		137	68,416
1996		7,596	24	83	1,185	11	88	16,938	188	0	1,735	505	86,417
1997		9,119	73	60	1,653	2	1,018	14,252	133	1	2,824	404	106,402
1998		8,617	79	80	1,120	33	1,208	14,410	88	2	5,871	286	98,042
1999		8,186	60	149	1,542	48	3,621	10,060	331	1	6,307	261	125,342
2000		8,842	69	55	940	4	1,798	9,645	120	3	3,654	490	85,529
2001		8,684	139	94	1,295	51	1,635	11,210	194	0	1,471	127	90,105
2002		7,965	381	30	525	4	2,357	10,387	235		700	(127)	(104,887)
2003		7,166	59	16	524	44	2,214	14,102	85	0	(2,400)	(127)	(92,620)
2004		4,988	126	12	360	1	1,506	13,346	160	0	(2,400)	(127)	(88,955)
2005		4,472	66	20	(304)		(1,719)	8,413	170	0	(2,400)	(127)	(64,183)
2006		4,317	(22)	(3)	(274)		(291)	(12,590)	(86)	(0)	(2,400)	(127)	(67,704)

2 Catches for 2000-2004 contain estimates of offshore longline catches from vessels landing at domestic ports

3 Other longline catches from vessels flying flags of convenience being called back to Chinese Taipei. Catches may be duplicated in the Chinese Taipei longline series (November 2005).

Table 2. Swordfish catches (in metric tons) by fishery, 1952-2006. Blank indicates no effort. - indicates data not available. 0 indicates less than 1 metric ton. Provisional estimates in ( ). Data are from the Swordfish Working Group catch tables as of 1 February 2007 and may differ from official statistics.

Year	Japan								Chinese Taipei[5]			
	Distant/ Offshore Longline[2]	Coastal Longline	Harpoon[3]	Drift Net	Other Bait Fishing	Trap Net	Other[4]	Total	Distant Water Longline	Offshore Long line	Other	Total
1952	8,890	152	0	2,569	6	68	6	11,691	-	-		-
1953	10,796	77	0	1,407	20	21	87	12,408	-	-		-
1954	12,563	96	0	813	104	18	17	13,611	-	-		-
1955	13,064	29	0	821	119	37	41	14,111	-	-		-
1956	14,596	10	0	775	66	31	7	15,485	-	-		-
1957	14,268	37	0	858	59	18	11	15,251	-	-		-
1958	18,525	42	0	1,069	46	31	21	19,734	-	-		-
1959	17,236	66	0	891	34	31	10	18,268	-	-		-
1960	20,058	51	1	1,191	23	67	7	21,400	-	-		-
1961	19,715	51	2	1,335	19	15	11	21,147	-	-		-
1962	10,607	78	0	1,371	26	15	18	12,115	-	-		-
1963	10,322	98	0	747	43	17	16	11,243	-	-		-
1964	7,669	91	4	1,006	42	17	28	8,858	-	343	18	361
1965	8,742	119	0	1,908	26	14	182	10,991	-	358	10	368
1966	9,866	113	0	1,728	41	11	4	11,764	-	331	27	358
1967	10,883	184	0	891	33	12	5	12,008	-	646	35	681
1968	9,810	236	0	1,539	41	14	9	11,649	-	763	12	775
1969	9,416	296	0	1,557	42	11	5	11,327	0	843	7	850
1970	7,324	427	0	1,748	36	9	1	9,545	-	904	5	909
1971	7,037	350	1	473	17	37	0	7,915	-	992	3	995
1972	6,796	531	55	282	20	1	1	7,686	-	862	11	873
1973	7,123	414	720	121	27	23	2	8,430	-	860	119	979
1974	5,983	654	1,304	190	27	16	1	8,175	1	880	136	1,017
1975	7,031	620	2,672	205	58	18	2	10,606	29	899	153	1,081
1976	8,054	750	3,488	313	170	14	1	12,790	23	613	194	830
1977	8,383	880	2,344	201	71	7	1	11,887	36	542	141	719
1978	8,001	1,031	2,475	130	110	22	1	11,770	-	546	12	558
1979	8,602	1,038	983	161	45	15	1	10,845	7	661	33	701
1980	6,005	849	1,746	398	30	15	1	9,045	10	603	76	689
1981	7,039	727	1,848	129	59	10	0	9,812	2	656	25	683
1982	6,064	874	1,257	195	58	7	0	8,546	1	855	49	905
1983	7,692	999	1,033	166	30	9	2	9,931	0	783	166	949
1984	7,177	1,177	1,053	117	98	13	0	9,635	-	733	264	997
1985	9,335	999	1,133	191	69	10	0	11,737	-	566	259	825
1986	8,721	1,037	1,264	123	47	9	0	11,201	-	456	211	667
1987	9,495	860	1,051	87	45	11	0	11,549	3	1,328	190	1,521
1988	8,574	678	1,234	173	19	8	0	10,686	-	777	263	1,040
1989	6,690	752	1,596	362	21	10	0	9,431	50	1,491	38	1,579
1990	5,833	690	1,074	128	13	4	0	7,742	143	1,309	154	1,606
1991	4,809	807	498	153	20	5	0	6,292	40	1,390	180	1,610
1992	7,234	1,181	887	381	16	6	0	9,705	21	1,473	243	1,737
1993	8,298	1,394	292	309	43	4	1	10,341	54	1,174	310	1,538
1994	7,366	1,357	421	308	37	4	0	9,493	-	1,155	219	1,374
1995	6,422	1,387	561	440	17	7	0	8,834	50	1,135	225	1,410
1996	6,916	1,067	428	633	9	4	0	9,057	9	701	31	741
1997	7,002	1,214	365	396	11	5	0	8,993	15	1,358	61	1,434
1998	6,233	1,190	471	535	9	2	0	8,441	20	1,178	41	1,239
1999	5,557	1,049	724	461	2	5	0	7,798	70	1,385	61	1,516
2000	6,180	1,121	808	539	7	5	1	8,661	325	1,531	86	1,942
2001	6,932	908	732	255	5	15	0	8,848	1,039	1,691	91	2,821
2002	6,230	965	1,164	222	8	11	0	8,600	1,633	1,557	27	3,217
2003	5,352	1,039	1,198	167	10	4	0	7,770	1,084	2,196	11	3,291
2004	(6,165)	1,454	1,339	33	33	23	1	(9,048)	884	1,828	16	2,728
2005	(6,972)							(6,972)	437	1,813	26	2,276
2006												

1 Catch data are currently unavailable for Korea, Philippines, and some other countries catching swordfish in the N. Pacific.
2 Catches by gear for 1952-1970 were estimated roughly using FAO statistics and other data. Catches for 1971-2002 are more reliably estimated.
3 Contains trolling and harpoon but majority of catch obtained by harpoon.
4 For 1952-1970 "Other" refers to catches by other baitfishing methods, trap nets, and various unspecified gears.
5 Offshore longline category includes some catches from harpoon and other fisheries but does not include catches unloaded in foreign ports

Table 2.(cont.) Swordfish catches (in metric tons) by fishery, 1952-2006. Blank indicates no effort. **-** indicates data not available. 0 indicates less than 1 metric ton. Provisional estimates in ( ). Data are from the Swordfish Working Group catch tables as of 1 February 2007 and may differ from official statistics.

Year	**Korea**	**Mexico**	**United States**[2]						**Grand Total**
			Hawaii	California					
	Longline	All Gears	Longline	Longline	Gill Net	Harpoon	Unknown	Total	
1952	-	-	-	-	-	-	-	-	11,691
1953	-	-	-	-	-	-	-	-	12,408
1954	-	-	-	-	-	-	-	-	13,611
1955	-	-	-	-	-	-	-	-	14,111
1956	-	-	-	-	-	-	-	-	15,485
1957	-	-	-	-	-	-	-	-	15,251
1958	-	-	-	-	-	-	-	-	19,734
1959	-	-	-	-	-	-	-	-	18,268
1960	-	-	-	-	-	-	-	-	21,400
1961	-	-	-	-	-	-	-	-	21,147
1962	-	-	-	-	-	-	-	-	12,115
1963	-	-	-	-	-	-	-	-	11,243
1964	-	-	-	-	-	-	-	-	9,219
1965	-	-	-	-	-	-	-	-	11,359
1966	-	-	-	-	-	-	-	-	12,122
1967	-	-	-	-	-	-	-	-	12,689
1968	-	-	-	-	-	-	-	-	12,424
1969	-	-	-	-	-	-	-	-	12,177
1970	-	-	5	-	-	612	10	627	11,081
1971	-	-	1	-	-	99	3	103	9,013
1972	-	2	0	-	-	171	4	175	8,736
1973	-	4	0	-	-	399	4	403	9,816
1974	-	6	0	-	-	406	22	428	9,626
1975	-	-	0	-	-	557	13	570	12,257
1976	-	-	0	-	-	42	13	55	13,675
1977	-	-	17	-	-	318	19	354	12,960
1978	-	-	9	-	-	1,699	13	1,721	14,049
1979	-	7	7	-	-	329	57	393	11,946
1980	-	380	5	-	160	566	62	793	10,907
1981	-	1,575	3	1	461	267	20	752	12,822
1982	-	1,365	5	2	911	156	43	1,117	11,933
1983	-	120	5	1	1,321	58	378	1,763	12,763
1984	-	47	3	14	2,101	96	678	2,892	13,571
1985	-	18	2	46	2,368	211	792	3,419	15,999
1986	-	422	2	4	1,594	236	696	2,532	14,822
1987	-	550	24	4	1,287	211	300	1,826	15,446
1988	-	613	24	19	1,092	180	344	1,659	13,998
1989	-	690	218	29	1,050	54	224	1,575	13,275
1990	-	2,650	2,436	18	1,028	50	137	3,669	15,667
1991	-	861	4,508	39	836	16	137	5,536	14,299
1992	-	1,160	5,700	95	1,332	74	44	7,245	19,847
1993	-	812	5,909	165	1,400	169	36	7,679	20,370
1994	-	581	3,176	740	799	153	8	4,876	16,324
1995	-	437	2,713	279	755	96	31	3,874	14,555
1996	12	439	2,502	347	752	81	10	3,692	13,941
1997	246	2,365	2,881	664	707	84	3	4,339	17,377
1998	123	3,603	3,263	422	924	48	13	4,670	18,076
1999	104	1,136	3,100	1,333	606	81	2	5,122	15,676
2000	161	2,216	2,949	1,908	646	90	9	5,602	18,582
2001	349	780	220	1,763	375	52	5	2,415	15,213
2002	350	465	204	1,320	302	90	3	1,919	14,551
2003	311	671	147	1,812	216	107	0	2,282	14,325
2004	(350)	270.1	(213)	(898)	182	89	(37)	(1,419)	(14,883)
2005	(407)	234.5	(1360)	-	219	73	(0)	(1,652)	(13,506)
2006		347.2							(347)

1 Catch data are currently unavailable for Korea, Philippines, and some other countries catching swordfish in the N. Pacific.
2 Estimated round weight of retained catch. Does not include discards.

Table 3. Striped marlin catches (in metric tons) by fishery, 1952-2005. Blank indicates no effort. - indicates data not available. 0 indicates less than 1 metric ton. Provisional estimates in ( ). Data are from the Marlin Working Group catch tables as of 1 February 2007 and may differ from official statistics.

Year	Japan							Chinese Taipei[1]				
	Distant Water Longline	Off Shore Longline	Other Longline	Small Mesh Gillnet	Large Mesh Gillnet	Other[2]	Total	Distant Water Longline	Highseas Drift Gillnet	Off Shore Longline	Other	Total
1952	2,901		722	0	0	1,564	5,187					-
1953	2,138		47	0	0	954	3,139					-
1954	3,068		52	0	0	1,088	4,208					-
1955	3,082		28	0	0	1,038	4,149					-
1956	3,729		59	0	0	1,996	5,785					-
1957	3,189		119	0	0	2,459	5,766					-
1958	4,106		277	0	3	2,914	7,301					-
1959	4,152		156	0	2	3,191	7,501					-
1960	3,862		101	0	4	1,937	5,905					-
1961	4,420		169	0	2	1,797	6,388					-
1962	5,739		110	0	8	1,912	7,770					-
1963	6,135		62	0	17	1,910	8,124					-
1964	14,304		42	0	2	2,344	16,691			560	199	759
1965	11,602		19	0	1	2,796	14,418			392	175	567
1966	8,419		112	0	2	1,573	10,106			356	157	513
1967	11,698		127	0	3	1,551	13,379	2		385	204	591
1968	15,913		230	0	3	1,040	17,186	1		332	208	541
1969	8,544	600	3	0	3	2,630	11,780	2		571	192	765
1970	12,996	690	181	0	3	1,029	14,899	0		495	189	684
1971	10,965	667	259	0	10	2,016	13,917	0		449	135	584
1972	7,006	837	145	0	243	990	9,221	9		380	126	515
1973	6,299	632	118	0	3,265	630	10,944	1		568	139	708
1974	6,625	327	49	0	3,112	775	10,888	24		650	118	792
1975	5,193	286	38	0	6,534	685	12,736	64		732	96	892
1976	4,996	244	34	0	3,561	571	9,406	32		347	140	519
1977	2,722	256	15	0	4,424	547	7,964	17		524	219	760
1978	2,464	243	27	0	5,593	418	8,745	0		618	78	696
1979	4,898	366	21	0	2,532	526	8,343	26		432	122	580
1980	5,871	607	5	0	3,467	537	10,488	61		223	132	416
1981	3,957	259	12	0	3,866	538	8,632	17		491	95	603
1982	5,211	270	13	0	2,351	655	8,500	7		397	138	542
1983	3,575	320	10	22	1,845	792	6,564	0		555	214	769
1984	3,335	386	9	76	2,257	719	6,782	0		965	339	1,304
1985	3,698	711	24	40	2,323	732	7,528	0		513	181	694
1986	5,178	901	33	48	3,536	571	10,267	0		179	148	327
1987	5,439	1,187	6	32	1,856	513	9,033	31		383	151	565
1988	5,768	752	7	54	2,157	668	9,406	7		457	169	633
1989	4,582	1,081	13	102	1,562	537	7,877	8		184	157	349
1990	2,298	1,125	3	19	1,926	545	5,916	2		137	256	395
1991	2,677	1,197	3	27	1,302	506	5,712	36		254	286	576
1992	2,757	1,247	10	35	1,169	302	5,520	1		219	197	417
1993	3,286	1,723	1	0	828	443	6,281	5		221	142	368
1994	2,911	1,284	1	0	1,443	383	6,022	1		137	196	334
1995	3,494	1,840	3	0	970	278	6,585	27		83	82	192
1996	1,951	1,836	4	0	703	152	4,646	26		162	47	235
1997	2,120	1,400	3	0	813	163	4,499	59		290	47	396
1998	1,784	1,975	2	0	1,092	304	5,157	90		205	50	345
1999	1,608	1,551	4	0	1,126	183	4,472	66		128	42	236
2000	1,152	1,109	8	0	1,062	297	3,628	153		161	55	369
2001	985	1,326	11	0	1,077	237	3,636	121		129	51	301
2002	764	795	5	0	1,264	291	3,119	251		226	29	506
2003	1,008	826	3	0	1,064	203	3,104	241		91	43	375
2004	(761)	(964)	(2)	(0)	(1,339)	(90)	(3,066)	261		95	24	380
2005	(803)						(803)	176		76	32	284

1 Estimated from catch in number of fish

2 Contains bait fishing, net fishing, trapnet, trolling, harpoon, etc.

Table 3.(cont). Striped marlin catches (in metric tons) by fishery, 1952-2005. Blank indicates no effort. - indicates data not available. 0 indicates less than 1 metric ton. Provisional estimates in ( ). Data are from the Marlin Working Group catch tables as of 1 February 2007 and may differ from official statistics.

Year	Costa Rica[1]	Korea			Mexico			United States					Grand Total
	Sport	Long Line	Highseas Drift Gillnet	Total	Long Line	Sport[1]	Total	Long Line	Troll	Hand Line	Sport[1]	Total	
1952		-		0			0				23	23	5,210
1953		-		0			0				5	5	3,144
1954		-		0			0				16	16	4,224
1955		-		0			0				5	5	4,154
1956		-		0			0				34	34	5,819
1957		-		0			0				42	42	5,808
1958		-		0			0				59	59	7,360
1959		-		0			0				65	65	7,566
1960		-		0			0				30	30	5,935
1961		-		0			0				24	24	6,412
1962		-		0			0				5	5	7,775
1963		-		0			0				68	68	8,192
1964		-		0			0				58	58	17,508
1965		-		0			0				23	23	15,008
1966		-		0			0				36	36	10,655
1967		-		0			0				49	49	14,018
1968		-		0			0				51	51	17,778
1969		-		0			0				30	30	12,575
1970		-		0			0				18	18	15,601
1971		-		0			0				17	17	14,518
1972		-		0			0				21	21	9,757
1973		-		0			0				9	9	11,660
1974		-		0			0				55	55	11,735
1975		-		0			0				27	27	13,655
1976		-		0			0				31	31	9,956
1977		-		0			0				41	41	8,766
1978		-		0			0				37	37	9,478
1979		-		0			0				36	36	8,960
1980		-		0			0				33	33	10,937
1981		-		0			0				60	60	9,295
1982		-		0			0				41	41	9,083
1983		-		0			0				39	39	7,373
1984		-		0			0				36	36	8,122
1985		-		0			0				42	42	8,263
1986		-		0	-		0				19	19	10,614
1987		-		0	-		0	272	30	1	28	331	9,928
1988		-		0	-		0	504	54	1	30	589	10,628
1989		-		0	-		0	612	24	0	52	688	8,914
1990		-		0	-	181	181	538	27	0	23	588	7,079
1991	106	-		0	-	75	75	663	40	0	12	715	7,184
1992	281	-		0	-	142	142	459	38	1	25	523	6,884
1993	438	-		0	-	159	159	471	68	1	11	551	7,796
1994	521	-		0	-	179	179	326	34	0	17	377	7,433
1995	153	-		0	-	190	190	543	52	0	14	609	7,729
1996	122	348		348	-	237	237	418	54	1	20	493	6,081
1997	138	828		828	-	193	193	352	38	1	21	412	6,466
1998	144	519		519	-	345	345	378	26	0	23	427	6,937
1999	166	352		352	-	266	266	364	28	1	12	405	5,897
2000	97	436		436	-	312	312	200	14	1	10	225	5,067
2001	151	206		206	-	237	237	351	42	2		395	4,926
2002	76	153		153	-	305	305	226	29	0		255	4,414
2003	79	172		172	-	322	322	538	28	0		566	4,618
2004	(19)	(75)		(75)	-	-	0	(384)	(56)	(2)		(442)	(3,768)
2005	-	(115)		(115)	-	-	0	(377)	-	-		(377)	(1,465)

[1] Estimated from catch in number of fish

Table 4. Schedule of ISC and Other Tuna and Tuna-like Species Regional Fisheries Management Organization Meetings, 2007-2009.

		09-07	10-07	11-07	12-07	01-08	02-08	03-08	04-08	05-08	06-08	07-08	08-08	09-08	10-08	11-08	12-08	01-09	02-09	03-09	04-09
ISC	**ALB WG**						MD/RP (28-), La Jolla	MD/RP (1-6), La Jolla				UP (16-17)					MD				
	PBF WG				DP/MD (11-18), Shimizu					DP/MD (21-27) FA (28-30)	FA (1-4)							MD RP			
	BILL WG					SWO DP/MD (15-23)					SWO SC (3-10), Japan				SWO MD (25-1) SYM (20-24)					SWO FA	
	BC WG									Shark DP		RE (16-17)					Shark SC	Shark SC			
	STAT WG											RE (18-21)									
	Plenary											(23-28)									
Other	**ICCAT**	Spp. Groups (24-28)	SCRS (1-5)						Tuna Assess		BET Assess			Spp. Groups (29- 3)	SCRS (6-10)	Comm (12-18)					
	IATTC									Stock Assess. (12-16)	Comm (22-27)				Work shop (14-17)						
	WPFC	NC (11-13)			Comm (3-7)								SC (10-22)	NC (9-11)			Comm (1-5)				
	IOTC			SC (5-9)						Comm (11-16)						SC (3-7)					
	Others									Tuna Conf. (19-22)					WFC (20-24)						

Key: MD = Model development and analyses; DP = Data preparation and review; RP = Biological reference points; SC = Stock condition advice; FA = Complete stock assessment with new model, data or information; UP = Updated stock assessment with additional data and minor corrections to existing data; RE = Review of activities, plans and progress; SYM = Symposium Comm. = Commission, NC = Northern Committee, SC = Science Committee

7th Meeting of the

INTERNATIONAL SCIENTIFIC COMMITTEE FOR TUNA AND TUNA-LIKE SPECIES IN THE NORTH PACIFIC OCEAN

Busan National University
Sangnam International House
Geumjeong-gu
Busan 609-735, Korea

July 25-30, 2007

Agenda

1. Opening
2. Adoption of Agenda
3. Delegation Reports on Research and Fishery Monitoring
4. Report of Chairman
5. Reports of Working Groups
6. Stock Status and Conservation Advice
7. Review of Stock Status of Secondary Stocks
8. Review of Statistics and Data Base Issues
9. Relationship between ISC and Regional Organizations
10. Review of Meeting Schedule
11. Administrative Matters
12. Adoption of Report
13. Close of Meeting

REPORT OF THE SEVENTH MEETING OF THE INTERNATIONAL SCIENTIFIC COMMITTEE FOR TUNA AND TUNA-LIKE SPECIES IN THE NORTH PACIFIC OCEAN

Plenary Session, July 25-30, 2007
Busan, Korea

LIST OF PARTICIPANTS

* indicates Delegation Leader

Canada

* Max Stocker
Fisheries and Oceans Canada, Pacific Biological Station
3190 Hammond Bay Road, Nanaimo, B.C. Canada V9T 6N7
1-250-758-0275 (tel), 1-250-756-7053 (fax)
StockerM@pac.dfo-mpo.gc.ca

Chinese-Taipei

*Chung-Hai Kwoh
Fisheries Agency
Council of Agriculture
2 Chaochow Street
Taipei, Taiwan
886-2-3343-6114 (tel), 886-2-3343-6268 (fax)
chunghai@ms1.fa.gov.tw

Chi-Lu Sun
Institute of Oceanography
National Taiwan University
1 Section 4, Roosevelt Road
Taipei, Taiwan 106
Email: 886-2-23629842 (tel & fax)
chilu@ntu.edu.tw

Ren-Fen Wu
Overseas Fisheries Development Council
Republic of China
19, Ln 113, Sec 4, Roosevelt Road
Taipei, Taiwan
886-2-2738-1522 ext. 118 (tel), 886-2-2738-4329 (fax)
fan@ofdc.org.tw

Shyh-Jiun Wang
Overseas Fisheries Development Council
Republic of China
19, Ln 113, Sec 4, Roosevelt Road
Taipei, Taiwan
886-2-2738-1522 ext. 116 (tel), 886-2-2738-4329 (fax)
shyhjiun@ofdc.org.tw

Japan

*Hitoshi Honda
National Research Institute of Far Seas Fisheries
5-7-1 Orido, Shimizu, Shizuoka, Japan, 424-8633
81-543-36-6034 (tel), 81-543-35-9642 (fax)
hhonda@affrc.go.jp

Hideo Inomata
Fisheries Agency of Japan
1-2-1, Kasumigaseki, Chiyoda-ku,
Tokyo 100-8907 JAPAN
81-3-3504-3995 (tel), 81-3-3502-0571 (fax)
Hideo_inomata@nm.maff.go.jp

Masashi Kiyota
National Research Institute of Far Seas Fisheries
5-7-1 Orido, Shimizu, Shizuoka, Japan, 424-8633
81-543-36-6046 (tel), 81-543-35-9642 (fax)
kiyo@fra.affrc.go.jp

Makoto Miyake
Scientific Advisor, Japan Tuna
3-3-4 Shimorenjaku, Mitaka-shi
Tokyo, Japan 181-0013
+81 422-46-3917 (tel)
p.m.miyake@gamma.ocn.ne.jp

Naozumi Miyabe
National Research Institute of Far Seas Fisheries
5-7-1 Orido, Shimizu, Shizuoka, Japan, 424-8633
81-543-36-6022 (tel), 81-543-35-9642 (fax)
miyabe@fra.affrc.go.jp

Yukio Takeuchi
National Research Institute of Far Seas Fisheries
5-7-1 Orido, Shimizu, Shizuoka, Japan, 424-8633
81-543-36-6039 (tel), 81-543-35-9642 (fax)
yukiot@fra.affrc.go.jp

Koji Uosaki
National Research Institute of Far Seas Fisheries
5-7-1 Orido, Shimizu, Shizuoka, Japan, 424-8633
81-543-36-6044 (tel), 81-543-35-9642 (fax)
uosaki@affrc.go.jp

Harumi Yamada
National Research Institute of Far Seas Fisheries
5-7-1 Orido, Shimizu, Shizuoka, Japan, 424-8633
81-543-36-6034 (tel), 81-543-35-9642 (fax)
hyamada@fra.affrc.go.jp

Kotaro Yokawa
National Research Institute of Far Seas Fisheries
5-7-1 Orido, Shimizu, Shizuoka, Japan, 424-8633
81-543-36-6035 (tel), 81-543-35-9642 (fax)
yokawa@fra.affrc.go.jp

Korea

*Sun-Do Hwang
National Fisheries Research and Development Institute
408-1 Sirang-ri, Gijang-eup, Gijang-gun
Busan, 619-705, Korea
82-51-720-2334 (tel), 82-51-720-2337 (fax)
sdhwang@nfrdi.re.kr

Doo-Hae An
National Fisheries Research and Development Institute
408-1 Sirang-ri, Gijang-eup, Gijang-gun
Busan, 619-705, Korea
82-51-720-2320 (tel), 82-51-720-2337 (fax)
dhan@nfrdi.re.kr

Seon-Jae Hwang
National Fisheries Research and Development Institute
408-1 Sirang-ri, Gijang-eup, Gijang-gun
Busan, 619-705, Korea
82-51-720-2325 (tel), 82-51-720-2337 (fax)
hwangseonjae@hanmail.net

Doo-Nam Kim
National Fisheries Research and Development Institute
408-1 Sirang-ri, Gijang-eup, Gijang-gun
Busan, 619-705, Korea
82-51-720-2324 (tel)
82 51 720 2337 (fax)
dnkim@nfrdi.re.kr

Dae-Yeon Moon
National Fisheries Research and Development Institute
408-1 Sirang-ri, Gijang-eup, Gijang-gun
Busan, 619-705, Korea
82-51-720-2310 (tel), 82-51-720-2337 (fax)
dymoon@nfrdi.re.kr

Mexico

*Michel Dreyfus
Instituto Nacional de la Pesca (INP)
Centro Regional de Investigaciones Pesqueras de Ensenada (CRIP-Ensenada)
KM 97.5 Carretera Tijuana-Ensenada
Ensenada, Baja California, Mexico
52-646-1746085 (tel)
dreyfus@cicese.mx

Luis Vicente González Ania
Instituto Nacional de la Pesca (INP)
Pitagoras 1320 Col. Santa Cruz Atoyac
03310 Mexico, D.F.
Mexico
52-55-54223012 (tel)
lgonzalez_inp@yahoo.com.mx

United States

*William Fox
NOAA/NMFS/SWFSC
8604 La Jolla Shores Dr.
La Jolla, CA 92037
1-858-546-7081 (tel), 1-858-546-5655 (fax)
William.Fox@noaa.gov

Jon Brodziak
NOAA/NMFS PIFSC
2570 Dole Street
Honolulu, HI 96822-2396
1-808-983-2964 (tel), 1-808-983-2902 (fax)
Jon.Brodziak@noaa.gov

Shelley Clarke
Visiting Researcher, Imperial College London
1675 Sasama-kami
Kawane-cho, Shizuoka, Japan 428-0211
81-547-54-0275 (tel and fax)
shelley.clarke@imperial.ac.uk

Ray Conser
NOAA/NMFS SWFSC
8604 La Jolla Shores Dr.
La Jolla, CA 92037 USA
1-858-546-5688 (tel), 858-546-7003 (fax)
rconser@ucsd.edu

Gerard DiNardo
NOAA/NMFS PIFSC
2570 Dole Street
Honolulu, HI 96822-2396 USA
1-808-983-5397 (tel), 1-808-983-2902 (fax)
Gerard.Dinardo@noaa.gov

Tom Graham
NOAA/NMFS/PIRO
1601 Kapiolani Blvd., Suite 1110
Honolulu, HI 96814
1-808- 944-2219 (tel), 1-808-973-2941 (fax)
Tom.Graham@noaa.gov

Kevin Piner
NOAA/NMFS SWFSC
8604 La Jolla Shores Dr.
La Jolla, CA 92037 USA
1-858-546-5613 (tel), 1-858-546-7003 (fax)
Kevin.Piner@noaa.gov

Gary Sakagawa (Chairman)
NOAA/NMFS SWFSC
8604 La Jolla Shores Dr.
La Jolla, CA 92037 USA
1-858-546-7177 (tel)
Gary.Sakagawa@noaa.gov

Sarah Shoffler
NOAA/NMFS SWFSC
8604 La Jolla Shores Dr.
La Jolla, CA 92037 USA
1-858-546-5678 (tel), 1-858 546 5655 (fax)
Sarah.Shoffler@noaa.gov

Robert Skillman
Western Pacific Fisheries Management Council
1164 Bishop Street, Suite 1400
Honolulu, HI 96813
1-808-522-8220 (WCPFC)
1-808-754-1219 (cell)
skilfishr@mac.com

WCPFC

Sung-Kwon Soh
WCPFC
Kaselehlie Street (P.O. Box 2356)
Kolonia, 96941
Federated States of Micronesia
sungkwons@mail.mf

SUPPORT STAFF

Jinhwan Kim
National Fisheries Research and Development Institute
408-1, Shirang-ri, Gijang-eup, Gijang-gun
Busan, Korea 619-705
82-51-720-2322 (tel), 82-51-720-2337 (fax)
kjtank@daum.net

Youjung Kwon
National Fisheries Research and Development Institute
408-1, Shirang-ri, Gijang-eup, Gijang-gun
Busan, Korea 619-705
82-51-720-2322 (tel), 82-51-720-2337 (fax)
youjungkwon@gmail.com

REPORT OF THE SEVENTH MEETING OF THE INTERNATIONAL SCIENTIFIC COMMITTEE FOR TUNA AND TUNA-LIKE SPECIES IN THE NORTH PACIFIC OCEAN

Plenary Session, July 25-30, 2007
Busan, Korea

LIST OF MEETING DOCUMENTS

Plenary Documents

ISC/07/PLENARY/01	ISC Action Plan for 2006-2007 (*ISC*)
ISC/07/PLENARY/02	IATTC-75-06: The Fishery for Tunas and Billfishes in the Eastern Pacific Ocean in 2006 (*IATTC*)
ISC/07/PLENARY/03	Operations Manual for the International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean (*ISC*)
ISC/07/PLENARY/04	The 2006 Canadian North Pacific Albacore Troll Fishery (*Max Stocker, Fisheries and Oceans Canada*)
ISC/07/PLENARY/05	Recent Status of Chinese-Taipei Tuna Fisheries in the North Pacific Region for 2005 (*Fisheries Agency, Council of Agriculture, Chinese-Taipei*)
ISC/07/PLENARY/06	U.S. Fisheries and Research on Tuna and Tuna-like Species in the North Pacific Ocean (*NOAA Fisheries SWFSC and PIFSC*)
ISC/07/PLENARY/07	Schedule of ISC and Other Highly Migratory Species Regional Fisheries Management Organization Meetings, 2007-09 (*ISC*)
ISC/07/PLENARY/08	ISC Organizational Chart (June 2007) (*ISC*)
ISC/07/PLENARY/09	National Report of Japan *(Harumi Yamada and Koji Uosaki, National Research Institute of Far Seas Fisheries)*
ISC/07/PLENARY/10	Mexican Progress Report to the ISC (*INP*)

ISC/07/PLENARY/11	National Report of Korea *(S.D. Hwang, D.N. Kim, K.H. Choi, D.H. An, and D.Y. Moon, National Fisheries Research and Development Institute)*

Informational Documents

ISC/07/PLENARY/INFO/01	Stock Assessment of Yellowfin Tuna in the Western and Central Pacific Ocean, Including an Analysis of Management Options (WCPFC-SC2-2006/SA WP-1) (*WCPFC*)
ISC/07/PLENARY/INFO/02	Stock Assessment of Bigeye Tuna in the Western and Central Pacific Ocean, Including an Analysis of Management Options (WCPFC-SC2-2006/SA WP-2) (*WCPFC*)
ISC/07/PLENARY/INFO/03	Status of Yellowfin Tuna in the Eastern Pacific Ocean (*IATTC*)
ISC/07/PLENARY/INFO/04	Status of Bigeye Tuna in the Eastern Pacific Ocean (*IATTC*)
ISC/07/PLENARY/INFO/05	The Relationship between the International Scientific Committee, the Northern Committee and the Scientific Committee in Respect to the Northern Stocks (WCPFC-SC3/GN WP-4) (*WCPFC*)

ANNEX 5

REPORT OF THE ALBACORE WORKING GROUP WORKSHOP

International Scientific Committee for Tuna and Tuna-Like Species in the North Pacific Ocean

(November 28 – December 5, 2006, Shimizu, Japan)

1.0 INTRODUCTION

The ISC Albacore Working Group (ISC-ALBWG) stock assessment workshop was held at the National Research Institute of Far Seas Fisheries (NRIFS) in Shimizu, Shizuoka, Japan from November 28 to December 5, 2006. Dr. Kobayashi, NRIFS Director, welcomed the participants. In his address to the participants, Dr. Kobayashi reflected on the long history of scientific cooperation on north Pacific albacore and he observed that the ISC Albacore Working Group serves as an effective forum for exchanging data, presenting research, and conducting stock assessments on albacore. He stressed that Japan recognizes the important scientific contributions the Working Group (WG) is making to the development of an understanding of the North Pacific albacore population. In closing, Dr. Kobayashi wished for participants to have a successful meeting.

A total of 16 participants from Canada, Japan, and the United States (U.S.) attended the Workshop (Appendix 1). Dr. Max Stocker chaired the stock assessment workshop. A provisional agenda that was circulated prior to the workshop received minor revisions and was adopted (Appendix 2). A total of 19 working documents were presented (Appendix 3). Paul Crone, Ray Conser, Al Coan, Vidar Wespestad, and Koji Uosaki served as rapporteurs.

The charge for the meeting was to complete a full assessment of the North Pacific albacore stock with data up to 2005, and to develop scientific advice on biological reference points for consideration of management action and for recommending action.

A Stock Assessment Task Group meeting was convened at the Pacific Biological Station in Nanaimo, B.C. July 13-17, 2006 for the purpose of data preparation for the full ISC-ALBWG stock assessment workshop. The report of the Task Group meeting is attached (Appendix 4).

2.0 REVIEW OF RECENT FISHERIES

North Pacific albacore are a valuable species with a long history of exploitation in the North Pacific Ocean. During the past five years, fisheries based in Japan accounted for 66.7% of the total harvest, followed by fisheries in the United States (16.4%), Chinese Taipei (7.7%) and Canada (6.7%). Other countries targeting North Pacific albacore contributed 2.5% and included Korea, Mexico, Tonga, Belize, Cook Islands, Ecuador and longline catches from vessels flying flags of convenience (Table 1). The total catch of North Pacific albacore for all nations combined peaked at a record high of 124,900 metric tons (mt) in 1999, but has declined over the course of the last several years and has averaged roughly 88,000 mt since the early 2000s (Figure 1); the 2005 total harvest of approximately 62,000 mt was the lowest observed since the early 1990s.

While various fishing gears have been employed over the years to harvest albacore in the North Pacific Ocean, the main gears used over the last five years were longline (36.0%), pole-and-line (37.5%), and troll (21.8%) (Figure 2). Other gears used since the mid-1990s included purse seine, gill net, unspecified and recreational fishing gears and accounted for roughly 5.5% of the total catch of albacore from the North Pacific Ocean.

2.1. Canada

Max Stocker presented a summary of catch, effort, and catch per unit of effort (CPUE) data for the Canadian north Pacific albacore tuna fishery in 2005 (**ISC/06/ALBWG/05**). The Canadian fishery for albacore in the North Pacific is a troll fishery using tuna jigs. All Canadian vessels must carry logbooks while fishing for highly migratory species in any waters. Detailed analysis of a combination of sales slips, logbooks, phone-in and trans-shipment records are undertaken to report fisheries statistics for the Canadian albacore fishery.

In 2005, 208 Canadian vessels operated in the North Pacific and caught 4,810 mt of albacore in 8,525 vessel days of fishing for a CPUE of 0.56 mt/vessel-day. Estimates for 2005 are considered preliminary. Both catch and CPUE have followed an increasing trend over the period 1995-2004 and then dropped in 2005. As in previous years, most of the 2005 catch was taken within 200-miles of the North American coast. Access by Canadian albacore vessels to waters in the US EEZ is governed by a US-Canada albacore treaty.

In terms of research activities, a project to document the existing relational database for the Canadian Pacific albacore catch and effort data is underway. A technical report is being prepared that describes the design of the entire database (including triplog, saleslip and hail components) based on a venn diagram concept, and include the relationship diagram that documents the structure of the relationships between these components.

2.1.1. Discussion

The group questioned the decrease in effort in offshore areas in 2005. The decrease was thought to be caused by increased fuel prices and depressed market conditions.

2.2. Japan

Koji Uosaki summarized recent trends in the Japanese fisheries (**ISC/06/ALBWG/04**). Japan has two major fisheries that catch albacore in the North Pacific, namely pole-and-line and longline. Other miscellaneous fisheries include purse seine, troll, and drift gillnet fisheries (Table 1). Total catches by the Japanese fisheries were 57,900 t in 2004 and decreased to 38,255 t in 2005. All 2005 figures are preliminary estimates. The albacore catch by the two major fisheries account for more than 90% of the total catch in recent years.

Pole-and-line catches were 32,255 t in 2004, and decreased to 16,883 t in 2005, the lowest reported catch during the last decade. The catch fluctuated ranging between 17,000-50,000 mt in the last decade. The pole-and-line fishery catches albacore during summer and autumn in areas from off Honshu-Island to the Emperor Sea Mount. This fishery targets primarily skipjack tuna and switches to albacore at the end of the skipjack season.

Longline albacore catches were 17,547 t in 2004 and 19,615 t in 2005. The catch shows a declining trend since 1996 when the catch peaked at 39,000 t. The longline fishery can be classified into two categories, the distant water and offshore longline fishery (vessels >20 GRT) and the coastal longline fishery (vessels < 20 GRT). The catches by both fisheries show a declining trend in recent years.

In 2004-2005, the coastal longline fleet operated principally off the eastern and southern coast of Japan, in an area between the Equator to 10°N, and 140°E to 150°E. The fleet caught albacore mainly during January-April, with catches distributed primarily off the south coast of Japan. In contrast, the 2004-2005 Japanese offshore and distant-water longline fleet (>20 GRT vessels) operated throughout the high-seas. High concentrations of effort were in areas between the Equator and 15°N, the east coast of Japan and 175°E, and in waters northeast of Hawaii. This longline fleet targeted mainly bigeye tuna in 2004-2005. Albacore were taken incidentally throughout the year and primarily from areas between 15°N to 40°N, and 150°E to 180°. Fishing effort and albacore catches in areas N-E of Hawaii drastically decreased from those in the 2002-2003 season.

Size (fork length, cm) measurements were taken from nearly 90,000 and 87,000 albacore landed by the longline fisheries in 2004 and 2005, respectively. Harvested albacore ranged between 50 cm and 120 cm. Size distributions showed two modes, namely at 75, 100 cm in 2004, 77, 102 cm in 2005. About 7,800 and 8,900 albacore were measured for length from pole-and-line landings in 2004 and 2005, respectively. Sizes of albacore caught ranged between 39 and 109 cm. The size distributions showed three modes, at approximately 52, 64 and 75 cm in 2004, and 54, 64, 78cm in 2005.

2.2.1. Discussion

The group discussed the decrease in albacore catches especially in the Japan pole and line fisheries. Japan indicated that this was caused by low availability of fish especially late in the year.

The group also noticed that the number of offshore and distant water longline vessels fishing in 2005 has decreased while the number of hooks fished has increased. Mr. Uosaki explained that this could be caused by the different areas represented in the two tables (north of the equator and north of 10 degrees N latitude). He also noted that coverage rates were low at the end of the year (Nov-Dec) and could also influence CPUE particularly of large vessels.

The group noticed the decrease in the number of hooks set by small longliners and the number of vessels fishing in 2005. Mr. Uosaki explained that this was probably due to the low logbook reporting rate and raising problems. Raising problems did not influence catch rate as raised data were not used.

2.3. South Korea

No information applicable to recent fisheries discussion was provided at this time. Korea has submitted catch data to the ISC data base for 2002-2005. However, albacore catches seem to be combined and reported in the other species and miscellaneous gear category.

2.4. Mexico

Luis Fleisher, representing the National Institute of Fisheries of Mexico (INP-Mexico), was unable to attend this meeting. However, Mexico sent the pertinent information and has been fully cooperating with the ALBWG efforts.

2.5. Chinese Taipei

No information applicable to recent fisheries discussion was provided at this time.

2.6. United States

In the U.S., North Pacific albacore are harvested by various types of fishing gear (Table 1). Troll gear has dominated since the early 1950s. During the last five years, troll fishing accounted for 81% of the total U.S. North Pacific albacore landings, with recreational fishing, and longline fishing generating roughly 13% and 4% respectively. Other gears included purse seine, pole-and-line, unspecified and gill net, which collectively accounted for only 2% of the total landings.

Al Coan reported on the U.S. albacore troll fishery that operated in the North Pacific Ocean in 2005 (**ISC/06/ALBWG/02**). During April-May, distant-water troll vessels begin fishing albacore in the central Pacific Ocean (around the International Date Line). As the fish become available off the North American coast in June and early July, the distant-water fleet moves closer to the coast and coastal vessels enter the fishery. The distributions of effort for the troll fishery in 2005 show this fishery operates from Mexico to Canada and from the west coast of North America to roughly 150°E. The majority of the 2005 albacore troll catch was concentrated mainly along the North American coast. The fleet continued a trend of decreased albacore catch and fishing in the mid Pacific Ocean and east of the International Date Line that started in 2004. Total albacore catch for U.S. North Pacific troll fishery was 13,346 mt in 2004, and declined to 9,122 mt in 2005 (Table 1). The number of vessels operating in the fishery decreased from 734 in

2004 to 652 in 2005. In 2005, 21,362 albacore were measured for fork length by port samplers. Fish ranged in size from 50-92 cm in length, with an average of 70 cm.

Al Coan reported on the U.S. longline fleets based in Hawaii and California (**ISC/06/ALBWG/03**). In 2005, U.S. longline vessels caught 277 metric tons (t) of albacore in the North Pacific Ocean, a reduction from the 560 t landed in 2004 and well below the peak catch of 1,652 t in 1997. Some of the catch was taken by the single vessel based in California, but most was recorded by the 124 active longline vessels based in Hawaii using shallow-set gear directed at swordfish or gear deployed deeper in the water column for bigeye tuna. The total fleet size has remained fairly stable over the past several years. The nominal effort by the U.S. fleet was about 35.1 million hooks in 2005, exceeding the 32.4 million hooks deployed in 2004.

During 2005, observers were deployed on 106 shallow-set trips (100% coverage) and 1,377 tuna trips (26% coverage) by Hawaii-based vessels. Observers were placed on one of the two tuna trips by the California-based vessel (shallow-set operations are not permitted by the California-based fleet). Observers on Hawaii-based longline vessels took fork length measurements on 3,577 of the 13,637 albacore they reported being caught. The observer on the California-based vessel also measured albacore.

Logbook data collected by Hawaii-based longline vessels in 2005 indicated that 3.6% of the albacore caught were discarded at sea. However, observer data suggest that discarding of albacore by these vessels may be more prevalent than indicated by logbook data, especially on trips targeting swordfish; this question is under investigation. All albacore caught by the California-based vessel were reported retained.

U.S. longline data for 2006 are being compiled and processed and will be disseminated as soon as they are validated and approved for release. The Hawaii-based shallow-set fishery for swordfish was closed on March 20 for the rest of 2006 because the swordfish fleet had already reached its annual incidental take limit for loggerhead sea turtles. The shallow-set fishery will resume in 2007. One of the new developments in the U.S. fishery for 2006 is the reported activity of a longline vessel based in Guam. Logbook data from this vessel are being collected by NMFS.

2.6.1. Discussion

The appropriateness of using a CPUE index for the U.S. longline fishery in the stock assessment was discussed. Two concerns were identified: 1) Regulations may have effected the index, and 2) Use of an index for a fishery that does not target albacore. The group agreed that this discussion should be addressed in the CPUE section. Mr. Coan was asked to capture the effect of U.S. longline regulations on albacore catches and develop quarterly plots of albacore catch and effort for the U.S. longline fishery for 2003 to 2005.

2.7. IATTC

No information applicable to recent fisheries discussion was provided at this time.

3.0 FISHERY STATISTICS

Al Coan reported on the current status of the North Pacific Albacore Working Group Data Catalog (**ISC/06/ALBWG/01**), including additions and updates made since the November-December 2005 Albacore Working Group meeting in La Jolla, California. The Data Catalog provides tables of fleet-specific data on annual catches of North Pacific albacore, the number of active vessels in each fishery (Category I), summarized logbook catch and effort (Category II), size composition (Category III) and the metadata for databases used for stock assessments, and other investigations. The Southwest Fisheries Science Center (SWFSC) in La Jolla, CA, U.S.A, maintains the Data Catalog and associated database files. It provides a secure FTP server at the Alaska Fisheries Science Center, and oversees the distribution of data to Workshop members and other scientists using the FTP site. The FTP site is accessible at ftp.afsc.noaa.gov. Access requires a user account and password. In addition to data and metadata, the site archives workshop reports, working papers from previous workshops, and derived analysis data sets (e.g., estimated catch-by-age matrices) used in albacore stock assessments.

The Data Catalog tables in ISC/06/ALBWG/01 reflect updates based on recent data submissions. Most of the data sets have been updated through 2005. In some instances uncertainty remains about table entries for recent catches because data updates have not yet been received (e.g., Category I data for the Korean longline fishery). Final catches received for this meeting are reflected in Table 1 of this report.

3.2. Discussion

Al Coan asked that the group consider three items:

1) Historical Category II and III data (Korea and Chinese Taipei) submitted from the ISC-ALBWG ftp site to the ISC in October of 2005 have not been transferred to the new ISC ftp site. A decision has to be made if the WG data manager will resubmit the data again or the ISC will copy the data to the respective ISC ftp site country folders. The WG will address this in other administrative matters later in the agenda.
2) Data are currently being submitted to the ISC and to the Albacore WG data bases. This policy will eventually lead to discrepancies in each data base. In order to alleviate this difference the group should decide whether to have data submitted to the ISC through the WG rather than directly to the ISC. The WG would rather keep their data base and will engage the Statistics Working Group to set up the necessary protocols.
3) The entire Chinese Taipei longline Category II data have been revised for the period 1964 to 2003. Since the changes are substantial, the WG Data Base Administrator needs some guidance from the WG in approving the data set for addition to the data base. The WG will check with Chinese Taipei to clarify

whether these new data were used to develop the standardized CPUE data used in the assessment models. If so, they will then recommend that the data be added.

The group agreed on the need for getting better information on Category I catch data for vessels presumed to have conducted illegal, unreported, and unregulated (IUU) fishing operations. Catches of North Pacific albacore may be taken but unreported by IUU vessels using longline or drift gill net gear. At the 19th Albacore Workshop, Adam Langley provided information from the OFP database on catches of albacore taken by IUU longline vessels in waters north of Hawaii but landed in the South Pacific. These data represented a partial reporting of the activity by these vessels. Adam Langley and Chien-Chung Hsu used these data to update entries in Table 1 for the “other longline” country category for 1996-2003. Workshop participants agreed to seek further information on activities of IUU vessels and work towards a comprehensive accounting of the North Pacific albacore catch, especially in 2004 and 2005 and for gillnet vessels..

4.0 BIOLOGICAL STUDIES

4.1. Age and Growth

Kyuji Watanabe presented a paper on length-weight (L-W) relationships for the North Pacific albacore (**ISC/06/ALBWG/14**). The L-W relationships at sex, area, season and year from 1990-2004 were investigated. The results were as follows: (1) The differences of the L-W relationships among the areas were found at each quarter; (2) in quarters 1, 2 and 4, condition factors *CF*s in area 4 tended to obviously decline in a range of approximately 90-140 cm as the length becomes bigger. (3) In quarters 1-3, condition factors in areas 1, 2 and 3 were higher than on average. While, in area 4, condition factors were below the average. Consequently, the utilization of the L-W equations for reliable estimations of the stock biomass and the spawning stock biomass was recommended.

4.2. Tagging Studies

4.2.1. Archival Tagging Studies

Koji Uosaki presented a summary of Japan’s albacore archival tagging program (**ISC/06/ALBWG/10**). Two albacore archival tagging sets were made during 2005-2006 by NRIFSF. In August 2005, a total of 50 tags (40 archrivals, 2 dummies and 8 conventional tags) were released at 43˚ – 44˚ N, 155˚ – 157˚ E. Size of tagged fish ranged from 51 to 58 cm in folk length, corresponding to age 2. In March 2006, a total of 13 tags (12 archrivals, 1 dummy) were released at 18˚ – 20˚ N, 135˚ – 137˚ E from the Research Vessel Shoyo-Maru. Size of tagged fish ranged from 94 to 103 cm in fork length, corresponding to adult albacore. The adult albacore archival tagging was a first in Japan. From these tagging sets, no tag has been recovered to date.

4.3. National Institute of Far Seas Fisheries - Japan

A scientific research cruise by the Japanese research vessel *Shoyo-maru* was conducted to investigate biology, ecology and stock dynamics of albacore (**ISC/06/ALBWG/12**). Ten longline operations were conducted around Okinotori-island (20-25ºN, 136-05ºW) during February 21 to March 7, 2006. GPS buoys, TDRs, small current meters and hook timers were attached to longline gear to monitor spatial and temporal movement of longline gear and to estimate hooking time and depth of the catch.

A total of 317 individuals consisting of 15 species were caught, which include four tuna and three billfish species. Albacore (118 individuals, 80-115cm FL) was the most frequently caught, and the mode was different between male (100-105cm FL) and female (95-100cm FL). A total of 41 individuals were caught by branch lines that were attached TDR or hook timer. Six of seven hook timers successfully recorded hooking time that ranged between 6:36 and 18:07 (local time).

Thirteen tags (12 archival tags and one dummy tag) were implanted during first to fifth longline operations (February 23-26, 2006). Pingers were attached to two adult albacore (97 and 96 cm FL) on February 27 and March 3, 2006. As a result of pinger tracking, both individuals died within a day after release although the second fish pingered seemed to be best condition. This result might be due to a damage of hauling-up from deep waters (adult individual). The authors recommended that it might be better to haul up slowly if the method of catching tunas using deep longline, or using other gears, such as pole-and-line to reduce mortality of tracking.

5. STOCK ASSESSMENT STUDIES

5.1. VPA-2BOX Model Analysis

Further details regarding sources of data and methods used to develop final time series and related model parameterizations particular to the VPA-based models are presented in paper **ISC/06/ALBWG/19**.

5.1.1. Catch-at-age Matrices

Catch-at-age matrices derived from fishery sample information are integral sources of data used in age-structured assessment models, such as VPA-2BOX (Porch 2003). Two papers were presented that generally addressed this subject: one paper from U.S. researchers that addressed the eastern North Pacific Ocean fisheries (**ISC/06/ALBWG/09**) and a paper from Japan researchers that focused on Japan's fisheries of the western North Pacific Ocean (**ISC/06/ALBWG/06**).

Paul Crone presented research (**ISC/06/ALBWG/09**) that addressed constructing catch-at-age matrices for the albacore fisheries in the 'eastern' North Pacific Ocean, i.e., based on sample data collected from vessels associated with the nations of North America (U.S., Canada, and Mexico). The estimation methods were based generally on the assumption that all 'surface' fisheries typically target juvenile albacore. Thus, size distributions derived from the U.S. troll fishery were applied to the catches of other ‘surface’ fisheries, including the pole-and-line, gill net, purse seine, and recreational fisheries of the U.S., as well as the Canada troll fishery, Mexico ‘unspecified’ fisheries, and ‘Others’ troll fisheries (Table 1).

For the single ‘sub-surface’ fishery that operated in the eastern North Pacific Ocean (i.e., the U.S. longline fishery), catch-at-age estimation was derived from biological (length and weight) data collected from an ongoing observer sampling program (1994-2005).

The two catch-at-age matrices for the surface and longline fisheries were simply summed together to produce a complete catch-at-age matrix that represented all fisheries (i.e., vessels from nations of North America) that operated in the eastern North Pacific Ocean (1966-2005). In summary, the complete catch-at-age matrix indicated that the vast majority of the albacore landed by the fisheries above were primarily juvenile fish (i.e., ages $\leq$5), which typically composed over 95% of the total (eastern North Pacific Ocean) landings in any given year (1966-2005).

Kyuji Watanabe presented methods used to develop catch-at-age matrices for Japan’s surface and longline fisheries (**ISC/06/ALBWG/06**). The catches-at-age of albacore by the Japanese fisheries in the North Pacific for 1966-2005 were updated. In the case of the Japanese large and small long line fisheries, the length-weight equations by quarter and area by Watanabe *et al*. (2006) instead to the length-weight equation by Suda and Warashina (1961). The estimated total catches slightly increased 4 to 6 millions during the 1960s-1970s, they reached 13 millions, but they began to decrease in the late 1970s, and dropped from about 5 to 2 millions during the early 1980s. Then, they gradually rose during the 1990s, reached to 10 million in 2002. To evaluate effects of the changes of the L-W equation on the catch number, the differences between the estimates induced from this change and those submitted in the ISC-ALBWG subgroup meeting in Nanaimo. However, both the fluctuations proved to be good fit with one another.

A single catch-at-age matrix (1966-2005) applicable to all (inclusive) fisheries was developed by simply summing the complete catch-at-age matrices independently derived above. Ultimately, this combined catch-at-age matrix served as the foundation for stock assessments based on the VPA-2BOX model analysis (Table 2).

5.1.1.1. Discussion

It was noted that the changes in Japan catch-at-age data (CAA) – from the CAA used for the 2004 assessment – were appreciable and tended to shift the total (annual) catch from smaller (younger) to larger (older) fish and thus, the WG noted that management-based parameters in units of biomass (vs. number of fish) would be most affected by these input data changes to the overall CAA. The effect of these changes on the assessment results will be fully explored and documented by the WG during this meeting.

5.1.2. Indices of Abundance

Indices of abundance (i.e., catch-per-unit-effort or CPUE) represent an important source of auxiliary data commonly used for 'tuning' purposes in VPA-based methods, such as the VPA-2BOX model. Several papers were presented that generally addressed this subject, including papers from the U.S. (**ISC/06/ALBWG/09**), and Japan (**ISC/06/ALBWG/07**, **ISC/06/ALBWG/08**, **ISC/06/ALBWG/11** and **ISC/06/ALBWG/13**).

Paul Crone presented research results regarding 'standardized' indices of abundance for both the U.S. troll and longline fisheries (**ISC/06/ALBWG/09**). Generalized Linear Model (GLM) estimation methods were used for purposes of standardizing catch and effort data collected from ongoing logbook sampling programs for the U.S. troll (1961-2005) and longline fleets (1991-2005).
The CPUE index applicable to the U.S. troll fishery indicated the stock size has fluctuated markedly since the 1960s, with generally declining catch rates from the 1960s to the late 1980s and increasing rates, albeit variable estimates, since the late 1980s (Figure 3). Since the early 1990s, catch rates for the U.S. longline fishery have been variable, ranging from 0.14 to 0.54 fish/set since 2000 (Figure 3).

Kyuji Watanabe presented a paper on age-specific abundance indices of the Japanese longline fisheries (**ISC/06/ALBWG/07**). The standardization of age-specific abundance index of albacore from Japanese large and small longline fisheries (L-LL and S-LL) in the North Pacific for 1966-2005 were improved. To use the indices throughout 1966-2005, the effects of area classification, fishery (the L-LL = 1, S-LL =2) and excluded gear configuration were compared throughout several models. The results showed that: (1) the effects of area classification can provide a decrease of AIC; (2) the effects of fishery and gear configurations are confounding; and (3) the model that excluded gear configuration during 1966-2005 was coincident with the model that included the effect of gear configuration. Consequently, the use of the model excluding gear configuration during 1966-2005 was recommended. In addition, the use of the indices of age 3 may not be appropriate since Japanese longline fisheries do not target this age class.

Koji Uosaki presented age-specific abundance indices applicable to the pole-and-line fishery (**ISC/06/ALBWG/08**). These indices were relatively low during the 1970s and through the mid 1980s, with higher estimates observed from the late 1980s through recent years. The age-specific abundance indices by fishing year indicated that 1999 and 2002 were associated with very high estimates, which represented the1995-99 year classes.

Kyuji Watanabe presented a paper on investigating declining abundance indices (**ISC/06/ALBWG/11**). The causes of the extreme decline of abundance indices for North Pacific albacore from the Japanese large longline (L-LL) fisheries from 2001-2004 were investigated as follows: (1) comparing the standardized CPUEs for North Pacific albacore by middle area *m*; (2) evaluating effectiveness of fishing effort as ratio for the estimated effective fishing effort to the aggregated fishing effort at *m* in year *y*; and (3) investigating annual catch number, hook number by grid 5˚ x5˚ . The results indicated that: (a) in almost all cases, the CPUEs largely dropped, slightly declined or remained constant during 2000-2004, but, these proved to increase a little bit in 2005; (b) in almost all cases, effectiveness of fishing effort remained below 1 over the period; and (c) at middle areas 1, 3, 5 and 8, where the standardized CPUEs were relatively high, the decrease rates of the catches were relative higher than those of the hook number. This decline of the standardized CPUEs from 2001-2004 implies a decrease in stock size. Consequently, the causes of the extreme decline of the CPUEs were low stock size and, in *m* 5, the decrease of hook numbers.

Kyuji Watanabe presented a paper on classification of horizontal habitats for albacore (**ISC/06/ALBWG/13**). To establish estimates of the correct abundance index for North Pacific albacore, the classification of horizontal habitats of the stock (considering similarities among variation patterns of the CPUEs and the fishing effort at area and their horizontal distributions) were performed as: (1) Conducting a principal component analysis (PCA) to examine similarities among annual fluctuations in CPUE and *x* (hook number) by area (a = 1, 70), which were caught by the L-LL during period studied; (2) calculating averages of the CPUE and the hook number at area over the period studied; (3) testing a cluster analysis for results of the PCA and the averages of the CPUE and fishing effort. The results indicated: (a) in large area 1, the trajectory of CPUE in the 2000s slightly increased at the range for 10°-35°N to 140°-180°E. While, they declined at the range for 30°-40°N to 140°-180°E; (b) the time series of hook number in the 2000s decreased bit by bit over large area 1, particularly, the hook number at the range for 10°-40°N to 160°-180°E decreased; (c) in large area 2, the trajectory of CPUE from 2003 largely dropped; (d) since 2003, the Hook number extremely declined over large area 2, but they slightly increased in the right side of large area 2; (e) in large area 3, the CPUEs fell gradually since 2001, particularly, in Northeast Pacific. They declined than those in Northwest Pacific; and (f) in large area 3, the hook number showed a decreasing trend. However, in a range from 10°-23°N to 120°-150°E, they rose gradually since 2002. Consequently, the cluster analysis generated from area classification in consideration of the mixed-information on the variation of the CPUE and the hook number and on their horizontal distributions.

A CPUE (age-aggregated index for the Japan pole-and-line fishery (1972-2005) remained at relatively low rates during the 1970s and 1980s (Figure 4). The index gradually increase in the 1990s peaking in 1999, declined markedly in 2000, increased to 2003 and decreased again to 2005 (Figure 4). The age-aggregated CPUE index for the Japanese L-LL fishery was relatively stable from 1966 through the late 1980s. The index increased markedly from 1990-2001 and has decrease since 2003 to historically low levels (Figure 4). The Chinese Taipei longline CPUE sows a marked decline from 1996-2005 (Figure 4).

5.1.2.1. Discussion

There is a ‘mismatch’ between U.S. LL size composition data and the reported (landed) catch. That is, the size composition time series is based on an observer sampling program, which indicates some amount of discarding (small fish) at sea prior to landing the harvest. Given that the landings from this fishery are very small relative to the total, Pacific Ocean-wide harvest, the WG felt that the impact of this potential discard issue on the current assessment model was likely minimal. However, if the U.S. LL CPUE continues to be used as an index of abundance in future assessment efforts, further consideration concerning appropriate parameterization of selectivity and catchability is warranted. Finally, the WG suggested: (1) to compile a history of regulations affecting the U.S. LL fishery (2002-2005), with particular emphasis on aspects of the regulations likely to affect albacore catchability and/or selectivity; and (2) to compare Japanese LL CPUE indices developed from similar spatial/temporal strata applicable to the U.S. LL fishery, i.e., these evaluations will provide a basis for further inclusion (or omission) of this index in upcoming assessments.

The "M-2006" Japanese longline (JLL) index of abundance is quite useful for the stock assessment because it begins in 1966, whereas the previously-used JLL index began in 1975. However, some concern was raised that the gear configuration factor – hooks per basket (HPB) – typically used in GLM analyses of longline CPUE was not incorporated into the M-2006 index. HPB was not used since the hooks per basket data are missing for several years of the early time series (1967-74).

From the various GLMs presented in **ISC/06/ALBWG/07** (some of which included the hooks per basket effect), there did not appear to be major differences in the standardized indices with and without the HPB effect. Based on these comparisons, the WG recommended that the M-2006 index be used for the 2006 assessment. For future assessments, however, the WG recommends developing a JLL index with the HPB effect beginning in 1966. This may be accomplished by simply assuming 5-9 HPB for all sets during 1967-74.

5.1.3. Results

The VPA team conducted VPA-2BOX model analysis for this year's Workshop using 'primary' sources of input data, i.e., the single, combined catch-at-age matrix (see Section 5.1.1. and Table 2) was used and the suite of candidate indices of abundance (see Section 5.1.2) was also used. Emmanis Dorval presented the results of a preliminary VPA analysis of the 1966-2005 data using the VPA-2BOX model (**ISC/06/ALBWG/19**). Fifteen different model runs were performed based on the following specifications:

<u>Model Scenario A</u>
This model scenario included the same catch-at-age (CAA), weight-at-age (WAA), index data (1975-2003), and parameterization as the 2004 VPA-2Box assessment model. The purpose of this scenario was to perform a validation run to show that we can accurately reproduce the results obtained in the 2004 model assessment.

<u>Model Scenario B1</u>
This model scenario included the same parameterization as in model A, but with a new set of 1975-2003 CAA. The catch-age matrix was updated due to the application of new weight –length relationship (Watanabe et al. 2006) to derive number-at-age from landing data; and also due to the use of a calendar year instead of a biological calendar to

distribute fish among age classes in the Japanese fisheries (Watanabe and Uosaki, 2006b).

Model Scenario B2
This model scenario included the same parameterization as in model A, but with a new set of 1975-2003 indices of abundances. Age-specific and age-aggregated indices were updated because of the application of a "new method" by the Japanese researchers (Watanabe and Uosaki 2006, Uosaki 2006) to derive these relative estimates of abundance. Additionally, the vulnerability indices that are associated to the age-aggregated indices were updated due to the new changes in the derivation of catch-at-age data (see above).

Model Scenario B3
This model scenario included the same parameterization as in model *A*, but with a new set of 1975-2003 WAA matrix. In this scenario we used Watanabe et al. (2006) equation, *all area combined/Quarter 1*, to compute January 1 biomass; and Watanabe et al. (2006) equation, *Area 2/Quarter 2*, to estimate mid-year (Month-6) biomass.

Model Scenario B4
This model scenario included the same parameterization as in model *A*, but with new set of 1975-2003 CAA and index data. The CAA matrix and indices used in this model were similar to Model *B2*, the WAA matrix from the 2004 assessment model was used.

Model Scenario B5
This model scenario included the same parameterization as in model A, but with new set of 1975-2003 CAA and WAA. CAA matrix in this model was similar to model B1, whereas WAA matrix was similar to model B3. The 2004 estimates for all indices were used.

Model Scenario B6
This model scenario included the same parameterization as in model *A*, but with new set of 1975-2003 index and WAA data. All index data were similar to model *B2*, but the WAA matrix was similar to model *B3*. The 2004 CAA matrix was used.

Model Scenario B7
This model scenario included the same parameterization as in model A, but with new set of 1975-2003 CAA, WAA, and index data. The CAA matrix in this model was similar to model *B1*, the WAA matrix to model *B3*, and the indices of abundance to model *B2*.

Model Scenario B8
This model scenario included the same parameterization as in model A, but with new set of 1975-2003 CAA, WAA, and index data along with the new Chinese Taipei age-aggregated index. The CAA, WAA, and index data for the US and Japanese fisheries were similar to model *B7*.

Model Scenario C1

This model scenario included the same parameterization as model *B8*, but with the time period for all input data extended forward to 2005. Newly available data for all fisheries in 2004 and 2005 were added to 1975-2003 data in model *B8*.

<u>Model Scenario C2</u>
This model scenario included the same parameterization as model *B8*, but with the time period for all input data extended back to 1966. Historical input data from 1966-1974 for the different fisheries were incorporated to the model in addition to the new set of 1975-2003 used in model *B8*.

<u>Model Scenario D1</u>
This model scenario included the same parameterization as model *C1*, with time period for all input data extended back to 1966. This model contains only new data spanning from 1966 to 2005, but the model parameterization is similar to the 2004 VPA2-Box assessment model.

<u>Model Scenario D2</u>
This model scenario included the same parameterization as model *D1*, but with only new 1975-2005 index data. The purpose of this run was to investigate the effect of deriving estimates for age-aggregated and age-specific indices on relatively few "biological" and fishery data during the period of 1966-1974. Both US and Japanese researchers had to perform more data substitution when deriving indices for 1966-1974 relative to the 1975-2005's period.

<u>Model Scenario D3</u>
This model scenario included the same parameterization as model *D1*, but with only the 1966-2005 age-aggregated index data. This model run was performed to determine the effects of removing all age-specific indices from model *D1*.

<u>Model Scenario D4</u>
This model scenario included the same parameterization as model *D1*, but with only 1966-2005 age-specific index data. The purpose of this model run was to determine the impact of removing all age-aggregated indices from the modeling process.

5.2. Alternative Stock Assessment Models

5.2.1. Stock Synthesis 2 (SS2)

Paul Crone presented preliminary research (**ISC/06/ALBWG/18**) that addressed an alternative population analysis of the North Pacific albacore stock using a length-based/age-structured, forward-simulation model (Stock Synthesis II, SS2). It is important to note that currently the International Scientific Committee's North Pacific Albacore Working Group (ISC-ALBWG) relies strictly on a VPA to develop consensus on the status of this fish population, which largely serves as the scientific information for guiding potential management. General methods of the SS2 modeling approach were presented, particularly, in respect to the ongoing assessment efforts applicable to the albacore population. Input data and parameterization files associated with a 'baseline' model scenario were generally discussed, as well as current difficulties associated with the development of this alternative assessment model. That is, currently, all input data (say time series) are not yet complete and further, some parameterization issues are currently unresolved.

It is important to note that the SS2 baseline model was developed in the context of the general VPA model, i.e., the baseline model reflects efforts to develop a configuration that generally mimics (mirrors) the parameterization of the VPA model. Thus, the SS2 baseline configuration should be viewed as the first 'phase' of an ongoing development of an alternative, more flexible modeling platform that can be used to assess the status of this fish population over the long-term, i.e., the overriding objective was to review model structure and not results from this baseline configuration. Finally, the alternative model is expected to receive substantial attention following this year's focused assessment-related exercises applicable to the VPA and ultimately, gain increasing support as the WG's assessment model for purposes of providing management-related advice within the ISC forum.

5.2.2. Discussion

The WG discussed the progress towards the development of an integrated statistical catch-at-age assessment model of NPO albacore using Stock Synthesis II (SS2). The WG reiterated its continuing supports of the development of an alternative model that is in addition to the VPA which is currently used to assess stock status. The WG acknowledges that additional work will be needed after the current WG to resolve or explain potential differences in results from the two assessment approaches.

The WG discussed the appropriate format of data for an SS2 assessment model of NPO albacore. It was noted that SS2 could use age-specific indices of relative abundance, but the WG concluded that age-aggregated indices were preferable. The WG also concluded that CPUE indices in SS2 should be fishery specific. It was also decided that the SS2 model should be started in 1966 with an initial catch of the same magnitude as the earliest recorded catches and that the initial age-structure should be estimated. Inputted values of natural mortality (*M*) and growth will be the same as used in the VPA. Finally, the WG agreed that some time series (e.g., CPUE information) currently used in the baseline (SS2) model will need revision, to some degree, in 2007 and thus, informal data exchange will need to take place during the summer 2007 in preparation for the next formal meeting, which is tentatively scheduled for early 2008.

6.0 STOCK ASSESSMENT CONCLUSIONS

6.1. Introduction

Following review of the preliminary VPA-2BOX (Porch 2003) runs presented by the VPA team, Workshop participants recommended that Model Scenario D1 be further evaluated. Maturity schedules (Ueyanagi 1957), length-weight relationship (**ISC/06/ALBWG/14**), growth curve (Suda 1966), and rates of natural mortality (*M* of 0.3 for all ages and years) were used. Model Scenario D1 was based on the following 17 indices: age-specific indices for ages 2-5 (U.S./Canada troll fishery); age-aggregated (assumed to represent ≥ 6-yr old fish) abundance index (U.S. longline fishery); age-specific indices for ages 2-5 (Japan pole-and-line fishery); age-specific indices for ages 3 to ≥ 9 (Japan longline fishery), and age-aggregated abundance index (Chinese Taipei longline fishery).

For the purposes of assessing current stock status and projecting future stock conditions, Model Scenario D1 was chosen as the preferred model, given: (1) statistical fits and diagnostics were deemed generally satisfactory; and (2) Model Scenario D1 utilized all of the available sample information. Workshop participants concluded that Model Scenario D1 represented a reasonable current understanding of the population dynamics of North Pacific albacore.

6.2. Input Data and Output Results From Model Scenario D1

The catch-at-age matrix used for the Workshop-based Model Scenario D1 run is presented in Table 2. Indices of abundance data and assumptions have been described generally in Section 5 above. The Model Scenario D1 estimates of numbers-at-age, and fishing mortality-at-age are presented in Tables 3 and 4, respectively. Also, given VPA-based methods commonly produce highly uncertain (imprecise) estimates of young fish for recent years, the following calculations were conducted: (1) numbers of age-1 fish in 2003-2004 reflected the mean estimate over the period 1966-98; and number of age-2 fish in 2006 reflected the exponential decline of age-1 fish in 2005 (i.e., e^{-Z} applied to the mean number of age-1 fish in 2005). Finally, extensive output associated with Model Scenario D1 can also be found in the Workshop Data Base Catalog, i.e., this output is archived in ‘pdf’ format and can be found at the site ‘ftp.afsc.noaa.gov.’ This output-related file includes all of the input data, statistical results (including diagnostics), and the complete suite of management-based results.

North Pacific albacore weight-at-age growth models used to calculate population abundance (from N_a) in Model D1 (based on a fixed age/year matrix) external to the population model, are shown in Table 6.

6.3. Results

6.3.1. Trends of Exploitable Biomass, Spawning Stock Biomass, and Recruitment

Estimated 'exploitable' (fishable) stock biomass (*B*, 'January 1' estimates for ages ≥1 filtered through the selectivity ogive) fluctuated around 150,000 mt from 1966-94. The biomass peaked in 1996 at 226,000 mt (Figure 5). From 1997-2003, exploitable biomass (January 1) declined to 161,000 mt, with a slight upward trend observed over the last few years with a 2006 (January 1) estimate of roughly 180,000 mt (80% *CI* of 121,000-263,000 mt). The 2006 fishable biomass is roughly 7% above the time series average of 169,000 mt (1966-2005).

Spawning stock biomass (*SSB*, 'May 1' estimates filtered through the maturity ogive) has experienced fluctuations around the modeled time series average of 100,000 mt (Figure 6). The 2006 stock assessment indicated that *SSB* increased from 2002 (73,000 mt) to 2005 (113,000 mt). The estimated spawning stock size in 2006 of about 153,000 mt is approximately 53% above the overall time series average (1966-2005).

For the purpose of comparison, exploitable *B* and *SSB* time series generated from the VPA-2BOX model in 2004 are also shown (Figures 5 and 6). For the most part, the 2004 and 2006 biomass trends were similar; however, some discrepancies exist, given primarily to the recent changes to catch-at-age data and abundance indices from Japan. Finally, the estimated time series for exploitable *B* and *SSB* should be evaluated in concert with the projected estimates (Figures 10 and 11, respectively).

Recruitment (R, age 1 fish) has substantially fluctuated over the period 1966-98 (Figure 7). A declining trend was observed from the late 1960s to the late 1980s. In recent years recruitment has fluctuated around the long term average of 27.75 million fish.

6.3.2. Biological Reference Points

The WG reviewed two documents relative to biological reference points. Papers **ISC/06/ALBWG/16** and **ISC/06/ALBWG/17**. Paper **ISC/06/ALBWG/16** relates to computational methods to calculating the plus age group statistics relative to stock forecasting and reference point estimation in the VPA2Box model. The WG reviewed and accepted the methodology. Paper **ISC/06/ALBWG/15** reviewed potential reference points that could be utilized for North Pacific albacore.

In the previous assessment, the determination of 'biological reference points' involved uncertainty analysis based on four model configurations that expressed uncertainty in terms of productivity and level of fishing mortality (high and low F), see Stocker (2005). The previous analyses indicated that the stock has experienced two, broad productivity periods; a low productivity period from 1975-1989 and a high period 1990-2000. However, in the current analysis, distinct productivity regimes were less clear and thus, a single productivity period was accommodated in this assessment. Therefore, computation of biological reference points was limited to examination of current levels of fishing mortality (*F*) relative to a suite of candidate biological reference points presented in Paper **ISC/06/ALBWG/15** (Table 5A).

Estimates of *F*-at-age were not adjusted for partial recruitment-at-age, but rather, partial recruitment-at-age was applied to *F* in the forward projections (see Section 6.3.3.). Partial recruitment schedule (selectivity ogive) was calculated in a straightforward fashion from Model D1 results as the geometric mean of estimated *F* from 2002-2004, normalized in accordance with maximum *F* over this time period (Figure 8). Also, equilibrium yield-per-recruit (*Y/R*) and spawning stock biomass-per-recruit (*SSB/R*) calculations were conducted using similar vital rates (growth, maturity, and natural mortality) as used in Model D1 calculations (Figure 8 and Table 6). Results from *Y/R* and *SSB/R* analyses are presented in Figure 9.

6.3.3. Stochastic Stock Projections

The initial conditions for the projections were taken from Model Scenario D1 (see Sections 6.1. and 6.2.). More specifically, the projections used terminal year (2006) stock numbers-at-age (N_a) and fishing mortality rate (geometric mean $F_{2002\text{-}04}$) estimated in the VPA-2BOX analysis, and partial recruitment (PR_a) reflected the mean from 2002-2004 (Figure 8). Constant *F* and PR_a were used for all years treated as the 'projection' period (2006-2020). The natural mortality, weight-at-age, and maturity-at-age parameters used in projections were identical to those used in the VPA-2BOX analysis (Model Scenario D1).

The stochastic projections were linked with bootstrap analysis that was carried out to estimate error associated with the VPA-2BOX-based parameters using similar methods and software as in previous assessments (Stocker 2005). Five hundred bootstrap replications were conducted, for a 15-year projection period (2006-2020) using Model Scenario D1. Along each of the projected trajectories, annual recruitment was drawn randomly (with replacement) from the pool of VPA-2BOX –estimated recruitments (i.e., 1966-98). The stochastic projection was designed to capture the variance in terminal year estimates, as well as recruitment variability in projection outputs.

Stochastic projection (2006-2020) of the 'exploitable' biomass shows a gradual decline to an equilibrium level of roughly 126,000 mt (with 80% CI of 99,000-155,000 mt) with the average productivity scenario (27.75 million age-1 fish per year) used in the simulations (Figure 10). Similarly, the spawning stock biomass (*SSB*) is projected to decline to an equilibrium level of 92,000 mt (with 80% CI of 69,000-116,000) by 2020 (Figure 11).

6.3.4. Stock Condition in Relation to Biological Reference Points

In addition to estimating stock sizes in the past (i.e., see Section 6.3.1.), it is desirable to assess 'current' conditions of both fishing mortality and stock biomass in relation to biological reference points of interest. Although inclusion of such reference points is becoming a standard feature of stock status determinations, there is no agreement yet as to which reference points are appropriate for tuna stocks, including North Pacific albacore. Accordingly, participants continued to take the approach adopted at the *Nineteenth North Pacific Albacore Workshop* (Stocker 2005) and simply compare current levels of fishing mortality and biomass with a familiar suite of reference points.

Evaluation and selection of preferred reference points is a task for the future and should be done by consensus among scientists, fishery managers, and stakeholders.

The biological reference points considered here fall into two categories: (1) reference points that may potential be candidates as *F*-based MSY proxies, namely $F_{40\%}$, $F_{30\%}$, and $F_{0.1}$; and (2) candidates to serve as *F*-based 'limit' proxies, namely $F_{20\%}$ F_{Max}, $F_{SSB\text{-}Min}$, $F_{SSB\text{-}10\%}$, and $F_{SSB\text{-}25\%}$. While it is recognized that this list of reference points does not encompass all possible reference points for North Pacific albacore, it does include the most commonly used reference points for contemporary fisheries management.

Under the 'current' level of *F*, the population is being fished at roughly $F_{17\%}$ (i.e., $F_{2002\text{-}2004}$ = 0.75), see Figure 9 and Tables 5A and 5B. These results are generally similar to the previous assessment conducted in 2004 (Stocker 2005). This conclusion regarding the spawning potential ratio reference point (i.e., $F_{\%}$) is essentially based on Model Scenario D1 (and assumptions regarding current *F*), coupled with the per-recruit analyses. However, in order to compare current levels of biomass with those at equilibrium that would result from fishing at any given *F*-based reference point, it is necessary to postulate the current productivity of the stock. That is, appropriate consideration of the status of the North Pacific albacore population necessarily involves assumptions regarding current levels of recruitment. In this context, important management-based statistics are presented in Table 5A. The management-based statistics from the 2004 assessment (Stocker 2005) are presented in Table 5B for the purpose of comparison. It should be noted that different definitions of 'current' *F* and selectivity were used for the 2004 and 2006 assessment. Thus, caution is advised when comparing *F*-related reference points presented in Table 5B.

The spawning stock biomass estimates (*SSB*) for the projection period (1966-05) were based on a 'current' F=0.75, selectivity (Figure 8), and forecasted recruitment (*R*) that reflected an average annual *R* as observed from 1966-1998 (*R*=27.75 million fish, Figure 7). The three horizontal lines (from top to bottom) represent the median *SSB* over the assessment period, the 25th percentile, and the 10th percentile, respectively (Figure 12).

The population projections and associated uncertainty was used to construct probability profiles for *SSB* (Figure 13). Each profile presents the probability that the spawning stock biomass will fall below a specified threshold level during one or more years of the projection period.

Finally, Table 7 provides the fishing mortality rates that will maintain the *SSB* above candidate 'thresholds' for two levels of desired probability. For example, if managers desire to maintain the *SSB* above the 25th percentile of observed *SSB* with a 95% probability of success, then the fishing mortality rate in the future should not exceed *F*=0.51 (current *F*=0.75).

In summary, although current *SSB* reached a historically high level in 2006 (roughly, 153,000 mt), projected levels of *SSB* are forecasted to decline to the long-term average (approximately 100,000 mt) observed over the modeled time period (1966-2005), i.e., the stock is predicted to decline to the equilibrium level of roughly 92,000 mt by 2015. Further, the WG strongly recommended that all countries support precautionary-based fishing practices (e.g., limits on current levels of fishing effort) at this time, given the following:

(1) the current level of fishing mortality (i.e., spawning potential ratio of $F_{17\%}$) is high relative to commonly used reference points and often associated with overfishing thresholds in various fisheries world-wide;

(2) a retrospective analysis indicated a noticeable trend of over-estimation of stock biomass over the last two assessment cycles;

(3) the considerable decline in total (North Pacific Ocean-wide) catch over the course of the last two years, particularly in 2005, when the total harvest (roughly, 62,000 mt) was the lowest recorded since the early 1990s; and

(4) a fishing mortality-based reference point (F_{SSB}) designed to ensure that *SSB* in future years remains within the range of the historical 'observed' *SSB* was introduced at an earlier ISC Plenary Meeting conducted in 2005. Even though the ISC forum has not yet determined which reference points are appropriate for North Pacific albacore (or other highly migratory stocks), preliminary discussions within the ISC Plenary forum were conducted in 2005 regarding candidate *SSB*-based 'thresholds' to consider, including: minimum 'observed', lower 10th percentile, lower 25th percentile, and median. In this context, at the 95% probability of success, all of thresholds (lower 10th percentile, lower 25th percentile, and median) would require reductions in future *F* from the current estimated level (F=0.75); noting that the future F=0.64 associated with the minimum 'observed' *SSB* target is roughly equal to the current rate. However, this minimum *SSB* value occurred at the beginning of the overall, estimated time series and necessarily reflects additional uncertainty. Thus, the WG felt that the thresholds based on the lower 10th percentile, lower 25th percentile, and median represented more robust and ultimately, precautionary thresholds that should be considered.

For the above reasons, the ISC-ALBWG emphasized the need for nations to closely monitor the population over the coming years to ensure the stock is responding favorably (say in sustainable terms) to present fishing practices in the North Pacific Ocean. Finally, the WG noted that considerable model simulation work will be needed immediately to better ascertain what management measures (e.g., addressing catch and/or effort) are appropriate for this tuna population and ultimately, to develop harvest control rule(s) that are likely to result in sustainable abundance levels in the long-term. In this context, the WG recognized that this research work is of the highest importance and thus, noted that the current assessment schedule may need to be offset (to some degree) to ensure such biological reference point-related analysis is undertaken.

7.0 RESEARCH RECOMMENDATIONS AND UPATED WORKPLAN

The recommendations are grouped into three broad categories: (1) Fishery statistics, (2) Biological studies and (3) Stock assessment studies.

7.1. Fisheries Statistics

Annual submission of fishery data by Data Correspondents to the Workshop Data Manager (Al Coan) for inclusion in the data base is a requirement of participants. Correspondents must pay special attention to submitting up-to-date fishery data on timely basis and well in advance of planned meetings.

7.1.1. Maintain Data Base Catalog

The data base catalog is to be maintained by the Workshop Data Manager as a record of available data, contributors and timeliness of submissions by Data Correspondents. The catalog also serves as a record of progress with special data requested of participants, such as detailed information on length-frequency samples: (1) sample size (i.e., number of fish measured) by year; (2) notes on measurement units, accuracy, etc. and sampling procedures used, particularly when procedures differ from the protocol; and (3) full description of steps employed and assumptions made in processing the samples to represent entire catches, particularly when different from Workshop standard procedures. The catalog is to be made available annually to participants.

7.1.2. IUU

The WG has insufficient data to analyze IUU impacts at this time. If the ISC wishes, the WG can develop simulations to evaluate differing patterns and levels of IUU fishing to evaluate the impact of simulated IUU removals on stock abundance and trends.

7.2. Biological Studies

Biological information is a critical building block for stock assessments. It should be reviewed and updated regularly in order to capture changes in population parameters if they occur.

7.2.1. Conduct Age and Growth Studies

There is a need for a wide range of related studies that the participants classified as age and growth. These include studies on weight-length relations, ageing techniques and growth curves. For all of these studies emphasis should be on developing parameter estimates that are applicable at the population level.

7.2.2. Conduct Studies on Behavior and Movement with Archival Tagging

Archival tags are being deployed off the U.S. West Coast by NMFS and off Japan by the NRIFSF to study albacore behavior and movement. So far, the results have not shown trans-Pacific movement, but movement solely within the respective eastern and western North Pacific where fish had been tagged. Both parties have plans for further deployment of tags and plan to report progress to the ISC-ALBWG on a regular basis.

7.3. Stock Assessment Studies

Recent stock assessment results as well as fishery developments suggest that the North Pacific albacore stock is at or fast approaching full exploitation by the fisheries. Demand for more frequent and more precise information on status of the stock and the sustainability of the fisheries, thus, is likely to increase. With this in mind, the ISC-ALBWG identified priority research needs to be executed in the near-term to improve analyses from current stock assessment models and to better understand the models' behavior to changes in parameter estimates and assumptions.

7.3.1. Conduct Research on Alternative Assessment Models

Exploratory work with the Stock Synthesis 2 model was conducted in 2006. Further research of this model as a stock assessment tool for albacore is recommended. Results of this research should be made available at the next ISC-ALBWG meeting (tentatively scheduled for early 2008).

7.3.2. Conduct Studies on Reference Points

Further development of appropriate biological reference points (MSY and limit-based) for North Pacific albacore is recommended. Currently, proxies for commonly used biological reference points are computed for the albacore stock. The proxies, however, span a wide range and research to narrow the range to appropriate ones needs to be undertaken. Such research should include determining robustness of the proxies through simulation studies and with both equilibrium and dynamic states.

7.3.8. Conduct Studies to Develop Abundance Indices

The accuracy of current stock assessments for albacore is largely constrained by the abundance indices used in the assessment models and obtained from fishery statistics. A thorough examination of abundance indices needs to be conducted in 2007.

8.0 ADMINISTRATIVE MATTERS

8.1. ISC-related Matters

The WG was directed to evaluate the effect of IUU fishing on the North Pacific albacore resource. Reportedly illegal fishing is occurring within the range of albacore. The characteristics and magnitude of this IUU fishing is unknown, but has the potential to increase total fishing mortality to unsustainable levels. The WG has insufficient data to analyze IUU impacts at this time. If the ISC wishes, the WG can develop simulations to evaluate differing patterns and levels of IUU fishing to evaluate the impact of simulated IUU removals on stock abundance and trends.

8.2. Procedures for Clearing the Report

A handout compiling available authors' paper summaries, rapporteurs' reports, and most figures was provided at the meeting for comments. A "complete" draft document will be distributed by the Chairman for review, comment and approval by participants by mid-March 2007. The Chairman will evaluate and incorporate all appropriate comments in a final text. Completion of this process and publication of a final Workshop report is planned for no later than the end of May 2007.

8.3. National Coordinators and Data Correspondents

As noted in Section 8.1., the Workshop will continue to maintain its data submission, management and exchange procedures and research coordination until these responsibilities are transferred to the ISC. Designated national coordinators and data correspondents, therefore, will continue in their roles. The coordinators and correspondents are as follows:

Sector	**National Coordinator**	**Data Correspondent**
Canada	Max Stocker	Max Stocker
Japan	Koji Uosaki	Koji Uosaki
Mexico	Luis Fleischer	Luis Fleisher
Chinese Taipei	Chien-Chung Hsu	Shui-Kai Chang
United States	Paul Crone	Al Coan
IATTC	Rick Deriso	Michael Hinton
SPC	Adam Langley	Peter Williams

8.4. Time and Place

The time and place for the next ISC-ALBWG meeting is planned for early 2008 (site still to be determined). Both the U.S. and Japan delegations have offered to host this meeting. The objectives of the meeting will be to: (1) update the catch (Table 1) to 2006; (2) conduct a thorough evaluation of the abundance indices; and (3) conduct further assessment modeling work using the SS2, with the goal of presenting sometime in 2008 a baseline model that can be used to develop WG-related consensus concerning the status of the albacore population in the North Pacific Ocean, i.e., further efforts will be needed to ensure input data (time series) are the best available, and model assumptions and related parameterization issues are appropriate (it is expected that this work will be completed sometime in mid-2008.

8.5. Acknowledgments

Workshop participants collectively thanked the hosts (National Research Institute of Far Seas Fisheries and staff) for their hospitality and overall meeting arrangements, which served as the foundation for meaningful scientific discussion and a successful meeting.

8.6. Adjournment

The Workshop was adjourned at 4:15 PM on December 5, 2006. The chairperson (Max Stocker) thanked all of the participants for their attendance and contributions and finally, stressed to National Coordinators the need to maintain ongoing communication concerning scientific data exchange and research applicable to North Pacific albacore, as well as scheduling future ALBW meetings, such as the proposed November 2007 meetings discussed here.

9.0 REFERENCES

Porch, C. E. 2003. VPA-2BOX: User's guide (Version 3.01). Sustainable Fisheries Division Contribution SFD-01/02-151, Southeast Fisheries Science Center, 75 Virginia Beach Dr., Miami, FL 33149, USA. 69 p.

Stocker, M. 2005 (editor). *Report of the Nineteenth North Pacific Albacore Workshop*. Nineteenth North Pacific Albacore Workshop, Nanaimo, B.C., Canada, November 25-December 2, 2004. Fisheries and Oceans Canada, Pacific Biological Station, Nanaimo, B.C., Canada. 127 p.

Suda, A. 1966. Catch variations in the North Pacific albacore VI. The speculation about influence of fisheries on the catch and abundance of the albacore in the north-west Pacific by use of some simplified mathematical models (continued paper - I). Rep. Nankai Reg. Fish. Res. Lab. 24:1-14.

Suda, A and Y. Warashina. 1961. Some consideration on factor of albacore in the North West Pacific, especially on differences between albacore caught by longline and pole and line methods. Rep. Nankai Reg. Fish. Res. Lab. 13:21-34.

Ueyanagi, S. 1957. Spawning of the albacore in the Western Pacific. Rep. Nankai Reg. Fish. Res. Lab. 6:113-124.

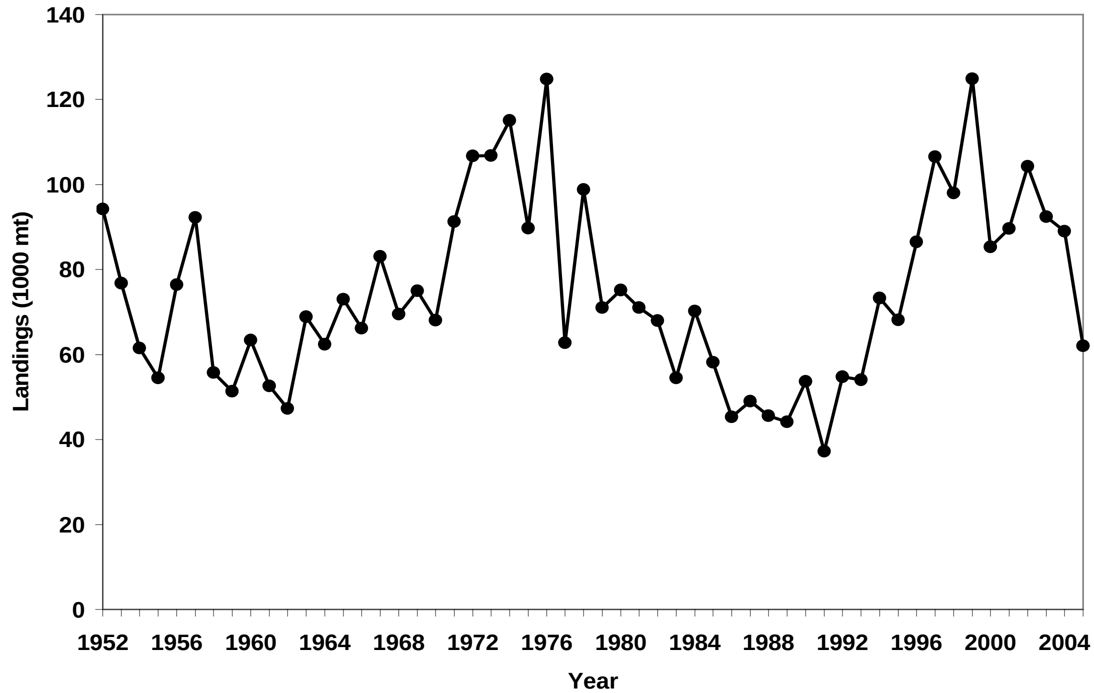


Figure 1. North Pacific Ocean albacore landings for all gears and nations combined (1952-05).

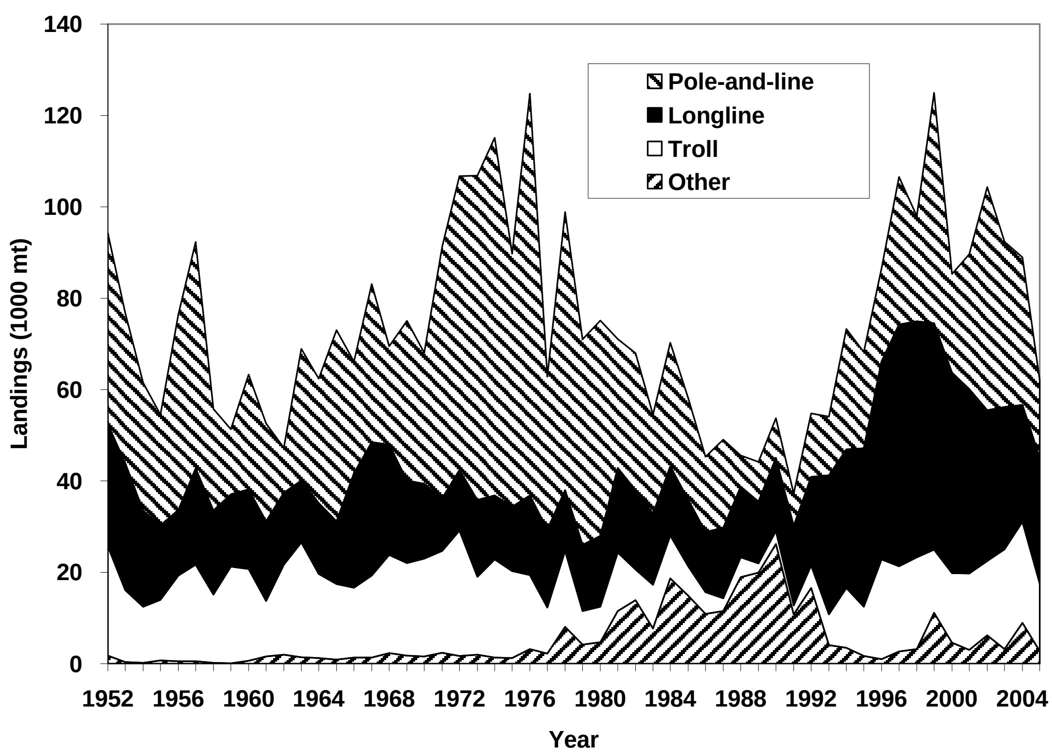


Figure 2. North Pacific Ocean albacore landings by gear, all nations combined (1952-05).

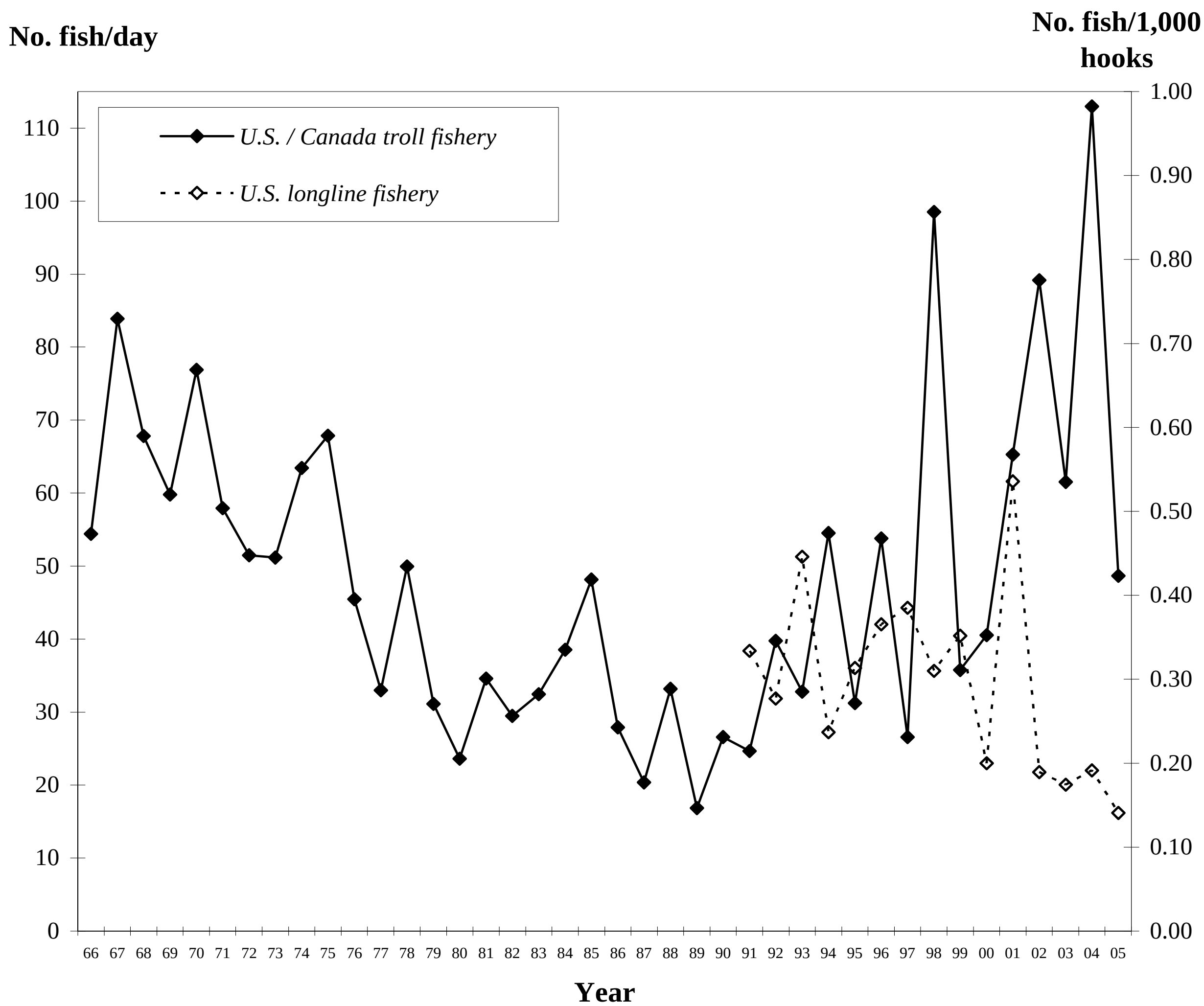


Figure 3. North Pacific albacore 'standardized' CPUE relative indices of abundance for the U.S. / Canada troll (1966-05) and U.S. longline (1991-05) fisheries.

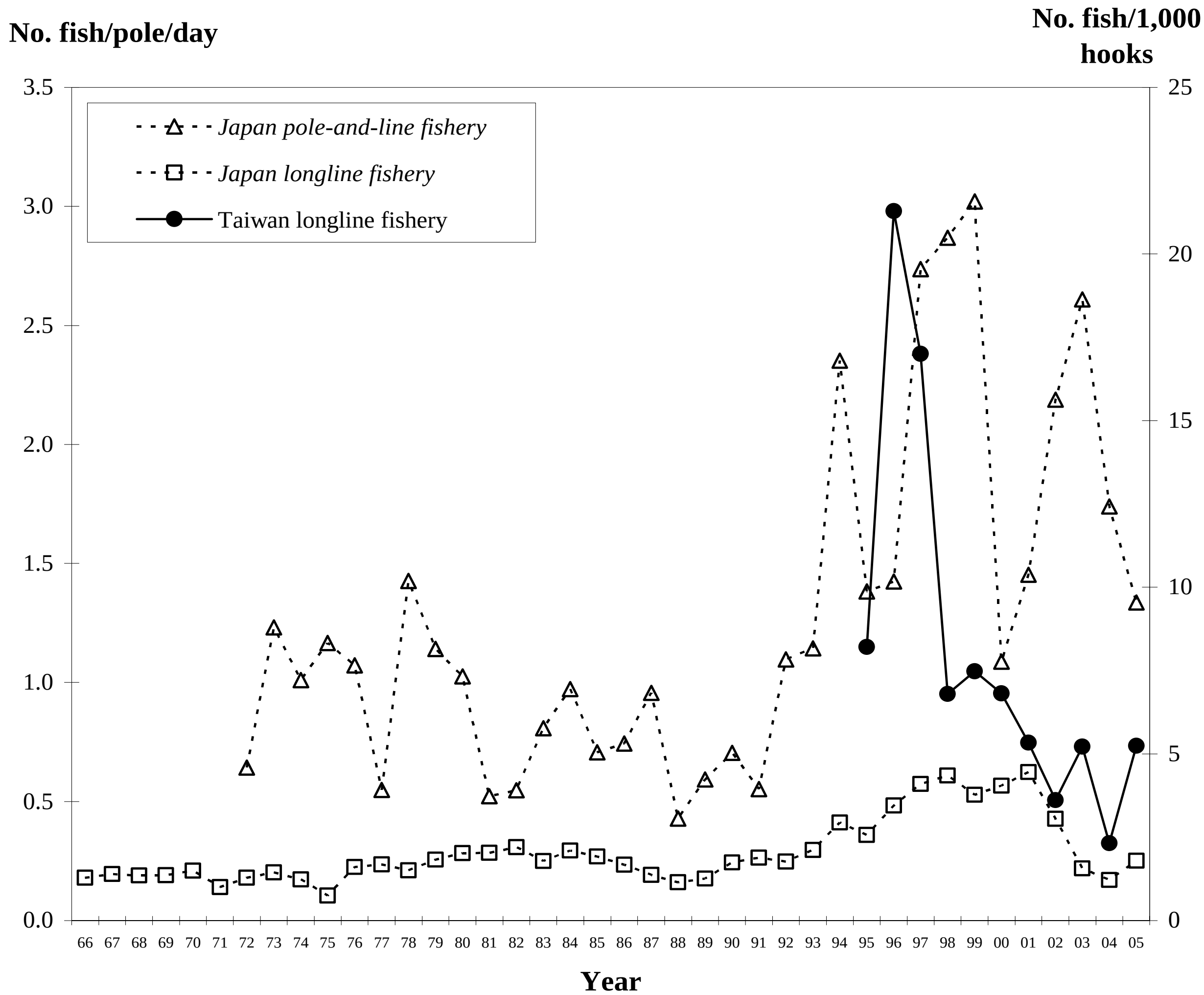


Figure 4. North Pacific albacore 'standardized' CPUE relative indices of abundance for western Pacific Ocean fisheries: Japan pole-and-line (1972-05); Japan longline (offshore/distant-water, 1966-05); and Chinese Taipei longline (1995-05).

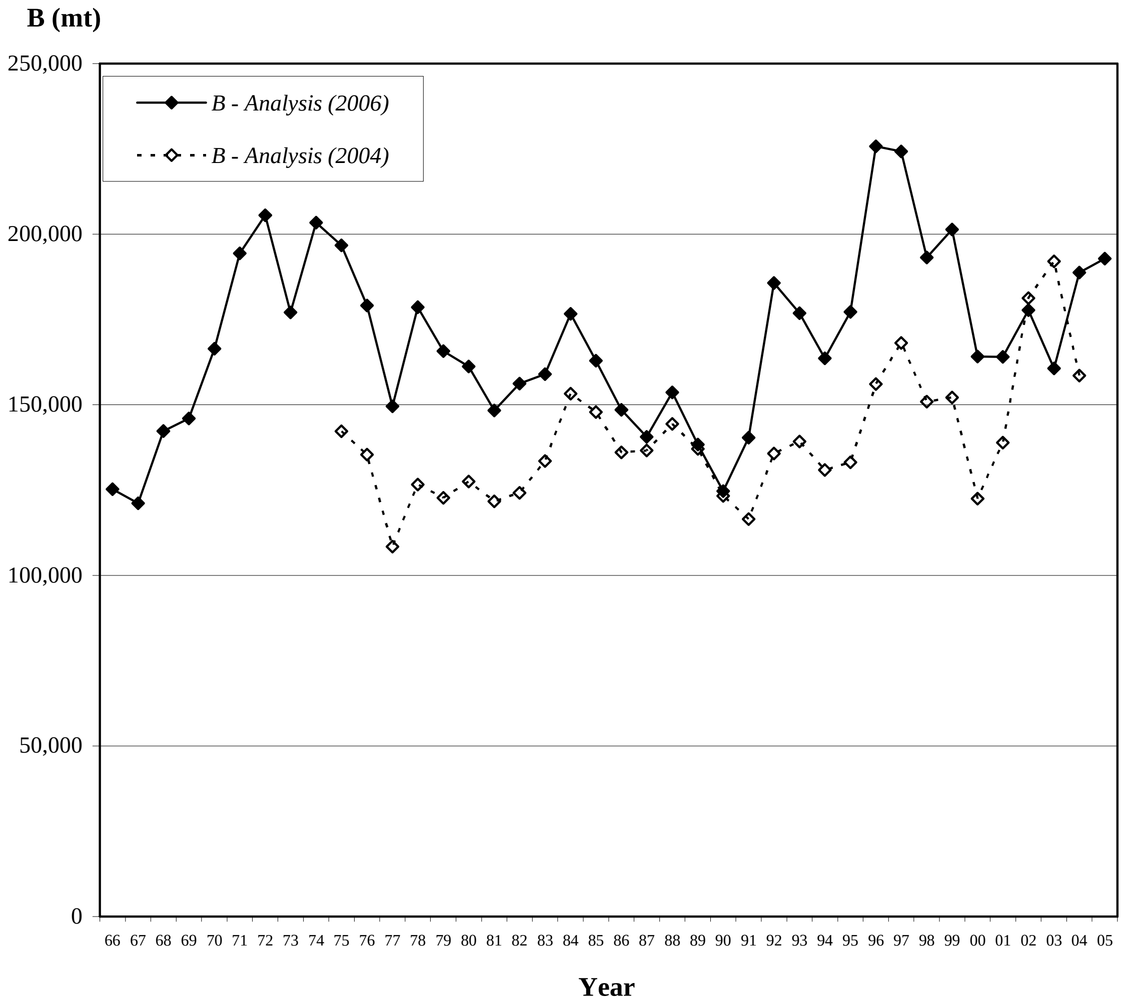


Figure 5. Total ‘exploitable’ stock biomass (*B*, mt) time series (1966-05) for North Pacific albacore generated from Model D1 (Analysis 2006). Final estimated time series from the previous North Pacific Albacore Workshop (2004) is also presented (Analysis 2004, 1975-03). Time series for *B* are based on ‘January 1’ estimates.

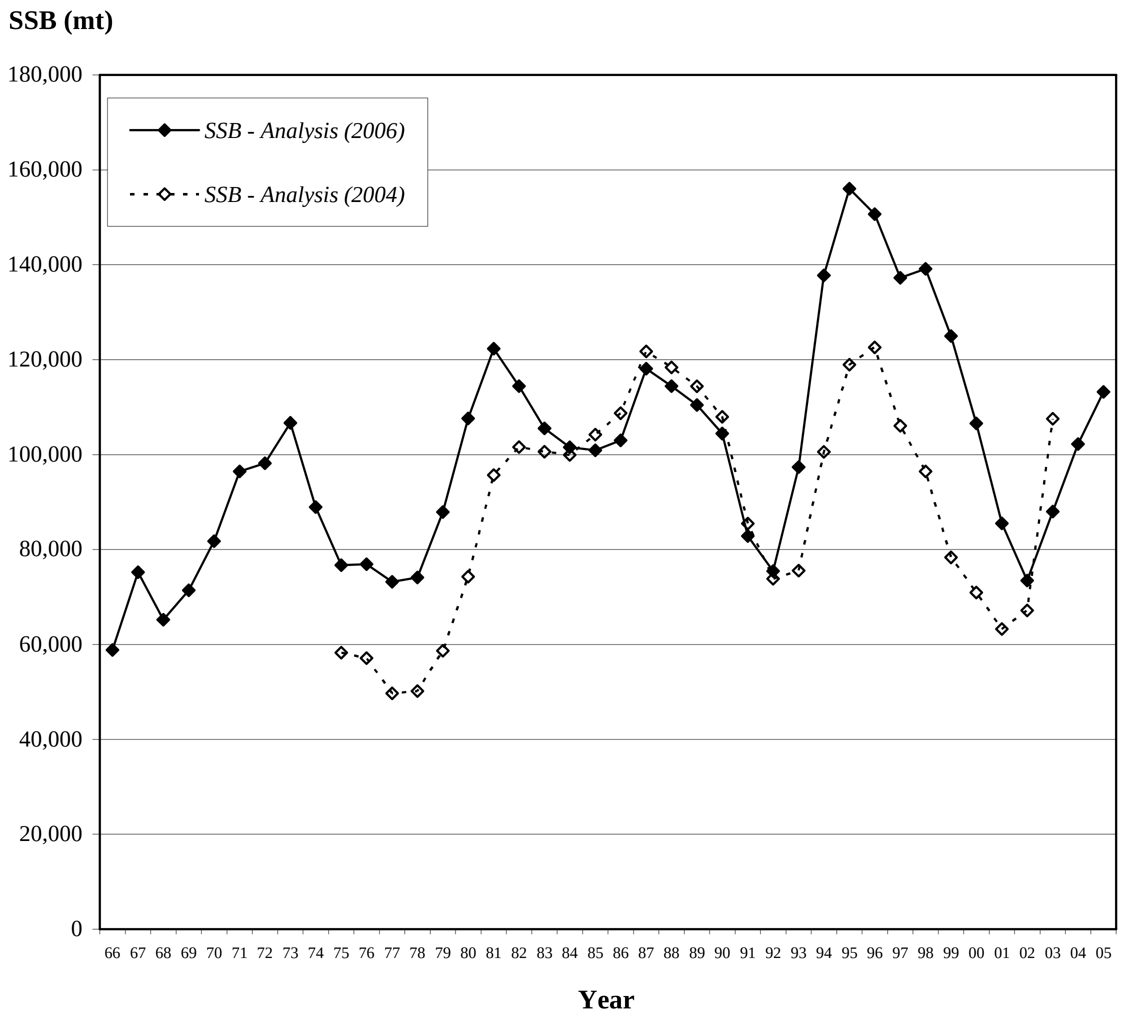


Figure 6. Spawning stock biomass (*SSB*, mt) time series (1966-05) for North Pacific albacore generated from Model D1 (Analysis 2006). Final estimated time series from the previous North Pacific Albacore Workshop (2004) is also presented (Analysis 2004, 1975-03). Time series for *SSB* are based on 'May 1' estimates.

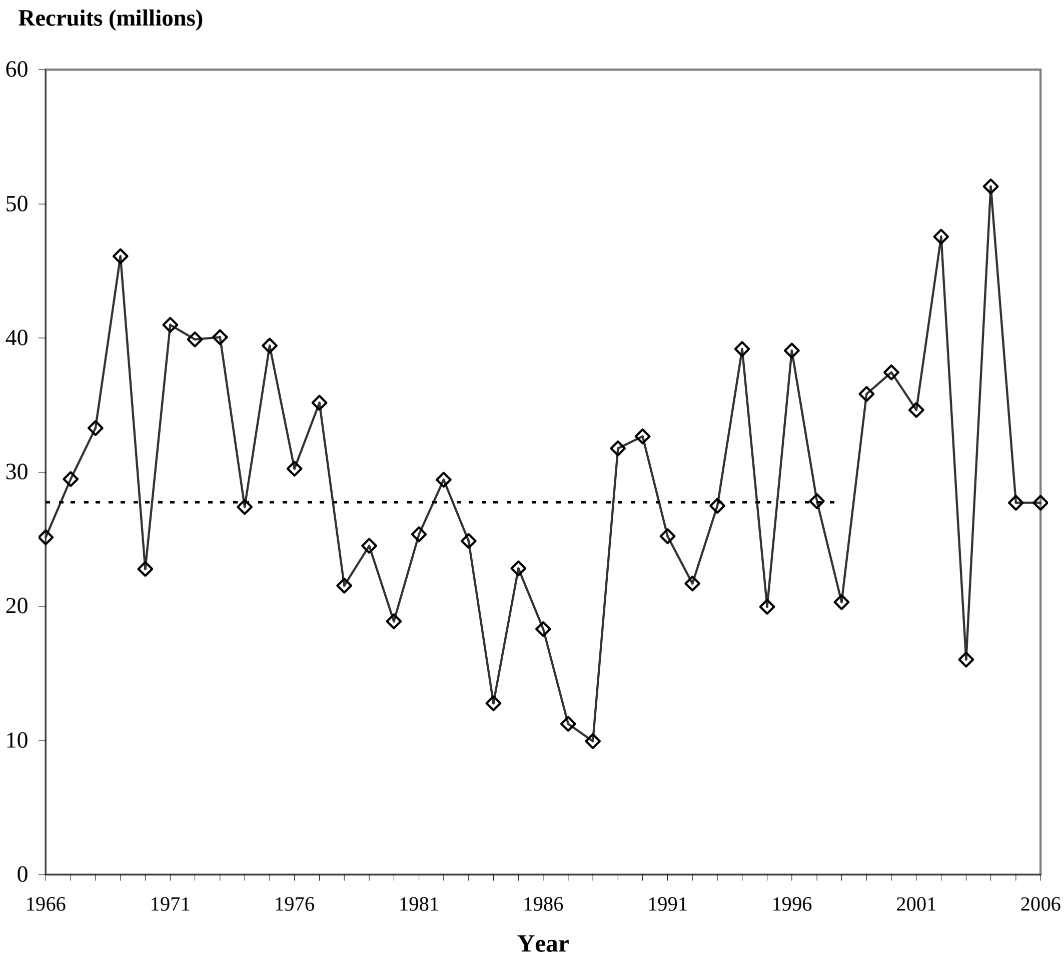


Figure 7. Recruitment (age-1 fish in millions) time series of North Pacific albacore generated from Model D1 (1966-98). Mean (1966-98) recruitment is presented as horizontal dashed line. Figure in 2005 and 2006 were derived from the mean recruitement.

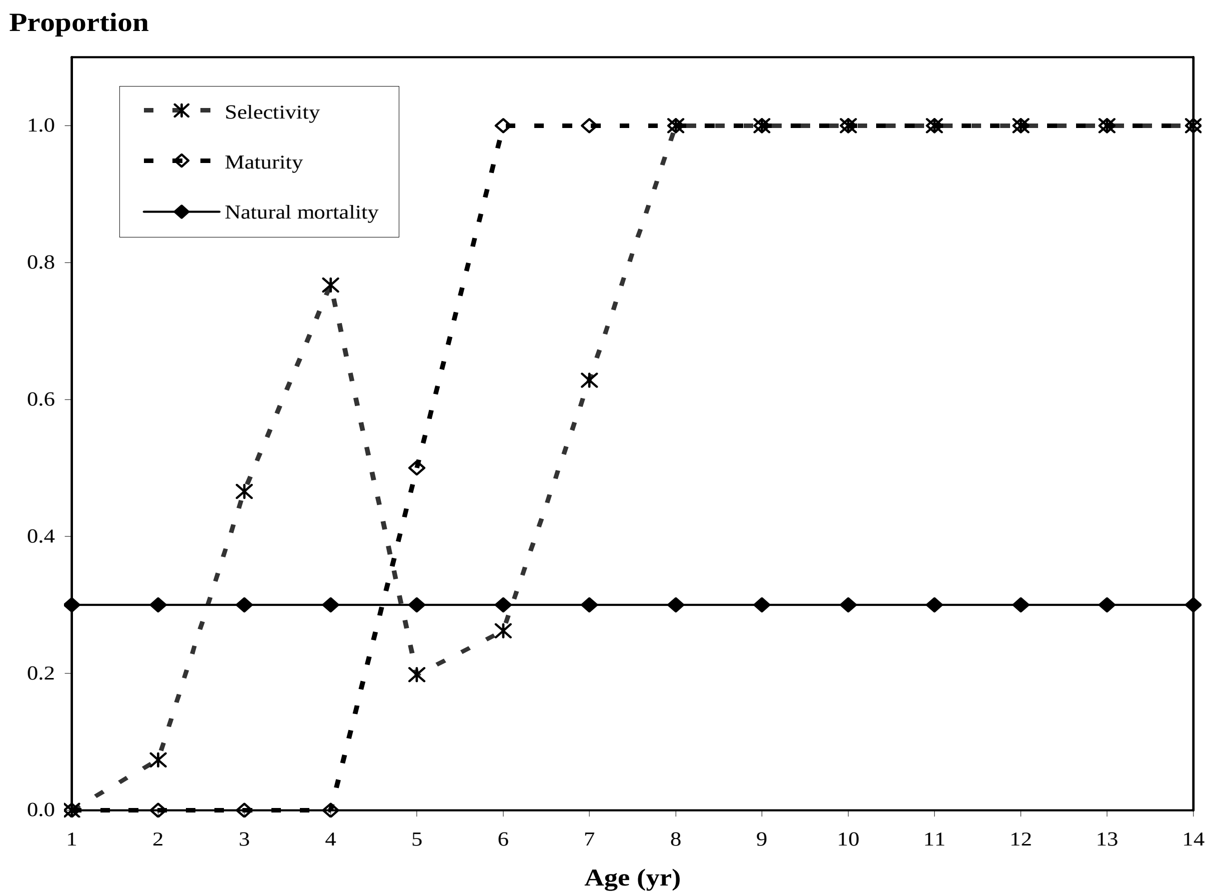


Figure 8. Partial recruitment (i.e., selectivity), maturity (Ueyangi 1957), and natural mortality (*M*) schedules used to determine biological reference points associated with Model D1.

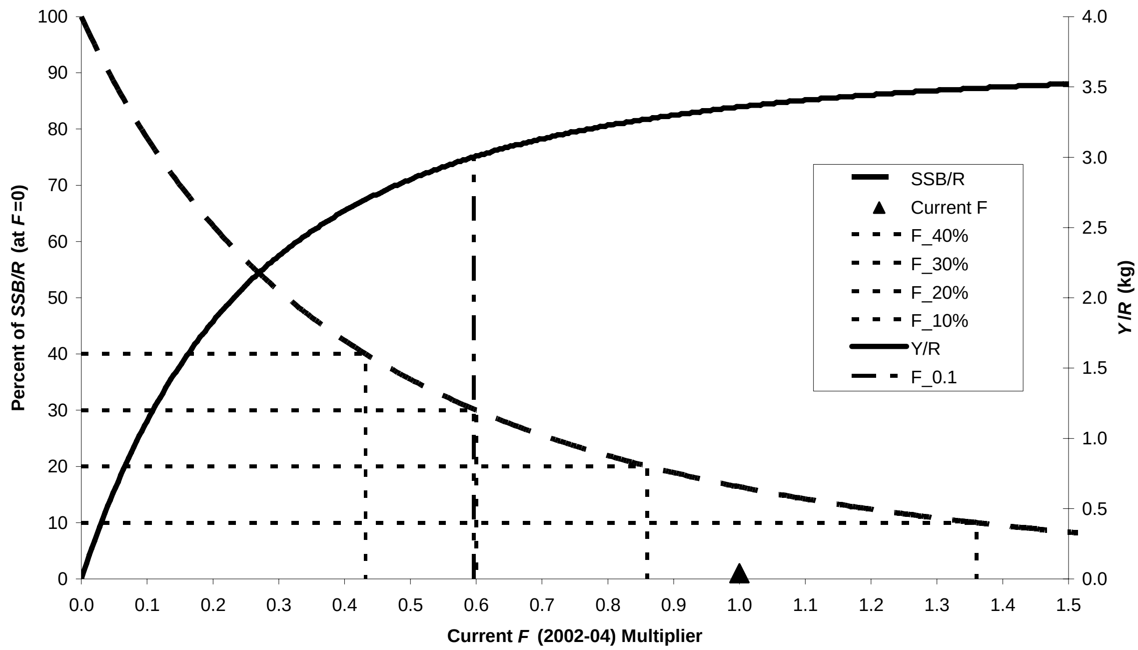


Figure 9. Equilibrium yield-per-recruit (*Y*/*R*, in kg) and percent of *SSB*/*R* (relative to *F*=0) for various *F*-based biological reference points as a function of fishing mortality rate (*F*) for North Pacific albacore associated with Model D1. The current fishing mortality rate multiplier (*F*=1.0 when $F=F_{2002\text{-}04}$) is based on the fully-selected *F* (*F*=0.75 for age groups 8 and 9+) observed from the mean (geometric) of *F*-at-age estimates from 2002-04. The current F multiplier for the maximum *Y*/*R* reference point was also estimated ($F_{max}/F_{2002\text{-}04}$ =2.8), but is not displayed here.

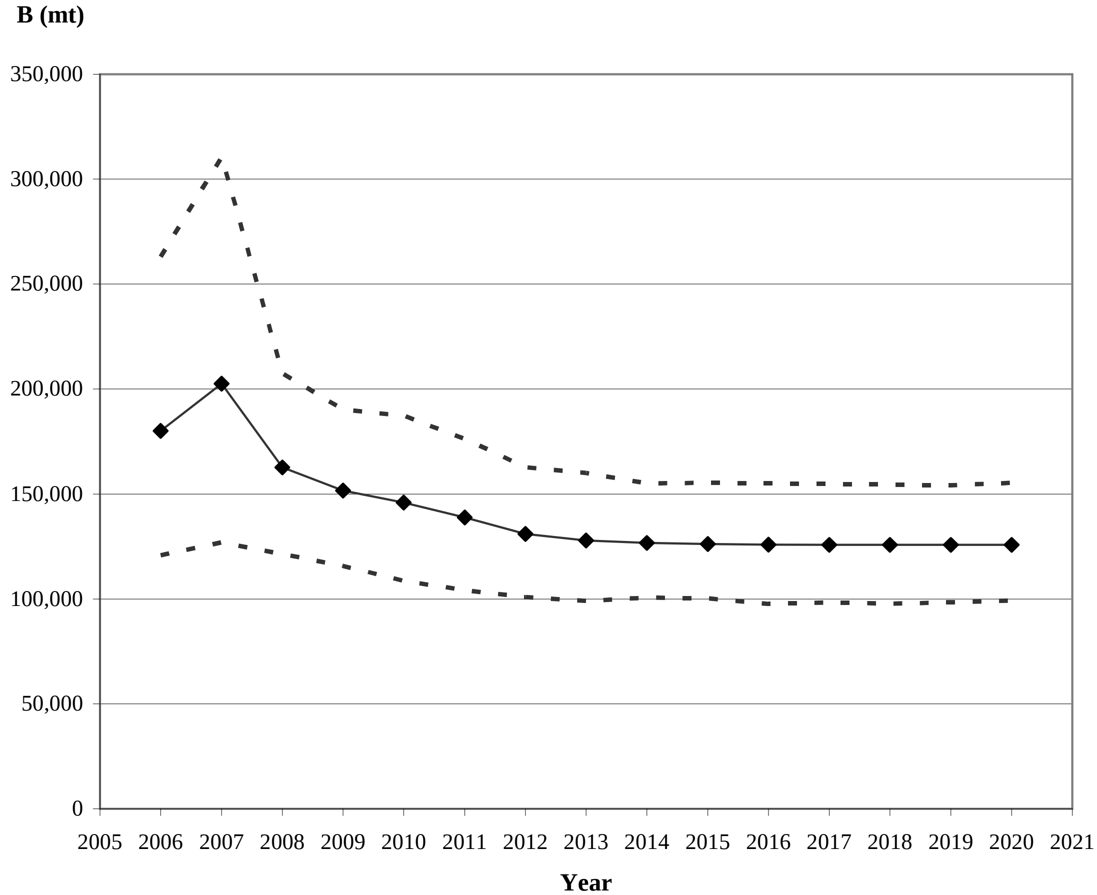


Figure 10. Stochastic projection (2006-20) of 'exploitable' biomass (*B*, mt) for North Pacific albacore based on Model D1 (Analysis 2006). Dashed lines represent 80% CI. Time series for *B* is based on 'January 1' estimates.

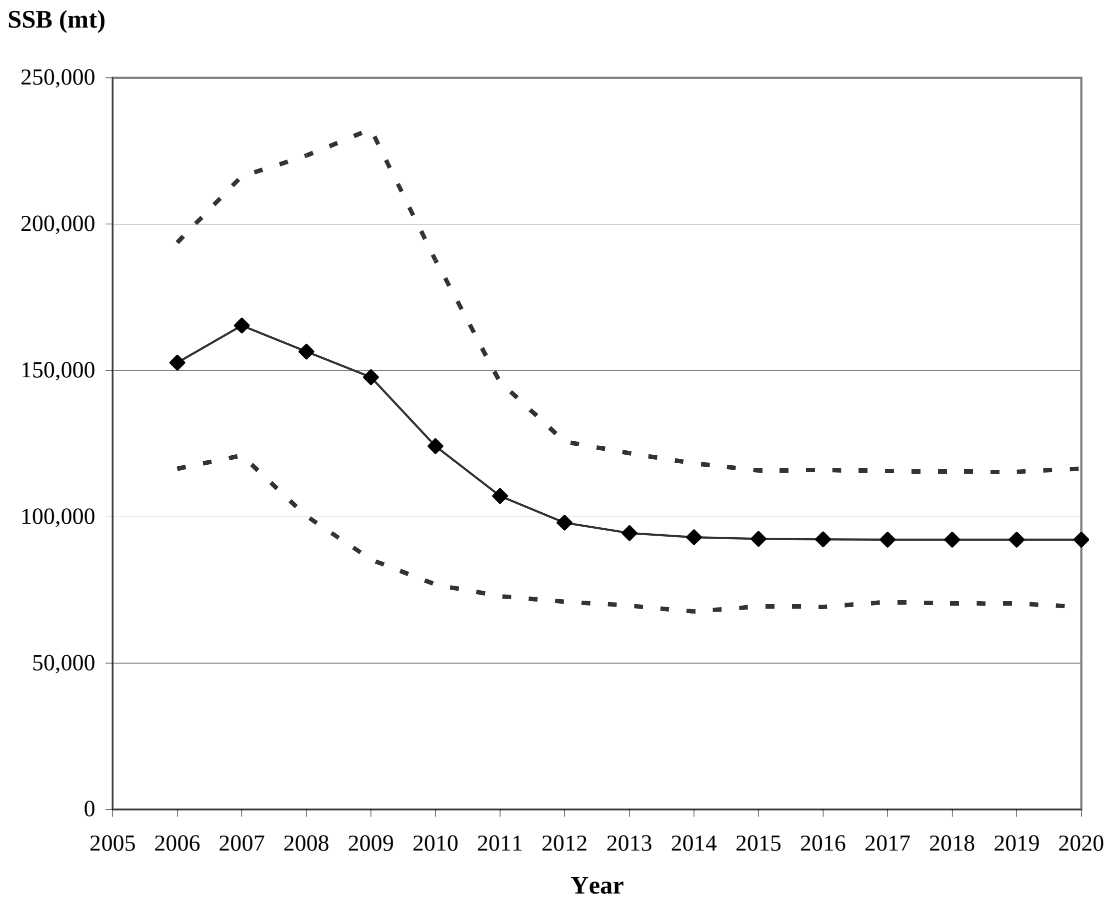


Figure 11. Stochastic projection (2006-20) of spawning stock biomass (*SSB*, mt) for North Pacific albacore based on Model D1 (Analysis 2006). Dashed lines represent 80% CI. Time series for *SSB* is based on 'May 1' estimates.

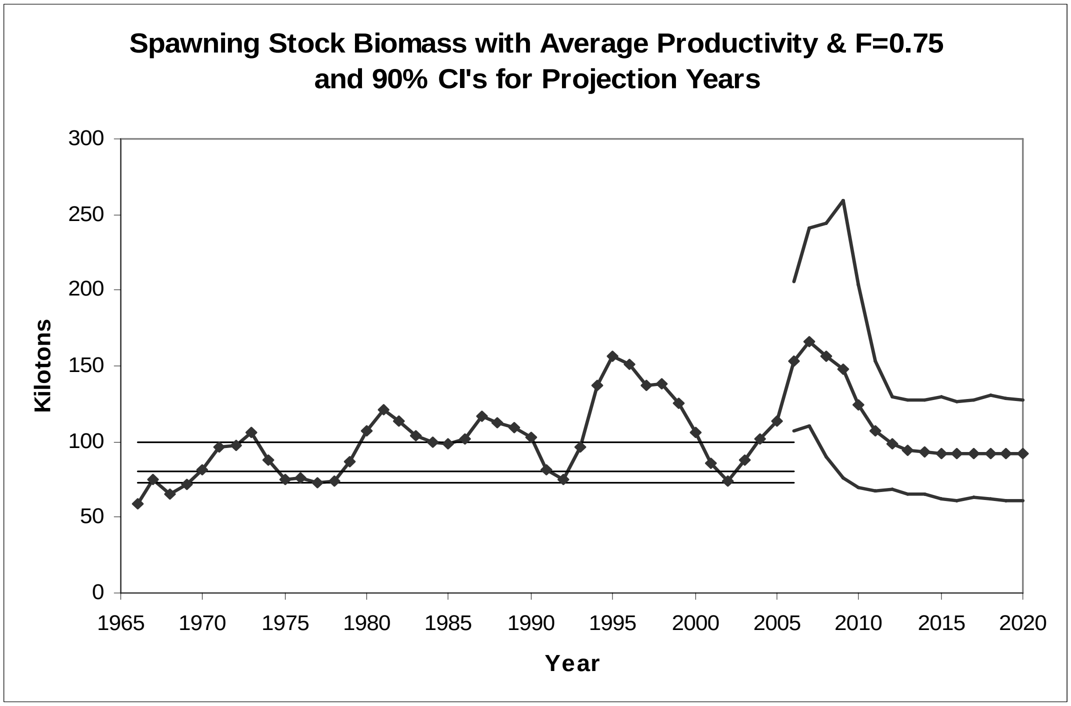


Figure 12. Spawning stock biomass estimates (*SSB*) for the assessment period (1966-2005) and for the projection period (2006-2020). Confidence intervals (90%) for the projection period are also displayed. The three horizontal lines (from top to bottom) represent the median *SSB* over the assessment period, the 25th percentile, and the 10th percentile, respectively. The stock projections were done using the 'current' *F*=0.75 and selectivity; and with annual recruitment (*R*) drawn randomly from the *R*s estimated over the 1966-98 period (average *R* = 27.75 million fish).

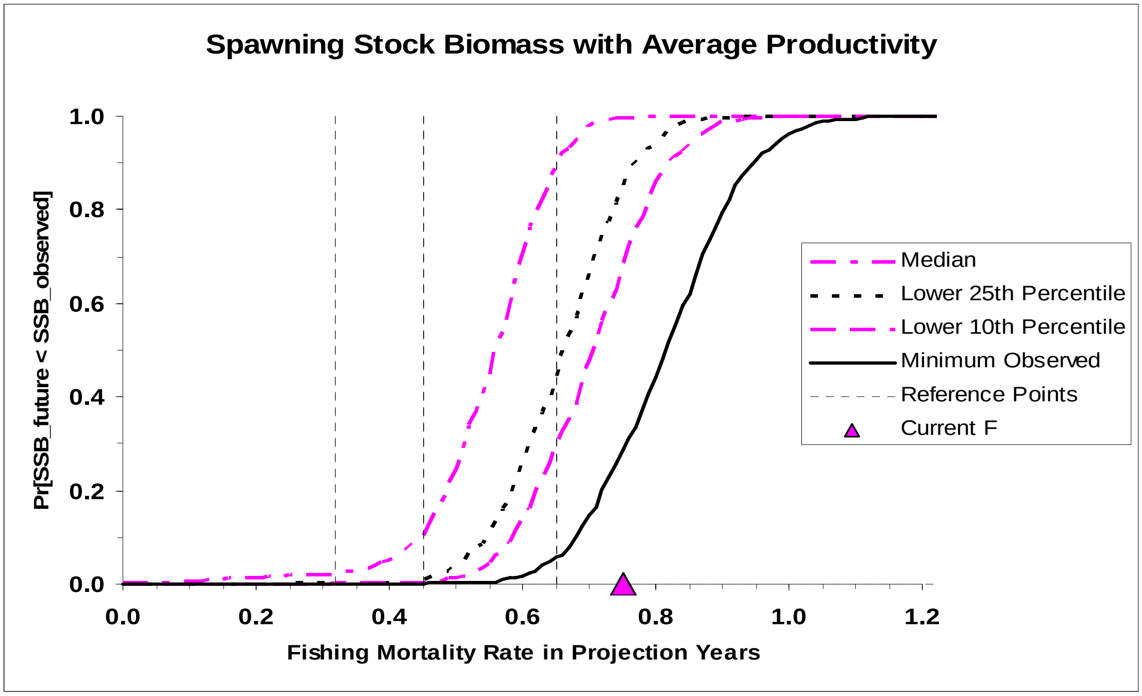


Figure 13. Probability profiles for four spawning stock biomass (*SSB*) threshold levels (from bottom to top – Minimum Observed *SSB*; Lower 10th Percentile; Lower 25th Percentile; and Median *SSB*). Each profile gives the probability that SSB will fall below the respective threshold level during one or more years of the projection period (2006-2030). For the bottom-most profile, the threshold is the minimum 'observed' *SSB* over the assessment period (1966-2006). The other three profiles (from bottom to top) have as their threshold the lower 10th percentile, the lower 25th percentile, and the median 'observed' *SSB* over the assessment period, respectively. For example, the fishing mortality rate (*F*) that will cause *SSB* to fall below the minimum 'observed' biomass (with 50% probability) is *F*=0.81; and the corresponding *F* for the 25th percentile is *F*=0.66. See Table 7 for a complete list of *F*s associated with these limit reference points. For reference, other *F*-based biological reference points (cf. Table 5) are displayed with vertical dashed lines – the leftmost line is $F_{40\%}$=0.32; the center line is $F_{30\%}$= $F_{0.1}$=0.45; and the rightmost line is $F_{20\%}$=0.65. The current *F*=0.75 is indicated with a triangular marker.

Table 1. North Pacific albacore catches (in metric tons) by fisheries, 1952-2005[1]. Blank indicates no effort. **--** indicates data not available. 0 indicates less than 1 metric ton. Provisional estimates in ().

YEAR	CANADA	JAPAN						KOREA		MEXICO
	TROLL	GILL NET	LONG LINE	POLE & LINE	PURSE SEINE	TROLL	UNSP. GEAR	GILL NET	LONG LINE	UNSP. GEAR
1952	71		26,687	41,787	154		237			
1953	5		27,777	32,921	38		132			
1954			20,958	28,069	23		38			
1955			16,277	24,236	8		136			
1956	17		14,341	42,810			57			
1957	8		21,053	49,500	83		151			
1958	74		18,432	22,175	8		124			
1959	212		15,802	14,252			67			
1960	5		17,369	25,156			76			
1961	4		17,437	18,639	7		268			0
1962	1		15,764	8,729	53		191			0
1963	5		13,464	26,420	59		218			0
1964	3		15,458	23,858	128		319			0
1965	15		13,701	41,491	11		121			0
1966	44		25,050	22,830	111		585			0
1967	161		28,869	30,481	89		520			
1968	1,028		23,961	16,597	267		1,109			
1969	1,365		18,030	31,912	521		935			0
1970	390		16,283	24,263	317		456			0
1971	1,746		11,524	52,957	902		308			0
1972	3,921	1	13,043	60,569	277		623			100
1973	1,400	39	16,795	68,767	1,353		495			0
1974	1,331	224	13,409	73,564	161		879			1
1975	111	166	10,318	52,152	159		228		2,463	1
1976	278	1,070	15,825	85,336	1,109		272		859	36
1977	53	688	15,696	31,934	669		355		792	0
1978	23	4,029	13,023	59,877	1,115		2,078		228	1
1979	521	2,856	14,215	44,662	125		1,126	0	259	1
1980	212	2,986	14,689	46,742	329		1,179	6	597	31
1981	200	10,348	17,922	27,426	252		663	16	459	8
1982	104	12,511	16,767	29,614	561		440	113	387	7
1983	225	6,852	15,097	21,098	350		118	233	454	33
1984	50	8,988	15,060	26,013	3,380		511	516	136	113
1985	56	11,204	14,351	20,714	1,533		305	576	291	49
1986	30	7,813	12,928	16,096	1,542		626	726	241	3
1987	104	6,698	14,702	19,082	1,205		155	817	549	7
1988	155	9,074	14,731	6,216	1,208		134	1,016	409	15
1989	140	7,437	13,104	8,629	2,521		393	1,023	150	2
1990	302	6,064	15,789	8,532	1,995		249	1,016	6	2
1991	139	3,401	17,046	7,103	2,652		392	852	3	2
1992	363	2,721	19,049	13,888	4,104		1,527	271	15	10
1993	494	287	29,966	12,797	2,889		867		32	11
1994	1,998	263	29,600	26,389	2,026		799		45	6
1995	1,720	282	29,075	20,981	1,177	856	81		440	5
1996	3,591	116	32,493	20,272	581	815	117		333	21
1997	2,433	359	38,951	32,238	1,068	1,585	123		319	53
1998	4,188	206	35,812	22,926	1,554	1,190	88		288	8
1999	2,641	289	33,364	50,369	6,872	891	127		107	23
2000	4,465	67	30,046	21,550	2,408	645	171		414	79
2001	4,985	117	28,818	29,430	974	416	96		82	22
2002	5,022	332	23,644	48,454	3,303	787	135		(113)	28
2003	6,735	126	20,954	36,114	627	922	106	(0)	(144)	28
2004	(7,842)	61	17,547	32,255	7,200	772	65	(0)	(68)	(104)
2005	(4,810)	(61)	(19,615)	(16,883)	(859)	(772)	(65)	(0)	(520)	(0)

[1] Data are from the 1st ISC Albacore Working Group, November 28 - December 2, 2005 except as noted.

Table 1. Continued

YEAR	TAIWAN		U.S.							OTHERS		GRAND TOTAL
	GILL NET	LONG LINE[2]	POLE & LINE	GILL NET	LONG LINE	PURSE SEINE	SPORT	TROLL	UNSP. GEAR	LONG LINE[3]	TROLL	
1952					46		1,373	23,843				94,198
1953					23		171	15,740				76,807
1954					13		147	12,246				61,494
1955					9		577	13,264				54,507
1956					6		482	18,751				76,464
1957					4		304	21,165				92,268
1958					7		48	14,855				55,723
1959					5		0	20,990	0			51,328
1960					4		557	20,100	0			63,403
1961			2,837		5		1,355	12,055	1			52,608
1962			1,085		7		1,681	19,752	1			47,264
1963			2,432		7		1,161	25,140	0			68,906
1964			3,411		4		824	18,388	0			62,393
1965			417		3		731	16,542	0			73,032
1966			1,600		8		588	15,333	1			66,150
1967		330	4,113		12		707	17,814	0			83,096
1968		216	4,906		11		951	20,434	0			69,480
1969		65	2,996		14		358	18,827	0			75,023
1970		34	4,416		9		822	21,032	0			68,022
1971		20	2,071		11		1,175	20,526	0			91,240
1972		187	3,750		8		637	23,600	0			106,717
1973		--	2,236		14		84	15,653	0			106,836
1974		486	4,777		9		94	20,178	0			115,113
1975		1,240	3,243		33		640	18,932	10			89,696
1976		686	2,700		23		713	15,905	4			124,816
1977		572	1,497		37		537	9,969	0			62,799
1978		6	950		54		810	16,613	15			98,822
1979		81	303		--		74	6,781	0			71,004
1980	--	249	382		--		168	7,556	0			75,126
1981	--	143	748		25		195	12,637	0			71,042
1982	--	38	425		105		257	6,609	21			67,960
1983	--	8	607		6		87	9,359	0			54,527
1984	--	--	1,030		2	3,728	1,427	9,304	0			70,258
1985	--	--	1,498	2	0		1,176	6,415	0			58,170
1986	--	--	432	3			196	4,708	0			45,344
1987	2,514	--	158	5	150		74	2,766	0			48,986
1988	7,389	--	598	15	308		64	4,212	10			45,554
1989	8,350	40	54	4	249		160	1,860	23			44,140
1990	16,701	4	115	29	177	71	24	2,603	4			53,683
1991	3,398	12	0	17	313	0	6	1,845	71			37,253
1992	7,866	--	0	0	337	0	2	4,572	72			54,796
1993		5	0	0	440		25	6,254	0			54,067
1994		83	0	38	546		106	10,978	213		158	73,248
1995		4,280	80	52	883		102	8,045	1		137	68,197
1996		7,596	24	83	1,187	11	88	16,938	0	1,735	505	86,506
1997		9,119	73	60	1,652	2	1,018	14,252	1	2,824	404	106,534
1998		8,617	79	80	1,120	33	1,208	14,410	2	5,871	286	97,966
1999		8,186	60	149	1,540	48	3,621	10,060	1	6,307	261	124,916
2000		8,842	69	55	940	4	1,798	9,645	3	3,654	490	85,344
2001		8,684	139	94	1,295	51	1,635	11,210	0	1,471	127	89,648
2002		7,965	381	30	525	4	2,357	10,387		700	(127)	(104,295)
2003		(7,166)	59	16	524	44	2,214	14,102	0	(2,400)	(127)	(92,409)
2004		(4,988)	(126)	(12)	(560)	(1)	(1,506)	(13,346)	(0)	(2,400)	(127)	(88,981)
2005		(4,692)	(66)	(20)	(277)	(2)	(1,719)	(9,122)	(0)	(2,400)	(127)	(62,011)

Table 2. North Pacific albacore catch-at-age (numbers of fish in 1,000s) matrix used for all VPA-2Box analyses (1966-05).

YEAR	AGE (yr)									TOTAL
	1	2	3	4	5	6	7	8	=9	
1966	0	129	2,022	1,118	2,412	261	145	52	41	6,180
1967	0	210	2,293	1,552	2,820	579	171	97	72	7,794
1968	0	92	3,268	1,422	1,118	763	254	97	39	7,053
1969	1	2,046	2,584	1,232	2,493	197	191	194	53	8,990
1970	0	282	3,390	2,220	1,321	410	101	71	61	7,856
1971	0	208	4,634	2,424	2,831	388	175	70	81	10,810
1972	0	4,030	3,514	4,646	2,348	270	118	92	60	15,078
1973	1	2,583	3,619	1,531	4,030	743	141	90	74	12,812
1974	0	1,128	4,483	5,653	1,538	754	153	57	96	13,863
1975	0	828	5,222	2,912	1,907	264	111	78	259	11,581
1976	0	2,325	4,937	5,767	2,766	285	165	106	186	16,538
1977	0	741	2,919	1,955	1,106	426	132	91	160	7,531
1978	2	5,931	2,125	4,729	1,018	387	185	45	83	14,505
1979	0	580	1,215	3,623	1,257	265	190	101	68	7,300
1980	0	2,518	2,830	3,160	801	311	110	87	97	9,916
1981	4	898	1,509	2,854	1,095	450	270	106	115	7,301
1982	78	599	1,949	3,408	435	255	200	213	134	7,272
1983	2	1,182	2,552	2,306	232	186	196	146	141	6,945
1984	5	1,111	4,571	3,031	241	177	126	131	156	9,550
1985	2	318	1,235	2,776	641	118	166	100	325	5,681
1986	0	794	906	2,461	204	128	127	90	131	4,840
1987	1	265	2,155	1,296	474	314	176	102	169	4,953
1988	4	133	1,529	1,156	270	606	223	161	181	4,264
1989	106	377	316	1,335	1,012	276	246	133	158	3,959
1990	109	317	239	1,151	1,606	641	113	213	247	4,635
1991	78	678	1,747	335	339	263	155	119	271	3,984
1992	1	332	2,350	1,664	662	360	150	151	156	5,826
1993	0	485	1,090	1,971	793	202	201	116	293	5,151
1994	28	669	1,575	2,355	1,077	654	206	97	136	6,798
1995	2	496	1,310	3,152	294	310	564	116	119	6,362
1996	8	494	3,938	2,294	603	396	554	477	105	8,869
1997	0	2,453	1,431	4,451	817	124	476	620	391	10,764
1998	0	1,105	4,036	1,568	1,880	302	213	379	282	9,766
1999	77	816	3,761	5,797	757	478	477	185	308	12,656
2000	0	1,231	1,852	2,739	923	415	450	435	247	8,292
2001	4	1,470	4,370	1,396	1,153	410	451	277	338	9,869
2002	0	1,447	7,396	3,141	439	226	381	209	222	13,461
2003	0	3,054	3,619	3,008	709	306	250	181	194	11,321
2004	30	210	4,411	4,363	282	452	332	130	44	10,253
2005	1	2,382	1,547	2,318	305	171	437	189	69	7,418
TOTAL	543	46,948	110,447	106,273	47,010	14,522	9,484	6,404	6,365	347,996

Table 3. North Pacific albacore numbers-at-age (January 1 in 1,000s of fish) as estimated in Model Scenario D1 (1966-06). Recruitment (age-1 fish) from 2005-06 reflects mean estimate from 1966-98; age-2 fish in 2006 reflects exponential decline (e^{-Z}) of age-1 fish in 2003.

YEAR	AGE (yr)								
	1	2	3	4	5	6	7	8	=9
1966	25,148	20,076	9,549	8,963	5,558	1,035	424	166	131
1967	29,475	18,630	14,762	5,352	5,685	2,083	545	191	142
1968	33,293	21,836	13,622	8,980	2,647	1,842	1,052	259	105
1969	46,100	24,664	16,098	7,312	5,439	1,018	720	563	154
1970	22,784	34,151	16,522	9,721	4,365	1,930	586	371	322
1971	40,983	16,879	25,058	9,353	5,312	2,113	1,081	348	401
1972	39,890	30,361	12,325	14,614	4,869	1,562	1,235	651	427
1973	40,054	29,551	19,050	6,147	6,887	1,632	927	814	669
1974	27,404	29,672	19,683	11,028	3,253	1,735	583	566	958
1975	39,421	20,302	21,015	10,766	3,424	1,116	650	302	999
1976	30,252	29,204	14,331	11,128	5,502	941	602	387	676
1977	35,167	22,411	19,646	6,435	3,405	1,752	455	306	539
1978	21,530	26,052	15,968	12,063	3,108	1,585	936	224	413
1979	24,512	15,948	14,252	10,014	4,940	1,440	845	536	363
1980	18,877	18,159	11,318	9,519	4,353	2,591	840	464	522
1981	25,360	13,984	11,302	5,978	4,374	2,542	1,654	528	574
1982	29,433	18,784	9,591	7,084	2,028	2,310	1,499	995	628
1983	24,877	21,738	13,402	5,445	2,382	1,132	1,493	939	907
1984	12,774	18,427	15,092	7,753	2,088	1,566	680	938	1,123
1985	22,816	9,460	12,700	7,301	3,182	1,341	1,009	396	1,282
1986	18,306	16,901	6,735	8,352	3,062	1,812	892	606	881
1987	11,247	13,562	11,841	4,216	4,099	2,094	1,233	553	913
1988	9,944	8,331	9,819	6,935	2,024	2,631	1,283	763	855
1989	31,762	7,364	6,058	5,969	4,151	1,269	1,433	760	907
1990	32,674	23,439	5,132	4,218	3,286	2,215	705	852	987
1991	25,211	24,112	17,092	3,598	2,146	1,084	1,097	426	971
1992	21,691	18,610	17,282	11,169	2,378	1,300	580	680	704
1993	27,488	16,068	13,502	10,796	6,854	1,200	657	302	765
1994	39,176	20,363	11,488	9,071	6,317	4,400	717	317	444
1995	19,968	28,999	14,513	7,165	4,718	3,761	2,701	356	366
1996	39,051	14,791	21,057	9,631	2,652	3,244	2,521	1,521	335
1997	27,849	28,923	10,535	12,243	5,184	1,451	2,065	1,396	881
1998	20,315	20,631	19,329	6,582	5,303	3,143	969	1,124	835
1999	35,829	15,049	14,338	10,882	3,542	2,338	2,070	536	892
2000	37,451	26,476	10,450	7,425	3,202	1,979	1,325	1,127	640
2001	34,645	27,744	18,559	6,163	3,183	1,589	1,113	601	733
2002	47,549	25,662	19,295	10,031	3,378	1,383	828	444	470
2003	16,034	35,225	17,772	8,042	4,767	2,127	831	293	314
2004	51,304	11,878	23,484	10,083	3,414	2,927	1,315	404	136
2005	27,722	37,981	8,620	13,638	3,791	2,288	1,782	692	252
2006	27,722	20,517	26,099	5,067	8,126	2,547	1,549	949	481

Table 4. Instantaneous rates of fishing mortality-at-age (yr^{-1}) as estimated in Model Scenario D1 (1966-05).

YEAR	AGE (yr)								
	1	2	3	4	5	6	7	8	=9
1966	0.000	0.007	0.279	0.155	0.681	0.341	0.496	0.439	0.439
1967	0.000	0.013	0.197	0.404	0.827	0.383	0.446	0.859	0.859
1968	0.000	0.005	0.322	0.201	0.656	0.639	0.324	0.561	0.561
1969	0.000	0.101	0.204	0.216	0.736	0.252	0.362	0.499	0.499
1970	0.000	0.010	0.269	0.304	0.426	0.280	0.222	0.247	0.247
1971	0.000	0.014	0.239	0.353	0.924	0.237	0.207	0.263	0.263
1972	0.000	0.166	0.396	0.452	0.793	0.222	0.117	0.177	0.177
1973	0.000	0.106	0.247	0.337	1.079	0.729	0.192	0.137	0.137
1974	0.000	0.045	0.303	0.870	0.770	0.682	0.359	0.123	0.123
1975	0.000	0.048	0.336	0.371	0.992	0.317	0.218	0.354	0.354
1976	0.000	0.096	0.501	0.884	0.844	0.427	0.376	0.379	0.379
1977	0.000	0.039	0.188	0.428	0.465	0.327	0.406	0.415	0.415
1978	0.000	0.303	0.167	0.593	0.470	0.329	0.257	0.263	0.263
1979	0.000	0.043	0.104	0.533	0.345	0.238	0.299	0.244	0.244
1980	0.000	0.174	0.338	0.478	0.238	0.149	0.164	0.242	0.242
1981	0.000	0.077	0.167	0.781	0.339	0.228	0.208	0.262	0.262
1982	0.003	0.038	0.266	0.790	0.283	0.136	0.167	0.282	0.282
1983	0.000	0.065	0.247	0.659	0.119	0.210	0.164	0.197	0.197
1984	0.000	0.072	0.426	0.590	0.143	0.140	0.240	0.175	0.175
1985	0.000	0.040	0.119	0.569	0.263	0.107	0.209	0.344	0.344
1986	0.000	0.056	0.168	0.412	0.080	0.085	0.179	0.188	0.188
1987	0.000	0.023	0.235	0.434	0.143	0.189	0.180	0.239	0.239
1988	0.000	0.019	0.198	0.213	0.167	0.307	0.224	0.279	0.279
1989	0.004	0.061	0.062	0.297	0.328	0.287	0.221	0.224	0.224
1990	0.004	0.016	0.055	0.375	0.809	0.403	0.204	0.338	0.338
1991	0.004	0.033	0.125	0.114	0.201	0.326	0.178	0.385	0.385
1992	0.000	0.021	0.170	0.188	0.384	0.382	0.351	0.294	0.294
1993	0.000	0.036	0.098	0.236	0.143	0.215	0.430	0.576	0.576
1994	0.001	0.039	0.172	0.354	0.219	0.188	0.401	0.431	0.431
1995	0.000	0.020	0.110	0.694	0.075	0.100	0.274	0.467	0.467
1996	0.000	0.039	0.242	0.319	0.303	0.152	0.291	0.445	0.445
1997	0.000	0.103	0.170	0.537	0.200	0.104	0.308	0.703	0.703
1998	0.000	0.064	0.274	0.320	0.519	0.118	0.292	0.487	0.487
1999	0.003	0.065	0.358	0.923	0.282	0.268	0.308	0.503	0.503
2000	0.000	0.055	0.228	0.547	0.401	0.276	0.491	0.580	0.580
2001	0.000	0.063	0.315	0.301	0.534	0.351	0.619	0.743	0.743
2002	0.000	0.067	0.575	0.444	0.162	0.209	0.739	0.768	0.768
2003	0.000	0.105	0.267	0.557	0.188	0.181	0.422	1.192	1.192
2004	0.001	0.021	0.243	0.678	0.100	0.196	0.342	0.461	0.461
2005	0.001	0.075	0.231	0.218	0.098	0.090	0.331	0.375	0.375

Table 5A. Results from equilibrium analysis of biological reference points (BRP) for North Pacific albacore associated with Model D1: (a) candidate target and limit reference points; (b) corresponding fishing mortality rates (*F*, yr^{-1}); (c) current *F* (2002-04) relative to target *F* or limit *F* reference points; (d) MSY proxy or equilibrium catch (1,000 mt); and (e) SSB_{MSY} proxy or equilibrium *SSB* (1,000 mt). The current *F* (0.75) reflects the fully-selected *F* (observed for age groups 8 and 9+) from the mean (geometric) of *F*-at-age estimates from 2002-04. All catch and *SSB* estimates are based on the assumption of constant recruitment of 27.75 million fish per year. All *SSB* statistics are based on the assumption of a 'May 1' reference spawning date.

Candidate Target Reference Points	**Target *F* (yr^{-1})**	**Ratio of Current *F* to Target *F***	**MSY Proxy (1,000 mt)**	**SSB_{MSY} Proxy (1,000 mt)**
$F_{40\%}$	0.32	2.31	75	226
$F_{35\%}$	0.38	1.97	79	198
$F_{0.1}$	0.45	1.68	83	171
$F_{30\%}$	0.45	1.67	83	169
Candidate Limit Reference Points	**Limit *F* (yr-1)**	**Ratio of Current *F* to Limit *F***	**Equilibrium Catch (1,000 mt)**	**Equilibrium *SSB* (1,000 mt)**
$F_{20\%}$	0.65	1.16	91	113
F_{Max}	2.07	0.36	100	10
$F_{SSB\text{-Min}}$	0.81	0.93	94	83
$F_{SSB\text{-}10\%}$	0.70	1.07	92	102
$F_{SSB\text{-}25\%}$	0.66	1.14	91	110

Table 5B. Comparison of biological reference points (BRP) from the 2006 stock assessment (Table 5A) and those from the 2004 assessment (Stocker 2005). Numbers in the body of the table reflect the current fishing mortality rate (F_{cur}) relative to biological reference points. A table entry greater than 1.0 implies that F_{cur} must be decreased to align with the respective BRP shown to the left of it. Whereas, a table entry less than 1.0 implies that F_{cur} is below the BRP. Note that in the 2004 assessment BRPs were based on two assumptions regarding F_{cur} ('low'=0.43 and 'high'=0.68), as well as two 'productivity' scenarios ('low' recruitment=22.5 million recruits and 'high' recruitment=31 million recruits). In the 2006 assessment, BRPs were based on a single assumption regarding F_{cur} (0.75, see Table 5A) and future productivity (27.75 million recruits), i.e., F_{cur} is greater than the F associated with all reference points other than $F_{SSB\text{-}Min}$ and F_{Max}.

BRPs	**2006**	**2004**	**2004**	**2004**	**2004**
Productivity in recent years	Average	Low	High	Low	High
F_{cur} Scenario	0.75	Low 0.43	Low 0.43	High 0.68	High 0.68
$F_{cur}/F_{40\%}$	2.31	1.43	1.43	2.27	2.27
$F_{cur}/F_{35\%}$	1.97	1.23	1.23	1.94	1.94
$F_{cur}/F_{0.1}$	1.68	1.16	1.16	1.84	1.84
$F_{cur}/F_{30\%}$	1.67	1.02	1.02	1.62	1.62
$F_{cur}/F_{20\%}$	1.16	0.70	0.70	1.11	1.11
F_{cur}/F_{max}	0.36	0.40	0.40	0.64	0.64
$F_{cur}/F_{SSB\text{-}Min}$	0.93	0.48	0.41	0.76	0.65
$F_{cur}/F_{SSB\text{-}10\%}$	1.07	0.52	0.44	0.83	0.69
$F_{cur}/F_{SSB\text{-}25\%}$	1.14	0.60	0.50	0.94	0.79
$F_{cur}/F_{SSB\text{-}50\%}$	1.34	0.80	0.64	1.26	1.01

Table 6. North Pacific albacore weight-at-age (w-a-a, in kg) growth models used to calculate population abundance in Model D1 (based on a fixed age/year matrix, external to the population model): (A) 'January 1' w-a-a for total biomass time series (1966-05), used as a fixed age/year matrix, external to the Model; (B) 'May 1' (i.e., assumed spawning 'reference' time) w-a-a for spawning stock biomass time series (1966-05), used as a fixed age/year matrix, external to the Model; and (C) 'Age group 9+' demographics in equilibrium as a function of the mean (geometric) age group 9+ fishing mortality rates estimated in Model D1, including age, length, and weight estimates for total and spawning stock biomass, respectively. Mean age values for the age group 9+ in Table (C) were estimated following Porch (2003; Equation 2.6b), with a natural mortality rate (*M*) of 0.3 and equal selection for all ages in the 9+ age group, i.e., consistent with methods used for the stock projections (2006-2011). Biomass calculations for 2005 and the projection period (2006-11) were based on similar w-a-a estimates as the 2002-04 time block. Estimates in Table (C) were internally parameterized in the population model using the length-at-age model from Suda (1966) and weight-length models from Watanabe et al. (2006), i.e., 'All Areas/Quarter 1' (total biomass) and 'Area 2/Quarter 2' (for spawning stock biomass). Note that exploitable biomass time series presented in the Report directly correspond to the w-a-a used for total biomass (i.e., 'January 1') calculations, filtered through a selectivity ogive.

(**A**)

YEAR	AGE (yr)								
	1	2	3	4	5	6	7	8	9+
1966	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	29.73
1967	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	29.73
1968	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	29.73
1969	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	29.73
1970	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	29.73
1971	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	29.73
1972	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	29.73
1973	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	29.73
1974	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	30.13
1975	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	30.13
1976	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	30.13
1977	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	30.13
1978	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	30.13
1979	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	30.46
1980	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	30.46
1981	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	30.46
1982	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	30.46
1983	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	30.46
1984	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	30.52
1985	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	30.52
1986	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	30.52
1987	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	30.52
1988	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	30.52
1989	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	29.67
1990	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	29.67
1991	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	29.67
1992	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	29.67
1993	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	29.67
1994	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	28.86
1995	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	28.86
1996	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	28.86
1997	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	28.86
1998	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	28.86
1999	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	28.10
2000	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	28.10
2001	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	28.10
2002	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	28.10
2003	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	28.10
2004	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	28.03
2005	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	28.03
2006	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	28.03

Table 6. continued.

(**B**)

YEAR	AGE (yr)								
	1	2	3	4	5	6	7	8	9+
1966	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.24
1967	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.24
1968	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.24
1969	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.24
1970	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.24
1971	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.24
1972	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.24
1973	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.24
1974	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.61
1975	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.61
1976	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.61
1977	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.61
1978	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.61
1979	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.91
1980	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.91
1981	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.91
1982	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.91
1983	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.91
1984	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.97
1985	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.97
1986	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.97
1987	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.97
1988	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.97
1989	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.19
1990	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.19
1991	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.19
1992	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.19
1993	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.19
1994	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	30.44
1995	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	30.44
1996	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	30.44
1997	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	30.44
1998	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	30.44
1999	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	29.74
2000	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	29.74
2001	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	29.74
2002	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	29.74
2003	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	29.74
2004	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	29.68
2005	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	29.68
2006	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	29.68

(C)

Period	Mean F on Age group 9+	Age group 9+ equilibrium demographics					
		Biomass (January 1)			Spawning stock biomass (May 1)		
		Mean age (yr)	Mean length (cm)	Mean weight (kg)	Mean age (yr)	Mean length (cm)	Mean weight (kg)
2002-2004	0.7501	9.54	115.60	**28.03**	9.87	117.10	**29.68**
1999-2003	0.7236	9.56	115.70	**28.10**	9.89	117.20	**29.74**
1994-1998	0.4981	9.82	116.87	**28.86**	10.15	118.30	**30.44**
1989-1993	0.3457	10.10	118.09	**29.67**	10.44	119.47	**31.19**
1984-1988	0.2374	10.41	119.35	**30.52**	10.74	120.66	**31.97**
1979-1983	0.2437	10.38	119.26	**30.46**	10.72	120.58	**31.91**
1974-1978	0.2826	10.26	118.77	**30.13**	10.60	120.11	**31.61**
1966-1973	0.3370	10.12	118.18	**29.73**	10.46	119.55	**31.24**

Table 7. Fishing mortality rates that will maintain the spawning stock biomass (*SSB*) above the respective threshold level, with the given probability. Four distinct *SSB* threshold levels and two probability levels are provided, but other levels may be desired by fishery managers. For example, if managers desire to maintain the *SSB* above the 25th percentile of observed *SSB* with a 95% probability of success, then the fishing mortality rate should not exceed *F*=0.51. In general, a higher desired probability of success requires a more precautionary fishing mortality rate.

		Probability Level Desired	
SSB Threshold Desired		**50%**	**95%**
Minimum Observed SSB	$F_{SSB\text{-}Min}$	0.81	0.64
Lower 10th Percentile	$F_{SSB\text{-}10\%}$	0.70	0.55
Lower 25th Percentile	$F_{SSB\text{-}25\%}$	0.66	0.51
Median	$F_{SSB\text{-}50\%}$	0.56	0.39

APPENDIX 1

List of Participants

Canada

Max Stocker (chair)
Fisheries and Oceans Canada, Pacific Biological Station
3190 Hammond Bay Road, Nanaimo, B.C., Canada V9T 6N7
Phone: 250-758-0275, Fax: 250-756-7053, E-mail: StockerM@pac.dfo-mpo.gc.ca

Japan

Hiroyasu Hasegawa
Fisheries Agency, 1-2-1, Kasumigaseki, Chiyoda-ku, Tokyo 100-8950 Japan
Phone: 81-3-3502-8111(ex. Number: 7377), Fax: 81-3-3592-0759, E-mail:
hiroyasu_hasegawa@nm.maff.go.jp

Hitoshi Honda
National Research Institute of Far Seas Fisheries, 5-7-1, Orido, Shimizu-ku, Shizuoka 424-8633 Japan
Phone: 81-543-36-6000, Fax: 81-543-35-9642, E-mail: hhonda@affrc.go.jp

Momoko Ichinokawa
National Research Institute of Far Seas Fisheries, 5-7-1, Orido, Shimizu-ku, Shizuoka 424-8633 Japan
Phone: 81-543-36-6039, Fax: 81-543-35-9642, E-mail: ichimomo@fra.affrc.go.jp

Mikihiko Kai
National Research Institute of Far Seas Fisheries, 5-7-1 Orido, Shimizu-ku, Shizuoka 424-8633 Japan
Phone: 81-543-36-6039, Fax: 81-543-35-9642, E-mail: kaim@affrc.go.jp

Minoru Kanaiwa
Tokyo University of Agriculture, 196 Yasaka, Abashiri, Hokkai, 099-2493 Japan,
Phone: 81-152-48-3857, Fax: 81-152-48-2940, E-mail:
m3kanaiw@bioindustry.nodai.ac.jp

Hirokazu Saito
National Research Institute of Far Seas Fisheries, 5-7-1 Orido, Shimizu-ku, Shizuoka 424-8633 Japan
Phone: 81-543-36-6037, Fax: 81-543-35-9642, E-mail: hisaito@affrc.go.jp

Yukio Takeuchi
National Research Institute of Far Seas Fisheries, 5-7-1, Orido, Shimizu-ku, Shizuoka 424-8633 Japan
Phone: 81-543-36-6039, Fax: 81-543-35-9642, E-mail: yukiot@fra.affrc.go.jp

List of Participants (continued)

Koji Uosaki
National Research Institute of Far Seas Fisheries, 5-7-1, Orido, Shimizu-ku, Shizuoka 424-8633 Japan
Phone: 81-543-36-6032, Fax: 81-543-35-9642, E-mail: uosaki@affrc.go.jp

Kyuji Watanabe
National Research Institute of Far Seas Fisheries, 5-7-1, Orido, Shimizu-ku, Shizuoka 424-8633 Japan
Phone: 81-543-36-6033, Fax: 81-543-35-9642, E-mail: watanabk@fra.affrc.go.jp

United States

Atilio L. Coan Jr.
NOAA Fisheries, Southwest Fisheries Science Center, 8604 La Jolla Shores Drive
La Jolla, CA 92037, U.S.A.
Phone: 858-546-7079, Fax: 858-546-5653, E-mail: Al.Coan@noaa.gov

Ray Conser
NOAA Fisheries, Southwest Fisheries Science Center, 8604 La Jolla Shores Drive
La Jolla, CA 92037, U.S.A.
Phone: 858-546-5688, Fax: 858-546-5656, E-mail: Ray.Conser@noaa.gov

Paul R. Crone
NOAA Fisheries, Southwest Fisheries Science Center, 8604 La Jolla Shores Drive
La Jolla, CA 92037, U.S.A.
Phone: 858-546-7069, Fax: 858-546-5653, E-mail: Paul.Crone@noaa.gov

Emmanis Dorval
NOAA Fisheries, Southwest Fisheries Science Center, 8604 La Jolla Shores Drive
La Jolla, CA 92037, U.S.A.
Phone: 858-546-5619, Fax: 858-546-5656, E-mail: Emmanis.Dorval@noaa.gov

Kevin Piner
NOAA Fisheries, Southwest Fisheries Science Center, 8604 La Jolla Shores Drive
La Jolla, CA 92037, U.S.A.
Phone: 858-546-5613, Fax: 858-546-7003, E-mail: Kevin.Piner@noaa.gov

Vidar Wespestad
American Fisherman's Research Foundation, 21231 8th Pl. W., Lynnwood, WA 98036
Phone: 425-672-7603, Fax: 425-672-1357, E-mail: vidarw@verizon.com

APPENDIX 2

Agenda

November 28 *(Tuesday)*, 0900-1700

1. Registration and distribution of documents, **09:00-09:30**

2. Opening of the International Scientific Committee Albacore Working Group (ISC-ALBWG) Stock Assessment Workshop, **09:30-10:00**
   - Welcome remarks by NRIFSF Director Dr. Kobayashi
   - Work program and logistics

3. Agenda
   - Adoption of agenda
   - Appointment of rapporteurs

4. Review of fisheries and highlights of research progress
   - Canada
   - Japan
   - Korea
   - Mexico
   - Chinese Taipei
   - United States
   - IATTC
   - Cook Islands
   - Other

5. Review of biological studies
   - Growth models
   - Reproductive studies
   - Tagging studies

November 28 *(Tuesday)*, 0900-1700 (cont.)

6. Review of fishery data used in stock assessments
   - Status of ALBWG Data Catalog
   - Review and update of catch data (Category I)
   - Review and update of catch/effort data (Category II)
   - Review and update of length-frequency data (Category III)
   - Review and update Miscellaneous fishery data (e.g., IUU fisheries)
   - Conclusions and work assignments

Reception: 1730-1900 (NRIFSF) – Welcome reception with guests and friends

November 29 *(Wednesday)*, 0900-1700

7. Stock Assessment Task Group (SATG) Report and Requirements
   - Review of the recommendations of the SATG Meeting in Nanaimo (i.e., provide update on the ground rules set by the SATG in July 2006 for data inputs and models that will be used in the 2006 stock assessment).

8. Northern Committee requests regarding catch and biological reference points
   - Discuss how the SATG plans to address Northern Committee requirements on IUU catch and biological reference points.

9. Workgroup session on input data used in VPA-2BOX
   - Catch-at-age matrices
   - Size data (i.e., length, weight)
   - CPUE: age-aggregated and age-specific indices of abundance
   - Conclusions and work assignments

10. Workgroup session on input data used in SS2
    - Catch and size frequency data
    - CPUE indices of abundance
    - Conclusions and work assignments

November 30 *(Thursday)*, 0900-1200

11. Review of VPA-2BOX requirements
    - Inputs—time series, estimates, assumptions
    - Baseline model run
    - Sensitivity analysis runs

12. Review of SS2 requirements
    - Inputs—time series, estimates, assumptions
    - Baseline model run
    - Sensitivity analysis runs

1300-1700

13. Small workgroup sessions to perform additional SS2 and VPA-2BOX model runs and sensitivity analyses

December 1 *(Friday)*, 0900-1200

14. Small workgroup sessions to perform additional SS2 and VPA-2BOX model runs and sensitivity analyses

1300-1700

15. Review of results from work assignments/model runs

Reception: Dinner at downtown Shimizu 19:00

December 2 (Saturday), **0900-1400**

16. Review of results from work assignments (*Continued*)

17. Workgroup session on stock projections and biological reference points
    - Refine initial conditions for projections
    - Assess 'hypotheses' used in projections
    - Review potential Biological Reference Points

18. Workgroup session on stock projections

19. Transition from the previous stock assessment (December 2004)
    - The effects of historical database corrections and updates, 1975-2003.
    - The effects of new data, 1966-74 and 2004-05.
    - The effects of employing the SS2 model (vs. VPA)

December 3 (*Sunday*), No Meeting

December 4 *(Monday)*, **0900-1200**

20. Stock status conclusions
    - Comparing results from VPA-2BOX and SS2 models
    - Assess 'current' conditions of B and F in relation to biological reference points
    - Discuss projection estimates
    - Develop conservation advice

21. SATG Workplan for 2007

22. Administrative matters
    - Northern Committee related matters
        1. address impact on the assessment of having no data on IUU fishing
        2. discuss projects that can be initiated to get a handle on the IUU catch or fishery
    - Update National coordinators and data correspondents
    - Procedures for clearing the report
    - Time and place for next meeting

1300-1700

23. Report preparation **-** rapporteurs and others

December 5 *(Tuesday)*, 0900-1500

24. Clearing of Workshop Report
25. Adjournment

APPENDIX 3

List of Documents

ISC/06/ALBWG/01:	International Scientific Committee Albacore Working Group Data Base Catalog – A.L. Coan
ISC/06/ALBWG/02:	Summary of the 2005 U.S. North and South Pacific Albacore Troll Fisheries – J. Childers and S. Aalbers
ISC/06/ALBWG/03:	North Pacific albacore catch in the U.S. longline fishery – J. Wetherall and A. Coan
ISC/06/ALBWG/04:	A review of Japanese albacore fisheries in the North Pacific – K. Uosaki and Y. Nishikaw
ISC/06/ALBWG/05:	The 2005 Canadian North Pacific albacore troll fishery – M. Stocker
ISC/06/ALBWG/06:	Update of catch-at-age of albacore caught by the Japanese fisheries in the North Pacific, 1966-2005 – K. Watanabe and K. Uosaki
ISC/06/ALBWG/07:	Standardization of age specific abundance index for North Pacific albacore caught by the Japanese large and small longline fisheries, 1966-2005: Improvement of general liner model – K. Watanabe and K. Uosaki
ISC/06/ALBWG/08:	Age specific abundance index for albacore caught by the Japanese pole-and-line fishery, 1972-2005 – K. Uosaki
ISC/06/ALBWG/09:	Critical evaluation of important time series associated with albacore fisheries (United States, Canada, and Mexico) of the eastern North Pacific Ocean – J.D. McDaniel, P.R. Crone, and E. Dorval
ISC/06/ALBWG/10:	Summary on archival tagging for North Pacific albacore, 2005-2006 – K. Uosaki
ISC/06/ALBWG/11:	Considerations in extreme depletion of abundance indices for North Pacific albacore from the Japanese longline fishery observed in 2003-2004 – K. Watanabe, K. Uosaki and Yukio Takeuchi
ISC/06/ALBWG/12:	Report of 2006 research cruise by R/V Shoyo-maru for albacore in the north-western Pacific – H. Saito, T. Tanabe, S. Koyama and K. Uosaki
ISC/06/ALBWG/13:	Classification of horizontal habitats of North Pacific albacore to derive abundance index from considering temporal fluctuations in catch per unit effort and effort, and their geographic distributions – K. Watanabe and K. Uosaki
ISC/06/ALBWG/14:	Revised practical solutions of application issues of length-weight relationship for the North Pacific albacore with respect to the stock assessment. – K. Watanabe, K. Uosaki, T. Kokubo, P. Crone, A. Coan and C.-C. Hsu
ISC/06/ALBWG/15:	Preliminary research concerning biological reference points associated with North Pacific albacore population dynamics and

	fisheries – R.J. Conser, P.R. Crone, S. Kohin, K. Uosaki, M. Ogura,and Y. Takeuchi
ISC/06/ALBWG/16:	Summary report on software for North Pacific albacore stock assessment – R. Conser and Y. Takeuchi
ISC/06/ALBWG/17:	Biological reference points and stock projections for North Pacific albacore – R. Conser, P. Crone and Y. Takeeuchi
ISC/06/ALBWG/18:	Population analysis of North Pacific albacore based on a length-based, age-structured model: Stock Synthesis 2 – P.R. Crone, K.R. Piner, Y. Takeuchi, K. Uosaki, R.J. Conser, E. Dorval, K. Watanabe, and J.D. McDaniel
ISC/06/ALBWG/19:	Population analysis of North Pacific albacore based on an age-structured model: VPA-2BOX – K. Uosaki, E. Dorval, K. Watanabe, P.R. Crone, Y. Takeuchi, J.M. McDaniel, R.J. Conser, and K.R. Piner

APPENDIX 4

Report of the ISC Albacore Working Group Stock Assessment Task Group Meeting

Fisheries and Oceans Canada
Pacific Biological Station
Nanaimo, B.C. Canada
13-17 July 2006

1.0 Introduction

During the Meeting of the International Scientific Committee's Albacore Working Group (ISC-ALBWG) held in La Jolla, CA from November 28-December 2, 2005, it was recommended that the newly formed Stock Assessment Task Group (SATG) meet in July 2006 to:

- review and prepare important data sources applicable to the formal assessment meeting to be held in Shimizu, Japan in November/December 2006;
- make decisions regarding model parameterization for both the VPA-2BOX and SS2 modeling efforts; and
- begin development of preliminary 'base case' models (VPA-2BOX and SS2) that will be presented in Shimizu in November/December 2006, and
  outline important model diagnostics to be considered in reviews of assessments.

The SATG Meeting was convened at the Pacific Biological Station in Nanaimo, B.C. on July 13, 2005. M. Stocker, Meeting chair, opened the 5-day Meeting and welcomed scientists from Chinese Taipei, Japan, and the USA (Attachment 1). Five working documents were presented (Attachment 2). The draft agenda was reviewed and adopted with minor modification (Attachment 3).

Table 1 provides an update of north Pacific albacore catches (in mt) by fisheries (1952-2005).

2.0 Data review - Eastern Pacific Ocean (EPO) fisheries: (a) catch data; (b) size-/age-distribution data; and (c) CPUE data

P. Crone outlined important topics that should be addressed when conducting a review of input data for inclusion in north Pacific albacore stock assessment models. Data 'review,' including preparation should be conducted for both the backward-simulation model (VPA-2BOX) and a forward-simulation model (SS2). The primary goal of this 'intersessional' Meeting is to make progress toward: (1) identifying 'strengths and weaknesses' of fishery-based data used in the models; and (2) 're-structuring' fisheries (both spatially and temporally) within SS2 based on similarities/differences between the fleets, in terms of catches, sizes of fish landed, and fishing success (CPUE). Ultimately, substantial time demands are required to prepare the overall input data files for each of the modeling efforts. In general, EPO fisheries contribute roughly 25% to the total annual catch of albacore in the North Pacific Ocean, i.e., in any given year, WPO fisheries contribute approximately 75% to the total landings (see below). In this context, it was noted that review topics should also reflect the preponderance of fishery data from WPO fleets and further, recognize that these data sources are likely the most influential in the overall population models—keeping in mind that the EPO-based USA troll fishery also provides important sample data in the North Pacific Ocean-wide model.

It was recommended that the overall review be structured on the basis of a 'fishery/data source/model' outline. Thus, in the EPO there would be: (1) three fisheries (USA/Canada troll, USA longline, and miscellaneous EPO fisheries); (2) three types (sources) of data (catch, catch/effort, and size (length, weight, etc.); and (3) two models (VPA-2BOX and SS2). Further, in efforts to develop a population model there are largely three primary 'tiers' of data, e.g., for the EPO fisheries: (1) 'raw' (electronic) data—catch records from PacFIN and WFOA, logbook data from commercial fleets (troll and longline), and size data from commercial fleets (troll and longline); and (2) initial phase, 'summarized' data (e.g., age-slicing matrices, particular growth-based models, GLMs for CPUE indices, etc.); and finally, (3) final phase, 'input' data that are included in the population model (e.g., weight-at-age, maturity, and mean length-distribution time series).

Also, a number of related (ongoing) data preparation issues were briefly addressed, including 'length-to-age' conversion techniques, 'quarter vs. annual' time steps, appropriate growth models, etc. It was concluded that considerable coordination will be needed following this data 'review' Meeting to assemble each of the input data files, given the objective of preparing base case configurations (both VPA-2BOX and SS2) before arriving in Shimizu later this year.

M. Stocker presented an update of the Canada troll fishery. The rationale for incorporating (raw) logbook data from the Canada fishery with analogous data from the USA troll fishery for purposes of standardizing in general linear models (GLMs) was discussed.

P. Crone presented a review of the USA fisheries. The usefulness of developing a standardized CPUE index from the relatively minor USA longline fishery was discussed. It was noted that CPUE indices developed from both the USA troll and longline fisheries should receive further research attention when time permits, i.e., likely during a year when no formal assessment is scheduled. Size and logbook data from the troll fishery prior to 1961 should not be used in population models, given concerns regarding the representativeness of this sample information.

3.0 Data review - Western Pacific Ocean (WPO) fisheries: (a) catch data; (b) size-/age-distribution data; and (c) CPUE data

K. Uosaki presented a review of the Japanese fisheries. Pole-and-line catch/effort data in the Working Group's Database Catalog are recorded in successful days fished for the period 1955–71. Following 1971, the data are recorded in number of poles, i.e., related data exist to convert the effort statistics from 1955-70 to number of poles.

For the longline fleets, hooks-per-basket were used to standardize CPUE from 1975 to present. Prior to 1975, hooks-per-basket information does not exist, which likely precludes extending this index back earlier than the mid-1970s. It is important to note that size data from the longline fisheries prior to 1965 should not be used until this information receives further scrutiny, given current concerns regarding the representativeness of these data. Thus, given the magnitude of this fishery in the North Pacific Ocean it is not recommended that a population model extend back further than 1966.

H. H. Lee presented a summary of the Chinese-Taipei distant-water longline fishery in the North Pacific Ocean, along with a CPUE-related analysis. This large-scale longline fishery has been active in the Pacific Ocean since the late 1960s, with most vessels targeting albacore in the South Pacific Ocean and since 1995, some vessels (seasonally) targeting albacore in the North Pacific Ocean.

The primary objective of the CPUE study was to generate representative indices of relative abundance for the Chinese-Taipei longline fleet operating from 1995-04; this index is intended to be incorporated in future assessment models applicable to this species. The SATG agreed that the best available age-aggregated CPUE index from the study should be considered for inclusion all future assessment models.

4.0 Assessment-related decisions for the upcoming assessment

The SATG agreed that each of the topics below require resolution (to some degree) in order to meet the objectives of the upcoming assessment-based meeting in Shimizu (November 28 – December 5, 2006). Each topic lists a number of options that were discussed by the SATG, with those in bold-faced type representing the best option to use in the upcoming assessment..

(1) Length of the time period modeled in both the VPA-2BOX and SS2 models:

a. 1975-2005 – status quo.
b. 1952-2005.
c. 1961-2005.
d. 1966-2005.

Note: Given concerns above regarding Japan data prior to the mid-1960s, it was agreed that, where possible, particular time series should be extended back to 1966.

(2) Weight-length (W-L) relationships to be used (externally and internally) in assessment models (VPA-2BOX and SS2):

a. Suda and Warashina (1961) equation – status quo.
b. Watanabe et al. (2006) equation(s).
c. Situation-specific equations:

i. Use 'Jan 1-' and 'SSB-specific' W-L relationships if the SS2 model can accommodate multiple W-L relationships; otherwise use 'Jan 1' W-L for both the VPA and SS2 models.

ii. Use quarter/area-specific W-L relationships to convert catch data collected in weight to catch estimates in number.

Note: The SATG agreed that 'i' will likely result in a single ('Jan 1') W-L equation be used to determine biomass estimates within the model (i.e., SS2 can accommodate a single W-L equation). Further, concerning 'ii,' it was agreed that analysts should apply multiple W-L equations in a meaningful manner that will likely be fishery-specific. Finally, it was agreed that all new W-L equations that are applied in anyway to either of the two models (VPA-2BOX and SS2) must come from the suite of alternative relationships presented in Watanabe et al. (2006).

(3) Software to be used for producing projection-related estimates for both the VPA-2BOX and SS2 models:

a. Conser and Crone (NPALB/02/05) – status quo.
b. Ichinokawa's projection software used for Pacific bluefin tuna.
c. PRO-2BOX – VPA.
d. SS2 (internal) projection – SS2.

(4) Calculation of 'current F' and 'current selectivity' from assessment model results (used for both projections and reference point estimation), which will inherently influence the characterization of the current 'status of the stock':

a. Average F estimates from terminal year; average selectivity (geometric mean) algorithms used in previous assessment – status quo.
b. Calculate 'current selectivity' and 'current F' as follows: drop 2005; average 2002-04 (geometric mean); start projections on January 1, 2005; replace R_{2005}; project known catch for 2005; project constant F for 2006, and beyond. Avoid using total B in current status discussion; instead use 'exploited' B, SSB, etc. Consider using ratios of F in management discussion (e.g., F_y relative F_{1966}, F_y relative F_{MSY_PROXY}).

(5) Use of tagging results as auxiliary data for abundance (or potentially, F) estimation (1971-89), i.e., not for parameterizing movement:

a. Do not incorporate tagging data into the assessment model – status quo.
b. Filter historical tagging data as suggested by Takeuchi and Ichinokawa (NPALB/04/15) and use as abundance index in the modeling.
c. Do not use the tagging data this time (except qualitatively); consider for use in the next stock assessment.

(6) Index of abundance from the Chinese-Taipei longline fishery:

a. Do not use the newly available Chinese-Taipei CPUE data to develop an index of abundance – status quo.
b. Use the CPUE data in a GLM analysis to develop an index as suggested by H. H. Lee's presentation to the Task Group, including: update with 2005 data (if possible); consider the relevance of a 'year-area' interaction factor; use GLM with a 'species composition' factor or with a 'hooks-per-basket' factor—if the latter is used, the index values for 2001 and 2003 should be considered missing values.

(7) Use of CPUE data from the from the Japanese small-vessel longline fishery (ISC –ALBWG Task Group06/04):

a. Use only the JLL large-vessel CPUE to index abundance – status quo.
b. Incorporate both large- and small-vessel CPUE data into the standardized JLL index(s) of abundance and modify the status quo GLM analysis as follows:
i. Consider interactions such as year-area, year-month, etc. to the GLM.
ii. Sub-divide the previously-used large EPO Areas 10 and 12 into smaller areas in order to better reflect the shifts in JLL effort within the EPO.
iii. Compare results of: (1) separate GLM's for the periods 1966-93 and 1994-2005; and (2) a single GLM over the entire period (1966-2005). Select one of these two options for use in the assessment models.

(8) SS2 model development:

a. There is no status quo, given the SS2 model has not been used in any previous formal assessments.
b. Develop an SS2 configuration that (at least initially) is parsimonious and facilitates comparison with the assessment results from the previous stock assessment, as well as the new VPA model results that will serve as the base case model in Shimizu (November/December 2006.
i. In the development of a 'single' catch-at-age matrix from multiple (fishery-based) matrices (i.e., the VPA model), attempt to use similar fishery definitions as defined in the SS2 model, i.e., a base case model that is characterized by the newly-defined '15 fishery' spatial structure, see (10) and Table 2—this will facilitate identifying the causal effects when results differ between the two models. Finally, it was noted that this suggestion is applicable to some fisheries, but not for others, given the manner in which input data are prepared/treated currently for the two models.
ii. Where possible, develop CPUE indices for each of the newly-defined fisheries in a manner that allows for comparison to

past assessment models. Again, it was noted that this suggestion is applicable to some fisheries, but not for others, given the manner in which input data are prepared/treated currently in the two modeling approaches.

iii. **Initially, use annual CPUE indices for all fisheries to avoid 'seasonality' issues with catchability (q); check consistency of selectivity over seasons within a year; and finally, where applicable, accommodate 'seasonality' for fisheries (based on patterns observed in q or selectivity).**

iv. **Maximum age should be no more than age 12, given the current growth suppositions are not considered realistic beyond age 12.**

Note: The SATG noted that numerous other issues related to parameterization of the SS2 model will require further discussion as the development of the alternative model progresses in the future. In this context, it was agreed that assessment analysts strive to meet (b) above in initial base case configurations. Finally, see also (9).

(9) Fishery definitions in the SS2 model:

a. There is no status quo per se in that SS2 has not been used in any previous formal assessments; however, previous 'forward-simulation' models developed for this species (MULTIFAN-CL or MF-CL) presented a preliminary '23 fishery' spatial structure.

b. **Review the 23 fisheries, i.e., examine similarities/differences in sample data collected from these fisheries, including both size and CPUE data, then re-define fisheries:**

   i. **Retain MF-CL fisheries 1.**
   ii. **Retain MF-CL fishery 2 and estimate selectivity and catchability based on available size-distribution and CPUE data from this longline fishery.**
   iii. **Retain MF-CL fishery 3 and link selectivity and catchability to fishery 1 (USA/Canada Troll).**
   iv. **Reduce the number of Japan pole-and-line fisheries from 5 to 2 by: combining MF-CL fisheries 4 and 5; and MF-CL fisheries 6, 7, and 8.**
   v. **Reduce the number Japan 'large' longline fisheries from 6 to 3 by: combining MF-CL fisheries 9, 13, and 14; combining MF-CL fisheries 11 and 12; and retaining MF-CL fishery 10.**
   vi. **Reduce the number Japan 'small' longline fisheries from 4 to 3 by: combining MF-CL fisheries 16, 18, and 19; and retaining MF-CL fisheries 15 and 17.**
   vii. **Retain MF-CL fisheries 20, 21, and 23.**
   viii. **Retain MF-CL fishery 22 (Chinese Taipei, Korea, and Others) and link its selectivity to the newly created Japan longline fishery 11/12.**

Note: In summary, the spatial structure (fishery definition say) to be used in a forward-simulation, length-based/age-structured model (e.g., SS2) is best characterized by a '15 fishery' definition, which is a reduction from the '23 fishery' structure defined in earlier configurations (see Table 2).

(10) Work schedule: August – November 2006
The following table presents a general timeline for completing work assignments related to the upcoming assessment in November/December 2006. The table presents assignments ('what'), parties responsible ('who'), and deadlines ('when')work that shoulconcerning what assignments, who will In order to successfully complete the construction of population models (VPA-2BOX and SS2) for the 2006 albacore assessment the Group concluded that the following work needs to be completed in a timely fashion:

What	**Who**	**When?**
Document all changes to catch-at-age estimates and CPUE indices	VPA Task Group	By ISC ALBWG Meeting at end of November 2006
Effects of database and model changes on the results from the previous stock assessment	Modeling Task Groups	By ISC ALBWG Meeting at end of November 2006
Rerun W-L analysis based on revised US data	K. Watanabe	August 1, 2006
Data presented by Japan on length diagrams for pole and line and longline fisheries be either archived on the FTP site	K. Uosaki	By ISC ALBWG Meeting at end of November 2006
Prepare LF plots by quarter for new fisheries definitions	SS2 Task Group	By ISC ALBWG Meeting at end of November 2006
Develop abundance index from tagging data (not use in this coming 2006 assessment)	Japan	By ISC ALBWG Meeting at end of November 2006
SS2 model parameterization issues: 1) Assign quarter when smallest fish enter fishery 2) Estimate or fix growth 3) S-R relationship: steepness, variance, etc. 4) Develop length frequencies for the new fishery definitions	SS2 Task Group	By ISC ALBWG Meeting at end of November 2006

Develop age-aggregated and age-specific (where possible) CPUE indices for new fishery definitions: 1) USA/Can TL, 2) USA LL, 3) Japan PL, 4) Japan LL, 5) Chinese-Taipei LL	US, Japan, Chinese-Taipei	September 2006
Develop catch-at-age matrices (where possible) for new fishery definitions: 1)US/Can troll, 2) US LL, 3) Japan PL, 4) Japan LL, 5) Chinese-Taipei LL	US, Japan, Chinese-Taipei	September 2006
Baseline VPA	VPA Task Group	By ISC ALBWG Meeting at end of November 2006
Baseline SS2	SS2 Task Group	By ISC ALBWG Meeting at end of November 2006

Table 1. North Pacific albacore catches (in metric tons) by fisheries, 1952-2005[1]. Blank indicates no effort. -- indicates data not available. 0 indicates less than 1 metric ton. Provisional estimates in ().

YEAR	CANADA		JAPAN						KOREA		MEXICO
	TROLL	PURSE SEINE	GILL NET	LONG LINE	POLE & LINE	PURSE SEINE	TROLL	UNSP. GEAR	GILL NET	LONG LINE	UNSP. GEAR
1952	71			26,687	41,787	154		237			
1953	5			27,777	32,921	38		132			
1954				20,958	28,069	23		38			
1955				16,277	24,236	8		136			
1956	17			14,341	42,810			57			
1957	8			21,053	49,500	83		151			
1958	74			18,432	22,175	8		124			
1959	212			15,802	14,252			67			
1960	5	136		17,369	25,156			76			
1961	4			17,437	18,639	7		268			0
1962	1			15,764	8,729	53		191			0
1963	5			13,464	26,420	59		218			0
1964	3			15,458	23,858	128		319			0
1965	15			13,701	41,491	11		121			0
1966	44			25,050	22,830	111		585			0
1967	161			28,869	30,481	89		520			
1968	1,028			23,961	16,597	267		1,109			
1969	1,365			18,006	31,912	521		935			0
1970	390			16,283	24,263	317		456			0
1971	1,746			11,524	52,957	902		308			0
1972	3,921		1	13,043	60,569	277		623			100
1973	1,400		39	16,795	68,767	1,353		495			0
1974	1,331		224	13,409	73,564	161		879			1
1975	111		166	10,318	52,152	159		228		2,463	1
1976	278		1,070	15,825	85,336	1,109		272		859	36
1977	53		688	15,696	31,934	669		355		792	0
1978	23		4,029	13,023	59,877	1,115		2,078		228	1
1979	521		2,856	14,215	44,662	125		1,126	0	259	1
1980	212		2,986	14,689	46,742	329		1,179	6	597	31
1981	200		10,348	17,922	27,426	252		663	16	459	8
1982	104		12,511	16,767	29,614	561		440	113	387	7
1983	225		6,852	15,097	21,098	350		118	233	454	33
1984	50		8,988	15,060	26,013	3,380		511	516	136	113
1985	56		11,204	14,351	20,714	1,533		305	576	291	49
1986	30		7,813	12,928	16,096	1,542		626	726	241	3
1987	104		6,698	14,702	19,082	1,205		155	817	549	7
1988	155		9,074	14,731	6,216	1,208		134	1,016	409	15
1989	140		7,437	13,104	8,629	2,521		393	1,023	150	2
1990	302		6,064	15,789	8,532	1,995		249	1,016	6	2
1991	139		3,401	17,046	7,103	2,652		392	852	3	2
1992	363		2,721	19,049	13,888	4,104		1,527	271	(15)	10
1993	494		287	29,966	12,797	2,889		867		(32)	11
1994	1,998		263	29,600	26,389	2,026		799		(45)	6
1995	1,720		282	29,075	20,981	1,177	856	81		440	5
1996	3,591		116	32,493	20,272	581	815	117		333	21
1997	2,433		359	38,950	32,238	1,068	1,585	123		319	53
1998	4,188		206	35,813	22,926	1,554	1,190	88		(288)	8
1999	2,641		289	33,365	50,369	6,872	891	127		107	23
2000	4,465		67	30,046	21,549	2,408	645	171		414	79
2001	4,985		117	28,818	29,430	974	416	96		82	22
2002	5,022		332	23,641	48,454	3,303	787	135		(113)	28
2003	6,735		126	20,918	36,114	627	922	106	(0)	(144)	29
2004	(7,842)		61	17,549	32,255	7200	(772)	(65)	(0)	(68)	(106)
2005	(4,810)		(61)	(17,549)	(16,883)	(859)	(772)	(65)	(0)	(520)	(0)

[1] Data are from the 1st ISC Albacore Working Group, November 28 - December 2, 2005 except as noted.

Table 1. Continued

YEAR	TAIWAN		U.S.							OTHERS		GRAND TOTAL
	GILL NET	LONG LINE[2]	POLE & LINE	GILL NET	LONG LINE	PURSE SEINE	SPORT	TROLL	UNSP. GEAR	LONG LINE[3]	TROLL	
1952					46		1,373	23,843				94,198
1953					23		171	15,740				76,807
1954					13		147	12,246				61,494
1955					9		577	13,264				54,507
1956					6		482	18,751				76,464
1957					4		304	21,165				92,268
1958					7		48	14,855				55,723
1959					5		0	20,990	0			51,328
1960					4		557	20,100	0			63,403
1961			2,837		5		1,355	12,055	1			52,608
1962			1,085		7		1,681	19,752	1			47,264
1963			2,432		7		1,161	25,140	0			68,906
1964			3,411		4		824	18,388	0			62,393
1965			417		3		731	16,542	0			73,032
1966			1,600		8		588	15,333	1			66,150
1967		330	4,113		12		707	17,814	0			83,096
1968		216	4,906		11		951	20,434	0			69,480
1969		65	2,996		14		358	18,827	0			74,999
1970		34	4,416		9		822	21,032	0			68,022
1971		20	2,071		11		1,175	20,526	0			91,240
1972		187	3,750		8		637	23,600	0			106,717
1973		--	2,236		14		84	15,653	0			106,836
1974		486	4,777		9		94	20,178	0			115,113
1975		1,240	3,243		33		640	18,932	10			89,696
1976		686	2,700		23		713	15,905	4			124,816
1977		572	1,497		37		537	9,969	0			62,799
1978		6	950		54		810	16,613	15			98,822
1979		81	303		--		74	6,781	0			71,004
1980	--	249	382		--		168	7,556	0			75,126
1981	--	143	748		25		195	12,637	0			71,042
1982	--	38	425		105		257	6,609	21			67,960
1983	--	8	607		6		87	9,359	0			54,527
1984	--	--	1,030		2	3,728	1,427	9,304	0			70,258
1985	--	--	1,498	2	0		1,176	6,415	0			58,170
1986	--	--	432	3			196	4,708	0			45,344
1987	2,514	--	158	5	150		74	2,766	0			48,986
1988	7,389	--	598	15	308		64	4,212	10			45,554
1989	8,350	40	54	4	249		160	1,860	23			44,140
1990	16,701	4	115	29	177	71	24	2,603	4			53,683
1991	3,398	12	0	17	313	0	6	1,845	71			37,253
1992	7,866	--	0	0	337	0	2	4,572	72			(54,796)
1993		5	0	0	440		25	6,254	0			(54,067)
1994		83	0	38	546		106	10,978	213		158	(73,248)
1995		4,280	80	52	883		102	8,045	1		137	68,197
1996		7,596	24	83	1,187	11	88	16,938	0	1,735	505	86,506
1997		9,119	73	60	1,652	2	1,018	14,252	1	2,824	404	106,533
1998		8,617	79	80	1,120	33	1,208	14,410	2	5,871	286	(97,967)
1999		8,186	60	149	1,540	48	3,621	10,060	1	6,307	261	124,917
2000		8,842	69	55	940	4	1,798	9,645	3	3,654	490	85,343
2001		8,684	139	94	1,295	51	1,635	11,210	0	1,471	127	89,647
2002		7,965	381	30	525	4	2,357	10,387		700	(127)	(104,292)
2003		7,166	59	16	524	44	2,214	14,102	0	(2,400)	(127)	(92,374)
2004		(4,988)	(126)	(12)	(356)	(1)	(1,506)	(13,432)	(0)	(2,400)	(127)	(88,867)
2005		(4,687)	(66)	(20)	(277)	(2)	(1,719)	(9,122)	(0)	(2,400)	(127)	(59,939)

[2] Catches for 2000-2004 contain estimates of offshore longline catches from vessels landing at domestic ports

[3] Other longline catches from vessels flying flags of convenience being called back to Taiwan. The catches may be duplicated in Taiwan longline catches (November 2005).

Table 2. Independent old and new fisheries definitions used in the SS2 model 2006

MODEL SCENARIO	FISHERY	FISHERY DESCRIPTIONS	FISHERY BOUNDARIES	CATCH DATA	BIOLOGICAL DATA	EFFORT DATA	ASSUMPTIONS
23 Fisheries	1	*USA/Canada troll*	0-55°N latitude by 120°W-180° longitude	Yes (1975-05)	Yes (1975-05)	Yes (1975-05) - Std.	Major Fishery
'Old' fishery definitions	2	*USA longline*	0-55°N latitude by 120°W-180° longitude	Yes (1975-05)	Yes (1994-05)	Yes (1991-05) - Std.	Major Fishery
	3	*EPO miscellaneous*	0-55°N latitude by 120°W-180° longitude				Major Fishery - similar to Major Fishery 1
		USA pole-and-line		Yes (1975-05)	No	No	Minor Fishery - similar to Major Fishery 1
		USA purse seine		Yes (1975-05)	No	No	Minor Fishery - similar to Major Fishery 1
		USA gill net		Yes (1975-05)	No	No	Minor Fishery - similar to Major Fishery 1
		USA recreational		Yes (1975-05)	No	No	Minor Fishery - similar to Major Fishery 1
		USA unspecified		Yes (1975-05)	No	No	Minor Fishery - similar to Major Fishery 1
		Mexico unspecified		Yes (1975-05)	No	No	Minor Fishery - similar to Major Fishery 1
		Others troll		Yes (1975-05)	No	No	Minor Fishery - similar to Major Fishery 1
	4	*Japan pole-and-line*	30-35°N latitude by 130-140°E longitude	Yes (1975-05)	Yes (1975-05)	Yes (1975-05) - Std.	Major Fishery
	5	*Japan pole-and-line*	25-30°N latitude by 130-150°E longitude	Yes (1975-05)	Yes (1975-05)	Yes (1975-05) - Std.	Major Fishery
	6	*Japan pole-and-line*	30-35°N latitude by 140-150°E longitude and 25-35°N latitude by 150-160°E longitude	Yes (1975-05)	Yes (1975-05)	Yes (1975-05) - Std.	Major Fishery
	7	*Japan pole-and-line*	35-45°N latitude by 140-160°E longitude	Yes (1975-05)	Yes (1975-05)	Yes (1975-05) - Std.	Major Fishery
	8	*Japan pole-and-line*	25-45°N latitude by 160°E-180° longitude	Yes (1975-05)	Yes (1975-05)	Yes (1975-05) - Std.	Major Fishery
	9	*Japan longline-large (distant-water/offshore)*	30-40°N latitude by 140°E-180° longitude and 25-30°N latitude by 150°E -180° longitude	Yes (1975-05)	Yes (1975-05)	Yes (1975-05) - Std.	Major Fishery
	10	*Japan longline-large (distant-water/offshore)*	25-40°N latitude by 120°W-180° longitude	Yes (1975-05)	Yes (1975-05)	Yes (1975-05) - Std.	Major Fishery
	11	*Japan longline-large (distant-water/offshore)*	10-25°N latitude by 120°E-180° longitude	Yes (1975-05)	Yes (1975-05)	Yes (1975-05) - Std.	Major Fishery
	12	*Japan longline-large (distant-water/offshore)*	10-25°N latitude by 120°W-180° longitude	Yes (1975-05)	Yes (1975-05)	Yes (1975-05) - Std.	Major Fishery
	13	*Japan longline-large (distant-water/offshore)*	25-35°N latitude by 120-140°E longitude	Yes (1975-05)	Yes (1975-05)	Yes (1975-05) - Std.	Major Fishery
	14	*Japan longline-large (distant-water/offshore)*	25-30°N latitude by 140-150°E longitude	Yes (1975-05)	Yes (1975-05)	Yes (1975-05) - Std.	Major Fishery
	15	*Japan longline -small (Fisheries 16-19) - 1975-93*	10-35°N latitude by 120-160°E longitude and 35-40°N latitude by 140-160°E longitude	Yes (1975-93)	No	No	Major Fishery
	16	*Japan longline -small (coastal-misc.) - 1994-03*	30-40°N latitude by 140-160°E longitude and 25-30°N latitude by 150-160°E longitude	Yes (1994-05)	Yes (1994-05)	Yes (1994-05) - Nom.	Major Fishery
	17	*Japan longline -small (coastal-misc.) - 1994-03*	10-25°N latitude by 120-160°E longitude	Yes (1994-05)	Yes (1994-05)	Yes (1994-05) - Nom.	Major Fishery
	18	*Japan longline -small (coastal-misc.) - 1994-03*	25-35°N latitude by 120-140°E longitude	Yes (1994-05)	Yes (1994-05)	Yes (1994-05) - Nom.	Major Fishery
	19	*Japan longline -small (coastal-misc.) - 1994-03*	25-30°N latitude by 140-150°E longitude	Yes (1994-05)	Yes (1994-05)	Yes (1994-05) - Nom.	Major Fishery
	20	*Japan gill net*	0-55°N latitude by 120°E-180° longitude	Yes (1975-05)	Yes (1990-91)	No	Major Fishery
	21	*Japan miscellaneous*	0-55°N latitude by 120°E-180° longitude				Major Fishery - similar to Major Fishery 7 and 20
		Japan purse seine		Yes (1975-05)	No	No	Minor Fishery - similar to Major Fishery 7 and 20
		Japan troll		Yes (1975-05)	No	No	Minor Fishery - similar to Major Fishery 7 and 20
		Japan unspecified		Yes (1975-05)	No	No	Minor Fishery - similar to Major Fishery 7 and 20
	22	*Taiwan, Korea, and Others longline*	0-55°N latitude by 120°E-180° longitude	Yes (1975-05)	No	No	Major Fishery - similar to Major Fishery 2 and 12
	23	*Taiwan and Korea gill net*	0-55°N latitude by 120°E-180° longitude	Yes (1980-92)	No	No	Major Fishery - similar to Major Fishery 20
15 Fisheries	1	*USA/Canada troll*	0-55°N latitude by 120°W-180° longitude - *Old Fishery 1*	Yes (1966-05)	Yes (1966-05)	Yes (1966-05) - Std.	Major Fishery
'New' fishery definitions	2	*USA longline*	0-55°N latitude by 120°W-180° longitude - *Old Fishery 2*	Yes (1966-05)	Yes (1994-05)	Yes (1991-05) - Std.	Major Fishery
	3	*EPO miscellaneous*	0-55°N latitude by 120°W-180° longitude - *Old Fishery 3*				Major Fishery - similar to Major Fishery 1
		USA pole-and-line		Yes (1966-05)	No	No	Minor Fishery
		USA purse seine		Yes (1966-05)	No	No	Minor Fishery
		USA gill net		Yes (1966-05)	No	No	Minor Fishery
		USA recreational		Yes (1966-05)	No	No	Minor Fishery
		USA unspecified		Yes (1966-05)	No	No	Minor Fishery
		Mexico unspecified		Yes (1966-05)	No	No	Minor Fishery
		Others troll		Yes (1966-05)	No	No	Minor Fishery
	4	*Japan pole-and-line*	25-35°N latitude by 130-140°E longitude / 25-30°N latitude by 140-150°E longitude- *Old Fisheries 4 and 5*	Yes (1966-05)	Yes (1966-05)	Yes (1966-05) - Std.	Major Fishery
	5	*Japan pole-and-line*	30-45°N latitude by 140-150°E longitude / 25-45°N latitude by 150°E-180° longitude- Old Fisheries 4 and 5 - *Old Fisheries 6, 7, and 8*	Yes (1966-05)	Yes (1966-05)	Yes (1966-05) - Std.	Major Fishery
	6	*Japan longline-large (distant-water/offshore)*	25-40°N latitude by 120°W-180° longitude - *Old Fishery 10*	Yes (1966-05)	Yes (1966-05)	Yes (1966-05) - Std.	Major Fishery
	7	*Japan longline-large (distant-water/offshore)*	10-25°N latitude by 120°E-120°W longitude - *Old Fisheries 11 and 12*	Yes (1966-05)	Yes (1966-05)	Yes (1966-05) - Std.	Major Fishery
	8	*Japan longline-large (distant-water/offshore)*	25-40°N latitude by 120°E-180° longitude - *Old Fisheries 9, 13, and 14*	Yes (1966-05)	Yes (1966-05)	Yes (1966-05) - Std.	Major Fishery
	9	*Japan longline -small (Fisheries 10-11) - 1966-93*	10-40°N latitude by 120-160°E longitude - *Old Fishery 15*	Yes (1966-93)	No	No	Major Fishery
	10	*Japan longline -small (coastal-misc.) - 1994-05*	25-40°N latitude by 120-160°E longitude - *Old Fisheries 16, 18, and 19*	Yes (1994-05)	Yes (1994-05)	Yes (1994-05) - Nom.	Major Fishery
	11	*Japan longline -small (coastal-misc.) - 1994-05*	10-25°N latitude by 120-160°E longitude - *Old Fishery 17*	Yes (1994-05)	Yes (1994-05)	Yes (1994-05) - Nom.	Major Fishery
	12	*Japan gill net*	0-55°N latitude by 120°E-180° longitude - *Old Fishery 20*	Yes (1975-05)	Yes (1990-91)	No	Major Fishery
	13	*Japan miscellaneous*	0-55°N latitude by 120°E-180° longitude - *Old Fishery 21*				Major Fishery
		Japan purse seine		Yes (1966-05)	No	No	Minor Fishery
		Japan troll		Yes (1966-05)	No	No	Minor Fishery
		Japan unspecified		Yes (1966-05)	No	No	Minor Fishery
	14	*Taiwan, Korea, and Others longline*	0-55°N latitude by 120°E-180° longitude - *Old Fishery 22* (for selectivity issues, link to *New Fishery 7*)	Yes (1966-05)	No	Yes (1995-05) - Std.	Major Fishery - similar to Major Fishery 7 and 2
	15	*Taiwan gill net*	0-55°N latitude by 120°E-180° longitude - *Old Fishery 23*	Yes (1987-92)	Yes (1988-90)	No	Major Fishery
		Korea gill net		Yes (1980-92)	No	No	Minor Fishery - similar to Major Fishery 15

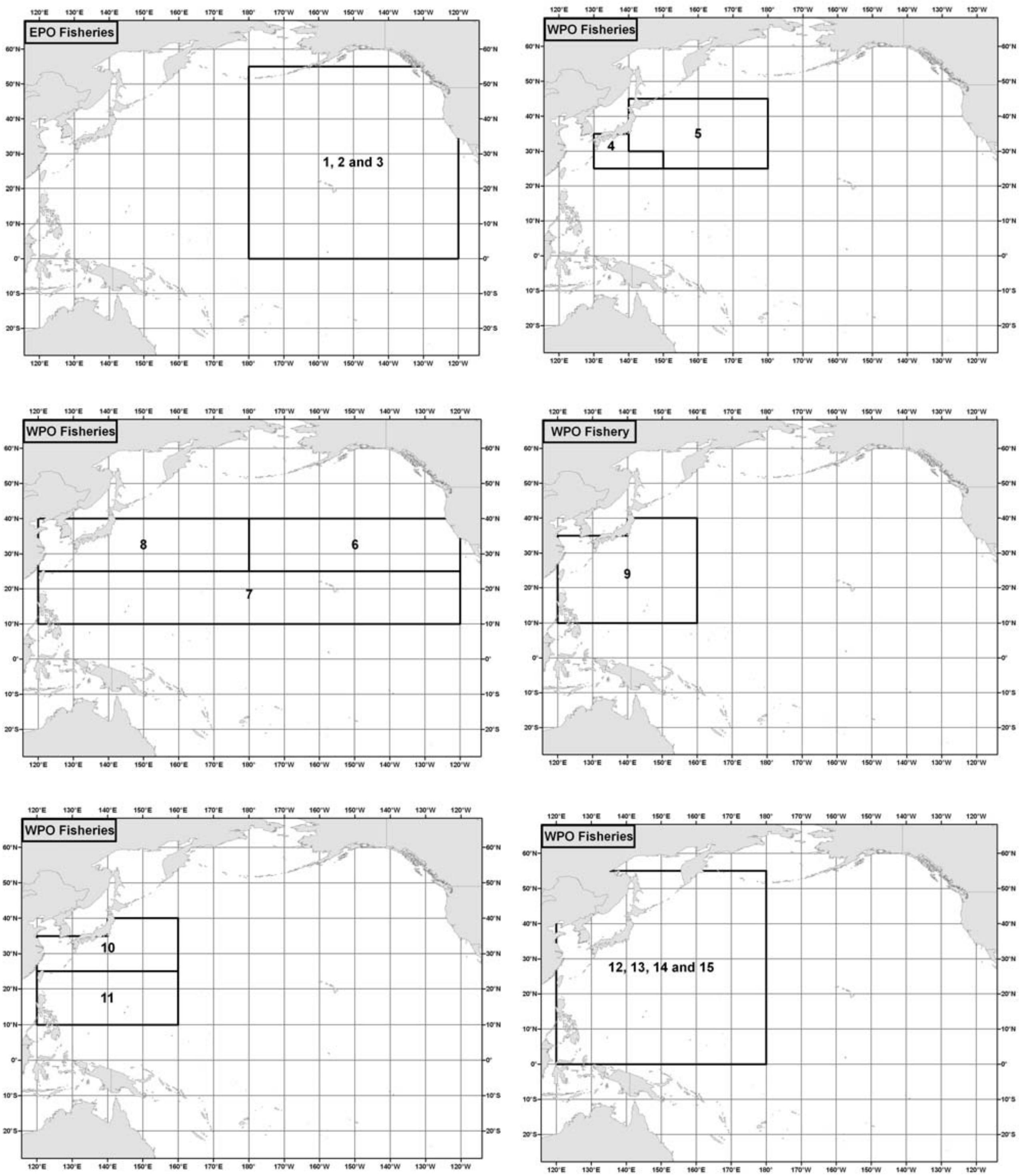


Figure 1. Independent Fisheries defined in the SS2 model (2006). Eastern Pacific Ocean-based (EPO) Fisheries include: (1) USA/Canada troll; (2) USA longline; and (3) EPO miscellaneous. Western Pacific Ocean-based (EPO) Fisheries include: (4-5) Japan pole-and-line; (6-8) Japan 'large' (offshore) longline; (9-11) Japan 'small' (coastal) longline, with Fishery 9 defined as a temporal stratification of Fisheries 10-11, i.e., within the same spatial boundaries, Fishery 9 spanned from 1966-93 and Fisheries 10-11 from 1994-present; (12) Japan gill net; (13) Japan miscellaneous; (14) Chinese Taipei, S. Korea, and 'Others' longline; and (15) Chinese Taipei and S. Korea gill net.

ATACHMENT 1. List of Participants

Canada

Max Stocker (chair)
Fisheries and Oceans Canada, Pacific Biological Station
3190 Hammond Bay Road, Nanaimo, B.C., Canada V9T 6N7
Phone: 250-758-0275, Fax: 250-756-7053, E-mail: StockerM@pac.dfo-mpo.gc.ca

Chinese-Taipei

Chien-Chung Hsu
Institute of Oceanography, National Taiwan University, P.O. Box 23-13
Taipei, Taiwan 106
Phone: 886-2-2362-2987, 886-2-3366-1198, Fax: 886-2-2366-1198,
E-mail:hsucc@ntu.edu.tw

Hui-Hua Lee
Institute of Oceanography, National Taiwan University, P.O. Box 23-13
Taipei, Taiwan 106
Phone: 886-2-2362-2987, Fax: 886-2-2366-1198, E-mail: d91241003@ntu.edu.tw

Japan

Momoko Ichinokawa
National Research Institute of Far Seas Fisheries, 5-7-1, Orido, Shimizu-ku, Shizuoka
424-8633 Japan
Phone: 81-543-36-6039, Fax: 81-543-35-9642, E-mail: ichimomo@fra.affrc.go.jp

Yukio Takeuchi
National Research Institute of Far Seas Fisheries, 5-7-1, Orido, Shimizu-ku, Shizuoka
424-8633 Japan
Phone: 81-543-36-6039, Fax: 81-543-35-9642, E-mail: yukiot@fra.affrc.go.jp

Koji Uosaki
National Research Institute of Far Seas Fisheries, 5-7-1, Orido, Shimizu-ku, Shizuoka
424-8633 Japan
Phone: 81-543-36-6036, Fax: 81-543-35-9642, E-mail: uosaki@affrc.go.jp

Kyuji Watanabe
National Research Institute of Far Seas Fisheries, 5-7-1, Orido, Shimizu-ku, Shizuoka
424-8633 Japan
Phone: 81-543-36-6037, Fax: 81-543-35-9642, E-mail: watanabk@fra.affrc.go.jp

United States
Atilio L. Coan Jr.
NOAA Fisheries, Southwest Fisheries Science Center, 8604 La Jolla Shores Drive
La Jolla, CA 92037, U.S.A.
Phone: 858-546-7079, Fax: 858-546-5653, E-mail: Al.Coan@noaa.gov

Ray Conser
NOAA Fisheries, Southwest Fisheries Science Center, 8604 La Jolla Shores Drive
La Jolla, CA 92037, U.S.A.
Phone: 858-546-5688, Fax: 858-546-5656, E-mail: Ray.Conser@noaa.gov

Paul R. Crone
NOAA Fisheries, Southwest Fisheries Science Center, 8604 La Jolla Shores Drive
La Jolla, CA 92037, U.S.A.
Phone: 858-546-7069, Fax: 858-546-5653, E-mail: Paul.Crone@noaa.gov

Emmanis Dorval
NOAA Fisheries, Southwest Fisheries Science Center, 8604 La Jolla Shores Drive
La Jolla, CA 92037, U.S.A.
Phone: 858-546-5619, Fax: 858-546-5656, E-mail: Emmanis.Dorval@noaa.gov

ATTACHMENT 2. List of Documents

ISC-ALBWG Task Group/06/01: Review of Japanese fisheries and Biological data to develop longer time series for albacore stock assessment - Koji Uosaki

ISC-ALBWG Task Group/06/02: Practical solutions of application issues of length-weight relationship for the North Pacific albacore with respect to the stock assessment – K. Watanabe and K. Uosaki

ISC-ALBWG Task Group/06/03: Introduction of the operational model for evaluating stock assessment models applied to oceanic tuna-like species - Momoko Ichinokawa & Yukio Takeuchi

ISC-ALBWG Task Group/06/04: Newly available data of Japanese small longline: examination of its availability for standardizing North Pacific albacore CPUE - Momoko Ichinokawa, Yukio Takeuchi & Koji Uosaki

ISC-ALBWG Task Group/06/05: How to select the future north Pacific albacore stock assessment model – Yukio Takeuchi

ATTACHMENT 3. Meeting Agenda

STOCK ASSESSMENT TASK GROUP MEETING OF THE INTERNATIONAL SCIENTIFIC COMMITTEE-ALBACORE WORKING GROUP (2006)

July 13-17, 2006
Nanaimo, British Columbia, Canada

Agenda

Objectives:

- Data preparation work for the assessment meeting in November/December 2006
- Making decisions about model parameterization for the VPA-2Box and SS2 assessment models
- Conduct preliminary base case VPA-2Box and SS2 assessments
- Provide sufficient model diagnostics for review at the November 28-December 5, 2006 meeting

Opening

- Welcome
- Orientation
- Approval of Agenda

Data review: Eastern Pacific Ocean (EPO) fisheries

- Surface fisheries
    - USA
        1. Troll
        2. Miscellaneous (pole-and-line, gill net fishery, purse seine, recreational, unspecified)
    - Canada
        1. Troll
    - Mexico
        1. Unspecified
- Sub-surface (longline) fisheries
    - USA
        1. Longline
    - ‘Others’
        1. Troll (Belize, Tonga, Ecuador, etc.)

Data review: Western Pacific Ocean (WPO) fisheries

- Surface fisheries
    - Japan
        1. Pole-and-line
        2. Gill net
        3. Miscellaneous (troll, purse seine, unspecified)
    - Korea

1. Gill net
- <u>Chinese Taipei</u>
    1. Gill net

- Sub-surface (longline) fisheries
    - <u>Japan</u>
        1. Longline
            a. 'Large' (distant-water)
            b. 'Small' (coastal)
    - <u>Korea</u>
        1. Longline
    - <u>Chinese Taipei</u>
        1. Longline
    - <u>"Others"</u>
        1. Longline (believed to be mostly Chinese Taipei)

Preliminary baseline model development: considerations

- Work that should be completed prior to the next ISC-ALBWG Meeting, including, preparing both the SS2 and VPA-2BOX baseline models and decisions concerning how best to identify a preferred model scenario for providing management-related advice
- Length of time series included in the population models, i.e., extend back prior to 1975?
- Parameterization of growth models 'within' the overall population model, including, maturity, weight-length, size-at-age, *M*?
- Age and/or length distributions, i.e., can time series be improved further?
- Indices of abundance: prioritizing, age-aggregated/age-specific, annual/quarter time steps?

Pacific Fishery Management Council

7700 NE Ambassador Place, Suite 101, Portland, OR 97220-1384
Phone 503-820-2280 | Toll free 866-806-7204 | Fax 503-820-2299 | www.pcouncil.org

April 27, 2007

Mr. Bill Robinson, Regional Administrator
Pacific Islands Region
1601 Kapiolani Blvd., Ste 1110
Honolulu, HI 96814-4700

Dear Mr. Robinson:

With the implementation of the Pacific Fishery Management Council's (Council's) Fishery Management Plan (FMP) for U.S. West Coast Fisheries for Highly Migratory Species (HMS) and §503(a) of the Western and Central Pacific Fisheries Convention Implementation Act, we must become more involved in the activities of the Western and Central Pacific Commission (WCPFC). The troll fishery for North Pacific albacore is the largest fishery we manage under our HMS FMP and a significant component of the stock occurs in waters west of 150° W longitude and under the jurisdiction of the WCPFC. As you know, the Convention establishes a Northern Committee to make recommendations to the Commission on the implementation of conservation and management measures for the area north of the 20° N latitude and for stocks which occur mostly in this area. Thus, participation in the annual meetings of the Northern Committee is of especial interest to us, because it is in that venue where detailed consideration of measures related to North Pacific albacore will occur. However, we note with dismay that in 2007, the Northern Committee meeting is scheduled for September 11–13, which coincides with our September 9–14 Council meeting, thus precluding meaningful participation by advisors, staff, or members of the Council. As the principal NMFS member of the U.S. delegation to the WCPFC, we ask you to request the WCPFC to reschedule the Northern Committee meeting to a time in October. I realize that rescheduling the 2007 meeting may not be possible at this time.

However, even if this year's meeting cannot be rescheduled, we request you make every effort to ensure that Northern Committee meetings in 2008 and beyond are not scheduled to conflict with our September Council meeting. Our current preference would be that they be scheduled for the mid-month of October. We schedule Council meetings several years in advance and the meetings occur during the same general time periods each year. I am enclosing the current schedule of Council meetings, through 2010.

We appreciate you attention to this important matter.

Sincerely,

D. O. McIsaac, Ph.D.
Executive Director

KRD:rdd

Enclosure (1): Council Meeting Schedule

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Pacific Islands Regional Office
1601 Kapiolani Blvd., Suite 1110
Honolulu, Hawaii 96814-4733
(808) 944-2200 • Fax: (808) 973-2941

June 12, 2007

D.O. McIsaac, PhD, Executive Director
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 101
Portland, OR 97220-1384

Dear ~~Dr. McIsaac~~, Don

Thank you for your letter of April 27, 2007, regarding the timing of the meetings of the Western and Central Pacific Fisheries Commission's Northern Committee. I recognize that the deliberations of the Northern Committee are especially important to the Pacific Fishery Management Council and its constituents and I agree that it is crucial that one or more representatives of the Council be able to participate in the Committee's meetings. In order to facilitate such participation, I will do my best to see that future meetings of the Northern Committee do not conflict with the meetings of the Council. However, as I am sure you can appreciate, it may be difficult to identify meeting dates that are agreeable to all the members of the Northern Committee, as well as all the members of the U.S. delegation. As far as this year's meeting of the Northern Committee, set for September 11-13, I am afraid it is too late to ask the Committee to consider changing the dates, as its members agreed to it some time ago. I am hopeful, however, that even if the Council's participation in the meeting itself is limited, the Council and its staff will be able to provide meaningful input to the U.S. delegation.

Sincerely,

William L. Robinson
Regional Administrator

cc: Rodney McInnis, SWRO
William Gibbons-Fly, Department of State

Agenda Item F.4.b
SWFSC PowerPoint
September 2007

North Pacific Albacore Stock Status and Conservation Advice

Report of the ISC – Albacore Working Group Stock Assessment Workshop (2006)

P. R. Crone
NOAA Fisheries
Southwest Fisheries Science Center
8604 La Jolla Shores Drive
La Jolla, CA 92037
USA

Presentation Outline

- Working Group history
- Stock assessment (2006)
  - Fishery-related ‘statistics’
  - Model
  - Input data
  - Analysis (Results)
  - Conclusions

ISC – Albacore Working Group

- Began informally in mid-1970s … *North Pacific Albacore Workshop*
- Several nations/institutions 'participate'
  - USA, Canada, and Mexico (EPO)
  - Japan, Taiwan, and S. Korea (WPO)
  - IATTC and SPC
- For the most part, first 'reviewed' assessment was in 2001
- Some collaborative research studies, but mostly independently conducted 'albacore' projects, e.g., …

Fishery-related Statistics

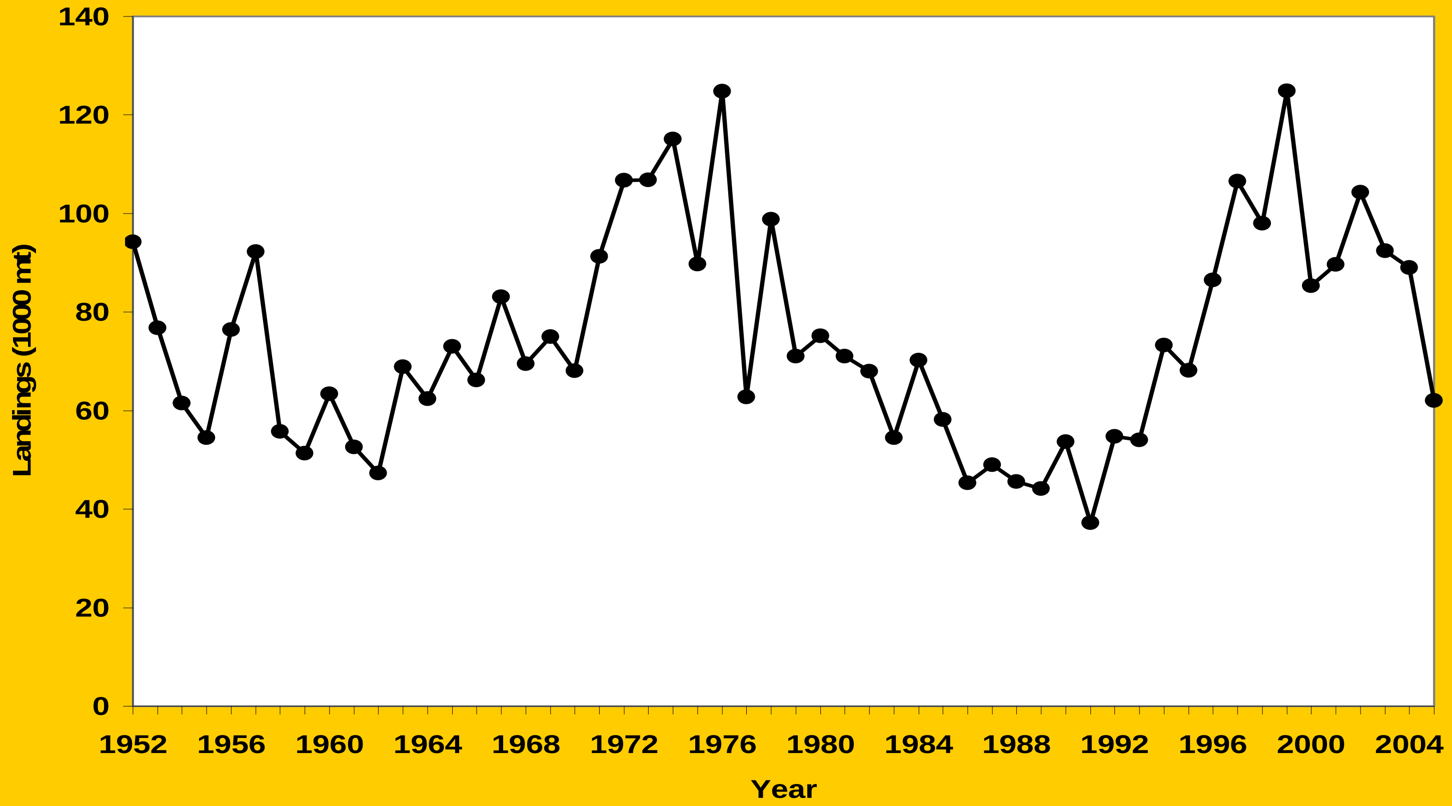
Sampling Programs (Data Base Catalog)

- Category I – Total landings (round weight, mt) and total nominal effort in number of active vessels

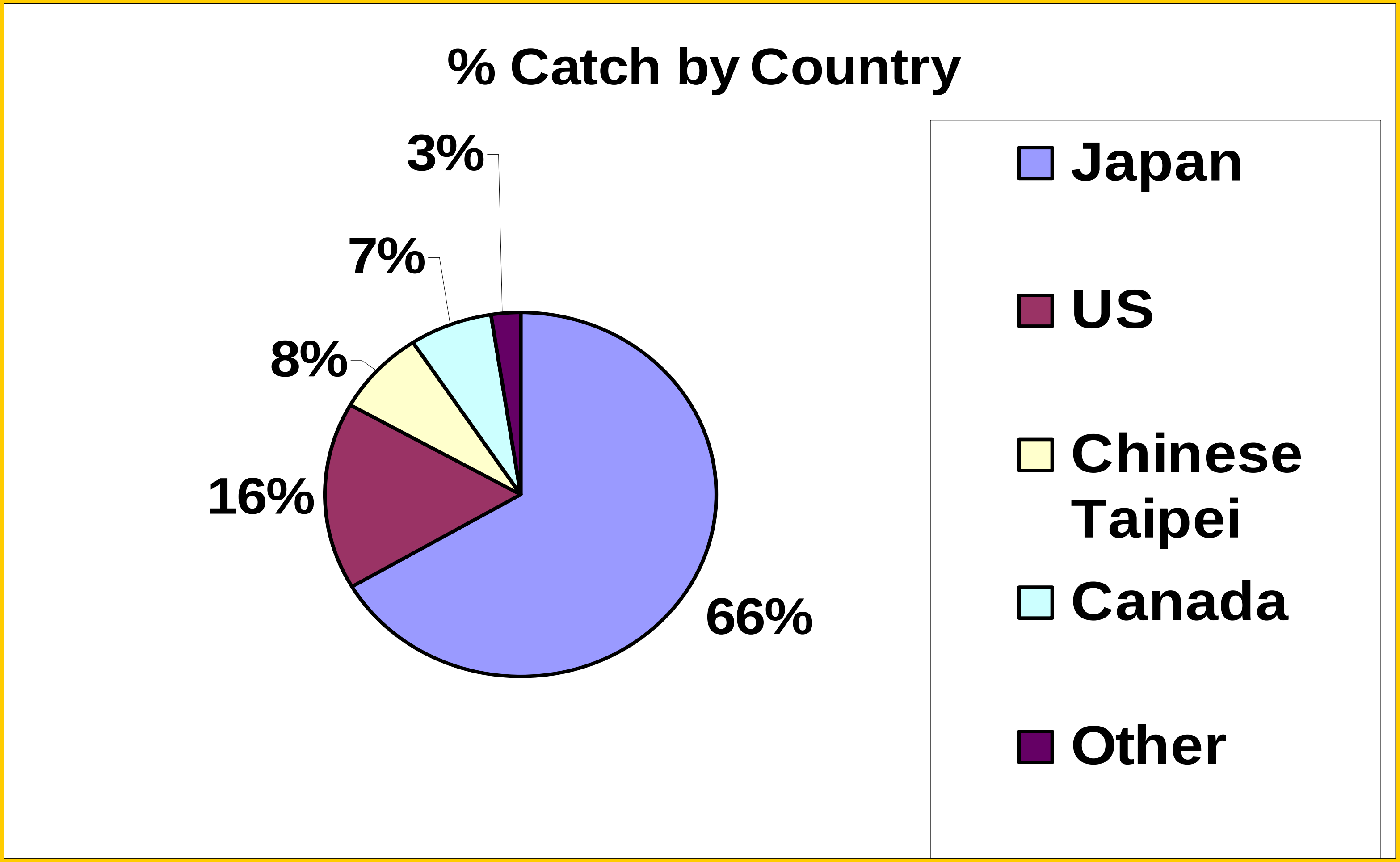
- Category II – Catch and nominal effort data from logbooks (5°×5° area for longline data and 1°×1° for other fisheries)

- Category III – Size composition (length or weight distributions)

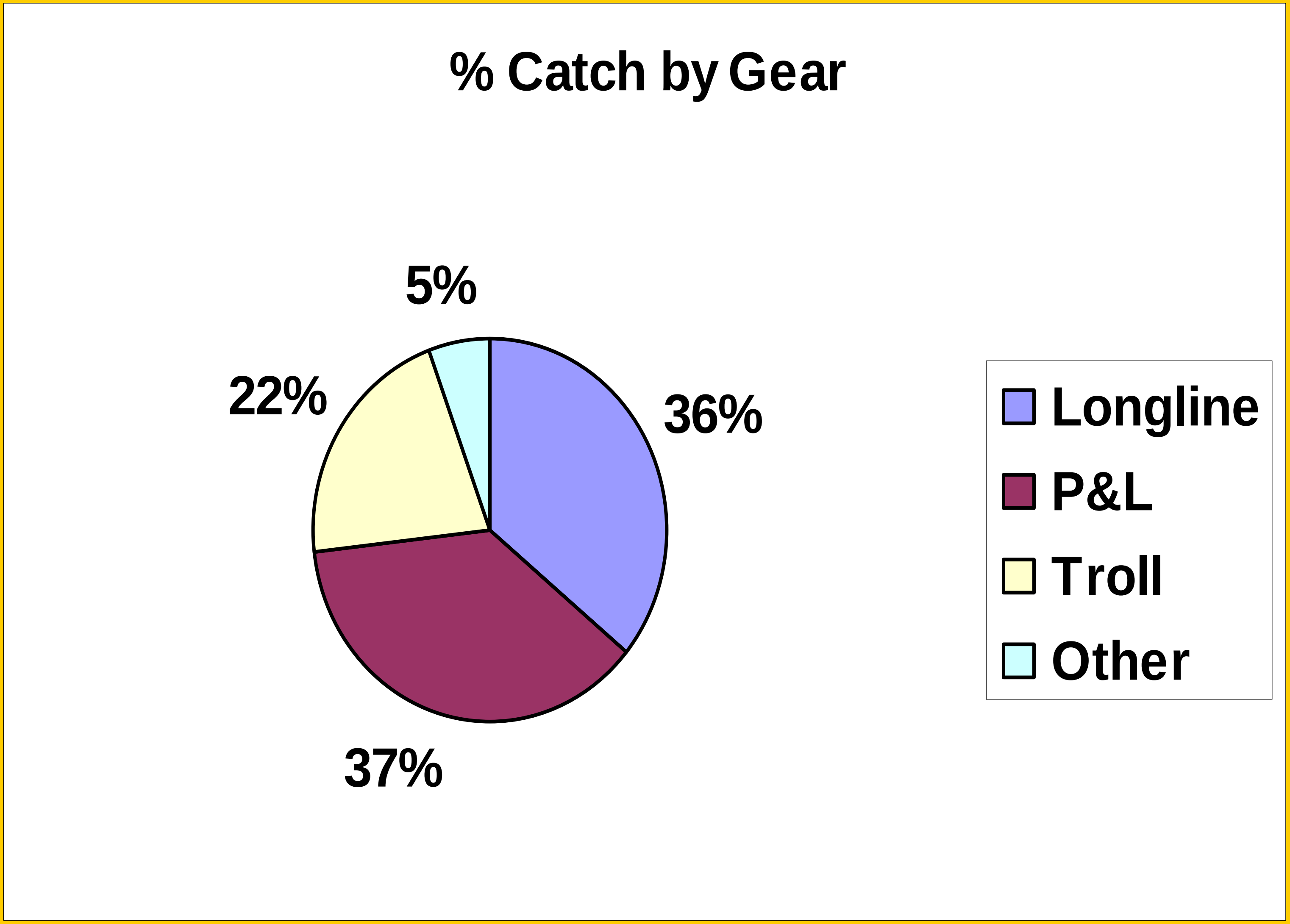
Fishery-related Statistics



Fishery-related Statistics



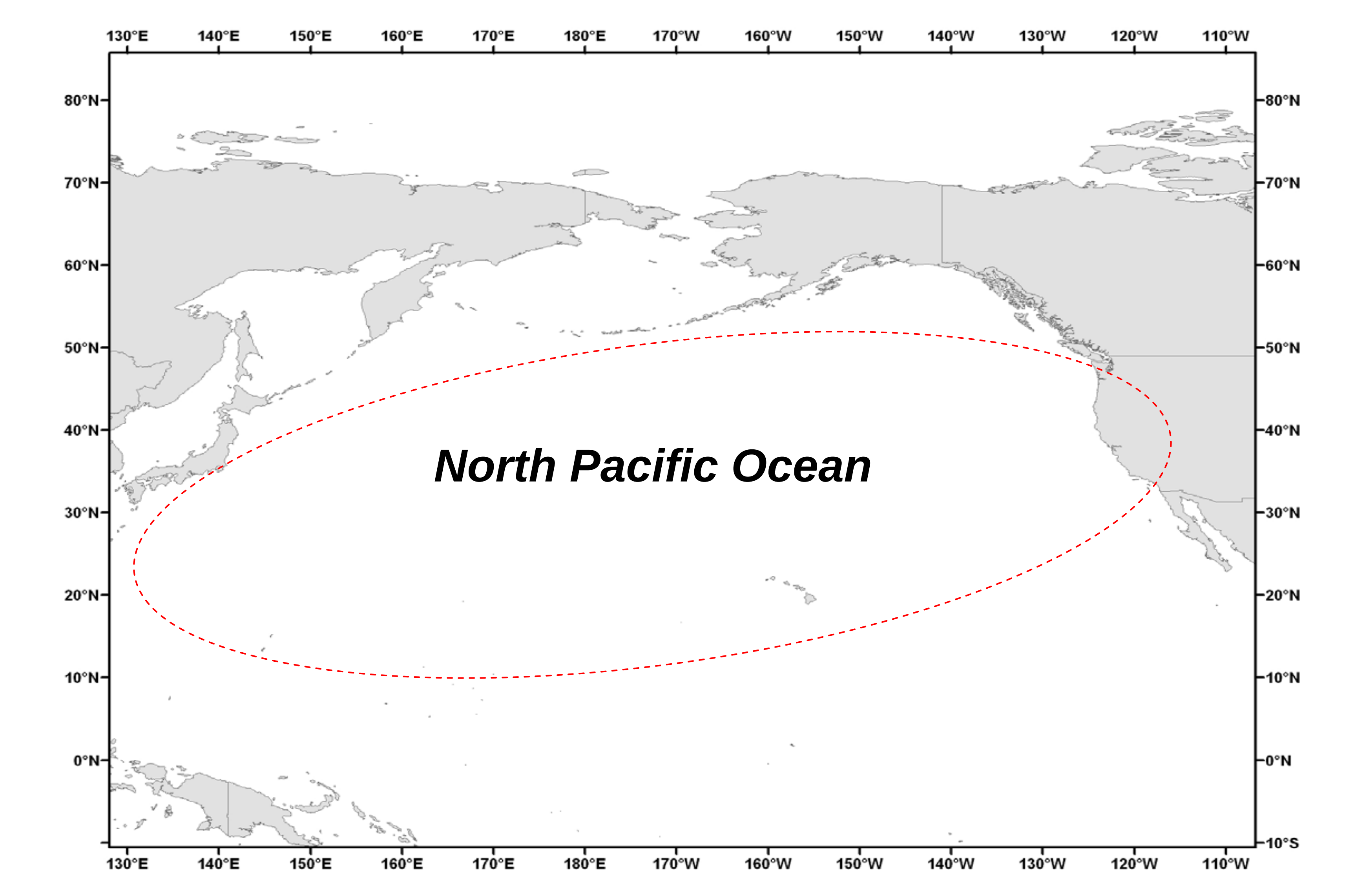
Fishery-related Statistics



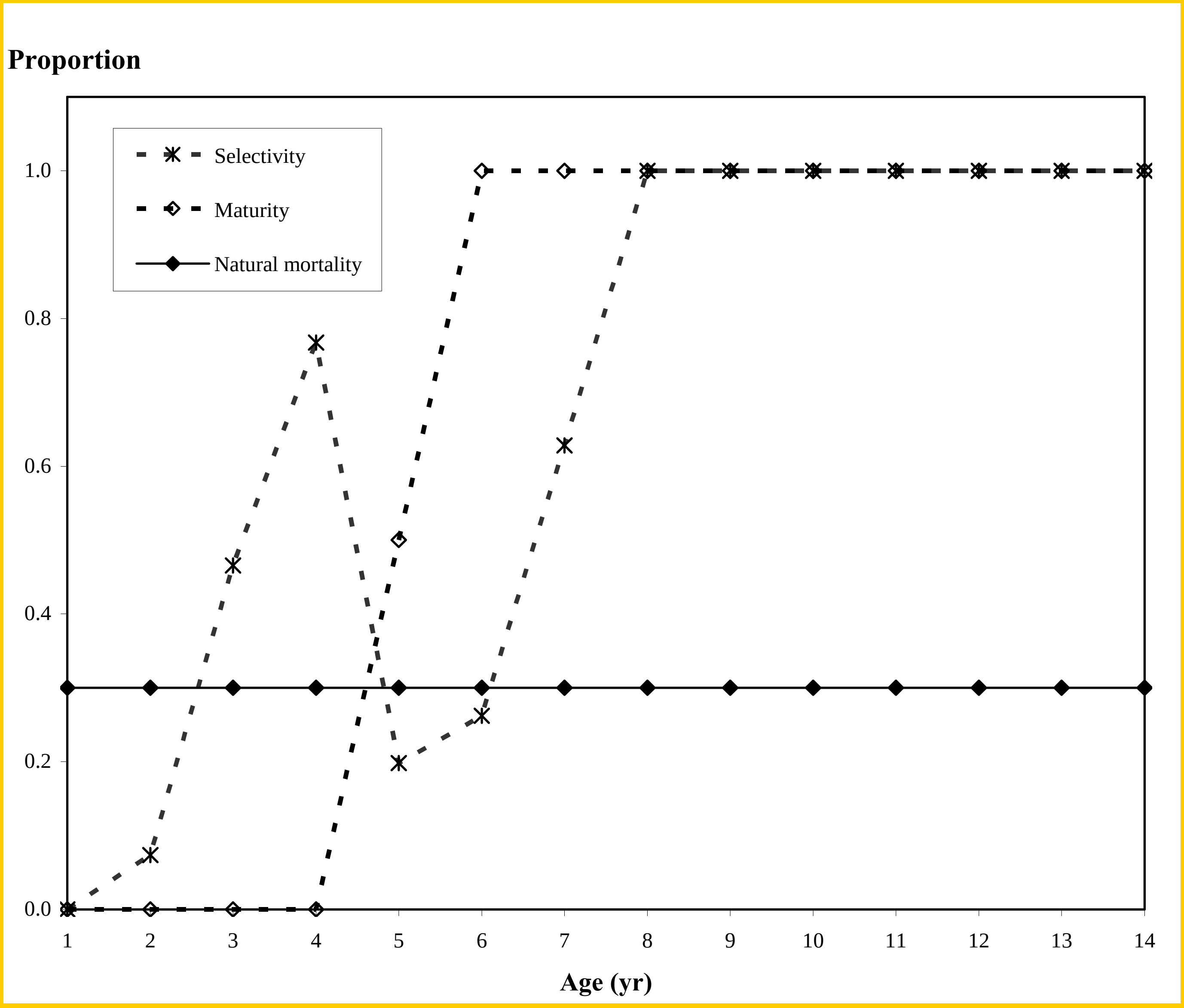
Model

- **VPA approach**
  - ‘VPA-2BOX’ platform (Clay …)
  - Based generally on ‘ADAPT’ framework (Stratis, Ray, Joe, Victor …)
  - Backward-simulation using catch-at-age time series
  - Maximum likelihood estimation (ADMB coded)
  - Statistical ≡ CPUE indices
  - Pluses / minuses of VPAs

‘Stock structure’ Assumption



‘Pop Dy’ Assumptions



Input Data

- Catch-at-age time series
  - Substantial changes from last assessment (2004)
- Eastern Pacific Ocean (USA, Canada, Mexico)
  - Sample data from USA and Canada
  - Age compositions largely based on age-slicing methods
  - USA longline age composition based on MULTIFAN
- Western Pacific Ocean (Japan, Taiwan, S. Korea)
  - Sample data from Japan and Taiwan
  - Age compositions based on age-slicing and MULTIFAN

Input Data

Catch-at-age (no. in 1,000s)

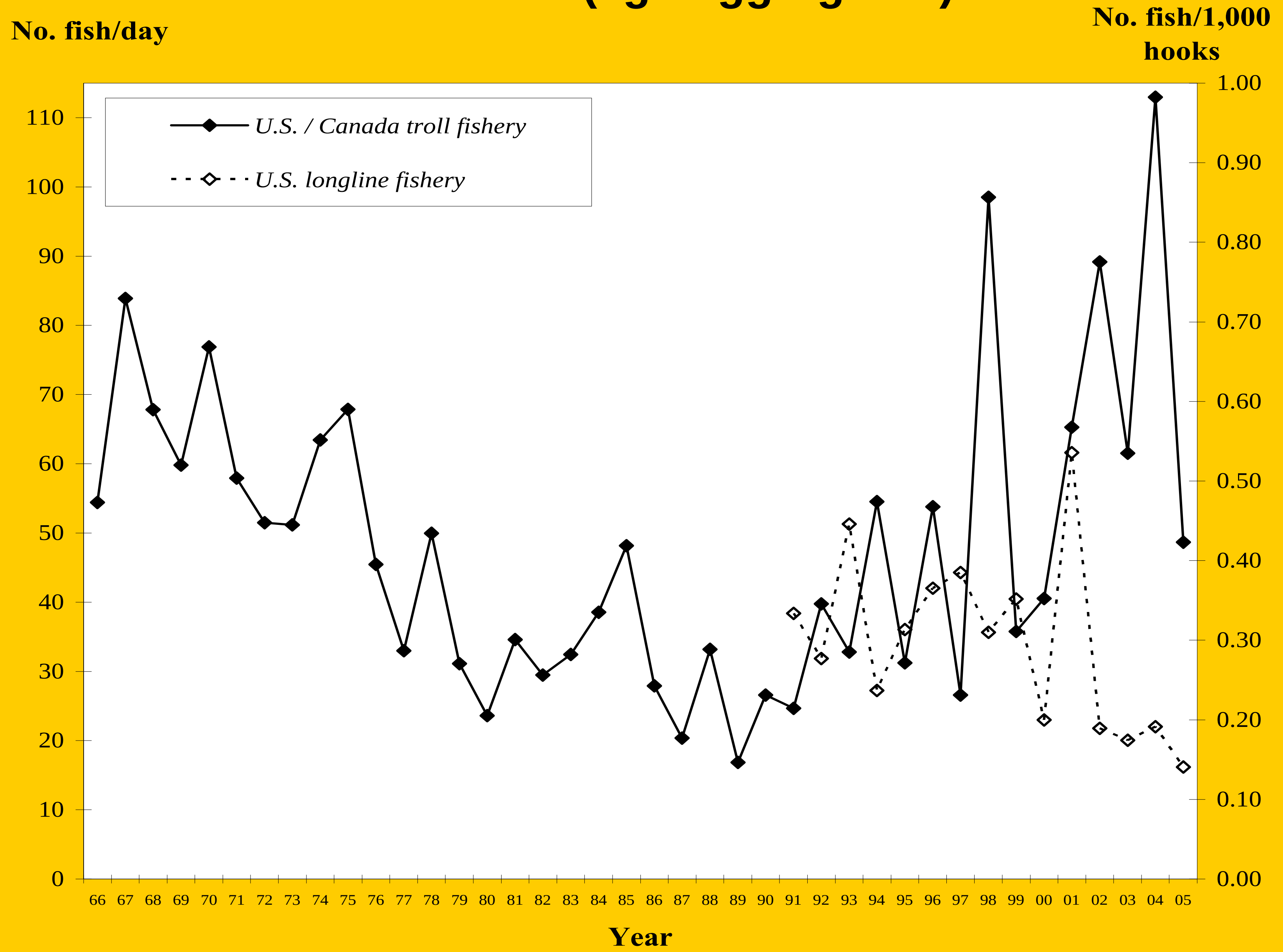
YEAR	AGE (yr)									TOTAL
	1	2	3	4	5	6	7	8	=9	
1966	0	129	2,022	1,118	2,412	261	145	52	41	6,180
1967	0	210	2,293	1,552	2,820	579	171	97	72	7,794
1968	0	92	3,268	1,422	1,118	763	254	97	39	7,053
1969	1	2,046	2,584	1,232	2,493	197	191	194	53	8,990
1970	0	282	3,390	2,220	1,321	410	101	71	61	7,856
1971	0	208	4,634	2,424	2,831	388	175	70	81	10,810
1972	0	4,030	3,514	4,646	2,348	270	118	92	60	15,078
1973	1	2,583	3,619	1,531	4,030	743	141	90	74	12,812
1974	0	1,128	4,483	5,653	1,538	754	153	57	96	13,863
1975	0	828	5,222	2,912	1,907	264	111	78	259	11,581
1976	0	2,325	4,937	5,767	2,766	285	165	106	186	16,538
1977	0	741	2,919	1,955	1,106	426	132	91	160	7,531
1978	2	5,931	2,125	4,729	1,018	387	185	45	83	14,505
1979	0	580	1,215	3,623	1,257	265	190	101	68	7,300
1980	0	2,518	2,830	3,160	801	311	110	87	97	9,916
1981	4	898	1,509	2,854	1,095	450	270	106	115	7,301
1982	78	599	1,949	3,408	435	255	200	213	134	7,272
1983	2	1,182	2,552	2,306	232	186	196	146	141	6,945
1984	5	1,111	4,571	3,031	241	177	126	131	156	9,550
1985	2	318	1,235	2,776	641	118	166	100	325	5,681
1986	0	794	906	2,461	204	128	127	90	131	4,840
1987	1	265	2,155	1,296	474	314	176	102	169	4,953
1988	4	133	1,529	1,156	270	606	223	161	181	4,264
1989	106	377	316	1,335	1,012	276	246	133	158	3,959
1990	109	317	239	1,151	1,606	641	113	213	247	4,635
1991	78	678	1,747	335	339	263	155	119	271	3,984
1992	1	332	2,350	1,664	662	360	150	151	156	5,826
1993	0	485	1,090	1,971	793	202	201	116	293	5,151
1994	28	669	1,575	2,355	1,077	654	206	97	136	6,798
1995	2	496	1,310	3,152	294	310	564	116	119	6,362
1996	8	494	3,938	2,294	603	396	554	477	105	8,869
1997	0	2,453	1,431	4,451	817	124	476	620	391	10,764
1998	0	1,105	4,036	1,568	1,880	302	213	379	282	9,766
1999	77	816	3,761	5,797	757	478	477	185	308	12,656
2000	0	1,231	1,852	2,739	923	415	450	435	247	8,292
2001	4	1,470	4,370	1,396	1,153	410	451	277	338	9,869
2002	0	1,447	7,396	3,141	439	226	381	209	222	13,461
2003	0	3,054	3,619	3,008	709	306	250	181	194	11,321
2004	30	210	4,411	4,363	282	452	332	130	44	10,253
2005	1	2,382	1,547	2,318	305	171	437	189	69	7,418
TOTAL	543	46,948	110,447	106,273	47,010	14,522	9,484	6,404	6,365	347,996

Input Data

- Abundance (CPUE) indices (17 total)
  - Substantial changes from last assessment (2004)
  - USA / Canada troll (age-specific for ages 2,3,4,5)
  - USA longline (age-aggregated)
  - Japan pole-and-line (ages 2,3,4,5)
  - Japan longline (3,4,5,6,7,8,9+)
  - Taiwan longline (age-aggregated)

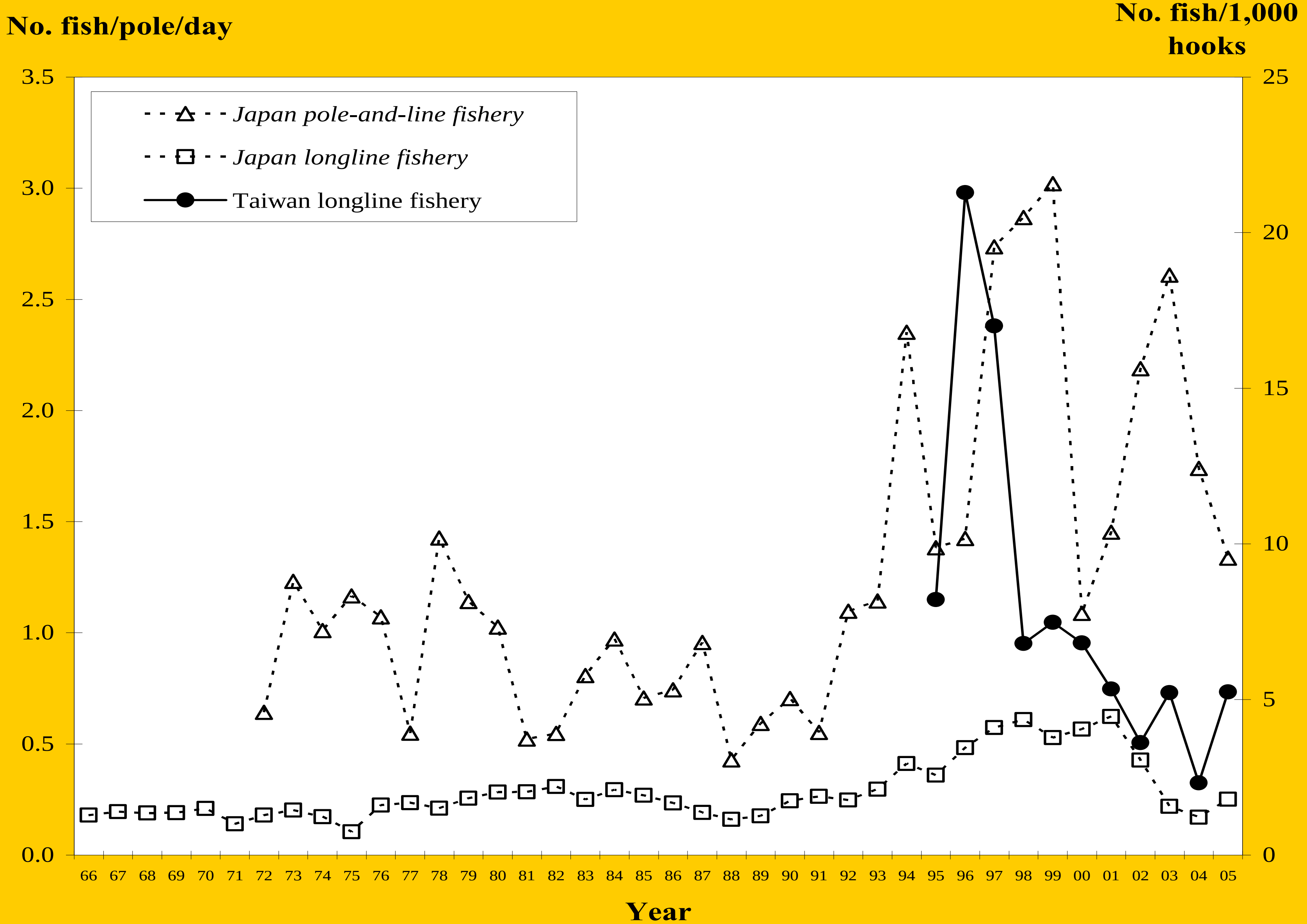
Input Data

CPUE Indices (age-aggregated)



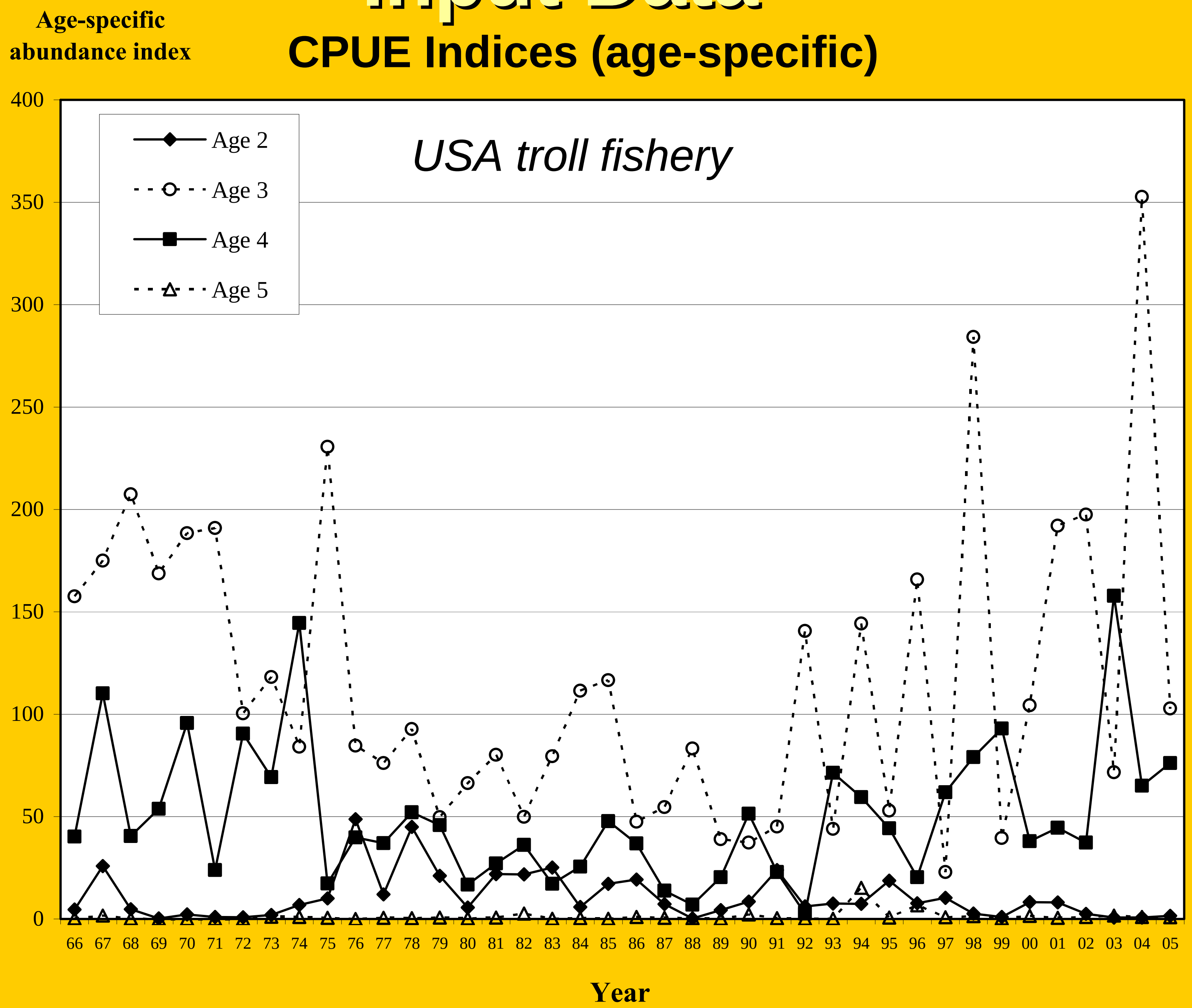
Input Data

CPUE Indices (age-aggregated)



Input Data

CPUE Indices (age-specific)



Analysis

- Considerable work (model scenario development and sensitivity analysis) prior to the Meeting (December 2006)
- In total, 15 (candidate) model ‘scenarios’ were tabled, refined, and reviewed by the ISC-ALBWG
- Model Scenario ‘D1’ was chosen as the ‘final’ model
- Essentially, similar (final) model as assessment in 2004

Results

Recruitment

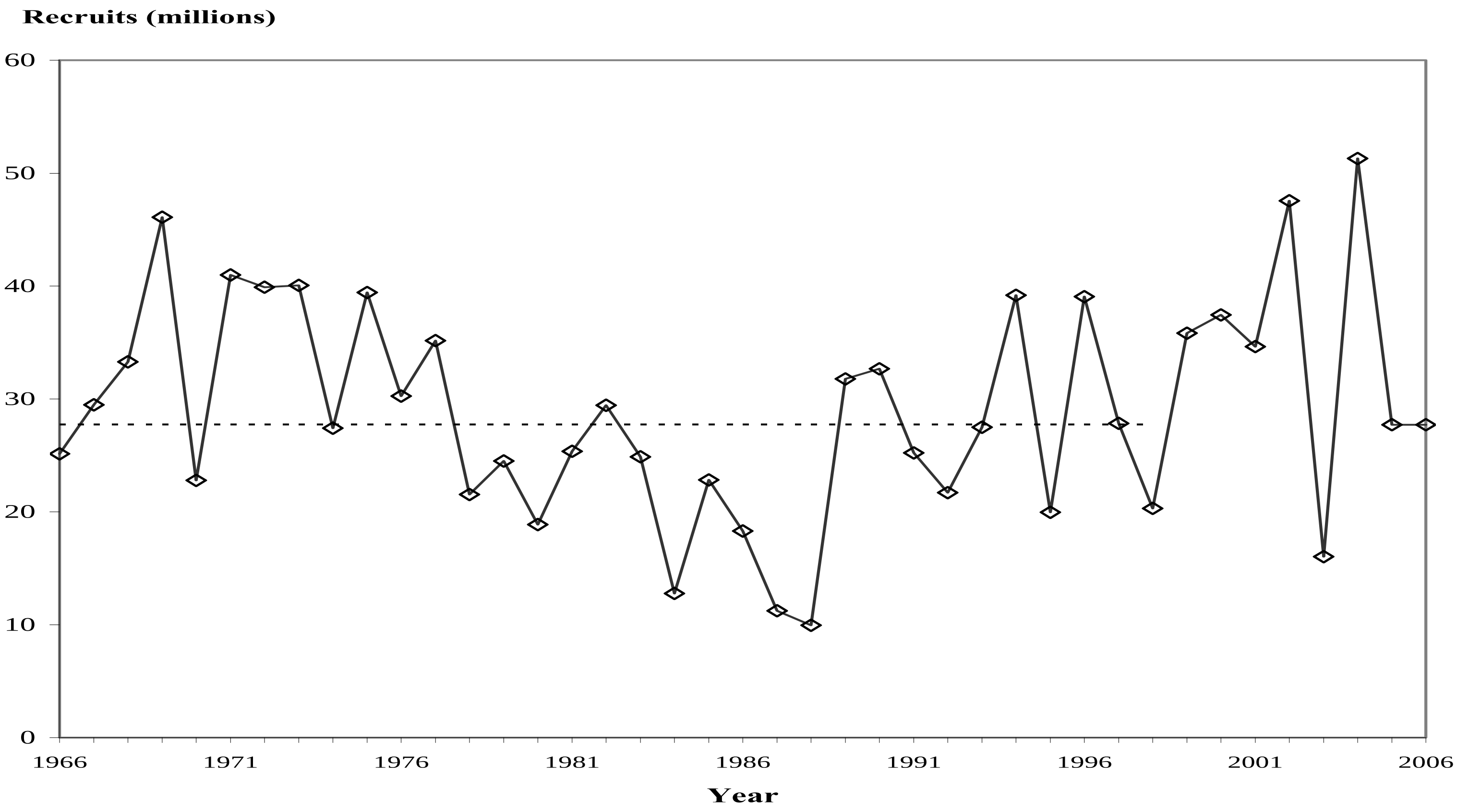
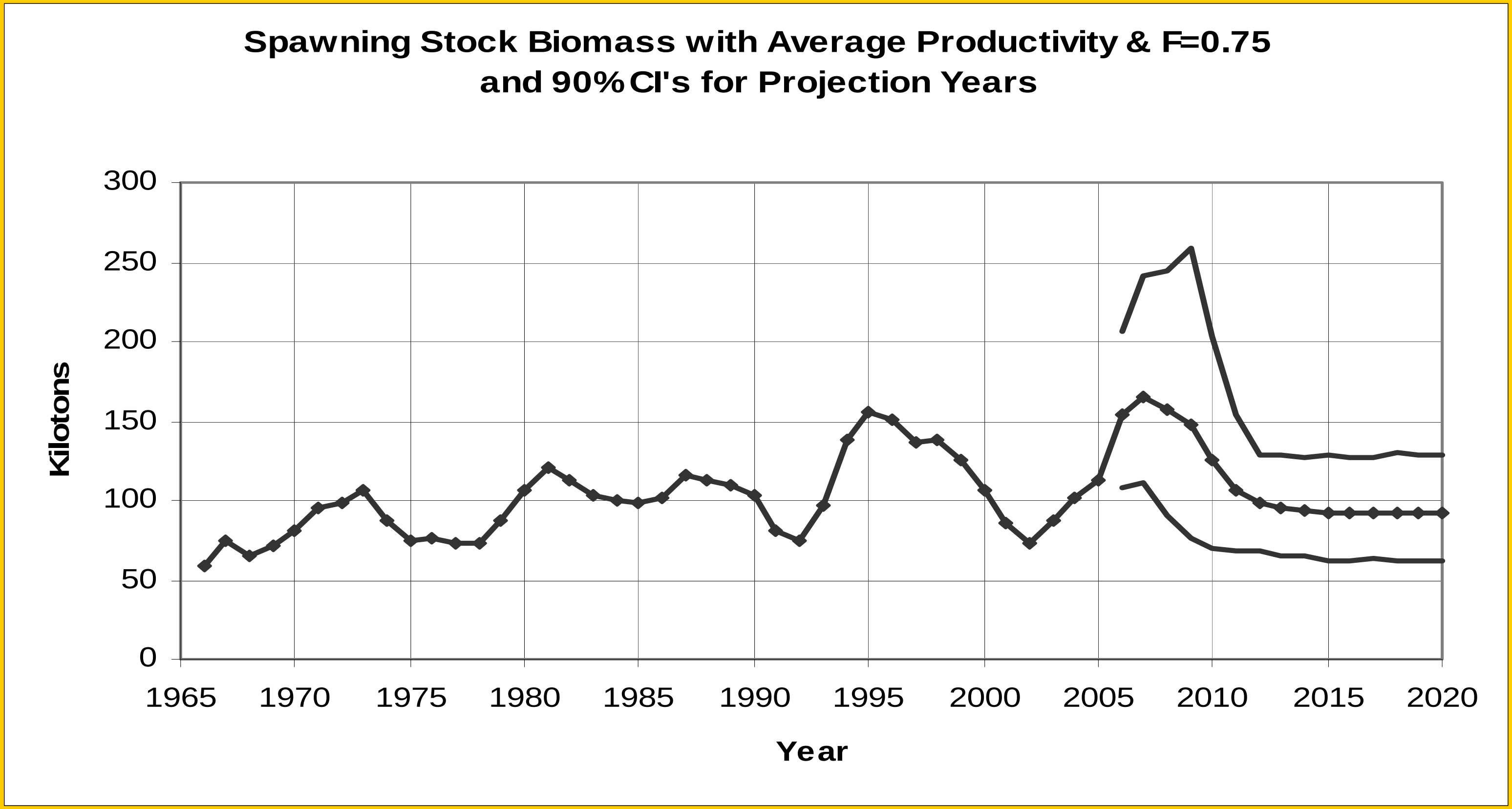


Figure 7. Recruitment (age-1 fish in millions) time series of North Pacific albacore generated from Model D1 (1966-98). Mean (1966-98) recruitment is presented as horizontal dashed line. Figure in 2005 and 2006 were derived from the mean recruitement.

Results

Spawning Stock Biomass



Results

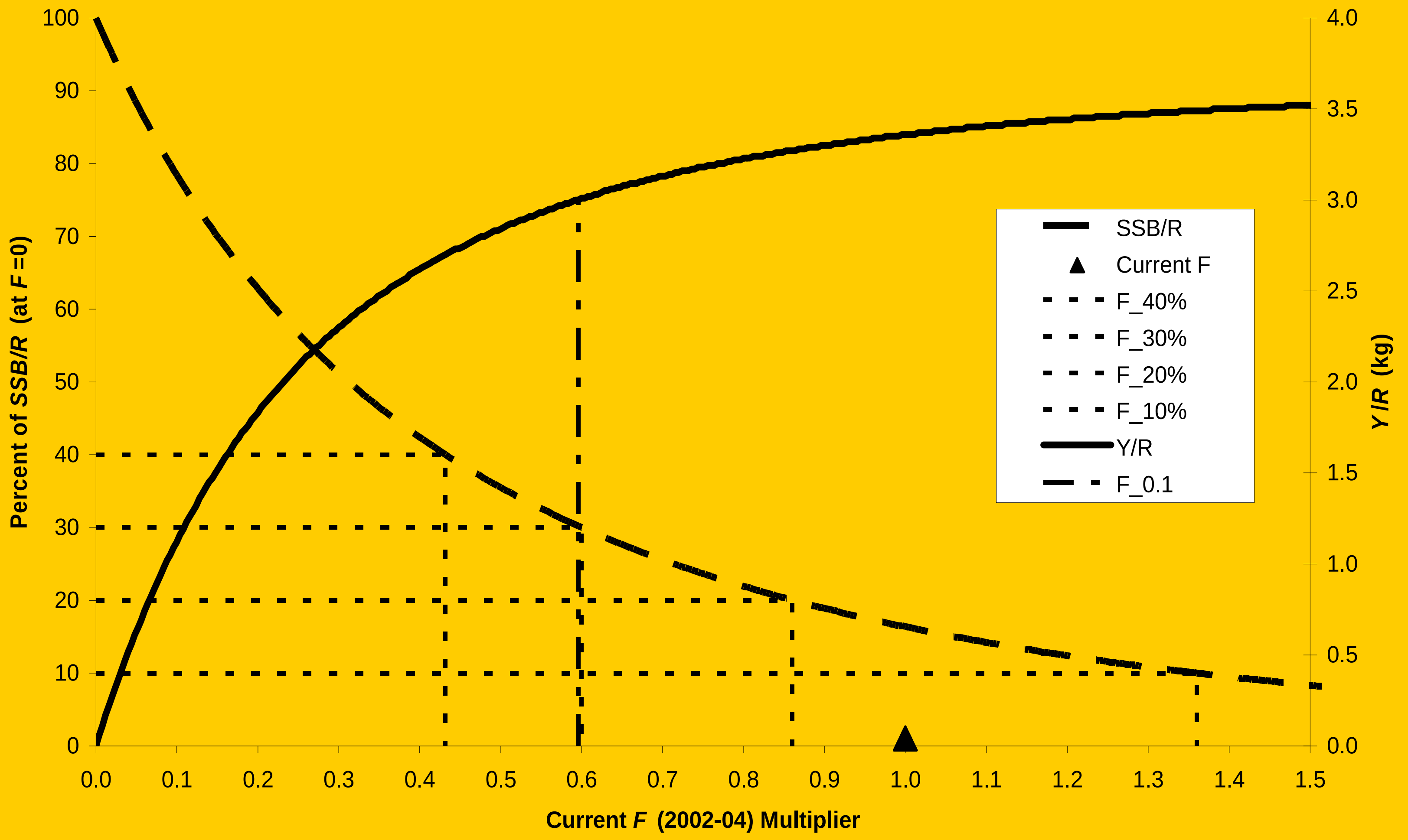
Projections and Biological Reference Points

- 2004 uncertainty analysis based on 4 model configurations:
  - ‘Low productivity’ / ’Low F’
  - ‘Low productivity’ / ’High F’
  - ‘High productivity’ / ’Low F’
  - ‘High productivity’ / ’High F’

- 2006 single productivity period and single current F

Results

Projections and Biological Reference Points



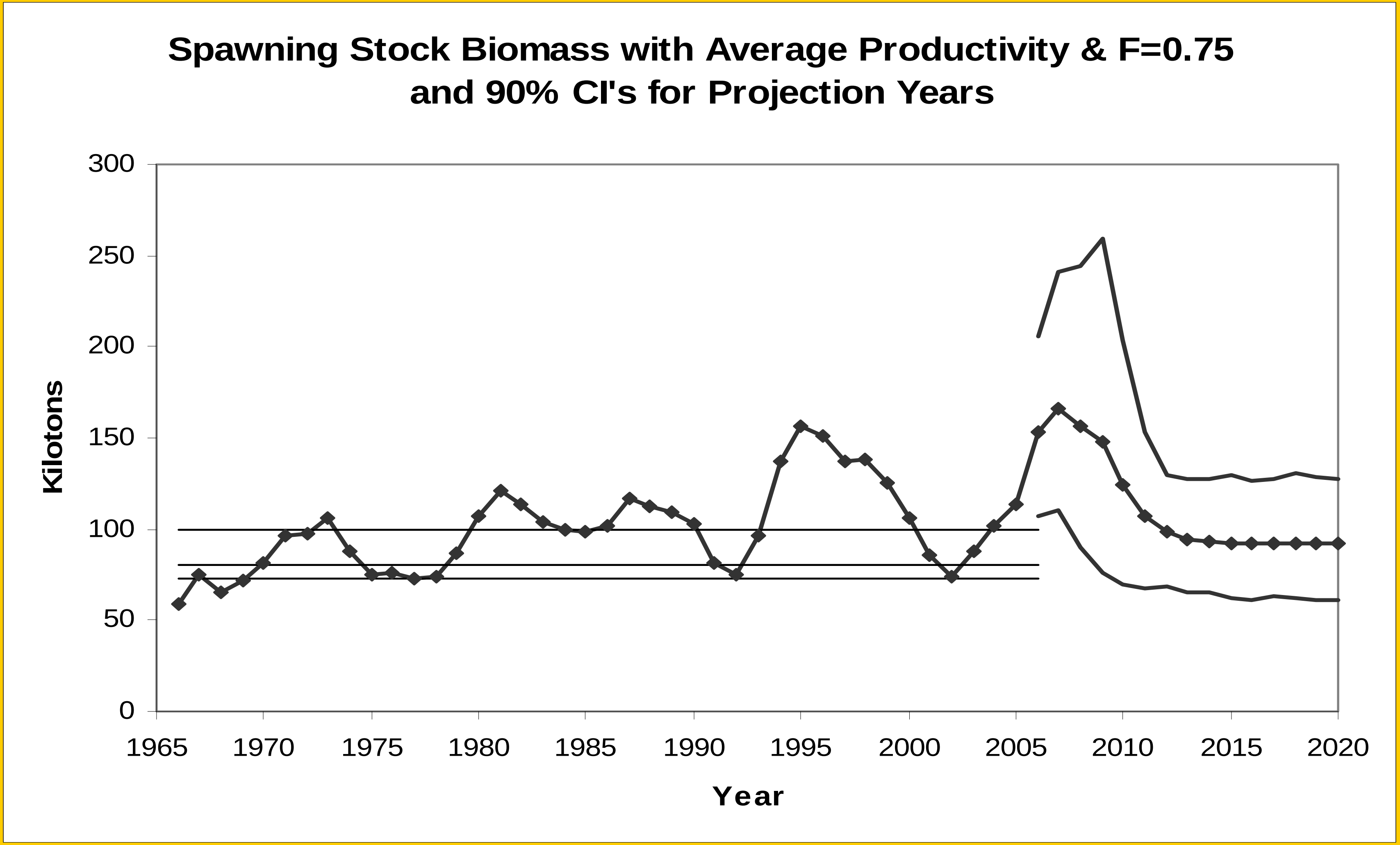
Results

Projections and Biological Reference Points

Candidate Target Reference Points	Target F (yr^{-1})	Ratio of Current F to Target F	MSY Proxy (1,000 mt)	SSB_{MSY} Proxy (1,000 mt)
$F_{40\%}$	0.32	2.31	75	226
$F_{35\%}$	0.38	1.97	79	198
$F_{0.1}$	0.45	1.68	83	171
$F_{30\%}$	0.45	1.67	83	169
Candidate Limit Reference Points	**Limit F (yr-1)**	**Ratio of Current F to Limit F**	**Equilibrium Catch (1,000 mt)**	**Equilibrium SSB (1,000 mt)**
$F_{20\%}$	0.65	1.16	91	113
F_{Max}	2.07	0.36	100	10
$F_{SSB\text{-}Min}$	0.81	0.93	94	83
$F_{SSB\text{-}10\%}$	0.70	1.07	92	102
$F_{SSB\text{-}25\%}$	0.66	1.14	91	110

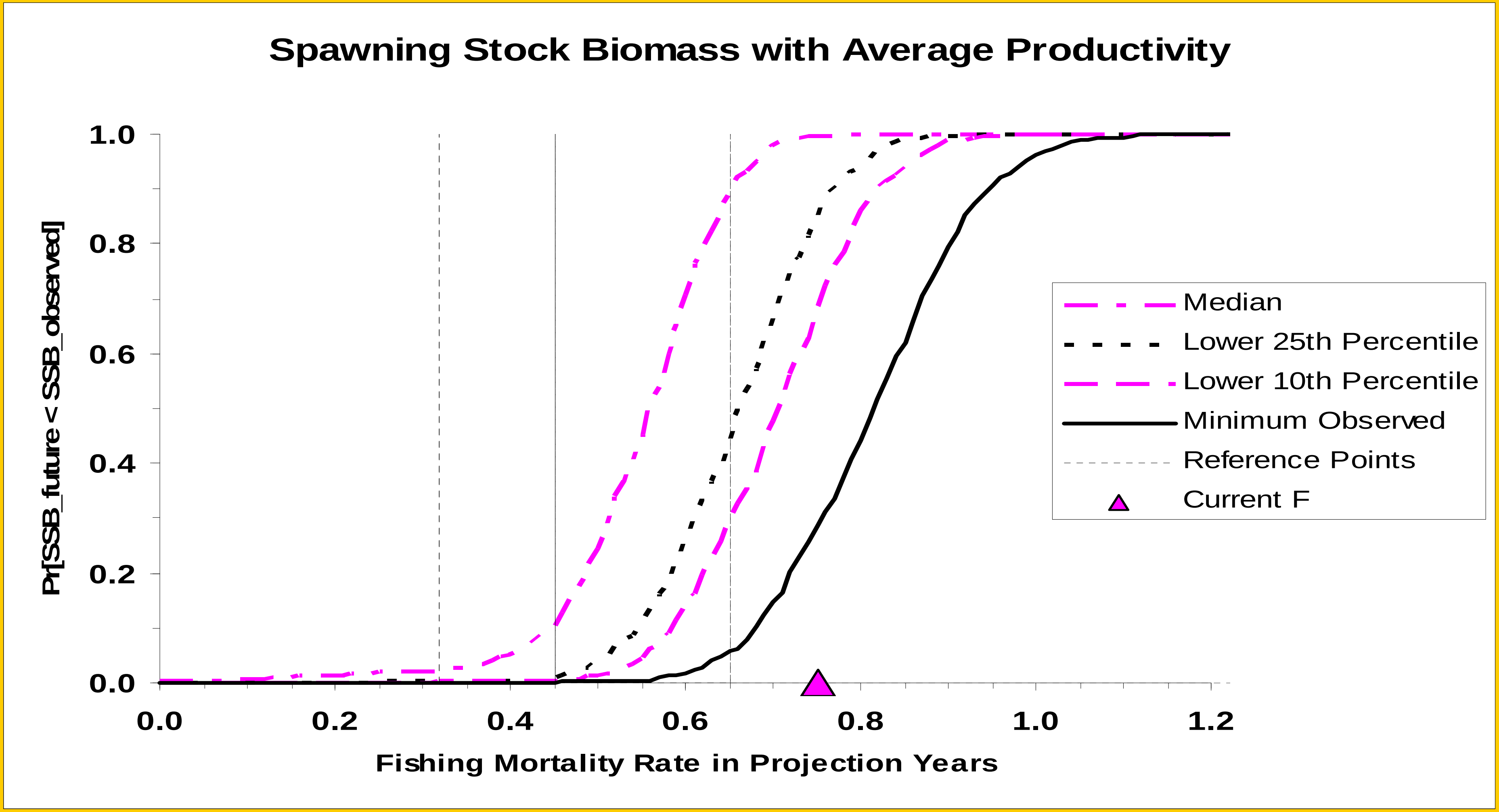
Results

Projections and Biological Reference Points



Results

Projections and Biological Reference Points



Results

Projections and Biological Reference Points

*F*s to Maintain *SSB* Above Threshold

SSB Threshold Desired		Probability Level Desired 50%	95%
Minimum Observed SSB	$F_{SSB\text{-}Min}$	0.81	0.64
Lower 10th Percentile	$F_{SSB\text{-}10\%}$	0.70	0.55
Lower 25th Percentile	$F_{SSB\text{-}25\%}$	0.66	0.51
Median	$F_{SSB\text{-}50\%}$	0.56	0.39

Conclusions

- *SSB* in 2006 estimated at about 153,000 mt; 53% above time series average
- Retrospective analysis showed noticeable trend of over-estimating abundance (say stock size)
- Over last 15 yr, *R* fluctuated around long-term average of roughly 28 million fish
- Presently, population is being fished at roughly $F_{17\%}$ (i.e., $F_{2002\text{-}2004}$ = 0.75) … similar to ‘pessimistic’ scenario in 2004 assessment
- Current *F* (SPR say …) is high relative to commonly used biological reference points
- *SSB* is forecasted to decline to an equilibrium level of 92,000 mt by 2015

Conclusions

- ISC-ALBWG expressed concern about the substantial decline in total catch over the last few years
- $F_{SSB\text{-}MIN}$ analysis indicated that at the 95% probability of success all of the threshold *F*s would require reductions from current *F*
- Finally, at this time, ISC-ALBWG strongly recommended that all countries support ‘precautionary’ fishing practices

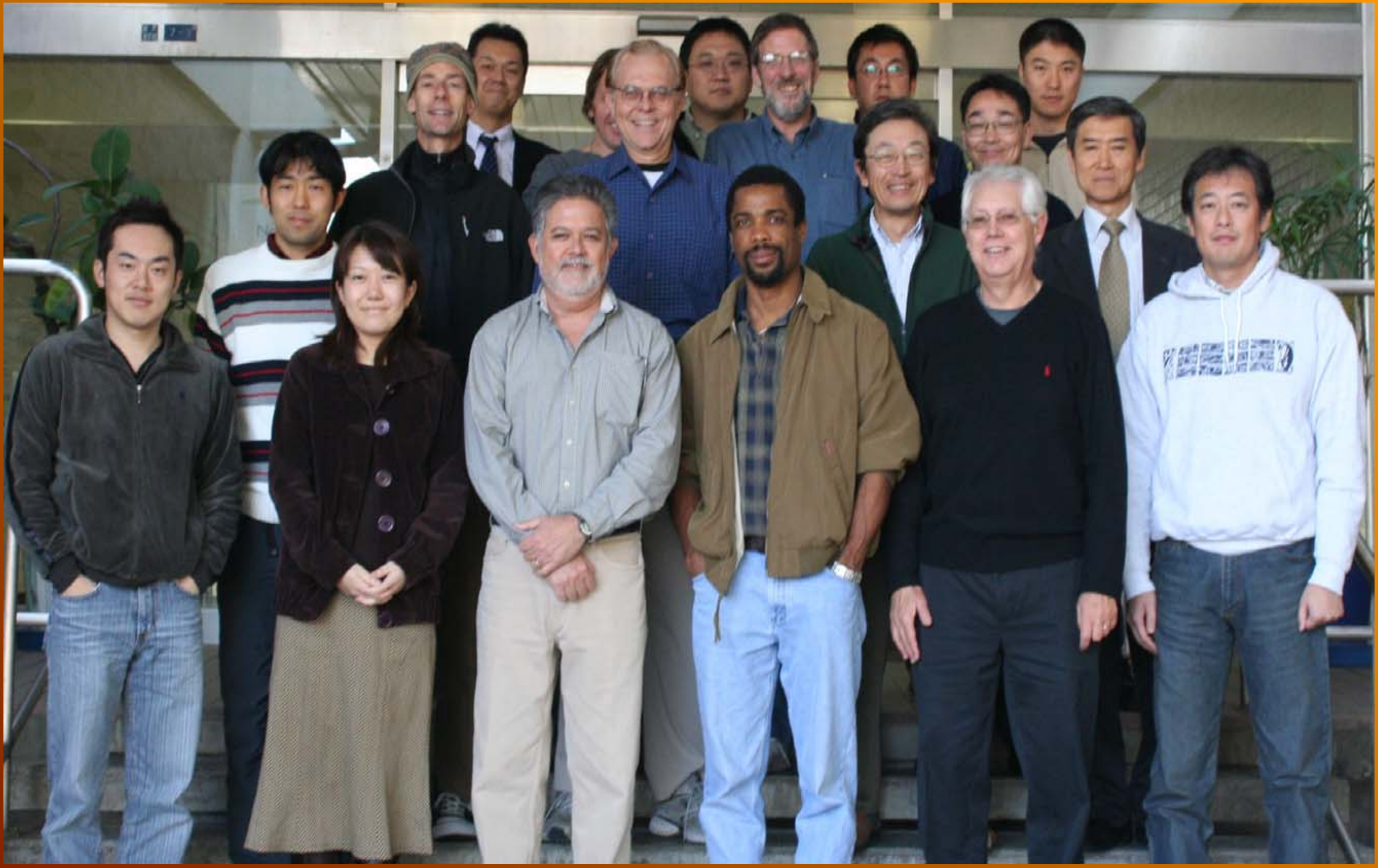
Bottom-line …

- Precautionary ≡ limits on current levels of ‘fishing effort’

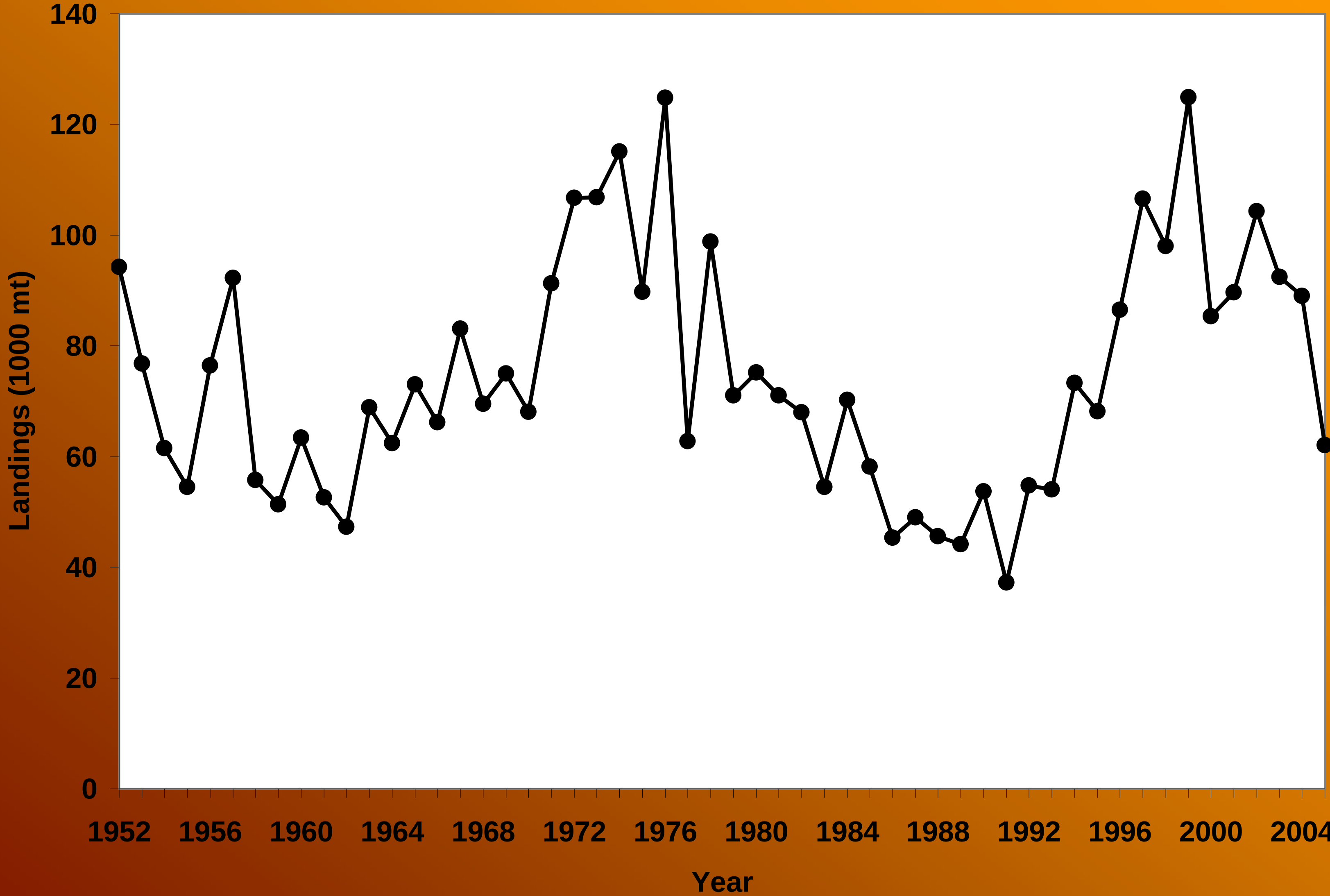
Stuff To Do ...

- Critical review of CPUE, including data and methods
- Further development of forward-simulation (SS2 model)
- Continue efforts formalizing harvest control rule
- Next meeting (objectives above) is in La Jolla (Feb. 2008)
- Next assessment is likely late 2008 or early 2009

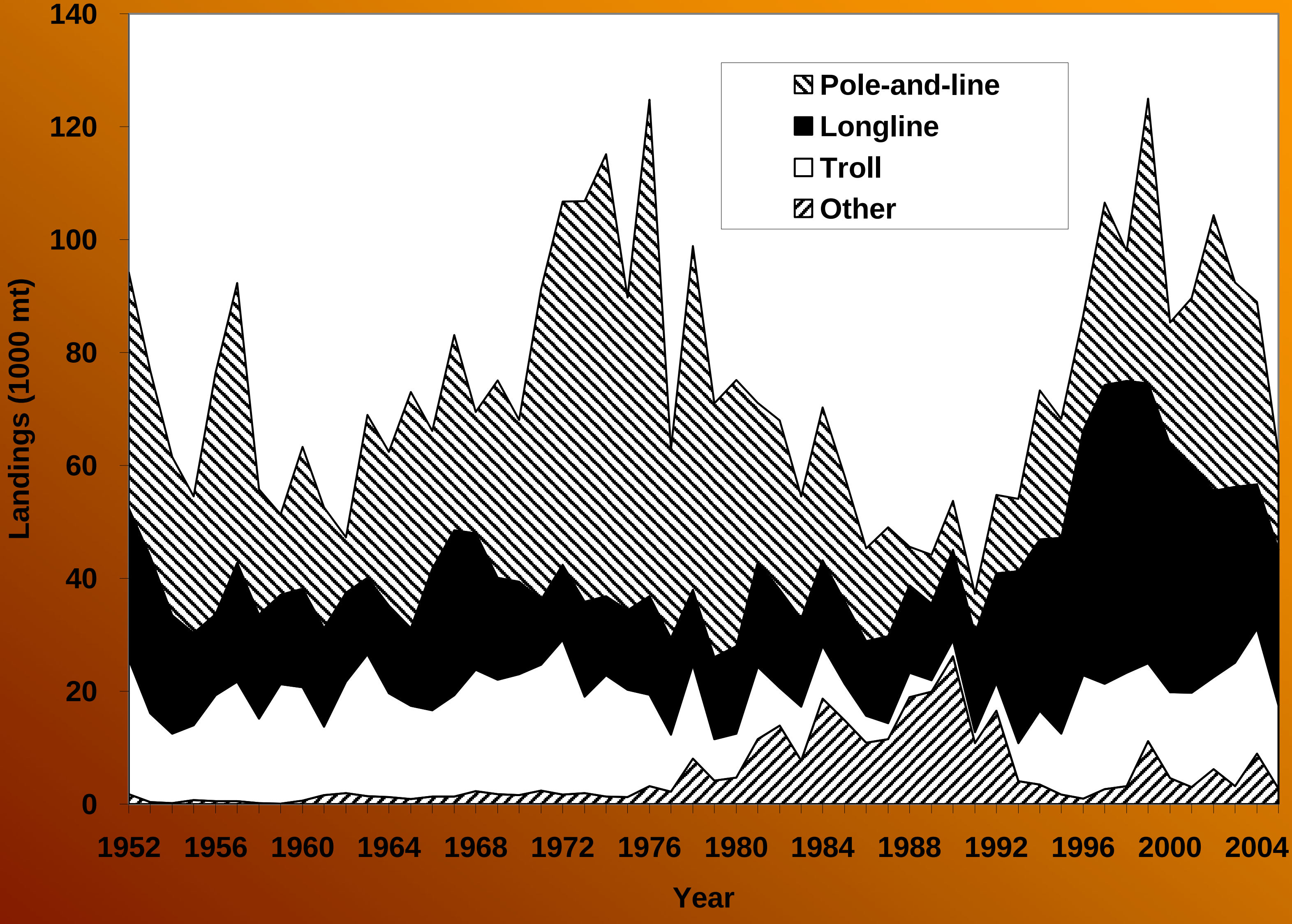
The Folks ...



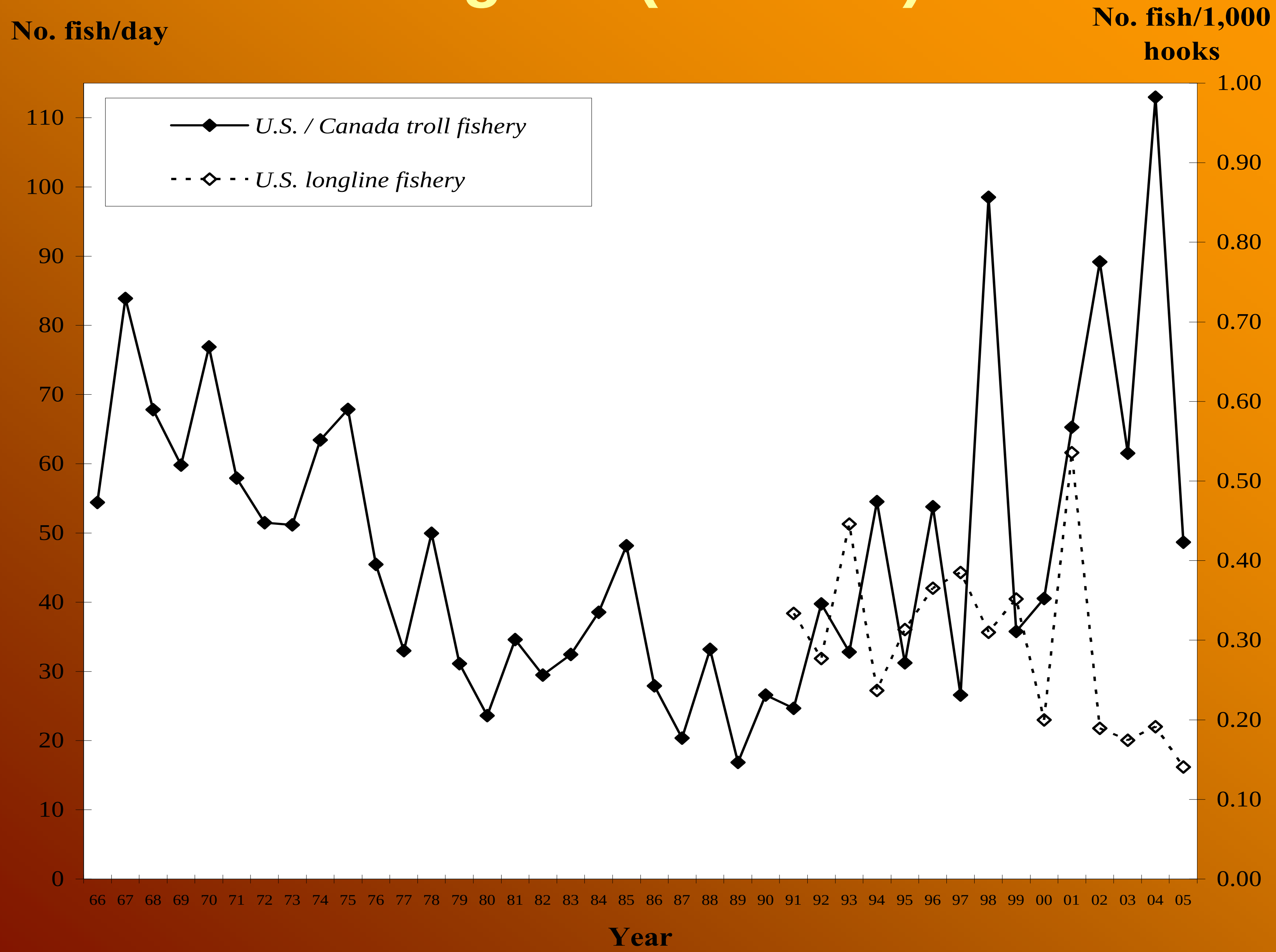
Landings – all gears and nations (1952-05)



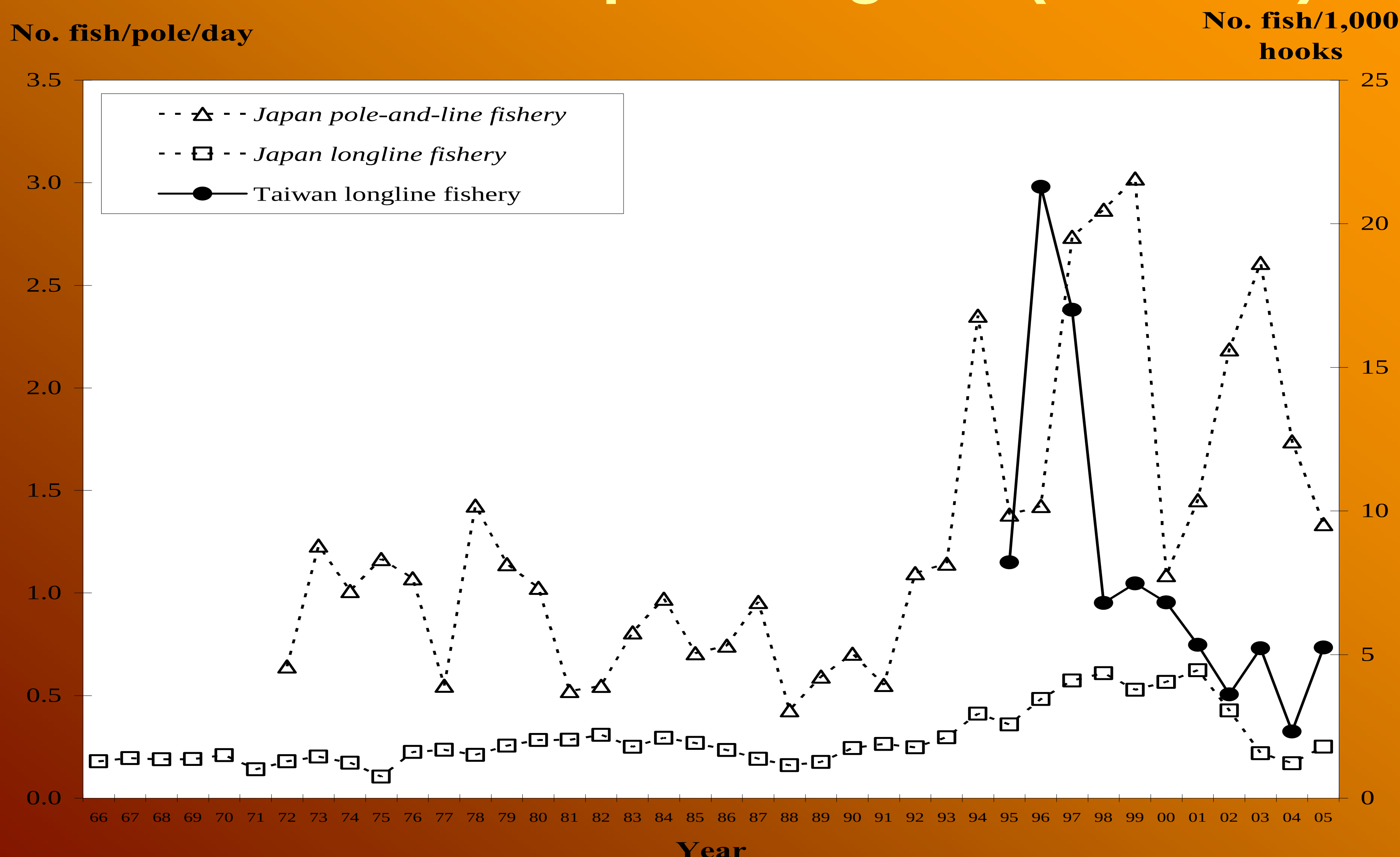
Landings by gear - all nations (1952-05)



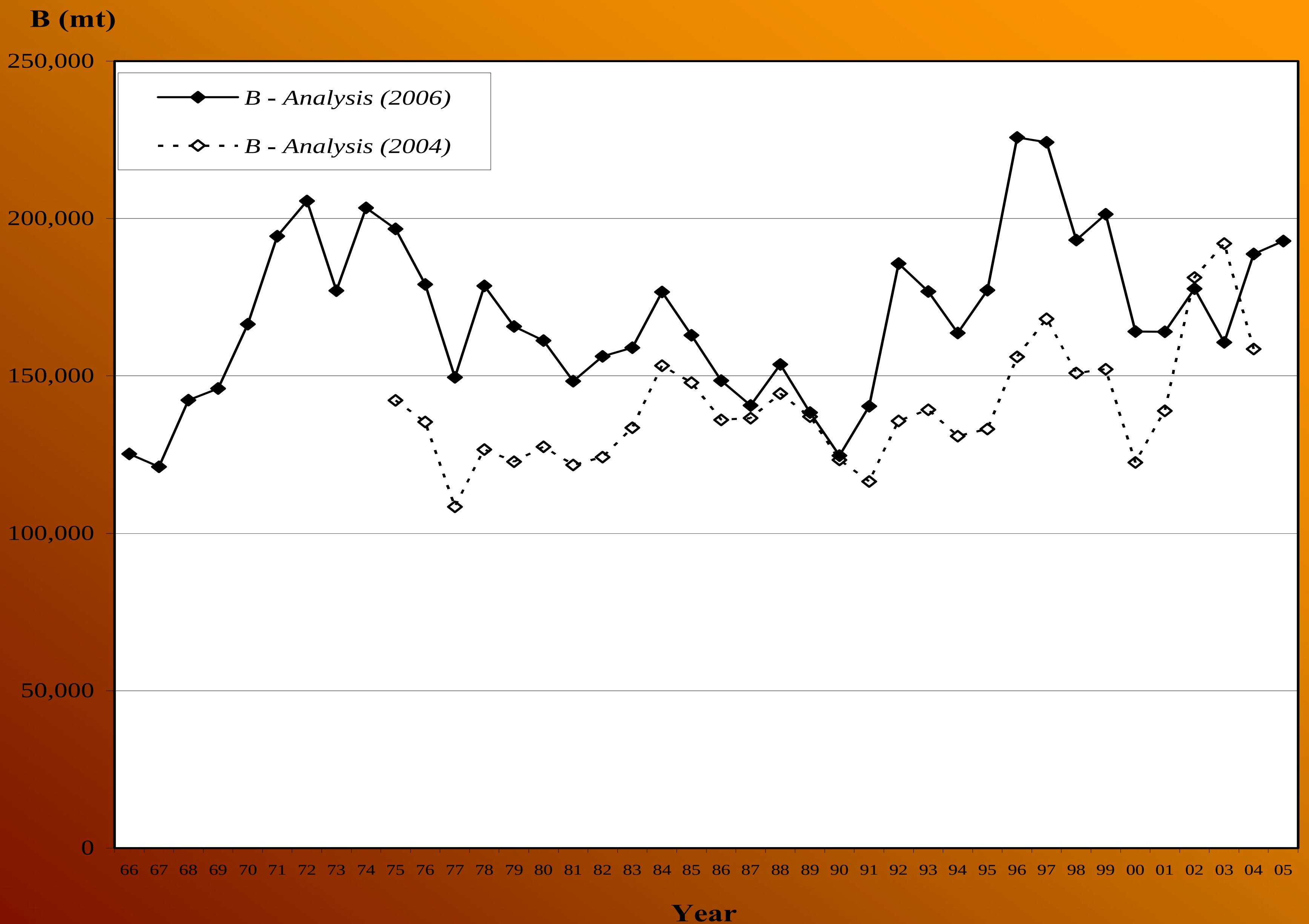
U.S. / Canada troll (1966-05) and U.S. longline (1991-05) fisheries



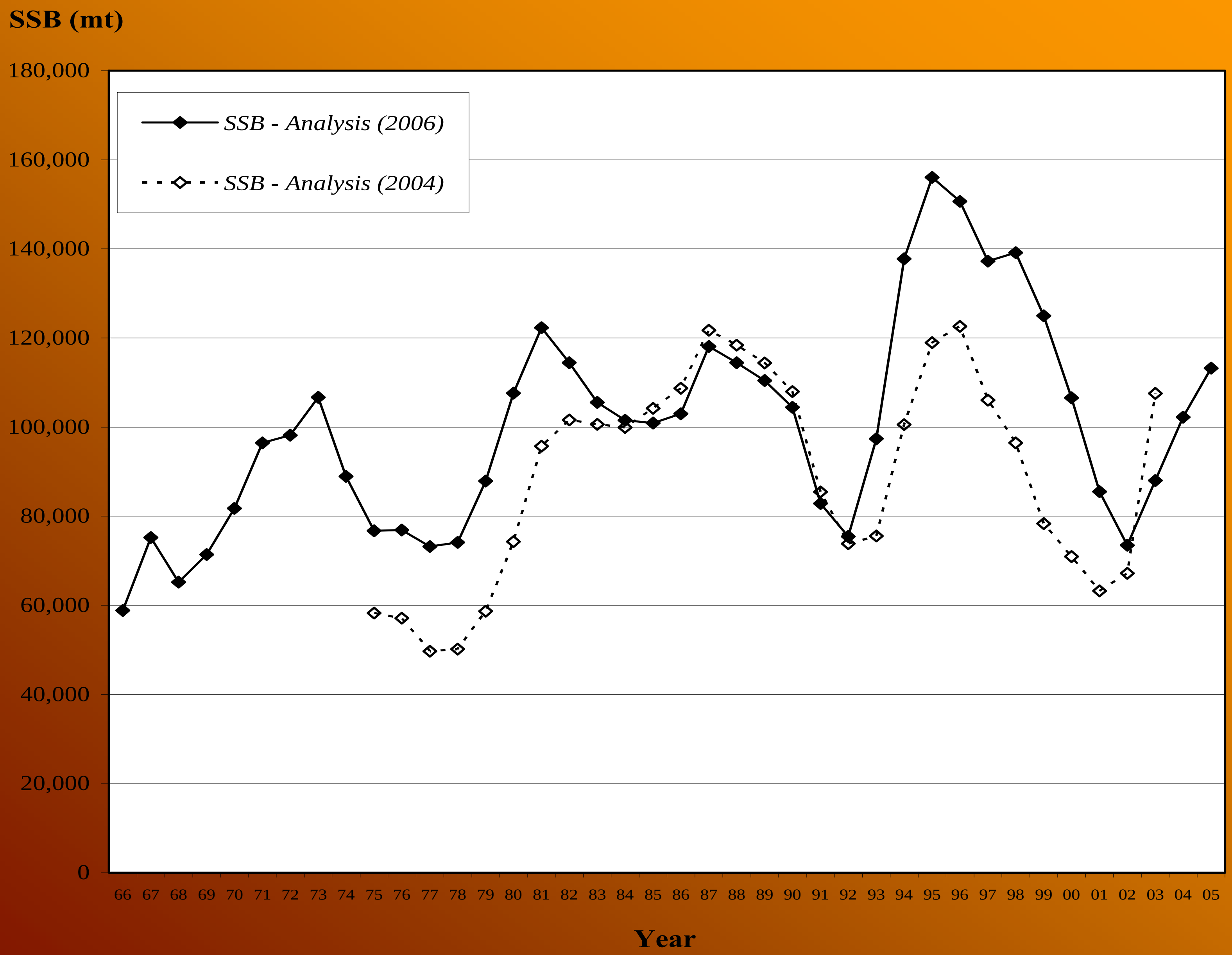
Japan Pole-and-Line (1972-05)
Japan Longline (1966-05)
and Chinese Taipei Longline (1995-05)



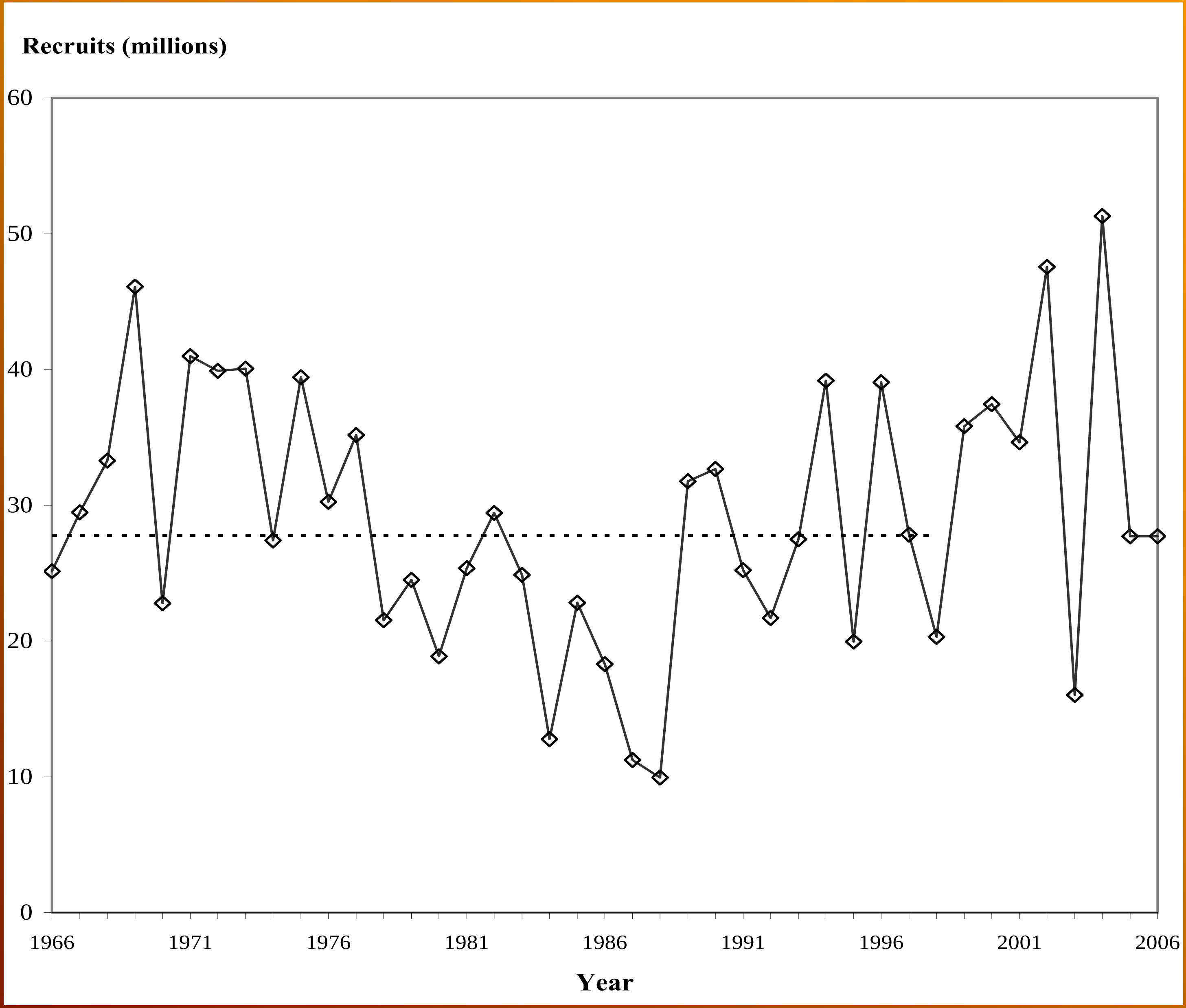
Exploitable Stock Biomass (B)



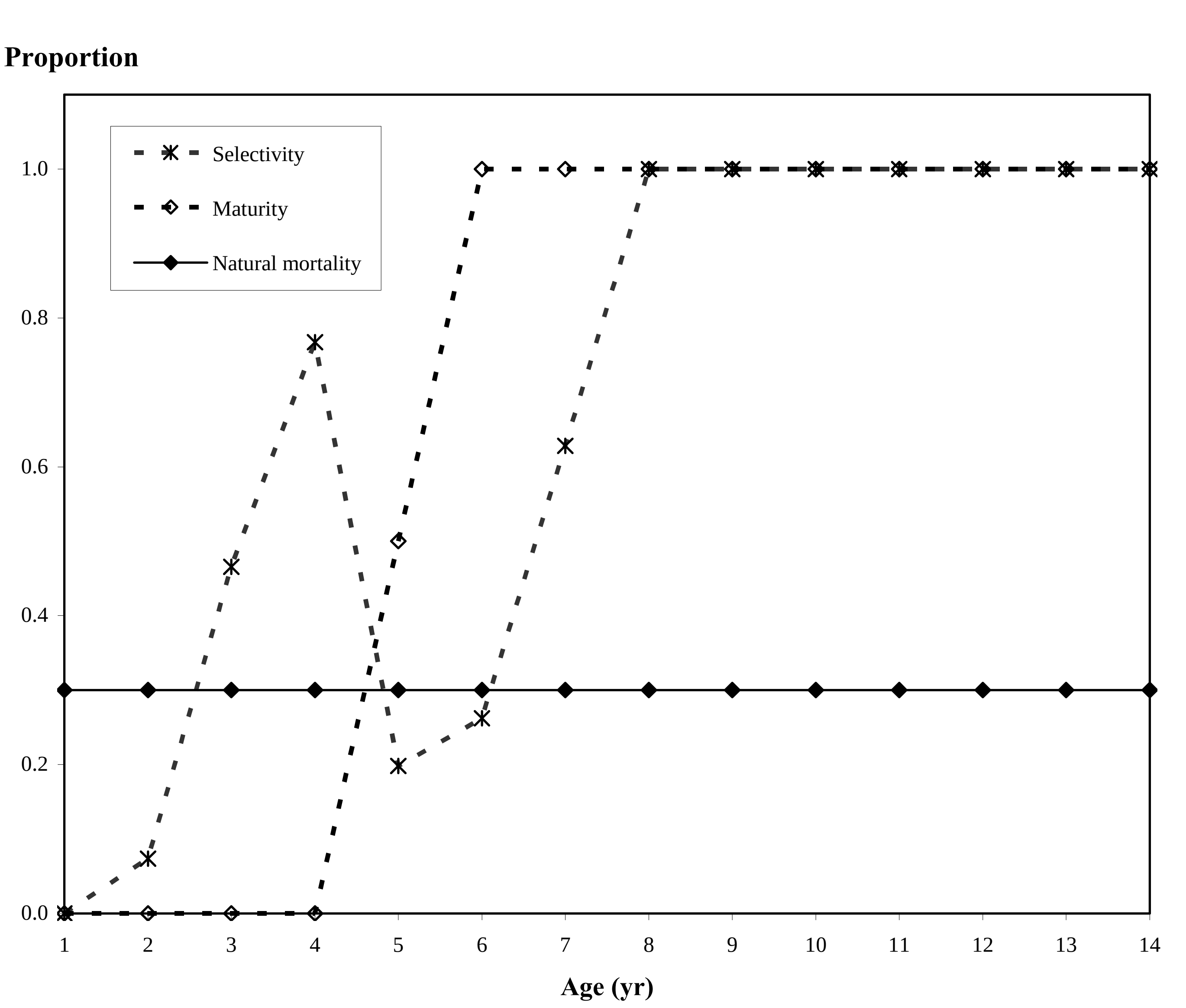
Spawning Stock Biomass (SSB)



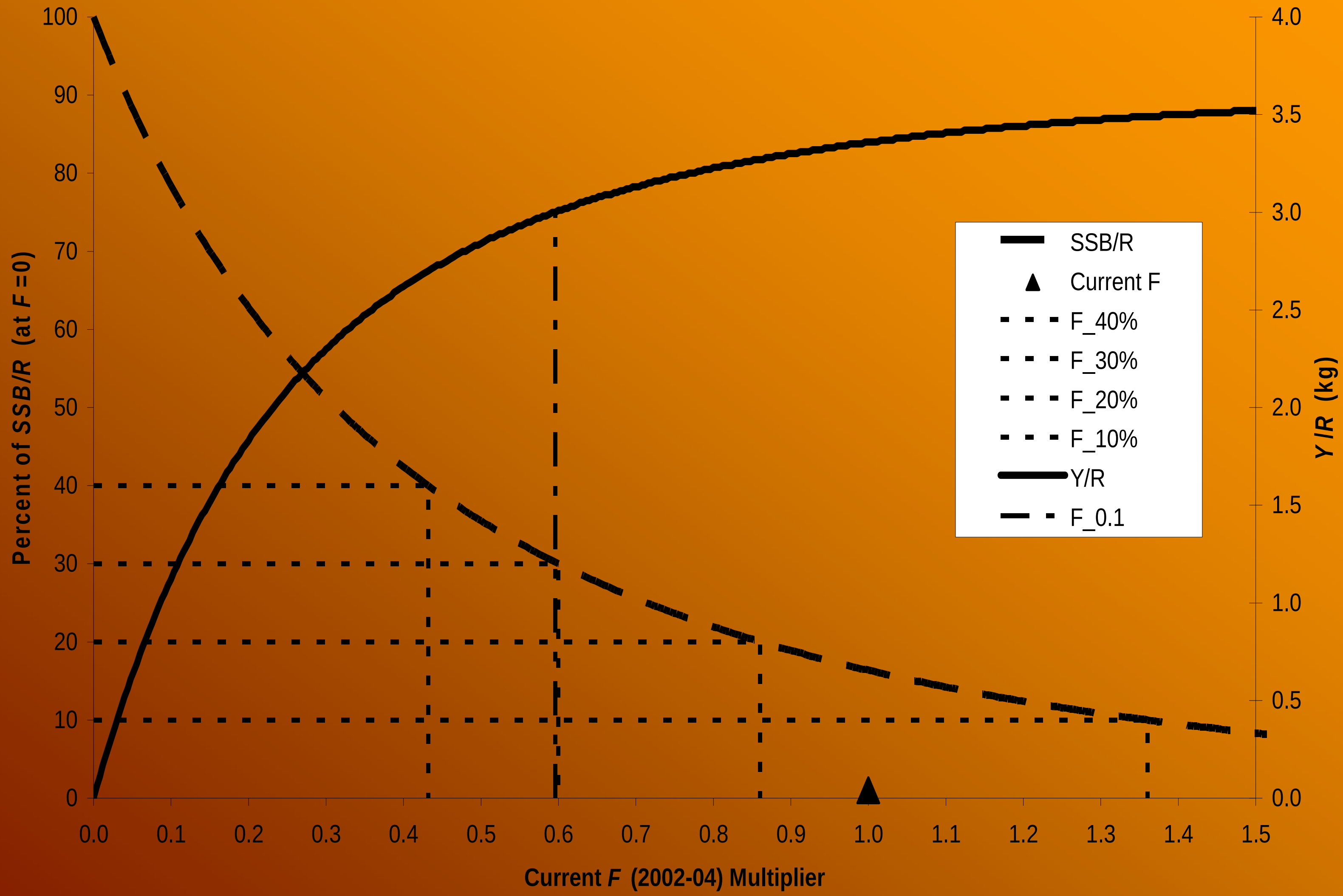
Recruitment (R) – Age-1 Fish (Millions)



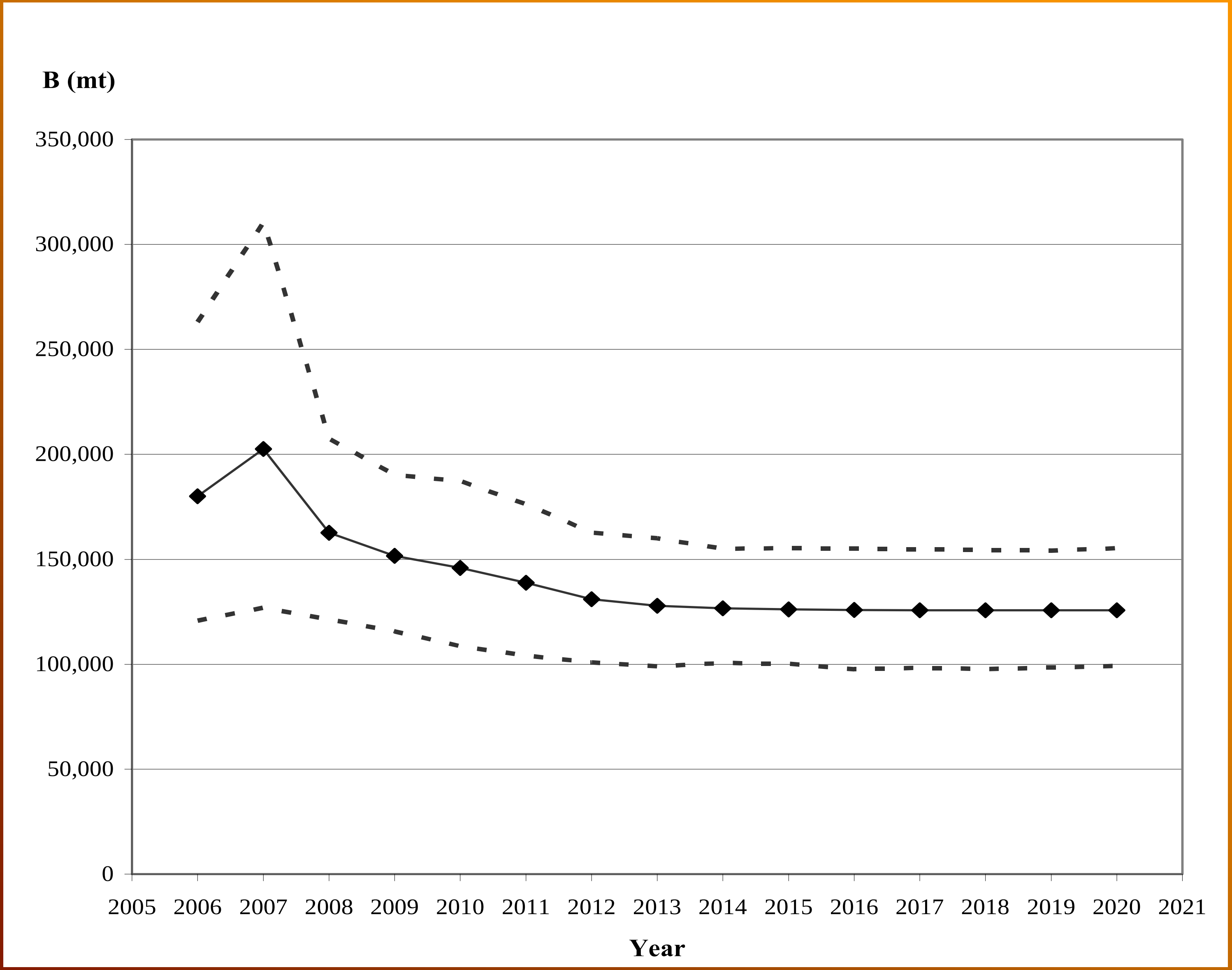
Partial recruitment , Maturity (Ueyangi 1957) and Natural Mortality (M)



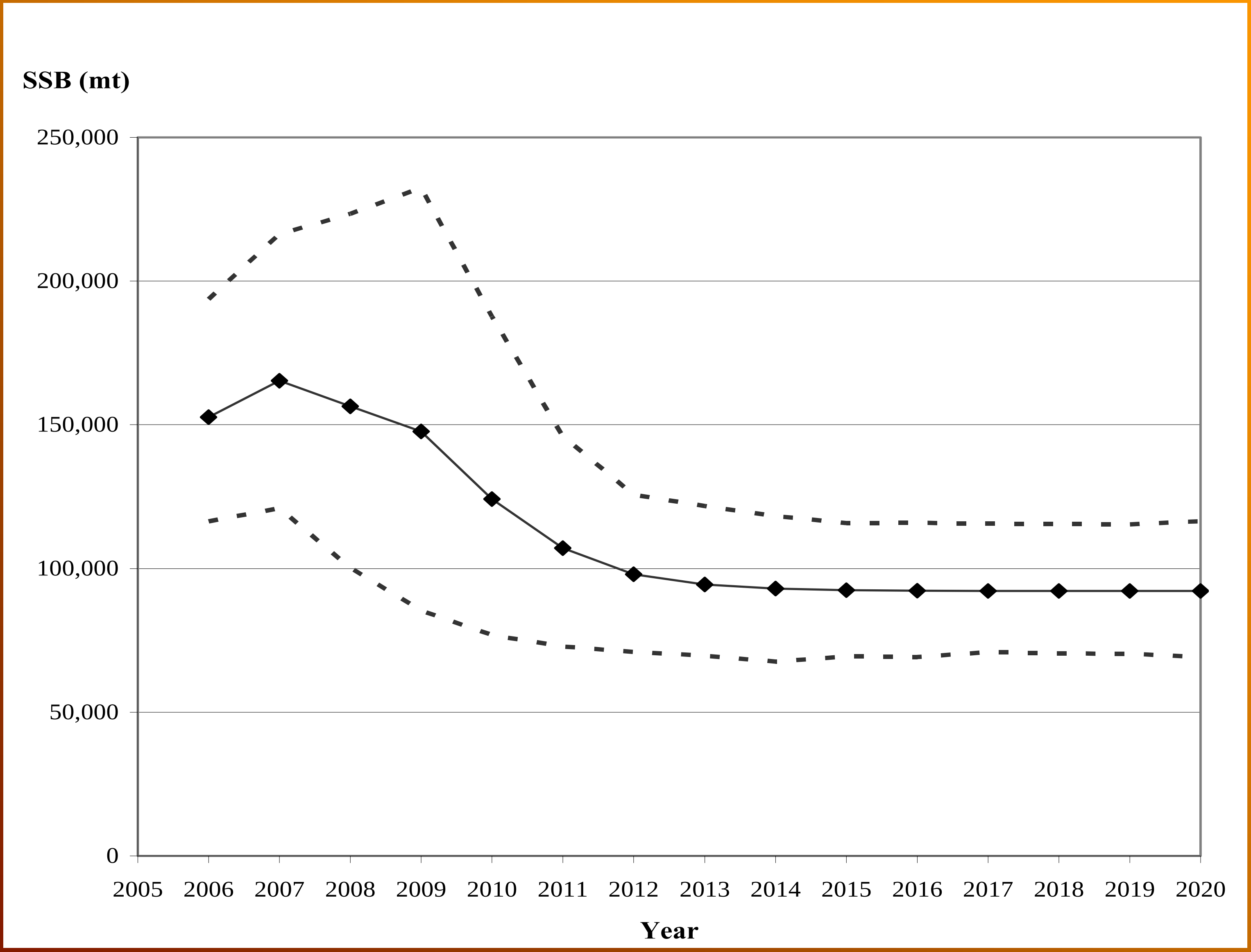
Equilibrium Yield-Per-Recruit (Y/R, in kg) and Percent of SSB/R (relative to F=0)



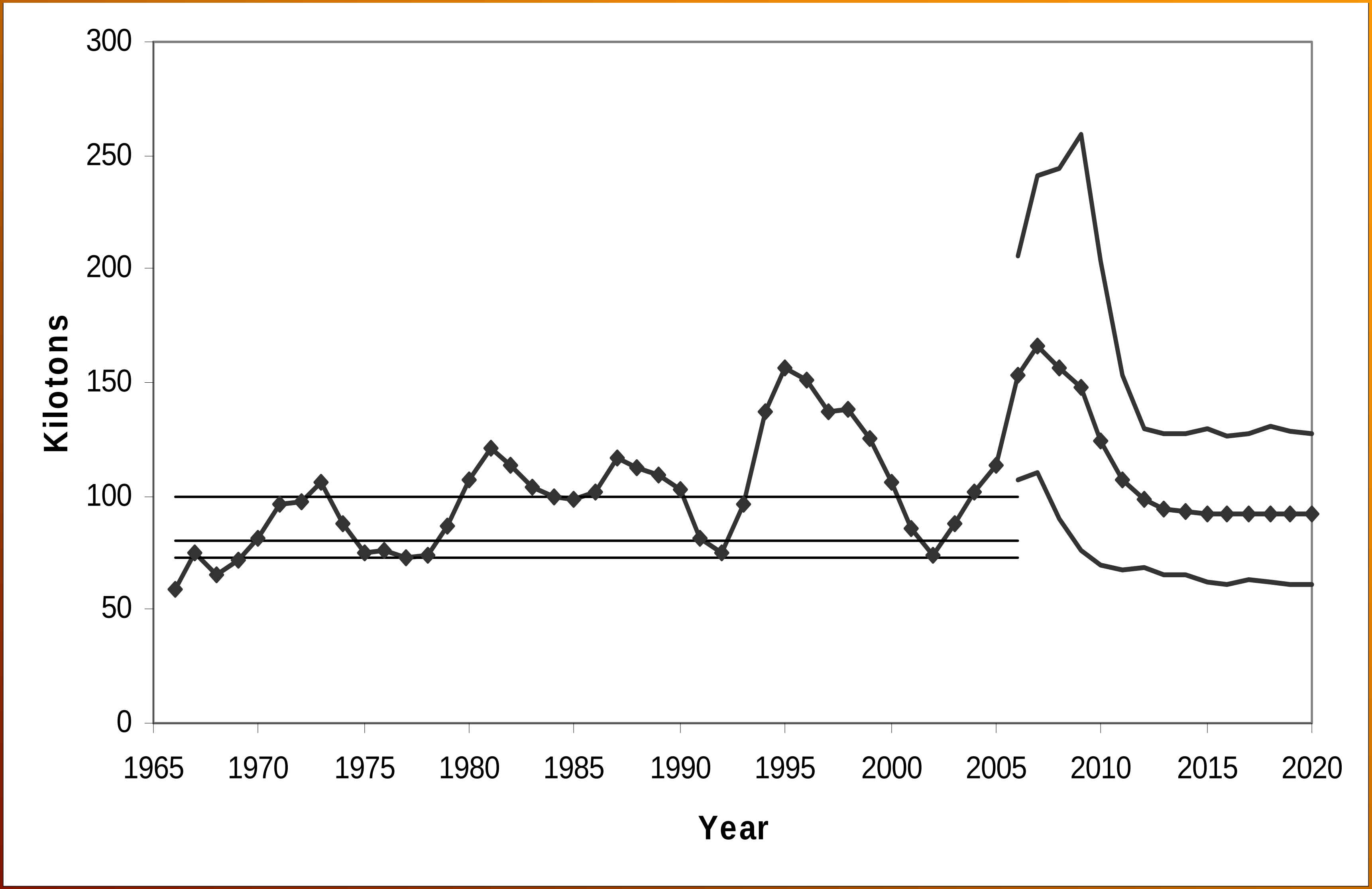
Stochastic projection (2006-20) of ‘Exploitable’ Biomass (B, mt)



Stochastic Projection (2006-20) of SSB (mt) with 80% CI



SSB with Average Productivity & F=0.75 and 90% CI's for Projection Years



Probability Profiles for Four SSB Threshold Levels

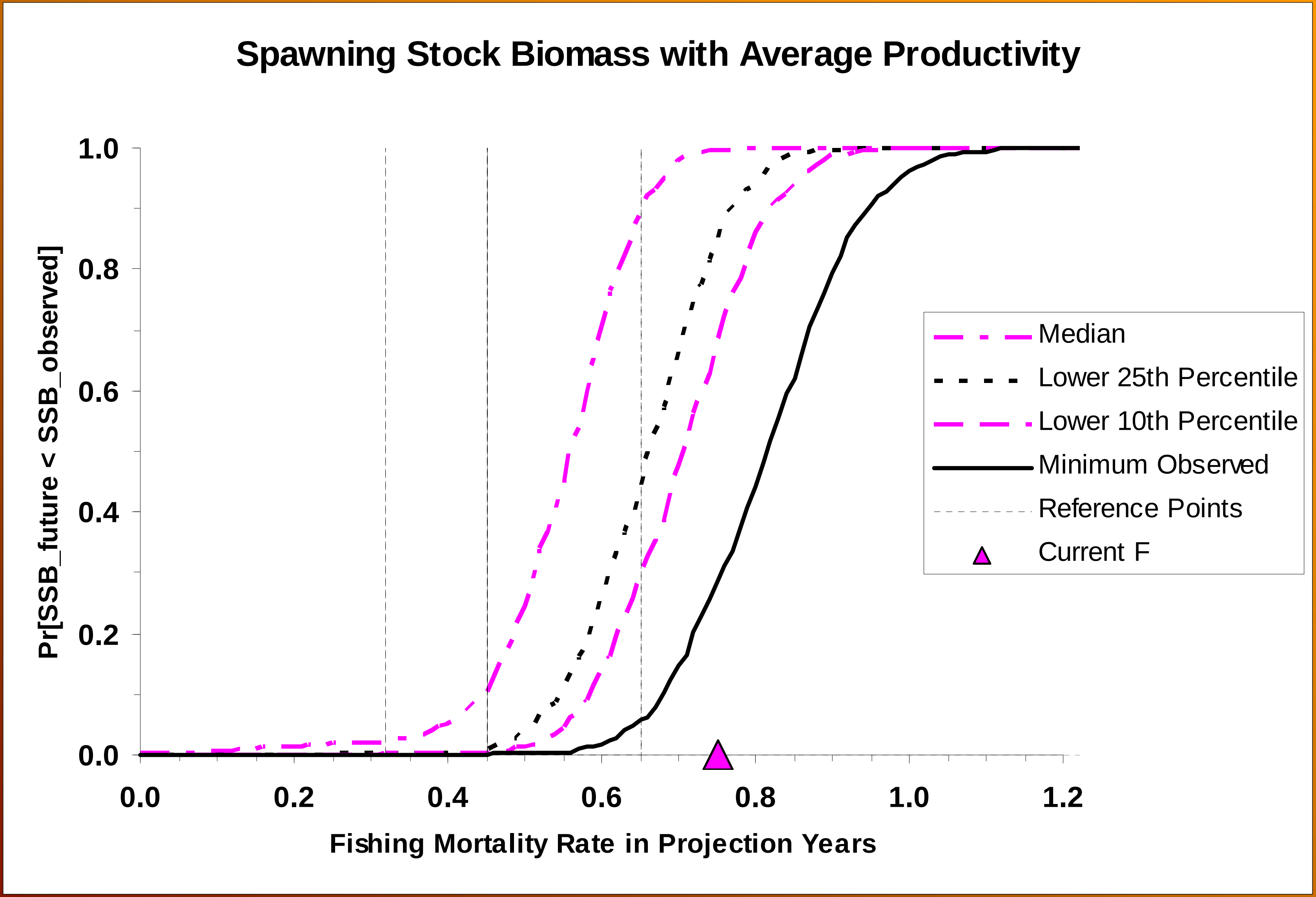


Table 1

YEAR	CANADA	JAPAN						KOREA		MEXICO
	TROLL	GILL NET	LONG LINE	POLE & LINE	PURSE SEINE	TROLL	UNSP. GEAR	GILL NET	LONG LINE	UNSP. GEAR
1952	71		26,687	41,787	154		237			
1953	5		27,777	32,921	38		132			
1954			20,958	28,069	23		38			
1955			16,277	24,236	8		136			
1956	17		14,341	42,810			57			
1957	8		21,053	49,500	83		151			
1958	74		18,432	22,175	8		124			
1959	212		15,802	14,252			67			
1960	5		17,369	25,156			76			
1961	4		17,437	18,639	7		268			0
1962	1		15,764	8,729	53		191			0
1963	5		13,464	26,420	59		218			0
1964	3		15,458	23,858	128		319			0
1965	15		13,701	41,491	11		121			0
1966	44		25,050	22,830	111		585			0
1967	161		28,869	30,481	89		520			
1968	1,028		23,961	16,597	267		1,109			
1969	1,365		18,030	31,912	521		935			0
1970	390		16,283	24,263	317		456			0
1971	1,746		11,524	52,957	902		308			0
1972	3,921	1	13,043	60,569	277		623			100
1973	1,400	39	16,795	68,767	1,353		495			0
1974	1,331	224	13,409	73,564	161		879			1
1975	111	166	10,318	52,152	159		228		2,463	1
1976	278	1,070	15,825	85,336	1,109		272		859	36
1977	53	688	15,696	31,934	669		355		792	0
1978	23	4,029	13,023	59,877	1,115		2,078		228	1
1979	521	2,856	14,215	44,662	125		1,126	0	259	1
1980	212	2,986	14,689	46,742	329		1,179	6	597	31
1981	200	10,348	17,922	27,426	252		663	16	459	8
1982	104	12,511	16,767	29,614	561		440	113	387	7
1983	225	6,852	15,097	21,098	350		118	233	454	33
1984	50	8,988	15,060	26,013	3,380		511	516	136	113
1985	56	11,204	14,351	20,714	1,533		305	576	291	49
1986	30	7,813	12,928	16,096	1,542		626	726	241	3
1987	104	6,698	14,702	19,082	1,205		155	817	549	7
1988	155	9,074	14,731	6,216	1,208		134	1,016	409	15
1989	140	7,437	13,104	8,629	2,521		393	1,023	150	2
1990	302	6,064	15,789	8,532	1,995		249	1,016	6	2
1991	139	3,401	17,046	7,103	2,652		392	852	3	2
1992	363	2,721	19,049	13,888	4,104		1,527	271	15	10
1993	494	287	29,966	12,797	2,889		867		32	11
1994	1,998	263	29,600	26,389	2,026		799		45	6
1995	1,720	282	29,075	20,981	1,177	856	81		440	5
1996	3,591	116	32,493	20,272	581	815	117		333	21
1997	2,433	359	38,951	32,238	1,068	1,585	123		319	53
1998	4,188	206	35,812	22,926	1,554	1,190	88		288	8
1999	2,641	289	33,364	50,369	6,872	891	127		107	23
2000	4,465	67	30,046	21,550	2,408	645	171		414	79
2001	4,985	117	28,818	29,430	974	416	96		82	22
2002	5,022	332	23,644	48,454	3,303	787	135		(113)	28
2003	6,735	126	20,954	36,114	627	922	106	(0)	(144)	28
2004	(7,842)	61	17,547	32,255	7,200	772	65	(0)	(68)	(104)
2005	(4,810)	(61)	(19,615)	(16,883)	(859)	(772)	(65)	(0)	(520)	(0)

Table 1 cont.

Table 1. Continued

YEAR	TAIWAN		U.S.							OTHERS		GRAND TOTAL
	GILL NET	LONG LINE[2]	POLE & LINE	GILL NET	LONG LINE	PURSE SEINE	SPORT	TROLL	UNSP. GEAR	LONG LINE[3]	TROLL	
1952					46		1,373	23,843				94,198
1953					23		171	15,740				76,807
1954					13		147	12,246				61,494
1955					9		577	13,264				54,507
1956					6		482	18,751				76,464
1957					4		304	21,165				92,268
1958					7		48	14,855				55,723
1959					5		0	20,990	0			51,328
1960					4		557	20,100	0			63,403
1961			2,837		5		1,355	12,055	1			52,608
1962			1,085		7		1,681	19,752	1			47,264
1963			2,432		7		1,161	25,140	0			68,906
1964			3,411		4		824	18,388	0			62,393
1965			417		3		731	16,542	0			73,032
1966			1,600		8		588	15,333	1			66,150
1967		330	4,113		12		707	17,814	0			83,096
1968		216	4,906		11		951	20,434	0			69,480
1969		65	2,996		14		358	18,827	0			75,023
1970		34	4,416		9		822	21,032	0			68,022
1971		20	2,071		11		1,175	20,526	0			91,240
1972		187	3,750		8		637	23,600	0			106,717
1973		--	2,236		14		84	15,653	0			106,836
1974		486	4,777		9		94	20,178	0			115,113
1975		1,240	3,243		33		640	18,932	10			89,696
1976		686	2,700		23		713	15,905	4			124,816
1977		572	1,497		37		537	9,969	0			62,799
1978		6	950		54		810	16,613	15			98,822
1979		81	303		--		74	6,781	0			71,004
1980	--	249	382		--		168	7,556	0			75,126
1981	--	143	748		25		195	12,637	0			71,042
1982	--	38	425		105		257	6,609	21			67,960
1983	--	8	607		6		87	9,359	0			54,527
1984	--	--	1,030		2	3,728	1,427	9,304	0			70,258
1985	--	--	1,498	2	0		1,176	6,415	0			58,170
1986	--	--	432	3			196	4,708	0			45,344
1987	2,514	--	158	5	150		74	2,766	0			48,986
1988	7,389	--	598	15	308		64	4,212	10			45,554
1989	8,350	40	54	4	249		160	1,860	23			44,140
1990	16,701	4	115	29	177	71	24	2,603	4			53,683
1991	3,398	12	0	17	313	0	6	1,845	71			37,253
1992	7,866	--	0	0	337	0	2	4,572	72			54,796
1993		5	0	0	440		25	6,254	0			54,067
1994		83	0	38	546		106	10,978	213		158	73,248
1995		4,280	80	52	883		102	8,045	1		137	68,197
1996		7,596	24	83	1,187	11	88	16,938	0	1,735	505	86,506
1997		9,119	73	60	1,652	2	1,018	14,252	1	2,824	404	106,534
1998		8,617	79	80	1,120	33	1,208	14,410	2	5,871	286	97,966
1999		8,186	60	149	1,540	48	3,621	10,060	1	6,307	261	124,916
2000		8,842	69	55	940	4	1,798	9,645	3	3,654	490	85,344
2001		8,684	139	94	1,295	51	1,635	11,210	0	1,471	127	89,648
2002		7,965	381	30	525	4	2,357	10,387		700	(127)	(104,295)
2003		(7,166)	59	16	524	44	2,214	14,102	0	(2,400)	(127)	(92,409)
2004		(4,988)	(126)	(12)	(560)	(1)	(1,506)	(13,346)	(0)	(2,400)	(127)	(88,981)
2005		(4,692)	(66)	(20)	(277)	(2)	(1,719)	(9,122)	(0)	(2,400)	(127)	(62,011)

Table 2

YEAR	AGE (yr)									TOTAL
	1	2	3	4	5	6	7	8	= 9	
1966	0	129	2,022	1,118	2,412	261	145	52	41	6,180
1967	0	210	2,293	1,552	2,820	579	171	97	72	7,794
1968	0	92	3,268	1,422	1,118	763	254	97	39	7,053
1969	1	2,046	2,584	1,232	2,493	197	191	194	53	8,990
1970	0	282	3,390	2,220	1,321	410	101	71	61	7,856
1971	0	208	4,634	2,424	2,831	388	175	70	81	10,810
1972	0	4,030	3,514	4,646	2,348	270	118	92	60	15,078
1973	1	2,583	3,619	1,531	4,030	743	141	90	74	12,812
1974	0	1,128	4,483	5,653	1,538	754	153	57	96	13,863
1975	0	828	5,222	2,912	1,907	264	111	78	259	11,581
1976	0	2,325	4,937	5,767	2,766	285	165	106	186	16,538
1977	0	741	2,919	1,955	1,106	426	132	91	160	7,531
1978	2	5,931	2,125	4,729	1,018	387	185	45	83	14,505
1979	0	580	1,215	3,623	1,257	265	190	101	68	7,300
1980	0	2,518	2,830	3,160	801	311	110	87	97	9,916
1981	4	898	1,509	2,854	1,095	450	270	106	115	7,301
1982	78	599	1,949	3,408	435	255	200	213	134	7,272
1983	2	1,182	2,552	2,306	232	186	196	146	141	6,945
1984	5	1,111	4,571	3,031	241	177	126	131	156	9,550
1985	2	318	1,235	2,776	641	118	166	100	325	5,681
1986	0	794	906	2,461	204	128	127	90	131	4,840
1987	1	265	2,155	1,296	474	314	176	102	169	4,953
1988	4	133	1,529	1,156	270	606	223	161	181	4,264
1989	106	377	316	1,335	1,012	276	246	133	158	3,959
1990	109	317	239	1,151	1,606	641	113	213	247	4,635
1991	78	678	1,747	335	339	263	155	119	271	3,984
1992	1	332	2,350	1,664	662	360	150	151	156	5,826
1993	0	485	1,090	1,971	793	202	201	116	293	5,151
1994	28	669	1,575	2,355	1,077	654	206	97	136	6,798
1995	2	496	1,310	3,152	294	310	564	116	119	6,362
1996	8	494	3,938	2,294	603	396	554	477	105	8,869
1997	0	2,453	1,431	4,451	817	124	476	620	391	10,764
1998	0	1,105	4,036	1,568	1,880	302	213	379	282	9,766
1999	77	816	3,761	5,797	757	478	477	185	308	12,656
2000	0	1,231	1,852	2,739	923	415	450	435	247	8,292
2001	4	1,470	4,370	1,396	1,153	410	451	277	338	9,869
2002	0	1,447	7,396	3,141	439	226	381	209	222	13,461
2003	0	3,054	3,619	3,008	709	306	250	181	194	11,321
2004	30	210	4,411	4,363	282	452	332	130	44	10,253
2005	1	2,382	1,547	2,318	305	171	437	189	69	7,418
TOTAL	543	46,948	110,447	106,273	47,010	14,522	9,484	6,404	6,365	347,996

Table 3

YEAR	AGE (yr)								
	1	2	3	4	5	6	7	8	=9
1966	25,148	20,076	9,549	8,963	5,558	1,035	424	166	131
1967	29,475	18,630	14,762	5,352	5,685	2,083	545	191	142
1968	33,293	21,836	13,622	8,980	2,647	1,842	1,052	259	105
1969	46,100	24,664	16,098	7,312	5,439	1,018	720	563	154
1970	22,784	34,151	16,522	9,721	4,365	1,930	586	371	322
1971	40,983	16,879	25,058	9,353	5,312	2,113	1,081	348	401
1972	39,890	30,361	12,325	14,614	4,869	1,562	1,235	651	427
1973	40,054	29,551	19,050	6,147	6,887	1,632	927	814	669
1974	27,404	29,672	19,683	11,028	3,253	1,735	583	566	958
1975	39,421	20,302	21,015	10,766	3,424	1,116	650	302	999
1976	30,252	29,204	14,331	11,128	5,502	941	602	387	676
1977	35,167	22,411	19,646	6,435	3,405	1,752	455	306	539
1978	21,530	26,052	15,968	12,063	3,108	1,585	936	224	413
1979	24,512	15,948	14,252	10,014	4,940	1,440	845	536	363
1980	18,877	18,159	11,318	9,519	4,353	2,591	840	464	522
1981	25,360	13,984	11,302	5,978	4,374	2,542	1,654	528	574
1982	29,433	18,784	9,591	7,084	2,028	2,310	1,499	995	628
1983	24,877	21,738	13,402	5,445	2,382	1,132	1,493	939	907
1984	12,774	18,427	15,092	7,753	2,088	1,566	680	938	1,123
1985	22,816	9,460	12,700	7,301	3,182	1,341	1,009	396	1,282
1986	18,306	16,901	6,735	8,352	3,062	1,812	892	606	881
1987	11,247	13,562	11,841	4,216	4,099	2,094	1,233	553	913
1988	9,944	8,331	9,819	6,935	2,024	2,631	1,283	763	855
1989	31,762	7,364	6,058	5,969	4,151	1,269	1,433	760	907
1990	32,674	23,439	5,132	4,218	3,286	2,215	705	852	987
1991	25,211	24,112	17,092	3,598	2,146	1,084	1,097	426	971
1992	21,691	18,610	17,282	11,169	2,378	1,300	580	680	704
1993	27,488	16,068	13,502	10,796	6,854	1,200	657	302	765
1994	39,176	20,363	11,488	9,071	6,317	4,400	717	317	444
1995	19,968	28,999	14,513	7,165	4,718	3,761	2,701	356	366
1996	39,051	14,791	21,057	9,631	2,652	3,244	2,521	1,521	335
1997	27,849	28,923	10,535	12,243	5,184	1,451	2,065	1,396	881
1998	20,315	20,631	19,329	6,582	5,303	3,143	969	1,124	835
1999	35,829	15,049	14,338	10,882	3,542	2,338	2,070	536	892
2000	37,451	26,476	10,450	7,425	3,202	1,979	1,325	1,127	640
2001	34,645	27,744	18,559	6,163	3,183	1,589	1,113	601	733
2002	47,549	25,662	19,295	10,031	3,378	1,383	828	444	470
2003	16,034	35,225	17,772	8,042	4,767	2,127	831	293	314
2004	51,304	11,878	23,484	10,083	3,414	2,927	1,315	404	136
2005	27,722	37,981	8,620	13,638	3,791	2,288	1,782	692	252
2006	27,722	20,517	26,099	5,067	8,126	2,547	1,549	949	481

Table 4

YEAR	AGE (yr)								
	1	2	3	4	5	6	7	8	=9
1966	0.000	0.007	0.279	0.155	0.681	0.341	0.496	0.439	0.439
1967	0.000	0.013	0.197	0.404	0.827	0.383	0.446	0.859	0.859
1968	0.000	0.005	0.322	0.201	0.656	0.639	0.324	0.561	0.561
1969	0.000	0.101	0.204	0.216	0.736	0.252	0.362	0.499	0.499
1970	0.000	0.010	0.269	0.304	0.426	0.280	0.222	0.247	0.247
1971	0.000	0.014	0.239	0.353	0.924	0.237	0.207	0.263	0.263
1972	0.000	0.166	0.396	0.452	0.793	0.222	0.117	0.177	0.177
1973	0.000	0.106	0.247	0.337	1.079	0.729	0.192	0.137	0.137
1974	0.000	0.045	0.303	0.870	0.770	0.682	0.359	0.123	0.123
1975	0.000	0.048	0.336	0.371	0.992	0.317	0.218	0.354	0.354
1976	0.000	0.096	0.501	0.884	0.844	0.427	0.376	0.379	0.379
1977	0.000	0.039	0.188	0.428	0.465	0.327	0.406	0.415	0.415
1978	0.000	0.303	0.167	0.593	0.470	0.329	0.257	0.263	0.263
1979	0.000	0.043	0.104	0.533	0.345	0.238	0.299	0.244	0.244
1980	0.000	0.174	0.338	0.478	0.238	0.149	0.164	0.242	0.242
1981	0.000	0.077	0.167	0.781	0.339	0.228	0.208	0.262	0.262
1982	0.003	0.038	0.266	0.790	0.283	0.136	0.167	0.282	0.282
1983	0.000	0.065	0.247	0.659	0.119	0.210	0.164	0.197	0.197
1984	0.000	0.072	0.426	0.590	0.143	0.140	0.240	0.175	0.175
1985	0.000	0.040	0.119	0.569	0.263	0.107	0.209	0.344	0.344
1986	0.000	0.056	0.168	0.412	0.080	0.085	0.179	0.188	0.188
1987	0.000	0.023	0.235	0.434	0.143	0.189	0.180	0.239	0.239
1988	0.000	0.019	0.198	0.213	0.167	0.307	0.224	0.279	0.279
1989	0.004	0.061	0.062	0.297	0.328	0.287	0.221	0.224	0.224
1990	0.004	0.016	0.055	0.375	0.809	0.403	0.204	0.338	0.338
1991	0.004	0.033	0.125	0.114	0.201	0.326	0.178	0.385	0.385
1992	0.000	0.021	0.170	0.188	0.384	0.382	0.351	0.294	0.294
1993	0.000	0.036	0.098	0.236	0.143	0.215	0.430	0.576	0.576
1994	0.001	0.039	0.172	0.354	0.219	0.188	0.401	0.431	0.431
1995	0.000	0.020	0.110	0.694	0.075	0.100	0.274	0.467	0.467
1996	0.000	0.039	0.242	0.319	0.303	0.152	0.291	0.445	0.445
1997	0.000	0.103	0.170	0.537	0.200	0.104	0.308	0.703	0.703
1998	0.000	0.064	0.274	0.320	0.519	0.118	0.292	0.487	0.487
1999	0.003	0.065	0.358	0.923	0.282	0.268	0.308	0.503	0.503
2000	0.000	0.055	0.228	0.547	0.401	0.276	0.491	0.580	0.580
2001	0.000	0.063	0.315	0.301	0.534	0.351	0.619	0.743	0.743
2002	0.000	0.067	0.575	0.444	0.162	0.209	0.739	0.768	0.768
2003	0.000	0.105	0.267	0.557	0.188	0.181	0.422	1.192	1.192
2004	0.001	0.021	0.243	0.678	0.100	0.196	0.342	0.461	0.461
2005	0.001	0.075	0.231	0.218	0.098	0.090	0.331	0.375	0.375

Table 5a

Candidate Target Reference Points	Target *F* (yr^{-1})	Ratio of Current *F* to Target *F*	MSY Proxy (1,000 mt)	SSB_{MSY} Proxy (1,000 mt)
$F_{40\%}$	0.32	2.31	75	226
$F_{35\%}$	0.38	1.97	79	198
$F_{0.1}$	0.45	1.68	83	171
$F_{30\%}$	0.45	1.67	83	169

Candidate Limit Reference Points	Limit *F* (yr-1)	Ratio of Current *F* to Limit *F*	Equilibrium Catch (1,000 mt)	Equilibrium *SSB* (1,000 mt)
$F_{20\%}$	0.65	1.16	91	113
F_{Max}	2.07	0.36	100	10
$F_{SSB\text{-}Min}$	0.81	0.93	94	83
$F_{SSB\text{-}10\%}$	0.70	1.07	92	102
$F_{SSB\text{-}25\%}$	0.66	1.14	91	110

Table 5b

BRPs	2006	2004	2004	2004	2004
Productivity in recent years	Average	Low	High	Low	High
F_{cur} Scenario	0.75	Low 0.43	Low 0.43	High 0.68	High 0.68
$F_{cur}/F_{40\%}$	2.31	1.43	1.43	2.27	2.27
$F_{cur}/F_{35\%}$	1.97	1.23	1.23	1.94	1.94
$F_{cur}/F_{0.1}$	1.68	1.16	1.16	1.84	1.84
$F_{cur}/F_{30\%}$	1.67	1.02	1.02	1.62	1.62
$F_{cur}/F_{20\%}$	1.16	0.70	0.70	1.11	1.11
F_{cur}/F_{max}	0.36	0.40	0.40	0.64	0.64
$F_{cur}/F_{SSB\text{-}Min}$	0.93	0.48	0.41	0.76	0.65
$F_{cur}/F_{SSB\text{-}10\%}$	1.07	0.52	0.44	0.83	0.69
$F_{cur}/F_{SSB\text{-}25\%}$	1.14	0.60	0.50	0.94	0.79
$F_{cur}/F_{SSB\text{-}50\%}$	1.34	0.80	0.64	1.26	1.01

Table 6a

YEAR	AGE (yr)								
	1	2	3	4	5	6	7	8	9+
1966	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	29.73
1967	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	29.73
1968	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	29.73
1969	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	29.73
1970	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	29.73
1971	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	29.73
1972	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	29.73
1973	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	29.73
1974	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	30.13
1975	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	30.13
1976	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	30.13
1977	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	30.13
1978	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	30.13
1979	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	30.46
1980	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	30.46
1981	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	30.46
1982	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	30.46
1983	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	30.46
1984	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	30.52
1985	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	30.52
1986	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	30.52
1987	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	30.52
1988	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	30.52
1989	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	29.67
1990	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	29.67
1991	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	29.67
1992	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	29.67
1993	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	29.67
1994	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	28.86
1995	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	28.86
1996	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	28.86
1997	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	28.86
1998	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	28.86
1999	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	28.10
2000	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	28.10
2001	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	28.10
2002	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	28.10
2003	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	28.10
2004	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	28.03
2005	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	28.03
2006	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	28.03

Table 6b

YEAR	AGE (yr)								
	1	2	3	4	5	6	7	8	9+
1966	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.24
1967	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.24
1968	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.24
1969	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.24
1970	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.24
1971	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.24
1972	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.24
1973	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.24
1974	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.61
1975	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.61
1976	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.61
1977	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.61
1978	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.61
1979	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.91
1980	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.91
1981	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.91
1982	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.91
1983	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.91
1984	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.97
1985	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.97
1986	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.97
1987	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.97
1988	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.97
1989	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.19
1990	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.19
1991	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.19
1992	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.19
1993	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.19
1994	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	30.44
1995	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	30.44
1996	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	30.44
1997	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	30.44
1998	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	30.44
1999	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	29.74
2000	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	29.74
2001	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	29.74
2002	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	29.74
2003	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	29.74
2004	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	29.68
2005	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	29.68
2006	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	29.68

Table 6c

Period	Mean F on Age group 9+	Age group 9+ equilibrium demographics					
		Biomass (January 1)			Spawning stock biomass (May 1)		
		Mean age (yr)	Mean length (cm)	Mean weight (kg)	Mean age (yr)	Mean length (cm)	Mean weight (kg)
2002-2004	0.7501	9.54	115.60	**28.03**	9.87	117.10	**29.68**
1999-2003	0.7236	9.56	115.70	**28.10**	9.89	117.20	**29.74**
1994-1998	0.4981	9.82	116.87	**28.86**	10.15	118.30	**30.44**
1989-1993	0.3457	10.10	118.09	**29.67**	10.44	119.47	**31.19**
1984-1988	0.2374	10.41	119.35	**30.52**	10.74	120.66	**31.97**
1979-1983	0.2437	10.38	119.26	**30.46**	10.72	120.58	**31.91**
1974-1978	0.2826	10.26	118.77	**30.13**	10.60	120.11	**31.61**
1966-1973	0.3370	10.12	118.18	**29.73**	10.46	119.55	**31.24**

Table 7

SSB Threshold Desired		Probability Level Desired 50%	95%
Minimum Observed SSB	$F_{SSB\text{-}Min}$	0.81	0.64
Lower 10th Percentile	$F_{SSB\text{-}10\%}$	0.70	0.55
Lower 25th Percentile	$F_{SSB\text{-}25\%}$	0.66	0.51
Median	$F_{SSB\text{-}50\%}$	0.56	0.39

Agenda Item F.4.c
HMSAS Report
September 2007

HIGHLY MIGRATORY SPECIES ADVISORY SUBPANEL REPORT ON NORTH PACIFIC ALBACORE TUNA STOCK ASSESSMENT

The Highly Migratory Species Advisory Subpanel (HMSAS) generally agreed to follow the lead of the HMSMT and support the establishment of international reference points for North Pacific Albacore.

The HMSAS discussed and was concerned by the August 2, 2007, Inter-American Tropical Tuna Commission (IATTC) General Advisory Committee (GAC) conference call where it was suggested effort be reduced from by 10-30 percent. The HMSAS is concerned that that in the absence of a thoughtfully designed management program, if, in the future, the stock is declared to be in an overfished state, reactive and draconian measures would have to be implemented.

Despite how other countries fish, the U.S. is locked into and restricted by the provisions of the Magnuson-Stevens Fishery Conservation and Management Act. Other participating countries are not encumbered by such laws. In the North Pacific, the Japanese and U.S. are the major participants and need to take the lead. The U.S. Departments of Commerce and State need to put forth more effort in this regard, especially by encouraging Japan and others to cooperate in responsible harvesting.

The HMSAS also emphasizes the importance of getting accurate information of the catch and landings of the illegal, unregulated, and unreported vessels operating in the North Pacific.

PFMC
08/23/07

Agenda Item F.4.c
HMSMT Report
September 2007

HIGHLY MIGRATORY SPECIES MANAGEMENT TEAM REPORT ON THE NORTH PACIFIC ALBACORE STOCK ASSESSMENT

The Highly Migratory Species Management Team (HMSMT) received a presentation by Dr. Paul Crone on the results of the latest stock assessment of North Pacific albacore. The assessment was conducted during the December 2006 meeting of the International Scientific Committee's (ISC) Albacore Working Group. The VPA-2Box model was used for the assessment as it was for the previous assessment. The results were generally similar to those of the previous assessment which was conducted by the North Pacific Albacore Workshop in 2004: 1) the estimated spawning stock biomass (SSB) of 153,000 mt for 2006 is near its highest level throughout the history of the data series (1966-2005), and 2) fishing mortality rate is high ($F_{17\%}$) relative to many commonly used reference points for tunas and tuna-like species. There is considerable uncertainty in the assessment, which may be attributed to recruitment variability and the inability to predict future recruitment. Future SSB projections, based on the average productivity of the stock over the time series and the current fishing mortality rate, estimate that SSB will decline to an equilibrium value of roughly 92,000 mt by 2015. The projected equilibrium value is somewhat below the long-term (1966-2005) average SSB of 100,000 mt.

The ISC Plenary reviewed the assessment results and concluded that given that F is high relative to most commonly used F reference points, that fishing mortality may need to be reduced. However, the ISC did not make recommendations regarding when, how, or to what degree reductions in F should be achieved. The degree to which reductions in fishing effort are necessary depends in part on the objectives of Regional Fishery Management Organizations managing the stocks. Neither the Inter-American Tropical Tuna Commission (IATTC) nor the Western and Central Pacific Fisheries Commission (WCPFC) have reviewed the assessment results, which were only made available during the July 2007 meeting of the ISC.

The HMSMT suggests that the Council, through the U.S. delegations, request the IATTC and WCPFC to review the albacore assessment during their upcoming meetings (scheduled for October 22-24 and December 3-7, respectively) and decide on their respective management objectives. However, for the WCPFC, Council input to the September 11-13 Northern Committee meeting is also important. The HMSMT suggests that the Council try to immediately communicate its recommendations to the U.S. delegation attending that meeting. The HMSMT supports the conclusion of the ISC Plenary that fishing mortality may need to be decreased to maintain biomass levels above a reference level consistent with management goals. However, those reference levels have yet to be established for North Pacific albacore. Similarly, reference points have yet to be established for many of the management unit species in the Council's Fishery Management Plan for U.S. West Coast Fisheries for Highly Migratory Species (HMS FMP). The HMSMT urges the Council to request that the IATTC and WCPFC continue to work toward developing reference points for North Pacific albacore and other HMS.

With respect to the IATTC and WCPFC resolutions currently in place, the HMSMT and National Marine Fisheries Service Southwest Fisheries Science Center staff have done considerable work in defining the current level of fishing effort of the U.S. fleets on North

Pacific albacore in order to demonstrate that the U.S. is complying with the resolutions. The HMSMT suggests that the Council request that the IATTC and WCPFC require similar response of their member nations in order to demonstrate compliance. In addition, the IATTC and WCPFC should clarify what metric is to be used to define “recent effort.”

In summary, the HMSMT suggests that the Council make the following recommendations to the IATTC and WCPFC, through the US delegations, regarding North Pacific albacore. Recommendations to the WCPFC’s Northern Committee should be made immediately in order to be considered at their meeting of September 11-13.

1. Review the latest stock assessment;
2. Define management objectives for North Pacific albacore;
3. Work toward developing reference points for North Pacific albacore, as well as for other highly migratory species;
4. Clarify what is meant by “recent effort levels” for compliance with current resolutions;
5. Require documentation of compliance with current resolutions from all members;
6. Consider the conclusions of the ISC that fishing mortality may need to be decreased.

PFMC
08/23/07

G:\!PFMC\MEETING\2007\September\HMS\F4 ALB HMSMTReport.doc

Agenda Item F.4.c
Supplemental SSC Report
September 2007

SCIENTIFIC AND STATISTICAL COMMITTEE REPORT ON
NORTH PACIFIC ALBACORE TUNA STOCK ASSESSMENT

The Scientific and Statistical Committee (SSC) was given a presentation on the Report of the Albacore Working Group of the International Scientific Committee (ISC) for Tuna and Tuna-Like Species in the North Pacific Ocean by Dr. Ray Conser (SWFSC).

The stock assessment of albacore tuna was conducted using the processes of the ISC and not those of the Pacific Fishery Management Council (Council). It involved the application of the package VPA-2BOX to catch-at-age data inferred from catch-at-length data and seventeen catch-rate indices. Although the current level of fishing mortality ($F_{17\%}$) was estimated to exceed many conventional fishing mortality references points, no agreed reference points currently exist for albacore tuna in the North Pacific. In addition, the spawning stock biomass was estimated to be at a high level at present and increasing.

The information provided in Agenda Item F.4.a, Attachment 2 was insufficient for the SSC to conduct a full review of the assessment. In particular, although eighteen background documents were presented to the ISC Working Group, and typical assessment outputs were examined in detail, the final report did not include this information, being largely a summary document. Therefore, given the lack of information, the SSC is unable to determine whether this assessment represents the best available science. Consequently, the SSC is unable to endorse the assessment at present.

Given the volume of information expected from a full highly migratory species (HMS) assessment, it is not be feasible for the SSC to review an HMS assessment during its normal meeting and a special meeting of the HMS subcommittee would likely be required to conduct a thorough review of the material.

A different approach than the SSC reviewing the summary document of the ISC meeting needs to be taken if the Council wishes the SSC to take a larger, and more rigorous, role in the review of assessments of HMS species conducted by international entities. For example, a member of the SSC could participate in the ISC Working Group and provide a report for Council consideration. This would provide for the maximum amount of direct SSC involvement in the review process. Alternatively, Terms of Reference (TOR) for HMS stock assessments could be developed by the SSC HMS subcommittee. Following approval by the Council, the Council could encourage, through the U.S. delegation, that the ISC modify its TOR for albacore assessments along the lines of the Council-developed TOR. The ISC Working Group would require sufficient lead time to modify its practices in order to satisfy changes to its TOR. Although there can be no guarantee that the ISC would adopt TOR for HMS assessments developed by the SSC, assessment reports produced following such TOR would provide a more rigorous basis for reviewing the assessment, although not to the extent a full Stock Assessment Review Panel Review.

Finally, the Working Group report noted that work is being conducted to apply the Stock Synthesis 2 (SS2) approach to albacore tuna in the North Pacific. The SSC encourages further work along these lines.

NATIONAL MARINE FISHERIES SERVICE REPORT

National Marine Fisheries Service (NMFS) Southwest Region and Science Center will briefly report on recent developments relevant to highly migratory species fisheries and issues of interest to the Council.

Attachment 2 is a letter sent by Mr. Rod McInnis, NMFS Southwest Regional Administrator, to Council Chair Hansen about the Council's recommendation to issue an exempted fishing permit for certain drift gillnet vessels.

Council Task:

Discussion.

Reference Materials:

1. Agenda Item F.1.a, Attachment 1, NMFS Southwest Region Report.
2. Agenda Item F.1.a, Attachment 2, Letter to Chair Hansen on Council exempted fishing permit recommendation.
3. Agenda Item F.1.c, HMSMT Report.
4. Agenda Item F.1.c, HMSAS Report.

Agenda Order:

a. Southwest Region Activity Report — Mark Helvey
b. Southwest Fishery Science Center Report — Gary Sakagawa
c. Reports and Comments of Advisory Bodies
d. Public Comment
e. Council Discussion

PFMC
08/23/07

NMFS SWR Report

I. Regulatory Activities

CPFV Vessel Markings: NMFS issued a final rule to amend vessel identification regulations of the Fishery Management Plan (FMP) for U.S. West Coast Fisheries for Highly Migratory Species (HMS) on August 6, 2007 and effective September 5, 2007. The current regulatory text requires all commercial fishing vessels and recreational charter vessels fishing under the HMS FMP to display their official numbers on the port and starboard sides of the deckhouse or hull so as to be visible from enforcement vessels and aircraft. The final rule exempts HMS recreational charter vessels from complying with the vessel identification requirements. The regulation relieves a restriction for which the costs outweigh the benefits. Current state and U.S. Coast Guard marking requirements are sufficient for law enforcement personnel to adequately identify HMS recreational charter vessels at sea.

Tropical Tuna 2007 Conservation Measures: NMFS published a final rule on June 4, 2007, and effective August 1, 2007, to implement the 2007 management measures to reduce overfishing of the eastern Pacific Ocean (EPO) tuna stocks in 2007, consistent with recommendations by the Inter-American Tropical Tuna Commission (IATTC) that have been approved by the Department of State under the Tuna Conventions Act. The U.S. purse seine fishery for yellowfin, bigeye, and skipjack tunas in the EPO closed for a 6–week period beginning August 1, 2007, through September 11, 2007. The longline fishery for bigeye tuna will close when a 500 metric ton (mt) limit has been reached. These actions are taken to limit fishing mortality caused by purse seine fishing and longline fishing in the EPO and contribute to long-term conservation of the tuna stocks at levels that support healthy fisheries.

Tuna Bag Limits: NMFS issued a proposed rule on June 27, 2007, to implement daily bag limits for sport-caught albacore and bluefin tuna in the Exclusive Economic Zone off California under the HMS FMP. The proposed rule would be implemented as a conservation measure as part of the 2007–2009 biennial management cycle as established in the HMS FMP Framework provisions for changes to routine management measures. The comment period ended July 27, 2007 and the final rule package was to be submitted late August.

II. Other Activities:

Drift Gillnet Leatherback Sea Turtle Conservation Area: When NMFS denied the Drift Gillnet Exempted Fishing Permit in June, 2007, it did not foreclose a reexamination of the seasonal closure using fishery independent information. The agency recognizes that considerable information on leatherback turtle distribution and migratory routes has been collected since the closure went into effect in 2001 including data from the most recent field season. Southwest Fisheries Science Center turtle experts are preparing to meet in November with Southwest Region staff to examine the baseline of what is currently known about the migration of leatherback sea turtles along the West Coast and determine whether there is sufficient information to reconfigure the seasonal closure. NMFS staff will also use the workshop to identify what additional data needs are required and use that to prepare a research plan. NMFS intends to submit a report of their results to the Council in spring 2008.

Shallow-Set Longline Exempted Fishing Permit (EFP): The SWR was notified on August 7, 2007, by way of a letter from Mr. David Kennedy, Director of NOAA's Office of Ocean and Coastal Resource Management (OCRM), to Mr. Peter Douglas, Executive Director of the California Coastal Commission (CCC), that OCRM had approved CCC's request to review the EFP. Accordingly, the applicant, Mr. Pete Dupuy, must provide the CCC with a consistency certification pursuant to the Coastal Zone Management Act. The State of California must complete its review within three months from receipt of Mr. Dupuy's consistency certification and accompanying necessary data and information. In addition, NMFS may approve the EFP only if consistency with the California Coastal Act is resolved under NOAA regulation implementing the Coastal Zone Management Act. As a result of this delay, NMFS requests that the Council recommend that the EFP be approved for the 2008 fishing season as originally submitted for the 2007 fishing season.

HMS Permit Fees: When the HMS FMP was implemented in 2004, a federal permit for HMS vessels was required but a fee for the permit was not included. The authority for NMFS to charge permit fees to recover its administrative costs is contained in five statutes. Historically, each NMFS permit program individually decided whether or not to use this authority to charge an administrative fee for the recovery of permit processing and issuance expenses. Based on NMFS national policy on permit fees, NMFS intends to begin the process to undertake a regulatory amendment to allow for the collection of HMS permit fees.

III. Meeting Summaries

Inter-American Tuna Tropical Commission (IATTC): The IATTC held its 75th annual meeting, June 25-29, 2007, in Cancun, Mexico. Subsidiary meetings also conducted included the Joint Working Group on Fishing by Non-Parties, the Permanent Working Group on Compliance, and the Working Group on Finance.

Selection of a new Director to the IATTC was confirmed. Dr. Guillermo Compean from Mexico will head the IATTC staff.

Tuna Conservation Measures for yellowfin and bigeye beyond 2007 were not adopted.

IV. Upcoming Meetings

Northern Committee of the Commission for the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean. September 11-13, 2007, Tokyo, Japan.

The IATTC will meet in a special session in October 22-24, 2007 to resolve the issue of tuna conservation measures for 2008 and beyond.

A meeting of the General Advisory Committee to the U.S. Section to the IATTC will be held November 2, 2007, in La Jolla, California, at the NMFS Southwest Fisheries Science Center Large Conference Room.

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Region
501 West Ocean Boulevard, Suite 4200
Long Beach, California 90802- 4213

JUN 05 2007

150413SWR2006SF00311:MH

Mr. Donald Hansen, Chairman
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 101
Portland, Oregon 97220-1384

Dear Mr. Hansen:

NOAA's National Marine Fisheries Service (NMFS) is in receipt of the Pacific Fishery Management Council's (Council) November 30, 2006, letter communicating its recommendation to issue the exempted fishing permit (EFP) for the drift gillnet fishery (DGN) for the 2007 fishing season. The proposed EFP was originally submitted by the Federation of Independent Seafood Harvesters to the Council for the 2006 fishing season but the permit was never issued by NMFS. The EFP would allow DGN fishing under specified conditions in the Pacific Leatherback Conservation Area (PLCA) from August 15 to November 15, 2007, when this area is normally closed to the DGN fishery.

NMFS recognizes that the DGN fishery is the primary fishery for swordfish and thresher sharks landed in west coast ports. To that extent, the agency was initially supportive of using the DGN EFP for generating new information pertaining to the question of whether the original time/area closure may have been excessive. However, a recent peer-reviewed scientific article by NMFS and California State University scientists presents the results of a study spanning over a decade of research that documents the importance of nearshore waters off the U. S. West Coast for foraging leatherback turtles[1]. The study indicates that due to a combination of oceanographic processes supporting favorable habitat for leatherback turtle prey such as jellyfish, nearshore waters off California are a vital foraging area for some western Pacific leatherbacks from one of the two largest of the remaining breeding populations in the Pacific. The article also notes that similar processes that concentrate dense and larger jellyfish in nearshore retention areas have been reported off Oregon.

NMFS is concerned about threats to leatherback sea turtles within the migratory pathways to and from these apparently critical nearshore waters if the DGN EFP were to be issued. The PLCA includes waters utilized by leatherbacks traveling to and from these nearshore foraging areas Currently, the migratory paths of leatherbacks are not sufficiently defined to allow for modification of the PLCA. Further, of the 23 observed

[1] Benson, S. R, K. A. Forney , J. T. Harvey, J. V. Carretta, and P. H. Dutton. In press. Abundance, distribution, and habitat of leatherback turtles (Dermochelys coriacea) off California, 1990-2003. Fishery Bulletin.

leatherback entanglements in the DGN fishery from 1990 through the present, 19 occurred within the PLCA. Sixty percent of the entanglements resulted in immediate mortality. Based on the condition reported by NMFS observers of those leatherbacks disentangled and released alive, NMFS estimates another 10 percent estimated mortality. Thus, NMFS approximates a total mortality rate for leatherbacks in the DGN fishery at 70 percent.

I am mindful of the innovative technical modifications the DGN industry has undertaken over the years to limit bycatch and reduce marine mammal bycatch including suspending nets 36 feet below the surface and adding pingers. While these efforts have effectively reduced marine mammal bycatch, there is no direct evidence suggesting that these measures have successfully reduced leatherback turtle bycatch.

In consideration of the potential for leatherback sea turtle mortalities that would result if the EFP were approved, NMFS does not intend to issue the proposed DGN EFP. At the same time, NMFS is aware of the strong demand for swordfish by U. S. consumers. Similarly, it also recognizes that efforts to inhibit U. S. fisheries targeting high market value species such as swordfish may only transfer ecosystem impacts to other, possibly less regulated fisheries and areas of the world. Consequently, NMFS encourages the Council to support those fisheries in its West Coast Highly Migratory Species (HMS) Fishery Management Plan that provide swordfish and other HMS managed species to U.S. consumers by utilizing areas where bycatch is minimized or using more conservative yet economically viable fishing methods. We will also continue to work with industry to find ways to assist them in adopting more conservative methods to meet U. S. demand for competitively priced fresh seafood while conserving protected species.

Sincerely,

Rodney R McInnis

Rodney R. McInnis
Regional Administrator

Cc: William Fox – SWFSC
Bob Lohn - NWR

Agenda Item F.1.c
HMSAS Report
September 2007

HIGHLY MIGRATORY SPECIES ADVISORY SUBPANEL REPORT ON NATIONAL MARINE FISHERIES SERVICE REPORT

NMFS's Rejection of the Drift Gillnet (DGN) Exempted Fishing Permit (EFP)

A majority of the Highly Migratory Species Advisory Subpanel (HMSAS) requests that the Council ask NMFS to reconsider their denial of the DGN EFP. Also, the HMSAS requests that the Council invite Dr. Bill Hogarth to the next HMSAS meeting to answer questions and clarify NMFS's position in regards to the EFP denial.

In the interim consideration should be made of any new modifications to either the EFP or the Pacific Leatherback Conservation Area to mitigate potential problems. The HMSAS also reiterates that the DGN EFP should refocus on economic feasibility.

A minority of the HMSAS (Bob Osborn, United Anglers of Southern California, and Meghan Jeans, Ocean Conservancy) supported NMFS's decision not to issue the DGN EFP recommended by the Council. Instead of further pursuing EFP issuance, the minority recommends that the Council and NMFS explore broader policy options for addressing protected species takes in the DGN fishery.

California Coastal Commission Hearing on the Shallow-set Longline EFP

A majority of the HMSAS is very concerned by the action of the California Coastal Commission (CCC) in determining that the shallow-set longline EFP is not consistent with their goal of protecting coastal marine resources.

The HMSAS received input at their August 14, 2007, meeting and had considerable discussion on the process, managing authority, and validity of the information used by the CCC in making their decision.

The HMSAS brings the following concerns to your attention and requests responses to the issues raised:

1. Who or which government entity is responsible for management of fisheries off the coast of California?

2. Where does the jurisdiction of the CCC extend to in regards to the HMS FMP?

3. The HMSAS requests that NMFS provide the Council with a report on how the science presentation on the proposed shallow-set longline EFP was used by the CCC.

4. HMSAS members at the CCC hearing reported that the CCC and their staff were indifferent to input from both NMFS and industry representatives before and during the EFP consideration. The Highly Migratory Species Management Team (HMSMT) requests that NMFS provide a report on how CCC and their staff reacted to their input. The HMSMT also encourages industry representatives who were at the CCC hearing to report to the Council their views on how the hearing was conducted.

5. Going forward, what system of communication should be established between our government agencies so the public view us working together and not against each other.

A minority of the HMSAS (Bob Osborn, United Anglers of Southern California, and Meghan Jeans, Ocean Conservancy) felt that the CCC consistency hearing on the proposed shallow-set longline EFP was warranted and conducted in a balanced and open manner.

PFMC
08/23/07

HIGHLY MIGRATORY SPECIES MANAGEMENT TEAM REPORT ON NATIONAL MARINE FISHERIES SERVICE REPORT

The Highly Migratory Species Management Team (HMSMT) discussed the recent decision by the California Coastal Commission (Commission) to unanimously reject the shallow-set longline exempted fishing permit (EFP) application as inconsistent with the California Coastal Zone Management Act. The HMSMT strongly disagrees with the Commission's decision based on the testimony presented at the August 10, 2007, Commission hearing by NMFS staff, the EFP applicant Pete Dupuy, and other supportive testimony. The HMSMT is concerned over the precedent that this decision might set and recommends that the Council send a letter to the Commission requesting that the factual basis and analytical criteria used to reach their final decision be explained in writing to the Council.

The HMSMT also recommends that the Council request a full briefing from the appropriate DOC and/or NOAA legal counsel on the ramifications that may stem from this decision and the potential next course of action. These ramifications include increased Commission scrutiny on present and future Council and/or NMFS fishery management actions. The HMSMT recommends that the Council also request an explanation of the role that NOAA's National Ocean Service played in the review and decision making process for this action. In particular, the Service's decision granting the Commission permission to undertake a full review of this action even though the proposed action area (40-200 nautical miles offshore) is well outside the Commission's state waters jurisdiction (0-3 nm).

After reviewing the pertinent correspondence and discussions related to the Commission's review, it was apparent to the HMSMT that the facts and merits of the EFP application and associated draft Environmental Assessment document were not appropriately considered nor summarized in the final Commission staff report. As a result, the HMSMT believes that the Commission's staff report was flawed, including a number of serious factual errors, and that a full reconsideration of the EFP application by the Commission, based strictly on the merits and impacts of the proposed action, should be granted. The HMSMT recommends that the Council convey this desire in writing to the Commission at their earliest convenience.

The HMSMT was briefed by NMFS staff on pre-hearing meetings that took place between NMFS scientists and managers and Commission staff to provide a comprehensive and well-documented response to a lengthy list of Commission staff questions relating to the proposed action. Based on review of the documented response, the HMSMT believes that the NMFS staff addressed all of the technical and scientific concerns raised. The HMSMT concluded that the final decision by the Commission was based largely on speculation and discounted the scientific and technical merits and precautionary and conservative measures built into the proposed action. The HMSMT believes that the Commission inappropriately expanded the scope of the proposed action to include considerations of global longlining and protected species impacts and the hypothetical full-scale development and expansion of a West Coast based shallow-set longline fishery within and beyond the U.S. EEZ. That was neither the intent nor the scope of the proposed action that was before the Commission for review.

Even after being fully briefed by NMFS scientists and fisheries managers, the Commission staff continually provided erroneous and misleading information upon which the final decision was likely based. For example, the Commission staff report stated that the level of take of protected species was not adequately established in the proposed action and therefore the EFP would pose a real risk to endangered species. The facts state otherwise. The exposure analysis provided in the environmental assessment (EA) detailed why marine mammal and other protected species interactions would not be reasonably expected to occur under the proposed action based on the best available information. Scientifically-based caps on protected species were included as part of the proposed action thereby establishing exactly what the risks would be.

Further indicative of the misinformation that the Commission staff propagated, a letter was sent to the NOS's Office of Ocean and Coastal Resource Management[1] stating that short-fin pilot whales have been observed entangled in the Hawaii shallow-set longline fishery using identical gear that would be used under the proposed action. The facts state otherwise. Since the Hawaii shallow-set longline fishery switched to circle hooks and mackerel bait beginning mid-season in 2004, there have been no recorded takes of short-fin pilot whales based on 100 percent observer coverage. (Takes have occurred only in the deep-set component of the longline fishery.) The Commission staff report goes on to state that given that short-fin pilot whales are found in same area as would be fished under the EFP, and that they are routinely taken, a high potential for the EFP to take short-fin pilot whales exists. The Commission's assertion that entanglements of short-fin pilot whales are very likely is an erroneous conclusion based on an erroneous assumption.

The Commission staff's report states that the potential biological removal of short-finned pilot whales is 0.98. This is not true and has been addressed in NMFS's response to the Commission staff's request for further information.

The Commission staff report references the 2004 Biological Opinion for the U.S. West Coast HMS Fishery Management Plan and the jeopardy finding for loggerheads due to anticipated takes in the shallow-set longline fishery. The report also mentions that the closure of the shallow-set longline fishery was necessary to conserve leatherbacks. This is misleading. The opinion determined that the then proposed HMS shallow-set longline fishing outside of the U.S. West Coast would jeopardize loggerhead sea turtles, but found no jeopardy to leatherbacks, even with old style gear (i.e., J hooks and squid bait with the associated higher turtle interaction rates). The Commission report fails to mention the 2004 Biological Opinion written for the Hawaii-based shallow-set longline fishery, which found no jeopardy to any sea turtle species for that fishery using gear techniques and methods identical to those in the proposed EFP.

In numerous statements the Commission staff has given the impression that the Pacific Leatherback Conservation Area is a permanent sea turtle marine protected area for all commercial fishery gear types. The facts state otherwise. The Conservation Area was put in place following a Section 7 consultation done in 2000 on the then California and Oregon Drift gillnet fishery. The time and area closure was considered necessary to avoid jeopardizing

[1] July 13, 2007 Letter from Peter Douglas, Executive Director of the California Coastal Commission to David Kennedy, Peter Dupuy, and Rodney McInnis

endangered leatherbacks and applies only to drift gillnet gear. This again highlights the fact that the Commission inappropriately expanded the scope of the proposed action and did not base its final decision on the scientific and technical merits of the proposed action before them. These merits included, among other things, 100 percent observer coverage, limited effort, and very conservative protected species take caps.

PFMC
08/23/07

G:\!PFMC\MEETING\2007\September\HMS\F1 NMFS Rpt HMSMT report.doc

HIGH SEAS LIMITED ENTRY LONGLINE FISHERY

In 2003, the Council submitted the Fishery Management Plan for U.S. West Coast Fisheries for Highly Migratory Species (HMS FMP) to National Marine Fisheries Service (NMFS) for Secretarial Review; it was approved, with the exception of one provision in the FMP that was disapproved: allowing shallow-set longline fishing east of 150° W longitude. (Shallow-set refers to the deployment of the gear so that hooks are at depths of 100 m or less, and is done to target swordfish.) The disapproval was based on the results of a Section 7 consultation and biological opinion pursuant to the Endangered Species Act (ESA), which found that the take of sea turtles, and specifically the leatherback sea turtles, would constitute a jeopardy condition. As a result, regulations were promulgated under the ESA to prohibit this activity.

Around the time of final Council action on the FMP, the Council directed the Highly Migratory Species Management Team (HMSMT) to begin developing options for a limited entry program for the shallow-set longline fishery, principally to address the ESA-related concerns that led to disapproval of the shallow-set longline management measures in the FMP. The HMSMT began work on developing information for a limited entry program, reporting back to the Council twice in 2004. However, since then, the attention of the Council and the HMSMT has been diverted to other issues. The Council last revisited this issue at their June 2005 meeting, establishing an ad hoc Highly Migratory Species Management Committee, composed of Council members, which met once with the HMSMT in October 2005. At the April 2007 Council meeting, the NMFS representative on the Council, Mr. Mark Helvey, requested the Council again take up consideration of measures that would lead to an approvable management framework for the shallow-set longline fishery.

Attachment 1 is a Council staff white paper which reviews past Council action with respect to longline fisheries, describes current management of the West Coast and Hawaii-based fisheries, discusses protected species issues, and lays out some alternatives for addressing the current situation. This information is intended to help the Council to consider whether and how to reinitiate development of approvable management measures for a West Coast shallow-set longline fishery.

Attachment 2 is a Federal Register notice that the Western Pacific Fishery Management Council intends to prepare a supplemental environmental impact statement (SEIS) on federal management of the Hawaii-based shallow-set pelagic longline fishery in the western Pacific. The SEIS will consider alternatives that include elimination of the current effort cap on the fishery and changing the current system of caps on the take of leatherback and loggerhead sea turtles. The action is likely to trigger a reinitiation of consultation under Section 7 of the ESA. If the proposed modifications result in higher sea turtle take levels in the Hawaii fishery, and is not found to cause jeopardy under the ESA, this could affect the approvability of any action the Pacific Council might propose to establish a management framework for a West Coast shallow-set longline fishery. According to the notice, written scoping comments must be received by September 20, 2007.

Council Task:

1. **Decide whether to reinitiate development of management measures for the high seas shallow-set longline fishery.**
2. **Discuss general schedule for Council decision-making.**
3. **Provide direction to the HMSMT and Highly Migratory Species Advisory Subpanel (HMSAS) on a range of preliminary alternatives, including the development of a limited entry program.**

Reference Materials:

1. Agenda Item F.2.a, Attachment 1: Implementing a Management Framework for a High Seas Shallow-set Longline Fishery; A PFMC Staff White Paper.
2. Agenda Item F.2.a, Attachment 2: 72 FR 46608, Notice of Intent to Prepare a Supplemental Environmental Impact Statement.
3. Agenda Item F.2.b, HMSMT Report.
4. Agenda Item F.2.b, HMSAS Report.

Agenda Order:

a. Agenda Item Overview — Kit Dahl
b. Reports and Comments of Advisory Bodies
c. Public Comment
d. **Council Action**: Consider Need, Planning and Potential Options Necessary to Include this Fishery in the HMS FMP

PFMC
08/23/07

Implementing a Management Framework for a High Seas Shallow-set Longline Fishery A PFMC Staff White Paper

Introduction

At the April 2007 Council meeting the NMFS representative, Mark Helvey, requested the Council again consider developing measures to address the portion of the Fishery Management Plan for U.S. West Coast Fisheries for Highly Migratory Species (HMS FMP) that was disapproved by National Marine Fisheries Service (NMFS), which relates to shallow-set longline fishing on the high seas outside of the West Coast EEZ. Shallow-set refers to the deployment of the gear so that hooks are at depths of 100 m or less, and is done to target swordfish. (This contrasts with deep-set longline where the gear is set deeper than 100 meters to target tunas, see 50 CFR 660.712(a)(9).[1]) As a result of the disapproval shallow-set longline fishing is currently prohibited under the HMS FMP. (The FMP and pursuant regulations prohibit all longline fishing within the West Coast EEZ. This was an element of Council's preferred alternative which was approved by NMFS.)

This paper reviews Council action with respect to longline fisheries, describes current management of the West Coast and Hawaii-based fisheries, discusses protected species issues, and lays out alternatives for addressing the current situation.

Chronology of PFMC Activities Related to the High Seas Shallow-set Longline Fishery

The Council began work on the HMS FMP in 2001. Prior to adoption of the HMS FMP, management of the West-Coast-based shallow-set longline (SSLL) fishery outside the EEZ was limited to the High Seas Fishing Compliance Act and fishermen were not subject to restrictions applied to Hawaii-based longline vessels. The Council adopted preferred alternatives defining elements of the FMP in November 2002. For longline fishing outside the EEZ they adopted Alternative 2 as their preferred alternative:

> …[A]ll of the restrictions applied to Hawaii-based longline vessels would also apply to West Coast based longline vessels when fishing west of 150° W longitude. However, West Coast-based longline vessels fishing east of 150° W longitude would only be subject to *selected* restrictions. This would allow West Coast-based vessels to target swordfish east of that line… (HMS FMP FEIS, Ch.8 Pg. 32)

At that time (2002) the restrictions applied to Hawaii-based vessels included a prohibition on shallow-set longline to target swordfish. (Hawaii-based vessels are those fishing under a limited entry permit issued pursuant to the Western Pacific Fishery Management Council's [WPFMC] FMP for the Pelagic Fisheries of the Western Pacific Region, referred to as a Hawaii permit.)

---

[1] Regulations governing the Hawaii-based longline fishery define *deep-set or deep-setting* without specifying deployment below 100 m., see 50 CFR 660.12.

Thus the Council's intent was to prohibit shallow set longline fishing west of 150° W longitude but permit it east of that line. [2] At the time of the Council action the NMFS representative on the Council warned that the provision to allow shallow-set longlining on the high seas east of 150° W longitude might not be approved because of potential impacts to sea turtles, particularly loggerhead sea turtles, which are listed as threatened under the Endangered Species Act (ESA). Based on a request from the NMFS Southwest Region Administrator, the Council agreed to delay submission of the FMP for Secretarial review while more information was developed about incidental take rates of turtles by SSLL gear on either side of the 150° W longitude line. This information was presented to the Council in June 2003 by Jim Carretta of the NMFS Southwest Fisheries Science Center (Carretta 2003). After discussion at the June 2003 meeting, the Council chose not to modify the preferred alternative. The HMS FMP FEIS was published in August 2003 and submitted for Secretarial review. On February 4, 2004, NMFS notified the Council that it had partially approved the FMP, disapproving the provision allowing shallow-set longlining on the high seas east of 150° W longitude, based on the results of a section 7 consultation and BO pursuant to the ESA:

> The Biological Opinion (BO) resulting from the consultation concluded that, if allowed to make shallow sets in the waters east of 150° W longitude at recent effort levels, the longline fishery would take turtles at levels that would appreciably reduce the likelihood of survival and recovery of at least one species of sea turtle. Therefore, that provision has been disapproved as not being consistent with the ESA, meaning the FMP does not comply with "other applicable law." (Letter from Rodney McInnis to Donald Hanson, February 4, 2004, Attachment 1 to this paper)

NMFS took two actions it considered necessary to protect ESA-listed sea turtles, in conformance with the BO. Concurrently to partially approving the HMS FMP, NMFS also promulgated regulations pursuant to the ESA implementing the prohibition on shallow-set longline fishing east of 150° W longitude by anyone "not operating under a western Pacific longline permit under §660.21" (50 CFR 223.206(d)(9)). The ESA-related regulations became effective April 12, 2004 (69 FR 11540), shortly before the HMS FMP regulations came into place (69 FR 18444, effective date May 7, 2004). As discussed in more detail below, at this time the WPFMC established a regulatory framework for a "model fishery," which again allowed shallow-set longline fishing for Hawaii-permitted vessels, subject to a variety of mitigation measures (69 FR 17329; effective date April 2, 2004). Thus, almost simultaneously the legal status of the Hawaii- and West Coast-based fisheries reversed: As of April 2004 only Hawaii permit holders were permitted to deploy shallow-set longline gear; fishers required to have an HMS FMP permit were prohibited from shallow-set fishing. (Prior to HMS FMP implementation there were no regulations prohibiting shallow-set longline fishing by vessels not registered to a Hawaii permit. Their activities were only regulated under the High Seas Fishing Compliance Act. As a consequence, prior to 2004, many Hawaii vessels de-registered from their permits and moved to the West Coast, where they could legally shallow-set longline.) Furthermore, the current regulations allow Hawaii permit holders to land swordfish (caught with shallow-set longline) on the West Coast and even to make trips that both originate from and return to West Coast ports. Given that a significant component of historical landings of longline-caught swordfish on the West Coast was made by fishermen possessing a Hawaii permit, some of the practical impediments to a West Coast fishery may be alleviated if willing Hawaii permit holders can prosecute a fishery that delivers product into West

[2] As discussed below, the management regime for the Hawaii-based shallow-set fishery subsequently changed. This raises the question of whether the current FMP-based prohibition on shallow-set longline fishing *west* of 150° W longitude is consistent with the intent of the alternative as then proposed.

Coast markets. (There is still a logistical problem because Hawaii-permitted vessels using SSLL gear are subject to 100 percent observer coverage in the shallow-set fishery. The observer program is administered by the NMFS Pacific Regional Office and such activity could require transporting embarking/disembarking observers to/from the West Coast.[3])

The Hawaii model fishery employs mitigation measures tested in the Atlantic 2001–03, which showed substantial reduction in the incidental take of sea turtles (Watson, *et al.* 2005). In the February 4, 2004, letter partially approving the HMS FMP, Rodney McInnnis noted the results of those studies and the pending regulatory amendment opening the Hawaii fishery and stated:

> I recommend that the Council direct its management team to review this information and to begin developing and analyzing alternative sets of comparable conservation measures under which a longline fishery off the west coast might be able to target swordfish with low levels of marine turtle takes. This could include consideration of limited longline fishing for swordfish with effort limits, gear and bait requirements, time/area limits, turtle take limits, or other measures that would limit sea turtle mortality to low levels approximating those that had previously been found in the drift gillnet fishery not to result in jeopardy to any listed sea turtles.

As described above, at their June 2003 meeting, the Council decided not to modify the preferred alternative; however, understanding that the SSLL component may be disapproved, they also directed the HMSMT (then the HMSPDT) to:

> …look at a limited entry program for the California-based high seas pelagic longline fishery and report their findings to the Council at the November 2003 meeting. The scope of the initial work should include a control date, qualifying period, qualifying landings, the issue of a capacity goal, and permit transferability issues. (Minutes of the 169th Council meeting, page 53)

The HMSMT reported to the Council in November 2003 on their initial findings (Exhibit G.2.c, HMSMT Report, November 2003, Attachment 2 to this paper). They pointed out that the rationale for a limited entry program is principally to address ESA-related issues (the projected sea turtle incidental takes that prompted subsequent partial disapproval of the HMS FMP). They recommended development of a "joint Biological Opinion" covering both a West Coast fishery and a Hawaii permitted fishery and "joint program design and cooperative management of these shared HMS and turtle stocks and vessels between the Council and the WPFMC" (HMSMT Report, page 2). The Council formally initiated an FMP amendment process to consider a limited entry program at this meeting. The HMSMT again reported at the April and September 2004 Council meetings with additional information relevant to the development of a limited entry program. At these two meetings, discussion turned to several related issues that diluted the effort to further develop a limited entry program. Foremost, HMS FMP funding support was uncertain, calling into question whether resources were available to pursue these activities. Recognizing the difficulty inherent in implementing a limited entry program, the Council discussed developing a regulatory framework to allow a shallow-set longline fishery outside the EEZ without license

[3] Only one Hawaii-permitted vessel has made a West Coast landing since 2004. This occurred in March 2006 when the fishery closed due to sea turtle interactions (Pers. Comm. Kevin Busscher, PIRO Observer Program). Upon closure of the fishery the skipper decided to land in Los Angeles because market prices were better. However, a March 9, 2007, letter from John Gibbs to Rodney McInnnis indicated his interest in fishing out of the West Coast for swordfish and tuna. He possesses a Hawaii permit and could therefore do so.

limitation. Management of the drift gillnet (DGN) fishery also became a concern because the 2001 implementation of a time-area closure to mitigate takes of leatherback sea turtles was having a substantial economic impact on the fishery. Related to this, there was some discussion of developing mechanisms to allow a switch from drift gillnet to longline gear, recognizing that DGN gear likely results in higher incidental mortality of protected species. (Both gear types principally target swordfish.) Any such mechanism would necessarily require a framework to allow shallow-set longlining outside the EEZ. However, the size and configuration of drift gillnet vessels makes it unlikely that existing vessels could be fitted for distant water fishing beyond the EEZ. Public comments indicated few DGN fishermen would likely switch gear types to fish outside the EEZ.

The last time the Council revisited the question of establishing a regulatory framework for the shallow-set fishery was at the June 2005 meeting. Council discussion mainly revolved around increasing cooperation and communication with the WPFMC in order to address the issue jointly. Although the HMSMT proposed a schedule for Council decision-making on a limited entry program, the Council was not inclined to pursue the issue unilaterally and aggressively. An ad hoc committee was formed, the Highly Migratory Species Management Committee (Mr. Phil Anderson, Mr. Donald K. Hansen, Mr. Mark Helvey, Ms. Marija Vojkovich), which met jointly with the HMSMT on October 4, 2005. The group developed several recommendations, which are summarized here:

- Investigate combined WPFMC and PFMC management of pelagic fisheries with assistance from NMFS (HQ, SWR, PIRO) to coordinate such an effort.

- Evaluate the feasibility of an area-restricted high seas SSLL fishery, such as east of 140° W longitude (as was suggested in previously in reports and recommendations), using the types of gear modifications and other mitigation measures used in the Hawaii model fishery. Such an approach could be initially evaluated with an EFP or addressed directly through an FMP/regulatory amendment.

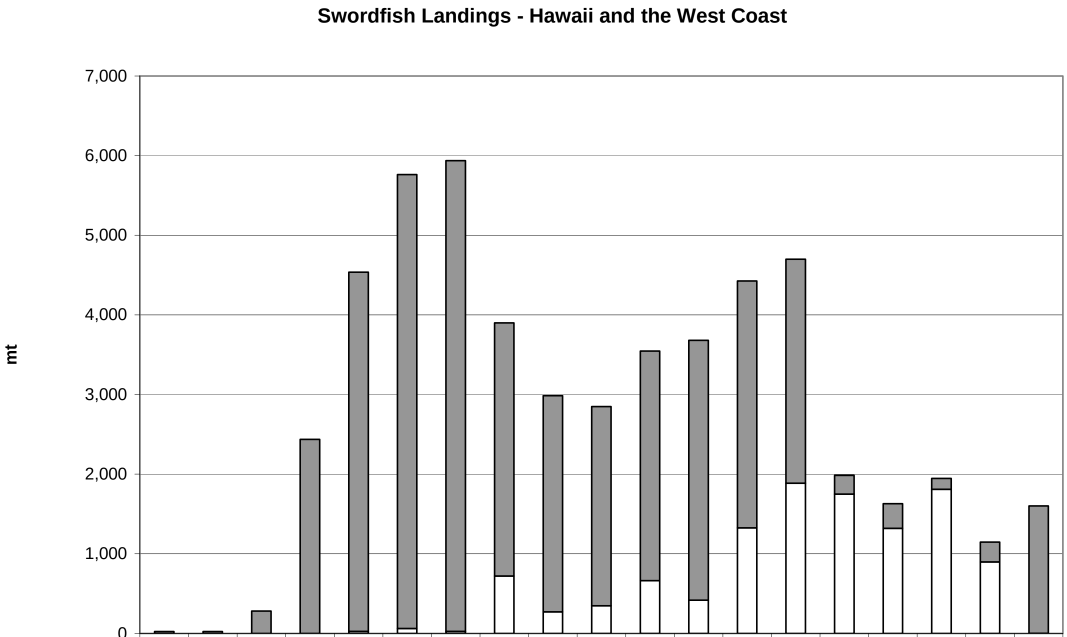
- Evaluate the utility of limited entry for the longline fishery (both shallow and deep set).

The Council has not subsequently pursued the issue of establishing a viable regulatory framework for a shallow-set fishery or development of a limited entry program. This is due to several factors: Council and advisory body workload, with other issues taking precedence; the problems of developing and coordinating an ESA-driven management framework covering both the West Coast and Hawaii; and the lack of strong pressure from longline fishers to re-open a West Coast opportunity. The last factor may be due to the re-opening of the Hawaii fishery—with Hawaii-permitted vessels traditionally being a large component of the West Coast fleet—and their ability to landings on the West Coast if they choose to do so.

Background on the Hawaii and West Coast Longline Fisheries and Current Situation

Section 2.2.5 from the HMS FMP FEIS (PFMC 2003) describes the development of longline fisheries in Hawaii and on the West Coast through 2001. Longline fisheries in both Hawaii and California expanded substantially in the 1990s with the arrival of vessels from the East Coast and Gulf of Mexico. As shown in Figure 1, throughout the 1990s longline-caught swordfish landings in Hawaii were larger than West Coast landings. Looking at combined landings, on average Hawaii accounted for 90 percent of annual landings from 1990 to 1999. Table 1 and Figure 2 show the species composition of longline landings on the West Coast. Swordfish accounted for 65 percent of annual landings, on average, for the same period, although the proportion increased from 2000 through 2004, likely representing the shift of the Hawaii fleet to California in response to litigation-induced regulatory changes in Hawaii. The HMS FMP summarizes these developments as follows:

> In August 2000, as the result of the case *Center for Marine Conservation vs. NMFS*, a federal district court issued an order directing the NMFS to complete an Environmental Impact Statement (EIS) to assess the environmental impacts of fishing activities conducted under the Fishery Management Plan for Pelagic Fisheries of the Western Pacific Region by April 1, 2001, and ordered restrictions and closures over millions of square miles of the Hawaiian longline fishery's usual and accustomed fishing grounds. These court ordered closures effectively eliminated the swordfish fishery. As a result, some Hawaiian longline permit holders de-registered their vessels from the permit, and proceeded to fish from California ports, as was their custom during this time of year [generally, the fourth and first quarters].
>
> NMFS completed the EIS in March, 2001, and, consistent with a Biological Opinion that was issued at the same time, NMFS found it necessary to implement measures for the protection of endangered and threatened sea turtles. Such measures included a prohibition against targeting swordfish north of the equator by Hawaiian longline vessels, and prohibits longline fishing by Hawaiian longline vessels in waters south of the Hawaiian Islands from 15^{o} N latitude to the equator, and from 145^{o} W longitude to 180^{o} longitude during the months of April and May. This decision is being challenged in a lawsuit filed by the Hawaiian Longline Association. As of July 2001, about 20 Hawaiian longline vessels sit idle in San Pedro Harbor. (PFMC 2003, Ch 2, Pg 21)



	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Hawaii	23.59	24	281	2437	4508	5700	5909	3176	2713	2502	2881	3263	3100	2813	235	309	136	249	1600
West Coast		1			27	63	27	722	271	346	663	418	1325	1885	1749	1320	1810	898	1

Year

Figure 1. Hawaii and West Coast swordfish landings. (Sources: 2006 HMS SAFE, 2006 Pelagics Annual Report.)

Table 1. West Coast landings in the high seas longline fishery. (Source: 2006 HMS SAFE, Table 4–13.)

	Swordfish		Sharks		Tunas		Dorado		Non-HMS		Total
	Mt	% total	Mt	% total	Mt	% total	Mt	% total	Mt	% total	Mt
1981	0.5	0.4%	75.8%	91	26	21.7%	0	0.0%	2.5	2.1%	120
1982	0.5	0.7%	35.7%	25	43	61.4%	0.5	0.7%	1	1.4%	70
1983	0.5	2.6%	18.4%	3.5	9	47.4%	0.5	2.6%	5.5	28.9%	19
1984	12	40.0%	18.3%	5.5	4	13.3%	3	10.0%	5.5	18.3%	30
1985	0.5	4.2%	16.7%	2	0.5	4.2%	0	0.0%	9	75.0%	12
1986	0	0.0%	26.9%	3.5	0	0.0%	0	0.0%	9.5	73.1%	13
1987	0	0.0%	8.2%	4	0.5	1.0%	0	0.0%	44.5	90.8%	49
1988	0.5	0.3%	82.8%	154	0.5	0.3%	0	0.0%	31	16.7%	186
1989	0	0.0%	92.3%	6	0	0.0%	0	0.0%	0.5	7.7%	5
1990	0	0.0%	86.7%	19.5	1.5	6.7%	0	0.0%	1.5	6.7%	20
1991	27	37.0%	32.9%	24	2.5	3.4%	0.5	0.7%	19	26.0%	73
1992	63	69.2%	5.5%	5	1.5	1.6%	0	0.0%	21.5	23.6%	91
1993	27	71.1%	5.3%	2	5.5	14.5%	1	2.6%	2.5	6.6%	38
1994	722	77.5%	5.8%	54	105	11.3%	32	3.4%	19	2.0%	932
1995	271	72.1%	6.4%	24	62	16.5%	5	1.3%	14	3.7%	376
1996	346	77.9%	1.7%	7.5	71	16.0%	9	2.0%	10.5	2.4%	444
1997	663	83.3%	1.2%	9.5	89	11.2%	1	0.1%	33.5	4.2%	796
1998	418	74.5%	1.3%	7.5	105	18.7%	1	0.2%	29.5	5.3%	561
1999	1325	83.5%	0.8%	12	227	14.3%	17	1.1%	5	0.3%	1586
2000	1885	90.5%	0.6%	12.5	121	5.8%	41	2.0%	24.5	1.2%	2084
2001	1749	89.7%	1.5%	30	95	4.9%	15	0.8%	60	3.1%	1949
2002	1320	94.8%	3.3%	46	13	0.9%	0.5	0.0%	13.5	1.0%	1393
2003	1810	97.7%	0.2%	3.5	31	1.7%	1	0.1%	7.5	0.4%	1853
2004	898	94.4%	0.4%	3.5	33	3.5%	1	0.1%	15.5	1.6%	951
2005	[redacted]										

2005 data redacted for confidentiality reasons.

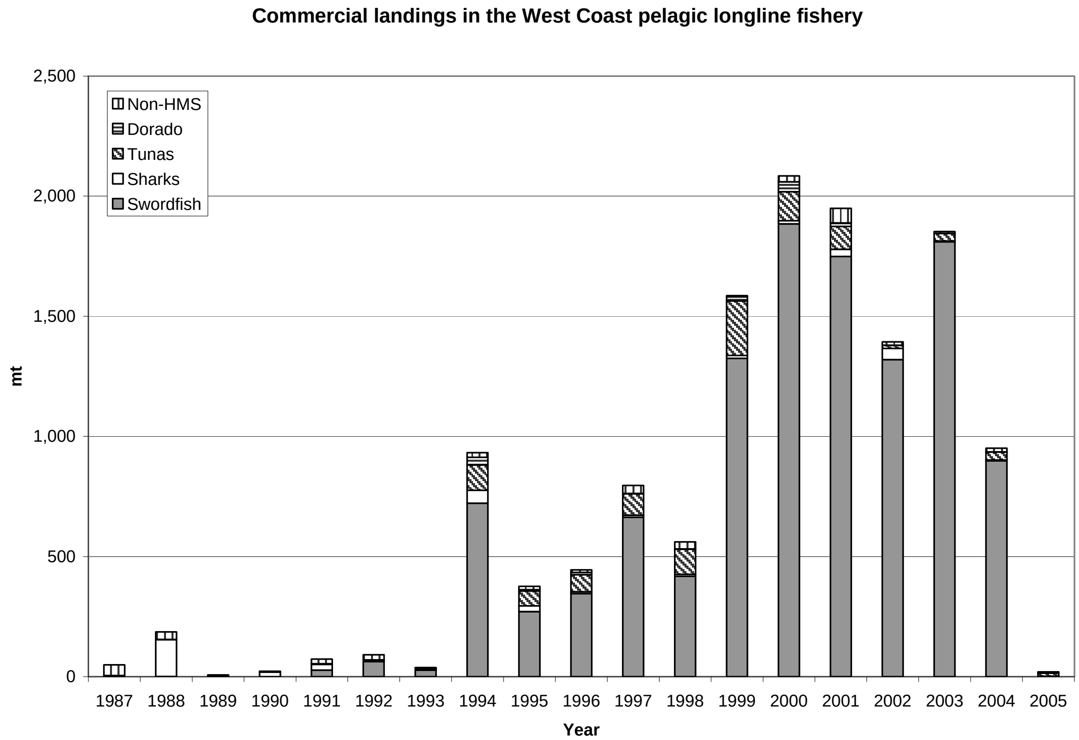


Figure 2. West Coast landings in the high seas longline fishery.

In response to the litigation referenced above, in 2003 the Federal Court vacated on procedural grounds a BO upon which the then current shallow-set longline closure was based. In October the Court stayed the execution of their order until April 1, 2004, in order to give NMFS time to develop a new BO and institute a more permanent regulatory framework. Concurrently, the WPFMC was preparing an EIS to evaluate new measures for the longline fishery, based on the results of trials in the Atlantic demonstrating that the use of offset circle hooks, mackerel-type bait, and other measures (such as setting in water below 68° F) could substantially reduce sea turtle takes. Along with limits on total annual effort these measures would constitute the model fishery intended to test their efficacy for the Hawaii fleet. Initially the WPFMC developed this proposal as an emergency action, but with the Court's stay, the Council shifted this effort to a regulatory amendment to implement a long-term management framework. As discussed above this regulatory framework was implemented on April 2, 2004. Attachment 3 excerpts the summary section of the regulatory amendment, describing the measures put in place.

In addition to the gear restrictions, the Hawaii regulatory framework for its shallow-set fishery established take caps for leatherback and loggerhead sea turtles and a limit on the number sets that could be made annually. The take caps were based on the incidental take statement prepared pursuant to the section 7 consultation on the regulatory amendment. Table 2 shows the caps and the number of takes in each year since 2004. The fishery reached the take cap for loggerheads early in 2006 and shut down in March due to high level of fishing effort in the first quarter (Gilman, *et al.* 2006). Fishing effort is limited to 2,120 sets annually; this effort limit is distributed equally to all permit holders responding to an annual solicitation in the form of certificates, which are freely tradable among permit holders.

Table 2. Leatherback and loggerhead sea turtle interactions in the shallow-set component of the Hawaii-based longline fishery.

	Leatherback	Loggerhead
Annual limit	16	17
2007 (as of July 2)	6	14
2006	1	17*
2005	8	12
2004	1	1

*The Hawaii shallow-set longline fishery reached the 2006 annual interaction limit of 17 loggerheads. As a result, the fishery was closed on March 20, 2006.
Source: http://www.fpir.noaa.gov/SFD/SFD_turtleint.html#numberscaught, accessed July 11, 2007.

A recent development relevant to the shallow-set fishery is the Council's recommendation, at their April 2007 meeting, that NMFS issue an exempted fishing permit (EFP) for a single vessel to fish with shallow-set longline gear inside the West Coast EEZ. The purpose is to test longline gear as a viable alternative to DGN gear. This proposal originates from Alternative 4 for pelagic longline fishery management measures inside the West Coast EEZ in the HMS FMP FEIS (PFMC 2003, Ch. 8 Pp. 31-32). The proposal under that alternative (which was not adopted as preferred) would have allowed a "limited entry pelagic longline fishery for tunas and swordfish within the EEZ, with effort and area restrictions, to evaluate longline gear as an alternative to drift gillnet gear to reduce bycatch or bycatch mortality and protected species interactions," with the limited entry provision addressed in a separate plan amendment. A maximum of 10 DGN-permitted vessels would have been allowed in the SSLL EFP fishery as described in the FEIS. The EFP currently under consideration is a more modest proposal involving a single vessel fishing within a single year (September to December 2007), although the results from the first year would be used to consider subsequent EFPs, presumably with more vessels participating. The vessel participating in the EFP fishery would be subject to the same sorts of mitigation measures under which the Hawaii fishery operates (e.g., offset circle hooks, mackerel-type bait, night setting, an effort limit, caps on sea turtle takes). Ultimately, the results could be used to establish some sort of limited shallow-set longline fishery targeting swordfish within the EEZ as an alternative to the current DGN fishery, similar to what was proposed in Alternative 4.

ESA Issues Related to Implementing a Management Framework for a West Coast Shallow-set Longline Fishery

A West Coast shallow-set longline fishery is currently constrained because of the potential for incidental take of ESA-listed sea turtles, specifically loggerheads and leatherbacks. As noted above, and stated in the BO for the HMS FMP, the closure of this fishery is pursuant to the ESA:

> NOAA Fisheries, Protected Resources Division, Southwest Region proposes to use Secretarial authority under 11(f) of the ESA … to promulgate regulations in the West Coast-based longline fishery … to ensure the fishery complies with the ESA. (Biological Opinion, p. 40)

The BO also states:

> We begin our analyses with an implicit understanding that the sea turtles considered in this Opinion are threatened with global extinction by a wide array of human activities and natural phenomena … We also recognize that some of these other human activities and natural phenomena pose a much larger and more serious threat to the survival and

> recovery of threatened and endangered species than the HMS [FMP] fisheries. For example, many foreign fishing fleets have substantially larger, adverse effects on threatened and endangered sea turtle populations in the Pacific Ocean than U.S. fishing fleets. We recognize that we will not be able to recover threatened and endangered species without addressing the full range of human activities and natural phenomena that have caused these species to decline or could cause these species to become extinct in the foreseeable future….
>
> Nevertheless, our task in this consultation is not to identify the various risks contributing to the endangerment of listed marine species, rank them according to relative significance, and address them according to ranked order. Our task in a consultation is simpler: identify the direct and indirect effects of the HMS fisheries managed under the HMS FMP to determine if the proposed management regime is likely to *contribute* to the endangerment of threatened and endangered species by appreciably reducing their likelihood of both surviving and recovering in the wild. (Pp. 46–47, emphasis in original)

A BO is prepared under section 7 of the ESA, which requires federal agencies, in consultation with and with the assistance of the Secretary of Commerce,[4] to insure that their actions are not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of critical habitat that has been designated for those species (section 7(a)(2)).[5] Regulations implementing section 7 of the ESA define the term "jeopardize the continued existence of," to paraphrase, as reduce appreciably the likelihood of survival and recovery of a species in the wild by reducing reproduction, population size, or distribution of a listed species (50 CFR 402.02). The BO is "a written statement setting forth the Secretary's opinion" as to whether a Federal action is likely to jeopardize listed species or destroy or adversely modify critical habitat as described in section 7(b) of the ESA. The BO may set forth reasonable and prudent measures or alternatives that *must* be complied with, and as noted above, section 11(f) authorizes the Secretary to promulgate regulations "as may be appropriate to enforce this act."

These facts underscore several points related to how the process of implementing a shallow-set management regime could interact with the ESA:

- An agency must propose an action and determine whether the action is likely to adversely affect listed species; if it does, formal section 7 consultation is triggered. Thus when the Council takes final action (by choosing a preferred alternative for example) there may be some uncertainty as to whether that action is approvable (i.e., whether or not it is likely to result in jeopardy to listed species). Consultation within NMFS is required of any action likely to adversely affect marine mammals, sea turtles, or salmonids, and for seabirds, the U.S. Fish and Wildlife Service. There are mechanisms available to provide preliminary information about the approvability of an action if NMFS is the consulting agency. Also, a BO cannot be prepared independent of an agency proposing some federal action.

- A consultation only considers the effects of the subject proposed action (when added to the environmental baseline and considering the status of the species); it is not a

4 In the case of most marine species; NMFS' Protected Resources Division (PRD) is the consulting agency. Thus the Sustainable Fisheries Division consults with PRD in the case of fisheries actions. Marine birds and otters are covered by FWS.

5 According the HMS FMP Biological Opinion, no critical habitat for any sea turtles occurs within the action area of the FMP.

mechanism to initiate other, separate actions. However, the consultation can impose reasonable and prudent alternatives to the proposed action to avoid jeopardy. For example, a consultation on an action under the HMS FMP may consider the effects of other U.S. fisheries (such as the Hawaii longline fishery) but cannot trigger changes in the management of those other fisheries (i.e., to reduce expected takes of ESA-listed species).

- A consultation for a new proposed action considers both existing sources of mortality (as part of the environmental baseline and status of the species evaluation) and any additional mortality estimated to occur as a result of the new action. Thus, a Council proposed action for the SSLL fishery would be considered as "new" mortality added to the existing level of "no jeopardy" take in other U.S. fisheries for which consultations have been completed (and non-U.S. actions not subject to the ESA). Depending on the increase in mortality that is estimated, the outcome of the jeopardy analysis in the consultation for the new action could result in it not being approved under the ESA. Thus the ESA framework, in a sense, favors those actions that are first through the door since a new action adds to the morality already estimated for the baseline, which includes existing actions. On the other hand, evidence of lower than expected mortality from actions considered in the baseline or an overall improvement in the status of the stock (for example improved reproductive success) could also affect the jeopardy analysis, making a given level of mortality estimated for the proposed action less likely to result in a jeopardy determination.

- Currently, the only regulations applicable to SSLL fishery east of 150° W longitude are promulgated pursuant to section 11(f) of the ESA—50 CFR 223.206(d)(9) prohibiting shallow-set longlining east of 150° W longitude. A proposed action to complete the HMS FMP, applicable to SSLL fishing east of 150° W longitude, would be promulgated under the Magnuson-Stevens Act (MSA) and implementing regulations would then be published at 50 CFR, part 660, subpart K. If the action contained sufficient mitigation measures so as to not cause jeopardy, as determined by consultation, the MSA action would be approved under Secretarial review, the HMS FMP would be amended, pursuant regulations implemented, and the ESA regulations removed, as they would no longer be necessary.

The provision in the Hawaii model fishery establishing take caps for leatherback and loggerhead sea turtles tends to lead fishery managers to the issue of allocation. In other words, is there a way to consider how the "pool" of sea turtle mortality can be divided (or re-divided) amongst various fisheries? However, this line of reasoning may be ultimately unproductive because of the difference between the MSA's mandate to "prevent overfishing while achieving … optimum yield" versus the ESA's mandate to insure an action is "not likely to jeopardize the continued existence" of ESA-listed species.[6] In the one instance mortality is "optimized" and allocation represents a decision about the resulting division of the social benefits of harvest. In the other, mortality is an unintended consequence that is determined acceptable within the legal mandate. There is thus no legal and procedural framework within which "allocation" of ESA-listed species takes can be considered. Furthermore, without closely coordinated action there is no way to effect changes that trigger an evaluation (consultation) under ESA that could have an effect similar to allocation (e.g., proposed measures resulting in a reduction in expected takes in one

[6] Of note, section 7 of the ESA also mandates that federal agencies utilize their authority in furtherance of the purposes of the ESA and carry out programs for the conservation of listed species (section 7(a)).

fishery affecting the no jeopardy take level in the other fishery). For fisheries under different jurisdictions this is likely to be impossible.

Alternative Management Frameworks for a West Coast Shallow-set Longline Fishery

Broadly, the Council has three options in considering a management framework for the shallow-set longline fishery. First, all management could be effectively ceded to the WPFMC, which is the status quo. Second, the Council could independently propose a management framework containing measures judged to result in a no jeopardy determination. Third, the Council could seek to develop a formal decision-making framework for joint management of a shallow-set longline fishery by the PFMC and WPFMC.

Status Quo

The status quo has been described above. Vessels in possession of a Hawaii limited entry permit may land fish on the West Coast. This offers at least the potential for a West Coast based fishery should any Hawaii permit holders wish to make deliveries into West Coast ports. Furthermore, there are latent permits; in theory an individual wishing to prosecute a West Coast fishery could purchase one of these permits in order to participate.

The main constraint to fishing under the status quo relates to the seasonality of a West Coast fishery, which normally occurs in the fall and winter quarters. Because of the sea turtle take caps and set limits applied to the Hawaii fishery, in which most effort occurs in the first and second quarters of the year, it is unlikely that there will be much fishing opportunity available by the last two quarters of the year. For example, in 2006, the Hawaii based SSLL fishery was closed in March because it reached the loggerhead cap (see Table 2). As of July 11, 2007, 14 loggerheads have been taken in the Hawaii SSLL, three below the cap of 17 loggerheads. Although an individual could accumulate set certificates (the mechanism for limiting effort) to fish SSLL in the fall from the U.S. West Coast, there is no guarantee of when the remaining three loggerheads may be taken, thus shutting down the fishery either before the last quarter of the year or before fishermen can use the certificates. Furthermore, because set certificates are tradable, there may have some monetary value that would be lost if the turtle take cap is reached before the certificates can be utilized. This creates the potential for “derby” conditions where fishermen will seek to maximize their fishing opportunity before the take caps are reached.

Under status quo the Pacific Council has no authority to modify the management measures for the Hawaii SSLL fishery. However, the PFMC could request the WPFMC to make modifications, such as allocating the take caps and/or set certificates on a seasonal basis. To some degree this is a chicken and egg problem. If there is not a substantial segment of fishery participants desiring the opportunity to land into the West Coast there will be little pressure to modify the management framework to accommodate them. On the other hand, without such an opportunity in hand there may be little interest in committing to such a fishing strategy. Furthermore, such a change could trigger a reinitiation of the section 7 consultation with uncertain consequences.

A West Coast Model Fishery without License Limitation

A West Coast model shallow-set fishery would likely include the same mitigation measures as the Hawaii-based fishery. These include:

- 100 percent observer coverage

- Use of 18/0 or larger circle hooks with 10 degree offset

- Use of mackerel-type bait

- Updating current sea turtle take mitigation measures at 50 CFR 660.712(b) to be consistent with like mitigation measures for the Hawaii fishery at 50 CFR 660.32, including the turtle de-hooking device requirement

- Require night setting

- Manage the effort with take caps for sea turtles (and for other protected species if appropriate)

- Direct effort limits implemented through set certificates or similar mechanism, likely based on some measure historical effort, recognizing West Coast participation by Hawaii-permitted vessels

In general some form of effort limitation must be implemented to establish a viable and approvable West Coast fishery. Without any limits there would be greater uncertainty about the likely number of incidental sea turtle takes, which would be a factor in a section 7 consultation. In lieu of limited entry indirect measures, such as time and/or area limits, could be investigated as a way of reducing expected sea turtle takes to a no jeopardy level.[7] The problem with indirect measures is that there would be a much higher likelihood of derby-style conditions as discussed above, assuming that take caps were a feature of the management framework, since participation would be unconstrained. Furthermore, a relatively small pool of potential revenue would likely be dissipated across a larger, less optimal number of participants. Another approach would be to limit participation directly through the use of set certificates, which could be distributed annually to HMS permit holders meeting specified qualifications. The qualifications would likely be similar to those that would be used to establish a limited entry program, such as West Coast landings history. In evaluating this option one consideration would be whether such qualifying criteria would be any easier to establish than implementing a full-blown limited entry program. Alternatively an aggregate effort cap could be established with the fishery closing for the season when effort by all participants reaches the cap. However, this would likely promote derby conditions with "fishing against the effort cap."

A key issue would be the approvability of the action in terms of the ESA jeopardy standard. As discussed above, one question would be whether any expected increase in sea turtle mortalities from current levels would pass the no jeopardy standard. The level of takes in the Hawaii SSLL fishery would be part of the baseline against which a Pacific Council SSLL proposed action would be considered. Thus, even if the estimated mortality from a West Coast SSLL fishery was lower than that occurring in the Hawaii fishery, its additive effect could still factor in a jeopardy determination. As discussed above, the Hawaii fishery is "first through the door" in terms of the jeopardy analysis. One question is whether there could be any element in a Pacific Council proposed action that would either trigger a simultaneous re-initiation of consultation for the Hawaii fishery or a joint consultation covering both fisheries. This type of process could result in

[7] Time-area closures as a mitigation measure—for example to close known sea turtle "hotspots"—also could be used in conjunction with a limited entry program.

adjustments in the management framework for the Hawaii SSLL fishery to compensate for the effects of a new West Coast SSLL fishing opportunity. However, there is no obvious mechanism whereby unilateral action by the Pacific Council would trigger such a re-initiation or joint consultation covering the Hawaii fishery. Although the NMFS Pacific Island Regional Office could request re-initiation in response to Pacific Council action, because of changed circumstances in the action area for the Hawaii SSLL fishery, it would be extremely unlikely that they would do so.

A West Coast Model Fishery with License Limitation

A limited entry program would include the same features of a model fishery described above and also license limitation. A key consideration in developing a limited entry program is establishing the qualifying criteria for who will get a license. The HMSMT's 2004 report referenced above provides a good starting point for developing alternatives, although the data would need to be updated. The basic decision in developing a limited entry program is establishing qualifying criteria; such criteria may include a window period (a time period during which landings must have been made) and a minimum landing requirement during the window period. These two basic concepts can be elaborated with further qualifications, such as the number of years in which landings were made, formulae for determining minimum landings that include dropping low-catch years, etc. (The reader is referred to options in the groundfish trawl rationalization process for examples of various qualifications.) For example, a recent participation provision could be added based on the HMS control date of March 9, 2000.

According to the HMSMT report, the baseline is 92 vessels meeting the criteria established at that time. (Of these 92, ninety made landings in the 1993–2002 period; the criteria that would account for the additional two vessels is not explained.) (Since the West Coast fishery closed in 2004 an option would be to extend the window period through 2003, although this is unlikely to increase the baseline count of vessels.) Of these, 37 were registered for a Hawaii permit in 2002. (Since a number of vessels deregistered from their Hawaii permit in order to fish out of the West Coast during the 2001–03 period when the Hawaii shallow-set fishery was closed, this may under-represent the number of Hawaii-permitted vessels that made landings on the West Coast during the window period.) A West Coast limited entry permit would be required to land longline-caught swordfish on the West Coast, but if the qualifying criteria are independent of permit status (e.g., based on historical landings), it is likely that most Hawaii-permitted vessels that participated in a West Coast fishery would qualify. Alternatively, the West Coast limited entry program could be parallel to the Hawaii permits, i.e., Hawaii permit holders would be specifically excluded from qualifying for a West Coast permit, but would still be permitted to land swordfish on the West Coast. This arrangement would basically add a pool of license holders to the current number of Hawaii permit holders, who can legally land shallow-set-caught swordfish on the West Coast. According to the HMSMT report, 53 vessels not holding a Hawaii permit in 2002 made landings during the window period. This gives an indication of the pool that could potentially qualify for such a parallel license.

Table 3 shows the number of vessels by total landings in the window period grouped in 25 mt increments. For each increment the table shows the number of vessels, cumulative number of vessels and percent, and the number of vessels with landings above the minimum value for each increment (the inverse of the cumulative number). This last column gives an indication of the number of vessels that could qualify with increasing minimum landings requirements and is a rough-and-ready estimate of how a minimum landings requirement would affect the number qualifying for permits.

Table 3. Number of vessels by landings category. (Data source: Exhibit G.3.a, Attachment 1, April 2004.)

Total landings 1993-2002 (mt)	Number of vessels	Cumulative number of vessels	Cumulative percent	Number of vessels with landings above category minimum
0-24	36	36	40%	90
25-49	14	50	56%	54
50-74	5	55	61%	40
75-99	10	65	72%	35
100-124	5	70	78%	25
125-149	2	72	80%	20
150-174	2	74	82%	18
175-199	1	75	83%	16
200-224	0	75	83%	15
225-249	3	78	87%	15
250-274	6	84	93%	12
275-299	1	85	94%	6
300-324	3	88	98%	5
325-349	0	88	98%	2
350-374	1	89	99%	2
375-400	1	90	100%	1

Another consideration is whether the limited entry program applies to longline fishing generally, including deep-setting (targeting tunas) or only to a shallow-set fishery. Historically, there has been little or no deep-set longline fishing out of the West Coast, although currently a single vessel is doing so. Given the lack, historically, of a very active fishery using this strategy and the lower protected species impacts, the rationale for license limitation for this segment is weaker. On the other hand, from an administrative and enforcement standpoint it may make more sense to apply the license limitation to the gear type generally rather than trying to distinguish between shallow- and deep-set components. Another alternative would be to endorse permits so that the different segments could be managed accordingly (this would be consistent with the proposal, discussed below, for creating a special class of permits for current DGN limited entry permit holders). If a limited entry permit were to apply to longline gear generally the qualification criteria might need to modified, if there are any potential participants having a history of substantial longline-caught landings of species other than swordfish.

DGN Options for a Limited Entry Program

The California DGN fishery also targets swordfish. DGN gear is fished within the West Coast EEZ, while the HMS FMP only allows longline gear to be used outside the EEZ. Observer records from both of these fisheries indicate that the numbers of marine mammal species and individuals interacting with DGN gear are higher than the numbers of species and individuals interacting with longline gear, although this may be linked to the differences in areas fished (i.e., higher abundance of marine mammals within the EEZ than outside the EEZ). Observed mortality rates of sea turtles are quite a bit higher in the DGN fishery than in the modified SSLL fisheries being prosecuted in Hawaii and the Atlantic. There is thus a reason to encourage willing participants to transition from one gear type to the other. However, as noted above, most DGN vessels are not big enough or configured properly to readily fish far offshore, outside the EEZ. (According to the data in the 2004 HMSMT report, seven of the 92 vessels making longline landings also possessed a 2002 MMPA DGN authorization and of these seven, two were also registered for a Hawaii longline permit in 2002.) The investment required to retrofit a vessel, or purchase a new one, may not be justified by the economic return of fishing with longline gear on the high seas. In relation to this issue the Council recommended NMFS issue an EFP to test the feasibility of shallow-set longline within the EEZ as a viable alternative to DGN gear. The long-term objective is to determine whether willing DGN participants could transition to longline gear for fishing inside the EEZ. Use of longline gear inside the West Coast EEZ is currently prohibited under the HMS FMP, thus necessitating an EFP to gather information to determine whether fishing inside the EEZ would be feasible. This suggests an option with a phase-in period. A special class of limited entry permits could be created; to qualify one would have to possess a California DGN limited entry permit which they would have to surrender to obtain the limited entry longline permit. Initially this special class would be no different than the general limited entry permit, only allowing the permit holder to fish with shallow-set longline gear outside the EEZ. However, if the Council were to amend the FMP to set up such a framework, this class of permit holders would be allowed to also fish inside the EEZ. Initially few, if any, DGN permit holders would be willing to surrender a DGN permit for a longline limited entry permit. However, if the program allowed permit conversion to occur at any time, DGN permit holders might consider conversion at a time when the permit class they qualify for allows fishing inside the EEZ.

A number of issues would have to be resolved to further develop this concept. First, if, as is likely, there is a substantial pool of latent DGN permits, a permit holder could surrender a DGN permit and then purchase another, unless further restrictions could be applied. Since the underlying premise in establishing such a scheme is to permanently transition DGN gear to longline gear, the intent would be to prevent holding dual permits. A second related issue is the design of such conditions. If made too onerous there would be little incentive to transition. In particular, the advantages of fishing with longline gear inside the EEZ would have to be amply demonstrated in order for DGN permit holders to be willing to surrender their permit.

If the hypothesis that shallow-set longline gear results in a lower take and mortality rate for sea turtles and if a transition from DGN to longline gear were large enough, such a management action could reduce overall U.S. sea turtle takes in the eastern Pacific. Thus, even though this scheme could increase the pool of those eligible to fish with shallow-set longline gear (i.e., both those with a history of shallow-set fishing and those using DGN but with no shallow-set history) it might be approvable under the ESA. (Obviously, considerably more analysis would be required to get a better indication of whether such an action would be approvable.)

Joint Management

The third, and possibly most difficult, approach would be to seek joint management of the shallow-set fishery by the WPFMC and the PFMC. As an example from another region, the New England and Mid-Atlantic Councils jointly administer a monkfish FMP (see http://www.nefmc.org/monk/summary/fmp.pdf). A special committee comprising members from each council administers the plan. Since both the WPFMC and PFMC have already implemented FMPs that deal with a shallow-set fishery this approach would likely require a coordinated effort to amend the respective FMPs to establish a common decision-making framework. Because there is no active West Coast SSLL fishery and the WPFMC recently established their model fishery the impetus for the WPFMC to cede some amount of management authority over what is effectively a Hawaii-based fishery would seem to be low. Even if there was a willingness to explore joint management it would be costly to set up and administer, given the travel distances involved. On the other hand, a joint management framework would be more seamless, with a single set of rules and procedures covering what would likely be a single fishery with a common set of participants.

An important adjunct to the WPFMC's model SSLL fishery is their Sea Turtle Program, intended to foster research- and conservation-related activities. This is a form of mitigation to address other sources of sea turtle mortality, recognizing that the Hawaii SSLL has sea turtle takes. The WPFMC employs a program coordinator, and established a Turtle Advisor Committee comprising scientific experts who make recommendations on research and conservation activities. The program has also sponsored a series of workshops to bring together experts and develop conservation initiatives. As stated in a program description,[8] "…the [Turtle Advisory Committee] concluded that the [Western Pacific] Council's conservation efforts be directed towards international projects with a focus on those species which are of greatest likelihood to interact with the Hawaii-based longline fishery, namely loggerhead and leatherback turtles." As part of a joint management program, or implementation of unilateral management measures for a West Coast SSLL fishery, the Pacific Council could consider a similar mitigation that would complement or supplement the WPFMC program.

Questions to be Answered and Additional Information Needed to Further Develop Alternatives

- Update data/analysis in the April 2004 HMSMT Report (see Exhibit G.3.a, Attachment 1).

- What is the historical seasonality of West Coast longline swordfish catch and landings (e.g., monthly cpue/landings totals during window period)? This would help inform decisions about establishing seasonal closures to concentrate effort during the period of highest catch/landings.

- What information is there about the distribution of sea turtles ("hotspots") that could be used to consider closed areas to lower the risk of incidental takes?

- What was the historical effort level in the West Coast fishery? This would help inform a decision on an effort cap similar to the Hawaii model fishery.

- Is there sufficient data to re-conduct the analysis of geographic distribution (east versus west of 150° W longitude) of sea turtle take rates provided by Jim Carretta at the June 2003 Council meeting (see Exhibit F.2.b, NMFS Report)? This could inform decisions about possible area restrictions.

- What would be the appropriate number of participants and/or effort cap based on best estimates of sea turtle bycatch rates in a model fishery?

- What procedures and circumstances would lead to a joint section 7 consultation covering both a new West Coast SSLL fishery and the existing Hawaii SSLL fishery? What are the implications or possible outcomes of such a consultation?

- What are the views of DGN fishers with respect to switching to SSLL gear and fishing either outside or inside the West Coast EEZ?

[8] http://www.wpcouncil.org/protected/Documents/WPCouncilTurtleProgramArticle.pdf

Attachments

Attachment 1: February 4, 2004 letter from Rodney McInnis to Donald Hanson describing partial approval of the HMS FMP.

Attachment 2: Exhibit G.2.c, HMSMT Report, November 2003

Attachment 3: Executive Summary from the WPFMC's regulatory amendment, Management Measures to Implement New Technologies for the Western Pacific Pelagic Longline Fisheries

References

Gilman, E., .D.Kobayashi, T Swenartion, P.Dalzell, I.Kinan, and N.Brothers. 2006. Analyses of observer data fro the Hawaii-based longline fishery. Pohnpei, FSM: Western and Central Pacific Fisheries Commission. WCPFC-SC2-2006/EB IP-1.

PFMC (Pacific Fishery Management Council). 2003. Final management plan and environmental impact statement for U.S. west coast fisheries for highly migratory species. Portland, OR: PFMC. Aug. 2003.

Watson, J. W., Sheryan P.Epperly, Arvind K.Shah, and Daniel G.Foster. 2005. Fishing methods to reduce sea turtle mortality associated with pelagic longlines. Can. J. Fish. Aquat. Sci. 62:965-981.

Attachment 1

Exhibit G.2.a
Attachment 1
April 2004

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Region
501 West Ocean Boulevard, Suite 4200
Long Beach, California 90802- 4213

FEB - 4 2004

F/SWR2:SF

RECEIVED
FEB 12 2004
PFMC

Mr. Donald Hanson, Chairman
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 200
Portland, Oregon 97220-1384

Dear Mr. Hanson:

I am pleased to inform you that, with the exception of one provision, I have approved the Pacific Fishery Management Council's proposed Fishery Management Plan for U.S. West Coast Highly Migratory Species (FMP). There is broad agreement that this FMP is a major step forward toward effective management of these important west coast fisheries and resources. Notwithstanding the provision disapproved, I compliment you and the Council on both the quality of the FMP and the open and collaborative process by which the FMP was developed.

The provision that I have disapproved would have allowed shallow-set longline fishing by west coast-based vessels targeting swordfish in waters beyond the U.S. exclusive economic zone (EEZ) east of 150° W. longitude. The FMP would prohibit longline fishing in the EEZ off the west coast, and would prohibit the longline fishery from making shallow sets to target swordfish sets in waters beyond the EEZ and west of 150° W. longitude. At the time the Council adopted the FMP, the Council had been provided with information about potential impacts of the fishery on endangered and threatened sea turtles if fishing shallow set longline fishing strategy were adopted and about the likelihood of FMP disapproval on this basis.

During review of the proposed FMP, the National Marine Fisheries Service (NOAA Fisheries) initiated consultations under section 7 of the Endangered Species Act (ESA) to determine if the levels of takes and mortalities that were projected to occur in the fishery under the Council's proposed management program would appreciably reduce the likelihood of survival and recovery of listed species of sea turtles. Shallow-set longline fishing has been shown to have high rates of interaction with sea turtles (especially loggerhead and leatherback sea turtles). Currently, all west coast longline vessels (approximately 20 vessels) fish in this manner. The Biological Opinion (BO) resulting from the consultation concluded that, if allowed to make shallow sets in the waters east of 150° W. longitude at recent effort levels, the longline fishery would take turtles at levels that would appreciably reduce the likelihood of survival and recovery of at least one species of sea turtle. Therefore, that provision has been disapproved as not being consistent with the ESA, meaning that the FMP does not comply with "other applicable law" (section 303(a)(1)(C) of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act)). A copy of the BO will be provided to the Council under separate cover.

NOAA Fisheries has separately published (68 FR 70219, December 17, 2003) a proposed rule under the authority of the ESA that would prohibit shallow sets in the waters east of 150° W. longitude. This was published prior to action on the FMP to ensure that, if the review of the Council's FMP concluded that its proposed management program would be inadequate, then NOAA Fisheries would have corrective regulations in place until the Council could make the necessary changes to its management program. Under this approach, the ESA regulations could be implemented at the same time as the FMP implementing regulations if they were deemed necessary after the section 7 consultation and action on the proposed FMP. In fact, this rule is now deemed necessary. The BO concluded that the fisheries as they would operate under the conservation and management measures of the FMP, and the ESA companion rule would not jeopardize the continued existence of any species of sea turtle. NOAA Fisheries will therefore proceed to finalize this rule on the same time track as the final rule for the FMP.

The Magnuson-Stevens Act (section 304(a)(1)) requires that, if an FMP is disapproved in part or in whole, the Council must be advised of actions it can take to correct the FMP. The following information is provided to satisfy this requirement.

First, NOAA Fisheries is very pleased with the results of recent research in the Atlantic Ocean regarding the use of alternative gear and bait combinations in longline fishing to reduce sea turtle interactions and consequent injury or mortality to sea turtles. A copy of the news release summarizing the achievements of that research is enclosed. The research concluded that encounters with leatherback and loggerhead turtles in the Atlantic Ocean can be reduced by 65 to 90 percent by switching the type of hook and bait from the traditional "J" style hook with squid to a large, circular hook with mackerel. In addition, the nature of hookings is less damaging as the large hooks are far less likely to be deeply swallowed and lethal. In addition, new de-hooking and release devices and techniques have been developed, further reducing the likelihood of major injury to or death of turtles. NOAA Fisheries is actively promoting adoption of this new gear in the international arena given that this is a global problem. NOAA Fisheries also plans to undertake additional research into the use of this gear in longline tuna fishing, which also is known to have sea turtle interactions.

Second, in January 2004, NOAA Fisheries convened 17 experts in the areas of biology, veterinary medicine, anatomy/physiology, satellite telemetry, and longline gear deployment for a Workshop on Marine Turtle Longline Post-Interaction Mortality. These experts presented and discussed recent data available on the survival and mortality of sea turtles subsequent to being hooked by fishing gear. Based on the data gathered during that workshop, NOAA Fisheries revised its February 2001 post-hooking mortality criteria. The Southwest Region will work with its observer contractor to make sure that future observers collect more detailed interaction information to better support application of this new policy.

Third, new regulations to govern the longline fishery for the Hawaii-based fleet are needed by April 1, 2004, in response to a court decision. The Western Pacific Fishery Management Council has submitted a proposal (summary enclosed) that would allow shallow longline sets targeting swordfish but that proposes to limit sea turtle takes and mortality through a combination of fleet effort limits, transferable vessel effort limits, a requirement to use circle hooks and mackerel bait, a limit on estimated sea turtle takes, in the fishery based on observer records, and other measures. This proposal is being reviewed by NOAA Fisheries, and a section 7 consultation is underway. I will advise the Pacific Council of the results of the consultation and NOAA Fisheries' action on this proposal.

I believe this information will be very useful to the Council in considering adjustments to its fishery management regime that can allow fishing without jeopardizing any ESA listed species. NOAA Fisheries' action on the Western Pacific Council's proposal has implications for potential approvability of similar approaches for the west coast longline fishery. I recommend that the Council direct its management team to review this information and to begin developing and analyzing alternative sets of comparable conservation and management measures under which the longline fishery off the west coast might be able to target swordfish with low levels of marine turtle takes. This could include consideration of limited longline fishing for swordfish with effort limits, gear and bait requirements, time/area limits, turtle take limits, or other measures that would limit sea turtle mortality to low levels approximating those that had previously been found in the drift gillnet fishery not to result in jeopardy to any listed sea turtles. I commit the Southwest Region to work closely with the Council and its advisory bodies as well as to coordinate with the Pacific Islands Region and the Office of Protected Resources to the extent possible to ensure that the best scientific information available is used in developing and evaluating the potential impacts of alternative approaches.

Again, congratulations to the Council on developing this new FMP. I look forward to working closely with you and your staff and the states to implement this FMP, and will report on our progress as it occurs.

Sincerely,

Rodney R McInnis

Rodney R. McInnis
Acting Regional Administrator

Enclosures
cc: F - W. Hogarth
F/NWR - B. Lohn
GCSW - J. Feder
GCNW - E. Cooney
F/NWR - B. Robinson
F/PIR - S. Pooley

HIGHLY MIGRATORY SPECIES MANAGEMENT TEAM REPORT REGARDING HIGH SEAS LONGLINE LIMITED ENTRY AND OTHER ISSUES

The Highly Migratory Species Management Team (HMSMT) met October 1-2, 2003 to discuss initial considerations for a limited entry program for the high seas longline fishery. The HMSMT provides the following comments about considerations for and development of limited entry.

1. Limited Entry Considerations

The Pacific Fishery Management Council (Council) had charged the HMSMT to evaluate limited entry for the West Coast pelagic longline fishery. Dr. Sam Herrick provided an initial evaluation to the HMSMT on a range of potential qualifying window periods and minimum landing requirements. It was suggested that qualifying periods ending on the Council established control date, March 9, 2000, be included.

The initial information included records of vessels with landings of highly migratory species (HMS) in the PacFIN database. This includes the years 1981-2002. The HMSMT discussed the need to resolve PacFIN data issues, notably given the apparently very high number of vessels with HMS landing during the 1981-2002 period (i.e., 402 vessels). It was noted that some of these could be mis-recorded landings from the California-based setnet fishery.

The HMSMT discussed additional information that would be needed, including allowable take of sea turtles (from the section 7 consultation), target catch, vessel size, gear used, length of gear, and number of hooks.

In addition to landings history, permits held by a vessel could be a measure used to determine eligibility. It was noted that most vessels landing HMS into West Coast ports hold (or held) Western Pacific Fishery Management Council (WPFMC) pelagic fishery permits. Before the Biological Opinion for the WPFMC-managed fishery, WPFMC permitted vessels could land swordfish into West Coast ports (generally, California). After the Biological Opinion prohibited WPFMC permitted vessels from targeting swordfish, many of these vessels surrendered/transferred their permits. These vessels continued to target swordfish, which were then landed into West Coast ports (generally, California).

If the main qualifying criteria were past West Coast HMS landings and possession of a WPFMC-permit, California-based drift gillnet fishermen (without longline landings history) and WPFMC-permitted vessels without landings history would not qualify.

The HMSMT notes that the limited entry program will be predicated on turtle interactions, rather than on swordfish or tuna resource concerns or economic considerations. The range of options must be predicated on sea turtle conservation.

The HMSMT also notes:

- A time line is needed for initial analysis and development of preliminary alternatives.

- The first measure of eligibility could be based on West Coast landings history.

- Measures of fishing capacity should include total number of hooks, not just vessel hold capacity or gross tonnage.

- The relevant capacity concern may be turtles rather than swordfish or tunas.

- Limited entry might first limit the number of vessels and then distribute the number of hooks.

- There is a need for a reciprocal landings agreement with WPFMC. Currently, Hawaii-based vessels can land on the West Coast, but West Coast vessels land into WPFMC management area ports.

The HMSMT briefly discussed management alternatives that could provide for drift gillnet fishers to switch to pelagic longline on the high seas. This could be a way for the two fisheries to operate without a net increase in turtle impacts. However, switching would be limited to those drift gillnet vessels large enough to work on the high seas.

2. Common Biological Opinion between Council and WPFMC

The HMSMT reiterates the recommendation made at the June 2003 Council meeting that a joint Biological Opinion is necessary between the West Coast and Western Pacific (Hawaii). The HMSMT also recommends joint program design and cooperative management of these shared HMS and turtle stocks and vessels between the Council and WPFMC. The current approach of separate Biological Opinion treats fisheries in isolation, which is inappropriate given the characteristics of the fishery – many of the same vessels in both fisheries, same gear used, same markets, same stocks of fish, same stocks of sea turtles. All Council and WPFMC fisheries that impact sea turtles should be considered.

A Biological Opinion for a specific fishery considers the full range of impacts (including other fisheries) on the sea turtle population. However, reasonable and prudent alternatives are set for the specific fishery. It might be better to develop comprehensive reasonable and prudent alternatives for the suite of fisheries. The lack of comprehensive alternatives results in an implicit allocation of allowable turtle takes among the various fisheries. Balancing allowable turtle takes among various fisheries appears hindered by the fishery-specific Biological Opinion process. There also exists a potential for double counting of effort and turtle takes with the Council and WPFMC Biological Opinions if there is not a common Biological Opinion.

This appears to be a prime opportunity for a joint/comprehensive Biological Opinion. The recent decision in the Hawaii Longline Association lawsuit vacated the previous WPFMC Biological

Opinion. A Biological Opinion is needed for the HMS fishery management plan (FMP). These two factors provide an incentive to conduct a Biological Opinion that covers the full range of HMS fisheries that impact the same stock of turtles.

NMFS appears resistant to the comprehensive Biological Opinion approach. Clarification as to whether this is true, and if yes, would be helpful.

3. Data Sources

The HMSMT noted that, while discussing operational aspects of a limited entry fishery and the Biological Opinions is interesting and useful, it is premature to formulate specific options. The first task is to identify, compile, refine, and analyze the available data. The available data, in large part, will dictate the types of management options that could be analyzed. To that end, the HMSMT discussed what data are available.

- PacFIN (1981-present). Based on fish tickets. Needs to be refined/filtered to focus on high seas pelagic longline participants with Pacific Coast landings. For example, there is no gear code for California-based pelagic longline landings. This necessitates the use of proxies, such as gear/area/species landed. It was also suggested to use some measure of species composition percentage as and estimate of what species or species groups were targeted.

- NMFS observer data (Fall 2002 - May 2003). Provides species composition, number of hooks, number of sets, bycatch, area fished, and length of set (miles of gear). There is information from 13 observed trips from one season. This includes some cost and earnings data.

- California and High Seas Fishing Compliance Act (HSFCA) high seas longline logbooks (1995 - present). These could provide information on recent versus historic effort.

- WPFMC-based longline logbooks.

- Recent (informal) socioeconomic survey information.

4. Qualifying Criteria Measures

The following could be used to determining eligibility:

- Participation over time – landings, number of trips, years, number of hooks, etc.

- Fishery dependence.

- Catch composition (possibly including protected species takes) over time.

- Vessel size/capacity.

5. Data Necessary for Analysis

The time series of vessels and landings into West Coast ports from high seas longline fishing up to control date (and to present) would be used. Time series should also include information before and after WPFMC swordfish-style set prohibition. Data needed to perform the analysis include:

- Landings per trip – broken out by swordfish, tuna (other than albacore), albacore, and other HMS (dorado, sharks).
- Vessel size/length.
- U.S. Coast Guard documented – yes/no.
- Number of hooks per trip.
- Length of gear per trip.
- Number of trips by year.
- Amount (mt) landed per trip.
- WPFMC permit – yes/no.
- Revenue information.
- Measures of relative dependence – by vessel. For example, revenues derived from HMS as part of total Pacific Coast landings; and Pacific Coast HMS landings as part of total HMS landings (WPFMC and Council).
- Time line of management events that could have influenced participation.

6. Other Items Discussed

Specific to the March 9, 2000 control date, fishing patterns before and after the control date should be reviewed to determine effect on participation. It is possible, given other events and actions affecting Pacific-based HMS fisheries, the control date had relatively little effect.

In developing the limited entry program, the HMSMT will need to have access to data used for the Biological Opinion and its underlying assumptions and analytical methods. There is a need to know how the Biological Opinion defines "current" fleet. There should be consistent data used in Biological Opinion and HMSMT limited entry program analysis.

The need to account for the combined impacts on sea turtles from the various fisheries was discussed extensively. For example, it is conceivable that, under the current Biological Opinion process, the section 7 consultation and jeopardy determination for Council-based longline fishery could result in reasonable and prudent alternatives that do not provide for any additional allowable takes of sea turtles (relative to what is provided for the current fisheries). This would effectively eliminate the Council-based swordfish fishery. Thus, it was suggested there is a strong need for a comprehensive Biological Opinion that covers all areas and all fisheries, and provides take allowances for all fisheries, if possible.

Conversely, at the HMSMT meeting, some members of the public opined that the California-based drift gill net (DGN) fishery and the WPFMC pelagic longline fisheries could be characterized as traditional fisheries. And, thus, should be given priority in take allowances.

7. Summary

The primary need for a limited entry program is driven by protected resources, not economic nor fishery resource concerns.

There is compelling need for the Biological Opinion to be completed prior to development of a limited entry program. First, because the opinion may result in prohibition of swordfish style-sets, which would close the fishery and negate need for limited entry. Second, because the principle driver for limited entry program is to prevent increased sea turtle takes; need results of Biological Opinion to know what allowable levels of takes would be.

Given the nature of the WPFMC and Council fisheries there is a compelling need for a coordinated Biological Opinion, coordinated management, and a coordinated limited entry program. For example, most of the vessels landing HMS into West Coast ports hold (or held) WPFMC pelagic fishery permits. It is unclear under whose jurisdiction these vessels truly fall.

Given that several HMS fisheries (e.g., WPFMC longline, Council longline, Council drift gill net) interact with turtles, there are allocation implications that should be addressed.

Reciprocal fishing arrangements are needed – WPFMC vessels can land into West Coast ports, Council boats can not land into Hawaii.

PFMC
10/21/03

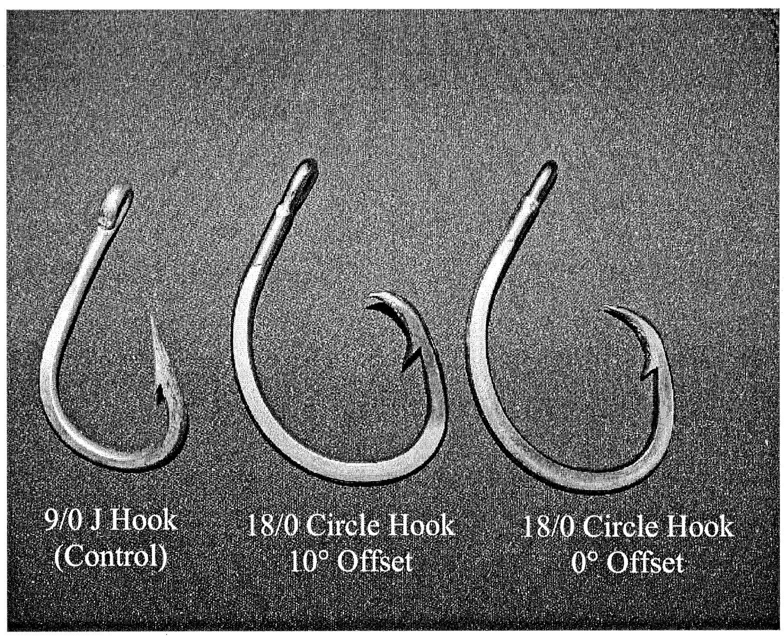
Attachment 3

Western Pacific
Regional Fishery
Management Council

MANAGEMENT MEASURES TO IMPLEMENT NEW TECHNOLOGIES FOR THE WESTERN PACIFIC PELAGIC LONGLINE FISHERIES

A REGULATORY AMENDMENT TO THE FISHERY MANAGEMENT PLAN FOR THE PELAGIC FISHERIES OF THE WESTERN PACIFIC REGION

INCLUDING A FINAL SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT



March 5, 2004

Western Pacific Regional Fishery Management Council
1164 Bishop St, Suite 1400
Honolulu, HI 96813
Telephone: (808) 522-8220
Fax: (808) 522-8226

Western Pacific
Regional Fishery
Management Council

Award #NA03NMF4410017

MANAGEMENT MEASURES TO IMPLEMENT NEW TECHNOLOGIES FOR THE WESTERN PACIFIC PELAGIC LONGLINE FISHERIES

A REGULATORY AMENDMENT
TO THE FISHERY MANAGEMENT PLAN FOR THE
PELAGIC FISHERIES OF THE WESTERN PACIFIC REGION

INCLUDING A FINAL SUPPLEMENTAL
ENVIRONMENTAL IMPACT STATEMENT

Lead Agency:	National Oceanic and Atmospheric Administration National Marine Fisheries Service Pacific Islands Regional Office Honolulu, Hawaii	
Responsible Official:	Samuel Pooley Acting Regional Administrator Pacific Islands Regional Office	
For Further Information Contact:	Alvin Katekaru National Marine Fisheries Service Pacific Islands Regional Office 1601 Kapiolani Blvd., Suite 1110 Honolulu, HI 96814 (808) 973-2937	Kitty Simonds Western Pacific Regional Fishery Management Council 1164 Bishop St., Suite 1400 Honolulu, HI 96813 (808) 522-8220

Abstract: This document considers management measures for the longline fisheries managed under the Pelagic Fisheries Management Plan of the Western Pacific Region, with the objective of achieving optimum yields from these fisheries without being likely to jeopardize the continued existence of sea turtles or other listed species. The range of alternatives includes time/area closures, as well as the implementation of a limited model shallow-set swordfish fishery using circle hooks with mackerel bait which in combination have been found to reduce interactions with leatherback and loggerhead turtles by 67% and 92% respectively in the U.S. Atlantic longline fishery. In addition the document considers a suite of conservation projects to protect sea turtles in their nesting and coastal habitats.

March 5, 2004

2.0 Summary

The regulatory aspects of this amendment to the regulations implementing the Fishery Management Plan for the Pelagics Fisheries of the Western Pacific Region would:

1) Establish an annual limit on the amount of shallow-set longline fishing effort north of the equator that may be collectively exerted by Hawaii-based longline vessels (2,120 shallow-sets per year);
2) divide and distribute this shallow-set effort limit each calendar year in equal portions (in the form of transferable single-set certificates valid for a single calendar year) to all holders of Hawaii longline limited access permits that respond positively to an annual solicitation of interest from NMFS;
3) prohibit any Hawaii-based longline vessel from making more shallow-sets north of the equator during a trip than the number of valid shallow-set certificates on board the vessel;
4) require that operators of Hawaii-based longline vessels submit to the Regional Administrator within 72 hours of each landing of pelagic management unit species one valid shallow-set certificate for every shallow-set made north of the equator during the trip;
5) require that Hawaii-based longline vessels, when making shallow-sets north of the equator, use only circle hooks sized 18/0 or larger with a 10-degree offset;
6) require that Hawaii-based longline vessels, when making shallow-sets north of the equator, use only mackerel-type bait;
7) establish annual limits on the numbers of interactions between leatherback and loggerhead sea turtles and Hawaii-based longline vessels while engaged in shallow-setting (set equal to the annual estimated incidental take for the respective species in the shallow-set component of the Hawaii-based fishery, as established in the prevailing biological opinion issued by the National Marine Fisheries Service (NMFS, also known as NOAA Fisheries) pursuant to section 7 of the Endangered Species Act);
8) establish a procedure for closing the shallow-setting component of the Hawaii-based longline fishery for the remainder of the calendar year when either of the two limits is reached, after giving 1 week advanced notice of such closure to all holders of Hawaii longline limited access permits (the numbers of interactions will be monitored with respect to the limits using year-to-date estimates derived from data recorded by NMFS vessel observers);
9) require that operators of Hawaii-based longline vessels notify NMFS in advance of every trip whether the longline sets made during the trip will involve shallow-setting or deep-setting and require that Hawaii-based longline vessels make sets only of the type declared (i.e., shallow-sets or deep-sets);
10) require that operators of Hawaii-based longline vessels carry and use NMFS-approved de-hooking devices; and
11) require that Hawaii-based longline vessels, when making shallow-sets north of 23° N. start and complete the line-setting procedure during the nighttime (specifically, no earlier than one hour after local sunset and no later than local sunrise).

On March 29, 2001, the National Marine Fisheries Service (NMFS) issued a Biological Opinion under section 7 of the Endangered Species Act for the authorization of fisheries under the Pelagics Fishery Management Plan (FMP) of the Western Pacific Region. The Biological Opinion (BiOp) contained a series of non-discretionary actions (Reasonable and Prudent Alternative) to mitigate interactions between the Hawaii-based longline fishery and sea turtles. At the 110th Council Meeting held June 18-21, 2001, staff of the Western Pacific Regional Fishery Management Council (WPRFMC or Council) were directed to prepare a regulatory amendment recommending implementation of the Reasonable and Prudent Alternative (RPA) as required under the Endangered Species Act (ESA). This recommendation was prepared, and it was implemented by NMFS on June 12, 2002. New measures included a ban on the use of shallow-set swordfish longline fishing north of the equator and a seasonal area closure from 15° N. lat. to the equator and from 145° W. long. to 180° long. during April and May for any longline vessel fishing under the authority of the FMP.

On December 12, 2001, NMFS reinitiated section 7 consultation on the Western Pacific Region's pelagic fishery. This reinitiation was based on new information that could improve the agency's ability to quantify and evaluate the effects of the fishery on listed sea turtle populations, as well the economic impacts of the implementation of the March 2001 RPA. At the conclusion of this reconsultation NMFS issued a new BiOp (November 15, 2002), which maintained the June 12, 2002 regulations including the ban on shallow-setting north of the equator and the April-May southern area closure.

At its 118th meeting in June 2003, the Council reviewed a number of potential modifications to the southern area closure to determine whether modifications could be made to support the economic viability of the fleet without jeopardizing sea turtles. The Council subsequently directed its staff to continue its preparation of a regulatory amendment to the Pelagics FMP containing a further range of alternatives and the impacts of those alternatives on sea turtles, fisheries, and the environment. The Council anticipated selecting a final preferred alternative at its 119th Council meeting, which would then be transmitted to NMFS for review and approval with the intention of implementing this change prior to the 2004 seasonal longline area closure.

However, on August 31, 2003, the Federal Court vacated the 2002 BiOp and the regulations put in place in June 2002. Consequently at its 119th meeting on September 23, 2003, the Council voted to recommend an emergency action which would allow a model swordfish longline fishery north of the equator at 75% of historic (1994-1998 average annual) swordfish levels of effort (sets) in conjunction with fishing experiments that stay within the anticipated takes in the model fishery. The fishery would only be allowed to operate with circle hooks instead of J-hooks and mackerel bait instead of squid, measures proven successful in minimizing leatherback and loggerhead interactions in the Atlantic Ocean. The emergency action would also require mandatory night setting for vessels shallow-setting fishing north of 23° N, implement a "hard limit" for turtle interactions, and would not include any time/area closures. Under this approach, the swordfish fishery would be closed annually upon exceeding its incidental take statement (rather than just reinitiating consultation) or when it reaches its effort limit (75% of historic effort or 3,200 sets). In addition, the Hawaii-based tuna and swordfish fisheries would have separate incidental take statements, the hard limit detailed above would apply only to the swordfish fishery. All longline vessels (tuna and sword) would be obliged to carry and use effective dehooking devices. Finally, a series of non-regulatory conservation measures designed to protect sea turtles on nesting beaches and in coastal waters would be pursued to mitigate fishery impacts. Looking ahead, the Council also created a special advisory committee to include scientists, managers, industry and conservation groups who would work together to develop and recommend to the Council measures for the long-term management of this fishery.

On October 6, 2003, the Federal Court stayed the execution of the August 31, 2003 order until April 1, 2004 to allow NMFS time to develop a new BiOp and hopefully render a more permanent solution than interim or emergency measures. The purpose of this amendment is thus to provide recommended measures for the long-term management of the Hawaii-based longline fishery.

At its 120th meeting (October 20, 2003), the Council rejected a request from NMFS that it withdraw its recommendation for emergency measures (transmitted to NMFS for implementation on October 10, 2003) on the basis that the stay through April 1, 2004 eliminated the need for emergency action. NMFS also requested that the Council work to develop and transmit a complete long-term rule package to NMFS by December 1, 2003 so that it could be processed and implemented by April 1, 2004. In response, the Council directed its staff to continue development of this long-term rule package through a series of meetings of the special advisory committee, workshops and seminars, and preparation of an appropriate NEPA document, with the goal of meeting the December 1 deadline. However, given the abbreviated time available, the Council declined to withdraw the emergency rule package, instead recommended that if the long-term rule package is not completed according to NMFS' schedule, NMFS should process the Council's emergency rule for implementation by April 1, 2004.

The Council's Sea Turtle Conservation Special Advisory Committee held a series of three meetings to craft recommendations for further analysis and possible Council action. Committee membership included representation from fishery managers, scientists, industry, and environmental organizations. The Committee's first two meetings resulted in five potential alternatives that were submitted to NMFS' Office of Protected Resources (OPR) for their review and feedback. At the Committee's third and last meeting, OPR's comments were circulated and discussed. In summary, OPR ranked the proposed action as representing the second lowest risk of the five alternatives considered. This assessment was based on the fact that although other alternatives would have similar anticipated interactions, under the proposed action a greater percent of loggerhead and green turtle interactions would be expected to involve shallow-set longline gear (with circle hooks and mackerel-type bait) which would minimize potential harm to these species.

Because the impetus for this action is concern for fishery interactions with sea turtles, and because the FMP's Hawaii-based longline fishery is the only one thought to interact significantly with sea turtles (see Sections 9.1.4.9 to 9.1.4.11) these alternatives focus on that fishery. No alternatives would allow general longline permit holders to participate in the Hawaii-based longline fishery (meaning to fish in Hawaii's EEZ or to land fish in Hawaii) without obtaining a Hawaii longline limited access permit. Thus, under all alternatives, the management of all other fisheries would remain unchanged, except for general longline permit holders.

This document includes a range of alternatives for the long-term management of the longline fisheries managed under the Council's Pelagics Fishery Management Plan. These alternatives supplement those described in NMFS' 2001 Final Environment Impact Statement (FEIS) for the Pelagic Fisheries of the Western Pacific Region through the examination of an additional range of levels of swordfish fishing, in conjunction with circle hooks and mackerel-type bait which have recently been shown to be effective in reducing sea turtle interactions, while maintaining swordfish catch rates.

A number of alternatives previously considered by the Council are also described in this document, but not analyzed in detail, as the Council's focus for final action at its 121st meeting was those alternatives recently recommended by its Turtle Conservation Special Advisory Committee. Please see the Council's October 9, 2003 document *Emergency Rule Package of the Management of Pelagic Fisheries under the Pelagic Fisheries Management Plan of the Western Pacific Region* for a detailed description and analysis of 18 additional action alternatives recently considered by the Council. A total of six alternatives were recommended for detailed analysis by Committee members, and a seventh, a 'no action' alternative, was added at the request of NMFS' acting Regional Administrator for the Pacific Islands Region. These seven alternatives are the subject of this document. These alternatives range from a tuna only (no swordfish fishing) fishery (Committee Alternative 6), to one in which there are no constraints on swordfish fishing beyond the existing limited entry program and maximum vessel size limits (Alternative 7, the no action alternative). Those aspects of the alternatives related to fishery management are summarized in Table 1, while the non-regulatory continuing conservation measures that are part of all action alternatives are presented in Section 8.2.

On November 25, 2003, the Council held its 121st meeting via teleconference at the Council's Honolulu office. This was an emergency meeting and the measures discussed here were its sole focus. The Council's November 18, 2003 draft document *An Amendment to the Pelagics Fishery Management Plan of the Western Pacific Region, Long-Term Management Measures of the Western Pacific Pelagic Fisheries (Including a Draft Preliminary Draft Supplemental Environmental Impact Statement)* was distributed at this meeting as well as made available on the Council's website. The Council also reviewed the Committee's alternatives and estimates of their relative impacts. The Council's final action on this measure was to recommend that NMFS now allow 2,120 swordfish sets to be made annually by Hawaii longline limited access permit holders to model the use of circle hooks with mackerel-type bait, dehookers and other new technologies shown to reduce and mitigate interactions with sea turtles, in addition to a continued

Table 1. Summary of Hawaii longline fishery management alternatives analyzed in detail for consideration by the Council

Committee Alternative	Tuna Fishery?	Model Swordfish Fishery - with circle hooks and mackerel bait?	Dehooker, (and line cutter, dip net and bolt cutters) required?	Conservation measures?
1	Yes, with no time/area closure	Yes, 1,060 sets annually	Yes	Yes
2	Yes, with no time/area closure	Yes, 1,560 sets	Yes	Yes
3	Yes, with recent time/area closure except for EEZ waters around Palmyra	Yes, 2,120 sets annually	Yes	Yes
4 Preferred Alternative	Yes, with no time/area closure	Yes, 2,120 sets annually	Yes	Yes
5	Yes, with no time/area closure	Yes, 3,179 sets annually	Yes	Yes
6 Current Fishery	Yes, with recent time/area closure	No	Yes, except for dehooker	Yes
7 No Action	Yes, with no time/area closure	Yes, no specific limits	Yes, except for dehooker	No

tuna fishery with no time/area closures, the mandated use of dehookers, and the continuation of a suite of conservation measures (Alternative 4). These conservation measures include protection of potentially affected turtles and eggs at nesting beaches and in coastal foraging waters in various areas throughout the Pacific. Based on information from NMFS' Pacific Islands Fishery Science Center and NMFS' Office of Protected Resources, as well as consideration of the conservation measures that are part of Alternative 4, the Council believes this alternative will best meet this action's objective of achieving optimum yields from the fisheries without jeopardizing sea turtles or other listed species.

All alternatives, apart from Alternative 6, would permit shallow-set swordfish style fishing by vessels with a Western Pacific general longline permit. American Samoa longline vessels currently fish under a general permit, but a limited entry program for this fishery is currently nearing completion. American Samoa vessels could conceivably fish north of the equator and make shallow sets for swordfish but have no history of doing so. Moreover, the American Samoa fleet targets primarily albacore for the two fish canneries in Pago Pago, and there is little to no market for fresh swordfish in American Samoa. More importantly, there is no easy access to markets elsewhere on the U.S. mainland, unlike Hawaii, where most of the swordfish catch was sent. Two general longline permits have been issued in the Mariana Islands, one in Guam and the other in Commonwealth of the Northern Mariana Islands (CNMI). Neither permit is being used to conduct longline fishing from these locations. Based on historical data from other fleets, any longline fishing conducted around the Marianas would target tunas and not swordfish. Vessels with a Western Pacific general permit may not land longline caught fish in Hawaii.

On December 3, 2003 (68 FR 67640), the Council and NMFS published a Supplemental Notice of Intent to prepare the SEIS for this action, along with public notice of a compressed schedule under alternative procedures approved by the Council on Environmental Quality (CEQ). This notice furnished additional information on the need for expedited management action on proposed management measures for the Hawaii-based longline fishery and it's potential impact on protected sea turtle populations. The accelerated management action schedule avoids a lapse in appropriate management measures after April 1, 2004. It further announced the Council and NMFS' intent to apply alternative procedures approved by the CEQ to facilitate completion of the SEIS on the proposed management measures for the Hawaii-based longline fishery for implementation of rules effective by April 1, 2004.

Since the completion of the Draft SEIS for this action, NMFS' Office of Protected Resources completed its section 7 consultation and issued a Biological Opinion on the preferred alternative presented here. That Opinion (attached as Appendix V) concluded that the preferred alternative, in conjunction with three measures which are expected to be implemented through future rule-making within the next year, is not likely to jeopardize the continued existence of sea turtles or other species listed as threatened or endangered under the Endangered Species Act. This process is described in detail in Section 14.0.

opportunity for additional public input: Biloxi, MS, on September 10, 2007; New Orleans, LA, on September 10, 2007; Orange Beach, AL, on September 11, 2007; Galveston, TX, on September 11, 2007; Panama City, FL, on September 12, 2007; Palacios, TX, on September 12, 2007; Corpus Christi, TX, on September 13, 2007; Madeira Beach, FL, on September 17, 2007; and Fort Myers Beach, FL, on September 18, 2007.

Copies of an information packet will be available at the meetings and are available prior to the meetings from the Council (see **ADDRESSES**).

All scoping meetings will begin at 7 p.m. The meetings will be physically accessible to people with disabilities. Requests for sign language interpretation or other auxiliary aids should be directed to the Council (see **ADDRESSES**).

Once the DEIS associated with Amendment 29 is completed, it will be filed with the Environmental Protection Agency (EPA). The EPA will publish a notice of availability of the DEIS for public comment in the **Federal Register**. The DEIS will have a 45-day comment period. This procedure is pursuant to regulations issued by the Council on Environmental Quality (CEQ) for implementing the procedural provisions of the National Environmental Policy Act (NEPA; 40 CFR parts 1500–1508) and to NOAA's Administrative Order 216–6 regarding NOAA's compliance with NEPA and the CEQ regulations.

NMFS will consider public comments received on the DEIS in developing the final environmental impact statement (FEIS) and before adopting final management measures for the amendment. NMFS will submit both the final amendment and the supporting FEIS to the Secretary of Commerce (Secretary) for review as per the Magnuson-Stevens Fishery Conservation and Management Act.

NMFS will announce, through a notice published in the **Federal Register**, the availability of the final amendment for public review during the Secretarial review period. During Secretarial review, NMFS will also file the FEIS with the EPA and the EPA will publish a notice of availability for the FEIS in the **Federal Register**. This comment period will be concurrent with the Secretarial review period and will end prior to final agency action to approve, disapprove, or partially approve the amendment.

NMFS will announce, through a notice published in the **Federal Register**, all public comment periods on the final amendment, its proposed implementing regulations, and the availability of its associated FEIS. NMFS will consider all public comments received during the Secretarial review period, whether they are on the final amendment, the proposed regulations, or the FEIS, prior to final agency action.

Authority: 16 U.S.C. 1801 *et seq.*

Dated: August 14, 2007.

James P. Burgess,

Acting Director, Office of Sustainable Fisheries, National Marine Fisheries Service.

[FR Doc. E7–16359 Filed 8–20–07; 8:45 am]

BILLING CODE 3510–22–S

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

RIN 0648–XC10

Western Pacific Pelagic Fisheries, Hawaii-based Longline Swordfish Fishery; Scoping Process

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Notice of intent to prepare a supplemental environmental impact statement and notice of initiation of scoping process; request for comments.

SUMMARY: The Western Pacific Fishery Management Council (WPFMC) and NMFS announce their intent to prepare a Supplemental Environmental Impact Statement (SEIS) in accordance with the National Environmental Policy Act of 1969 (NEPA) on the federal management of the Hawaii-based shallow-set pelagic longline fishery in the western Pacific. The SEIS will supplement the March 30, 2001, Final EIS on the Fishery Management Plan for Pelagic Fisheries of the Western Pacific Region as well as the March 5, 2004, Final SEIS on Management Measures to Implement New Technologies for the Western Pacific Longline Fisheries.

DATES: The WPFMC and NMFS will discuss alternatives and take scoping comments at a public meeting on August 30, 2007, from 6–9 p.m.

Written scoping comments must be received by September 20, 2007.

ADDRESSES: The public meeting will be held at the Ala Moana Hotel, 410 Atkinson Dr., Honolulu, HI 96815.

Written comments may be submitted by any of the following methods:

- Mail: William L. Robinson, Regional Administrator, Pacific Islands Region, NMFS, 1601 Kapiolani Blvd., Suite 1110, Honolulu, HI 96814. Please write on the envelope: ''Scoping Comments on HI Swordfish SEIS''; or
- E-mail: *HILonglineScoping@noaa.gov*.

FOR FURTHER INFORMATION CONTACT: Kitty Simonds, Executive Director, WPFMC, (808) 522–8220, or William L. Robinson, Regional Administrator, NMFS, (808) 944–2200.

SUPPLEMENTARY INFORMATION: The SEIS will consider alternatives for modifying the current regulatory structure for the Hawaii-based shallow-set pelagic longline fishery (''the fishery'') to provide increased opportunities to harvest swordfish while continuing to avoid, to the extent practicable, the incidental catch of seabirds, marine mammals, and threatened and endangered sea turtles. Potential regulatory changes to be analyzed in the SEIS include: modifying or eliminating the existing limit on fishing effort; maintaining or eliminating longline ''set certificates'' that limit the amount of fishing effort in the fishery; retaining or eliminating hard ''caps'' (limits) on the incidental take of sea turtles which, if reached, close the fishery for the remainder of the year; the use of time and/or area restrictions in combination with caps on interactions with loggerhead and leatherback sea turtles; modifications to assessment methodologies; changes in observer coverage; and other management alternatives designed to increase incentives to avoid interactions with sea turtles and other protected resources. The SEIS will analyze the impacts of the range of reasonable alternatives on the affected human environment, including the No Action alternative, and the potential impacts on affected populations of sea turtles. The SEIS will include an update on the status of the biological and economic factors affecting the fishery, analysis of the impacts of regulatory measures currently in effect in the shallow-set fishery since 2004, summary of information on international conservation efforts, and a discussion of the potential transferred effects on both target- and incidentally-caught species to other national fishing fleets from regulatory restrictions in the domestic fishery.

Under the Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. 1801 *et seq.*), the United States has exclusive management authority over all living marine resources found within the Exclusive Economic Zone (EEZ). Management of these marine resources, with the exception of seabirds and some marine mammals, is vested in the Secretary of Commerce (Secretary). Eight Regional Fishery Management Councils prepare fishery management plans which are reviewed for approval and implementation by the Secretary. The WPFMC has the responsibility to prepare fishery management plans for fishery resources in the EEZ of the western Pacific.

Pelagic fisheries in the EEZ and on the high seas of the western Pacific have been managed under the Fishery Management Plan for the Pelagics Fisheries of the Western Pacific Region (FMP) and its amendments since 1986. Managed resources include both marketable (primarily billfishes and tunas), and non-marketable (primarily sharks) species. Fisheries managed under the FMP include pelagic longline, troll, handline, pole-and-line (bait boat), and charter-boat fisheries. Management measures include gear restrictions, vessel size limitations, time and area closures, access limitations, and other measures.

Longline fisheries of the western Pacific are further regulated under two classifications: (1) The ''shallow-set'' component that targets swordfish, and (2) the ''deep-set'' component that targets that targets tuna. The shallow-set component of the Hawaii-based longline fishery currently operates under the following regulations: an annual set limit of 2,120 shallow-sets (half of the 1994–99 historical average); mandatory night setting; the required use of 18/0 circle hooks or larger (with a 10 degree offset) and blue-dyed mackerel-type bait; closure of the fishery if sea turtle interaction limits are reached for loggerhead (17) or leatherback (16) sea turtles; and other measures. The sea turtle interaction limits were established based on a biological opinion issued by NMFS on February 23, 2004, associated with management measures to implement new technologies for the western Pacific longline fisheries. The biological opinion also requires 100 percent federal observer coverage in the shallow-set fishery.

In February 2007, the WPFMC and NMFS received a proposal from the Hawaii Longline Association (HLA) requesting an amendment to the Pelagics FMP and related MSA regulations concerning the Hawaii-based shallow-set longline fishery. The proposal requests that the WPFMC consider amending the Pelagics FMP to eliminate the existing annual fishing effort limit of 2,120 sets. The HLA proposal is premised on new information obtained since the implementation of the existing shallow-set fishery regime in early 2004 (Gilman and Kobayashi [1]). The new information pertains primarily to sea turtle interaction and mortality rates. The analysis done by Gilman and Kobayashi indicate a reduction in sea turtle capture rates and in the type of incidental hookings (lightly hooked vs. deeply hooked in the mouth or swallowed) observed during sea turtle interactions with longline gear. Combined sea turtle capture rates have declined by 89 percent in comparison to historical capture rates in the shallow-set fishery. Deep hooking (thought to result in sea turtle mortality) rates have also declined to 15 percent of all loggerhead sea turtle captures and zero percent of leatherback sea turtle captures. Prior to requiring the use of circle hooks and mackerel-type bait in the Hawaii-based longline shallow-set fishery, 51 percent of the sea turtles were believed to have been deeply hooked. No green or olive ridley sea turtles have been incidentally caught in the current shallow-set fishery.

The WPFMC and NMFS will consider a range of alternatives that may modify the current regulatory structure for the Hawaii-based pelagic longline shallow-set fishery. Preliminary alternatives that may be analyzed in the SEIS and considered by the WPFMC and NMFS include the following:

Longline Fishing Effort:
1. No action - keep 2120 set limit;
2. Allow 3,000 sets;
3. Allow 4,000 sets; and
4. Do not limit sets.

Time-Area Closures:
1. No action - no time-area closures;
2. Implement pre-season monthly closure of waters in designated sea turtle ''hot spots'' based on historical and contemporary sea surface temperature data; and
3. Implement in-season closure of waters based on analysis of sea surface temperature data.

Interaction Hard Cap for Loggerhead and Leatherback Sea Turtles:
1. No action - continue limitations of sea turtle interactions using caps set by NMFS; and
2. Discontinue limitations of sea turtle interactions using caps set by NMFS.

Fishery Participation:
1. No action - keep set certificates; and
2. Remove set certificates.

Assessment Methodology:
1. No action - annual (1 year) cap on interactions with loggerhead and leatherback turtles (numbers of sea turtle interactions to be determined by NMFS); and
2. Multi-year cap on interactions with loggerhead and leatherback turtles (numbers of sea turtle interactions to be determined by NMFS).

Sea Turtle Avoidance Incentives:
1. No action - do not implement individual vessel sea turtle interaction ''limits'';
2. Individual vessel ''limits'' for loggerhead and leatherback turtles will be available on an annual basis (calendar or fishing year) to individual vessels. These ''limits'' will be transferable among vessels; and
3. Any shallow-set vessel in the fleet that interacts with a certain (unspecified at this time) number of sea turtles during the calendar year or fishing year will be precluded from shallow-set fishing for a certain period (unspecified at this time).

Observer Coverage:
1. No action - 100 percent coverage;
2. A reduced level of observer coverage that achieves an appropriate extrapolation of interactions between sea turtles and the fishery;
3. NMFS covers costs for 100 percent coverage at current effort limit (2,120 longline sets), and fishing industry pays for observer costs for additional shallow-set effort beyond current limit; and
4. Fishing industry pays all on-board observer costs associated with monitoring of the Hawaii-based shallow-set longline fishery.

Public Involvement

Public scoping is an early and open process for determining the scope of issues to be addressed. A principal objective of the scoping and public involvement process is to identify a reasonable range of management alternatives that, with adequate analysis, will delineate critical issues and provide a clear basis for distinguishing between those alternatives and selecting a preferred alternative.

In addition to the public meeting (see **DATES** and **ADDRESSES**), other opportunities for public involvement will be available at WPFMC's Science and Statistical Committee meeting on September 25–27, 2007, at the WPFMC office, 1164 Bishop St, Suite 1400, Honolulu, HI 96813, and at the 139th WPFMC meeting on October 9–12, 2007, at the Ala Moana Hotel, 410 Atkinson Dr., Honolulu, HI 96815.

Special Accommodations

These meetings are physically accessible to people with disabilities. Requests for sign language interpretation or other auxiliary aids should be directed to Kitty M. Simonds, (808) 522–8220 (voice) or (808) 522–

[1] Gilman, E., and D. Kobayashi. In press. Sea turtle interactions in the Hawaii-based swordfish fishery first quarter 2007 and comparison to previous periods.

8226 (fax), at least five days prior to the meeting date.

Authority: 16 U.S.C. 1801 *et seq.*

Dated: August 15, 2007.

James P. Burgess,

Acting Director, Office of Sustainable Fisheries, National Marine Fisheries Service.

[FR Doc. E7–16358 Filed 8–20–07; 8:45 am]

BILLING CODE 3510–22–S

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

RIN 0648–XC11

Marine Mammals; File No. 1128–1922

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Notice; receipt of application.

SUMMARY: Notice is hereby given that Eduardo Mercado III, Ph.D, Department of Psychology, 350 Park Hall, University at Buffalo, SUNY, Buffalo, New York, 14260, has applied in due form for a permit to conduct research on humpback whales (*Megaptera novaeangliae*).

DATES: Written, telefaxed, or e-mail comments must be received on or before September 20, 2007.

ADDRESSES: The application and related documents are available for review upon written request or by appointment in the following offices:

Permits, Conservation and Education Division, Office of Protected Resources, NMFS, 1315 East-West Highway, Room 13705, Silver Spring, MD 20910; phone (301) 713–2289; fax (301) 427–2521; and

Southeast Region, NMFS, 263 13th Avenue South, Saint Petersburg, Florida 33701; phone (727) 824–5301; fax (727) 824–5320.

Written comments or requests for a public hearing on this application should be mailed to the Chief, Permits, Conservation and Education Division, F/PR1, Office of Protected Resources, NMFS, 1315 East-West Highway, Room 13705, Silver Spring, MD 20910. Those individuals requesting a hearing should set forth the specific reasons why a hearing on this particular request would be appropriate.

Comments may also be submitted by facsimile at (301) 427–2521, provided the facsimile is confirmed by hard copy submitted by mail and postmarked no later than the closing date of the comment period.

Comments may also be submitted by e-mail. The mailbox address for providing e-mail comments is *NMFS.Pr1Comments@noaa.gov*. Include in the subject line of the e-mail comment the following document identifier: File No. 1128–1922.

FOR FURTHER INFORMATION CONTACT: Amy Hapeman or Carrie Hubard, (301) 713–2289.

SUPPLEMENTARY INFORMATION: The subject permit is requested under the authority of the Marine Mammal Protection Act of 1972, as amended (MMPA; 16 U.S.C. 1361 *et seq.*), the regulations governing the taking and importing of marine mammals (50 CFR part 216), the Endangered Species Act of 1973, as amended (ESA; 16 U.S.C. 1531 *et seq.*), and the regulations governing the taking, importing, and exporting of endangered and threatened species (50 CFR parts 222–226).

Dr. Mercado is requesting a five-year scientific research permit to expose humpback whales to playback sessions in the coastal waters of Puerto Rico. The purpose of this research is to develop methods for testing the hearing and auditory perceptual capabilities of humpback whales in order to better predict when anthropogenic sounds may interfere with social behaviors, particularly mating and group feeding. Up to 200 humpback whales would be harassed by playback experiments (active acoustics) and up to 30 additional humpbacks would be harassed by close approach during vessel surveys for passive acoustic recordings annually. In addition, up to 45 Stenellid dolphins (*Stenella* spp.), 45 bottlenose dolphins (*Tursiops truncatus*), 5 sperm whales (*Physeter macrocephalus*), and 5 Cuvier's beaked whales (*Ziphius cavirostris*) may be incidentally harassed annually during playback sessions.

Concurrent with the publication of this notice in the **Federal Register**, NMFS is forwarding copies of this application to the Marine Mammal Commission and its Committee of Scientific Advisors.

Dated: August 15, 2007.

P. Michael Payne,

Chief, Permits, Conservation and Education Division, Office of Protected Resources, National Marine Fisheries Service.

[FR Doc. E7–16462 Filed 8–20–07; 8:45 am]

BILLING CODE 3510–22–S

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

RIN XC06

U.S. Climate Change Science Program Synthesis and Assessment Product Draft Report 4.4: ''Preliminary Review of Adaptation Options for Climate-Sensitive Ecosystems and Resources''

AGENCY: National Oceanic and Atmospheric Administration (NOAA),Department of Commerce.

ACTION: Notice of availability and request for public comments.

SUMMARY: The National Oceanic and Atmospheric Administration publishes this notice to announce the availability for public comments for the draft document titled, U.S. Climate Change Science Program Synthesis and Assessment Product 4.4: ''Preliminary Review of Adaptation Options for Climate-Sensitive Ecosystems and Resources.'' This Synthesis and Assessment Product (SAP) analyzes information on the state of knowledge of adaptation options for key, representative ecosystems and resources that may be sensitive to climate variability and change.

This draft document is being released solely for the purpose of pre-dissemination peer review under applicable information quality guidelines. This document has not been formally disseminated by NOAA. It does not represent and should not be construed to represent any Agency policy or determination. Any public comments submitted in accordance with this notice will be considered when revising the document.

DATES: Comments must be received by October 5, 2007.

ADDRESSES: The draft of Synthesis and Assessment Product 4.4: ''Preliminary Review of Adaptation Options for Climate-Sensitive Ecosystems and Resources'' is posted on the CCSP Web site at:*www.climatescience.gov/Library/sap/sap4–4/default.php* Detailed instructions for making comments on the draft Report is provided on the SAP 4.4 webpage (see link here). Comments should be prepared and submitted in accordance with these instructions.

FOR FURTHER INFORMATION CONTACT: Dr. Fabien Laurier, Climate Change Science Program Office, 1717 Pennsylvania Avenue NW, Suite 250, Washington, DC 20006, Telephone: (202) 419 3481.

SUPPLEMENTARY INFORMATION: The Climate Change Science Program (CCSP)

HIGHLY MIGRATORY SPECIES ADVISORY SUBPANEL REPORT ON HIGH SEAS SHALLOW-SET LIMITED ENTRY LONGLINE FISHERY

A majority of the Highly Migratory Species Advisory Subpanel (HMSAS) agreed that there is enough interest by West Coast based vessels for further effort to be taken by the Council and other regulatory bodies in exploring the feasibility of a highly migratory species shallow set longline fishery outside of 200 nm. Some of the HMSAS members suggested that such a fishery could involve or be limited to a certain number of vessels based on certain criteria to be established, and the fishery could operate under the same type of rules as does the Hawaii shallow-set longline fishery that at this time can fish to within 200 nm of the West Coast. Concern was expressed over the process required to implement a management framework and how the time and effort thus expended could be thwarted at the very end, as has occurred with other proposals. The HMSAS recommends establishing a transparent set of standards on how to create a fishery.

Developing a coordinated conservation and management strategy and a joint pelagic fisheries management plan with the Western Pacific Fishery Management Council (WPFMC) would be helpful, but not a necessary prerequisite to establishing a high seas shallow set longline fishery of the U.S. West Coast.

A minority of the HMSAS (Bob Osborn, United Anglers of Southern California, and Meghan Jeans, Ocean Conservancy) recommend that the Pacific Council not take unilateral action to establish a high seas shallow-set longline fishery but instead should only pursue collaboration with the WPFMC to establish a common management framework for the fishery.

PFMC
08/23/07

HIGHLY MIGRATORY SPECIES MANAGEMENT TEAM REPORT ON HIGH SEAS LIMITED ENTRY LONGLINE FISHERY

The Highly Migratory Species Management Team (HMSMT) discussed a possible management framework for a West Coast-based high seas shallow-set longline fishery with members of the Highly Migratory Species Advisory Subpanel (HMSAS) during the joint HMSMT/HMSAS meeting in La Jolla on August 14-15, 2007. The HMSMT solicited comments from industry representatives who were present at the meeting regarding their possible interest in moving forward with measures to establish a high seas shallow-set longline fishery under the Fishery Management Plan for U.S. West Coast Fisheries for Highly Migratory Species (HMS FMP).

A white paper summarizing a chronology of events leading up to the current state of affairs and compiling previous HMSMT work on this subject was presented to the joint bodies (Agenda Item F.2.a, Attachment 1). The paper proposed a number of alternatives, including a status quo option along with various possible configurations of a West Coast-based high seas shallow set longline (SSLL) fishery. Industry representatives in attendance suggested a small and tightly controlled West Coast-based SSLL fishery could involve a limited number of vessels, for example ten, based on a qualifying point system similar to one that was established to identify eligible fishers in Alaska's limited entry fisheries. The fishery could operate under a similar set of conservation measures as those used in the Hawaii SSLL fishery to reduce the risk of interactions with protected species, including ESA listed sea turtles and seabirds.

Meeting participants discussed the possible role of combined Western Pacific Fishery Management Council (WPFMC) and Pacific Council management of the pelagic fisheries. A longline fishing industry member in attendance, with experience in fishing under the WPFMC's Pelagics FMP, pointed out that it is not in WPFMC's interest to coordinate management with the Pacific Council. He opined that engaging in joint management would potentially place WPFMC-managed commercial fisheries at risk of curtailment of effort along the lines of conservation measures which currently constrain pelagic longline and drift-gillnet fishing effort in the West Coast EEZ.

The HMSMT wishes to call to the Council's attention that a Notice of Intent was published in the Federal Register on August 21, 2007, by the WPFMC and NMFS Pacific Islands Region Office (PIRO) for the preparation of a Supplemental Environmental Impact Statement (SEIS) for consideration of federal management of the Hawaii SSLL fishery. (Agenda Item F.2.a, Attachment 2). (As noted in the situation summary, written scoping comments on the SEIS must be received by September 20, 2007.) The SEIS will analyze, among other options, the possibility of removing the overall effort limit and increasing the allowable number of turtle interactions which currently constrains Hawaii-based SSLL fishing effort. Given that the populations of leatherback and loggerhead turtles, which are potentially impacted by the Hawaii-based SSLL fishery, would also be potentially impacted by a future West Coast-based SSLL fishery, any increase in allowable turtle take that would result from this proposed action could indirectly impose stringent conservation limits on any potential expansion of a West Coast-based SSLL fishery. The HMSMT recommends that the Council request from both the WPFMC and

NMFS PIRO that future considerations into increasing fishing effort and allowable turtle interactions take into consideration a West Coast-based SSLL fishery. The HMSMT has been informed that the NMFS Southwest Region Assistant Regional Administrator for Sustainable Fisheries has undertaken preliminary discussions with his counterpart at NMFS PIRO on the feasibility of a joint SEIS approach for a Pacific-wide SSLL fishery framework recognizing fleets and interests for both Council-managed HMS fisheries. The HMSMT supports these discussions and requests that a timely decision is made to address, among other things, the issue of the first-come first-serve framework that currently exists in regards to the available turtle interaction caps.

Provided there is sufficient interest by West Coast-based vessels, the HMSMT requests guidance from the Council in setting its future work plan to develop the necessary criteria to establish a West Coast-based SSLL fishery. These criteria include, but are not limited to, the development of limited entry and/or effort controls, HMS FMP regulatory measures to ensure compliance with all applicable state and federal statutes, and the implementation of best conservation practices that have been recently developed. The HMSMT notes that the start of the SEIS scoping process by WPFMC and NMFS PIRO underscores the urgency for taking prompt action on this issue.

PFMC
08/23/07

G:\!PFMC\MEETING\2007\September\HMS\F2 SSLL HMSMT Report_High Seas SSLL.doc

MOTION ON HIGH SEAS LIMITED ENTRY LONGLINE FISHERY

The staff white paper (Agenda Item F.2.a, Attachment 1) describes the following alternatives:

1. Status quo – Shallow-set longline fishing seaward of 200 nm and east of 150 deg W longitude allowed by Hawaii-permitted vessels only; landings can occur on the West Coast by Hawaii-permitted vessels.

2. Use management measures, such as take caps or set certificates, rather than license limitation, to limit shallow-set longline effort seaward of 200 nm.

3. Implement a West Coast limited entry program for shallow-set longline fishery seaward of 200 nm subject to regulations, which would include sea turtle protection measures.

4. Implement a West Coast limited entry program for shallow-set longline fishery seaward of 200 nm (same as Alternative 3) and require a drift gillnet permit to participate.

5. Pursue joint management efforts with the Western Pacific Fishery Management Council.

Motion:

1. Adopt a preliminary purpose and need statement as follows:

   The proposed action is to implement a limited West Coast-based shallow-set longline fishery to target swordfish on the high seas, which would be subject to conservation and management measures to protect, among other things, listed sea turtles, seabirds, and marine mammals.

2. Adopt Alternatives 1, 3, 4, and 5 described in the staff white paper as a preliminary range of alternatives for further exploration. (Note: Alternative 4 could be a sub-option of Alternative 3—e.g., Alternative 3a.)

   Rationale – There are problems with Alternative 2 relative to creating a derby-style fishery and a level of fishing effort that could potentially result in a jeopardy finding under the Endangered Species Act. With regard to Alternative 3, while the majority of drift gillnet permitted vessels are not big enough or configured properly to fish long-distance, the feasibility of Alternative 3 should be further explored. While there may be higher costs associated with Alternative 5, the cooperative nature of this approach also warrants further consideration.

3. The HMSMT and HMSAS could develop sub-options for Alternative 3 with different conservation and management measures.

4. Suggested Process and Timeline:

   a. March 2008 – Council consider draft range of alternatives for public review and preliminary guidance on qualifying criteria for analysis

   b. July-Aug 2008 – HMS Management Committee meet with HMSMT and HMSAS to provide further guidance (if needed)

   c. November 2008 – Council adopt a preferred alternative

YELLOWFIN TUNA OVERFISHING

In 2006 the Council was notified that the Eastern Pacific Ocean (EPO) yellowfin tuna stock is subject to overfishing, requiring a Council response under the Magnuson-Stevens Act (MSA). In April 2007 the Council was briefed on new provisions in the MSA at §304(i) applicable to international overfishing. The Council also received a letter from Mr. Rod McInnis, National Marine Fisheries Service Southwest Regional Administrator, informing the Council that these provisions are applicable to yellowfin tuna. Based on this letter, the Council has until March 30, 2008 to (1) develop recommendations for domestic regulations to address the relative impact of United States fishing vessels on the stock, and (2) develop and submit recommendations to the Secretary of State and Congress for international actions to end overfishing and rebuild the stocks, recognizing the relative impact of foreign vessels and U.S. vessels.

According to data from the Inter-American Tropical Tuna Commission (IATTC), U.S. catches of yellowfin tuna amounted to 3,698 mt in 2004, 1.3 percent of the total catch (291,471 mt) recorded by the IATTC in the EPO for that year. Of the U.S. catch, recreational fishing accounted for 1,159 mt. The Council may wish to consider whether current domestic conservation and management measures pursuant to the Fishery Management Plan for U.S. West Coast Fisheries for Highly Migratory Species (50 CFR 660, subpart K) are sufficient to address MSA §304(i)(2)(A), or new measures should be proposed. If new measures are proposed, they would be promulgated under the standard rulemaking process and associated review requirements.

With respect to any recommendations for international actions the Council may develop to address MSA §304(i)(2)(B), it is likely that they would be categorically excluded from further analysis under the National Environmental Policy Act. That being the case, the Council would not be required to develop a range of alternatives when considering recommendations, although for the purposes of public review and input the Council may wish to do so. Presuming the identification of a proposal or alternatives at this meeting, the Council is scheduled for final action at the March 2008 Council Meeting in Sacramento, California.

At the April 2007 meeting the Council made recommendations to the U.S. Section of the IATTC on measures they should communicate during the 75th IATTC meeting (June 25–29, 2007). Attachment 1 is the letter sent to Mr. Rod McInnis containing these recommendations. The IATTC subsequently prepared a new yellowfin tuna stock assessment in May 2007, which the Scientific and Statistical Committee is scheduled to review and report on to the Council at the September 2007 meeting. (The stock assessment is provided in electronic format as Attachment 2.) Attachments 3 and 4 are papers prepared by IATTC staff evaluating conservation proposals and making recommendations in advance of the 75th meeting. Attachment 5 is a U.S. proposal for tuna conservation measures tabled at the meeting but not adopted. These materials provide background information that can help in the formulation of recommendations for international measures to address yellowfin tuna overfishing per MSA §304(i)(2)(B).

At the 75th meeting the IATTC did not adopt any new resolutions for the conservation of yellowfin and bigeye tuna for the period after 2007. Resolution C-04-09, replacing Resolution C-06-02, is in effect through the end of 2007. The principal measure applicable to yellowfin tuna contained in this Resolution is a closure of purse seine fisheries for either the period August

1-September 11 or November 20 to December 31, the choice of period being at the discretion of IATTC Parties. The 76th IATTC meeting is scheduled for October 22–24, 2007, in La Jolla, California. The main purpose of this meeting is to adopt conservation recommendations for 2008 and beyond.

Council Task:

1. **Consider the need for additional domestic regulations to address MSA §304(i)(2)(A); if needed, identify preliminary proposal or alternatives for public review.**
2. **Identify recommendations for international actions to address MSA §304(i)(2)(B), in the form of a proposal or alternatives, for public review.**
3. **Consider recommendations to the U.S. delegation to the October 22–24, 2007, IATTC meeting for tuna conservation measures to adopted by the Commission for 2008 and beyond.**

Reference Materials:

1. Agenda Item F3.a, Attachment 1: May 1, 2007, letter from Mr. Donald Hanson to Mr. Rod McInnis containing recommendations to the U.S. Section of the IATTC on conservation measures
2. Agenda Item F3.a, Attachment 2: Status of Yellowfin Tuna in the Eastern Pacific Ocean, IATTC Document SAR-08-08a (*CD-ROM and Web only*)
3. Agenda Item F3.a, Attachment 3: Staff Response to Request from *Ad Hoc* Meeting, February 2007, Document IATTC-75-05a
4. Agenda Item F3.a, Attachment 4: Conservation Recommendations, Document IATTC-75-07b
5. Agenda Item F.3.a, Attachment 5: Proposal D1 Submitted by the United States; Resolution on a Multi-Annual Program on the Conservation of Tuna in the Eastern Pacific Ocean for 2008, 2009, and 2010
6. Agenda Item F.3.b, Highly Migratory Species Management Team Report
7. Agenda Item F.3.b, Highly Migratory Species Advisory Subpanel Report

Agenda Order:

a. Agenda Item Overview — Kit Dahl
b. Reports and Comments of Advisory Bodies
c. Public Comment
d. **Council Action**: Adopt Alternatives for Public Review to Address Yellowfin Tuna Overfishing

PFMC
8/14/07

Pacific Fishery Management Council

7700 NE Ambassador Place, Suite 101, Portland, OR 97220-1384
Phone 503-820-2280 | Toll free 866-806-7204 | Fax 503-820-2299 | www.pcouncil.org

May 1, 2007

Mr. Rodney McInnis
Regional Administrator
National Marine Fisheries Service Southwest Region
501 West Ocean Blvd.
Long Beach, CA 90802-4213

Dear Mr. McInnis,

At our April 1–6, 2007, meeting, the Council discussed management measures that should be taken at the international level to address overfishing of Pacific-wide bigeye and eastern Pacific yellowfin tuna stocks. For the eastern Pacific Ocean such management measures would have to be adopted by the Inter-American Tropical Tuna Commission (IATTC) by resolutions committing members to implement domestic measures. The Council discussed possible recommendations they would like to forward to the U.S. Section to the IATTC for consideration in the development of a U.S. position for the June 25–29, 2007, IATTC meeting in Cancun, Mexico. Recognizing that the General Advisory Committee has a statutory role to advise the U.S. Section, this letter is copied to its Chair.

The Council has a direct interest in the status of these stocks because they are part of the management unit in our Fishery Management Plan for U.S. West Coast Fisheries for Highly Migratory Species. As such, the Council was previously notified by you of the Secretarial determination for these two stocks, which obligates a response. For bigeye tuna, the Council submitted an amendment to our fishery management plan (FMP) in response to the requirements of the Magnuson-Stevens Fishery Conservation and Management Act at §304(e)(3). However, we recognize the limits of unilateral action; furthermore, new provisions in the Magnuson-Stevens Reauthorization Act of 2006 (§406(a)) expressly call on Councils to develop and submit recommendations to the Secretary of State and Congress for international actions to end overfishing. If, at their next meetings, the IATTC and, for bigeye tuna, the Western and Central Pacific Fisheries Commission (WCPFC) are unable to adopt conservation measures that demonstrably end overfishing, we expect to continue making recommendations on a U.S. position in subsequent years.

At their April meeting, the Council was informed that significant new information in relation to these stocks and the efficacy of potential conservation measures will become available at the 8th Meeting of the Working Group on Stock Assessment (May 7–11, 2007). Although the Council will meet again in June, this offers scant time to transmit a formal recommendation to the U.S. Section prior to the IATTC meeting. In addition, the General Advisory Committee will meet on May 30 and we would like to offer this input for that meeting as well. Recognizing the limitation on information available to the Council at the time of their meeting, the Council identified the following general recommendations for the U.S. Section to consider for this year's IATTC meeting, based on input from our Highly Migratory Species Management Team and

Highly Migratory Species Advisory Subpanel (the Highly Migratory Species Management Team's report is attached for your information).

Controlling fishing capacity is an important precursor to implementing catch controls that achieve F_{MSY}. The IATTC has made progress in controlling capacity through the adoption of Resolution C-98-11 (Resolution on Fleet Capacity), Resolution C-00-01 (Resolution on the Capacity of the Tuna Fleet Operating in the Eastern Pacific Ocean) and Resolution C-02-03 (Resolution on the Capacity of the Tuna Fleet Operating in the Eastern Pacific Ocean [Revised]). The Council encourages the U.S. Section to continue to work with the IATTC to implement effective capacity limits, such as the Capacity Plan identified in Resolution C-02-03. Capacity limits should first focus on purse seine vessels. If capacity reduction measures are identified and implemented they should take into account patterns of historical participation.

Depending on recruitment to the stocks, conservation measures that limit total catch may be necessary. The most direct mechanism would be to establish a total allowable catch (TAC) level, which is a measure identified by the IATTC at the February 5–6, 2007, Ad Hoc meeting for analysis by the Working Group on Stock Assessment. The IATTC has previous experience with the application of a TAC and the U.S. Section should propose a workable formula that could end overfishing. If appropriate, allocation or subdivision of the TAC by fleet; area; or Contracting Parties, cooperating non-Parties, fishing entities and regional economic integration organizations (CPCs) should be considered.

Time-area closures are an indirect method to limit catch. The time-area closure for purse seine vessels implemented under Resolution C-06-02 may not be sufficient to end overfishing on the two stocks (in concert with other, existing conservation measures). At the February Ad Hoc IATTC meeting the U.S. recommended, for analysis, an ongoing closed area for purse seine vessels focused to an area from which slightly less than half the 2001–05 bigeye tuna catch originated. While not advocating, without further analysis, the specific closed area identified by the U.S., the Council recognizes that area closures can be an effective tool to limit catch and encourages the consideration of closed area proposals that would have a demonstrable effect on reducing or ending overfishing on the two stocks; any analysis of closed area proposals should consider the effect on the U.S. fleet. In order to monitor compliance, the IATTC should implement a vessel monitoring system (VMS) that would require uniform participation by subject vessels. The VMS should consolidate data originated from national VMS programs or operate transnationally and independently. Such a consolidated VMS should be administered by a neutral third party to ensure transparency and enhance accountability.

One source of overfishing, particularly for yellowfin tuna, is the catch of fish of lower average weight, reducing yield-per-recruit below a level that could achieve average maximum sustainable yield (AMSY). In general, the floating-object, unassociated, and pole-and-line fisheries capture younger, smaller fish than do the dolphin-associated and longline fisheries. The floating object segment has shown the largest decline in average weight of yellowfin tuna caught, 2001–06, of about 70 percent. Conservation measures should address these catches, and catches of juvenile bigye tuna, directly. At the February Ad Hoc IATTC meeting, the U.S. proposed area closures to limit fishing in areas with high catch of juvenile fish. The Council encourages further development of this proposal.

Increased use of artificial fish aggregating devices (FADs) may be contributing to high catches of juvenile fish. Free-floating FADs may be deployed for long periods and intentionally or inadvertently fished on by multiple vessels. As with fishing vessels overall, the number, or "capacity," of FADs may be an issue. The U.S. should propose a requirement that all FADs be appropriately marked to allow identification by deploying vessel and/or nation of origin. A marking requirement could be linked to a registry system in order to account for the number of FADs in use. In concert with, or as an alternative to, the closed area proposals discussed above, the U.S. should press for the implementation of measures to limit the use of FADs in areas of high juvenile catch.

The development of conservation measures should be guided by catch or effort targets corresponding to a level of fishing mortality at or below F_{MSY} for the two stocks. Such targets should be based on actual or proxy reference points derived from the most recent stock assessments, periodically updated upon the receipt of new information, and used, in addition to identifying measures, to assess the efficacy of any measures that have been implemented. As appropriate, such targets should be established for different fishery segments, recognizing differences in the age composition of catches. In the case of bigeye tuna, which is considered a single, Pacific-wide stock, any such targets should take into account fishing in the Western Pacific and be coordinated with the WCPFC.

The Council recognizes the challenges of negotiating agreements among sovereign entities, since it is the CPCs who will actually implement most control measures for their fleets. For this reason, conservation measures should also be adjudged according to the practibility of monitoring and enforcement, and their transparency at the international level. Without effective compliance even the most well-crafted conservation measures cannot end overfishing.

In addition to communicating the Council's recommendations, with this letter I would like to indicate the Council's ongoing commitment to engage with regional fishery management organizations to encourage effective management of highly migratory species. To this end, we wish to strengthen our relationship with the U.S. Section to the IATTC and engage with the WCPFC through our Commissioner.

Sincerely,

Donald K. Hansen
Chairman

Enclosure (1)

cc: Peter Flournoy, Chairman, General Advisory Committee
David Hogan, Department of State
Edwin Ebisui, Chair, Western Pacific Fishery Management Council
Kitty Simonds, Executive Director, Western Pacific Fishery Management Council
Paul Dalzell, Pelagics Program Coordinator, Western Pacific Fishery Management Council

F:\!master\Corr-draft\HMS\McInnis re IATTC recommendations.doc

INTER-AMERICAN TROPICAL TUNA COMMISSION
COMISIÓN INTERAMERICANA DEL ATÚN TROPICAL

75TH MEETING

CANCUN (MEXICO)
25-29 JUNE 2007

DOCUMENT IATTC-75-05a

STAFF RESPONSE TO REQUESTS FROM *AD HOC* MEETING, FEBRUARY 2007

The *ad hoc* meeting of the IATTC in February 2007 recommended that Commission staff provide the following information and analysis for consideration by the Parties in June:

1. work to refine critical areas for juvenile bigeye tuna and juvenile yellowfin tuna and consider the conservation value of closing these areas to purse-seine fishing for a period or year-round;
2. produce estimates of total allowable catch (TAC);
3. compile a list of the practical and administrative issues raised regarding potential use of national catch allocations or individual fishing quotas (IFQs) for vessels;
4. estimate the conservation measures that would be necessary if the Commission implemented the *Plan for regional management of fishing capacity*[1] and reduced the purse-seine fleet to the target capacity levels;
5. investigate the impact of fishing effort on adult stocks of yellowfin tuna during recent years;
6. summarize available information on the impacts of the use of FADs, describe areas where FADs should not be placed because of the probability of catching juvenile tunas, determine the increase in vulnerability of tunas since the introduction of the FAD fishery, and determine the number of FADs placed.

1. CONSERVATION VALUE OF CLOSING CRITICAL AREAS FOR JUVENILE YELLOWFIN AND BIGEYE TUNA

The staff recommendations in Document IATTC-75-07b address the conservation value of closing critical areas for juvenile yellowfin and bigeye tuna. The staff believes that closing coastal areas would significantly reduce the catch of juvenile yellowfin and may not have adverse consequences for the catches of skipjack and bigeye. On the other hand, closures designed to reduce catches of juvenile bigeye would be likely to lead to significant increases in yellowfin catches and reductions in skipjack catches.

2. ESTIMATES OF TOTAL ALLOWABLE CATCH

The staff recommendations in Document IATTC-75-07b include options for total allowable catches of yellowfin and bigeye tuna.

3. ISSUES REGARDING THE USE OF NATIONAL QUOTAS OR INDIVIDUAL FISHING QUOTAS

The allocation of either national quotas or individual quotas raises issues of criteria for allocation, monitoring of catches against quotas, and transferability.

3.1. Allocation

Allocation of national quotas could be negotiated, possibly after agreeing on criteria for allocation. The simplest allocation is based on recent catches, but this methodis often seen as unfair by states that have

[1] http://www.iattc.org/PDFFiles2/IATTC-73-EPO-Capacity-Plan.pdf

aspirations to develop their tuna industries. Following a consideration of criteria for allocating purse-seine capacity, the Commission adopted Resolution C-98-11, in which allocation of capacity took into account various factors, including: the catch of national fleets during the 1985-1998 period; the amount of catch historically taken within the zones where each state exercises sovereignty or national jurisdiction; the landings of tuna in each nation; and the contribution of each state to the IATTC conservation program, including the reduction of dolphin mortality.

Allocating quotas to individual vessels or vessel owners can also be based on individual catch histories. Catch histories may be reduced by factors such as breakdowns, recent purchases of vessels, *etc.*, and it may be necessary to establish a system for compensating for such factors. Under the AIDCP, the total annual dolphin mortality limit is simply divided equally among the qualified vessels, but it is unlikely that such a system would be acceptable for catch quotas.

3.2. Monitoring of catch against quota

Currently, various catch reporting systems are used within the IATTC. Purse-seine vessels and some other vessels based in coastal countries report catches to the IATTC staff, distant-water longline and troll vessels generally report nationally. Some reporting systems are too slow to be used to monitor catch against quotas. Modern technologies, for example vessel monitoring systems (VMS), can provide real-time catch reports.

The consequences of exceeding either national or individual quotas need to be considered. One option is to deduct the excess catch from the next year's quota, possibly with the addition of a penalty.

In addition to monitoring national or individual catches, there must be a record of the quotas. This is more complex if excess catches are deducted from the quota next year..

3.3. Transferability

Some form of transferability is likely to be necessary to allow for new entrants and to allow retirement of those who wish to leave the industry. Without transferability, changes in the distribution of quota could only come about as a result of reallocation of quota.

Transferability of individual quotas requires a very complex system for recording ownership of quotas, and makes monitoring, management and enforcement much more difficult.

4. CONSERVATION MEASURES NECESSARY IF THE COMMISSION IMPLEMENTED THE PLAN FOR REGIONAL MANAGEMENT OF FISHING CAPACITY

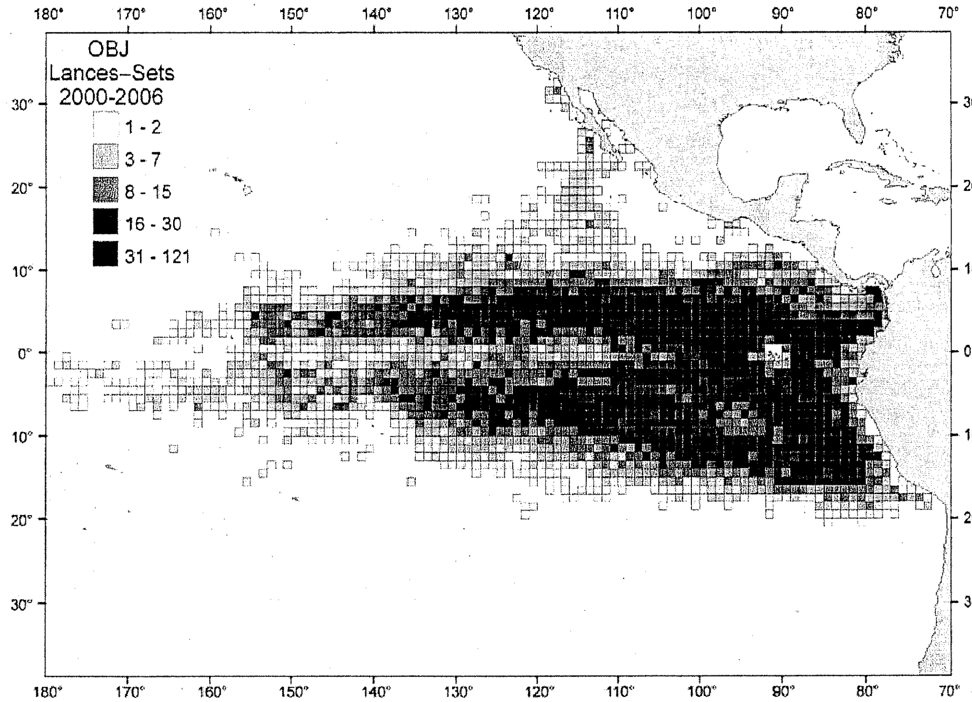
The target for the purse-seine fleet capacity in the *Plan for regional management of fishing capacity* was calculated with the intention that other management measures would not be necessary if the purse-seine fleet was reduced to the target size and other fleets were not increased. However, some economic studies have shown that there may be a significant difference between measurements of fishing capacity contemplated in the regional plan of action, and actual harvest (excess capacity) that the fleet in the eastern Pacific is capable of. It is possible that a reduction of the fleet size would lead to more efficient use of the remaining vessels, and if so, additional measures may be required.

5. IMPACT OF FISHING EFFORT ON ADULT STOCKS OF YELLOWFIN TUNA DURING RECENT YEARS

The yellowfin stock assessment summarized in Document IATTC-75-06 considers the effect of fishing effort on adult stocks of yellowfin tuna during recent years.

6. AVAILABLE INFORMATION ON THE IMPACT OF FADs

The figure below shows the distribution of sets on floating objects (most of which are FADs) during the 2000-2006 period.



The number of sets and the catches in those years are as follows.

	Number of sets—Número de lances			Retained catch—Captura retenida		
	Vessel capacity-Capacidad del buque		Total	YFT	SKJ	BET
	≤ 363 t	> 363 t				
OBJ	**Sets on fish associated with floating objects Lances sobre peces asociados con objetos flotantes**					
2000	504	3,916	4,420	42,688	121,036	91,474
2001	801	5,744	6,545	66,353	122,752	60,627
2002	857	5,781	6,638	37,797	116,656	55,916
2003	704	5,497	6,201	29,798	181,326	52,705
2004	615	5,083	5,698	27,595	117,669	65,829
2005	641	5,122	5,763	26,238	132,483	67,510
2006	1,086	7,140	8,226	35,642	194,679	69,564

What is not known for the fleet as a whole is how many FADs are placed at sea, where they are deployed and for how long.

INTER-AMERICAN TROPICAL TUNA COMMISSION
COMISIÓN INTERAMERICANA DEL ATÚN TROPICAL

75TH MEETING

CANCUN (MEXICO)
25-29 JUNE 2007

DOCUMENT IATTC-75-07b REV

CONSERVATION RECOMMENDATIONS

Resolutions C-04-09 and C-06-02 on the conservation of tunas in the eastern Pacific Ocean (EPO) establish measures for the conservation of yellowfin and bigeye tuna during 2004-2007. This paper makes recommendations for yellowfin and bigeye for 2007-2009 and for an annual limit on the catch of swordfish in the southeastern Pacific Ocean, and suggests clarification of Resolution C-05-02 concerning northern albacore tuna. It also recommends that the growing capacity of the purse-seine fleet be addressed. Summaries of the stock assessments for all species are provided in Document IATTC-75-06, *Tunas and billfishes in the eastern Pacific Ocean in 2006.*

The *ad hoc* meeting of the Commission in February 2007 asked the staff to provide information on possible area closures that would reduce catches of juvenile yellowfin and bigeye tuna, and to estimate the total allowable catches (TACs) for each species. These recommendations, therefore, include those measures, in addition to the seasonal closure that has been in effect during 2004-2007. Two points suggested by individual delegations at the February meeting, a closure of a large area to all fishing and measures affecting fish-aggregating devices (FADs), are also addressed.

1. FLEET CAPACITY

The major issue that must be addressed to facilitate conservation of the stocks and the economic viability of the fisheries for yellowfin and bigeye tunas is that of the size of the purse-seine fleet. On May 13, 2007, the carrying capacity of the purse-seine fleet fishing or expected to fish in the EPO was 228,157 m^3. While Resolution C-02-03 on capacity has limited entry, there is still room for some additional vessels to enter the fishery within the terms of the Resolution.

The staff recommends that the Commission examine means to reduce the fleet size toward the Commission's target of 158,000 m^3 as soon as possible.

2. YELLOWFIN TUNA

The stock assessment for yellowfin is similar to that of 2006. The base case assessment indicates that the spawning stock size has declined from a high point in 2001 to about 95% of the level corresponding to the average maximum sustainable yield (AMSY). The fishing mortality corresponding to the AMSY is 0.96 (*F multiplier*) times the average fishing mortality rate for the last three years. The historical status of the stock is shown in the plot in Figure 1. The trajectory starts in 1977, near the edge of the green section of the graph, and the large red dot at the end represents the average of 2004-2006.

Since 2002 recruitment has been less than the average for 1985-2002. It is possible that this lesser recruitment will persist in the future, which would produce reduced catches relative to those possible during 1987-2003.

At the beginning of 2007 the carrying capacity of the purse-seine fleet was 7% greater than the average for 2004-2006. To simply maintain the effect of Resolution C-04-09, the period during which purse-seining was permitted (46 weeks) should be reduced.[1]

The base case assessment did not include a stock-recruitment relationship; if that were incorporated (the alternative assessment) the *F multiplier* would be 0.65. The staff has attributed the increase in

[1] closure = 365 – *F multiplier* × (365 – 42)/(1 + capacity increase)

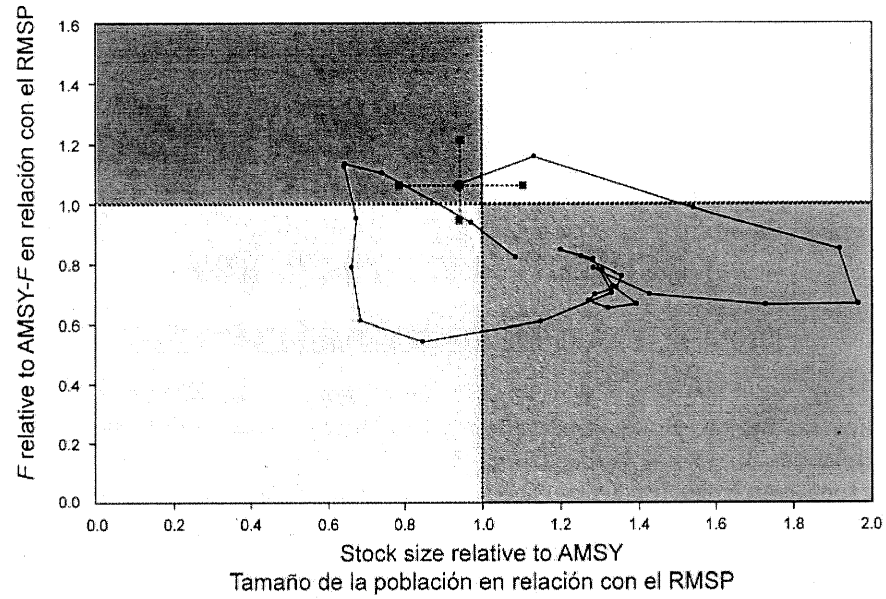


FIGURE 1.

recruitment and stock size after 1985 to a regime change that led to greater spawning biomasses, rather than to dependence of recruitment on spawning stock size. Nevertheless, it is possible that this interpretation is wrong, and that the increase in recruitment after 1985 was related to a stock-recruitment relationship, in which moderate stock reductions cause recruitment to decline. If that were the case, the stock would currently be overfished.

Regardless of the recruitment, the total catch and stock size could be increased if the average size of the yellowfin in the catch were increased. The longline fishery catches the largest fish, but takes less than 5% of the total catch. The purse-seine fishery takes yellowfin of a wide range of sizes, depending on set type. Increasing the proportion of the catch made by longlines or by purse-seine sets on tunas associated with dolphins, particularly offshore, would increase the sustainable yields and the biomass. Area closures might be used to increase the yield per recruit of yellowfin, but their effect cannot be precisely forecast. Juvenile yellowfin tuna are taken mostly in inshore areas, and restricting fishing by vessels carrying observers in an area such as that shown in Figure 2 would increase the yield per recruit of yellowfin tuna, but would not on its own resolve the issue of too much fishing. The proposal is for large vessels only as it might be difficult for small vessels to fish in offshore areas. The Appendix gives the catches of large vessels inside the proposed area and an indication of its possible effect.

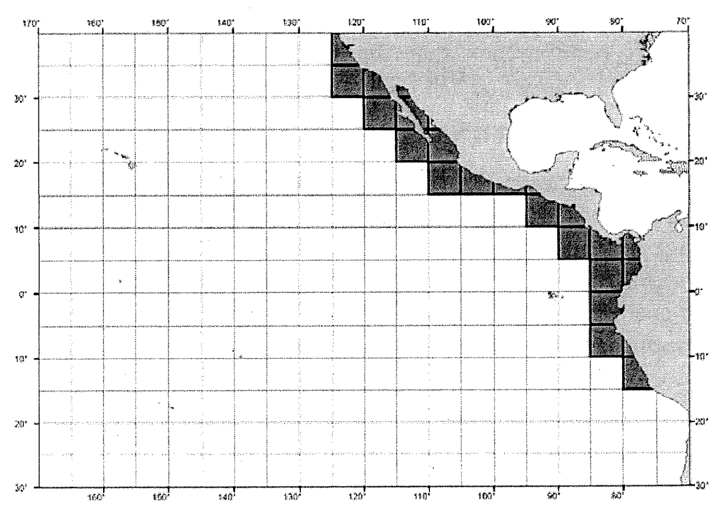


FIGURE 2.

The staff recommends that the

Commission:

1. (a) Extend the closure periods for the purse-seine fishery in Resolution C-06-02 by an additional 32 days, to 74 days, and that the closure period be extended further if the carrying capacity of the purse-seine fleet continues to increase; or

   (b) Set a TAC of 200,000 metric tons [2] (t) for yellowfin taken by purse seine in the EPO, but that the Director be authorized to increase the limit by up to four increments of 30,000 t each if he concludes, from examination of available data, that such increments would pose no significant risk to the stock. If the limit, including any increments authorized by the Director, is reached, purse-seining for tunas will cease.

2. Examine the effectiveness of closing coastal areas, such as that shown in Figure 2 to purse-seine vessels fishing for tropical tunas that are required by the AIDCP to carry observers, with the objective of improving the yield per recruit of yellowfin tuna. The examination might include closing an area for one quarter of the year and evaluating the result.

In case of Option 1(b), the Director should give CPCs one month's notice of the date on which he estimates that the catch limit will be reached.

3. BIGEYE TUNA

The stock assessment results are generally similar to those of previous assessments, except that the recruitments in 2001 and 2002 are now estimated to be less than they were estimated to be in 2006.

The stock remains below the AMSY level, but a recent large recruitment has mitigated the overfishing. The stock is expected to approach the level corresponding to the AMSY in 2010, and subsequently to decline. The fishing mortality corresponding to the AMSY is 0.83 times the average fishing mortality rate during 2004-2006. The historical status of the stock is shown in the plot in Figure 3. The trajectory starts in 1977, at the lower right of the graph, and the large red dot at the end represents the average of 2004-2006.

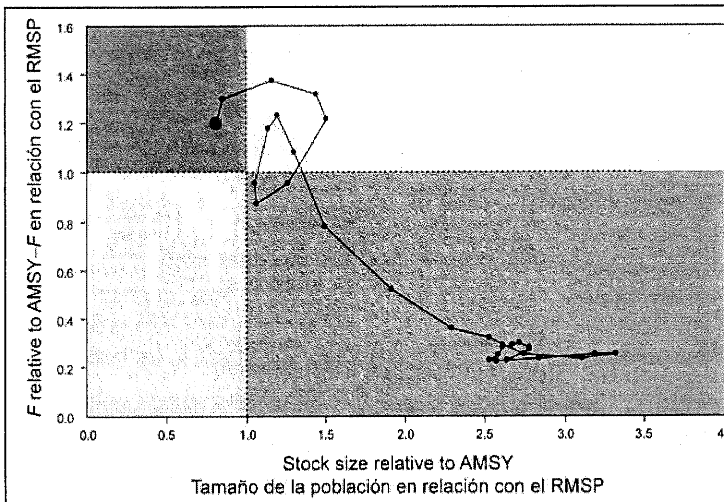


FIGURE 3.

The base case assessment did not include a stock-recruitment relationship; if that were incorporated (the alternative assessment) the *F multiplie*r would be 0.59.

The staff recommendation is based on the base case assessment. In contrast to yellowfin, there is no information in the history of the fishery that supports a stock-recruitment relationship in which moderate stock reductions cause recruitment to decline. However, the steepness of the stock-recruitment relationship is difficult to estimate, and there remains a possibility that inferences made using the base case assessment underestimate the extent to which the stock is overfished.

[2] The initial TAC and range for yellowfin tuna are calculated as the AMSY during the period of low recruitment (1975-1982), with the increments such that four increments would produce a TAC equal to the AMSY during the period of high recruitment (1983–2001).

The staff has made an evaluation of the effect of closing the area shown in Figure 4 to fishing by large purse-seiners. The absolute effect is uncertain because the response of fishermen, the variability of the stocks, and the variability of the environment cannot be predicted, but it would be likely to lead to a reduction of bigeye and skipjack catches and to increased catches of yellowfin. If that were coupled with restrictions in fishing inshore (Figure 1), at least some of the increase in yellowfin catches would probably be made up of large fish taken in association with dolphins. An indicative evaluation of the effect of closing the area for a year is given in the Appendix.

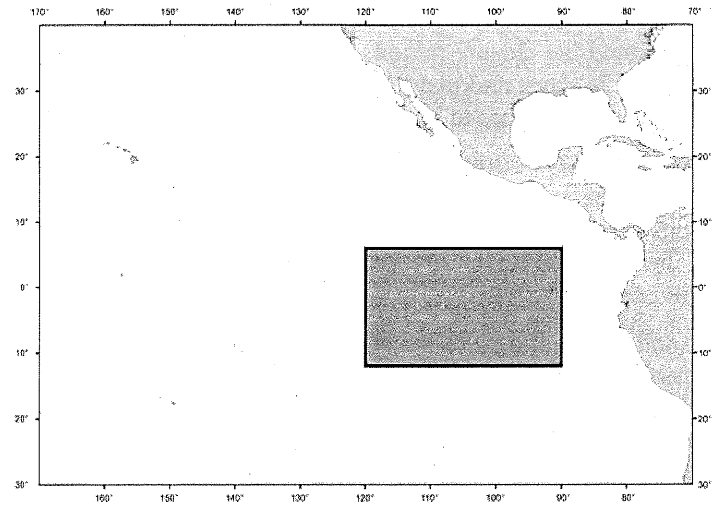


FIGURE 4.

Longline catches have declined to less than the levels allowed by Resolution C-06-02, making the impact of this fishery less than envisaged in the Resolution. On the other hand, the growth in the carrying capacity of the purse-seine fleet has militated against the effect of the Resolution in limiting purse-seine catches.

Recent catches of bigeye tuna		
	Purse-seine	Longline
2003	54,509	59,666
2004	67,337	43,354
2005	68,699	43,433
2006	71,195	30,271

Further measures are necessary to allow the stock to be maintained at or above the AMSY level.

The AMSY has been significantly reduced by purse-seine catches of small bigeye, and measures that encourage purse-seine vessels to avoid catching bigeye while fishing for skipjack would be beneficial. The aggregation of fish by FADs is a major part of the fishing effort for that fishery, but there is little information available about deployment and disposition of FADs. Such information is critical as a basis for any decisions about management of the use of FADs.

The combined fishing effort (longline and purse-seine) should be reduced to 83% of the level of 2004-2006. Reductions of differing amounts for each of the two fleets could also achieve the goal of producing the AMSY, as shown in Figure 5.

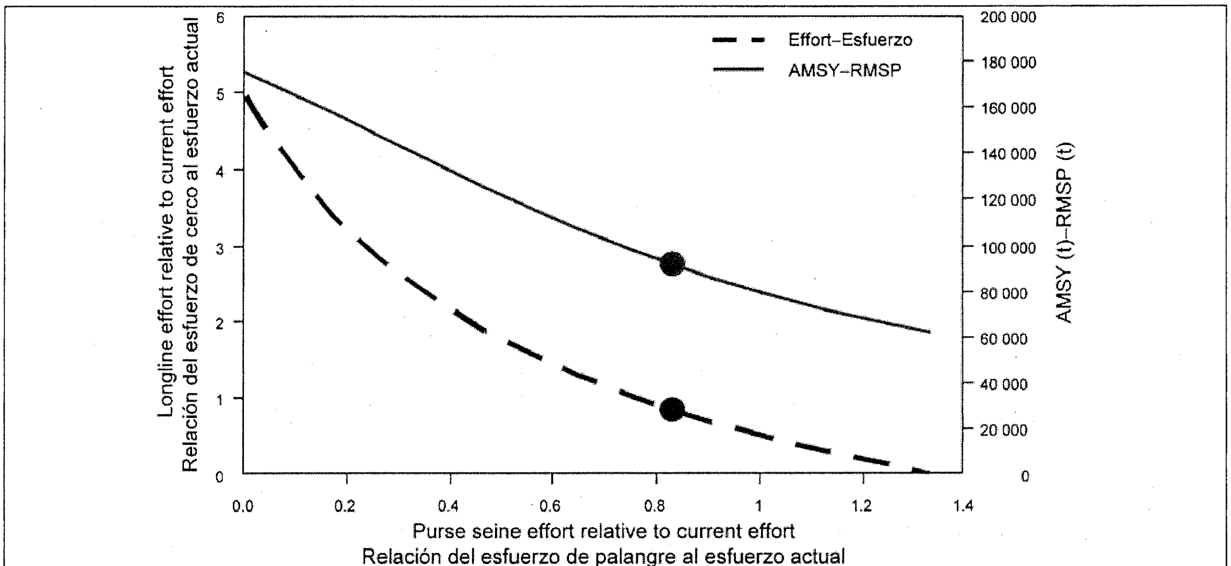


FIGURE 5. The dashed line shows combinations of longline and purse-seine fishing effort (compared to 2004-2006 levels) that will produce the AMSY. The solid line shows the relationship between the AMSY for the whole fishery and purse-seine effort when longline effort is adjusted appropriately to produce the AMSY.

The staff recommends that the Commission:

1. Determine the appropriate adjustments to the balance of the longline and purse-seine fisheries, and note the following three examples of different reductions in each of the two fisheries that would achieve an AMSY level with a different mix of the two gears.

Purse-seine : longline reduction – *F multipliers*	73% : 1.06%	83% : 83%	93% : 0.66%
Longline catch at AMSY	50,229	38,210	28,828
Purse-seine catch at AMSY	49,476	53,308	56,109
AMSY	99,704	91,518	84,937

2. If it wishes to make equal reductions (83%:83%) compared to the provisions of Resolution C-06-02

    2.1. Reduce the catch limits for longline fishing to 83% of their previous values, to:

China	2,190
Japan	28,283
Korea	10,438
Chinese Taipei	6,601

and, for other CPCs, to the greater of 83% of the 2001 catches or 500 t, <u>and</u>

    2.2. Choose one of the three following options for purse-seine limits:

        2.2.1. In addition to the yellowfin closure in 1 (a) above, close the purse-seine fishery on floating objects in the EPO for an additional 35 days[3]; <u>or</u>

        2.2.2. Set a TAC for bigeye tuna taken by purse-seine, and prohibit sets on floating objects after the catch limit has been reached. The initial TAC would be 48,000 t[4], but the Director

[3] Closure = 365 – *F multiplier* × (365 – 42)/(1 + capacity increase)

[4] The initial value of the TAC is 90% of the AMSY for the purse-seine catches. Four increments would provide a TAC of 70,000 t, to accommodate uncertainty in the most recent estimates of recruitment.

would be authorized to increase the limit by up to four increments of 5,500 t each, if he concludes, from examination of available data, that such increases would pose no significant risk to the stock; or

2.2.3. Limit the total annual catch of bigeye tuna by each purse-seine vessel in such a way that the sum of the individual-vessel limits equals 68,000 t[5], and prohibit further sets on floating objects by any vessel that reaches its limit. A vessel's catch of bigeye would be estimated either by the observer or, at the request of the captain, by sampling of the vessel's catch conducted by IATTC staff members at the time of unloading. If the latter option is chosen, the vessel would be responsible for reasonable costs of the sampling.

3. Require that vessels that use FADs mark the FADs in accordance with international standards for marking fishing gear, and maintain a record of the numbers of FADs on board at the beginning and end of each fishing trip and of the numbers and positions of FADs deployed at sea, and make this information available to the Commission.

The estimates of the bigeye catches referred to in section 2.2, except for the observer estimate in 2.2.3, should be calculated on the basis of species composition sampling of unloadings, and the Director should give the CPCs one month's notice of the date on which he estimates that the catch limit will be reached.

4. SOUTHEASTERN PACIFIC SWORDFISH

The stock assessment for southeastern Pacific swordfish (east of 150°W and south of 5°S) indicates that the stock is currently above the level corresponding to the AMSY, but that the current catches are slightly above the AMSY level. The staff assessment for 2004 suggested that the stock was overfished. As a precautionary measure, **the staff recommends that** the annual catches be limited to 13,000 t, by allocating limits to the CPCs involved in the fishery.

5. NORTHERN ALBACORE TUNA

The staff's assessment for northern albacore has not been updated. For clarity, **the staff recommends that** the meaning of the words "current levels" in paragraph 1 of Resolution C-05-02 should be specified.

[5] It is likely that individual vessel limits will produce a total catch less than the sum of the individual limits, and this would reduce catches by more than the initial TAC plus two increments.

APPENDIX: CATCHES INSIDE AND OUTSIDE TWO POTENTIAL CLOSED AREAS

Catches, expressed in metric tons (t), are based on estimates by observers aboard purse-seine vessels >363 t, and include both retained and discarded catch. The catch data from a trip were not used if the observer reports did not contain estimated stratification of catch by size category (<2.5kg, 2.5-15 kg, and >15 kg); this excluded about 15% of the trips, mostly from the northern part of the fishing area (Figure A-1). Section 1 contains estimates of the average purse-seine catches of tunas during 1994-2006 inside and outside the coastal closure area proposed by the staff (Figure 2); Section 2 contains estimates of average purse-seine catches of tunas during 1994-2006 inside and outside the offshore closure area at 90°W-120°W - 6°N-12°S proposed at the *ad hoc* meeting in February 2007 (Figure 4). Each section provides an estimate of changes in catches if the area were closed and an equivalent amount of fishing was carried out outside the area.

1. COASTAL CLOSURE AREA

Figure A-1 shows the distribution of catches of yellowfin (YFT) and bigeye (BET) tuna <15 kg in sets on unassociated schools (NOA) and on floating objects (OBJ) in the EPO.

The average annual purse-seine catches, including discards, of yellowfin, bigeye, and skipjack tunas in the EPO, by size category, inside and outside the proposed coastal closure area during 1994-2006 are shown in Table A-1.

For the purposes of this analysis, the area in which the catches illustrated in Figure A-1 were made was divided into northern and southern coastal areas (covering the coastal closure area in Figure 2) and northern and southern offshore areas (Figure A-2).

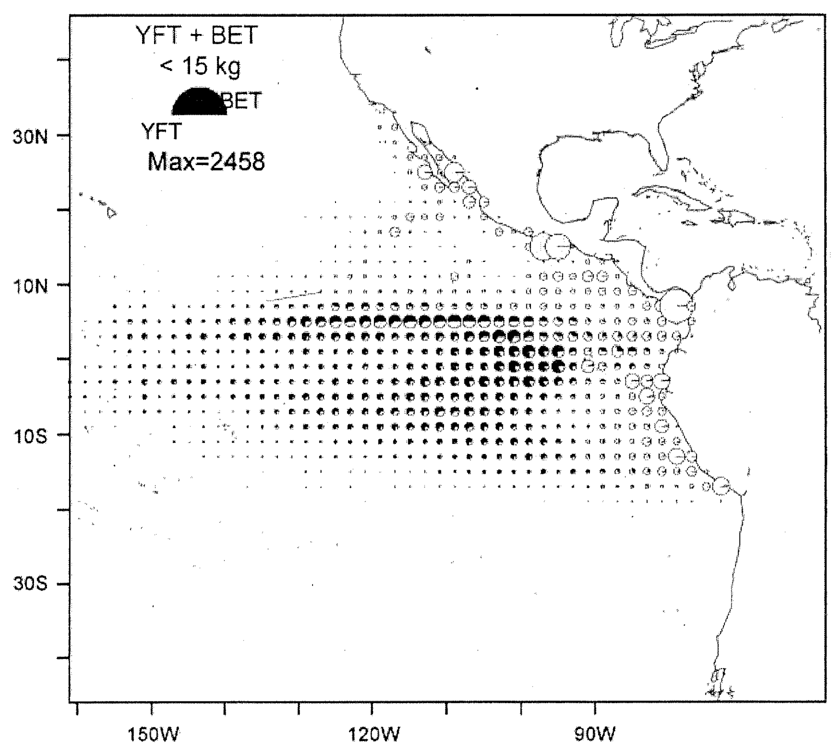


FIGURE A-1.

An approximation of the effect of a closure was made by allocating sets made within the coastal closure area to sets in the offshore areas. The allocations were restricted so that sets associated with dolphins (DEL) or floating objects did not change to the other mode, and that sets on unassociated schools in the northern and southern coastal areas were restricted to the fishing modes shown in the table below.

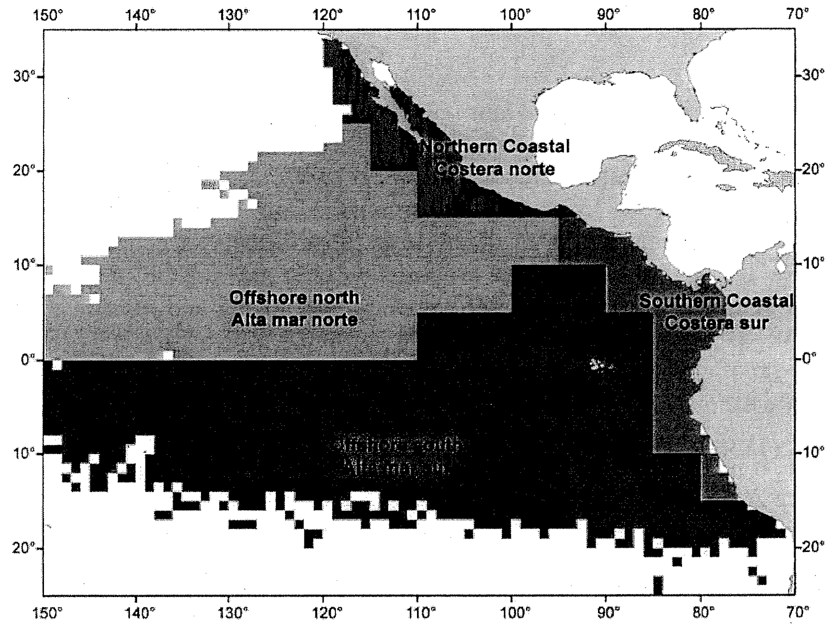


FIGURE A-2.

Set type within coastal closure area	Set type(s) in offshore areas	North or South coastal areas
DEL	DEL or NOA	Both
OBJ	OBJ or NOA	Both
NOA	NOA or DEL	North
NOA	NOA or OBJ	South

The technical details of the approximation are as follows. The sets transferred to the offshore area are apportioned among set types in the average proportion of those set types during 1994-2006; thus, if 40% of sets in the offshore area during that period were made on dolphins, 40% on floating objects, and 20% on unassociated tunas, 100 sets made on dolphins transferred from the coastal area would be apportioned as 67 dolphin sets, 33 unassociated sets, and 0 floating-object sets. In addition, it is assumed that the catch per set by the apportioned sets will equal the average catch per set by the set type to which the set is transferred.

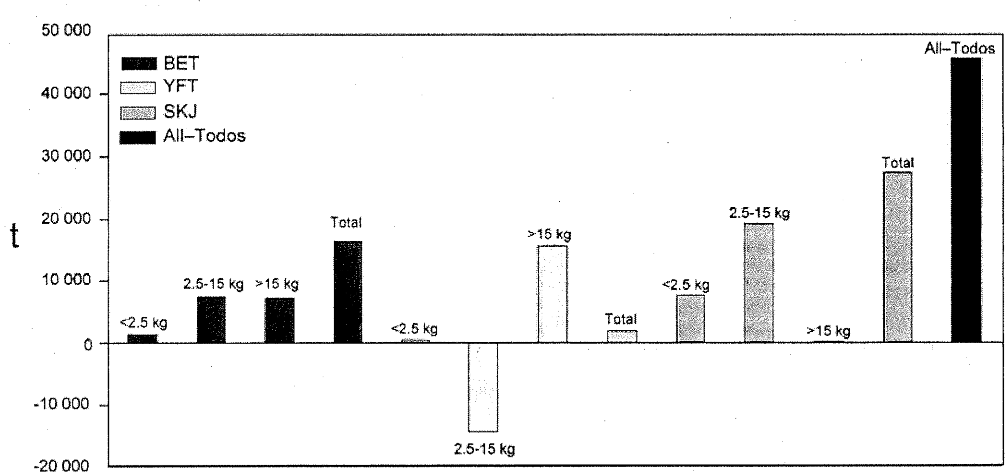


FIGURE A-3. Average change in annual catch, by species, with closure of coastal area

As shown in Figure A-3, a year-long closure of the coastal fishery could result in lower catches of yellowfin <15 kg and higher catches of >15 kg yellowfin, accompanied by some increases in the catches of bigeye and skipjack for that year. The increase in the catch of yellowfin is underestimated because no yield-per-recruit analyses have been made. The increase in catches of bigeye < 15 kg should be examined further.

The majority of yellowfin catches inside the coastal area are taken in the southern coastal area (Table A-2), and most of those catches are taken in the first and second quarters of the year (Table A-3).

2. OFFSHORE CLOSURE AREA

This section presents estimates of the catches of tunas during 1994-2006 inside and outside the proposed offshore closure area (Figure 4).

Table A-4 shows the average annual purse-seine catches of yellowfin, bigeye, and skipjack tunas, by size category, inside and outside the offshore closure area illustrated in Figure 4 during 1994-2006. Overall, 62% of all bigeye caught in the EPO is taken inside this area, but only about half the bigeye <2.5 kg. However, only 18% of the catches of yellowfin and 44% of the catches of skipjack are made in this area.

An approximation of the effect of a closure of the offshore area was made by allocating sets inside the area to sets outside of the area in proportion to the average proportion of those sets in the 1994-2006 time period. In addition, the assumption is made that the catch per set by the displaced sets will equal the average catch per set by the set type to which the set is transferred.

As shown in Figure A-4, the catches of bigeye and skipjack would be likely to be reduced by closing the area, but catches of yellowfin would be increased.

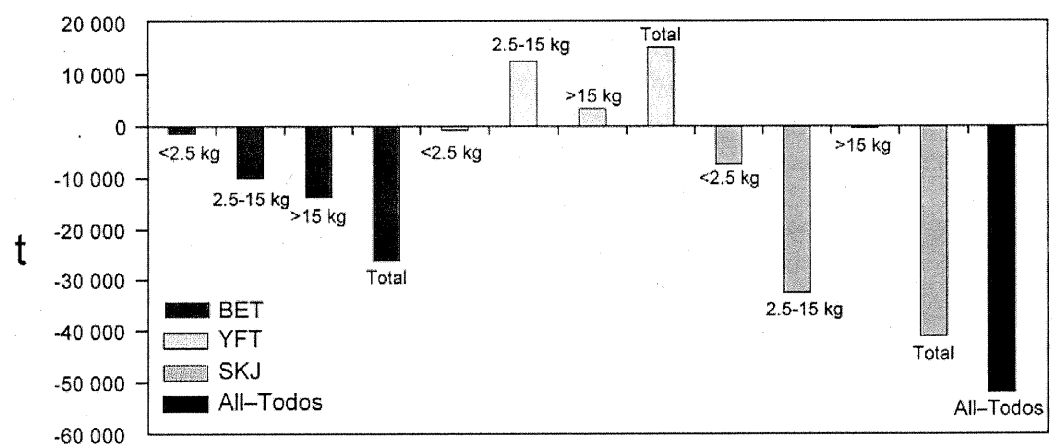


FIGURE A-4. Average change in annual catch, by species, with closure of offshore area

TABLE A-1. Average annual purse-seine catches, including discards, of tunas, by size category, inside and outside the coastal closure area (Figure 2), 1994-2006.

		Inside	Outside	% inside
Bigeye	<2.5 kg	105	4,375	2
	2.5-15 kg	305	23,782	1
	>15 kg	537	23,046	2
	Total	946	51,203	2
Yellowfin	<2.5 kg	1,354	5,158	21
	2.5-15 kg	32,795	39,947	45
	>15 kg	24,896	80,515	24
	Total	59,045	125,620	32
Skipjack	<2.5 kg	6,300	41,088	13
	2.5-15 kg	15,371	93,777	14
	>15 kg	68	1,209	5
	Total	21,739	136,075	14
Grand total		**81,730**	**312,897**	**21**

TABLE A-2. Average annual purse-seine catches, including discards, of tunas, by size category, in the four areas illustrated in Figure A-2, 1994-2006.

	Northern Coastal				Southern Coastal			
	Bigeye	**Skipjack**	**Yellowfin**	**Total**	**Bigeye**	**Skipjack**	**Yellowfin**	**Total**
<2.5 kg	0	496	207	703	105	5,804	1,147	7,056
2.5-15 kg	0	2,257	11,315	13,571	305	13,114	21,481	34,899
> 15 kg	0	0	5,297	5,297	537	68	19,598	20,203
All	0	2,753	16,819	19,572	946	18,986	42,226	62,158
	Northern Offshore				**Southern Offshore**			
	Bigeye	**Skipjack**	**Yellowfin**	**Total**	**Bigeye**	**Skipjack**	**Yellowfin**	**Total**
<2.5 kg	1,311	10,193	1,666	13,170	2,912	29,098	3,388	35,398
2.5-15 kg	6,073	22,139	21,781	49,993	16,900	69,805	17,870	104,574
> 15 kg	3,428	290	33,381	37,099	19,293	918	46,643	66,853
All	10,812	32,621	56,829	100,261	39,105	99,820	67,900	206,825

TABLE A-3. Catches of tunas, by species and quarter, inside and outside the coastal closure area (Figure 2).

	Quarter	Inside	Outside	% inside
Bigeye	1	189	10,622	2
	2	384	12,846	3
	3	250	13,114	2
	4	124	14,620	1
	Total	946	51,203	2
Yellowfin	1	19,048	37,327	34
	2	17,863	32,705	35
	3	12,539	30,161	29
	4	9,595	25,426	27
	Total	59,045	125,620	32
Skipjack	1	8,071	35,830	18
	2	7,088	31,711	18
	3	4,018	32,562	11
	4	2,562	35,973	7
	Total	21,739	136,075	14
Grand total		**81,730**	**312,897**	**21**

TABLE A-4. Average annual purse-seine catches of tunas, by species and size category, inside and outside the offshore closure area (Figure 4), 1994-2006.

		Inside	Outside	% inside
Bigeye	>2.5 kg	2,274	2,203	51
	2.5 kg–12.5 kg	13,603	10,481	56
	>15 kg	16,251	7,328	69
	Total	32,435	20,176	62
Yellowfin	>2.5 kg	2,317	4,189	36
	2.5 kg–15 kg	7,806	64,929	11
	>15 kg	22,890	82,513	22
	Total	33,212	153,045	18
Skipjack	>2.5 kg	17,014	30,368	36
	2.5 kg–15 kg	50,953	58,188	47
	>15 kg	770	504	60
	Total	69,258	89,860	44
Grand total		**134,907**	**263,089**	**34**

INTER-AMERICAN TROPICAL TUNA COMMISSION

75TH MEETING

CANCUN (MEXICO)
25-29 JUNE 2007

PROPOSAL D1

SUBMITTED BY THE UNITED STATES

RESOLUTION ON A MULTI-ANNUAL PROGRAM ON THE CONSERVATION OF TUNA IN THE EASTERN PACIFIC OCEAN FOR 2008, 2009, AND 2010

The Inter-American Tropical Tuna Commission (IATTC), at its 75th Meeting in Cancun, Mexico, in June 2007:

Having responsibility for the scientific study of the tunas and tuna-like species of the eastern Pacific Ocean (EPO), defined as the area bounded by the coastline of the Americas, the 40°N parallel, the 150°W meridian, and the 40°S parallel, and for the formulation of recommendations to Contracting Parties, cooperating non-Parties, fishing entities and regional economic integration organizations (collectively "CPCs") with regard to these tuna resources, and having maintained since 1950 a continuous scientific program directed toward the study of tuna resources;

Recognizes, based on past experience in the fishery, that the potential production from the tuna resource can be reduced by excessive fishing effort;

Being aware with grave concern that, despite the previous conservation and management measures adopted by the Commission, although the catches of bigeye and yellowfin tunas have declined recently, capacity continues to increase and overfishing of bigeye tuna and yellowfin tuna is occurring;

Notes that the tuna resource of the EPO supports one of the most significant surface fisheries for tunas in the world;

Notes the staff's recommendation that the conservation measures for tunas for 2008 should include a closure of the purse-seine fishery of 109 days in order to conserve the stocks of yellowfin and bigeye in the EPO;

Taking into account the best scientific information available, as reflected in the recommendations of the staff and the report of the meeting of the Working Group on Stock Assessments in May 2007; and

Considering that the studies of yellowfin and bigeye tunas presented at this meeting show that the stocks are at a level below that which would produce the average maximum sustainable yield (AMSY);

Resolves as follows:

1. This resolution is applicable in the years 2008, 2009, and 2010 to all purse-seine vessels and all longline vessels fishing for yellowfin, bigeye, and skipjack tunas in the EPO.
2. The objective of this Resolution is to reduce fishing levels to levels that will produce the AMSY of yellowfin tuna within three years, and of bigeye tuna within five years.
3. Pole-and-line, troll, and sportfishing vessels are not subject to this resolution.
4. In each one of the years covered by this resolution, the fishery for tunas by purse-seine vessels in the EPO shall be closed for the rest of that year when a total allowable catch (TAC) of 200,000 metric

tons of yellowfin tuna is reached. The Director will be authorized to decrease or increase the TAC by no more than four reductions or increments of 30,000 metric tons each, if the Director concludes, from examination of available data, that any such decreases are required to increase the stock to the level producing AMSY or any such increases will pose no significant risk to the stock so as not to fall below the level producing AMSY. Any reduction or increase shall go into effect 30 days after the Director has notified each CPC that the Director has determined such change is appropriate and provided the information upon which the Director's determination was based.

5. In addition, during 2008, 2009, and 2010, each CPC shall limit the annual catch of bigeye tuna by each one of its purse-seine vessels to no more than 500 metric tons per vessel.

6. Each CPC shall, for purse-seine fisheries:

   a. Before the date of entry into force of the closure, take the legal and administrative measures necessary to implement the closure;

   b. Inform all interested parties in its national tuna industry of the closure;

   c. Inform the Director that these steps have been taken;

   d. Ensure that at the time a closure begins, and for the entire duration of the closure, all purse-seine vessels fishing for yellowfin, bigeye, or skipjack tunas flying its flag, or operating under its jurisdiction, in the EPO are in port, except that vessels carrying an observer from the AIDCP On-Board Observer Program may remain at sea, provided they do not fish in the EPO. The only other exception to this provision shall be that vessels carrying an observer from the AIDCP On-Board Observer Program may leave port during the closure, provided they do not fish in the EPO.

7. Each CPC shall take the measures necessary to control the total annual longline catch of bigeye tuna in the EPO during 2008, 2009, and 2010 by longline vessels fishing under its jurisdiction.

8. China, Japan, Korea, and Chinese Taipei shall take the measures necessary to ensure that their total annual longline catches of bigeye tuna in the EPO during 2008, 2009, and 2010 does not exceed the following levels:

China	2,190 metric tons
Japan	28,283 metric tons
Korea	10,438 metric tons
Chinese Taipei	6,601 metric tons

9. Other CPCs shall take the measures necessary to ensure that their total annual longline catches of bigeye tuna in the EPO during 2008, 2009, and 2010 do not exceed 500 metric tons or their respective catches of bigeye tuna in 2001, whichever is higher[1].

10. To prohibit landings, transshipments and commercial transactions in tuna or tuna products that have been positively identified as originating from fishing activities that contravene this resolution. The Director shall provide relevant information to the Parties to assist them in this regard. The Commission shall develop transparent and non-discriminatory criteria and procedures to promote compliance in the EPO, consistent with international law, including World Trade Organization agreements and other applicable trade agreements.

11. Catches of bigeye tuna by large-scale longline vessels (> 24 meters in length) that are not landed in ports in the EPO will be verified for the purpose of paragraphs 8-11 through either Commission-approved port sampling programs or at-sea observers. The Director shall determine, and announce to the CPCs, the appropriate level of observer coverage.

12. Each CPC shall, in each of the years covered by this resolution, notify the Director by 15 July of national actions taken to implement this Resolution, including any controls it has imposed on its fleets

and any monitoring, control, and compliance measures it has established to ensure compliance with such controls.

13. Each CPC with tuna longline vessels shall provide monthly of reports of longline catches of bigeye tuna to the Director.

14. To evaluate progress towards the objectives of paragraph 2 of this Resolution, in 2008 the IATTC Scientific Working Group will analyze the effects on the stocks of the implementation of Resolution C-06-02, Resolution C-04-09, and previous conservation and management measures, and will propose to the Commission, if necessary, appropriate measures to be applied in 2009 and thereafter.

15. Each CPC shall comply with this resolution.

---

[1] The Parties acknowledge that France, as a coastal State, is developing a tuna longline fleet on behalf of its overseas territories in the EPO.

Agenda Item F.3.b
HMSAS Report
September 2007

HIGHLY MIGRATORY SPECIES ADVISORY SUBPANEL REPORT ON YELLOWFIN TUNA OVERFISHING

The Highly Migratory Species Advisory Subpanel (HMSAS) recognizes that yellowfin tuna overfishing needs to be addressed. The HMSAS agrees that all present U.S. domestic measures are adequate as they apply to the U.S. fisheries. The HMSAS also recognizes that the U.S. fishery for yellowfin tuna both commercially and recreationally could be viable in the future and would like to see regulatory measures addressing present overfishing have some flexibility in this regard.

International measures to address the present overfishing could include capacity reduction, fish aggregation device fishing reductions, area closures, and other measures to address the immediate problem.

PFMC
08/23/07

HIGHLY MIGRATORY SPECIES MANAGEMENT TEAM REPORT ON YELLOWFIN TUNA OVERFISHING

As outlined in the Situation Summary, the Magnuson Stevens Act (MSA) includes new Council requirements related to international overfishing. For overfishing of yellowfin tuna in the Eastern Pacific Ocean (EPO), the Council has until March 30, 2008, to meet these requirements. Specifically, the Council is required to develop recommendations for domestic regulations to address the relative impact of United States vessels on the stock (MSA Section 304(i)(2)(A)) and to submit recommendations to the Secretary of State and Congress for international actions to end overfishing and rebuild the stock (MSA Section 304(i)(2)(B)).

The Highly Migratory Species Management Team (HMSMT) is uncertain whether these MSA requirements are fully satisfied with the Council's recommendations due on March 30, 2008, or they are on-going requirements for the Council. If they are on-going requirements, what are the frequency and schedule for complying with them? For example, are these annual requirements due every March 30 until overfishing of yellowfin tuna ends and stocks are rebuilt?

The HMSMT considered information on the status of yellowfin tuna and potential management measures contained in Attachments 1 through 5 to the Situation Summary. Given the short time period allowed to develop recommendations, the HMSMT has relied on recommendations and proposals already developed by the United States, the International Scientific Committee for Tuna and Tuna-like Species (ISC) and the Inter-American Tropical Tuna Commission (IATTC) to address yellowfin tuna overfishing. The HMSMT would also like to incorporate relevant outcomes from the October 2007 IATTC meeting into the draft report to Congress and the State Department; the Council is scheduled to consider for final action at its March 2008 meeting. Upon Council direction, the HMSMT could conduct a more in-depth analysis and potentially recommend other management measures in the future if MSA poses an on-going requirement.

For domestic regulations, the HMSMT does not recommend new management measures. The HMSMT considers current measures included in the HMS fishery management plan adequate to address the very low impact of U.S. fisheries on the stock. Based on the best available estimates, U.S. domestic fisheries account for a very small portion (about 1 percent) of the total yellowfin tuna catch. Of particular note, the sport fishery is a significant component of the U.S. domestic fishery and accounts for about one-third of the U.S. catch. The full complement of domestic regulations (federal and state) for U.S. fisheries catching EPO yellowfin tuna will be included in the draft report provided for Council consideration in March 2008.

For international measures, the HMSMT considers capacity reduction a key component to ending overfishing and rebuilding the EPO yellowfin tuna stock. Progress to reduce fishing capacity in the international fisheries arena has been slow. Decisions are heavily politicized and numerous regional fishery management organization (RFMO) staff recommendations to work at reducing capacity have been disregarded. The HMSMT encourages the Council to strongly support faster adoption and full implementation of recommended measures.

The HMSMT recommends the Council further evaluate the measures proposed by the IATTC and its staff in 2007 (Attachments 3 and 4) to be presented in March 2008. In February, IATTC staff noted that the *Plan for regional management of fishing capacity* has not been implemented and its target for purse seine capacity has not been reached. They indicated that the target may not be sufficient to meet conservation goals and other measures may be needed. Staff also identified several management tools to evaluate for potential conservation benefits, including closing critical areas for juvenile yellowfin, setting a total allowable catch, considering national quotas or individual fishing quotas, implementing the *Plan for regional management of fishing capacity,* and assessing the impacts of fish aggregation devices (FADs) and fishing on adult yellowfin tuna.

In June the IATTC staff further developed management recommendations. As described in Document IATTC 75-07b REV (Agenda Item F.3.a, Attachment 4) key management proposals are:

1. Extend the closure periods for the purse seine fishery to 74 days, and longer if the capacity of the purse seine fleet continues to increase.
2. Set a total allowable catch of 200,000 mt for the purse seine fleet in the EPO, with Director's discretion to increase or decrease the cap if conditions warrant.
3. Consider seasonal closures of coastal areas to purse seine vessels fishing for tropical tunas. The IATTC also noted some of the interactions and impacts of recommended measures for fisheries for bigeye and skipjack tunas. They recommended evaluating the impact of using FADs to address conservation of bigeye tunas which may also be beneficial for yellowfin tuna, especially juveniles.

The HMSMT recommends the Council also consider and evaluate the recommendations included in the U.S. proposal for the conservation of tuna in the EPO for 2008, 2009, and 2010 (Attachment 5). The objective of the U.S. proposal is to reduce fishing levels to those that will produce the average maximum sustainable yield of yellowfin tuna within three years. The recommendations would apply to all purse seine and longline vessels fishing for yellowfin, bigeye, and skipjack tunas, but pole-and-line, troll and sportfishing vessels would be exempt. The U.S. proposal includes the following measures beneficial for yellowfin tuna conservation:

1. Set a total allowable catch of 200,000 mt of yellowfin tuna with Director's discretion. This is the same as the IATTC proposal.
2. Indirectly reduce some purse seine effort on yellowfin tuna via catch caps for bigeye tuna. When bigeye catch caps on individual purse seine vessels are met, the vessel must remain in port or carry an observer and not fish in the EPO.
3. Prohibit landings, transshipments and commercial transactions in tuna products that have been identified as taken in contravention of the U.S. proposal.

In summary, the HMSMT suggests the Council consider the following to meet Magnuson-Stevens Act Section 304(i) requirements:

1. Clarify if MSA requirements are met in March 2008 for yellowfin tuna overfishing and if not, the schedule for any on-going requirements.

2. For U.S. domestic regulations (Section 304(i)(2)(A)), maintain that current domestic regulations are satisfactory and no new domestic regulations are needed to address overfishing of yellowfin tuna.

3. For international management measures (Section 304(i)(2)(B)), the HMSMT recommends evaluating the following conservation and management measures for public review, with final adoption of a suite of recommendations in March 2008:

    a) Specify further measures to limit capacity of the purse seine fleet as discussed in Document IATTC-75-7b REV and the Council's previous letter to the U.S. delegation (Agenda Item F.3.a, Attachment 1).

    b) Extend the current purse-seine time/area closure to 74 days, as discussed in Document IATTC-75-7b REV.

    c) Apply the additional coastal area closure discussed in Document IATTC-75-7b REV.

    d) Adopt the elements of the U.S. proposal (Agenda Item F.3.a, Attachment 5) for 2008–10 as may be modified in any proposal submitted at the October 22-24, 2007, IATTC meeting. These include an adjustable 200,000 mt TAC for purse seine catches, purse seine vessel catch limits of 500 mt for bigeye tuna, and extension of the current national quotas for longline catches of bigeye.

    e) Further develop proposals for a registry of FADs, FAD marking, and limits on the total number of FADs that may be deployed, as discussed in the Council's previous recommendations (Agenda Item F.3.a, Attachment 1).

4. Consider making specific recommendations to the U.S. delegation at the October 2007 IATTC meeting, based on the range of measures outlined above.

PFMC
08/23/07

Agenda Item F.3.b
Supplemental SSC Report
September 2007

SCIENTIFIC AND STATISTICAL COMMITTEE REPORT ON YELLOWFIN TUNA OVERFISHING

Dr. Mark Maunder (Inter-American Tropical Tuna Commission [IATTC]) briefed the Scientific and Statistical Committee (SSC) on the stock assessment conducted for yellowfin tuna in the Eastern Tropical Pacific (Agenda Item F.3.a, Attachment 2). The SSC reviewed the assessment, noting that there is currently no terms of reference document for highly migratory species stock assessments. The report on the yellowfin tuna stock assessment, however, includes most of the information typically included in a stock assessment report used for Council decision-making and hence could be reviewed by the SSC. Based on its review of the assessment, the SSC endorses the assessment, and its use for status determination purposes.

The assessment indicates that the spawning stock biomass (SSB) has been relatively stable since 1984 with periodic fluctuation. For the base-case assessment, the stock is estimated to be slightly below SSB_{MSY} with a fishing mortality rate (F) slightly above F_{MSY}. Therefore, based on the point estimates from the base-case assessment, overfishing is occurring and the stock is in an overfished state under the terms of the IATTC treaty. However, it should be noted that there is considerable uncertainty in the "current" estimates of both F and SSB. Also, note that the "current" estimates reflect an average over 2003-2005.

The base-case assessment assumes that recruitment is independent of SSB (i.e. steepness is one). The extent to which "current" F exceeds F_{MSY} depends on the relationship between spawning biomass and recruitment; the lower the value of steepness, the greater the implied extent of overfishing. Dr. Maunder noted that steepness for yellowfin tuna was unlikely to be one, but that it was also unlikely to be much lower than one.

The recruitment used in the calculation of SSB_{MSY} is the average over the entire period considered in the assessment. However, Dr. Maunder noted that the results of the assessment are consistent with a change in average recruitment in about 1984. The value of SSB_{MSY} would have been higher had it been based on recent (post-1983) recruitment; and hence the current stock status determination would have been more pessimistic.

Finally, the SSC notes that, at present, very few U.S.-flagged vessels operate in the commercial fishery for yellowfin tuna and landings are minimal (approximately 1% of the total). Hence, multi-national management arrangements are needed to stop overfishing.

PFMC
09/11/07

Agenda Item F.4
Situation Summary
September 2007

NORTH PACIFIC ALBACORE TUNA STOCK ASSESSMENT

The International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean (ISC) held its plenary session July 25–30, 2007, in Busan, Korea. As part of its mandate to assess stocks and analyze fisheries occurring in the North Pacific, the ISC's Albacore Working Group finalized a stock assessment for North Pacific albacore tuna (Attachment 1 is the ISC plenary report. Printed excerpts are attached; the full report is available on CD-ROM and Web only. Attachment 2 is the Albacore Working Group Report, available on CD-ROM and Web only). The ISC assessment process involves collaboration by scientists from member nations on data contributions and model review but independent peer review is not part of the process. The Council's Scientific and Statistical Committee is scheduled to review the North Pacific albacore stock assessment and report to the Council. After evaluating the utility of the stock assessment, the Council is scheduled to consider recommendations for fishery management in the international arena.

The ISC and the Western and Central Pacific Fisheries Commission (WCPFC) have entered into a memorandum of understanding on the provision of scientific advice to the WCPFC and its Northern Committee. The Northern Committee is responsible for developing conservation and management recommendations for stocks occurring north of 20º N latitude in the Pacific Ocean and comprises members situated in the area or fishing on such stocks. The Commission may only accept or reject recommendations made by the Northern Committee. If the Commission rejects such advice it returns the matter to the Northern Committee. In effect, the Commission may only make an up or down vote on Northern Committee recommendations and cannot independently modify them. Thus the Northern Committee plays an important role in the international management of highly migratory species stocks in the northwest Pacific (north of 20° N latitude and west of 150° W longitude). The Northern Committee holds its third regular session September 11–13, 2007, in Tokyo, Japan, which is the same time as the September Council meeting. Therefore, Council input on conservation and management measures for North Pacific albacore would have to be immediately transmitted to the U.S. delegation at the Northern Committee meeting in Tokyo if they were to affect the formulation of their recommendations. (Attachment 3 is an April 2007 request to reschedule the Northern Committee meeting and a reply from Bill Robinson, National Marine Fisheries Service Pacific Islands Regional Administrator.)

The Council may also wish to develop conservation and management recommendations for the U.S. delegation to the fourth regular session of the WCPFC, scheduled for December 3–7, 2007, at this time. One of the Commissioner seats is designated for a Pacific Council member. Ms. Marija Vojkovich is being considered for Presidential appointment to this seat. Agenda Item B.1.a, Attachment 2, preliminary November Council meeting agenda, shows an agenda item to further refine recommendations to the WCPFC. This would be an opportunity to receive a report on the Northern Committee recommendations and comment on them in time for the December WCPFC fourth regular session, if the Council decides to keep this item on the November 2007 meeting agenda.

Council Action:

Review North Pacific Albacore stock assessment and develop recommendations to the U.S. delegation at the Northern Committee meeting and/or the WCPFC fourth regular session.

Reference Materials:

1. Agenda Item F.4.a, Attachment 1: Report of the Seventh Meeting of the International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean Plenary Session, 25-30 July 2007, Busan, Korea (*Printed excerpts; full document on CD-ROM and Web only*).
2. Agenda Item F.4.a, Attachment 2: Report of the Albacore Working Group Workshop, ISC, November 28-December 5, 2006, Shimizu, Japan (*on CD-Rom and Web only*).
3. Agenda Item F.4.a, Attachment 3: Letter to Bill Robinson and reply on scheduling of the WCPFC Northern Committee meeting.
4. Agenda Item F.4.c, HMSMT Report.
5. Agenda Item F.4.c, HMSAS Report.

Agenda Order:

a. Agenda Item Overview — Kit Dahl
b. Southwest Fishery Science Center Report — Paul Crone
c. Reports and Comments of Advisory Bodies
d. Public Comment
e. **Council Action:** Review Stock Assessment and Develop Recommendations to the U. S. delegation to the Western and Central Pacific Fisheries Commission (WCPFC)

PFMC
08/23/07

International Scientific Committee for Tuna and Tuna-like Species in the North Pacific

REPORT OF THE SEVENTH MEETING OF THE INTERNATIONAL SCIENTIFIC COMMITTEE FOR TUNA AND TUNA-LIKE SPECIES IN THE NORTH PACIFIC OCEAN

PLENARY SESSION

25-30 July 2007
Busan, Korea

TABLE OF CONTENTS

REPORT OF THE SEVENTH MEETING OF THE INTERNATIONAL SCIENTIFIC COMMITTEE FOR TUNA AND TUNA-LIKE SPECIES IN THE NORTH PACIFIC OCEAN

Busan, Korea
Plenary Session, July 25-30, 2007

LIST OF TABLES

LIST OF ANNEXES

REPORT OF THE SEVENTH MEETING OF THE INTERNATIONAL SCIENTIFIC COMMITTEE FOR TUNA AND TUNA-LIKE SPECIES IN THE NORTH PACIFIC OCEAN

Busan, Korea
Plenary Session, July 25-30, 2007

Highlights of the ISC7 Plenary Meeting

The ISC7 Plenary, held in Busan, Korea from 25-30 July 2007, was attended by delegations from Canada, Chinese Taipei, Japan, Korea, Mexico and the United States. The Plenary reached consensus on several important issues including stock status and conservation advice, as well as governance and data management procedures. Based on assessments carried out during the past year, recommendations regarding the reduction of fishing mortality rates for albacore and striped marlin were adopted. Plans for undertaking a Pacific bluefin tuna assessment in the next year were approved. Governance and operational procedures were updated and amended in the form of an Operations Manual which was approved by the members. Through discussion, data management procedures underwent continued development and improvement. The next Plenary will be held in July 2008 in either Japan or Chinese Taipei.

1 INTRODUCTION AND OPENING OF THE MEETING

1.1 Introduction

The ISC was established in 1995 through an intergovernmental agreement between the governments of Japan and the United States of America. Since its establishment and first meeting in 1996, the ISC has undergone a number of changes to its charter and name (from the Interim Scientific Committee to the International Scientific Committee) and has adopted guidelines for its operations. The two main goals of the ISC are to 1) to enhance scientific research and cooperation for conservation and rational utilization of the species of tuna and tuna-like fishes which inhabit the North Pacific Ocean during a part or all of their life cycle; and 2) to establish the scientific groundwork, if at some point in the future, it is decided to create a multilateral regime for the conservation and rational utilization of these species in this region. The Committee is made up of voting Members from coastal states and fishing entities of the region and coastal states and fishing entities with vessels fishing for highly migratory species in the region, and non-voting members from relevant intergovernmental fishery and marine science organizations, recognized by all voting Members.

The ISC provides scientific advice on the stocks and fisheries of tuna and tuna-like species in the North Pacific to the Member governments and regional fishery management organizations. The most recently available data for which complete statistics have been tabulated by ISC Members and reported for their fisheries operating in the North Pacific is 2005. The total landed amount was 643,568 metric tons (t) of the major species (albacore – *Thunnus alalunga*, bigeye tuna – *T. obesus*, Pacific bluefin tuna – *T. orientalis*, yellowfin tuna – *T. albacares*, skipjack tuna – *Katsuwonus pelamis*, swordfish – *Xiphias gladius*, striped marlin – *Tetrapterus audax*, and blue marlin- *Makaira nigricans*). This represents an increase in catch of just over 15% in comparison to 2004 data. In 2005 there were slight increases in Pacific bluefin and yellowfin tuna catches and swordfish catches, but the main contributor to the higher catches in 2005 was the increase in skipjack tuna catches from 243,128 t in 2004 to 328,146 t in the following year.

1.2 Opening of the Meeting

The Seventh Plenary meeting of the ISC was convened at 0900 on 25 July 2007 by the Chairman, G. Sakagawa. A role call confirmed the presence of delegates from Canada, Chinese Taipei, Japan, Korea, Mexico and the United States (U.S.) (*Annex 1*). Absent members were China, the Inter-American Tropical Tuna Commission (IATTC), the Secretariat for the Pacific Community (SPC) and the Food and Agriculture Organization (FAO). A Western and Central Pacific Fisheries Commission (WCPFC) representative attended as an Observer.

Deok-Bae Park, President of Korea's National Fisheries Research and Development Institute (NFRDI) officially welcomed the participants to Busan. He noted that this year marks the 50^{th} anniversary of Korea's distant water fisheries, including the tuna longline fishery, and encouraged scientists in their important work toward providing conservation advice for the valuable tuna species that inhabit the North Pacific.

After some brief logistical announcements, the agenda for the meeting was tabled (*Annex 2*). S. Clarke was assigned lead rapporteur duties. Assistance was provided by J. Brodziak and K. Uosaki for Agenda Item 7 and G. DiNardo and Y. Takeuchi for Agenda Item 9.

2 ADOPTION OF AGENDA

One addition to the agenda involving a presentation by H. Honda regarding research on recruitment of Pacific bluefin tuna and opportunities for collaboration was proposed. The Chairman suggested this presentation could be scheduled between Agenda Items 8 and 9. With this change the agenda was adopted.

3 DELEGATION REPORTS ON FISHERY MONITORING, DATA COLLECTION AND RESEARCH

3.1 Canada

M. Stocker presented a summary of catch, effort, and catch per unit of effort (CPUE) data for the Canadian North Pacific albacore tuna fishery in 2006 (*ISC/07/PLENARY/04*). The Canadian fishery for albacore in the North Pacific is a troll fishery using tuna jigs. All Canadian vessels must carry logbooks while fishing for highly migratory species in any waters. Detailed analysis of a combination of sales slips, logbooks, phone-in and transhipment records are undertaken to report fisheries statistics for the Canadian albacore fishery.

In 2006, 171 Canadian vessels operated in the North Pacific Ocean and caught 5,819 t of albacore in 6,239 vessel days (v-d) of fishing for a CPUE of 0.93 t/v-d. Estimates for 2006 are considered preliminary. Both catch and CPUE have followed an increasing trend over the period 1995-2004 and then dropped in 2005. The catch and CPUE increased from 2005 to 2006. Almost all of the 2006 catch was taken within 200 miles of the North American coast. Access by Canadian albacore vessels to waters in the US Exclusive Economic Zone (EEZ) is governed by a US-Canada albacore treaty.

In terms of research activities, a project to document the existing relational database for the Canadian Pacific albacore catch and effort data has been completed. A technical report has been published and is available at http://www.dfo-mpo.gc.ca/Library/327827.pdf. The report describes the design of the entire database (including trip log, sales slip and hail components) based on a Venn diagram concept, and includes a figure that documents the structure of the relationships between these components.

Discussion

A question was raised regarding the reason for the continued increasing trend in CPUE in the albacore troll fishery. M. Stocker replied that this could be explained by the fact that the most skilled fishermen remain active in the industry. This creates a situation where the catch rate is increasing while the total catch and effort are decreasing.

3.2 Chinese-Taipei

Shyh-Jiun Wang presented the report for Chinese Taipei (*ISC/07/PLENARY/05*). There are two major Chinese Taipei tuna fisheries operating in the North Pacific. Distant water longliners (DWLL) >100 GRT usually operate in the high seas or under license in foreign EEZs. Offshore longliners (OSLL) are smaller than 100 GRT and generally operate in the waters of Chinese Taipei.

The number of DWLL vessels operating in the Pacific Ocean in 2005 was 133, but reduced to 117 in 2006. Catches of albacore in the North Pacific were estimated at about

4,000 t per year in 2004-2006, whereas Pacific bluefin tuna catches have been < 1 t per year since 2000. Catches of swordfish were <100 t before 2000, increased to more than 1,000 t in 2001 to 2003 due to increasing fishing efforts for bigeye tuna, but then declined to <1,000 t in 2004 to 2006. Most Chinese Taipei DWLL vessels operate in the North Pacific from September to the following March, then shift to the South Pacific to target southern albacore from April through August.

The OSLL vessels generally target bigeye tuna and yellowfin tuna with considerable swordfish and marlin bycatch. OSLL catch of albacore is 100-900 t since 2000. Catches of Pacific bluefin tuna peaked at 3,000 t in 1999 and reduced to a level of 1,500-2,000 t after 2000. The catch of swordfish was 1,813 t in 2005 and estimated at 2,587 t for 2006. These catch estimates do not include landings in frozen form. From logbooks collected between 2002 and 2005, it was observed that fishing activities have been primarily located in the area of 110 to 150°E and 10-30°N, i.e. in waters southeast of Chinese Taipei and northeast of the Philippines.

Size frequency data on major tuna and tuna-like species caught by DWLL and OSLL fisheries in the North Pacific region are available from 2004-2006. For DWLL fisheries, the catch size data is recorded in logbooks. For OSLL fisheries, the data were collected from port sampling in domestic tuna fishing ports under a sampling program begun in 1997. Port sampling was carried out in Pago Pago (American Samoa), Suva and Levuka (Fiji) in 2005 and American Samoa in 2006. An observer program was launched in 2001 and included 2 North Pacific trips in 2004-2005 and 3 North Pacific trips in 2006. VMS has been mandatory for all DWLLs operating in the Pacific since June 2004. VMS data are used to verify logbook data. National Taiwan University (NTU) has conducted stock assessments for swordfish and sailfish, and is currently undertaking a stock assessment of blue marlin. Biological studies are in progress on black and striped marlin and a billfish tagging program has been undertaken.

Discussion

Chinese Taipei delegates were asked about their efforts to improve data coverage and quality. R.F. Wu responded that in the past Category I catch data had relied on agent and trade slips only but that now logbooks and VMS records are being used to cross-check these data. Finer scale Category II data will be similarly cross-checked but the data for 2006 are still considered preliminary.

Clarification was requested as to the coverage of the catches reported in Table 1 of the Chinese Taipei national report and specifically whether catches landed in frozen form and foreign landings were included. R.F. Wu responded that frozen catch from OSLLs is difficult to classify by fishing ground since it may have come from the Indian Ocean. Chinese Taipei officials hope to be able to better deal with this issue in the future. Nevertheless, Chinese Taipei delegates consider that DWLL catches are not affected by this issue, and OSLL catches are not drastically affected because the frozen catch in the North Pacific is not very large.

A question was raised regarding the plans to increase North Pacific observer coverage in the future. This issue is still under discussion by Chinese Taipei authorities but efforts to increase the observer coverage will continue.

In response to a request for more details on the billfish tagging program, C.L. Sun replied that this research was conducted by the National Taiwan University in conjunction with the Fisheries Research Institute and Fisheries Agency. However, now that it is becoming an important research program, it will be taken over by the Fisheries Research Institute. Results have been good thus far and there are plans to add black and striped marlin to the program. Opportunities for collaboration are available.

The Plenary Chairman reminded the delegates that the report falls short of the ISC requirements because it implies that there are only two fisheries for tuna and tuna-like species. In reality, other coastal gears are being deployed and should be covered in a more comprehensive report. Complete information on billfishes taken by all fleets is also required. The Chairman noted that this comment was also raised last year.

Clarification of the coverage rate for the DWLL catch records was requested. R.F. Wu replied that the coverage rate is >80%. Chinese Taipei delegates were then asked to explain how it had been possible to incorporate the requirement to measure fish into their logbook regulations. R.F. Wu replied that it was a requirement to measure the first 30 fish caught each day regardless of species. Tunas are measured from snout to fork; billfish are measured from lower jaw to fork. As mentioned in the presentation, there is some port sampling and though this began only 3 years ago it has already been expanded to Mauritius and Trinidad-Tobago, and will be further expanded with the hiring of 17 new government employees with college degree assigned to domestic port sampling. It was pointed out, however, that under the current system there is no way to validate the fishermen's measurements with those of independent observers and this should be considered as an essential element of the port sampling in the future. Another suggestion was made to weight the length frequency data in Figure 3 by catch since this might reflect a different distribution than that shown by the un-raised length frequencies in Figure 3.

3.3 Korea

S.D. Hwang presented the national report for Korea (*ISC/07/PLENARY/11*). From 1995-2006 the annual total catch of fishes captured by the Korean distant-water longline fleet in the North Pacific ranged between 11,403 and 27,212 t (average 17,818 t). In 2006, the annual catch increased compared to recent years to 19,711 t compared with recent years. Major species caught by longlines in the North Pacific were bigeye tuna (11,152 t, 57%) and yellowfin tuna (5,079 t, 26%) in 2006. The catch of Pacific bluefin tuna was negligible.

Most Pacific bluefin tuna produced by Korea were by-catch in the domestic purse seine fishery targeting mackerels. The annual catch of Pacific bluefin tuna by 33 purse seiners and 4 trawlers fluctuated in 2001-2006 between 591 and 1,005 t. In 2006, the monthly catch was highest in the months of April (248 t, 30%) and August (285 t, 34%). In

Korean coastal areas, most Pacific bluefin tuna are small individuals of 26-100 cm fork length (FL). The 40-50 cm FL size class dominated in 2006 whereas the 50-60 cm FL class dominated in 2004 and 2005. Catches of Pacific bluefin tuna were mainly taken in the southern coastal waters of Korea near Jeju and Tsushima Islands. The distribution of Pacific bluefin tuna catch appears to depend on the distribution of the fishery fleet's target species and the degree of biological interaction among Pacific bluefin tuna, mackerels and squids.

NFRDI initiated an international fisheries observer program for distant-water fisheries in 2002. In 2006, nine observers were deployed on Korean fishing vessels. To reduce numbers of seabird and sea turtle by-catch in the tuna longline fishery, guidebooks and posters summarizing information on these species were distributed to fishing boats including tuna longliners.

Discussion

Several technical questions were raised regarding the data presented. In response Korean delegates replied that:

- data for "white marlin" is actually data for "black marlin";
- due to delays in compiling data 1-3 years are required to finalize the catch figures;
- the mackerel species being targeted by purse seines are the same species as those targeted in Japan;
- the observed relationships between Pacific bluefin tuna abundance and oceanographic conditions were based on surface water temperature data;
- there are no size data available for billfishes even though the flying squid gill net fishery may have caught billfishes as bycatch;
- the original information underlying Table 1 is collected in both number and weight; and
- Korean purse seiners use general purpose purse seine nets for targeting small pelagic fishes which have not been modified to target Pacific bluefin tuna.

Several data requests were raised including provisions of catch-by-size for Pacific bluefin tuna caught by the Korean purse seine fishery, and data similar to those in Table 1 but for billfish so that average weights can be calculated. To the latter request, D.H. An replied that since the Korean longline fishery is targeting yellowfin tuna and bigeye tuna they may not have data for billfishes.

A final question pertained to why Figure 2 shows a considerable change in fork length (FL) of Pacific bluefin tuna from 2000-2006 and whether this could indicate a change in fishing grounds. After discussion by the group it was concluded a change in fishing grounds was unlikely. Instead, the increase in sample size from <500 to nearly 5,000 was probably responsible for the change. S.D. Hwang noted that it is probably unrealistic to expect that the entire size range of Pacific bluefin tuna could be sampled from a fishery in which this species is not a target species.

3.4 Japan

The national report for Japan was presented by H. Yamada (*ISC/07/PLENARY/09*). Japanese tuna catches are collected by three major fisheries, i.e. longline, purse seine, pole-and-line, as well as other miscellaneous fisheries like troll, drift net and set net fisheries. Total landings of tunas, swordfish and billfishes in the Pacific Ocean were 543,000 t in 2005.

Total catch of longline vessels smaller than 20 GRT has continuously increased since the 1980s, and was 30,000 t in 2005. The effort of this fishery was relatively stable in the 1980s, but increased after that. The total catch and effort of longline vessels larger than 20 GRT was stable until 1990, but both catch and effort have shown decreasing trends since then. The total catch was 45,000 t in the North Pacific in 2005. Bigeye tuna has been the dominant species in the landings.

Total catch of the purse seine fishery in the waters north of 20ºN was variable during the documented period, ranging from 23,000 t to 102,000 t, and was 80,000 t in 2005. Skipjack tuna (skipjack) dominates in purse seine catch, followed by Pacific bluefin tuna and yellowfin tuna. The effort of this fishery was highest in the mid 1980s (> 4,000 sets) but has been about 2,500-3,000 sets in recent years.

Total catch of the offshore and distant water pole-and-line fishery in the waters north of 20ºN was variable ranging from 90,000 t to 199,000 t, and was 120,000 t in 2005. Skipjack and albacore dominate the pole-and-line catch. The effort of this fishery decreased during the 1980s due to a decrease in the number of vessels, but it has been relatively stable since the early 1990s.

The annual catches of Pacific bluefin tuna have been stable at an average of 13,000 t since 2000, except for a high catch of 21,000 t in 2005. Purse seines have the largest catches of Pacific bluefin tuna with a catch of 7,100 t in 2006. The catch of albacore by longline was 17,000 t in 2006. This catch is similar to the catch in 2005 which is the lowest level in the last decade. This is due to substantial reductions in the number of large longline vessels due to economic circumstances. Swordfish catch by offshore and distant water longliners in 2005 (5,714 t) in the North Pacific showed a 9% increase from that in 2004.

Research cruises for bigeye tuna and blue marlin tagging, research on early life history of tunas, and testing of bycatch mitigation measures in longline fisheries were conducted by the National Research Institute of Far Seas Fisheries. Tagging studies using conventional tags, archival tags and pop-up archival tags are carried out for many kinds of tunas and tuna-like species. Studies of biological parameters for skipjack and Pacific bluefin tuna were also conducted.

Discussion

In response to a question, K. Uosaki noted that preliminary results from the 2007 albacore pole and line fishery showed that the catch was more than 20,000 t, therefore an increase over the catch values from the past 2 years. However, the skipjack fishery is performing poorly this year.

Various technical questions relating to data and research were also raised. Clarification was requested regarding the size difference between bigeye tuna caught in temperate versus tropical areas. N. Miyabe confirmed that modal size (100 cm versus 120 cm FL) and average weight (30 kg versus 50 kg) were lower in temperate waters compared to tropical waters but he considered this might be due to a seasonal difference rather than location alone. Further details on the testing of mitigation measures were requested to be released so they can inform potential actions by WCPFC. These details are provided in the report of the Bycatch WG. A request was also raised for provision of data on the number of active vessels rather than just the registered number of vessels. This could indicate whether or not a smaller number of vessels are using a greater number of hooks. N. Miyabe considered that this issue was complex due to vessels moving from area to area and thus there was a potential for double-counting. VMS will be in place soon and may help to address this issue. However, since the scientific standard unit is number of hooks, the absence of data on the number of vessels should not impede assessments. When asked whether previous work on age 0 skipjack was continuing, it was confirmed that additional sampling was conducted west of the Marianas and south of the Federated States of Micronesia last year and analysis is underway.

A request was made to coordinate on future tagging studies with WCPFC. Because of its limited research budget, Japan welcomes such collaboration and has coordinated with SPC in the past. It was suggested that this issue can be discussed at the WCPFC Scientific Committee Meeting next month.

3.5 Mexico

M. Dreyfus presented the Mexican national report (*ISC/07/PLENARY/10*). The tuna fishery of Mexico developed to its present size in the 1970s when Mexico implemented its 200 mile EEZ. Catch is dominated by yellowfin tuna, and to a lesser extent skipjack. Since the beginning of Pacific bluefin tuna farming on the west coast of the Baja California peninsula, this species is also a target. The fleet is mainly composed of purse seine vessels with concessions to catch all tuna species. Pacific bluefin tuna farming is undertaken by Mexican as well as foreign investment companies, but Pacific bluefin tuna for farming must be caught by the tuna fleet. Although the number of farms is stable, there have been record catches in 2004 and 2006. Therefore these fluctuations are related to environmental conditions.

All vessels above 363 tons of carrying capacity have observers on board (from both IATTC and Mexican observer programs). In the case of the national program, sampling is routinely performed on board for yellowfin tuna and since 2005 also for Pacific bluefin tuna. The number of vessels and the capacity of the fleet are stable.

In the case of the swordfish fishery, there are less than 30 vessels operating off the west coast of the Baja California peninsula using gillnets as well as longlines. They are allowed to operate only outside a zone of 50 miles from the coast within which billfishes are reserved for the sport fishing fleet. Billfishes are more important for sport fishing activity, mainly located in the states of Baja California Sur and Sinaloa. Increases in sport fishing effort have been observed particularly in Cabo San Lucas. The catch and release rate in sport fisheries is estimated to be 75%.

Discussion

In the discussion it was confirmed that since all billfishes are reserved for the sport fishery within a zone of 50 nmi from the coast, the research programs conducted by the INP through monitoring the fishery are the main source of scientific information on these species, as long as they are the target species. All available catch, size and weight data have been reported to the swordfish and marlin WGs. Catches of Pacific bluefin tuna in 2006 were the highest on record and it appears 2007 will show a mid-range catch. However, since yellowfin tuna is also relatively scarce this year, there may be re-direction of effort to other species such as Pacific bluefin tuna as happens in years in which tropical tuna catches are low. Nevertheless, Pacific bluefin tuna fishing grounds are located to the north of the yellowfin tuna fishing grounds, therefore this deters some of the vessels which are searching for yellowfin tuna from shifting to the Pacific bluefin tuna fishing grounds. The area west of Baja California appears to be a productive area for both Pacific bluefin tuna and sardines and there is a predator-prey connection. Although 80% of the Pacific bluefin tuna catch is sent to the farms, M. Dreyfus confirmed that the rise in catches was not due to an expansion of the industry but instead due to an increase in availability of the resource. Those interested in more information about the Pacific bluefin tuna pen-rearing industry were referred to the report of the Pacific bluefin tuna WG.

3.6 United States of America

W. Fox presented the United States (U.S.) national report on behalf of A. Coan who could not attend the meeting (*ISC/07/PLENARY/06*). Various U.S. fisheries harvest tuna and tuna-like species in the North Pacific. Large-scale purse seine, albacore troll, and longline fisheries operate both in coastal waters and on the high seas. Small-scale gill net, harpoon, and pole-and-line fisheries and commercial and recreational troll and handline fisheries usually operate in coastal waters. Overall, the range of U.S. fisheries in the Pacific is extensive, from coastal waters of North America to Guam and the Commonwealth of the Northern Mariana Islands (CNMI) in the western Pacific, and from the equatorial region to the upper reaches of the North Pacific Transition Zone.

In U.S. Pacific fisheries for tunas and billfishes, fishery monitoring responsibilities are shared by the National Marine Fisheries Service (NMFS) and by partner fisheries agencies in the states of California, Oregon, Washington, Hawaii, and territories of American Samoa, Guam, and the CNMI. On the federal side, monitoring is conducted by the Southwest Regional Office (SWRO) and the Southwest Fisheries Science Center (SWFSC) in California and the Pacific Islands Regional Office (PIRO) and the Pacific Islands Fisheries Science Center (PIFSC) in Hawaii.

U.S. government research on tunas and tuna-like species of the North Pacific Ocean is shared between the SWFSC and PIFSC. Studies are largely carried out from laboratories in La Jolla, California for the SWFSC and in Honolulu, Hawaii for the PIFSC, and in collaboration with scientists of other government or university institutions, both in the U.S. and abroad. Both Centers have studies devoted to stock assessment, biological and oceanographic research, and fishery management issues, but each Center concentrates on different species and fisheries in order to minimize duplication.

Discussion

Further clarification on a proposed Pacific bluefin tuna tagging project was provided. The plan is for NMFS to hire the vessel and use the sales proceeds from non-tagged fish to offset the cost of the hire. The tagging will be conducted in conjunction with a Mexican farming operation but will take place in U.S. waters. The program is designed to take place at the end of the Pacific bluefin tuna season with the intended result that the tagged individuals will remain at liberty for some time (i.e. perhaps until the start of the next fishing season). Whether this occurs will depend on the degree to which tagged individuals move, but there is believed to be little effort on Pacific bluefin tuna in U.S. waters. This program differs from NMFS collaboration with the TOPP program because TOPP mostly deploys archival tags.

A question was raised as to why the U.S. purse seine fleet is catching a larger percentage of bigeye tuna than other purse seine fleets, e.g. most purse seiners, including Korea vessels very similar to U.S. vessels catch 6-7% bigeye tuna whereas the U.S. purse seiners catch around 10% bigeye tuna. Potential differences such as more setting on fish aggregating devices (FADs) or floating objects by the U.S. fleet, or use of helicopters by the U.S. fleet were discussed. However, it was concluded that the market value/prices, yield, species composition and abundance, and changes in fishing grounds, could also play a large part in determining catch rates. Furthermore, a species composition of >10% bigeye tuna is not unusual. In any case the U.S. purse seine fleet is shrinking and may soon reach an economic tipping point where fuel prices outweigh returns. Many of the vessels which have already left the fleet have been sold and moved into other fishing grounds such as the eastern Pacific.

There was also a discussion concerning the targeting strategy of the Hawaii longline fishery and why it appears to have shifted from albacore to bigeye tuna. It was clarified that the Hawaii longline fishery has always mainly targeted bigeye tuna but that a small portion of the fleet targeted swordfish and a subset of these targeted albacore. However, due to recent effort restrictions on swordfish effort, there is almost no albacore targeting occurring now. The hypothesis that the Hawaii longline fleet has shifted from albacore to bigeye tuna because of decline in albacore stocks is also not supported by the constancy of catch per unit effort in the U.S. albacore troll fishery.

4 REPORT OF CHAIRMAN

The Chairman reported that the Committee made progress in advancing research required to meet the objectives of the Committee. Since the Sixth Plenary Meeting in 2006, the ISC held eight working group workshops, completed two full stock assessments (albacore and striped marlin), developed work plans for completing full assessments for Pacific bluefin tuna and swordfish by 2010, concluded an agreement with the WCPFC for providing scientific advice to the Northern Committee of the WCPFC, prepared a penultimate draft of the ISC Procedures Manual, and completed a long list of action items identified by the Sixth Plenary.

Despite this significant progress, further gains are needed and at a more rapid pace than to date. Members were reminded that through cooperation, collaboration and increased investment of resources, this challenge can be effectively addressed. Cooperation, such as collection and exchange of complete and timely fishery statistics is required. Collaboration, such as full support of working group activities including participation in workshops is essential. Investment of resources, such as dedicated national budgets for projects listed as research gaps in working group reports needs to be made. Priority activities for the next two years should include supporting tasks required to complete full stock assessments for Pacific bluefin tuna and North Pacific swordfish; updated stock assessments for albacore and striped marlin; providing the resources and developing the infrastructure for a fully capable ISC data and information management system; upgrading the website to meet expanding needs; and increasing the scientific capacity of the members to address growing ISC stock assessment needs.

The Chairman thanked the members for supporting ISC activities during the past year, and looked forward to continued support in the coming year. He also thanked the working group Chairmen and active members of the working groups for their contributions to the progress made by the Committee during the year, especially in expanding the scientific knowledge on the biology, fisheries and stock condition of highly migratory species in the North Pacific Ocean.

5 INTERACTION WITH REGIONAL ORGANIZATIONS

5.1 Activities relating to WCPFC

S.K. Soh introduced the issue of the relationship between the ISC, the Northern Committee (NC) and the WCPFC’s Scientific Committee (SC) with regard to northern stocks. According to the Memorandum of Understanding (MOU) between the ISC and the WCPFC, the ISC will provide scientific information and advice on the northern stocks to the WCPFC, the NC and the SC. Under the current agenda, both the NC and the SC will consider northern stocks at each of their regular sessions. In order to promote efficiency and cost-effectiveness of the WCPFC’s work, the WCPFC Secretariat has prepared a discussion paper suggesting a review of the roles and responsibilities between the ISC, the NC and the SC in respect to the northern stocks (*WCPFC-SC3/GN WP-4*). This paper outlines 3 options as follows:

Option 1: The SC and NC will receive the same information on the northern stocks (currently swordfish, Pacific bluefin tuna and albacore but the issue of including striped marlin is under discussion), and other stocks as requested, by the NC from the ISC Plenary. This is the current situation. If the SC has opinions they may voice them to the NC and the NC will ask the ISC for clarification. The SC or the NC may request an independent assessment of the advice provided, if considered necessary.

Option 2: The NC provides management advice to the WCPFC regarding species in the list of 'northern stocks' based on the ISC's advice. The SC would only cover those species not formally identified in the list of 'northern stocks'.

Option 3: The SC reviews the details of the ISC work and reports it to the NC and the WCPFC for management decisions. This will duplicate the work of the ISC at the SC meeting.

It was acknowledged by S.K. Soh that Option 3 is not practical. The ISC was invited to provide any views on the proposed agenda item at the upcoming SC meeting in August 2007.

<u>Discussion</u>

All agreed that given the lack of staff capacity and research budgets in this field that duplication and redundancy should be avoided as a matter of priority. It was noted that the MOU between the ISC and the WCPFC which lays out procedures very similar to those in Option 1 was practical and could provide useful guidance. However, concerns were expressed regarding the process by which the SC would review the work of the ISC under Option 1, particularly given the extensive nature of the documentation produced by the ISC WGs, and the resource and timing implications for WCPFC should they decide to call for an independent review of the assessment(s). A related concern was voiced regarding the three-channel provision of ISC advice under Option 1 and its potential to create confusion or stalemate.

As an alternative, a fourth option was suggested in which the SC would nominate a representative to participate in the ISC WG assessments throughout the process. When the assessment is complete and provided to the SC, the representative would then be called upon to endorse the results to the SC or call for further review. It was acknowledged that this fourth option would create resource demands for the WCPFC but these demands are relatively minor compared to the demands triggered by a call for full-scale re-assessment. It was also pointed out that the WCPFC is routinely invited to participate in the ISC WG assessments which are scheduled to avoid other major RFMO activities. It may be necessary to formalize procedures through which the WCPFC is invited to participant under the fourth option, in order to specifically create the role of a "qualified representative".

The discussion concluded with consensus that the issue is complex and a decision should not be rushed. Several options under consideration, as well as potentially other options which have not yet been developed, appear to be viable. It was agreed that the best solution would need to promote efficiency, continue the sound science embodied in the ISC WG assessments, protect the interests of all members, and maintain productive relationships between all interacting RFMO bodies.

5.2 Activities relating to PICES

The Plenary Chairman called to the attention of the group that the PICES 16th annual meeting will be held in Victoria, Canada on Oct 26th to Nov 5th. PICES has invited the ISC to send a representative to speak about potential collaborative research and the ISC needs to respond to this invitation. No honorarium or travel funding can be made available but if members are interested in attending PICES as the ISC representative they should notify the Chairman. In a related note, members were also urged to consider attending the WCPFC SC meeting in Honolulu to be held 13-24 August.

6 REPORTS OF WORKING GROUPS

6.1 Albacore

M. Stocker presented a summary of the ISC Albacore Working Group (ALBWG) activities since the 6th ISC Plenary. The total catch of North Pacific albacore for all nations combined peaked at a record high of about 125,000 t in 1976, then declined to a low of about 37,000 t in 1991. In the early 1990s, catches increased again, peaking in 1999 at 125,000 t, and averaged about 88,000 t since the early 2000. The 2005 catch of about 62,000 t was the lowest observed since the early 1990s. During the past five years, fisheries based in Japan accounted for 66% of the total harvest, followed by fisheries in the United States (16%), Chinese Taipei (8%) and Canada (7%). Other countries targeting the North Pacific stock contributed 3% to the catch and included Korea, Mexico, Tonga, Belize, Cook Islands, and Ecuador. While various fishing gears have been employed over the years to harvest albacore in the North Pacific, the main gears used over the last five years were longline (36%), pole-and-line (37%), and troll (22%). Other gears used since the mid-1990s included purse seine, gill net, and recreational fishing gears, which in combination accounted for roughly 5% of the total catch of albacore from the North Pacific.

A Stock Assessment Task Group workshop was convened at the Pacific Biological Station in Nanaimo, B.C. July 13-17, 2006 for the purpose of data preparation for the full ISC ALBWG stock assessment workshop. The report of the Stock Assessment Task Group workshop is included in *Annex 5*.

The ALBWG stock assessment workshop was held at the National Research Institute of Far Seas Fisheries (NRIFSF) in Shimizu, Shizuoka, Japan from November 28 to December 5, 2006. A total of 16 participants from Canada, Japan, and the U.S. attended the workshop; regrettably there were no participants from Mexico, Chinese Taipei, IATTC and SPC. The charge for the workshop was to complete a full assessment of the North Pacific albacore stock with data from 1966 to 2005, and to develop scientific advice on biological reference points for consideration of management action and for recommending action. In addition to conducting a full assessment, the workshop reviewed recent fisheries, reviewed biological studies, considered alternative stock assessment models, made research recommendations, updated the work plan for 2007, and discussed administrative matters. The workshop report is included in *Annex 5*.

The time and place for the next ALBWG workshop is planned for early 2008 in La Jolla, California, U.S. The objectives of the workshop will be to: (1) update the catch (Table 1) to 2007; (2) conduct a thorough evaluation of the abundance indices; and (3) conduct further assessment modeling work using the Stock Synthesis-II (SS-II) model, with the goal of presenting sometime in 2008 a baseline model that can be used to develop WG-related consensus concerning the status of the albacore population in the North Pacific Ocean. Further efforts will be needed to ensure input data (time series) are the best available, and model assumptions and related parameterization issues are appropriate. It is expected that this work will be completed sometime in mid-2008 and presented at the ISC ALBWG workshop to be held in conjunction with the 8th meeting of the ISC Plenary in 2008. The next full assessment for North Pacific albacore will be carried out in 2009.

Discussion

A question was raised regarding the data available for incorporating estimates of Illegal, Unregulated and Unreported (IUU) fishing into the stock assessment models. A particular problem could be that if the number of active vessels is unknown, the number of vessels potentially engaged in IUU would be nearly impossible to estimate. M. Stocker agreed that these are important issues to consider and noted that the WG had yet to tackle them fully.

The Plenary Chairman then asked for a review of the ALBWG's progress against the action items that had been agreed last year. The main actions items pertained to commitments to review and rescue data from the early 1950s through the mid 1970s. M. Stocker replied that data starting in 1966 had been rescued and used in the assessment, thus extending the historical extent of the assessment backward from 1975 by 9 years. However, it was explained that problems had been encountered when attempting to rescue data from 1952-1966 since these data were mostly limited to annual catch values and were not useful for the kind of fine-scale assessment models being run by the ALBWG. In addition, much of these early data have problems with species identification. Therefore, in this case there is a trade-off between the length of the data series and its quality. Members were referred to the ALBWG report for detailed discussions of these issues. While members agreed there may be ways to work around these data deficiencies and still extend the historical extent of the model, it was also deemed important to continue efforts to rescue these data.

6.2 Pacific bluefin tuna

Y. Takeuchi, Chairman of the last two workshops of the Pacific Bluefin Tuna Working Group (PBFWG), summarized the efforts since the last Plenary meeting including a summary of the two PBFWG workshops held during this period. Catch of Pacific bluefin tuna fluctuated from a low of 8,500 t in 1990 to a peak catch of 38,000 t in 1956. Recent five-year (2002-2006) average catch is about 22,000 t, nearly the same as the historical average. Japanese catch continues to consist of about half or more of total Pacific bluefin tuna catch. In addition, the U.S. fishery caught substantial amounts of Pacific bluefin tuna until the 1980s. Mexico and Chinese Taipei have increased their catches in recent years although they remain relatively smaller than those of Japan. In response to a request from the Plenary in 2006, the current catch database held by the PBFWG was expanded to include the catch of New Zealand longline vessels operating in their EEZ. At the two intercessional workshops since the last Plenary, the WG have made significant progress in addressing both data gaps and model uncertainties. This work involved:

- Age and growth study from otoliths by scientists from Japan and Chinese Taipei;
- Comprehensive review of historical size data;
- Estimation of historical quarterly catches for the stock assessment model;
- Review of historical Japanese longline CPUE;
- Review of Pacific bluefin tuna catch in the pre-assessment period;
- Review of alternative stock assessment models (i.e. SS-II).

The PBFWG developed a schedule of intercessional workshops to complete a full stock assessment by the next ISC Plenary meeting. A workshop dedicated to data preparation and model development will be held from 11-18 December 2007 in Shimizu. That will be followed by a stock assessment workshop from May 28-June 4 2008. Key stock assessment scientists will meet one week before (21-27 May 2008) the assessment. This will ensure that preparations are in order for the assessment.

<u>Discussion</u>

Once again the discussion focused on progress of this WG with regard to previously agreed action items. Y. Takeuchi clarified that progress had been made with regard to obtaining relevant data from non-member countries including receipt of data from New Zealand and communication with the SPC regarding additional data. The Plenary Chairman acknowledged that originally there had been a desire to fast track the Pacific bluefin tuna stock assessment but that ultimately it was decided that more time was necessary to assemble the correct data. For this reason, the stock assessment is scheduled for completion in May-June 2008.

The IATTC requested that the assessment be held earlier to allow its staff to avoid workload conflicts in May and to allow IATTC to present the findings to peer review before its annual meeting in June. While members were sympathetic to IATTC's scheduling issues and appreciated IATTC's sincere interest in participating in the assessment, there was general agreement to support the Pacific bluefin tuna WG in its desire to adhere to the original schedule. The Plenary Chairman will contact R. Allen of the IATTC and inform him of the decision.

6.3 Marlin and Swordfish

G. DiNardo, Chairman of the Marlin, summarized the efforts of the Marlin (MARWG) and Swordfish (SWOWG) working groups since the last Plenary including a summary of the three joint MARWG-SWOWG workshops held during this period. Workshop goals included the review and update of fishery statistics, agreements on stock structure scenarios, estimation and agreement on standardized CPUE time series, and completion of a striped marlin stock assessment. In addition, the WGs discussed the need and timing for a World Swordfish Meeting which was identified as an action item for the SWOWG at the 2006 Plenary.

Significant progress was made to facilitate the goals, including the updating of Category I, II, and III data and standardization of CPUE time series. A request for Category I, II, and III data for all billfish caught by member countries in the North Pacific was approved by the WGs, and these data were submitted to the WG Chairmen. While significant improvements in catch statistics have occurred, most notably for the fisheries of Mexico and Chinese Taipei, further improvements from other member countries is still needed. A striped marlin stock assessment was completed and conservation advice proffered.

Administrative matters were presented including a proposal to merge the MARWG and SWOWG into a single Billfish WG (BILLWG). The rationale for this proposal was outlined to Plenary members, and a decision on the proposal was requested. Elections for WG Chairmen were also conducted and it was agreed that if the ISC Plenary supports the establishment of the BILLWG, then one chairman should be elected. Nominations were taken and a vote conducted, with Chinese Taipei, Mexico, Japan, and the USA all voting for the election of G. DiNardo as Chairman of the BILLWG. A proposed assessment schedule was presented which included the completion of a North Pacific swordfish stock assessment in July 2009 and a Pacific-wide blue marlin stock assessment in July 2010. It was pointed out that a collaborative approach will be required to complete the blue marlin assessment and efforts are currently underway to establish the necessary collaborations. The WG's recommendation for dealing with the requirement of a World Swordfish Meeting in 2008 was presented, and concurrence from the Plenary sought. Proposed dates and venues for upcoming intercessional workshops were presented and they include January 15-23, 2008, possibly in Hawaii, USA, and June 2008 in Hokkaido, Japan.

Problems impinging on the ability of the WG to complete it's goals were presented, including the lack of (1) sufficient data in the ISC database and (2) continued participation at WG workshops by member countries. Possible solutions to the problems were presented and guidance from the Plenary sought. Finally, it was pointed out that many of the WG's goals were achieved and that their successful completion is linked directly to the commitment and dedication of scientists from the member countries and organizations.

Discussion

The Plenary Chairman commended the MARWG and SWOWG for their excellent progress. Members agreed with the recommendation and rational of the WG to combine the MARWG and SWOWG into a single BILLWG. It also endorsed the election of G. DiNardo as the Chairman of this BILLWG.

Through discussion it was clarified that a special session on swordfish is being proposed for the World Fisheries Congress (WFC) in Yokohama in October 2008. Plans for a multi-day World Swordfish Symposium would be postponed until after the swordfish stock assessment workshops in May-June 2008. The WFC session would focus on resolving issues of stock structure for the Pacific. Members expressed support for the proposal to hold the special session at the WFC.

The possibility of accelerating the schedule of the planned assessment was discussed. However, the statistics currently in the ISC database are so incomplete that considerable time will be required to assemble the necessary data. It is therefore practically impossible to have a swordfish assessment ready for the July 2008 Plenary, although there will be stock condition determination conducted in Japan in June 2008 that will be reported to the July 2008 Plenary.

Related issues of capacity building through participation in WG workshops and data sharing to allow members to use WG data to test their own models were raised. It was clarified that members are strongly encouraged to participate in assessment WGs from the very beginning of the process to not only contribute data but to build capacity within their own staff. One of the early tasks of the WG will be to select the best model or models for the assessment and full participation in such exercises is encouraged. After model(s) have been selected, there is no prohibition on running other models for comparison but this should be done within the context of the WG workshops with the data being actively used in that workshop.

The final discussion point involved evaluating progress against the previously agreed Action Items. With reference to document *ISC/07/PLENARY/01*, the SWOWG accomplished all three of its action items and the Plenary Chairman considered that the MARWG had also undertaken all of the required actions.

6.4 Bycatch

G. DiNardo substituted for C. Boggs in presenting the report of the Bycatch Working Group (BCWG). The BCWG held an intercessional workshop from May 2-5, 2007 in Honolulu, Hawaii attended by scientists from Chinese Taipei, IATTC, Japan, Mexico, and the U.S. Members reviewed the WG Terms of Reference developed at the previous workshop and agreed that the WG would focus on highly migratory species (HMS) and their fisheries, specifically on fisheries interactions with sea turtles, seabirds, and sharks. In particular, the review of bycatch stock status would be a recurring group activity, but the group would not actually conduct assessments due to lack of expertise. Since the group provided a broad summary of bycatch stock status last year, it focused on new topics in 2007. One objective was to review bycatch estimates for HMS fisheries, but most attendees only had data on sea turtles or seabirds. Substantial data on shark catches may be forthcoming from several members, but an issue is whether or not these represent bycatch or targeted catch.

Methods for producing bycatch estimates were reviewed, beginning with the need for observer programs. The value of systematic observer sampling for producing unbiased estimates of fleet-wide bycatch was emphasized, as was the need to understand different operational styles that can greatly influence bycatch rates. Past attempts to produce global and Pacific estimates of longline sea turtle bycatch were reviewed and deemed unreliable. The extent of observer coverage was summarized, and with one exception (U.S.), past coverage was considered too low to provide useful bycatch data. However observer programs are being initiated or expanded by several members.

The WG requests guidance from the ISC Plenary as to whether the WG should examine only those fisheries targeting HMS in the North Pacific or should it also examine other fisheries which may interact with the same bycatch species of concern to the WG. The participants discussed this issue but could not reach consensus. Most participants believed that the WG's role is to examine just those fisheries which target HMS.

A detailed work plan was developed based on objectives agreed last year. For some elements it was not possible to identify parties to conduct the work, but most projects are underway. Salient activities include: the submission to the ISC of fisheries and bycatch statistics needed to initiate estimation of bycatch by fishery sectors; continuation of experiments on sea turtle, seabird and shark bycatch reduction; and analysis of trends in sea turtle abundance and trends in fisheries effort to look for any relationships between the two. Bycatch reduction research underway was reviewed. Although current and proposed conservation and management measures of various RFMOs were presented, there was resistance to proposing or discussing technical specifications or best practices for such measures.

<u>Discussion</u>

It was noted in the discussion that the BCWG will meet in May 2008 and then again in conjunction with the Plenary next year (July 2008). Members discussed the suggestion that the activities of the BCWG with respect to seabird and sea turtle bycatch mitigation measures are duplicative of other efforts underway by the IATTC and the WCPFC. Given the Terms of Reference of the BCWG, if the emphasis is shifted away from seabirds and sea turtles, this would lead to a greater focus on shark issues. While it was noted that the Plenary Chairman and the Chairman of the BCWG agree that the current seabird and sea turtle focus is redundant with other organizations, and that there is currently a vacuum concerning shark research in the Pacific, reservations were expressed about disengaging from seabird and sea turtle issues. Reasons cited included a loss of ISC expertise in handling these issues on a North Pacific-wide basis and ability to shape the debate with academic and non-governmental organizations who promote these issues; and the need to wait until further management measures (e.g. the IATTC has sea turtle measures (only) and the WCPFC has seabird measures (only)) are adopted before changing course. On the other hand, all members acknowledged the need to focus ISC efforts toward activities where a concrete contribution can be made, rather than simply reviewing information that is also being presented in other forums. Members reached consensus on a recommendation the BCWG review where it can best focus its work given its limited resources and the areas already being covered by other organizations. The WG's Terms of Reference will not be changed but it is expected that a shift in emphasis away from seabird and sea turtle issues, and toward shark issues, is likely to result.

The group also discussed a request from the WG to clarify whether it should be addressing only impacts from HMS fisheries, or all fisheries which impact the species in the WG's Terms of Reference. It was noted that it is quite difficult to obtain data for HMS fisheries and would likely be even harder to obtain data for non-HMS fisheries in the North Pacific. Several members stated that broadening the scope to non-HMS fisheries would exceed the mandate of the ISC. All members agreed that a holistic approach to evaluating impacts to bycatch species was necessary and that this requires taking into account not only HMS fishery impacts but also non-HMS fishery impacts, pollution, habitat impacts, etc. However, WG efforts should be focused on HMS fisheries since that is the primary area of ISC expertise. While beyond the remit of the ISC, a suggestion was noted that an international focus group for sea turtle issues in the North Pacific, i.e. one that meets regularly to coordinate new research/information and assess population status, is missing and could be established by interested nations.

7 STOCK STATUS AND CONSERVATION ADVICE

7.1 Albacore

M. Stocker presented an overview of the ALBWG stock assessment workshop (*Annex 5*). A total of 16 participants from Canada, Japan, and the United States, attended the Workshop. A total of 19 working documents were tabled. The 2006 stock assessment was conducted with the VPA-2BOX model.

A single catch-at-age matrix (1966-2005) applicable to all (inclusive) fisheries was developed by simply summing the completed catch-at-age matrices from the 'eastern' and 'western' North Pacific Ocean. The combined catch-at-age matrix served as the foundation for stock assessments based on the VPA-2BOX model analysis.

Seventeen abundance (CPUE) indices were used in the 2006 albacore assessment:

- U.S./Canada Troll (ages 2,3,4,5)
- U.S. Longline (age-aggregated 6-9+)
- Japan Pole-and-Line (ages 2,3,4,5)

- Japan Longline (age 3,4,5,6,7,8,9+)
- Chinese Taipei (age-aggregated)

The VPA team conducted VPA-2BOX model analysis (15) for this year's workshop using 'primary' sources of input data. Model Scenario D1 was selected by the WG to assess current stock status and project future stock conditions.

Spawning stock biomass (*SSB*, in tons) time series (1966-2006) for north Pacific albacore generated from Model D1 (based on 'May 1' estimates) show fluctuations around the modeled time series average of 100,000 t. The 2006 stock assessment indicated that *SSB* increased from 2002 (73,500 t) to 2006 (153,300 t) and is projected to increase to 165,800 t in 2007. The increase is attributable to strong year classes in 2001 and 2003. The estimated spawning stock size in 2006 of 153,300 t is approximately 53% above the overall time series average (1966-2005). Projections (2007-2020), using an average productivity of 27.75 million fish and F equal to 0.75, indicate that the SSB will reach equilibrium by 2015 at 92,600 t (90% CI=62,700-129,300).

The WG reviewed two documents relative to Biological Reference Points (BRPs): 1) computational methods; and 2) simulation and probability analysis. Computation of BRPs was limited to examination of current F levels relative to a suite of candidate F-level BRPs. Equilibrium yield-per-recruit analysis(*Y*/*R)* and spawning stock biomass-per-recruit (*SB*/*R)* calculations were conducted using similar vital rates (growth, maturity, and natural mortality) as used in Model D1 calculations. The population projections and associated uncertainty were used to construct probability profiles for *SSB*. Each profile presents the probability that the spawning stock biomass will fall below a specified threshold level during one or more years of the projection period.

In conclusion the WG noted the following:

- Retrospective analysis shows a noticeable trend of over-estimating current stock size; and conversely underestimating current fishing mortality rate;
- The population is being fished at roughly *F*17% (i.e., $F_{2002\text{-}2004}$ = 0.75); similar to the 2004 assessment;
- F_{cur} (0.75) is high relative to commonly used F reference points;
- The ALBWG expressed concern about the considerable decline in total albacore catch since 2002;
- The $F_{SSB\text{-}MIN}$ analysis indicates that at the 95% probability of success all of the threshold Fs would require reductions from F_{cur};
- Therefore, the ALBWG strongly recommends that all countries support precautionary-based fishing practices.

<u>Discussion</u>

Details of the 2006 albacore assessment were discussed:

- While it might appear contradictory that some fisheries show increasing CPUEs while others show decreasing CPUEs, this may be due to high catch rates for smaller fish in good years resulting in a fishing down of these year classes, leaving fewer fish left for fisheries targeting larger fish. It is thus consistent with population dynamics theory.
- The reason for a consistently overestimated spawning stock biomass/exploitable biomass in the most recent year (shown in retrospective analysis) is difficult to pinpoint. It might be possible that with the proposed use of the SS-II model in the future this problem can be avoided.
- As indicated by the broad confidence intervals in the projections of spawning stock biomass, there seems to be considerable uncertainty, particularly with respect to predicting future recruitment.
- It was pointed out that although several related scenarios were modelled, the assessment does not present a future projection with a constant catch scenario. It was suggested that in conjunction with future assessments, a suite of constant catch projections may be useful for managers.
- The WG decided the best approach was to model recruitment using an average for 1966-1998 with random variation. This is in contrast to the previous approach in which alternative low and high recruitment regimes were assumed. However, it was suggested that for future assessments it would be useful to examine alternative recruitment parameter forms. It was acknowledged that when recruitment varies a great deal and constant catch projection are made, it may be necessary to assume a relatively low catch in order to avoid population depletion within the projection model.
- An alternative suggestion to address uncertainties in recruitment was to have the Plenary invite further involvement of fisheries oceanographers in the WGs and thereby get better information on whether periodicity is present or regime shifts have occurred. However, any potential autocorrelation in recruitment was not considered to be a major issue for the scenarios run in the current assessment.
- Despite the discussion of uncertainties and the differing interpretations of the results, there was consensus that the assessment represented the scientists' best attempt at evaluating stock status. Future improvements to both data and models are necessary and anticipated.

A procedural question was raised about whether *Annex 5* requires an individual endorsement from the Plenary. The Chairman clarified that it was standard practice to endorse the annexes in conjunction with the adoption of the Plenary report.

In summary, members agreed that stock assessment results indicated that 2006 estimate of spawning stock biomass (SSB) is the second highest in history (roughly, 153,000 t). This high level of SSB is reflective of strong year classes in 1999, 2001 and 2003. On the other hand, it is also indicated that the current fishing mortality rate (F=0.75) is high relative to commonly used reference points. Projected levels of SSB are forecasted to decline from a high level of 166,000 t in 2007 to the equilibrium level of roughly 92,000 t by 2015, if the population is fished at the current F of 0.75, which is near the long-term average (1966-2005).

Conservation Advice

After discussion of the 2006 ALBWG's assessment report and comments raised by Plenary members, the ISC offers the following scientific advice:

Previous scientific advice, based on the 2004 stock assessment, recommended that current fishing mortality rate (F) should not be increased. It was noted that management objectives for the IATTC and WCPFC are based on maintaining population levels which produce maximum sustainable yield. Due to updating, and improvements and refinements in data and models used in the 2006 stock assessment, it is now recognized that F_{cur} (0.75) is high relative to most of the F reference points (see Table 5a in *Annex 5*). On the other hand, the same analysis indicates that the current estimate of the SSB is the second highest in history but that keeping the current F would gradually reduce the SSB to the long-term average by the mid 2010s. Therefore, the recommendation of not increasing F from current level (F_{cur}(2002-2004)=0.75) is still valid. However, with the projection based on the continued current high F, the fishing mortality rate will have to be reduced. The degree to which, when and how reductions should occur will depend on which reference points are selected and the desired probability and practicability of success of attaining these reference points in a timeframe to be agreed. The ISC requires additional guidance on these issues from the management authorities in a timely manner to work further on these issues.

7.2 Pacific Bluefin Tuna

Y. Takeuchi introduced the outlook for the stock in relation to the 2001 year class which was estimated to be exceptionally strong (*Annex 10*). The conclusion was as follows:

> *"WG planned to review recent trends in stock abundance at this workshop in addition to reviewing the strength of the 2001 year class. While the two topics are interrelated, the more general review of recent trends could not be undertaken using the data available to the WG at this workshop. A thorough review of recent trends will be undertaken in conjunction with the next stock assessment.*
>
> *Nonetheless, the WG noted that the last Pacific bluefin tuna stock assessment (Jan 2006) estimated an exceptionally strong 2001 year class. Based largely on the estimated size of this year class, the stock projections indicated that the current level of SSB (Spawning Stock Biomass) could be maintained at the current F level. Based on this assessment, the ISC6 Plenary recommended that F should not be increased from the current level.*
>
> *The WG agreed that preliminary analysis of the Japanese catch and size-frequency data that has become available since the last assessment (2005-2007) indicates that the 2001 year-class was not as strong as previously thought, but may have indeed been larger than the average year class.*

More importantly, however, the survivorship of this year class in 2007 is unclear and cannot be well estimated until the next stock assessment (2008). While the last well-estimated strong year-class (1994) appeared clearly in the JLL size frequency data in 2000 (i.e. at age 6), the 2001 year-class did not appear in the 2007 JLL fishery. Consequently, the conclusion of the last stock assessment regarding the likelihood that the 2001 year-class would maintain the bluefin SSB level now appears to have been optimistic in light of the new data that have become available since the last assessment. "

Discussion

In the discussion that followed the presentation, it was noted that no complete stock assessment has been performed since the last Plenary meeting. However, a stock assessment is scheduled for completion in the coming year. In clarifying the status of the Pacific bluefin tuna stock, Y. Takeuchi explained that it is supported by several strong year classes including the 1994 year class, the strongest in the time series. In the past, other strong year classes have had a major positive impact on the stock.

Conservation Advice

After discussion of the 2006 PBFWG's assessment report and consideration of comments raised by Plenary members, the ISC offers the following conservation advice:

It was concluded that the advice provided by the ISC Plenary in 2006 still holds. That is:

> ***"Noting the uncertainty in the assessments, the ISC Plenary agreed with the WG recommendation that bluefin tuna fishing mortality[*] not be increased above recent levels as a precautionary measure. "***

7.3 Swordfish

G. DiNardo informed the Plenary that the next North Pacific swordfish stock assessment is scheduled to be completed in 2009. Thus, no stock status and conservation advice was provided at this time.

Discussion

G. DiNardo explained that there was no assessment to present at this Plenary but that a plan to produce an assessment had been tabled under Agenda Item 6 (see Section 6.3). He clarified that no conservation advice has yet been provided to the Plenary.

---

[*] "fishing mortality" refers to a rate which can be converted into effort or catch in management

7.4 Striped Marlin

K. Piner and J. Brodziak presented a brief overview of a stock assessment of North Pacific striped marlin completed by the MARWG in March 2007 (*Annex 8*). This is an update of the previous assessment presented at last year's Plenary meeting. A total of 29 different fisheries, defined by region, country and gear were used in the assessment. Nine fisheries, all of them longline fisheries from the western or central Pacific, provided reasonable measures of abundance. One series was available from the Eastern Pacific but it was shorter and noisier. Size data were available from 13 fisheries from 1970 onward. A decline in catch since the 1960s was observed. CPUE indices were constructed by combining across gears and countries by area for fives areas in the Pacific. The main CPUE series showed a decline; coastal longlines from Japan and Hawaii showed similar trends. Most of the striped marlin catch comes from the northwest Pacific.

Catch, CPUE and length composition data from the sources described above were included in a SS-II model of the population dynamics. Due to uncertainty in the controlling factor of recruitment, two parallel hypotheses were forwarded as separate assessment models. In the first, recruitment was determined by a maternal effect described by a Beverton and Holt Spawner-Recruit curve with the steepness parameter set to h=0.7. In the second hypothesis, recruitment was driven by environmental conditions with recruitment variability around a mean level.

Both hypotheses indicated a stock depleted from historical levels, but assuming a maternal effect resulted in a more depleted stock (6% of 1952 levels for maternal effect versus 16% of 1952 levels for environmental effect). Additional forms of uncertainty were identified by the WG including the true nature of the stock delineation, constant catchability of the CPUE series (i.e. targeting and standardization issues), life-history parameters and the true level of catch in the North Pacific. It would be possible to model eastern and western sides of the Pacific in two separate models but the lack of data available for the eastern Pacific constrains this option. The basic data supporting biological parameters will be improved. Further CPUE standardization research will also continue.

Fishery selectivity estimates from the stock-recruitment and environmentally-driven recruitment models were used as alternative scenarios for calculating biological reference points. The reference points for the alternative scenarios were similar and as a result, reference points were robust to model selection uncertainty. The WG discussed the relative benefits of maintaining various levels of striped marlin spawning potential as a biological reference point and concluded that it would be useful to consider the 20% and 40% values of maximum spawning potential as candidate reference points.

The WG also considered the F_{Max} value as a potential reference point for striped marlin but observed that using this reference would diminish spawning potential ratio values to less than 1% of the maximum spawning potential. This, combined with the fact that the F_{Max} values for Model 1 and Model 2 were over 5-fold larger than the striped marlin natural mortality rate, indicated that using F_{Max} as a target or limit reference point was not appropriate for striped marlin given the model results. The WG also considered the current fishing mortality rate for striped marlin as a potential reference. In this case, the current fishing mortality rate was the average fishing mortality rate during 2001-2003, i.e. under Model 1, F_{Cur}=0.72 and under Model 2, F_{Cur}=0.64 per year.

The WG projected the management implications of applying the F_{Cur}, $F_{20\%}$ and $F_{40\%}$ reference points to the striped marlin stock during 2004-2009. Relative benefits were measured in terms of increasing spawning biomass and maintaining yield under the stock-recruitment and environmentally-driven recruitment models. This comparison emphasized the intrinsic trade-off between the biological conservation and fishery yield benefits of the alternative reference points. Overall, the relative merit of the F_{Cur} and $F_{20\%}$ reference points depends on whether the striped marlin stock can be sustainably fished at the current low spawning potential ratio of roughly 9%.

The WG concluded that there was a clear decline in striped marlin abundance since the 1970s. However the actual magnitude of decline may be under- or over-estimated given the noted uncertainties in assessment data and model structure (see *Annex 9*, Section 6.3). Additionally:

- The WG concluded that the stock-recruitment steepness parameter appeared to be the most important axis of uncertainty for evaluating stock status of striped marlin.
- The WG expressed concern that almost all of the CPUE data in the assessment, especially in the most recent years was from the western Pacific. The relatively short time series of CPUE values from the eastern Pacific was a limiting factor for assessing biomass trends in this region. To address the concern that the western Pacific data could be unduly influencing stock assessment results, it was suggested that a split area assessment could be conducted.
- The WG noted that there was limited empirical information on striped marlin life history characteristics across the species range in the North Pacific. This suggests that spatial variation in striped marlin growth may not be adequately approximated in the assessment model.
- The WG noted that the total enumeration of striped marlin catch, including discards and unreported landings, was a source of concern.
- The WG suggested that there should be further investigation of the use of aggregated fishery length frequency data for stock assessment.

The WG discussed how to characterize the status of the striped marlin stock in a way that reflected its concerns about the health of the population but also the uncertainty of the data used in the stock assessment. It was noted that declines in catch and declines in catch per unit effort from several different fisheries support the conclusion that the marlin population has declined, but the precise extent of the decline is uncertain.

The WG discussed what the objectives and responsibilities of the WG were with respect to providing management guidance. It was noted that the WG will need to know the management objectives to provide specific guidance. It was decided that a range of reference points would be presented, along with impacts to the stock and yield if that reference point were to be adopted. The WG recommended that projections be provided to the Plenary to clarify the impacts.

Discussion

Several technical points regarding the assessment were clarified through Plenary discussion as follows:

- It was pointed out that in some of the model projections; the yield from the current value of F is greater than simulations of a reduced value of F. This was attributed to arbitrarily selected starting values which do not actually affect the model fit. Although it was decided that such scenarios are not erroneous they were felt to be misleading and perhaps require better explanation.
- Since the model projections were only recently completed and circulated to the WG, there was not sufficient time to study the results thoroughly.
- Clarification was sought regarding the equilibrium yield and biomass as obtained from model projections when a stock-recruitment relationship was not assumed (Model 2). It was noted that the recent average yield of striped marlin could be sustainable, however, this may require an increase in F, since the average equilibrium yield at the annual current F (F=0.6) is about 500 t below the recent yield.
- Questions were raised regarding the WG's ability to account for different targeting strategies when standardizing the CPUE indices.
- Concerns were expressed that constraints on recruitment estimates prior to 1965 might introduce an underestimation bias to recruitment estimates in recent years.
- It was suggested that some reference points be chosen and a Kobe chart (i.e. two different reference points on two axes with the stock's position in each year plotted) produced. However, concerns were expressed that there is not sufficient clarity on which reference points to select.
- One suggestion was made to formulate a reference point based on maintaining the stock's spawning potential at 20-40%.
- Another area of uncertainty in the assessment is unaccounted for catch. This could occur due to under-reporting, lack of data for a fishery, mis-reporting by species, etc. While this is a concern, it is unlikely to be remedied in the near future.
- There was a lengthy discussion on different views regarding the interpretation of the assessment results. One interpretation is that the assessment results convey a clear message that the stock has declined precipitously and should be conserved through an immediate reduction in F. Another interpretation is that the uncertainties in the assessment are considerable and prevent full understanding of the state of the stock. Only by removing these uncertainties can the stock status be clarified.

Three procedural issues were raised. The first, regarding the access to data of participating scientists, was dealt with under Section 7.1. Another issue resulted in calls for clarification of the role of the Plenary in reviewing the WG's assessments and of the role of the WGs in formulating conservation advice. The final issue was a suggestion for a traffic light system (i.e. red, yellow and green colors), such as that used by the recent RFMO meeting in Kobe, to focus managers on the categories of interest in an easily understandable way.

Conservation Advice

After discussion of the 2007 MARWGs' report and comments raised by Plenary members, the ISC offers the following conservation advice:

While further guidance from the management authority is necessary, including guidance on reference points and the desirable degree of reduction, the fishing mortality rate of striped marlin (which can be converted into effort or catch in management) should be reduced from the current level (2003 or before), taking into consideration various factors associated with this species and its fishery. Until appropriate measures in this regard are taken, the fishing mortality rate should not be increased.

7.5 Bycatch

A report on bycatch was presented by G. DiNardo on behalf of C. Boggs, the Chairman of the BCWG. Guidance from the Plenary had been sought regarding which species and issues to address and with regard to taking a holistic approach to bycatch species impacts. Useful guidance was received on both topics. G. DiNardo informed the Plenary that no assessments were completed since the last Plenary meeting; therefore no conservation advice was offered.

8 REVIEW OF STOCK STATUS OF SECONDARY STOCKS

8.1 Eastern Pacific – Yellowfin and Bigeye Tunas

M. Dreyfus presented an overview of IATTC stock assessments for yellowfin and bigeye tunas (*ISC/07/PLENARY/INFO/03* and *ISC/07/PLENARY/INFO/04*). The fishery is predominantly a purse seine fishery (with sets on dolphins, free-swimming schools and floating objects), with longlines being the next most common gear type. In the case of the purse seine fishery, fleet capacity in cubic meters has recently reached a peak of over 200,000 cubic meters. For longlines, the number of hooks reached a peak in 2003 and has diminished since then. The catch composition is usually led by yellowfin tuna with skipjack in second place, but for 2005 and 2006, catches of the latter have surpassed catches of yellowfin tuna which are at their lowest level in more than two decades. Catches of bigeye, albacore and Pacific bluefin tuna comprise a smaller proportion of the fishery. Size composition of the catch varies depending on gear type. Longlines target adult tuna whereas the purse seine fishery also captures smaller tunas particularly when setting on floating objects. The average weight of tuna in the purse seine fishery has been decreasing over time and averaged 7.8 kg in 2006.

For yellowfin tuna, based on the assessment model (A-SCALA), the spawning biomass ratio is below the level corresponding to average maximum sustainable yield (AMSY), thus the stock is overfished. Effort levels are above the ones that would support AMSY. There were record catches in the early 2000s and recruitment was very high, but more recently recruitment has been similar to the long-term average. Recent catches are below AMSY and are now 44% of previous values. If a stock recruitment relationship is assumed, the results are more pessimistic. The fishing mortality rate has generally been below that required to support AMSY except in recent years.

Bigeye tuna catches have been predominantly from longline fisheries until 1994 when a FAD fishery in the southern part of the eastern Pacific at 10°N and 20°S latitude was developed. At the present time catches are higher in the surface fishery that focuses on juvenile bigeye tuna. The mean weight of bigeye tunas in the surface fishery in 2006 is 5.3 kg. Based on the assessment model (SS-II), the recent fishing mortality rate is about 20% greater than the corresponding AMSY. As a consequence, if fishing effort is not reduced, total biomass and spawning biomass will eventually decline. The current status and future projections are more pessimistic in terms of stock status if a stock recruitment relation is considered. Diagrams of stock size and fishing mortality rate relative to AMSY reference points show that overall the reference points have not been exceeded until recent years, but the two most recent estimates indicate the stock is overfished and overfishing is occurring.

Discussion

The group discussed what might be the reasons for recent, high skipjack catches in the coastal waters off Ecuador and Peru. It is possible that this phenomenon is due to an inverse relationship between yellowfin and skipjack which has previously seemed to be associated with El Niño events. It could be that the current large fleet size is causing the shift to be even more noticeable in this El Niño cycle. It is also possible that the low catch of yellowfin tuna in recent years is El Niño-related. In particular, following El Niño there is usually very good recruitment of small yellowfin tuna. This appears to have been taken into consideration in formulating IATTC's management recommendations. Another contributing factor could be that the segment of the purse seine fleet targeting floating objects has increased, and since fish size is smallest for floating object sets, this could lead to lower catches overall. It was noted that IATTC has just appointed a new Director of Investigations, Dr. Guillermo Compeán Jiménez, and it is hoped that Dr. Compeán will be able to participate in the ISC Plenary next year.

8.2 Western and Central Pacific – Yellowfin and Bigeye Tuna

Dr. S.K. Soh of the WCPFC presented the results of the assessments of western and central Pacific yellowfin and bigeye tuna that were presented at the WCPFC Scientific Committee meeting last August. MULTIFAN-CL was used to fit to catch, size and tagging data. The principal index came from longline CPUE (GLM standardized) and estimated parameters were selectivity, catchability, movement, recruitment, growth, and stock-recruitment relationship (SRR) steepness using fixed parameters of natural mortality-at-age, length-weight, and maturity-at-age. The total catch of yellowfin and bigeye tuna in the WCPO is about 400,000 t and 100,000 t, respectively. Data sources for the stock assessment were catch in number and weight, standardized and nominal effort, length and weight frequency, tag releases and recoveries, and other auxiliary information used to formulate priors, e.g. estimates of tag reporting rates.

In all analyses, recruitment of yellowfin increased from about 1970 and remained stable over the last two decades, whereas recruitment of bigeye increased from about 1980 and has been at high levels since the early 1990s. Both yellowfin and bigeye biomass declined to about half of its initial level by 1970 and has been fairly stable since then, except for a recent decline of biomass for yellowfin tuna. Biomass is currently 51% of unexploited levels for yellowfin and 30% for bigeye tuna. Kobe charts of both yellowfin and bigeye tuna show that their current biomass is not in an overfished state, but there is a high probability that overfishing is occurring.

Discussion

During the discussion, members remarked upon the usefulness of the Kobe charts of stock size and fishing mortality rate relative to reference points as used by both IATTC and WCPFC, and encouraged their use within ISC. It was remarked that although the stock assessments to be presented at next month's WCPFC Scientific Committee are not yet publicly available, the outlook for tuna stocks is improved in comparison to past assessments. G. DiNardo informed the group that the WCPFC yellowfin tuna assessment had been sent out for independent peer review and that comments received had been fed back to the SPC and considered in formulating this year's assessment. The same process is occurring for the WCPFC bigeye tuna assessment and comments are expected back in November. It was noted that due to a desire by the SPC to focus in detail on the yellowfin tuna assessment, a full assessment of bigeye tuna will occur next year.

9 REVIEW OF STATISTICS AND DATA BASE ISSUES

9.1 Report of the STATWG

The STATWG workshop was held prior to the Plenary on 22-24 July (*Annex 11*). All members except China, FAO, SPC and PICES were represented. One of the main tasks of the workshop was to review what data have been received and where gaps remain. Canada, Korea, Chinese Taipei, and the U.S. have submitted data for Categories I-III. Japan has submitted data for Categories I and II only, while Mexico has only submitted Category I data. No data have been received from China. Only Japan, Chinese Taipei and the U.S. have provided metadata.

One of the major issues for the STATWG is that data are passed by member's data correspondents to the WGs, bypassing the Database Administrator. In such cases, it is difficult for the Database Administrator to know when a submission has been made and what data are contained in the submission. A further difficulty is that WGs sometimes adjust data and do not feed the results of such adjustments back to the Database

Administrator. These and other issues have led, at times, to large discrepancies between WG and STATWG databases. It was concluded by the STATWG that the WG catch tables currently represent best available data for assessments and that these data should be used as the basis for the catch tables.

The STATWG discussed modifications to the ISC website, including a policy for loading working documents on the website and archiving information from the WGs. A future work plan was formulated which identifies several high priority action items for the group. These actions include preparing a timetable for the implementation of new functionality within the system including data quality control, enhancement of the website, storage of archival data from the WGs, and better procedures for WG and STATWG interaction. N. Miyabe stated that the appointment of a full-time database manager is essential to the success of the ISC database.

9.2 Database Administration

The status of the database was reviewed by H. Yamada. A data submission protocol was created at the STATWG workshop in 2002, and modified in the last workshop in 2006, at which point the modified protocol was distributed to the ISC members. Despite this, some submissions have contained missing and/or incorrect codes or missing columns which caused the rejection of some data when uploading into the main ISC database. In other cases, catch quantity units were rounded to the nearest metric ton rather than the required rounding to the nearest 0.1 t. In this case, if metadata are available it may be possible to correct this, but otherwise the true unit is unknown and the data cannot be rectified. H. Yamada encouraged all data correspondents to pay close attention to data submission procedures when providing data.

Discussion

In order to reduce duplication of effort between the WGs and the Database Administrator it was agreed that the flow of data should be from the data correspondents to the WGs and from the WGs to the Database Administrator. This would avoid current problems arising from WG modification of data. With regard to WG data, the primary function of the ISC main database would be to back-up and maintain the data from the WGs, including WG-prepared metadata. In addition, the Database Administrator would serve a coordinating function when a single gear type is catching a variety of species. There was consensus that better coordination between the WGs and the Database Administrator is required, and a periodic submission timetable for WGs to provide data to the Database Administrator was suggested.

In terms of overall responsibilities, the STATWG would have two main duties:

- Oversee production (i.e. compiling, checking and loading) of Category I data for comprehensive catch tables for highly migratory species (this would include not only the tunas but billfishes and bycatch species) in the North Pacific;

- Oversee the archiving of WG data, catch data, catch distribution maps for major species and metadata.

The current confidentiality policy in the ISC Rules of Procedures should be used as a guide.

This led to a discussion of what data should be held by the ISC main database. In this regard, it was noted that the WGs already have Category II and III data but at a finer scale, if required, for stock assessment purposes. These data are not available to the public. On the other hand, similar data of this type are being summarized and made available to interested individuals by other RFMOs.

It was decided that the remit of the Database Administrator will be changed to specify that he/she should receive data from the WGs through explicit procedures; store WG data and catch distribution maps, and produce Category I tables for tuna and tuna-like species of interest to the ISC. The ISC Rules of Procedures will be re-examined and modified as necessary to refine the role of the Database Administrator and the STATWG. New draft procedures will be trialed as a means of accelerating progress on data management systems.

N. Miyabe was asked to clarify the STATWG's position with regard to data exchange with the WCPFC. He referred to statements in the STATWG report which highlight the need to avoid redundancy, the importance of sharing public domain data, and the strong expertise of ISC members in understanding tuna and tuna-like species resources and fisheries in the North Pacific. The ISC welcomes the participation of WCPFC scientists in ISC stock assessment working group workshops.

A suggestion was made to develop a standing performance report for each member to show at a glance which data have and have not been submitted. It was believed this could serve as a useful prompt, and should be produced periodically.

Concerns regarding the slow pace of development of the ISC database system were expressed. Japan delegates were asked whether resourcing for the database work was sufficient. N. Miyabe replied that the Japanese government is providing a reasonable amount of funding for the task for which Japan has assumed responsibility. However, staffing will likely continue to be by contract sources owing to administrative constraints preventing the hiring of permanent staff. The current staff person is on contract through March 2008. While understanding was expressed for the administrative constraints, it was suggested that staff turnover with contractors could lead to inefficiencies and delays and thus a long-term, or permanent position would be preferred. In response to a question, N. Miyabe replied that outside assistance in the form of seconded staff, or similar, from members would certainly be helpful.

9.3 Data Rescue

The Plenary Chairman made a brief statement on data rescue issues. As discussed in the STATWG, Plenary was reminded that the first priority was to compile data from 1971 to the present, then work backward decade-by-decade until the 1950s. Since according to the Chairman of the STATWG, N. Miyabe, there are many data missing from the database, it is important to set data rescue goals and continuously work toward those goals.

9.4 Public Domain Data

H. Yamada made a brief presentation on public domain data. Category I data were confirmed to be public domain data. Differences in archived data between the WG databases and the ISC main database were identified. Noted discrepancies between the Category I data held in the main database and by the WGs were attributed to changes to data in the WGs which are not reported to the Database Administrator, different compilation methodologies, and data sets missing from one database or the other. An example, drawn from Pacific bluefin tuna catches, was used to illustrate the issue (*Annex 11*).

Catch tables were presented (*Tables 1* through *3*) for albacore, swordfish and striped marlin, respectively. As noted above, all of these data are derived from WG data rather than from the ISC main database and may be different from catches reported by members to other forums where “official statistics” are required. The catch table for bluefin tuna, as compiled by the Pacific bluefin tuna WG, is contained in *Annex 6*.

Discussion

Chairmen of the working groups clarified that the data shown in their WG catch tables represent data used in the most recent stock assessments or as of the most recent workshops. In some cases new data may have been received or modifications made to existing data since the last assessment, and those changes may be reflected in the catch tables. There was consensus that the table captions should clearly state that the data were provided by the species WG and could differ from the “officially submitted” statistics. The importance of adding a reference to each table to indicate the date of last update was also agreed.

The Plenary Chariman pointed out that in order to prepare Category I catch tables the STATWG will need more than WG data, e.g. data on yellowfin, bigeye, and skipjack tunas and bycatch will be required. It was explained that for catch distribution maps, the WGs should already be preparing these; therefore the WGs will submit them to the Data Administrator. A question was raised with regard to the WCPFC data exchange issue and further clarification was provided.

10 REVIEW OF SCHEDULE OF MEETINGS

10.1 Time and Place of ISC8

Provisional dates for ISC8 are 23-28 July 2008. Related working group workshops in conjunction with ISC8 will be held beginning 16 July 2008. Japan and the United States traditionally take turns hosting the meeting, and next year it is Japan's turn. Delegates from Japan announced that Japan would be pleased to host ISC8 but given the offer made earlier by the Chinese Taipei delegation to host ISC8, it would be better to defer the decision until after such time when the two members can discuss and settle the matter bilaterally. Chinese Taipei officials stated that they remain interested in holding the meeting but are open to further discussions with Japanese colleagues. The U.S. delegation indicated that should Japanese colleagues exercise their responsibility to host ISC8, the U.S. would be flexible and agreeable to allowing Chinese Taipei colleagues to host ISC9. The Plenary Chairman will be informed of the outcome of the consultation among concerned parties and members will be informed of the selected venue.

10.2 Working Group Intercessional Workshops

A tentative schedule of ISC workshops and other highly migratory species' RFMO meetings has been compiled for 2007-2009 (*Table 4*). Only one conflict emerged in the scheduling of ISC intercessional workshops, i.e. timing of the ISC swordfish and ISC Pacific bluefin tuna assessment workshops, but this was resolved by the Chairmen. Members are encouraged to participate as fully as possible in the WG workshops. The Plenary Chairman will distribute the schedule to other RFMOs so that they will be aware of ISC meetings and workshops.

11 ADMINISTRATIVE MATTERS

11.1 Operational Procedures Manual

The Plenary Chairman introduced a draft Operations Manual (*ISC/07/PLENARY/03*) as an important source of information about the ISC and how it operates. If the Plenary approves the document it will be a living document which will be updated as necessary to reflect evolving operational practice. A log of changes will be maintained.

Members discussed whether any additional amendments might be necessary to the tabled draft. The Chairman suggested that given the call for data on all billfishes to be submitted, the Chairman of the Billfish WG should update the species codes to include all relevant billfish species monitored by the ISC.

The Chairman called to members' attention the change in membership categories to include voting and non-voting members. The non-voting members are comprised of the U.N. Food and Agriculture Organization (FAO), the Inter-American Tropical Tuna Commission (IATTC), the North Pacific Marine Science Organization (PICES), and the Secretariat for the Pacific Community (SPC). It was clarified that there is also Observer and Invited Expert status which would allow non-members to attend meetings and workshops. The difference between the two is that the Invited Expert is nominated by a member, whereas an Observer may be self-nominated. Both must be approved by members.

In this context, the situation with respect to the WCPFC Scientific Committee was discussed. It was explained that this situation is specified in the MOU between the WCPFC and the ISC. Specifically, provisions are already specified by which a representative of the WCPFC is invited to observe the ISC Plenary meeting and WG workshops, and the Chairman, or designee, of the ISC is invited to observe the annual meetings of the WCPFC, the Northern Committee and the Scientific Committee. The possibility of a WCPFC representative becoming a non-voting member was discussed and it was resolved that it would be up to the WCPFC, only in the form of the Scientific Committee, to apply for non-voting member status. It was confirmed that under Observer status, there are no restrictions on the degree of participation by a WCPFC representative other than the restriction on voting (which would apply in the case of non-voting member as well) but it should be of a degree similar to that allowed by the WCPFC for the ISC observer.

With respect to the original ISC Guidelines which require simultaneous Japanese language translation of the Plenary session, the Chairman informed members that under the new wording of the Guidelines, this is now optional.

The U.S. delegation raised the idea of providing a glossary of standard terms within the ISC Operational Procedures Manual. This was advocated as means of maintaining agreement among the ISC members on the usage of common terminology.

11.2 Organization Structure

The Plenary Chairman tabled a document showing the ISC Organizational Structure (*ISC/07/PLENARY/08*). The following items were discussed
:

- The Mexican delegation leader will be M.A. Cisneros Mata;
- The Korean delegation leader and representative to all WGs is S.D. Hwang;
- Chinese Taipei will confirm all delegation names by September 2007;
- The IATTC representative to the albacore WG is Alexandre Aires-da-Silva;
- The swordfish and marlin WGs will be merged as agreed into a billfish WG;
- The names of data correspondents and email addresses for all names will be added.

A final diagram will be distributed to the head of each delegation and to each WG Chairman.

11.3 Election of Vice-Chairman

Given the resignation of J.R. Koh as Vice-Chairman of the ISC due to a change in job duties, the Chairman explained it is necessary to conduct a special election for Vice-Chairman to serve out the one remaining year of Dr. Koh's term. After rounds of balloting, in which each of the six members present cast one vote, H. Honda was elected as ISC Vice-Chairman. H. Honda thanked the members for their support and stressed the importance of cooperation among members, attention to the needs of industry and consumers, and the necessity of focusing on applied fishery science.

11.4 Website Design

After calling members' attention to the commitments to upgrade the ISC website (see *Annex 11* and Section 9 of this report), the Plenary Chairman asked H. Yamada to explain what plans are currently in place to progress with the necessary enhancements. H. Yamada replied that he was planning to add a box for Chairman's comments on the webpage and will begin searching for a new server (operated by a private company) that can accommodate and host the new requirements for the website. The U.S. delegation offered to assist by providing the services of web design contractor who has recently completed upgrades to the National Marine Fisheries Service Southwest Fisheries Science Center's website. The Japan delegation thanked the U.S. for their kind offer, but stated that the work on a new design and server has already been started by Japan. After receiving guidance on the conceptual design of the website, Japanese colleagues would first like to attempt construction of the website themselves but they would call upon the U.S. if any difficulties are encountered. A decision was made to continue as suggested by the Japan delegation but with the requirement that periodic updates on progress, including structural design, flow, functionality, and content be provided to the heads of delegations and WG Chairmen in order to ensure full participation and adequate consultation.

11.5 Preparations for meetings

The Plenary Chairman remarked that he would provide a list of requirements and organizational tools, such as meeting room configurations, distribution lists and logistics guidance, to whichever member will be hosting the next Plenary meeting as guidelines for hosting and organizing the ISC8 meeting.

11.6 Other matters

The use of Kobe charts to indicate whether stocks are overfished or whether overfishing is occurring was revisited. It was agreed that WGs should attempt to use such diagrams as much as is practical. If it is not clear which reference points should be used, multiple diagrams with various reference points should be prepared. The ALBWG agreed to trial use of these diagrams in their next assessment and will begin work in the interim, using the 2006 assessment results, to develop prototype diagrams.

H. Honda presented an outline of two major research programs for the sustainable use of tuna resources around Japan being undertaken by Japan's National Research Institute of Far Seas Fisheries. Both programs are being conducted over the period 2007-2009 with funding from the Japan Fisheries Research Agency. Outcomes of the studies will be applied to developing indicators or models for predicting recruitment strength in early life history stages for larvae and/or juveniles of Pacific bluefin tuna. The results will also be used to analyze long term fluctuations in natural stocks of tuna resources, especially Pacific bluefin tuna. The first of the two programs consists of basic research, using field surveys and modelling, on the recruitment strategy of Pacific bluefin tuna around Japan. The second program is an analytical study of long term fluctuations in tuna stocks around Japan, especially Pacific bluefin tuna, using historical data sets.

Discussion

The Mexico delegation remarked that they are developing a similar project on tuna recruitment which will use different methodology but complement Japan's work. Chinese Taipei officials complimented Japan on the project and stated their hopes of contributing to the study. The Chairman thanked H. Honda for his interesting presentation and expressed appreciation for the financial support of such studies by Japan.

12 ADOPTION OF REPORT

A draft Report of the Seventh Meeting of the International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean was prepared based on input and comment from all participants, and circulated to all members for review. The report was reviewed in its entirety, section by section, within the Plenary meeting and additional comments were incorporated. The report, including all of its annexes, was then adopted as a final document which will be distributed to all members within one week.

13 CLOSE OF MEETING

M. Dreyfus complimented the Plenary Chairman on his skillful and effective management of the meeting, and expressed his appreciation to the rapporteurs and meeting organizers. N. Miyabe, on behalf of the Japanese delegation, also thanked the Chairman for a useful meeting. The Plenary Chairman recognized the WG Chairs and the new ISC Vice-Chair, H. Honda, for their important work, and encouraged them to continue to try to resolve technical issues within their WGs. He thanked the Japan and U.S. delegations for their strong support of the ISC, noting that without interest from members it will be difficult to accomplish the goals of the ISC. Finally, he expressed his and the participants gratitude to the National Fisheries Research and Development Institute of Korea for hosting the meeting. D.Y. Moon responded on behalf of the Korea delegation with congratulations on a successful outcome. The meeting adjourned at 14:20 on July 31, 2007.

Table 1. North Pacific albacore catches (in metric tons) by fishery, 1952-2006. Blank indicates no effort. **--** indicates data not available. 0 indicates less than 1 metric ton. Provisional estimates in ( ). Data are from the Albacore Working Group catch tables as of 28 July 2007 and may differ from official statistics.

Year	**Canada**		**Japan**						**Korea**		**Mexico**
	Troll	Purse Seine	Gill Net	Long Line	Pole & Line	Purse Seine	Troll	Unsp. Gear	Gill Net	Long Line	Purse Seine
1952	71			26,687	41,787	154		237			
1953	5			27,777	32,921	38		132			
1954				20,958	28,069	23		38			
1955				16,277	24,236	8		136			
1956	17			14,341	42,810			57			
1957	8			21,053	49,500	83		151			
1958	74			18,432	22,175	8		124			
1959	212			15,802	14,252			67			
1960	5	136		17,369	25,156			76			
1961	4			17,437	18,639	7		268			0
1962	1			15,764	8,729	53		191			0
1963	5			13,464	26,420	59		218			0
1964	3			15,458	23,858	128		319			0
1965	15			13,701	41,491	11		121			0
1966	44			25,050	22,830	111		585			0
1967	161			28,869	30,481	89		520			
1968	1,028			23,961	16,597	267		1,109			
1969	1,365			18,006	31,912	521		935			0
1970	390			16,283	24,263	317		456			0
1971	1,746			11,524	52,957	902		308			0
1972	3,921		1	13,043	60,569	277		623			100
1973	1,400		39	16,795	68,767	1,353		495			0
1974	1,331		224	13,409	73,564	161		879			1
1975	111		166	10,318	52,152	159		228		2,463	1
1976	278		1,070	15,825	85,336	1,109		272		859	36
1977	53		688	15,696	31,934	669		355		792	0
1978	23		4,029	13,023	59,877	1,115		2,078		228	1
1979	521		2,856	14,215	44,662	125		1,126	0	259	1
1980	212		2,986	14,689	46,742	329		1,179	6	597	31
1981	200		10,348	17,922	27,426	252		663	16	459	8
1982	104		12,511	16,767	29,614	561		440	113	387	7
1983	225		6,852	15,097	21,098	350		118	233	454	33
1984	50		8,988	15,060	26,013	3,380		511	516	136	113
1985	56		11,204	14,351	20,714	1,533		305	576	291	49
1986	30		7,813	12,928	16,096	1,542		626	726	241	3
1987	104		6,698	14,702	19,082	1,205		155	817	549	7
1988	155		9,074	14,731	6,216	1,208		134	1,016	409	15
1989	140		7,437	13,104	8,629	2,521		393	1,023	150	2
1990	302		6,064	15,789	8,532	1,995		249	1,016	6	2
1991	139		3,401	17,046	7,103	2,652		392	852	3	2
1992	363		2,721	19,049	13,888	4,104		1,527	271	15	10
1993	494		287	29,966	12,797	2,889		867		32	11
1994	1,998		263	29,600	26,389	2,026		799		45	6
1995	1,763		282	29,075	20,981	1,177	856	81		440	5
1996	3,316		116	32,493	20,272	581	815	117		333	21
1997	2,168		359	38,951	32,238	1,068	1,585	123		319	53
1998	4,177		206	35,812	22,926	1,554	1,190	88		288	8
1999	2,734		289	33,364	50,369	6,872	891	127		107	23
2000	4,531		67	30,046	21,549	2,408	645	171		414	79
2001	5,248		117	28,819	29,430	974	416	96		82	22
2002	5,379		332	23,644	48,454	3,303	787	135		(113)	28
2003	6,861	0	126	20,954	36,114	627	922	106	(0)	(144)	28
2004	7,856	0	61	17,547	32,255	7,200	772	65	(0)	(68)	(104)
2005	4,829		154	21,020	16,133	850	665	316	(0)	(520)	(0)
2006	(5,819)		(154)	(21,020)	(16,133)	(850)	(665)	(316)	(0)	(520)	(109)

[1] Data are from the 1st ISC Albacore Working Group, November 28 - December 5, 2006 except as noted below.
Recent updates -- Childers added Hawaii troll/handline for US (7/3/2007), -- Uosaki updated figures in 2005 and 2006 for Japan (7/23/2007); Chinese Taipei updates for 2005 and 2006 received 28 July 2007.

Table 1. (cont.) North Pacific albacore catches (in metric tons) by fishery, 1952-2006. Blank indicates no effort. **--** indicates data not available. 0 indicates less than 1 metric ton. Provisional estimates in ( ). Data are from the Albacore Working Group catch tables as of 28 July 2007 and may differ from official statistics.

Year	Chinese Taipei		United States								Other		Grand Total
	Gill Net	Long Line[2]	Pole& Line	Gill Net	Long Line	Purse Seine	Sport	Troll	Troll/ Handline	Unsp. Gear	Long Line[3]	Troll	
1952					46		1,373	23,843					**94,198**
1953					23		171	15,740					**76,807**
1954					13		147	12,246					**61,494**
1955					9		577	13,264					**54,507**
1956					6		482	18,751					**76,464**
1957					4		304	21,165					**92,268**
1958					7		48	14,855					**55,723**
1959					5		0	20,990		0			**51,328**
1960					4		557	20,100		0			**63,403**
1961			2,837		5		1,355	12,055		1			**52,608**
1962			1,085		7		1,681	19,752		1			**47,264**
1963			2,432		7		1,161	25,140		0			**68,906**
1964			3,411		4		824	18,388		0			**62,393**
1965			417		3		731	16,542		0			**73,032**
1966			1,600		8		588	15,333		1			**66,150**
1967		330	4,113		12		707	17,814		0			**83,096**
1968		216	4,906		11		951	20,434		0			**69,480**
1969		65	2,996		14		358	18,827		0			**74,999**
1970		34	4,416		9		822	21,032		0			**68,022**
1971		20	2,071		11		1,175	20,526		0			**91,240**
1972		187	3,750		8		637	23,600		0			**106,717**
1973		--	2,236		14		84	15,653		0			**106,836**
1974		486	4,777		9		94	20,178		0			**115,113**
1975		1,240	3,243		33		640	18,932		10			**89,696**
1976		686	2,700		23		713	15,905		4			**124,816**
1977		572	1,497		37		537	9,969		0			**62,799**
1978		6	950		54		810	16,613		15			**98,822**
1979		81	303		--		74	6,781		0			**71,004**
1980	--	249	382		--		168	7,556		0			**75,126**
1981	--	143	748		25		195	12,637		0			**71,042**
1982	--	38	425		105		257	6,609		21			**67,960**
1983	--	8	607		6		87	9,359		0			**54,527**
1984	--	--	1,030		2	3,728	1,427	9,304		0			**70,258**
1985	--	--	1,498	2	0	26	1,176	6,415	7	0			**58,203**
1986	--	--	432	3		47	196	4,708	5	0			**45,396**
1987	2,514	--	158	5	150	1	74	2,766	6	0			**48,994**
1988	7,389	--	598	15	307	17	64	4,212	9	10			**45,579**
1989	8,350	40	54	4	248	1	160	1,860	36	23			**44,176**
1990	16,701	4	115	29	177	71	24	2,603	15	4			**53,698**
1991	3,398	12	0	17	312	0	6	1,845	72	71			**37,324**
1992	7,866	--	0	0	334	0	2	4,572	54	72			**54,847**
1993		5	0	0	438		25	6,254	71	0			**54,136**
1994		83	0	38	544		106	10,978	90	213		158	**73,336**
1995		4,280	80	52	882		102	8,045	177	1		137	**68,416**
1996		7,596	24	83	1,185	11	88	16,938	188	0	1,735	505	**86,417**
1997		9,119	73	60	1,653	2	1,018	14,252	133	1	2,824	404	**106,402**
1998		8,617	79	80	1,120	33	1,208	14,410	88	2	5,871	286	**98,042**
1999		8,186	60	149	1,542	48	3,621	10,060	331	1	6,307	261	**125,342**
2000		8,842	69	55	940	4	1,798	9,645	120	3	3,654	490	**85,529**
2001		8,684	139	94	1,295	51	1,635	11,210	194	0	1,471	127	**90,105**
2002		7,965	381	30	525	4	2,357	10,387	235		700	(127)	**(104,887)**
2003		7,166	59	16	524	44	2,214	14,102	85	0	(2,400)	(127)	**(92,620)**
2004		4,988	126	12	360	1	1,506	13,346	160	0	(2,400)	(127)	**(88,955)**
2005		4,472	66	20	(304)		(1,719)	8,413	170	0	(2,400)	(127)	**(64,183)**
2006		4,317	(22)	(3)	(274)		(291)	(12,590)	(86)	(0)	(2,400)	(127)	**(67,704)**

[2] Catches for 2000-2004 contain estimates of offshore longline catches from vessels landing at domestic ports

[3] Other longline catches from vessels flying flags of convenience being called back to Chinese Taipei. Catches may be duplicated in the Chinese Taipei longline series (November 2005).

Table 2. Swordfish catches (in metric tons) by fishery, 1952-2006. Blank indicates no effort. - indicates data not available. 0 indicates less than 1 metric ton. Provisional estimates in ( ). Data are from the Swordfish Working Group catch tables as of 1 February 2007 and may differ from official statistics.

Year	Japan								Chinese Taipei[5]			
	Distant/ Offshore Longline[2]	Coastal Longline	Harpoon[3]	Drift Net	Other Bait Fishing	Trap Net	Other[4]	Total	Distant Water Longline	Offshore Long line	Other	Total
1952	8,890	152	0	2,569	6	68	6	11,691	-	-		-
1953	10,796	77	0	1,407	20	21	87	12,408	-	-		-
1954	12,563	96	0	813	104	18	17	13,611	-	-		-
1955	13,064	29	0	821	119	37	41	14,111	-	-		-
1956	14,596	10	0	775	66	31	7	15,485	-	-		-
1957	14,268	37	0	858	59	18	11	15,251	-	-		-
1958	18,525	42	0	1,069	46	31	21	19,734	-	-		-
1959	17,236	66	0	891	34	31	10	18,268	-	-		-
1960	20,058	51	1	1,191	23	67	7	21,400	-	-		-
1961	19,715	51	2	1,335	19	15	11	21,147	-	-		-
1962	10,607	78	0	1,371	26	15	18	12,115	-	-		-
1963	10,322	98	0	747	43	17	16	11,243	-	-		-
1964	7,669	91	4	1,006	42	17	28	8,858	-	343	18	361
1965	8,742	119	0	1,908	26	14	182	10,991	-	358	10	368
1966	9,866	113	0	1,728	41	11	4	11,764	-	331	27	358
1967	10,883	184	0	891	33	12	5	12,008	-	646	35	681
1968	9,810	236	0	1,539	41	14	9	11,649	-	763	12	775
1969	9,416	296	0	1,557	42	11	5	11,327	0	843	7	850
1970	7,324	427	0	1,748	36	9	1	9,545	-	904	5	909
1971	7,037	350	1	473	17	37	0	7,915	-	992	3	995
1972	6,796	531	55	282	20	1	1	7,686	-	862	11	873
1973	7,123	414	720	121	27	23	2	8,430	-	860	119	979
1974	5,983	654	1,304	190	27	16	1	8,175	1	880	136	1,017
1975	7,031	620	2,672	205	58	18	2	10,606	29	899	153	1,081
1976	8,054	750	3,488	313	170	14	1	12,790	23	613	194	830
1977	8,383	880	2,344	201	71	7	1	11,887	36	542	141	719
1978	8,001	1,031	2,475	130	110	22	1	11,770	-	546	12	558
1979	8,602	1,038	983	161	45	15	1	10,845	7	661	33	701
1980	6,005	849	1,746	398	30	15	1	9,045	10	603	76	689
1981	7,039	727	1,848	129	59	10	0	9,812	2	656	25	683
1982	6,064	874	1,257	195	58	7	0	8,546	1	855	49	905
1983	7,692	999	1,033	166	30	9	2	9,931	0	783	166	949
1984	7,177	1,177	1,053	117	98	13	0	9,635	-	733	264	997
1985	9,335	999	1,133	191	69	10	0	11,737	-	566	259	825
1986	8,721	1,037	1,264	123	47	9	0	11,201	-	456	211	667
1987	9,495	860	1,051	87	45	11	0	11,549	3	1,328	190	1,521
1988	8,574	678	1,234	173	19	8	0	10,686	-	777	263	1,040
1989	6,690	752	1,596	362	21	10	0	9,431	50	1,491	38	1,579
1990	5,833	690	1,074	128	13	4	0	7,742	143	1,309	154	1,606
1991	4,809	807	498	153	20	5	0	6,292	40	1,390	180	1,610
1992	7,234	1,181	887	381	16	6	0	9,705	21	1,473	243	1,737
1993	8,298	1,394	292	309	43	4	1	10,341	54	1,174	310	1,538
1994	7,366	1,357	421	308	37	4	0	9,493	-	1,155	219	1,374
1995	6,422	1,387	561	440	17	7	0	8,834	50	1,135	225	1,410
1996	6,916	1,067	428	633	9	4	0	9,057	9	701	31	741
1997	7,002	1,214	365	396	11	5	0	8,993	15	1,358	61	1,434
1998	6,233	1,190	471	535	9	2	0	8,441	20	1,178	41	1,239
1999	5,557	1,049	724	461	2	5	0	7,798	70	1,385	61	1,516
2000	6,180	1,121	808	539	7	5	1	8,661	325	1,531	86	1,942
2001	6,932	908	732	255	5	15	0	8,848	1,039	1,691	91	2,821
2002	6,230	965	1,164	222	8	11	0	8,600	1,633	1,557	27	3,217
2003	5,352	1,039	1,198	167	10	4	0	7,770	1,084	2,196	11	3,291
2004	(6,165)	1,454	1,339	33	33	23	1	(9,048)	884	1,828	16	2,728
2005	(6,972)							(6,972)	437	1,813	26	2,276
2006												

1 Catch data are currently unavailable for Korea, Philippines, and some other countries catching swordfish in the N. Pacific.
2 Catches by gear for 1952-1970 were estimated roughly using FAO statistics and other data. Catches for 1971-2002 are more reliably estimated.
3 Contains trolling and harpoon but majority of catch obtained by harpoon.
4 For 1952-1970 "Other" refers to catches by other baitfishing methods, trap nets, and various unspecified gears.
5 Offshore longline category includes some catches from harpoon and other fisheries but does not include catches unloaded in foreign ports

Table 2.(cont.) Swordfish catches (in metric tons) by fishery, 1952-2006. Blank indicates no effort. **-** indicates data not available. 0 indicates less than 1 metric ton. Provisional estimates in ( ). Data are from the Swordfish Working Group catch tables as of 1 February 2007 and may differ from official statistics.

Year	**Korea**	**Mexico**	**United States[2]**						**Grand Total**
			Hawaii	California					
	Longline	All Gears	Longline	Longline	Gill Net	Harpoon	Unknown	Total	
1952	-	-	-	-	-	-	-	-	11,691
1953	-	-	-	-	-	-	-	-	12,408
1954	-	-	-	-	-	-	-	-	13,611
1955	-	-	-	-	-	-	-	-	14,111
1956	-	-	-	-	-	-	-	-	15,485
1957	-	-	-	-	-	-	-	-	15,251
1958	-	-	-	-	-	-	-	-	19,734
1959	-	-	-	-	-	-	-	-	18,268
1960	-	-	-	-	-	-	-	-	21,400
1961	-	-	-	-	-	-	-	-	21,147
1962	-	-	-	-	-	-	-	-	12,115
1963	-	-	-	-	-	-	-	-	11,243
1964	-	-	-	-	-	-	-	-	9,219
1965	-	-	-	-	-	-	-	-	11,359
1966	-	-	-	-	-	-	-	-	12,122
1967	-	-	-	-	-	-	-	-	12,689
1968	-	-	-	-	-	-	-	-	12,424
1969	-	-	-	-	-	-	-	-	12,177
1970	-	-	5	-	-	612	10	627	11,081
1971	-	-	1	-	-	99	3	103	9,013
1972	-	2	0	-	-	171	4	175	8,736
1973	-	4	0	-	-	399	4	403	9,816
1974	-	6	0	-	-	406	22	428	9,626
1975	-	-	0	-	-	557	13	570	12,257
1976	-	-	0	-	-	42	13	55	13,675
1977	-	-	17	-	-	318	19	354	12,960
1978	-	-	9	-	-	1,699	13	1,721	14,049
1979	-	7	7	-	-	329	57	393	11,946
1980	-	380	5	-	160	566	62	793	10,907
1981	-	1,575	3	1	461	267	20	752	12,822
1982	-	1,365	5	2	911	156	43	1,117	11,933
1983	-	120	5	1	1,321	58	378	1,763	12,763
1984	-	47	3	14	2,101	96	678	2,892	13,571
1985	-	18	2	46	2,368	211	792	3,419	15,999
1986	-	422	2	4	1,594	236	696	2,532	14,822
1987	-	550	24	4	1,287	211	300	1,826	15,446
1988	-	613	24	19	1,092	180	344	1,659	13,998
1989	-	690	218	29	1,050	54	224	1,575	13,275
1990	-	2,650	2,436	18	1,028	50	137	3,669	15,667
1991	-	861	4,508	39	836	16	137	5,536	14,299
1992	-	1,160	5,700	95	1,332	74	44	7,245	19,847
1993	-	812	5,909	165	1,400	169	36	7,679	20,370
1994	-	581	3,176	740	799	153	8	4,876	16,324
1995	-	437	2,713	279	755	96	31	3,874	14,555
1996	12	439	2,502	347	752	81	10	3,692	13,941
1997	246	2,365	2,881	664	707	84	3	4,339	17,377
1998	123	3,603	3,263	422	924	48	13	4,670	18,076
1999	104	1,136	3,100	1,333	606	81	2	5,122	15,676
2000	161	2,216	2,949	1,908	646	90	9	5,602	18,582
2001	349	780	220	1,763	375	52	5	2,415	15,213
2002	350	465	204	1,320	302	90	3	1,919	14,551
2003	311	671	147	1,812	216	107	0	2,282	14,325
2004	(350)	270.1	(213)	(898)	182	89	(37)	(1,419)	(14,883)
2005	(407)	234.5	(1360)	-	219	73	(0)	(1,652)	(13,506)
2006		347.2							(347)

1 Catch data are currently unavailable for Korea, Philippines, and some other countries catching swordfish in the N. Pacific.
2 Estimated round weight of retained catch. Does not include discards.

Table 3. Striped marlin catches (in metric tons) by fishery, 1952-2005. Blank indicates no effort. - indicates data not available. 0 indicates less than 1 metric ton. Provisional estimates in ( ). Data are from the Marlin Working Group catch tables as of 1 February 2007 and may differ from official statistics.

Year	Japan							Chinese Taipei[1]				
	Distant Water Longline	Off Shore Longline	Other Longline	Small Mesh Gillnet	Large Mesh Gillnet	Other[2]	Total	Distant Water Longline	Highseas Drift Gillnet	Off Shore Longline	Other	Total
1952	2,901		722	0	0	1,564	5,187					-
1953	2,138		47	0	0	954	3,139					-
1954	3,068		52	0	0	1,088	4,208					-
1955	3,082		28	0	0	1,038	4,149					-
1956	3,729		59	0	0	1,996	5,785					-
1957	3,189		119	0	0	2,459	5,766					-
1958	4,106		277	0	3	2,914	7,301					-
1959	4,152		156	0	2	3,191	7,501					-
1960	3,862		101	0	4	1,937	5,905					-
1961	4,420		169	0	2	1,797	6,388					-
1962	5,739		110	0	8	1,912	7,770					-
1963	6,135		62	0	17	1,910	8,124					-
1964	14,304		42	0	2	2,344	16,691			560	199	759
1965	11,602		19	0	1	2,796	14,418			392	175	567
1966	8,419		112	0	2	1,573	10,106			356	157	513
1967	11,698		127	0	3	1,551	13,379	2		385	204	591
1968	15,913		230	0	3	1,040	17,186	1		332	208	541
1969	8,544	600	3	0	3	2,630	11,780	2		571	192	765
1970	12,996	690	181	0	3	1,029	14,899	0		495	189	684
1971	10,965	667	259	0	10	2,016	13,917	0		449	135	584
1972	7,006	837	145	0	243	990	9,221	9		380	126	515
1973	6,299	632	118	0	3,265	630	10,944	1		568	139	708
1974	6,625	327	49	0	3,112	775	10,888	24		650	118	792
1975	5,193	286	38	0	6,534	685	12,736	64		732	96	892
1976	4,996	244	34	0	3,561	571	9,406	32		347	140	519
1977	2,722	256	15	0	4,424	547	7,964	17		524	219	760
1978	2,464	243	27	0	5,593	418	8,745	0		618	78	696
1979	4,898	366	21	0	2,532	526	8,343	26		432	122	580
1980	5,871	607	5	0	3,467	537	10,488	61		223	132	416
1981	3,957	259	12	0	3,866	538	8,632	17		491	95	603
1982	5,211	270	13	0	2,351	655	8,500	7		397	138	542
1983	3,575	320	10	22	1,845	792	6,564	0		555	214	769
1984	3,335	386	9	76	2,257	719	6,782	0		965	339	1,304
1985	3,698	711	24	40	2,323	732	7,528	0		513	181	694
1986	5,178	901	33	48	3,536	571	10,267	0		179	148	327
1987	5,439	1,187	6	32	1,856	513	9,033	31		383	151	565
1988	5,768	752	7	54	2,157	668	9,406	7		457	169	633
1989	4,582	1,081	13	102	1,562	537	7,877	8		184	157	349
1990	2,298	1,125	3	19	1,926	545	5,916	2		137	256	395
1991	2,677	1,197	3	27	1,302	506	5,712	36		254	286	576
1992	2,757	1,247	10	35	1,169	302	5,520	1		219	197	417
1993	3,286	1,723	1	0	828	443	6,281	5		221	142	368
1994	2,911	1,284	1	0	1,443	383	6,022	1		137	196	334
1995	3,494	1,840	3	0	970	278	6,585	27		83	82	192
1996	1,951	1,836	4	0	703	152	4,646	26		162	47	235
1997	2,120	1,400	3	0	813	163	4,499	59		290	47	396
1998	1,784	1,975	2	0	1,092	304	5,157	90		205	50	345
1999	1,608	1,551	4	0	1,126	183	4,472	66		128	42	236
2000	1,152	1,109	8	0	1,062	297	3,628	153		161	55	369
2001	985	1,326	11	0	1,077	237	3,636	121		129	51	301
2002	764	795	5	0	1,264	291	3,119	251		226	29	506
2003	1,008	826	3	0	1,064	203	3,104	241		91	43	375
2004	(761)	(964)	(2)	(0)	(1,339)	(90)	(3,066)	261		95	24	380
2005	(803)						(803)	176		76	32	284

1 Estimated from catch in number of fish

2 Contains bait fishing, net fishing, trapnet, trolling, harpoon, etc.

Table 3.(cont). Striped marlin catches (in metric tons) by fishery, 1952-2005. Blank indicates no effort. - indicates data not available. 0 indicates less than 1 metric ton. Provisional estimates in ( ). Data are from the Marlin Working Group catch tables as of 1 February 2007 and may differ from official statistics.

Year	Costa Rica[1]	Korea			Mexico			United States					Grand Total
	Sport	Long Line	Highseas Drift Gillnet	Total	Long Line	Sport[1]	Total	Long Line	Troll	Hand Line	Sport[1]	Total	
1952		-		0			0				23	23	5,210
1953		-		0			0				5	5	3,144
1954		-		0			0				16	16	4,224
1955		-		0			0				5	5	4,154
1956		-		0			0				34	34	5,819
1957		-		0			0				42	42	5,808
1958		-		0			0				59	59	7,360
1959		-		0			0				65	65	7,566
1960		-		0			0				30	30	5,935
1961		-		0			0				24	24	6,412
1962		-		0			0				5	5	7,775
1963		-		0			0				68	68	8,192
1964		-		0			0				58	58	17,508
1965		-		0			0				23	23	15,008
1966		-		0			0				36	36	10,655
1967		-		0			0				49	49	14,018
1968		-		0			0				51	51	17,778
1969		-		0			0				30	30	12,575
1970		-		0			0				18	18	15,601
1971		-		0			0				17	17	14,518
1972		-		0			0				21	21	9,757
1973		-		0			0				9	9	11,660
1974		-		0			0				55	55	11,735
1975		-		0			0				27	27	13,655
1976		-		0			0				31	31	9,956
1977		-		0			0				41	41	8,766
1978		-		0			0				37	37	9,478
1979		-		0			0				36	36	8,960
1980		-		0			0				33	33	10,937
1981		-		0			0				60	60	9,295
1982		-		0			0				41	41	9,083
1983		-		0			0				39	39	7,373
1984		-		0			0				36	36	8,122
1985		-		0			0				42	42	8,263
1986		-		0	-		0				19	19	10,614
1987		-		0	-		0	272	30	1	28	331	9,928
1988		-		0	-		0	504	54	1	30	589	10,628
1989		-		0	-		0	612	24	0	52	688	8,914
1990		-		0	-	181	181	538	27	0	23	588	7,079
1991	106	-		0	-	75	75	663	40	0	12	715	7,184
1992	281	-		0	-	142	142	459	38	1	25	523	6,884
1993	438	-		0	-	159	159	471	68	1	11	551	7,796
1994	521	-		0	-	179	179	326	34	0	17	377	7,433
1995	153	-		0	-	190	190	543	52	0	14	609	7,729
1996	122	348		348	-	237	237	418	54	1	20	493	6,081
1997	138	828		828	-	193	193	352	38	1	21	412	6,466
1998	144	519		519	-	345	345	378	26	0	23	427	6,937
1999	166	352		352	-	266	266	364	28	1	12	405	5,897
2000	97	436		436	-	312	312	200	14	1	10	225	5,067
2001	151	206		206	-	237	237	351	42	2		395	4,926
2002	76	153		153	-	305	305	226	29	0		255	4,414
2003	79	172		172	-	322	322	538	28	0		566	4,618
2004	(19)	(75)		(75)	-	-	0	(384)	(56)	(2)		(442)	(3,768)
2005	-	(115)		(115)	-	-	0	(377)	-	-		(377)	(1,465)

[1] Estimated from catch in number of fish

Table 4. Schedule of ISC and Other Tuna and Tuna-like Species Regional Fisheries Management Organization Meetings, 2007-2009.

		09-07	10-07	11-07	12-07	01-08	02-08	03-08	04-08	05-08	06-08	07-08	08-08	09-08	10-08	11-08	12-08	01-09	02-09	03-09	04-09
ISC	**ALB WG**						MD/RP (28-), La Jolla	MD/RP (1-6), La Jolla				UP (16-17)					MD				
	PBF WG				DP/MD (11-18), Shimizu					DP/MD (21-27) FA (28-30)	FA (1-4)							MD RP			
	BILL WG					SWO DP/MD (15-23)					SWO SC (3-10), Japan				SWO MD (25-1) SYM (20-24)					SWO FA	
	BC WG									Shark DP		RE (16-17)					Shark SC	Shark SC			
	STAT WG											RE (18-21)									
	Plenary											(23-28)									
Other	**ICCAT**	Spp. Groups (24-28)	SCRS (1-5)						Tuna Assess		BET Assess			Spp. Groups (29- 3)	SCRS (6-10)	Comm (12-18)					
	IATTC									Stock Assess. (12-16)	Comm (22-27)				Work shop (14-17)						
	WPFC	NC (11-13)			Comm (3-7)								SC (10-22)	NC (9-11)			Comm (1-5)				
	IOTC			SC (5-9)						Comm (11-16)						SC (3-7)					
	Others									Tuna Conf. (19-22)					WFC (20-24)						

Key: MD = Model development and analyses; DP = Data preparation and review; RP = Biological reference points; SC = Stock condition advice; FA = Complete stock assessment with new model, data or information; UP = Updated stock assessment with additional data and minor corrections to existing data; RE = Review of activities, plans and progress; SYM = Symposium Comm. = Commission, NC = Northern Committee, SC = Science Committee

7th *Meeting of the*

INTERNATIONAL SCIENTIFIC COMMITTEE FOR TUNA AND TUNA-LIKE SPECIES IN THE NORTH PACIFIC OCEAN

Busan National University
Sangnam International House
Geumjeong-gu
Busan 609-735, Korea

July 25-30, 2007

Agenda

1. Opening
2. Adoption of Agenda
3. Delegation Reports on Research and Fishery Monitoring
4. Report of Chairman
5. Reports of Working Groups
6. Stock Status and Conservation Advice
7. Review of Stock Status of Secondary Stocks
8. Review of Statistics and Data Base Issues
9. Relationship between ISC and Regional Organizations
10. Review of Meeting Schedule
11. Administrative Matters
12. Adoption of Report
13. Close of Meeting

REPORT OF THE SEVENTH MEETING OF THE INTERNATIONAL SCIENTIFIC COMMITTEE FOR TUNA AND TUNA-LIKE SPECIES IN THE NORTH PACIFIC OCEAN

Plenary Session, July 25-30, 2007
Busan, Korea

LIST OF PARTICIPANTS

* indicates Delegation Leader

Canada

* Max Stocker
Fisheries and Oceans Canada, Pacific Biological Station
3190 Hammond Bay Road, Nanaimo, B.C. Canada V9T 6N7
1-250-758-0275 (tel), 1-250-756-7053 (fax)
StockerM@pac.dfo-mpo.gc.ca

Chinese-Taipei

*Chung-Hai Kwoh
Fisheries Agency
Council of Agriculture
2 Chaochow Street
Taipei, Taiwan
886-2-3343-6114 (tel), 886-2-3343-6268 (fax)
chunghai@ms1.fa.gov.tw

Chi-Lu Sun
Institute of Oceanography
National Taiwan University
1 Section 4, Roosevelt Road
Taipei, Taiwan 106
Email: 886-2-23629842 (tel & fax)
chilu@ntu.edu.tw

Ren-Fen Wu
Overseas Fisheries Development Council
Republic of China
19, Ln 113, Sec 4, Roosevelt Road
Taipei, Taiwan
886-2-2738-1522 ext. 118 (tel), 886-2-2738-4329 (fax)
fan@ofdc.org.tw

Shyh-Jiun Wang
Overseas Fisheries Development Council
Republic of China
19, Ln 113, Sec 4, Roosevelt Road
Taipei, Taiwan
886-2-2738-1522 ext. 116 (tel), 886-2-2738-4329 (fax)
shyhjiun@ofdc.org.tw

Japan

*Hitoshi Honda
National Research Institute of Far Seas Fisheries
5-7-1 Orido, Shimizu, Shizuoka, Japan, 424-8633
81-543-36-6034 (tel), 81-543-35-9642 (fax)
hhonda@affrc.go.jp

Hideo Inomata
Fisheries Agency of Japan
1-2-1, Kasumigaseki, Chiyoda-ku,
Tokyo 100-8907 JAPAN
81-3-3504-3995 (tel), 81-3-3502-0571 (fax)
Hideo_inomata@nm.maff.go.jp

Masashi Kiyota
National Research Institute of Far Seas Fisheries
5-7-1 Orido, Shimizu, Shizuoka, Japan, 424-8633
81-543-36-6046 (tel), 81-543-35-9642 (fax)
kiyo@fra.affrc.go.jp

Makoto Miyake
Scientific Advisor, Japan Tuna
3-3-4 Shimorenjaku, Mitaka-shi
Tokyo, Japan 181-0013
+81 422-46-3917 (tel)
p.m.miyake@gamma.ocn.ne.jp

Naozumi Miyabe
National Research Institute of Far Seas Fisheries
5-7-1 Orido, Shimizu, Shizuoka, Japan, 424-8633
81-543-36-6022 (tel), 81-543-35-9642 (fax)
miyabe@fra.affrc.go.jp

Yukio Takeuchi
National Research Institute of Far Seas Fisheries
5-7-1 Orido, Shimizu, Shizuoka, Japan, 424-8633
81-543-36-6039 (tel), 81-543-35-9642 (fax)
yukiot@fra.affrc.go.jp

Koji Uosaki
National Research Institute of Far Seas Fisheries
5-7-1 Orido, Shimizu, Shizuoka, Japan, 424-8633
81-543-36-6044 (tel), 81-543-35-9642 (fax)
uosaki@affrc.go.jp

Harumi Yamada
National Research Institute of Far Seas Fisheries
5-7-1 Orido, Shimizu, Shizuoka, Japan, 424-8633
81-543-36-6034 (tel), 81-543-35-9642 (fax)
hyamada@fra.affrc.go.jp

Kotaro Yokawa
National Research Institute of Far Seas Fisheries
5-7-1 Orido, Shimizu, Shizuoka, Japan, 424-8633
81-543-36-6035 (tel), 81-543-35-9642 (fax)
yokawa@fra.affrc.go.jp

Korea

*Sun-Do Hwang
National Fisheries Research and Development Institute
408-1 Sirang-ri, Gijang-eup, Gijang-gun
Busan, 619-705, Korea
82-51-720-2334 (tel), 82-51-720-2337 (fax)
sdhwang@nfrdi.re.kr

Doo-Hae An
National Fisheries Research and Development Institute
408-1 Sirang-ri, Gijang-eup, Gijang-gun
Busan, 619-705, Korea
82-51-720-2320 (tel), 82-51-720-2337 (fax)
dhan@nfrdi.re.kr

Seon-Jae Hwang
National Fisheries Research and Development Institute
408-1 Sirang-ri, Gijang-eup, Gijang-gun
Busan, 619-705, Korea
82-51-720-2325 (tel), 82-51-720-2337 (fax)
hwangseonjae@hanmail.net

Doo-Nam Kim
National Fisheries Research and Development Institute
408-1 Sirang-ri, Gijang-eup, Gijang-gun
Busan, 619-705, Korea
82-51-720-2324 (tel)
82 51 720 2337 (fax)
dnkim@nfrdi.re.kr

Dae-Yeon Moon
National Fisheries Research and Development Institute
408-1 Sirang-ri, Gijang-eup, Gijang-gun
Busan, 619-705, Korea
82-51-720-2310 (tel), 82-51-720-2337 (fax)
dymoon@nfrdi.re.kr

Mexico

*Michel Dreyfus
Instituto Nacional de la Pesca (INP)
Centro Regional de Investigaciones Pesqueras de Ensenada (CRIP-Ensenada)
KM 97.5 Carretera Tijuana-Ensenada
Ensenada, Baja California, Mexico
52-646-1746085 (tel)
dreyfus@cicese.mx

Luis Vicente González Ania
Instituto Nacional de la Pesca (INP)
Pitagoras 1320 Col. Santa Cruz Atoyac
03310 Mexico, D.F.
Mexico
52-55-54223012 (tel)
lgonzalez_inp@yahoo.com.mx

United States

*William Fox
NOAA/NMFS/SWFSC
8604 La Jolla Shores Dr.
La Jolla, CA 92037
1-858-546-7081 (tel), 1-858-546-5655 (fax)
William.Fox@noaa.gov

Jon Brodziak
NOAA/NMFS PIFSC
2570 Dole Street
Honolulu, HI 96822-2396
1-808-983-2964 (tel), 1-808-983-2902 (fax)
Jon.Brodziak@noaa.gov

Shelley Clarke
Visiting Researcher, Imperial College London
1675 Sasama-kami
Kawane-cho, Shizuoka, Japan 428-0211
81-547-54-0275 (tel and fax)
shelley.clarke@imperial.ac.uk

Ray Conser
NOAA/NMFS SWFSC
8604 La Jolla Shores Dr.
La Jolla, CA 92037 USA
1-858-546-5688 (tel), 858-546-7003 (fax)
rconser@ucsd.edu

Gerard DiNardo
NOAA/NMFS PIFSC
2570 Dole Street
Honolulu, HI 96822-2396 USA
1-808-983-5397 (tel), 1-808-983-2902 (fax)
Gerard.Dinardo@noaa.gov

Tom Graham
NOAA/NMFS/PIRO
1601 Kapiolani Blvd., Suite 1110
Honolulu, HI 96814
1-808- 944-2219 (tel), 1-808-973-2941 (fax)
Tom.Graham@noaa.gov

Kevin Piner
NOAA/NMFS SWFSC
8604 La Jolla Shores Dr.
La Jolla, CA 92037 USA
1-858-546-5613 (tel), 1-858-546-7003 (fax)
Kevin.Piner@noaa.gov

Gary Sakagawa (Chairman)
NOAA/NMFS SWFSC
8604 La Jolla Shores Dr.
La Jolla, CA 92037 USA
1-858-546-7177 (tel)
Gary.Sakagawa@noaa.gov

Sarah Shoffler
NOAA/NMFS SWFSC
8604 La Jolla Shores Dr.
La Jolla, CA 92037 USA
1-858-546-5678 (tel), 1-858 546 5655 (fax)
Sarah.Shoffler@noaa.gov

Robert Skillman
Western Pacific Fisheries Management Council
1164 Bishop Street, Suite 1400
Honolulu, HI 96813
1-808-522-8220 (WCPFC)
1-808-754-1219 (cell)
skilfishr@mac.com

WCPFC

Sung-Kwon Soh
WCPFC
Kaselehlie Street (P.O. Box 2356)
Kolonia, 96941
Federated States of Micronesia
sungkwons@mail.mf

SUPPORT STAFF

Jinhwan Kim
National Fisheries Research and Development Institute
408-1, Shirang-ri, Gijang-eup, Gijang-gun
Busan, Korea 619-705
82-51-720-2322 (tel), 82-51-720-2337 (fax)
kjtank@daum.net

Youjung Kwon
National Fisheries Research and Development Institute
408-1, Shirang-ri, Gijang-eup, Gijang-gun
Busan, Korea 619-705
82-51-720-2322 (tel), 82-51-720-2337 (fax)
youjungkwon@gmail.com

REPORT OF THE SEVENTH MEETING OF THE INTERNATIONAL SCIENTIFIC COMMITTEE FOR TUNA AND TUNA-LIKE SPECIES IN THE NORTH PACIFIC OCEAN

Plenary Session, July 25-30, 2007
Busan, Korea

LIST OF MEETING DOCUMENTS

Plenary Documents

ISC/07/PLENARY/01	ISC Action Plan for 2006-2007 (*ISC*)
ISC/07/PLENARY/02	IATTC-75-06: The Fishery for Tunas and Billfishes in the Eastern Pacific Ocean in 2006 (*IATTC*)
ISC/07/PLENARY/03	Operations Manual for the International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean (*ISC*)
ISC/07/PLENARY/04	The 2006 Canadian North Pacific Albacore Troll Fishery (*Max Stocker, Fisheries and Oceans Canada*)
ISC/07/PLENARY/05	Recent Status of Chinese-Taipei Tuna Fisheries in the North Pacific Region for 2005 (*Fisheries Agency, Council of Agriculture, Chinese-Taipei*)
ISC/07/PLENARY/06	U.S. Fisheries and Research on Tuna and Tuna-like Species in the North Pacific Ocean (*NOAA Fisheries SWFSC and PIFSC*)
ISC/07/PLENARY/07	Schedule of ISC and Other Highly Migratory Species Regional Fisheries Management Organization Meetings, 2007-09 (*ISC*)
ISC/07/PLENARY/08	ISC Organizational Chart (June 2007) (*ISC*)
ISC/07/PLENARY/09	National Report of Japan *(Harumi Yamada and Koji Uosaki, National Research Institute of Far Seas Fisheries)*
ISC/07/PLENARY/10	Mexican Progress Report to the ISC (*INP*)

ISC/07/PLENARY/11	National Report of Korea *(S.D. Hwang, D.N. Kim, K.H. Choi, D.H. An, and D.Y. Moon, National Fisheries Research and Development Institute)*

Informational Documents

ISC/07/PLENARY/INFO/01	Stock Assessment of Yellowfin Tuna in the Western and Central Pacific Ocean, Including an Analysis of Management Options (WCPFC-SC2-2006/SA WP-1) (*WCPFC*)
ISC/07/PLENARY/INFO/02	Stock Assessment of Bigeye Tuna in the Western and Central Pacific Ocean, Including an Analysis of Management Options (WCPFC-SC2-2006/SA WP-2) (*WCPFC*)
ISC/07/PLENARY/INFO/03	Status of Yellowfin Tuna in the Eastern Pacific Ocean (*IATTC*)
ISC/07/PLENARY/INFO/04	Status of Bigeye Tuna in the Eastern Pacific Ocean (*IATTC*)
ISC/07/PLENARY/INFO/05	The Relationship between the International Scientific Committee, the Northern Committee and the Scientific Committee in Respect to the Northern Stocks (WCPFC-SC3/GN WP-4) (*WCPFC*)

ANNEX 5

REPORT OF THE ALBACORE WORKING GROUP WORKSHOP

International Scientific Committee for Tuna and Tuna-Like Species in the North Pacific Ocean

(November 28 – December 5, 2006, Shimizu, Japan)

1.0 INTRODUCTION

The ISC Albacore Working Group (ISC-ALBWG) stock assessment workshop was held at the National Research Institute of Far Seas Fisheries (NRIFS) in Shimizu, Shizuoka, Japan from November 28 to December 5, 2006. Dr. Kobayashi, NRIFS Director, welcomed the participants. In his address to the participants, Dr. Kobayashi reflected on the long history of scientific cooperation on north Pacific albacore and he observed that the ISC Albacore Working Group serves as an effective forum for exchanging data, presenting research, and conducting stock assessments on albacore. He stressed that Japan recognizes the important scientific contributions the Working Group (WG) is making to the development of an understanding of the North Pacific albacore population. In closing, Dr. Kobayashi wished for participants to have a successful meeting.

A total of 16 participants from Canada, Japan, and the United States (U.S.) attended the Workshop (Appendix 1). Dr. Max Stocker chaired the stock assessment workshop. A provisional agenda that was circulated prior to the workshop received minor revisions and was adopted (Appendix 2). A total of 19 working documents were presented (Appendix 3). Paul Crone, Ray Conser, Al Coan, Vidar Wespestad, and Koji Uosaki served as rapporteurs.

The charge for the meeting was to complete a full assessment of the North Pacific albacore stock with data up to 2005, and to develop scientific advice on biological reference points for consideration of management action and for recommending action.

A Stock Assessment Task Group meeting was convened at the Pacific Biological Station in Nanaimo, B.C. July 13-17, 2006 for the purpose of data preparation for the full ISC-ALBWG stock assessment workshop. The report of the Task Group meeting is attached (Appendix 4).

2.0 REVIEW OF RECENT FISHERIES

North Pacific albacore are a valuable species with a long history of exploitation in the North Pacific Ocean. During the past five years, fisheries based in Japan accounted for 66.7% of the total harvest, followed by fisheries in the United States (16.4%), Chinese Taipei (7.7%) and Canada (6.7%). Other countries targeting North Pacific albacore contributed 2.5% and included Korea, Mexico, Tonga, Belize, Cook Islands, Ecuador and longline catches from vessels flying flags of convenience (Table 1). The total catch of North Pacific albacore for all nations combined peaked at a record high of 124,900 metric tons (mt) in 1999, but has declined over the course of the last several years and has averaged roughly 88,000 mt since the early 2000s (Figure 1); the 2005 total harvest of approximately 62,000 mt was the lowest observed since the early 1990s.

While various fishing gears have been employed over the years to harvest albacore in the North Pacific Ocean, the main gears used over the last five years were longline (36.0%), pole-and-line (37.5%), and troll (21.8%) (Figure 2). Other gears used since the mid-1990s included purse seine, gill net, unspecified and recreational fishing gears and accounted for roughly 5.5% of the total catch of albacore from the North Pacific Ocean.

2.1. Canada

Max Stocker presented a summary of catch, effort, and catch per unit of effort (CPUE) data for the Canadian north Pacific albacore tuna fishery in 2005 (**ISC/06/ALBWG/05**). The Canadian fishery for albacore in the North Pacific is a troll fishery using tuna jigs. All Canadian vessels must carry logbooks while fishing for highly migratory species in any waters. Detailed analysis of a combination of sales slips, logbooks, phone-in and trans-shipment records are undertaken to report fisheries statistics for the Canadian albacore fishery.

In 2005, 208 Canadian vessels operated in the North Pacific and caught 4,810 mt of albacore in 8,525 vessel days of fishing for a CPUE of 0.56 mt/vessel-day. Estimates for 2005 are considered preliminary. Both catch and CPUE have followed an increasing trend over the period 1995-2004 and then dropped in 2005. As in previous years, most of the 2005 catch was taken within 200-miles of the North American coast. Access by Canadian albacore vessels to waters in the US EEZ is governed by a US-Canada albacore treaty.

In terms of research activities, a project to document the existing relational database for the Canadian Pacific albacore catch and effort data is underway. A technical report is being prepared that describes the design of the entire database (including triplog, saleslip and hail components) based on a venn diagram concept, and include the relationship diagram that documents the structure of the relationships between these components.

2.1.1. Discussion

The group questioned the decrease in effort in offshore areas in 2005. The decrease was thought to be caused by increased fuel prices and depressed market conditions.

2.2. Japan

Koji Uosaki summarized recent trends in the Japanese fisheries (**ISC/06/ALBWG/04**). Japan has two major fisheries that catch albacore in the North Pacific, namely pole-and-line and longline. Other miscellaneous fisheries include purse seine, troll, and drift gillnet fisheries (Table 1). Total catches by the Japanese fisheries were 57,900 t in 2004 and decreased to 38,255 t in 2005. All 2005 figures are preliminary estimates. The albacore catch by the two major fisheries account for more than 90% of the total catch in recent years.

Pole-and-line catches were 32,255 t in 2004, and decreased to 16,883 t in 2005, the lowest reported catch during the last decade. The catch fluctuated ranging between 17,000-50,000 mt in the last decade. The pole-and-line fishery catches albacore during summer and autumn in areas from off Honshu-Island to the Emperor Sea Mount. This fishery targets primarily skipjack tuna and switches to albacore at the end of the skipjack season.

Longline albacore catches were 17,547 t in 2004 and 19,615 t in 2005. The catch shows a declining trend since 1996 when the catch peaked at 39,000 t. The longline fishery can be classified into two categories, the distant water and offshore longline fishery (vessels >20 GRT) and the coastal longline fishery (vessels < 20 GRT). The catches by both fisheries show a declining trend in recent years.

In 2004-2005, the coastal longline fleet operated principally off the eastern and southern coast of Japan, in an area between the Equator to 10°N, and 140°E to 150°E. The fleet caught albacore mainly during January-April, with catches distributed primarily off the south coast of Japan. In contrast, the 2004-2005 Japanese offshore and distant-water longline fleet (>20 GRT vessels) operated throughout the high-seas. High concentrations of effort were in areas between the Equator and 15°N, the east coast of Japan and 175°E, and in waters northeast of Hawaii. This longline fleet targeted mainly bigeye tuna in 2004-2005. Albacore were taken incidentally throughout the year and primarily from areas between 15°N to 40°N, and 150°E to 180°. Fishing effort and albacore catches in areas N-E of Hawaii drastically decreased from those in the 2002-2003 season.

Size (fork length, cm) measurements were taken from nearly 90,000 and 87,000 albacore landed by the longline fisheries in 2004 and 2005, respectively. Harvested albacore ranged between 50 cm and 120 cm. Size distributions showed two modes, namely at 75, 100 cm in 2004, 77, 102 cm in 2005. About 7,800 and 8,900 albacore were measured for length from pole-and-line landings in 2004 and 2005, respectively. Sizes of albacore caught ranged between 39 and 109 cm. The size distributions showed three modes, at approximately 52, 64 and 75 cm in 2004, and 54, 64, 78cm in 2005.

2.2.1. Discussion

The group discussed the decrease in albacore catches especially in the Japan pole and line fisheries. Japan indicated that this was caused by low availability of fish especially late in the year.

The group also noticed that the number of offshore and distant water longline vessels fishing in 2005 has decreased while the number of hooks fished has increased. Mr. Uosaki explained that this could be caused by the different areas represented in the two tables (north of the equator and north of 10 degrees N latitude). He also noted that coverage rates were low at the end of the year (Nov-Dec) and could also influence CPUE particularly of large vessels.

The group noticed the decrease in the number of hooks set by small longliners and the number of vessels fishing in 2005. Mr. Uosaki explained that this was probably due to the low logbook reporting rate and raising problems. Raising problems did not influence catch rate as raised data were not used.

2.3. South Korea

No information applicable to recent fisheries discussion was provided at this time. Korea has submitted catch data to the ISC data base for 2002-2005. However, albacore catches seem to be combined and reported in the other species and miscellaneous gear category.

2.4. Mexico

Luis Fleisher, representing the National Institute of Fisheries of Mexico (INP-Mexico), was unable to attend this meeting. However, Mexico sent the pertinent information and has been fully cooperating with the ALBWG efforts.

2.5. Chinese Taipei

No information applicable to recent fisheries discussion was provided at this time.

2.6. United States

In the U.S., North Pacific albacore are harvested by various types of fishing gear (Table 1). Troll gear has dominated since the early 1950s. During the last five years, troll fishing accounted for 81% of the total U.S. North Pacific albacore landings, with recreational fishing, and longline fishing generating roughly 13% and 4% respectively. Other gears included purse seine, pole-and-line, unspecified and gill net, which collectively accounted for only 2% of the total landings.

Al Coan reported on the U.S. albacore troll fishery that operated in the North Pacific Ocean in 2005 (**ISC/06/ALBWG/02**). During April-May, distant-water troll vessels begin fishing albacore in the central Pacific Ocean (around the International Date Line). As the fish become available off the North American coast in June and early July, the distant-water fleet moves closer to the coast and coastal vessels enter the fishery. The distributions of effort for the troll fishery in 2005 show this fishery operates from Mexico to Canada and from the west coast of North America to roughly 150°E. The majority of the 2005 albacore troll catch was concentrated mainly along the North American coast. The fleet continued a trend of decreased albacore catch and fishing in the mid Pacific Ocean and east of the International Date Line that started in 2004. Total albacore catch for U.S. North Pacific troll fishery was 13,346 mt in 2004, and declined to 9,122 mt in 2005 (Table 1). The number of vessels operating in the fishery decreased from 734 in

2004 to 652 in 2005. In 2005, 21,362 albacore were measured for fork length by port samplers. Fish ranged in size from 50-92 cm in length, with an average of 70 cm.

Al Coan reported on the U.S. longline fleets based in Hawaii and California (**ISC/06/ALBWG/03**). In 2005, U.S. longline vessels caught 277 metric tons (t) of albacore in the North Pacific Ocean, a reduction from the 560 t landed in 2004 and well below the peak catch of 1,652 t in 1997. Some of the catch was taken by the single vessel based in California, but most was recorded by the 124 active longline vessels based in Hawaii using shallow-set gear directed at swordfish or gear deployed deeper in the water column for bigeye tuna. The total fleet size has remained fairly stable over the past several years. The nominal effort by the U.S. fleet was about 35.1 million hooks in 2005, exceeding the 32.4 million hooks deployed in 2004.

During 2005, observers were deployed on 106 shallow-set trips (100% coverage) and 1,377 tuna trips (26% coverage) by Hawaii-based vessels. Observers were placed on one of the two tuna trips by the California-based vessel (shallow-set operations are not permitted by the California-based fleet). Observers on Hawaii-based longline vessels took fork length measurements on 3,577 of the 13,637 albacore they reported being caught. The observer on the California-based vessel also measured albacore.

Logbook data collected by Hawaii-based longline vessels in 2005 indicated that 3.6% of the albacore caught were discarded at sea. However, observer data suggest that discarding of albacore by these vessels may be more prevalent than indicated by logbook data, especially on trips targeting swordfish; this question is under investigation. All albacore caught by the California-based vessel were reported retained.

U.S. longline data for 2006 are being compiled and processed and will be disseminated as soon as they are validated and approved for release. The Hawaii-based shallow-set fishery for swordfish was closed on March 20 for the rest of 2006 because the swordfish fleet had already reached its annual incidental take limit for loggerhead sea turtles. The shallow-set fishery will resume in 2007. One of the new developments in the U.S. fishery for 2006 is the reported activity of a longline vessel based in Guam. Logbook data from this vessel are being collected by NMFS.

2.6.1. Discussion

The appropriateness of using a CPUE index for the U.S. longline fishery in the stock assessment was discussed. Two concerns were identified: 1) Regulations may have effected the index, and 2) Use of an index for a fishery that does not target albacore. The group agreed that this discussion should be addressed in the CPUE section. Mr. Coan was asked to capture the effect of U.S. longline regulations on albacore catches and develop quarterly plots of albacore catch and effort for the U.S. longline fishery for 2003 to 2005.

2.7. IATTC

No information applicable to recent fisheries discussion was provided at this time.

3.0 FISHERY STATISTICS

Al Coan reported on the current status of the North Pacific Albacore Working Group Data Catalog (**ISC/06/ALBWG/01**), including additions and updates made since the November-December 2005 Albacore Working Group meeting in La Jolla, California. The Data Catalog provides tables of fleet-specific data on annual catches of North Pacific albacore, the number of active vessels in each fishery (Category I), summarized logbook catch and effort (Category II), size composition (Category III) and the metadata for databases used for stock assessments, and other investigations. The Southwest Fisheries Science Center (SWFSC) in La Jolla, CA, U.S.A, maintains the Data Catalog and associated database files. It provides a secure FTP server at the Alaska Fisheries Science Center, and oversees the distribution of data to Workshop members and other scientists using the FTP site. The FTP site is accessible at ftp.afsc.noaa.gov. Access requires a user account and password. In addition to data and metadata, the site archives workshop reports, working papers from previous workshops, and derived analysis data sets (e.g., estimated catch-by-age matrices) used in albacore stock assessments.

The Data Catalog tables in ISC/06/ALBWG/01 reflect updates based on recent data submissions. Most of the data sets have been updated through 2005. In some instances uncertainty remains about table entries for recent catches because data updates have not yet been received (e.g., Category I data for the Korean longline fishery). Final catches received for this meeting are reflected in Table 1 of this report.

3.2. Discussion

Al Coan asked that the group consider three items:

1) Historical Category II and III data (Korea and Chinese Taipei) submitted from the ISC-ALBWG ftp site to the ISC in October of 2005 have not been transferred to the new ISC ftp site. A decision has to be made if the WG data manager will resubmit the data again or the ISC will copy the data to the respective ISC ftp site country folders. The WG will address this in other administrative matters later in the agenda.
2) Data are currently being submitted to the ISC and to the Albacore WG data bases. This policy will eventually lead to discrepancies in each data base. In order to alleviate this difference the group should decide whether to have data submitted to the ISC through the WG rather than directly to the ISC. The WG would rather keep their data base and will engage the Statistics Working Group to set up the necessary protocols.
3) The entire Chinese Taipei longline Category II data have been revised for the period 1964 to 2003. Since the changes are substantial, the WG Data Base Administrator needs some guidance from the WG in approving the data set for addition to the data base. The WG will check with Chinese Taipei to clarify

whether these new data were used to develop the standardized CPUE data used in the assessment models. If so, they will then recommend that the data be added.

The group agreed on the need for getting better information on Category I catch data for vessels presumed to have conducted illegal, unreported, and unregulated (IUU) fishing operations. Catches of North Pacific albacore may be taken but unreported by IUU vessels using longline or drift gill net gear. At the 19th Albacore Workshop, Adam Langley provided information from the OFP database on catches of albacore taken by IUU longline vessels in waters north of Hawaii but landed in the South Pacific. These data represented a partial reporting of the activity by these vessels. Adam Langley and Chien-Chung Hsu used these data to update entries in Table 1 for the “other longline” country category for 1996-2003. Workshop participants agreed to seek further information on activities of IUU vessels and work towards a comprehensive accounting of the North Pacific albacore catch, especially in 2004 and 2005 and for gillnet vessels..

4.0 BIOLOGICAL STUDIES

4.1. Age and Growth

Kyuji Watanabe presented a paper on length-weight (L-W) relationships for the North Pacific albacore (**ISC/06/ALBWG/14**). The L-W relationships at sex, area, season and year from 1990-2004 were investigated. The results were as follows: (1) The differences of the L-W relationships among the areas were found at each quarter; (2) in quarters 1, 2 and 4, condition factors *CF*s in area 4 tended to obviously decline in a range of approximately 90-140 cm as the length becomes bigger. (3) In quarters 1-3, condition factors in areas 1, 2 and 3 were higher than on average. While, in area 4, condition factors were below the average. Consequently, the utilization of the L-W equations for reliable estimations of the stock biomass and the spawning stock biomass was recommended.

4.2. Tagging Studies

4.2.1. Archival Tagging Studies

Koji Uosaki presented a summary of Japan’s albacore archival tagging program (**ISC/06/ALBWG/10**). Two albacore archival tagging sets were made during 2005-2006 by NRIFSF. In August 2005, a total of 50 tags (40 archrivals, 2 dummies and 8 conventional tags) were released at 43˚ – 44˚ N, 155˚ – 157˚ E. Size of tagged fish ranged from 51 to 58 cm in folk length, corresponding to age 2. In March 2006, a total of 13 tags (12 archrivals, 1 dummy) were released at 18˚ – 20˚ N, 135˚ – 137˚ E from the Research Vessel Shoyo-Maru. Size of tagged fish ranged from 94 to 103 cm in fork length, corresponding to adult albacore. The adult albacore archival tagging was a first in Japan. From these tagging sets, no tag has been recovered to date.

4.3. National Institute of Far Seas Fisheries - Japan

A scientific research cruise by the Japanese research vessel *Shoyo-maru* was conducted to investigate biology, ecology and stock dynamics of albacore (**ISC/06/ALBWG/12**). Ten longline operations were conducted around Okinotori-island (20-25ºN, 136-05ºW) during February 21 to March 7, 2006. GPS buoys, TDRs, small current meters and hook timers were attached to longline gear to monitor spatial and temporal movement of longline gear and to estimate hooking time and depth of the catch.

A total of 317 individuals consisting of 15 species were caught, which include four tuna and three billfish species. Albacore (118 individuals, 80-115cm FL) was the most frequently caught, and the mode was different between male (100-105cm FL) and female (95-100cm FL). A total of 41 individuals were caught by branch lines that were attached TDR or hook timer. Six of seven hook timers successfully recorded hooking time that ranged between 6:36 and 18:07 (local time).

Thirteen tags (12 archival tags and one dummy tag) were implanted during first to fifth longline operations (February 23-26, 2006). Pingers were attached to two adult albacore (97 and 96 cm FL) on February 27 and March 3, 2006. As a result of pinger tracking, both individuals died within a day after release although the second fish pingered seemed to be best condition. This result might be due to a damage of hauling-up from deep waters (adult individual). The authors recommended that it might be better to haul up slowly if the method of catching tunas using deep longline, or using other gears, such as pole-and-line to reduce mortality of tracking.

5. STOCK ASSESSMENT STUDIES

5.1. VPA-2BOX Model Analysis

Further details regarding sources of data and methods used to develop final time series and related model parameterizations particular to the VPA-based models are presented in paper **ISC/06/ALBWG/19**.

5.1.1. Catch-at-age Matrices

Catch-at-age matrices derived from fishery sample information are integral sources of data used in age-structured assessment models, such as VPA-2BOX (Porch 2003). Two papers were presented that generally addressed this subject: one paper from U.S. researchers that addressed the eastern North Pacific Ocean fisheries (**ISC/06/ALBWG/09**) and a paper from Japan researchers that focused on Japan's fisheries of the western North Pacific Ocean (**ISC/06/ALBWG/06**).

Paul Crone presented research (**ISC/06/ALBWG/09**) that addressed constructing catch-at-age matrices for the albacore fisheries in the 'eastern' North Pacific Ocean, i.e., based on sample data collected from vessels associated with the nations of North America (U.S., Canada, and Mexico). The estimation methods were based generally on the assumption that all 'surface' fisheries typically target juvenile albacore. Thus, size distributions derived from the U.S. troll fishery were applied to the catches of other ‘surface’ fisheries, including the pole-and-line, gill net, purse seine, and recreational fisheries of the U.S., as well as the Canada troll fishery, Mexico ‘unspecified’ fisheries, and ‘Others’ troll fisheries (Table 1).

For the single ‘sub-surface’ fishery that operated in the eastern North Pacific Ocean (i.e., the U.S. longline fishery), catch-at-age estimation was derived from biological (length and weight) data collected from an ongoing observer sampling program (1994-2005).

The two catch-at-age matrices for the surface and longline fisheries were simply summed together to produce a complete catch-at-age matrix that represented all fisheries (i.e., vessels from nations of North America) that operated in the eastern North Pacific Ocean (1966-2005). In summary, the complete catch-at-age matrix indicated that the vast majority of the albacore landed by the fisheries above were primarily juvenile fish (i.e., ages $\leq$5), which typically composed over 95% of the total (eastern North Pacific Ocean) landings in any given year (1966-2005).

Kyuji Watanabe presented methods used to develop catch-at-age matrices for Japan’s surface and longline fisheries (**ISC/06/ALBWG/06**). The catches-at-age of albacore by the Japanese fisheries in the North Pacific for 1966-2005 were updated. In the case of the Japanese large and small long line fisheries, the length-weight equations by quarter and area by Watanabe *et al*. (2006) instead to the length-weight equation by Suda and Warashina (1961). The estimated total catches slightly increased 4 to 6 millions during the 1960s-1970s, they reached 13 millions, but they began to decrease in the late 1970s, and dropped from about 5 to 2 millions during the early 1980s. Then, they gradually rose during the 1990s, reached to 10 million in 2002. To evaluate effects of the changes of the L-W equation on the catch number, the differences between the estimates induced from this change and those submitted in the ISC-ALBWG subgroup meeting in Nanaimo. However, both the fluctuations proved to be good fit with one another.

A single catch-at-age matrix (1966-2005) applicable to all (inclusive) fisheries was developed by simply summing the complete catch-at-age matrices independently derived above. Ultimately, this combined catch-at-age matrix served as the foundation for stock assessments based on the VPA-2BOX model analysis (Table 2).

5.1.1.1. Discussion

It was noted that the changes in Japan catch-at-age data (CAA) – from the CAA used for the 2004 assessment – were appreciable and tended to shift the total (annual) catch from smaller (younger) to larger (older) fish and thus, the WG noted that management-based parameters in units of biomass (vs. number of fish) would be most affected by these input data changes to the overall CAA. The effect of these changes on the assessment results will be fully explored and documented by the WG during this meeting.

5.1.2. Indices of Abundance

Indices of abundance (i.e., catch-per-unit-effort or CPUE) represent an important source of auxiliary data commonly used for 'tuning' purposes in VPA-based methods, such as the VPA-2BOX model. Several papers were presented that generally addressed this subject, including papers from the U.S. (**ISC/06/ALBWG/09**), and Japan (**ISC/06/ALBWG/07**, **ISC/06/ALBWG/08**, **ISC/06/ALBWG/11** and **ISC/06/ALBWG/13**).

Paul Crone presented research results regarding 'standardized' indices of abundance for both the U.S. troll and longline fisheries (**ISC/06/ALBWG/09**). Generalized Linear Model (GLM) estimation methods were used for purposes of standardizing catch and effort data collected from ongoing logbook sampling programs for the U.S. troll (1961-2005) and longline fleets (1991-2005).
The CPUE index applicable to the U.S. troll fishery indicated the stock size has fluctuated markedly since the 1960s, with generally declining catch rates from the 1960s to the late 1980s and increasing rates, albeit variable estimates, since the late 1980s (Figure 3). Since the early 1990s, catch rates for the U.S. longline fishery have been variable, ranging from 0.14 to 0.54 fish/set since 2000 (Figure 3).

Kyuji Watanabe presented a paper on age-specific abundance indices of the Japanese longline fisheries (**ISC/06/ALBWG/07**). The standardization of age-specific abundance index of albacore from Japanese large and small longline fisheries (L-LL and S-LL) in the North Pacific for 1966-2005 were improved. To use the indices throughout 1966-2005, the effects of area classification, fishery (the L-LL = 1, S-LL =2) and excluded gear configuration were compared throughout several models. The results showed that: (1) the effects of area classification can provide a decrease of AIC; (2) the effects of fishery and gear configurations are confounding; and (3) the model that excluded gear configuration during 1966-2005 was coincident with the model that included the effect of gear configuration. Consequently, the use of the model excluding gear configuration during 1966-2005 was recommended. In addition, the use of the indices of age 3 may not be appropriate since Japanese longline fisheries do not target this age class.

Koji Uosaki presented age-specific abundance indices applicable to the pole-and-line fishery (**ISC/06/ALBWG/08**). These indices were relatively low during the 1970s and through the mid 1980s, with higher estimates observed from the late 1980s through recent years. The age-specific abundance indices by fishing year indicated that 1999 and 2002 were associated with very high estimates, which represented the1995-99 year classes.

Kyuji Watanabe presented a paper on investigating declining abundance indices (**ISC/06/ALBWG/11**). The causes of the extreme decline of abundance indices for North Pacific albacore from the Japanese large longline (L-LL) fisheries from 2001-2004 were investigated as follows: (1) comparing the standardized CPUEs for North Pacific albacore by middle area *m*; (2) evaluating effectiveness of fishing effort as ratio for the estimated effective fishing effort to the aggregated fishing effort at *m* in year *y*; and (3) investigating annual catch number, hook number by grid 5˚ x5˚ . The results indicated that: (a) in almost all cases, the CPUEs largely dropped, slightly declined or remained constant during 2000-2004, but, these proved to increase a little bit in 2005; (b) in almost all cases, effectiveness of fishing effort remained below 1 over the period; and (c) at middle areas 1, 3, 5 and 8, where the standardized CPUEs were relatively high, the decrease rates of the catches were relative higher than those of the hook number. This decline of the standardized CPUEs from 2001-2004 implies a decrease in stock size. Consequently, the causes of the extreme decline of the CPUEs were low stock size and, in *m* 5, the decrease of hook numbers.

Kyuji Watanabe presented a paper on classification of horizontal habitats for albacore (**ISC/06/ALBWG/13**). To establish estimates of the correct abundance index for North Pacific albacore, the classification of horizontal habitats of the stock (considering similarities among variation patterns of the CPUEs and the fishing effort at area and their horizontal distributions) were performed as: (1) Conducting a principal component analysis (PCA) to examine similarities among annual fluctuations in CPUE and *x* (hook number) by area (*a* = 1, 70), which were caught by the L-LL during period studied; (2) calculating averages of the CPUE and the hook number at area over the period studied; (3) testing a cluster analysis for results of the PCA and the averages of the CPUE and fishing effort. The results indicated: (a) in large area 1, the trajectory of CPUE in the 2000s slightly increased at the range for 10°-35°N to 140°-180°E. While, they declined at the range for 30°-40°N to 140°-180°E; (b) the time series of hook number in the 2000s decreased bit by bit over large area 1, particularly, the hook number at the range for 10°-40°N to 160°-180°E decreased; (c) in large area 2, the trajectory of CPUE from 2003 largely dropped; (d) since 2003, the Hook number extremely declined over large area 2, but they slightly increased in the right side of large area 2; (e) in large area 3, the CPUEs fell gradually since 2001, particularly, in Northeast Pacific. They declined than those in Northwest Pacific; and (f) in large area 3, the hook number showed a decreasing trend. However, in a range from 10°-23°N to 120°-150°E, they rose gradually since 2002. Consequently, the cluster analysis generated from area classification in consideration of the mixed-information on the variation of the CPUE and the hook number and on their horizontal distributions.

A CPUE (age-aggregated index for the Japan pole-and-line fishery (1972-2005) remained at relatively low rates during the 1970s and 1980s (Figure 4). The index gradually increase in the 1990s peaking in 1999, declined markedly in 2000, increased to 2003 and decreased again to 2005 (Figure 4). The age-aggregated CPUE index for the Japanese L-LL fishery was relatively stable from 1966 through the late 1980s. The index increased markedly from 1990-2001 and has decrease since 2003 to historically low levels (Figure 4). The Chinese Taipei longline CPUE sows a marked decline from 1996-2005 (Figure 4).

5.1.2.1. Discussion

There is a 'mismatch' between U.S. LL size composition data and the reported (landed) catch. That is, the size composition time series is based on an observer sampling program, which indicates some amount of discarding (small fish) at sea prior to landing the harvest. Given that the landings from this fishery are very small relative to the total, Pacific Ocean-wide harvest, the WG felt that the impact of this potential discard issue on the current assessment model was likely minimal. However, if the U.S. LL CPUE continues to be used as an index of abundance in future assessment efforts, further consideration concerning appropriate parameterization of selectivity and catchability is warranted. Finally, the WG suggested: (1) to compile a history of regulations affecting the U.S. LL fishery (2002-2005), with particular emphasis on aspects of the regulations likely to affect albacore catchability and/or selectivity; and (2) to compare Japanese LL CPUE indices developed from similar spatial/temporal strata applicable to the U.S. LL fishery, i.e., these evaluations will provide a basis for further inclusion (or omission) of this index in upcoming assessments.

The "M-2006" Japanese longline (JLL) index of abundance is quite useful for the stock assessment because it begins in 1966, whereas the previously-used JLL index began in 1975. However, some concern was raised that the gear configuration factor – hooks per basket (HPB) – typically used in GLM analyses of longline CPUE was not incorporated into the M-2006 index. HPB was not used since the hooks per basket data are missing for several years of the early time series (1967-74).

From the various GLMs presented in **ISC/06/ALBWG/07** (some of which included the hooks per basket effect), there did not appear to be major differences in the standardized indices with and without the HPB effect. Based on these comparisons, the WG recommended that the M-2006 index be used for the 2006 assessment. For future assessments, however, the WG recommends developing a JLL index with the HPB effect beginning in 1966. This may be accomplished by simply assuming 5-9 HPB for all sets during 1967-74.

5.1.3. Results

The VPA team conducted VPA-2BOX model analysis for this year's Workshop using 'primary' sources of input data, i.e., the single, combined catch-at-age matrix (see Section 5.1.1. and Table 2) was used and the suite of candidate indices of abundance (see Section 5.1.2) was also used. Emmanis Dorval presented the results of a preliminary VPA analysis of the 1966-2005 data using the VPA-2BOX model (**ISC/06/ALBWG/19**). Fifteen different model runs were performed based on the following specifications:

<u>Model Scenario A</u>

This model scenario included the same catch-at-age (CAA), weight-at-age (WAA), index data (1975-2003), and parameterization as the 2004 VPA-2Box assessment model. The purpose of this scenario was to perform a validation run to show that we can accurately reproduce the results obtained in the 2004 model assessment.

<u>Model Scenario B1</u>

This model scenario included the same parameterization as in model A, but with a new set of 1975-2003 CAA. The catch-age matrix was updated due to the application of new weight –length relationship (Watanabe et al. 2006) to derive number-at-age from landing data; and also due to the use of a calendar year instead of a biological calendar to distribute fish among age classes in the Japanese fisheries (Watanabe and Uosaki, 2006b).

Model Scenario B2

This model scenario included the same parameterization as in model A, but with a new set of 1975-2003 indices of abundances. Age-specific and age-aggregated indices were updated because of the application of a “new method” by the Japanese researchers (Watanabe and Uosaki 2006, Uosaki 2006) to derive these relative estimates of abundance. Additionally, the vulnerability indices that are associated to the age-aggregated indices were updated due to the new changes in the derivation of catch-at-age data (see above).

Model Scenario B3

This model scenario included the same parameterization as in model *A*, but with a new set of 1975-2003 WAA matrix. In this scenario we used Watanabe et al. (2006) equation, *all area combined/Quarter 1*, to compute January 1 biomass; and Watanabe et al. (2006) equation, *Area 2/Quarter 2*, to estimate mid-year (Month-6) biomass.

Model Scenario B4

This model scenario included the same parameterization as in model *A*, but with new set of 1975-2003 CAA and index data. The CAA matrix and indices used in this model were similar to Model *B2*, the WAA matrix from the 2004 assessment model was used.

Model Scenario B5

This model scenario included the same parameterization as in model A, but with new set of 1975-2003 CAA and WAA. CAA matrix in this model was similar to model B1, whereas WAA matrix was similar to model B3. The 2004 estimates for all indices were used.

Model Scenario B6

This model scenario included the same parameterization as in model *A*, but with new set of 1975-2003 index and WAA data. All index data were similar to model *B2*, but the WAA matrix was similar to model *B3*. The 2004 CAA matrix was used.

Model Scenario B7

This model scenario included the same parameterization as in model A, but with new set of 1975-2003 CAA, WAA, and index data. The CAA matrix in this model was similar to model *B1*, the WAA matrix to model *B3*, and the indices of abundance to model *B2*.

Model Scenario B8

This model scenario included the same parameterization as in model A, but with new set of 1975-2003 CAA, WAA, and index data along with the new Chinese Taipei age-aggregated index. The CAA, WAA, and index data for the US and Japanese fisheries were similar to model *B7*.

Model Scenario C1

This model scenario included the same parameterization as model *B8*, but with the time period for all input data extended forward to 2005. Newly available data for all fisheries in 2004 and 2005 were added to 1975-2003 data in model *B8*.

<u>Model Scenario C2</u>
This model scenario included the same parameterization as model *B8*, but with the time period for all input data extended back to 1966. Historical input data from 1966-1974 for the different fisheries were incorporated to the model in addition to the new set of 1975-2003 used in model *B8*.

<u>Model Scenario D1</u>
This model scenario included the same parameterization as model *C1*, with time period for all input data extended back to 1966. This model contains only new data spanning from 1966 to 2005, but the model parameterization is similar to the 2004 VPA2-Box assessment model.

<u>Model Scenario D2</u>
This model scenario included the same parameterization as model *D1*, but with only new 1975-2005 index data. The purpose of this run was to investigate the effect of deriving estimates for age-aggregated and age-specific indices on relatively few "biological" and fishery data during the period of 1966-1974. Both US and Japanese researchers had to perform more data substitution when deriving indices for 1966-1974 relative to the 1975-2005's period.

<u>Model Scenario D3</u>
This model scenario included the same parameterization as model *D1*, but with only the 1966-2005 age-aggregated index data. This model run was performed to determine the effects of removing all age-specific indices from model *D1*.

<u>Model Scenario D4</u>
This model scenario included the same parameterization as model *D1*, but with only 1966-2005 age-specific index data. The purpose of this model run was to determine the impact of removing all age-aggregated indices from the modeling process.

5.2. Alternative Stock Assessment Models

5.2.1. Stock Synthesis 2 (SS2)

Paul Crone presented preliminary research (**ISC/06/ALBWG/18**) that addressed an alternative population analysis of the North Pacific albacore stock using a length-based/age-structured, forward-simulation model (Stock Synthesis II, SS2). It is important to note that currently the International Scientific Committee's North Pacific Albacore Working Group (ISC-ALBWG) relies strictly on a VPA to develop consensus on the status of this fish population, which largely serves as the scientific information for guiding potential management. General methods of the SS2 modeling approach were presented, particularly, in respect to the ongoing assessment efforts applicable to the albacore population. Input data and parameterization files associated with a 'baseline' model scenario were generally discussed, as well as current difficulties associated with the development of this alternative assessment model. That is, currently, all input data (say time series) are not yet complete and further, some parameterization issues are currently unresolved.

It is important to note that the SS2 baseline model was developed in the context of the general VPA model, i.e., the baseline model reflects efforts to develop a configuration that generally mimics (mirrors) the parameterization of the VPA model. Thus, the SS2 baseline configuration should be viewed as the first 'phase' of an ongoing development of an alternative, more flexible modeling platform that can be used to assess the status of this fish population over the long-term, i.e., the overriding objective was to review model structure and not results from this baseline configuration. Finally, the alternative model is expected to receive substantial attention following this year's focused assessment-related exercises applicable to the VPA and ultimately, gain increasing support as the WG's assessment model for purposes of providing management-related advice within the ISC forum.

5.2.2. Discussion

The WG discussed the progress towards the development of an integrated statistical catch-at-age assessment model of NPO albacore using Stock Synthesis II (SS2). The WG reiterated its continuing supports of the development of an alternative model that is in addition to the VPA which is currently used to assess stock status. The WG acknowledges that additional work will be needed after the current WG to resolve or explain potential differences in results from the two assessment approaches.

The WG discussed the appropriate format of data for an SS2 assessment model of NPO albacore. It was noted that SS2 could use age-specific indices of relative abundance, but the WG concluded that age-aggregated indices were preferable. The WG also concluded that CPUE indices in SS2 should be fishery specific. It was also decided that the SS2 model should be started in 1966 with an initial catch of the same magnitude as the earliest recorded catches and that the initial age-structure should be estimated. Inputted values of natural mortality (*M*) and growth will be the same as used in the VPA. Finally, the WG agreed that some time series (e.g., CPUE information) currently used in the baseline (SS2) model will need revision, to some degree, in 2007 and thus, informal data exchange will need to take place during the summer 2007 in preparation for the next formal meeting, which is tentatively scheduled for early 2008.

6.0 STOCK ASSESSMENT CONCLUSIONS

6.1. Introduction

Following review of the preliminary VPA-2BOX (Porch 2003) runs presented by the VPA team, Workshop participants recommended that Model Scenario D1 be further evaluated. Maturity schedules (Ueyanagi 1957), length-weight relationship (**ISC/06/ALBWG/14**), growth curve (Suda 1966), and rates of natural mortality (*M* of 0.3 for all ages and years) were used. Model Scenario D1 was based on the following 17 indices: age-specific indices for ages 2-5 (U.S./Canada troll fishery); age-aggregated (assumed to represent ≥ 6-yr old fish) abundance index (U.S. longline fishery); age-specific indices for ages 2-5 (Japan pole-and-line fishery); age-specific indices for ages 3 to ≥ 9 (Japan longline fishery), and age-aggregated abundance index (Chinese Taipei longline fishery).

For the purposes of assessing current stock status and projecting future stock conditions, Model Scenario D1 was chosen as the preferred model, given: (1) statistical fits and diagnostics were deemed generally satisfactory; and (2) Model Scenario D1 utilized all of the available sample information. Workshop participants concluded that Model Scenario D1 represented a reasonable current understanding of the population dynamics of North Pacific albacore.

6.2. Input Data and Output Results From Model Scenario D1

The catch-at-age matrix used for the Workshop-based Model Scenario D1 run is presented in Table 2. Indices of abundance data and assumptions have been described generally in Section 5 above. The Model Scenario D1 estimates of numbers-at-age, and fishing mortality-at-age are presented in Tables 3 and 4, respectively. Also, given VPA-based methods commonly produce highly uncertain (imprecise) estimates of young fish for recent years, the following calculations were conducted: (1) numbers of age-1 fish in 2003-2004 reflected the mean estimate over the period 1966-98; and number of age-2 fish in 2006 reflected the exponential decline of age-1 fish in 2005 (i.e., e^{-Z} applied to the mean number of age-1 fish in 2005). Finally, extensive output associated with Model Scenario D1 can also be found in the Workshop Data Base Catalog, i.e., this output is archived in ‘pdf’ format and can be found at the site ‘ftp.afsc.noaa.gov.’ This output-related file includes all of the input data, statistical results (including diagnostics), and the complete suite of management-based results.

North Pacific albacore weight-at-age growth models used to calculate population abundance (from N_a) in Model D1 (based on a fixed age/year matrix) external to the population model, are shown in Table 6.

6.3. Results

6.3.1. Trends of Exploitable Biomass, Spawning Stock Biomass, and Recruitment

Estimated 'exploitable' (fishable) stock biomass (*B*, 'January 1' estimates for ages ≥1 filtered through the selectivity ogive) fluctuated around 150,000 mt from 1966-94. The biomass peaked in 1996 at 226,000 mt (Figure 5). From 1997-2003, exploitable biomass (January 1) declined to 161,000 mt, with a slight upward trend observed over the last few years with a 2006 (January 1) estimate of roughly 180,000 mt (80% *CI* of 121,000-263,000 mt). The 2006 fishable biomass is roughly 7% above the time series average of 169,000 mt (1966-2005).

Spawning stock biomass (*SSB*, 'May 1' estimates filtered through the maturity ogive) has experienced fluctuations around the modeled time series average of 100,000 mt (Figure 6). The 2006 stock assessment indicated that *SSB* increased from 2002 (73,000 mt) to 2005 (113,000 mt). The estimated spawning stock size in 2006 of about 153,000 mt is approximately 53% above the overall time series average (1966-2005).

For the purpose of comparison, exploitable *B* and *SSB* time series generated from the VPA-2BOX model in 2004 are also shown (Figures 5 and 6). For the most part, the 2004 and 2006 biomass trends were similar; however, some discrepancies exist, given primarily to the recent changes to catch-at-age data and abundance indices from Japan. Finally, the estimated time series for exploitable *B* and *SSB* should be evaluated in concert with the projected estimates (Figures 10 and 11, respectively).

Recruitment (R, age 1 fish) has substantially fluctuated over the period 1966-98 (Figure 7). A declining trend was observed from the late 1960s to the late 1980s. In recent years recruitment has fluctuated around the long term average of 27.75 million fish.

6.3.2. Biological Reference Points

The WG reviewed two documents relative to biological reference points. Papers **ISC/06/ALBWG/16** and **ISC/06/ALBWG/17**. Paper **ISC/06/ALBWG/16** relates to computational methods to calculating the plus age group statistics relative to stock forecasting and reference point estimation in the VPA2Box model. The WG reviewed and accepted the methodology. Paper **ISC/06/ALBWG/15** reviewed potential reference points that could be utilized for North Pacific albacore.

In the previous assessment, the determination of 'biological reference points' involved uncertainty analysis based on four model configurations that expressed uncertainty in terms of productivity and level of fishing mortality (high and low F), see Stocker (2005). The previous analyses indicated that the stock has experienced two, broad productivity periods; a low productivity period from 1975-1989 and a high period 1990-2000. However, in the current analysis, distinct productivity regimes were less clear and thus, a single productivity period was accommodated in this assessment. Therefore, computation of biological reference points was limited to examination of current levels of fishing mortality (*F*) relative to a suite of candidate biological reference points presented in Paper **ISC/06/ALBWG/15** (Table 5A).

Estimates of *F*-at-age were not adjusted for partial recruitment-at-age, but rather, partial recruitment-at-age was applied to *F* in the forward projections (see Section 6.3.3.). Partial recruitment schedule (selectivity ogive) was calculated in a straightforward fashion from Model D1 results as the geometric mean of estimated *F* from 2002-2004, normalized in accordance with maximum *F* over this time period (Figure 8). Also, equilibrium yield-per-recruit (*Y/R*) and spawning stock biomass-per-recruit (*SSB/R*) calculations were conducted using similar vital rates (growth, maturity, and natural mortality) as used in Model D1 calculations (Figure 8 and Table 6). Results from *Y/R* and *SSB/R* analyses are presented in Figure 9.

6.3.3. Stochastic Stock Projections

The initial conditions for the projections were taken from Model Scenario D1 (see Sections 6.1. and 6.2.). More specifically, the projections used terminal year (2006) stock numbers-at-age (N_a) and fishing mortality rate (geometric mean $F_{2002\text{-}04}$) estimated in the VPA-2BOX analysis, and partial recruitment (PR_a) reflected the mean from 2002-2004 (Figure 8). Constant *F* and PR_a were used for all years treated as the 'projection' period (2006-2020). The natural mortality, weight-at-age, and maturity-at-age parameters used in projections were identical to those used in the VPA-2BOX analysis (Model Scenario D1).

The stochastic projections were linked with bootstrap analysis that was carried out to estimate error associated with the VPA-2BOX-based parameters using similar methods and software as in previous assessments (Stocker 2005). Five hundred bootstrap replications were conducted, for a 15-year projection period (2006-2020) using Model Scenario D1. Along each of the projected trajectories, annual recruitment was drawn randomly (with replacement) from the pool of VPA-2BOX –estimated recruitments (i.e., 1966-98). The stochastic projection was designed to capture the variance in terminal year estimates, as well as recruitment variability in projection outputs.

Stochastic projection (2006-2020) of the 'exploitable' biomass shows a gradual decline to an equilibrium level of roughly 126,000 mt (with 80% CI of 99,000-155,000 mt) with the average productivity scenario (27.75 million age-1 fish per year) used in the simulations (Figure 10). Similarly, the spawning stock biomass (*SSB*) is projected to decline to an equilibrium level of 92,000 mt (with 80% CI of 69,000-116,000) by 2020 (Figure 11).

6.3.4. Stock Condition in Relation to Biological Reference Points

In addition to estimating stock sizes in the past (i.e., see Section 6.3.1.), it is desirable to assess 'current' conditions of both fishing mortality and stock biomass in relation to biological reference points of interest. Although inclusion of such reference points is becoming a standard feature of stock status determinations, there is no agreement yet as to which reference points are appropriate for tuna stocks, including North Pacific albacore. Accordingly, participants continued to take the approach adopted at the *Nineteenth North Pacific Albacore Workshop* (Stocker 2005) and simply compare current levels of fishing mortality and biomass with a familiar suite of reference points.

Evaluation and selection of preferred reference points is a task for the future and should be done by consensus among scientists, fishery managers, and stakeholders.

The biological reference points considered here fall into two categories: (1) reference points that may potential be candidates as F-based MSY proxies, namely $F_{40\%}$, $F_{30\%}$, and $F_{0.1}$; and (2) candidates to serve as F-based 'limit' proxies, namely $F_{20\%}$ F_{Max}, $F_{SSB\text{-}Min}$, $F_{SSB\text{-}10\%}$, and $F_{SSB\text{-}25\%}$. While it is recognized that this list of reference points does not encompass all possible reference points for North Pacific albacore, it does include the most commonly used reference points for contemporary fisheries management.

Under the 'current' level of F, the population is being fished at roughly $F_{17\%}$ (i.e., $F_{2002\text{-}2004} = 0.75$), see Figure 9 and Tables 5A and 5B. These results are generally similar to the previous assessment conducted in 2004 (Stocker 2005). This conclusion regarding the spawning potential ratio reference point (i.e., $F_{\%}$) is essentially based on Model Scenario D1 (and assumptions regarding current F), coupled with the per-recruit analyses. However, in order to compare current levels of biomass with those at equilibrium that would result from fishing at any given F-based reference point, it is necessary to postulate the current productivity of the stock. That is, appropriate consideration of the status of the North Pacific albacore population necessarily involves assumptions regarding current levels of recruitment. In this context, important management-based statistics are presented in Table 5A. The management-based statistics from the 2004 assessment (Stocker 2005) are presented in Table 5B for the purpose of comparison. It should be noted that different definitions of 'current' F and selectivity were used for the 2004 and 2006 assessment. Thus, caution is advised when comparing F-related reference points presented in Table 5B.

The spawning stock biomass estimates (*SSB*) for the projection period (1966-05) were based on a 'current' F=0.75, selectivity (Figure 8), and forecasted recruitment (R) that reflected an average annual R as observed from 1966-1998 (R=27.75 million fish, Figure 7). The three horizontal lines (from top to bottom) represent the median *SSB* over the assessment period, the 25th percentile, and the 10th percentile, respectively (Figure 12).

The population projections and associated uncertainty was used to construct probability profiles for *SSB* (Figure 13). Each profile presents the probability that the spawning stock biomass will fall below a specified threshold level during one or more years of the projection period.

Finally, Table 7 provides the fishing mortality rates that will maintain the *SSB* above candidate 'thresholds' for two levels of desired probability. For example, if managers desire to maintain the *SSB* above the 25th percentile of observed *SSB* with a 95% probability of success, then the fishing mortality rate in the future should not exceed F=0.51 (current F=0.75).

In summary, although current *SSB* reached a historically high level in 2006 (roughly, 153,000 mt), projected levels of *SSB* are forecasted to decline to the long-term average (approximately 100,000 mt) observed over the modeled time period (1966-2005), i.e., the stock is predicted to decline to the equilibrium level of roughly 92,000 mt by 2015. Further, the WG strongly recommended that all countries support precautionary-based fishing practices (e.g., limits on current levels of fishing effort) at this time, given the following:

(1) the current level of fishing mortality (i.e., spawning potential ratio of $F_{17\%}$) is high relative to commonly used reference points and often associated with overfishing thresholds in various fisheries world-wide;

(2) a retrospective analysis indicated a noticeable trend of over-estimation of stock biomass over the last two assessment cycles;

(3) the considerable decline in total (North Pacific Ocean-wide) catch over the course of the last two years, particularly in 2005, when the total harvest (roughly, 62,000 mt) was the lowest recorded since the early 1990s; and

(4) a fishing mortality-based reference point (F_{SSB}) designed to ensure that *SSB* in future years remains within the range of the historical 'observed' *SSB* was introduced at an earlier ISC Plenary Meeting conducted in 2005. Even though the ISC forum has not yet determined which reference points are appropriate for North Pacific albacore (or other highly migratory stocks), preliminary discussions within the ISC Plenary forum were conducted in 2005 regarding candidate *SSB*-based 'thresholds' to consider, including: minimum 'observed', lower 10^{th} percentile, lower 25^{th} percentile, and median. In this context, at the 95% probability of success, all of thresholds (lower 10^{th} percentile, lower 25^{th} percentile, and median) would require reductions in future *F* from the current estimated level (F=0.75); noting that the future F=0.64 associated with the minimum 'observed' *SSB* target is roughly equal to the current rate. However, this minimum *SSB* value occurred at the beginning of the overall, estimated time series and necessarily reflects additional uncertainty. Thus, the WG felt that the thresholds based on the lower 10^{th} percentile, lower 25^{th} percentile, and median represented more robust and ultimately, precautionary thresholds that should be considered.

For the above reasons, the ISC-ALBWG emphasized the need for nations to closely monitor the population over the coming years to ensure the stock is responding favorably (say in sustainable terms) to present fishing practices in the North Pacific Ocean. Finally, the WG noted that considerable model simulation work will be needed immediately to better ascertain what management measures (e.g., addressing catch and/or effort) are appropriate for this tuna population and ultimately, to develop harvest control rule(s) that are likely to result in sustainable abundance levels in the long-term. In this context, the WG recognized that this research work is of the highest importance and thus, noted that the current assessment schedule may need to be offset (to some degree) to ensure such biological reference point-related analysis is undertaken.

7.0 RESEARCH RECOMMENDATIONS AND UPATED WORKPLAN

The recommendations are grouped into three broad categories: (1) Fishery statistics, (2) Biological studies and (3) Stock assessment studies.

7.1. Fisheries Statistics

Annual submission of fishery data by Data Correspondents to the Workshop Data Manager (Al Coan) for inclusion in the data base is a requirement of participants. Correspondents must pay special attention to submitting up-to-date fishery data on timely basis and well in advance of planned meetings.

7.1.1. Maintain Data Base Catalog

The data base catalog is to be maintained by the Workshop Data Manager as a record of available data, contributors and timeliness of submissions by Data Correspondents. The catalog also serves as a record of progress with special data requested of participants, such as detailed information on length-frequency samples: (1) sample size (i.e., number of fish measured) by year; (2) notes on measurement units, accuracy, etc. and sampling procedures used, particularly when procedures differ from the protocol; and (3) full description of steps employed and assumptions made in processing the samples to represent entire catches, particularly when different from Workshop standard procedures. The catalog is to be made available annually to participants.

7.1.2. IUU

The WG has insufficient data to analyze IUU impacts at this time. If the ISC wishes, the WG can develop simulations to evaluate differing patterns and levels of IUU fishing to evaluate the impact of simulated IUU removals on stock abundance and trends.

7.2. Biological Studies

Biological information is a critical building block for stock assessments. It should be reviewed and updated regularly in order to capture changes in population parameters if they occur.

7.2.1. Conduct Age and Growth Studies

There is a need for a wide range of related studies that the participants classified as age and growth. These include studies on weight-length relations, ageing techniques and growth curves. For all of these studies emphasis should be on developing parameter estimates that are applicable at the population level.

7.2.2. Conduct Studies on Behavior and Movement with Archival Tagging

Archival tags are being deployed off the U.S. West Coast by NMFS and off Japan by the NRIFSF to study albacore behavior and movement. So far, the results have not shown trans-Pacific movement, but movement solely within the respective eastern and western North Pacific where fish had been tagged. Both parties have plans for further deployment of tags and plan to report progress to the ISC-ALBWG on a regular basis.

7.3. Stock Assessment Studies

Recent stock assessment results as well as fishery developments suggest that the North Pacific albacore stock is at or fast approaching full exploitation by the fisheries. Demand for more frequent and more precise information on status of the stock and the sustainability of the fisheries, thus, is likely to increase. With this in mind, the ISC-ALBWG identified priority research needs to be executed in the near-term to improve analyses from current stock assessment models and to better understand the models' behavior to changes in parameter estimates and assumptions.

7.3.1. Conduct Research on Alternative Assessment Models

Exploratory work with the Stock Synthesis 2 model was conducted in 2006. Further research of this model as a stock assessment tool for albacore is recommended. Results of this research should be made available at the next ISC-ALBWG meeting (tentatively scheduled for early 2008).

7.3.2. Conduct Studies on Reference Points

Further development of appropriate biological reference points (MSY and limit-based) for North Pacific albacore is recommended. Currently, proxies for commonly used biological reference points are computed for the albacore stock. The proxies, however, span a wide range and research to narrow the range to appropriate ones needs to be undertaken. Such research should include determining robustness of the proxies through simulation studies and with both equilibrium and dynamic states.

7.3.8. Conduct Studies to Develop Abundance Indices

The accuracy of current stock assessments for albacore is largely constrained by the abundance indices used in the assessment models and obtained from fishery statistics. A thorough examination of abundance indices needs to be conducted in 2007.

8.0 ADMINISTRATIVE MATTERS

8.1. ISC-related Matters

The WG was directed to evaluate the effect of IUU fishing on the North Pacific albacore resource. Reportedly illegal fishing is occurring within the range of albacore. The characteristics and magnitude of this IUU fishing is unknown, but has the potential to increase total fishing mortality to unsustainable levels. The WG has insufficient data to analyze IUU impacts at this time. If the ISC wishes, the WG can develop simulations to evaluate differing patterns and levels of IUU fishing to evaluate the impact of simulated IUU removals on stock abundance and trends.

8.2. Procedures for Clearing the Report

A handout compiling available authors' paper summaries, rapporteurs' reports, and most figures was provided at the meeting for comments. A "complete" draft document will be distributed by the Chairman for review, comment and approval by participants by mid-March 2007. The Chairman will evaluate and incorporate all appropriate comments in a final text. Completion of this process and publication of a final Workshop report is planned for no later than the end of May 2007.

8.3. National Coordinators and Data Correspondents

As noted in Section 8.1., the Workshop will continue to maintain its data submission, management and exchange procedures and research coordination until these responsibilities are transferred to the ISC. Designated national coordinators and data correspondents, therefore, will continue in their roles. The coordinators and correspondents are as follows:

Sector	**National Coordinator**	**Data Correspondent**
Canada	Max Stocker	Max Stocker
Japan	Koji Uosaki	Koji Uosaki
Mexico	Luis Fleischer	Luis Fleisher
Chinese Taipei	Chien-Chung Hsu	Shui-Kai Chang
United States	Paul Crone	Al Coan
IATTC	Rick Deriso	Michael Hinton
SPC	Adam Langley	Peter Williams

8.4. Time and Place

The time and place for the next ISC-ALBWG meeting is planned for early 2008 (site still to be determined). Both the U.S. and Japan delegations have offered to host this meeting. The objectives of the meeting will be to: (1) update the catch (Table 1) to 2006; (2) conduct a thorough evaluation of the abundance indices; and (3) conduct further assessment modeling work using the SS2, with the goal of presenting sometime in 2008 a baseline model that can be used to develop WG-related consensus concerning the status of the albacore population in the North Pacific Ocean, i.e., further efforts will be needed to ensure input data (time series) are the best available, and model assumptions and related parameterization issues are appropriate (it is expected that this work will be completed sometime in mid-2008.

8.5. Acknowledgments

Workshop participants collectively thanked the hosts (National Research Institute of Far Seas Fisheries and staff) for their hospitality and overall meeting arrangements, which served as the foundation for meaningful scientific discussion and a successful meeting.

8.6. Adjournment

The Workshop was adjourned at 4:15 PM on December 5, 2006. The chairperson (Max Stocker) thanked all of the participants for their attendance and contributions and finally, stressed to National Coordinators the need to maintain ongoing communication concerning scientific data exchange and research applicable to North Pacific albacore, as well as scheduling future ALBW meetings, such as the proposed November 2007 meetings discussed here.

9.0 REFERENCES

Porch, C. E. 2003. VPA-2BOX: User's guide (Version 3.01). Sustainable Fisheries Division Contribution SFD-01/02-151, Southeast Fisheries Science Center, 75 Virginia Beach Dr., Miami, FL 33149, USA. 69 p.

Stocker, M. 2005 (editor). *Report of the Nineteenth North Pacific Albacore Workshop*. Nineteenth North Pacific Albacore Workshop, Nanaimo, B.C., Canada, November 25-December 2, 2004. Fisheries and Oceans Canada, Pacific Biological Station, Nanaimo, B.C., Canada. 127 p.

Suda, A. 1966. Catch variations in the North Pacific albacore VI. The speculation about influence of fisheries on the catch and abundance of the albacore in the north-west Pacific by use of some simplified mathematical models (continued paper - I). Rep. Nankai Reg. Fish. Res. Lab. 24:1-14.

Suda, A and Y. Warashina. 1961. Some consideration on factor of albacore in the North West Pacific, especially on differences between albacore caught by longline and pole and line methods. Rep. Nankai Reg. Fish. Res. Lab. 13:21-34.

Ueyanagi, S. 1957. Spawning of the albacore in the Western Pacific. Rep. Nankai Reg. Fish. Res. Lab. 6:113-124.

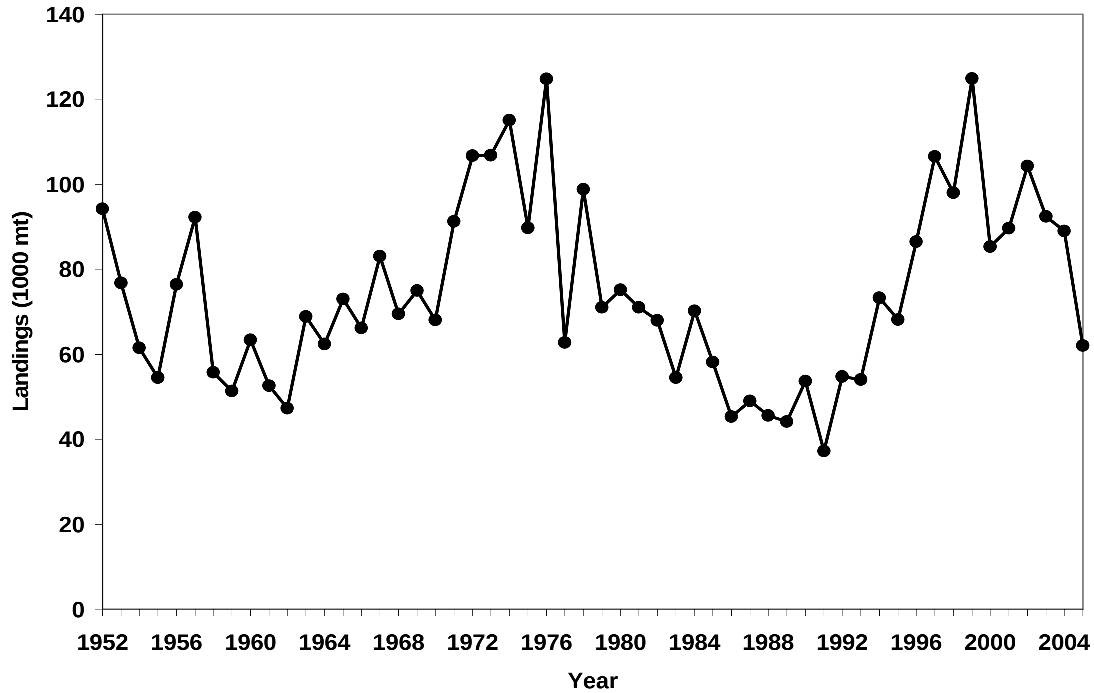


Figure 1. North Pacific Ocean albacore landings for all gears and nations combined (1952-05).

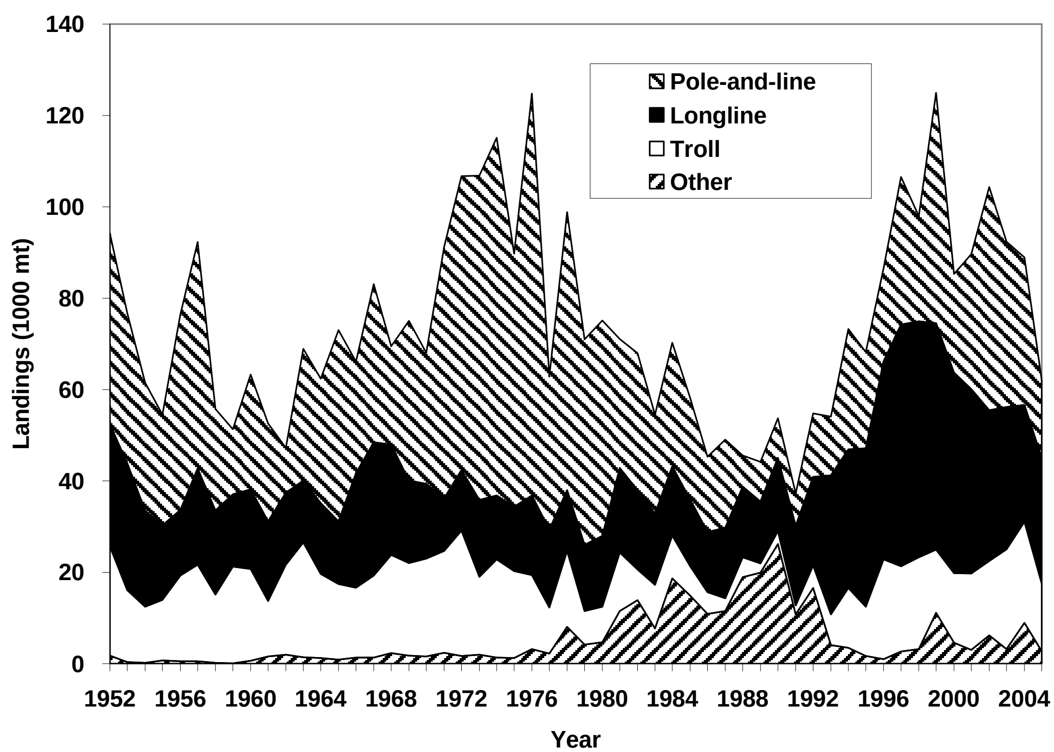


Figure 2. North Pacific Ocean albacore landings by gear, all nations combined (1952-05).

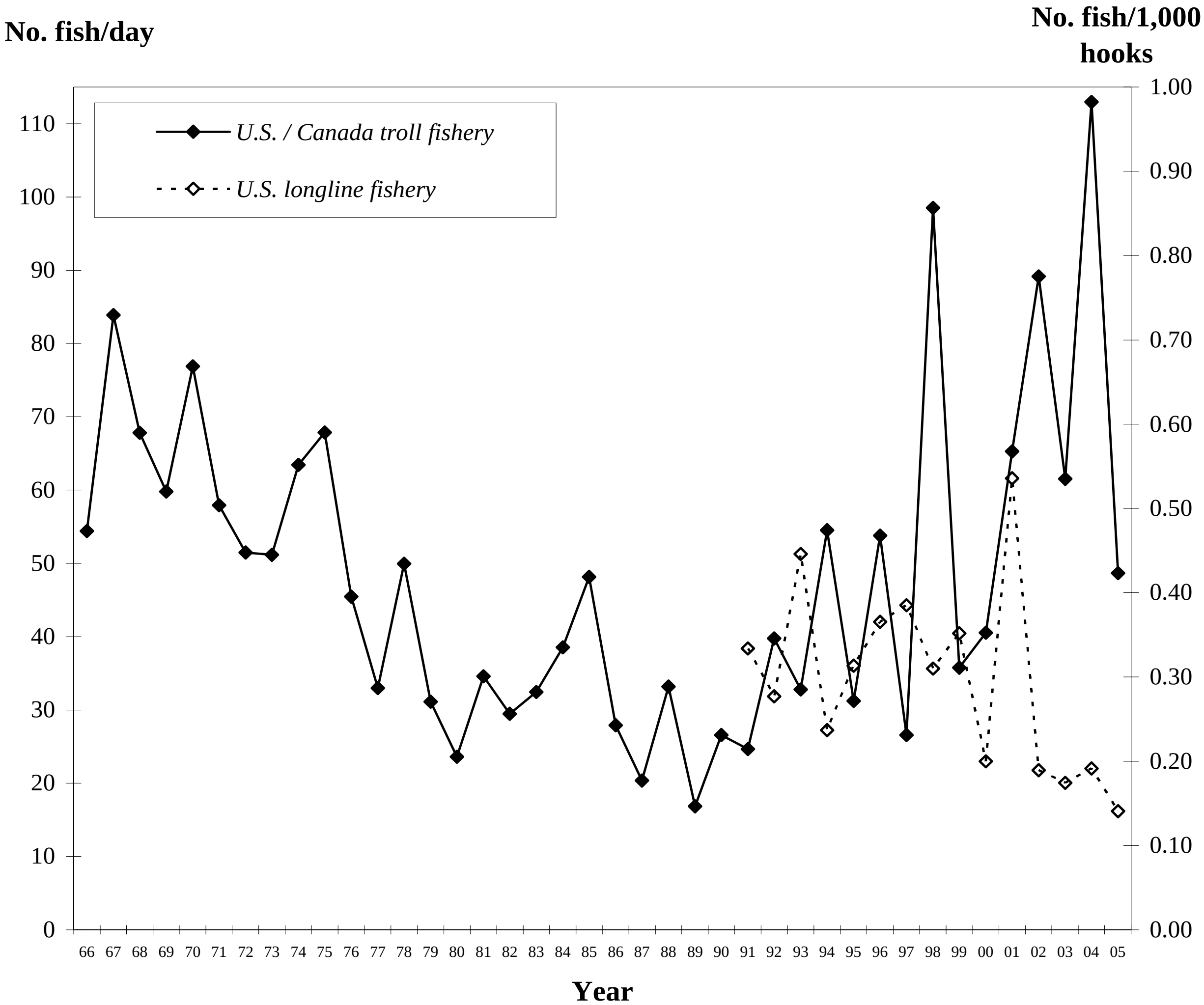


Figure 3. North Pacific albacore 'standardized' CPUE relative indices of abundance for the U.S. / Canada troll (1966-05) and U.S. longline (1991-05) fisheries.

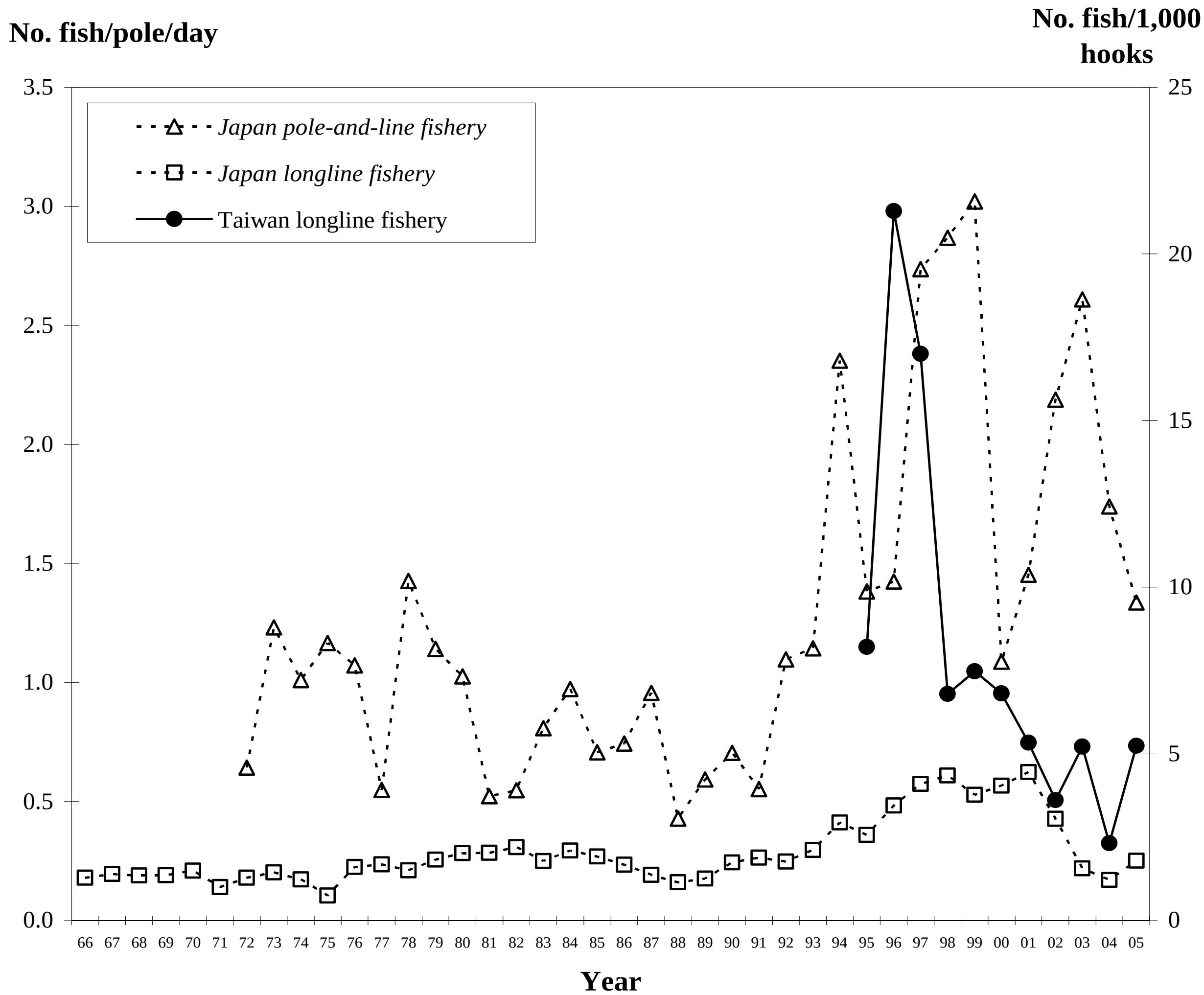


Figure 4. North Pacific albacore 'standardized' CPUE relative indices of abundance for western Pacific Ocean fisheries: Japan pole-and-line (1972-05); Japan longline (offshore/distant-water, 1966-05); and Chinese Taipei longline (1995-05).

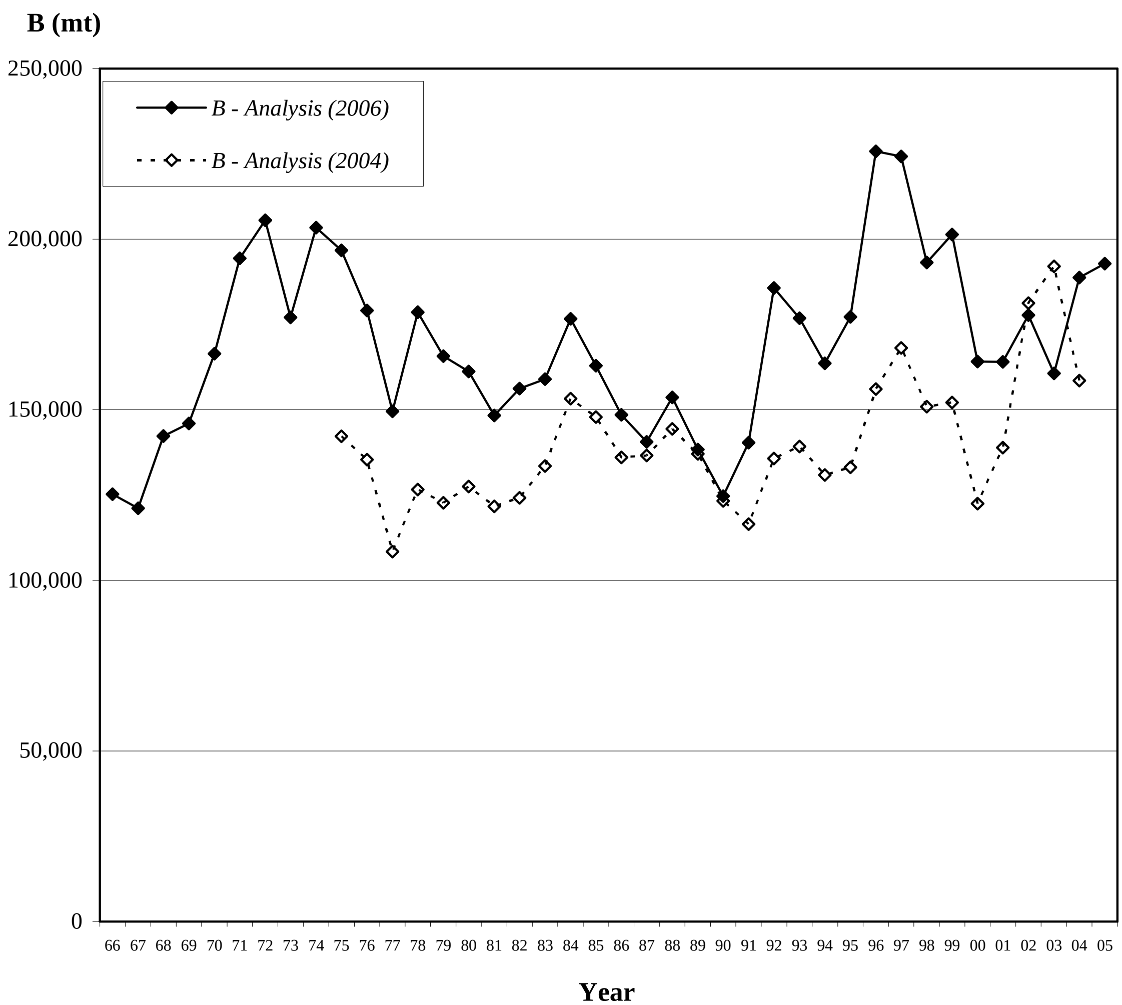


Figure 5. Total 'exploitable' stock biomass (*B*, mt) time series (1966-05) for North Pacific albacore generated from Model D1 (Analysis 2006). Final estimated time series from the previous North Pacific Albacore Workshop (2004) is also presented (Analysis 2004, 1975-03). Time series for *B* are based on 'January 1' estimates.

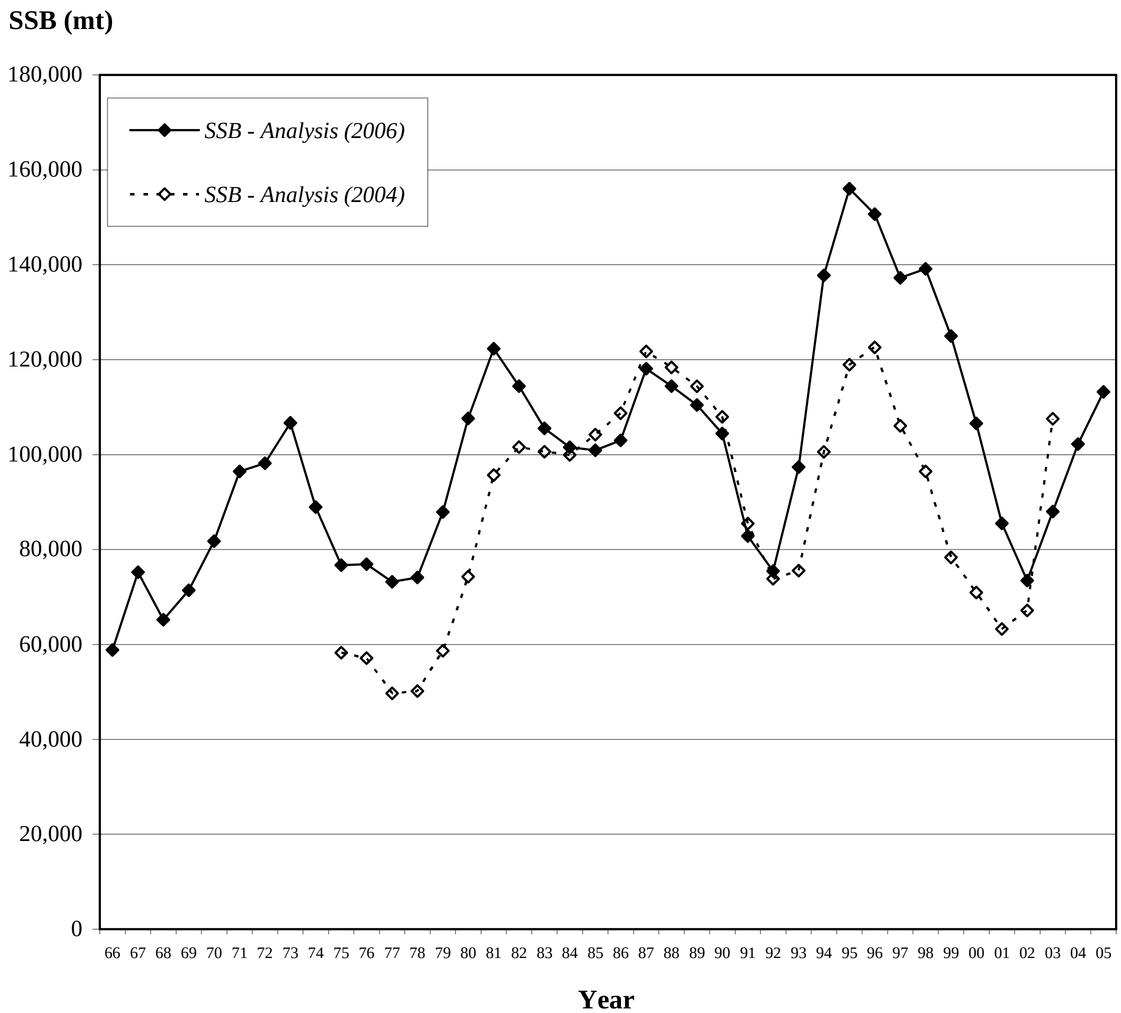


Figure 6. Spawning stock biomass (*SSB*, mt) time series (1966-05) for North Pacific albacore generated from Model D1 (Analysis 2006). Final estimated time series from the previous North Pacific Albacore Workshop (2004) is also presented (Analysis 2004, 1975-03). Time series for *SSB* are based on 'May 1' estimates.

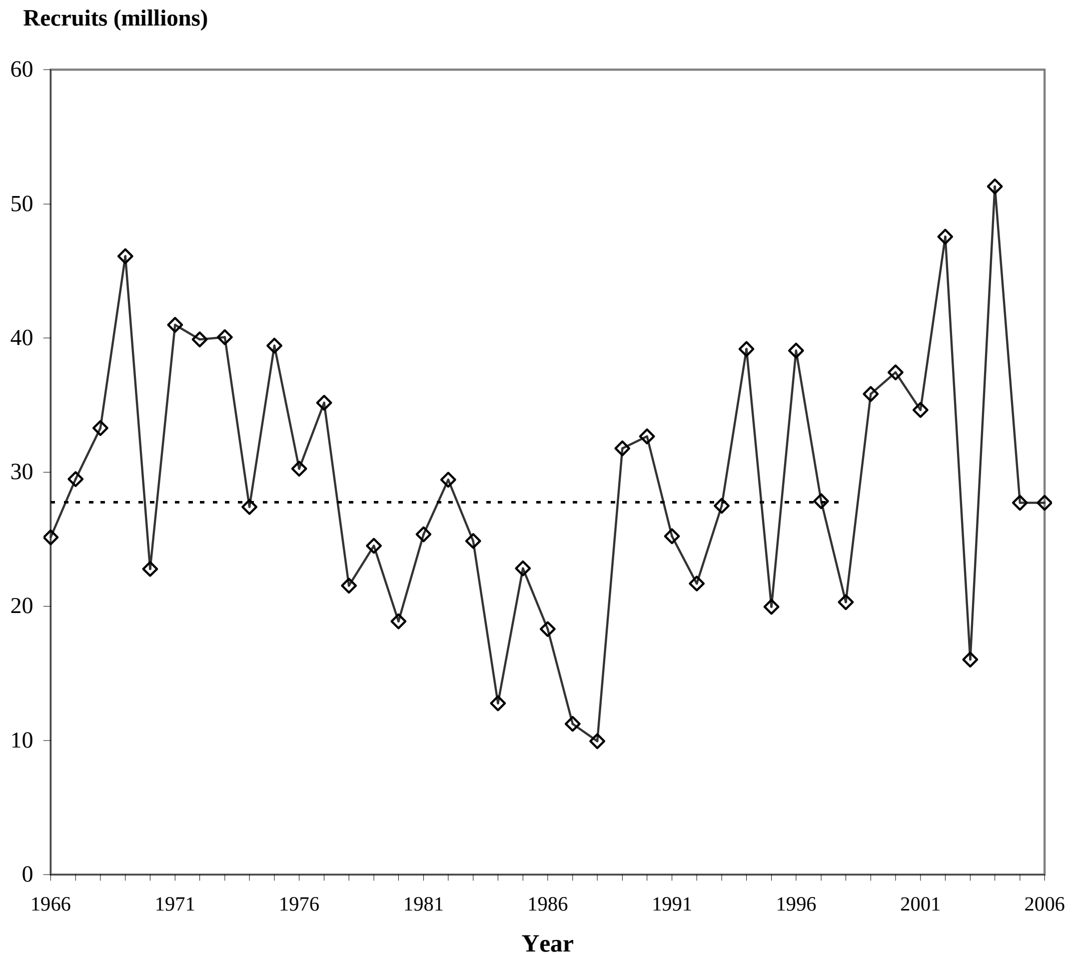


Figure 7. Recruitment (age-1 fish in millions) time series of North Pacific albacore generated from Model D1 (1966-98). Mean (1966-98) recruitment is presented as horizontal dashed line. Figure in 2005 and 2006 were derived from the mean recruitement.

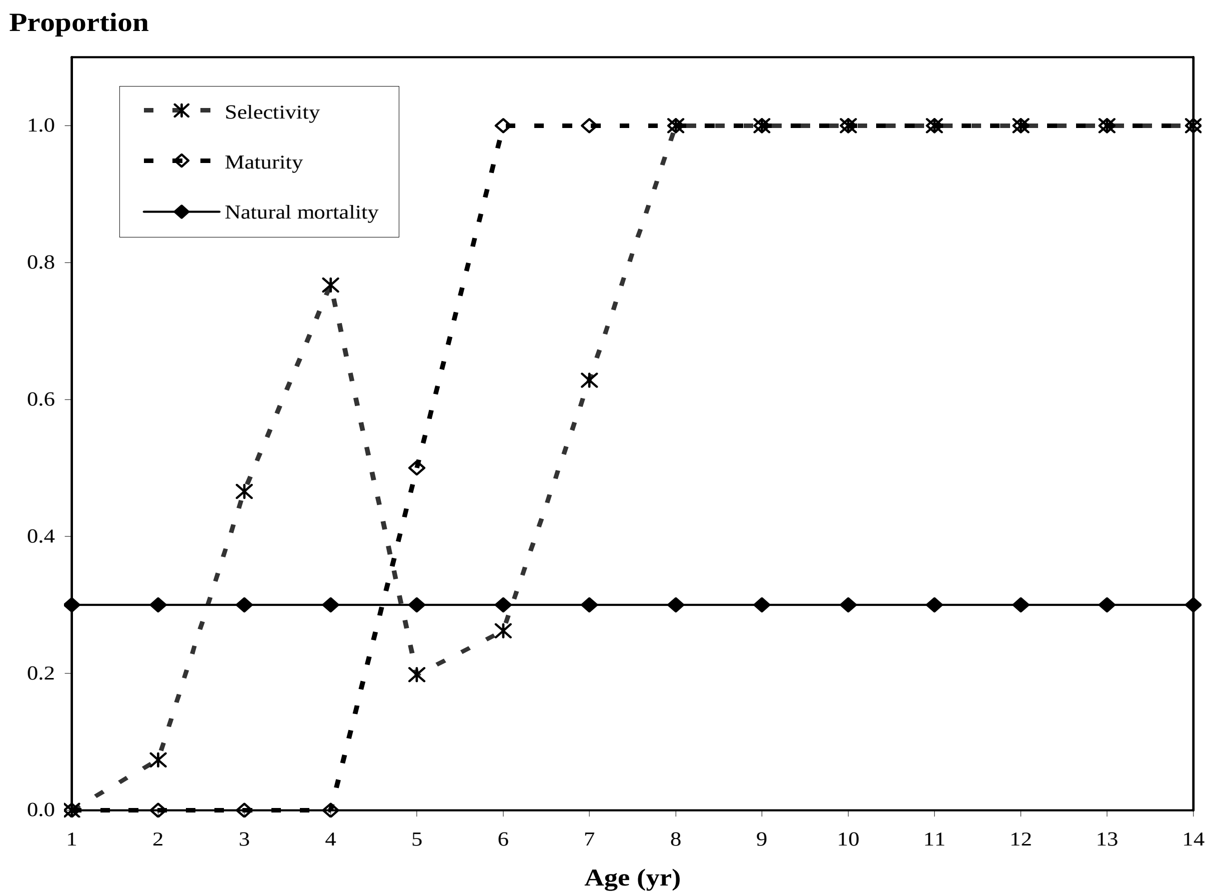


Figure 8. Partial recruitment (i.e., selectivity), maturity (Ueyangi 1957), and natural mortality (*M*) schedules used to determine biological reference points associated with Model D1.

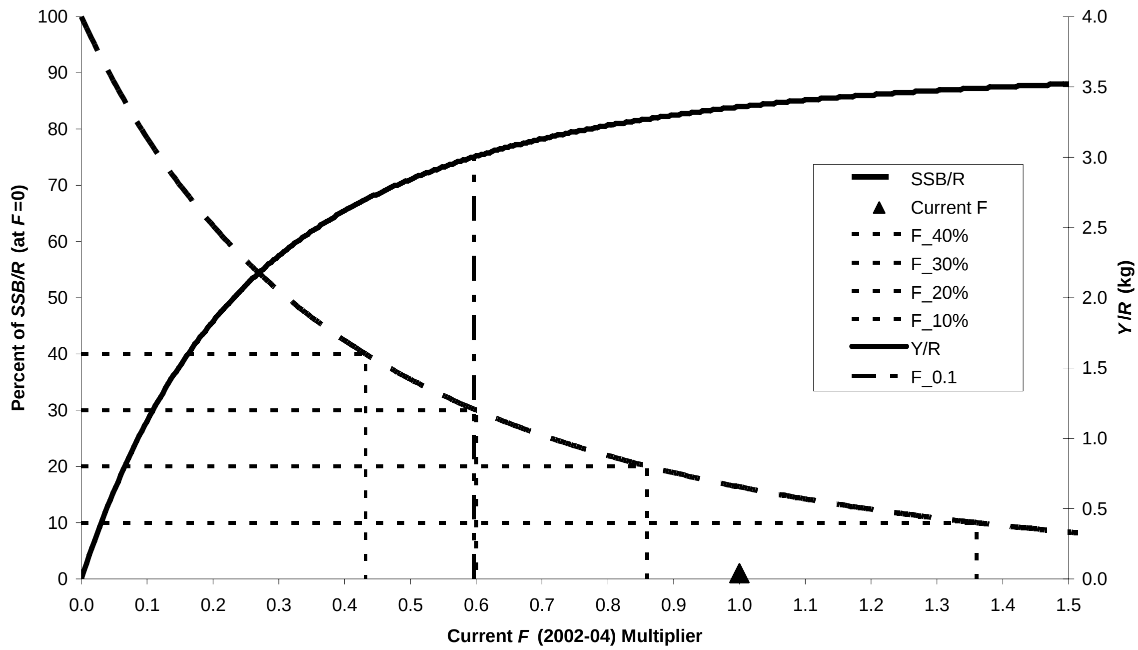


Figure 9. Equilibrium yield-per-recruit (*Y*/*R*, in kg) and percent of *SSB*/*R* (relative to *F*=0) for various *F*-based biological reference points as a function of fishing mortality rate (*F*) for North Pacific albacore associated with Model D1. The current fishing mortality rate multiplier (*F*=1.0 when $F=F_{2002\text{-}04}$) is based on the fully-selected *F* (*F*=0.75 for age groups 8 and 9+) observed from the mean (geometric) of *F*-at-age estimates from 2002-04. The current F multiplier for the maximum *Y*/*R* reference point was also estimated ($F_{max}/F_{2002\text{-}04}$ =2.8), but is not displayed here.

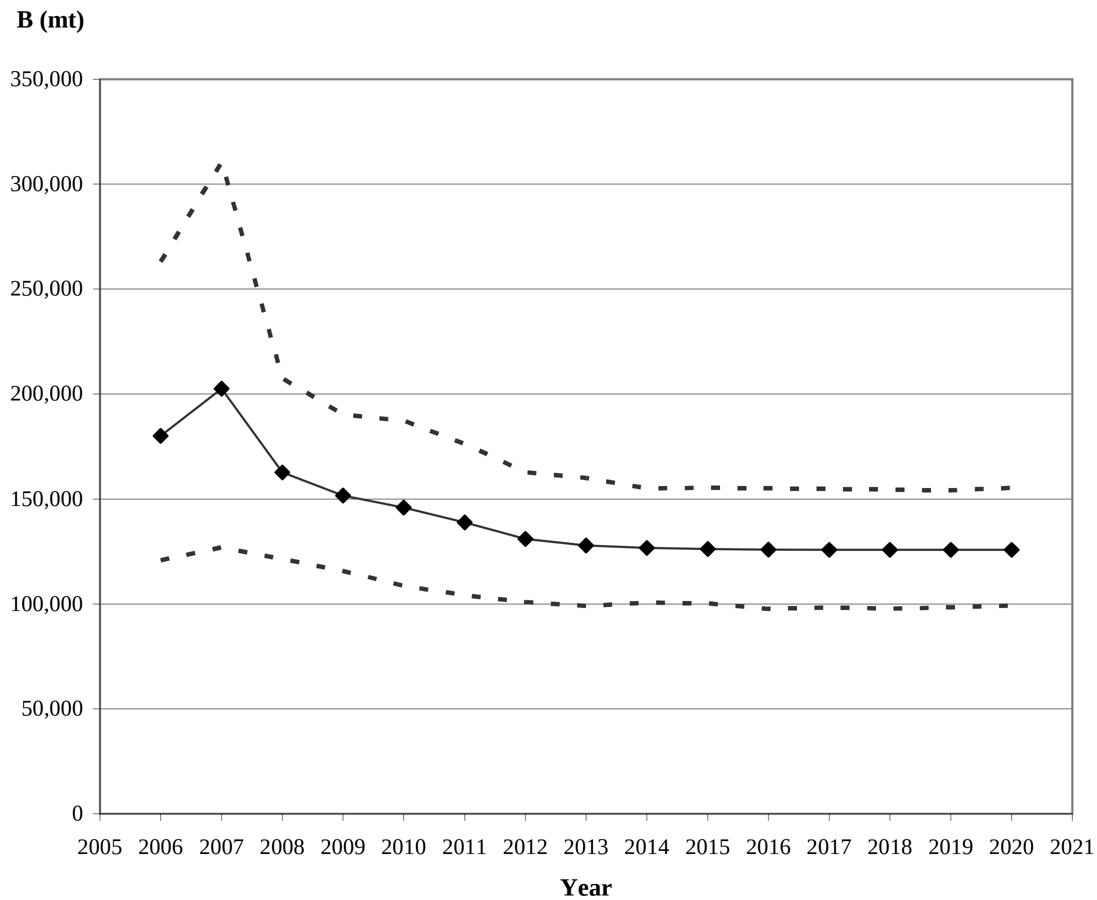


Figure 10. Stochastic projection (2006-20) of 'exploitable' biomass (*B*, mt) for North Pacific albacore based on Model D1 (Analysis 2006). Dashed lines represent 80% CI. Time series for *B* is based on 'January 1' estimates.

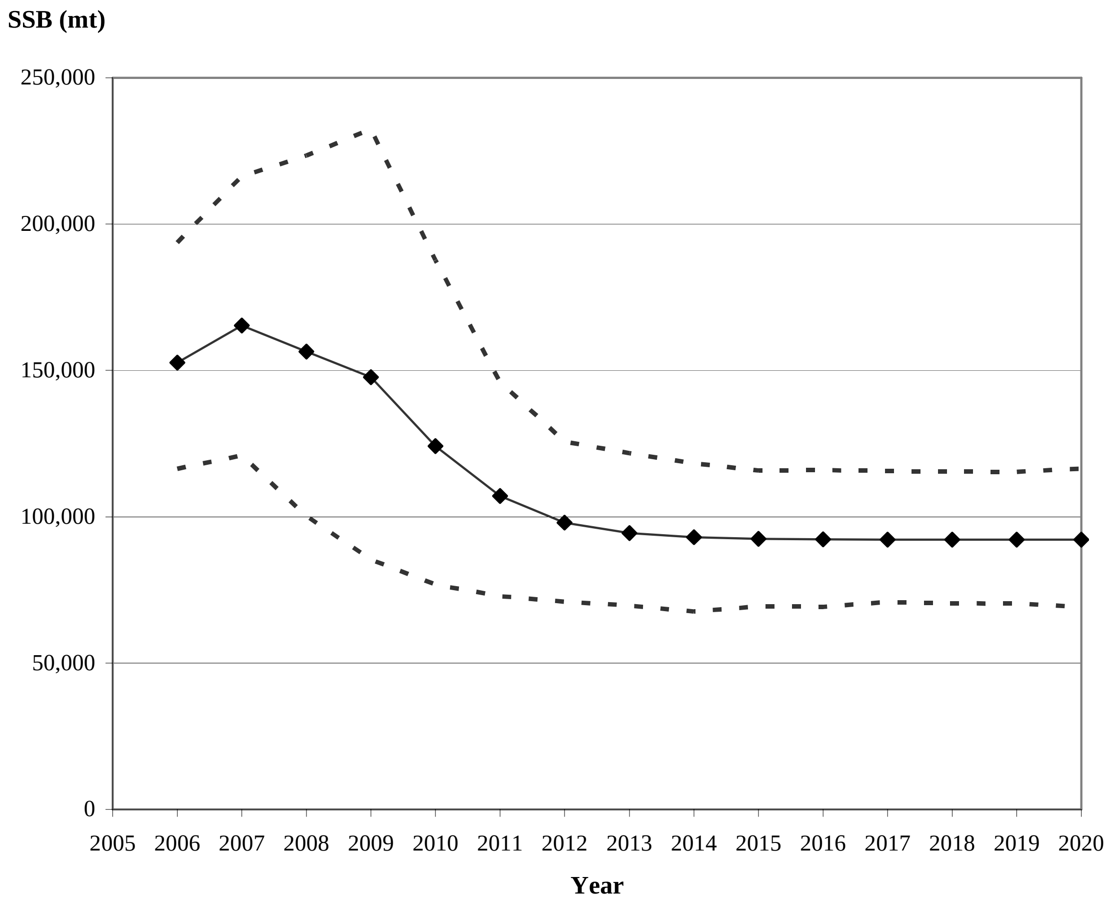


Figure 11. Stochastic projection (2006-20) of spawning stock biomass (*SSB*, mt) for North Pacific albacore based on Model D1 (Analysis 2006). Dashed lines represent 80% CI. Time series for *SSB* is based on 'May 1' estimates.

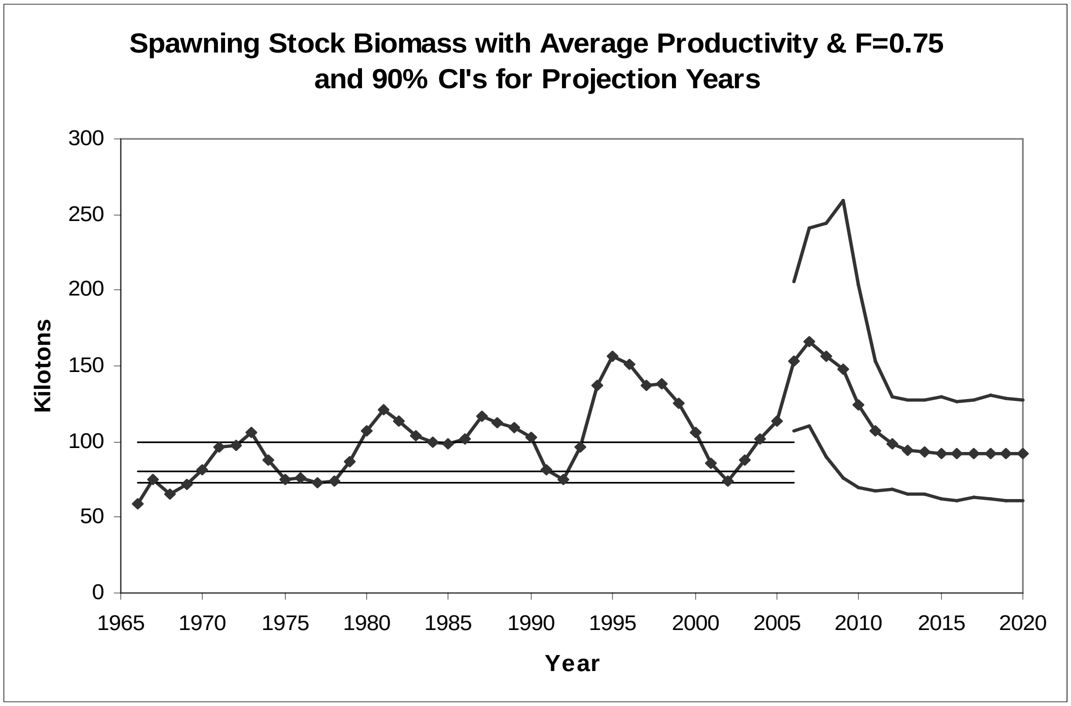


Figure 12. Spawning stock biomass estimates (*SSB*) for the assessment period (1966-2005) and for the projection period (2006-2020). Confidence intervals (90%) for the projection period are also displayed. The three horizontal lines (from top to bottom) represent the median *SSB* over the assessment period, the 25th percentile, and the 10th percentile, respectively. The stock projections were done using the 'current' F=0.75 and selectivity; and with annual recruitment (R) drawn randomly from the Rs estimated over the 1966-98 period (average R = 27.75 million fish).

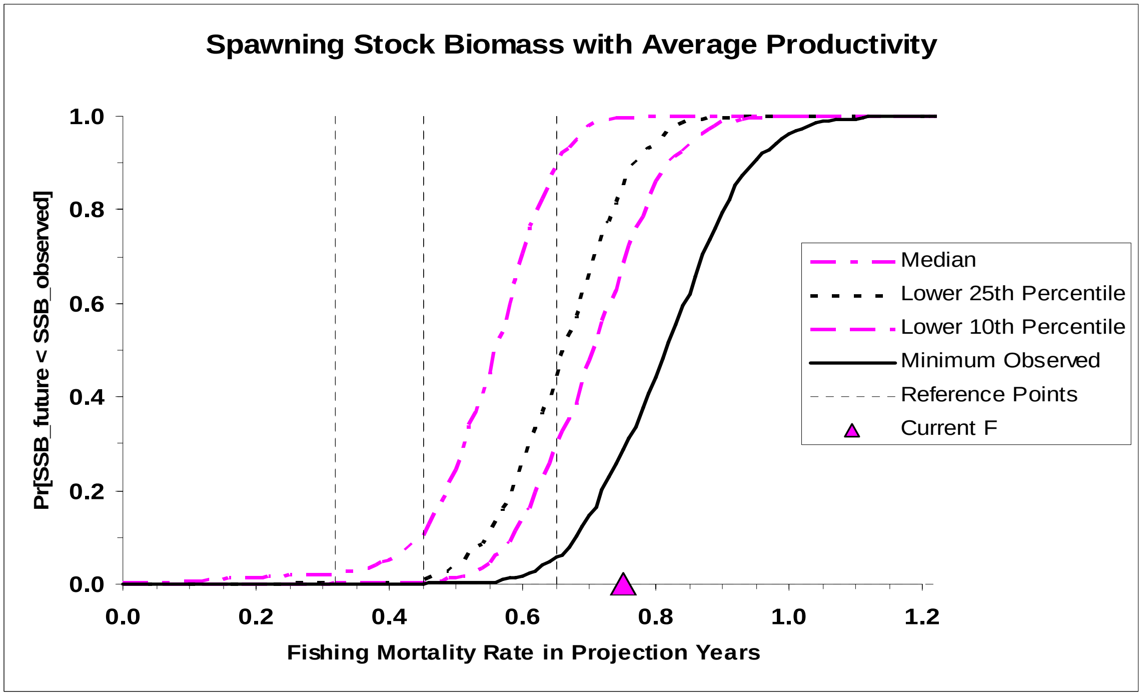


Figure 13. Probability profiles for four spawning stock biomass (*SSB*) threshold levels (from bottom to top – Minimum Observed *SSB*; Lower 10th Percentile; Lower 25th Percentile; and Median *SSB*). Each profile gives the probability that SSB will fall below the respective threshold level during one or more years of the projection period (2006-2030). For the bottom-most profile, the threshold is the minimum 'observed' *SSB* over the assessment period (1966-2006). The other three profiles (from bottom to top) have as their threshold the lower 10th percentile, the lower 25th percentile, and the median 'observed' *SSB* over the assessment period, respectively. For example, the fishing mortality rate (F) that will cause *SSB* to fall below the minimum 'observed' biomass (with 50% probability) is F=0.81; and the corresponding F for the 25th percentile is F=0.66. See Table 7 for a complete list of Fs associated with these limit reference points. For reference, other F-based biological reference points (cf. Table 5) are displayed with vertical dashed lines – the leftmost line is $F_{40\%}$=0.32; the center line is $F_{30\%}$= $F_{0.1}$=0.45; and the rightmost line is $F_{20\%}$=0.65. The current F=0.75 is indicated with a triangular marker.

Table 1. North Pacific albacore catches (in metric tons) by fisheries, 1952-2005[1]. Blank indicates no effort. -- indicates data not available. 0 indicates less than 1 metric ton. Provisional estimates in ().

YEAR	CANADA	JAPAN						KOREA		MEXICO
	TROLL	GILL NET	LONG LINE	POLE & LINE	PURSE SEINE	TROLL	UNSP. GEAR	GILL NET	LONG LINE	UNSP. GEAR
1952	71		26,687	41,787	154		237			
1953	5		27,777	32,921	38		132			
1954			20,958	28,069	23		38			
1955			16,277	24,236	8		136			
1956	17		14,341	42,810			57			
1957	8		21,053	49,500	83		151			
1958	74		18,432	22,175	8		124			
1959	212		15,802	14,252			67			
1960	5		17,369	25,156			76			
1961	4		17,437	18,639	7		268			0
1962	1		15,764	8,729	53		191			0
1963	5		13,464	26,420	59		218			0
1964	3		15,458	23,858	128		319			0
1965	15		13,701	41,491	11		121			0
1966	44		25,050	22,830	111		585			0
1967	161		28,869	30,481	89		520			
1968	1,028		23,961	16,597	267		1,109			
1969	1,365		18,030	31,912	521		935			0
1970	390		16,283	24,263	317		456			0
1971	1,746		11,524	52,957	902		308			0
1972	3,921	1	13,043	60,569	277		623			100
1973	1,400	39	16,795	68,767	1,353		495			0
1974	1,331	224	13,409	73,564	161		879			1
1975	111	166	10,318	52,152	159		228		2,463	1
1976	278	1,070	15,825	85,336	1,109		272		859	36
1977	53	688	15,696	31,934	669		355		792	0
1978	23	4,029	13,023	59,877	1,115		2,078		228	1
1979	521	2,856	14,215	44,662	125		1,126	0	259	1
1980	212	2,986	14,689	46,742	329		1,179	6	597	31
1981	200	10,348	17,922	27,426	252		663	16	459	8
1982	104	12,511	16,767	29,614	561		440	113	387	7
1983	225	6,852	15,097	21,098	350		118	233	454	33
1984	50	8,988	15,060	26,013	3,380		511	516	136	113
1985	56	11,204	14,351	20,714	1,533		305	576	291	49
1986	30	7,813	12,928	16,096	1,542		626	726	241	3
1987	104	6,698	14,702	19,082	1,205		155	817	549	7
1988	155	9,074	14,731	6,216	1,208		134	1,016	409	15
1989	140	7,437	13,104	8,629	2,521		393	1,023	150	2
1990	302	6,064	15,789	8,532	1,995		249	1,016	6	2
1991	139	3,401	17,046	7,103	2,652		392	852	3	2
1992	363	2,721	19,049	13,888	4,104		1,527	271	15	10
1993	494	287	29,966	12,797	2,889		867		32	11
1994	1,998	263	29,600	26,389	2,026		799		45	6
1995	1,720	282	29,075	20,981	1,177	856	81		440	5
1996	3,591	116	32,493	20,272	581	815	117		333	21
1997	2,433	359	38,951	32,238	1,068	1,585	123		319	53
1998	4,188	206	35,812	22,926	1,554	1,190	88		288	8
1999	2,641	289	33,364	50,369	6,872	891	127		107	23
2000	4,465	67	30,046	21,550	2,408	645	171		414	79
2001	4,985	117	28,818	29,430	974	416	96		82	22
2002	5,022	332	23,644	48,454	3,303	787	135		(113)	28
2003	6,735	126	20,954	36,114	627	922	106	(0)	(144)	28
2004	(7,842)	61	17,547	32,255	7,200	772	65	(0)	(68)	(104)
2005	(4,810)	(61)	(19,615)	(16,883)	(859)	(772)	(65)	(0)	(520)	(0)

[1] Data are from the 1st ISC Albacore Working Group, November 28 - December 2, 2005 except as noted.

Table 1. Continued

YEAR	TAIWAN GILL NET	TAIWAN LONG LINE[2]	U.S. POLE & LINE	U.S. GILL NET	U.S. LONG LINE	U.S. PURSE SEINE	U.S. SPORT	U.S. TROLL	U.S. UNSP. GEAR	OTHERS LONG LINE[3]	OTHERS TROLL	GRAND TOTAL
1952					46		1,373	23,843				94,198
1953					23		171	15,740				76,807
1954					13		147	12,246				61,494
1955					9		577	13,264				54,507
1956					6		482	18,751				76,464
1957					4		304	21,165				92,268
1958					7		48	14,855				55,723
1959					5		0	20,990	0			51,328
1960					4		557	20,100	0			63,403
1961			2,837		5		1,355	12,055	1			52,608
1962			1,085		7		1,681	19,752	1			47,264
1963			2,432		7		1,161	25,140	0			68,906
1964			3,411		4		824	18,388	0			62,393
1965			417		3		731	16,542	0			73,032
1966			1,600		8		588	15,333	1			66,150
1967		330	4,113		12		707	17,814	0			83,096
1968		216	4,906		11		951	20,434	0			69,480
1969		65	2,996		14		358	18,827	0			75,023
1970		34	4,416		9		822	21,032	0			68,022
1971		20	2,071		11		1,175	20,526	0			91,240
1972		187	3,750		8		637	23,600	0			106,717
1973		--	2,236		14		84	15,653	0			106,836
1974		486	4,777		9		94	20,178	0			115,113
1975		1,240	3,243		33		640	18,932	10			89,696
1976		686	2,700		23		713	15,905	4			124,816
1977		572	1,497		37		537	9,969	0			62,799
1978		6	950		54		810	16,613	15			98,822
1979		81	303		--		74	6,781	0			71,004
1980	--	249	382		--		168	7,556	0			75,126
1981	--	143	748		25		195	12,637	0			71,042
1982	--	38	425		105		257	6,609	21			67,960
1983	--	8	607		6		87	9,359	0			54,527
1984	--	--	1,030		2	3,728	1,427	9,304	0			70,258
1985	--	--	1,498	2	0		1,176	6,415	0			58,170
1986	--	--	432	3			196	4,708	0			45,344
1987	2,514	--	158	5	150		74	2,766	0			48,986
1988	7,389	--	598	15	308		64	4,212	10			45,554
1989	8,350	40	54	4	249		160	1,860	23			44,140
1990	16,701	4	115	29	177	71	24	2,603	4			53,683
1991	3,398	12	0	17	313	0	6	1,845	71			37,253
1992	7,866	--	0	0	337	0	2	4,572	72			54,796
1993		5	0	0	440		25	6,254	0			54,067
1994		83	0	38	546		106	10,978	213		158	73,248
1995		4,280	80	52	883		102	8,045	1		137	68,197
1996		7,596	24	83	1,187	11	88	16,938	0	1,735	505	86,506
1997		9,119	73	60	1,652	2	1,018	14,252	1	2,824	404	106,534
1998		8,617	79	80	1,120	33	1,208	14,410	2	5,871	286	97,966
1999		8,186	60	149	1,540	48	3,621	10,060	1	6,307	261	124,916
2000		8,842	69	55	940	4	1,798	9,645	3	3,654	490	85,344
2001		8,684	139	94	1,295	51	1,635	11,210	0	1,471	127	89,648
2002		7,965	381	30	525	4	2,357	10,387		700	(127)	(104,295)
2003		(7,166)	59	16	524	44	2,214	14,102	0	(2,400)	(127)	(92,409)
2004		(4,988)	(126)	(12)	(560)	(1)	(1,506)	(13,346)	(0)	(2,400)	(127)	(88,981)
2005		(4,692)	(66)	(20)	(277)	(2)	(1,719)	(9,122)	(0)	(2,400)	(127)	(62,011)

Table 2. North Pacific albacore catch-at-age (numbers of fish in 1,000s) matrix used for all VPA-2Box analyses (1966-05).

YEAR	AGE (yr)									TOTAL
	1	2	3	4	5	6	7	8	=9	
1966	0	129	2,022	1,118	2,412	261	145	52	41	6,180
1967	0	210	2,293	1,552	2,820	579	171	97	72	7,794
1968	0	92	3,268	1,422	1,118	763	254	97	39	7,053
1969	1	2,046	2,584	1,232	2,493	197	191	194	53	8,990
1970	0	282	3,390	2,220	1,321	410	101	71	61	7,856
1971	0	208	4,634	2,424	2,831	388	175	70	81	10,810
1972	0	4,030	3,514	4,646	2,348	270	118	92	60	15,078
1973	1	2,583	3,619	1,531	4,030	743	141	90	74	12,812
1974	0	1,128	4,483	5,653	1,538	754	153	57	96	13,863
1975	0	828	5,222	2,912	1,907	264	111	78	259	11,581
1976	0	2,325	4,937	5,767	2,766	285	165	106	186	16,538
1977	0	741	2,919	1,955	1,106	426	132	91	160	7,531
1978	2	5,931	2,125	4,729	1,018	387	185	45	83	14,505
1979	0	580	1,215	3,623	1,257	265	190	101	68	7,300
1980	0	2,518	2,830	3,160	801	311	110	87	97	9,916
1981	4	898	1,509	2,854	1,095	450	270	106	115	7,301
1982	78	599	1,949	3,408	435	255	200	213	134	7,272
1983	2	1,182	2,552	2,306	232	186	196	146	141	6,945
1984	5	1,111	4,571	3,031	241	177	126	131	156	9,550
1985	2	318	1,235	2,776	641	118	166	100	325	5,681
1986	0	794	906	2,461	204	128	127	90	131	4,840
1987	1	265	2,155	1,296	474	314	176	102	169	4,953
1988	4	133	1,529	1,156	270	606	223	161	181	4,264
1989	106	377	316	1,335	1,012	276	246	133	158	3,959
1990	109	317	239	1,151	1,606	641	113	213	247	4,635
1991	78	678	1,747	335	339	263	155	119	271	3,984
1992	1	332	2,350	1,664	662	360	150	151	156	5,826
1993	0	485	1,090	1,971	793	202	201	116	293	5,151
1994	28	669	1,575	2,355	1,077	654	206	97	136	6,798
1995	2	496	1,310	3,152	294	310	564	116	119	6,362
1996	8	494	3,938	2,294	603	396	554	477	105	8,869
1997	0	2,453	1,431	4,451	817	124	476	620	391	10,764
1998	0	1,105	4,036	1,568	1,880	302	213	379	282	9,766
1999	77	816	3,761	5,797	757	478	477	185	308	12,656
2000	0	1,231	1,852	2,739	923	415	450	435	247	8,292
2001	4	1,470	4,370	1,396	1,153	410	451	277	338	9,869
2002	0	1,447	7,396	3,141	439	226	381	209	222	13,461
2003	0	3,054	3,619	3,008	709	306	250	181	194	11,321
2004	30	210	4,411	4,363	282	452	332	130	44	10,253
2005	1	2,382	1,547	2,318	305	171	437	189	69	7,418
TOTAL	543	46,948	110,447	106,273	47,010	14,522	9,484	6,404	6,365	347,996

Table 3. North Pacific albacore numbers-at-age (January 1 in 1,000s of fish) as estimated in Model Scenario D1 (1966-06). Recruitment (age-1 fish) from 2005-06 reflects mean estimate from 1966-98; age-2 fish in 2006 reflects exponential decline (e^{-Z}) of age-1 fish in 2003.

YEAR	AGE (yr)								
	1	2	3	4	5	6	7	8	=9
1966	25,148	20,076	9,549	8,963	5,558	1,035	424	166	131
1967	29,475	18,630	14,762	5,352	5,685	2,083	545	191	142
1968	33,293	21,836	13,622	8,980	2,647	1,842	1,052	259	105
1969	46,100	24,664	16,098	7,312	5,439	1,018	720	563	154
1970	22,784	34,151	16,522	9,721	4,365	1,930	586	371	322
1971	40,983	16,879	25,058	9,353	5,312	2,113	1,081	348	401
1972	39,890	30,361	12,325	14,614	4,869	1,562	1,235	651	427
1973	40,054	29,551	19,050	6,147	6,887	1,632	927	814	669
1974	27,404	29,672	19,683	11,028	3,253	1,735	583	566	958
1975	39,421	20,302	21,015	10,766	3,424	1,116	650	302	999
1976	30,252	29,204	14,331	11,128	5,502	941	602	387	676
1977	35,167	22,411	19,646	6,435	3,405	1,752	455	306	539
1978	21,530	26,052	15,968	12,063	3,108	1,585	936	224	413
1979	24,512	15,948	14,252	10,014	4,940	1,440	845	536	363
1980	18,877	18,159	11,318	9,519	4,353	2,591	840	464	522
1981	25,360	13,984	11,302	5,978	4,374	2,542	1,654	528	574
1982	29,433	18,784	9,591	7,084	2,028	2,310	1,499	995	628
1983	24,877	21,738	13,402	5,445	2,382	1,132	1,493	939	907
1984	12,774	18,427	15,092	7,753	2,088	1,566	680	938	1,123
1985	22,816	9,460	12,700	7,301	3,182	1,341	1,009	396	1,282
1986	18,306	16,901	6,735	8,352	3,062	1,812	892	606	881
1987	11,247	13,562	11,841	4,216	4,099	2,094	1,233	553	913
1988	9,944	8,331	9,819	6,935	2,024	2,631	1,283	763	855
1989	31,762	7,364	6,058	5,969	4,151	1,269	1,433	760	907
1990	32,674	23,439	5,132	4,218	3,286	2,215	705	852	987
1991	25,211	24,112	17,092	3,598	2,146	1,084	1,097	426	971
1992	21,691	18,610	17,282	11,169	2,378	1,300	580	680	704
1993	27,488	16,068	13,502	10,796	6,854	1,200	657	302	765
1994	39,176	20,363	11,488	9,071	6,317	4,400	717	317	444
1995	19,968	28,999	14,513	7,165	4,718	3,761	2,701	356	366
1996	39,051	14,791	21,057	9,631	2,652	3,244	2,521	1,521	335
1997	27,849	28,923	10,535	12,243	5,184	1,451	2,065	1,396	881
1998	20,315	20,631	19,329	6,582	5,303	3,143	969	1,124	835
1999	35,829	15,049	14,338	10,882	3,542	2,338	2,070	536	892
2000	37,451	26,476	10,450	7,425	3,202	1,979	1,325	1,127	640
2001	34,645	27,744	18,559	6,163	3,183	1,589	1,113	601	733
2002	47,549	25,662	19,295	10,031	3,378	1,383	828	444	470
2003	16,034	35,225	17,772	8,042	4,767	2,127	831	293	314
2004	51,304	11,878	23,484	10,083	3,414	2,927	1,315	404	136
2005	27,722	37,981	8,620	13,638	3,791	2,288	1,782	692	252
2006	27,722	20,517	26,099	5,067	8,126	2,547	1,549	949	481

Table 4. Instantaneous rates of fishing mortality-at-age (yr^{-1}) as estimated in Model Scenario D1 (1966-05).

YEAR	AGE (yr)								
	1	2	3	4	5	6	7	8	=9
1966	0.000	0.007	0.279	0.155	0.681	0.341	0.496	0.439	0.439
1967	0.000	0.013	0.197	0.404	0.827	0.383	0.446	0.859	0.859
1968	0.000	0.005	0.322	0.201	0.656	0.639	0.324	0.561	0.561
1969	0.000	0.101	0.204	0.216	0.736	0.252	0.362	0.499	0.499
1970	0.000	0.010	0.269	0.304	0.426	0.280	0.222	0.247	0.247
1971	0.000	0.014	0.239	0.353	0.924	0.237	0.207	0.263	0.263
1972	0.000	0.166	0.396	0.452	0.793	0.222	0.117	0.177	0.177
1973	0.000	0.106	0.247	0.337	1.079	0.729	0.192	0.137	0.137
1974	0.000	0.045	0.303	0.870	0.770	0.682	0.359	0.123	0.123
1975	0.000	0.048	0.336	0.371	0.992	0.317	0.218	0.354	0.354
1976	0.000	0.096	0.501	0.884	0.844	0.427	0.376	0.379	0.379
1977	0.000	0.039	0.188	0.428	0.465	0.327	0.406	0.415	0.415
1978	0.000	0.303	0.167	0.593	0.470	0.329	0.257	0.263	0.263
1979	0.000	0.043	0.104	0.533	0.345	0.238	0.299	0.244	0.244
1980	0.000	0.174	0.338	0.478	0.238	0.149	0.164	0.242	0.242
1981	0.000	0.077	0.167	0.781	0.339	0.228	0.208	0.262	0.262
1982	0.003	0.038	0.266	0.790	0.283	0.136	0.167	0.282	0.282
1983	0.000	0.065	0.247	0.659	0.119	0.210	0.164	0.197	0.197
1984	0.000	0.072	0.426	0.590	0.143	0.140	0.240	0.175	0.175
1985	0.000	0.040	0.119	0.569	0.263	0.107	0.209	0.344	0.344
1986	0.000	0.056	0.168	0.412	0.080	0.085	0.179	0.188	0.188
1987	0.000	0.023	0.235	0.434	0.143	0.189	0.180	0.239	0.239
1988	0.000	0.019	0.198	0.213	0.167	0.307	0.224	0.279	0.279
1989	0.004	0.061	0.062	0.297	0.328	0.287	0.221	0.224	0.224
1990	0.004	0.016	0.055	0.375	0.809	0.403	0.204	0.338	0.338
1991	0.004	0.033	0.125	0.114	0.201	0.326	0.178	0.385	0.385
1992	0.000	0.021	0.170	0.188	0.384	0.382	0.351	0.294	0.294
1993	0.000	0.036	0.098	0.236	0.143	0.215	0.430	0.576	0.576
1994	0.001	0.039	0.172	0.354	0.219	0.188	0.401	0.431	0.431
1995	0.000	0.020	0.110	0.694	0.075	0.100	0.274	0.467	0.467
1996	0.000	0.039	0.242	0.319	0.303	0.152	0.291	0.445	0.445
1997	0.000	0.103	0.170	0.537	0.200	0.104	0.308	0.703	0.703
1998	0.000	0.064	0.274	0.320	0.519	0.118	0.292	0.487	0.487
1999	0.003	0.065	0.358	0.923	0.282	0.268	0.308	0.503	0.503
2000	0.000	0.055	0.228	0.547	0.401	0.276	0.491	0.580	0.580
2001	0.000	0.063	0.315	0.301	0.534	0.351	0.619	0.743	0.743
2002	0.000	0.067	0.575	0.444	0.162	0.209	0.739	0.768	0.768
2003	0.000	0.105	0.267	0.557	0.188	0.181	0.422	1.192	1.192
2004	0.001	0.021	0.243	0.678	0.100	0.196	0.342	0.461	0.461
2005	0.001	0.075	0.231	0.218	0.098	0.090	0.331	0.375	0.375

Table 5A. Results from equilibrium analysis of biological reference points (BRP) for North Pacific albacore associated with Model D1: (a) candidate target and limit reference points; (b) corresponding fishing mortality rates (*F*, yr^{-1}); (c) current *F* (2002-04) relative to target *F* or limit *F* reference points; (d) MSY proxy or equilibrium catch (1,000 mt); and (e) SSB_{MSY} proxy or equilibrium *SSB* (1,000 mt). The current *F* (0.75) reflects the fully-selected *F* (observed for age groups 8 and 9+) from the mean (geometric) of *F*-at-age estimates from 2002-04. All catch and *SSB* estimates are based on the assumption of constant recruitment of 27.75 million fish per year. All *SSB* statistics are based on the assumption of a 'May 1' reference spawning date.

Candidate Target Reference Points	Target *F* (yr^{-1})	Ratio of Current *F* to Target *F*	MSY Proxy (1,000 mt)	SSB_{MSY} Proxy (1,000 mt)
$F_{40\%}$	0.32	2.31	75	226
$F_{35\%}$	0.38	1.97	79	198
$F_{0.1}$	0.45	1.68	83	171
$F_{30\%}$	0.45	1.67	83	169
Candidate Limit Reference Points	**Limit *F* (yr-1)**	**Ratio of Current *F* to Limit *F***	**Equilibrium Catch (1,000 mt)**	**Equilibrium *SSB* (1,000 mt)**
$F_{20\%}$	0.65	1.16	91	113
F_{Max}	2.07	0.36	100	10
$F_{SSB\text{-Min}}$	0.81	0.93	94	83
$F_{SSB\text{-}10\%}$	0.70	1.07	92	102
$F_{SSB\text{-}25\%}$	0.66	1.14	91	110

Table 5B. Comparison of biological reference points (BRP) from the 2006 stock assessment (Table 5A) and those from the 2004 assessment (Stocker 2005). Numbers in the body of the table reflect the current fishing mortality rate (F_{cur}) relative to biological reference points. A table entry greater than 1.0 implies that F_{cur} must be decreased to align with the respective BRP shown to the left of it. Whereas, a table entry less than 1.0 implies that F_{cur} is below the BRP. Note that in the 2004 assessment BRPs were based on two assumptions regarding F_{cur} ('low'=0.43 and 'high'=0.68), as well as two 'productivity' scenarios ('low' recruitment=22.5 million recruits and 'high' recruitment=31 million recruits). In the 2006 assessment, BRPs were based on a single assumption regarding F_{cur} (0.75, see Table 5A) and future productivity (27.75 million recruits), i.e., F_{cur} is greater than the F associated with all reference points other than $F_{SSB\text{-}Min}$ and F_{Max}.

BRPs	**2006**	**2004**	**2004**	**2004**	**2004**
Productivity in recent years	Average	Low	High	Low	High
F_{cur} Scenario	0.75	Low 0.43	Low 0.43	High 0.68	High 0.68
$F_{cur}/F_{40\%}$	2.31	1.43	1.43	2.27	2.27
$F_{cur}/F_{35\%}$	1.97	1.23	1.23	1.94	1.94
$F_{cur}/F_{0.1}$	1.68	1.16	1.16	1.84	1.84
$F_{cur}/F_{30\%}$	1.67	1.02	1.02	1.62	1.62
$F_{cur}/F_{20\%}$	1.16	0.70	0.70	1.11	1.11
F_{cur}/F_{max}	0.36	0.40	0.40	0.64	0.64
$F_{cur}/F_{SSB\text{-}Min}$	0.93	0.48	0.41	0.76	0.65
$F_{cur}/F_{SSB\text{-}10\%}$	1.07	0.52	0.44	0.83	0.69
$F_{cur}/F_{SSB\text{-}25\%}$	1.14	0.60	0.50	0.94	0.79
$F_{cur}/F_{SSB\text{-}50\%}$	1.34	0.80	0.64	1.26	1.01

Table 6. North Pacific albacore weight-at-age (w-a-a, in kg) growth models used to calculate population abundance in Model D1 (based on a fixed age/year matrix, external to the population model): (A) 'January 1' w-a-a for total biomass time series (1966-05), used as a fixed age/year matrix, external to the Model; (B) 'May 1' (i.e., assumed spawning 'reference' time) w-a-a for spawning stock biomass time series (1966-05), used as a fixed age/year matrix, external to the Model; and (C) 'Age group 9+' demographics in equilibrium as a function of the mean (geometric) age group 9+ fishing mortality rates estimated in Model D1, including age, length, and weight estimates for total and spawning stock biomass, respectively. Mean age values for the age group 9+ in Table (C) were estimated following Porch (2003; Equation 2.6b), with a natural mortality rate (*M*) of 0.3 and equal selection for all ages in the 9+ age group, i.e., consistent with methods used for the stock projections (2006-2011). Biomass calculations for 2005 and the projection period (2006-11) were based on similar w-a-a estimates as the 2002-04 time block. Estimates in Table (C) were internally parameterized in the population model using the length-at-age model from Suda (1966) and weight-length models from Watanabe et al. (2006), i.e., 'All Areas/Quarter 1' (total biomass) and 'Area 2/Quarter 2' (for spawning stock biomass). Note that exploitable biomass time series presented in the Report directly correspond to the w-a-a used for total biomass (i.e., 'January 1') calculations, filtered through a selectivity ogive.

(**A**)

YEAR	AGE (yr)								
	1	2	3	4	5	6	7	8	9+
1966	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	29.73
1967	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	29.73
1968	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	29.73
1969	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	29.73
1970	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	29.73
1971	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	29.73
1972	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	29.73
1973	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	29.73
1974	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	30.13
1975	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	30.13
1976	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	30.13
1977	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	30.13
1978	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	30.13
1979	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	30.46
1980	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	30.46
1981	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	30.46
1982	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	30.46
1983	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	30.46
1984	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	30.52
1985	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	30.52
1986	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	30.52
1987	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	30.52
1988	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	30.52
1989	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	29.67
1990	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	29.67
1991	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	29.67
1992	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	29.67
1993	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	29.67
1994	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	28.86
1995	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	28.86
1996	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	28.86
1997	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	28.86
1998	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	28.86
1999	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	28.10
2000	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	28.10
2001	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	28.10
2002	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	28.10
2003	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	28.10
2004	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	28.03
2005	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	28.03
2006	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	28.03

Table 6. continued.

(**B**)

YEAR	AGE (yr)								
	1	2	3	4	5	6	7	8	9+
1966	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.24
1967	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.24
1968	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.24
1969	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.24
1970	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.24
1971	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.24
1972	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.24
1973	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.24
1974	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.61
1975	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.61
1976	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.61
1977	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.61
1978	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.61
1979	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.91
1980	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.91
1981	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.91
1982	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.91
1983	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.91
1984	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.97
1985	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.97
1986	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.97
1987	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.97
1988	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.97
1989	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.19
1990	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.19
1991	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.19
1992	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.19
1993	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.19
1994	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	30.44
1995	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	30.44
1996	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	30.44
1997	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	30.44
1998	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	30.44
1999	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	29.74
2000	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	29.74
2001	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	29.74
2002	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	29.74
2003	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	29.74
2004	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	29.68
2005	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	29.68
2006	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	29.68

(C)

		Age group 9+ equilibrium demographics					
	Mean F on	Biomass (January 1)			Spawning stock biomass (May 1)		
Period	**Age group 9+**	**Mean age (yr)**	**Mean length (cm)**	**Mean weight (kg)**	**Mean age (yr)**	**Mean length (cm)**	**Mean weight (kg)**
2002-2004	0.7501	9.54	115.60	**28.03**	9.87	117.10	**29.68**
1999-2003	0.7236	9.56	115.70	**28.10**	9.89	117.20	**29.74**
1994-1998	0.4981	9.82	116.87	**28.86**	10.15	118.30	**30.44**
1989-1993	0.3457	10.10	118.09	**29.67**	10.44	119.47	**31.19**
1984-1988	0.2374	10.41	119.35	**30.52**	10.74	120.66	**31.97**
1979-1983	0.2437	10.38	119.26	**30.46**	10.72	120.58	**31.91**
1974-1978	0.2826	10.26	118.77	**30.13**	10.60	120.11	**31.61**
1966-1973	0.3370	10.12	118.18	**29.73**	10.46	119.55	**31.24**

Table 7. Fishing mortality rates that will maintain the spawning stock biomass (*SSB*) above the respective threshold level, with the given probability. Four distinct *SSB* threshold levels and two probability levels are provided, but other levels may be desired by fishery managers. For example, if managers desire to maintain the *SSB* above the 25th percentile of observed *SSB* with a 95% probability of success, then the fishing mortality rate should not exceed *F*=0.51. In general, a higher desired probability of success requires a more precautionary fishing mortality rate.

		Probability Level Desired	
SSB Threshold Desired		**50%**	**95%**
Minimum Observed SSB	$F_{SSB\text{-}Min}$	0.81	0.64
Lower 10th Percentile	$F_{SSB\text{-}10\%}$	0.70	0.55
Lower 25th Percentile	$F_{SSB\text{-}25\%}$	0.66	0.51
Median	$F_{SSB\text{-}50\%}$	0.56	0.39

APPENDIX 1

List of Participants

Canada

Max Stocker (chair)
Fisheries and Oceans Canada, Pacific Biological Station
3190 Hammond Bay Road, Nanaimo, B.C., Canada V9T 6N7
Phone: 250-758-0275, Fax: 250-756-7053, E-mail: StockerM@pac.dfo-mpo.gc.ca

Japan

Hiroyasu Hasegawa
Fisheries Agency, 1-2-1, Kasumigaseki, Chiyoda-ku, Tokyo 100-8950 Japan
Phone: 81-3-3502-8111(ex. Number: 7377), Fax: 81-3-3592-0759, E-mail: hiroyasu_hasegawa@nm.maff.go.jp

Hitoshi Honda
National Research Institute of Far Seas Fisheries, 5-7-1, Orido, Shimizu-ku, Shizuoka 424-8633 Japan
Phone: 81-543-36-6000, Fax: 81-543-35-9642, E-mail: hhonda@affrc.go.jp

Momoko Ichinokawa
National Research Institute of Far Seas Fisheries, 5-7-1, Orido, Shimizu-ku, Shizuoka 424-8633 Japan
Phone: 81-543-36-6039, Fax: 81-543-35-9642, E-mail: ichimomo@fra.affrc.go.jp

Mikihiko Kai
National Research Institute of Far Seas Fisheries, 5-7-1 Orido, Shimizu-ku, Shizuoka 424-8633 Japan
Phone: 81-543-36-6039, Fax: 81-543-35-9642, E-mail: kaim@affrc.go.jp

Minoru Kanaiwa
Tokyo University of Agriculture, 196 Yasaka, Abashiri, Hokkai, 099-2493 Japan,
Phone: 81-152-48-3857, Fax: 81-152-48-2940, E-mail: m3kanaiw@bioindustry.nodai.ac.jp

Hirokazu Saito
National Research Institute of Far Seas Fisheries, 5-7-1 Orido, Shimizu-ku, Shizuoka 424-8633 Japan
Phone: 81-543-36-6037, Fax: 81-543-35-9642, E-mail: hisaito@affrc.go.jp

Yukio Takeuchi
National Research Institute of Far Seas Fisheries, 5-7-1, Orido, Shimizu-ku, Shizuoka 424-8633 Japan
Phone: 81-543-36-6039, Fax: 81-543-35-9642, E-mail: yukiot@fra.affrc.go.jp

List of Participants (continued)

Koji Uosaki
National Research Institute of Far Seas Fisheries, 5-7-1, Orido, Shimizu-ku, Shizuoka 424-8633 Japan
Phone: 81-543-36-6032, Fax: 81-543-35-9642, E-mail: uosaki@affrc.go.jp

Kyuji Watanabe
National Research Institute of Far Seas Fisheries, 5-7-1, Orido, Shimizu-ku, Shizuoka 424-8633 Japan
Phone: 81-543-36-6033, Fax: 81-543-35-9642, E-mail: watanabk@fra.affrc.go.jp

United States

Atilio L. Coan Jr.
NOAA Fisheries, Southwest Fisheries Science Center, 8604 La Jolla Shores Drive
La Jolla, CA 92037, U.S.A.
Phone: 858-546-7079, Fax: 858-546-5653, E-mail: Al.Coan@noaa.gov

Ray Conser
NOAA Fisheries, Southwest Fisheries Science Center, 8604 La Jolla Shores Drive
La Jolla, CA 92037, U.S.A.
Phone: 858-546-5688, Fax: 858-546-5656, E-mail: Ray.Conser@noaa.gov

Paul R. Crone
NOAA Fisheries, Southwest Fisheries Science Center, 8604 La Jolla Shores Drive
La Jolla, CA 92037, U.S.A.
Phone: 858-546-7069, Fax: 858-546-5653, E-mail: Paul.Crone@noaa.gov

Emmanis Dorval
NOAA Fisheries, Southwest Fisheries Science Center, 8604 La Jolla Shores Drive
La Jolla, CA 92037, U.S.A.
Phone: 858-546-5619, Fax: 858-546-5656, E-mail: Emmanis.Dorval@noaa.gov

Kevin Piner
NOAA Fisheries, Southwest Fisheries Science Center, 8604 La Jolla Shores Drive
La Jolla, CA 92037, U.S.A.
Phone: 858-546-5613, Fax: 858-546-7003, E-mail: Kevin.Piner@noaa.gov

Vidar Wespestad
American Fisherman's Research Foundation, 21231 8th Pl. W., Lynnwood, WA 98036
Phone: 425-672-7603, Fax: 425-672-1357, E-mail: vidarw@verizon.com

APPENDIX 2

Agenda

November 28 *(Tuesday)*, 0900-1700

1. Registration and distribution of documents, **09:00-09:30**

2. Opening of the International Scientific Committee Albacore Working Group (ISC-ALBWG) Stock Assessment Workshop, **09:30-10:00**
   - Welcome remarks by NRIFSF Director Dr. Kobayashi
   - Work program and logistics

3. Agenda
   - Adoption of agenda
   - Appointment of rapporteurs

4. Review of fisheries and highlights of research progress
   - Canada
   - Japan
   - Korea
   - Mexico
   - Chinese Taipei
   - United States
   - IATTC
   - Cook Islands
   - Other

5. Review of biological studies
   - Growth models
   - Reproductive studies
   - Tagging studies

November 28 *(Tuesday)*, 0900-1700 (cont.)

6. Review of fishery data used in stock assessments
   - Status of ALBWG Data Catalog
   - Review and update of catch data (Category I)
   - Review and update of catch/effort data (Category II)
   - Review and update of length-frequency data (Category III)
   - Review and update Miscellaneous fishery data (e.g., IUU fisheries)
   - Conclusions and work assignments

Reception: 1730-1900 (NRIFSF) – Welcome reception with guests and friends

November 29 *(Wednesday)*, 0900-1700

7. Stock Assessment Task Group (SATG) Report and Requirements
   - Review of the recommendations of the SATG Meeting in Nanaimo (i.e., provide update on the ground rules set by the SATG in July 2006 for data inputs and models that will be used in the 2006 stock assessment).

8. Northern Committee requests regarding catch and biological reference points
   - Discuss how the SATG plans to address Northern Committee requirements on IUU catch and biological reference points.

9. Workgroup session on input data used in VPA-2BOX
   - Catch-at-age matrices
   - Size data (i.e., length, weight)
   - CPUE: age-aggregated and age-specific indices of abundance
   - Conclusions and work assignments

10. Workgroup session on input data used in SS2
    - Catch and size frequency data
    - CPUE indices of abundance
    - Conclusions and work assignments

November 30 *(Thursday)*, 0900-1200

11. Review of VPA-2BOX requirements
    - Inputs—time series, estimates, assumptions
    - Baseline model run
    - Sensitivity analysis runs

12. Review of SS2 requirements
    - Inputs—time series, estimates, assumptions
    - Baseline model run
    - Sensitivity analysis runs

1300-1700

13. Small workgroup sessions to perform additional SS2 and VPA-2BOX model runs and sensitivity analyses

December 1 *(Friday)*, 0900-1200

14. Small workgroup sessions to perform additional SS2 and VPA-2BOX model runs and sensitivity analyses

1300-1700

15. Review of results from work assignments/model runs

Reception: Dinner at downtown Shimizu 19:00

December 2 (Saturday), 0900-1400

16. Review of results from work assignments (*Continued*)

17. Workgroup session on stock projections and biological reference points
    - Refine initial conditions for projections
    - Assess 'hypotheses' used in projections
    - Review potential Biological Reference Points

18. Workgroup session on stock projections

19. Transition from the previous stock assessment (December 2004)
    - The effects of historical database corrections and updates, 1975-2003.
    - The effects of new data, 1966-74 and 2004-05.
    - The effects of employing the SS2 model (vs. VPA)

December 3 (*Sunday*), No Meeting

December 4 *(Monday)*, 0900-1200

20. Stock status conclusions
    - Comparing results from VPA-2BOX and SS2 models
    - Assess 'current' conditions of B and F in relation to biological reference points
    - Discuss projection estimates
    - Develop conservation advice

21. SATG Workplan for 2007

22. Administrative matters
    - Northern Committee related matters
        1. address impact on the assessment of having no data on IUU fishing
        2. discuss projects that can be initiated to get a handle on the IUU catch or fishery
    - Update National coordinators and data correspondents
    - Procedures for clearing the report
    - Time and place for next meeting

1300-1700

23. Report preparation **-** rapporteurs and others

December 5 *(Tuesday)*, 0900-1500

24. Clearing of Workshop Report
25. Adjournment

APPENDIX 3

List of Documents

ISC/06/ALBWG/01:	International Scientific Committee Albacore Working Group Data Base Catalog – A.L. Coan
ISC/06/ALBWG/02:	Summary of the 2005 U.S. North and South Pacific Albacore Troll Fisheries – J. Childers and S. Aalbers
ISC/06/ALBWG/03:	North Pacific albacore catch in the U.S. longline fishery – J. Wetherall and A. Coan
ISC/06/ALBWG/04:	A review of Japanese albacore fisheries in the North Pacific – K. Uosaki and Y. Nishikaw
ISC/06/ALBWG/05:	The 2005 Canadian North Pacific albacore troll fishery – M. Stocker
ISC/06/ALBWG/06:	Update of catch-at-age of albacore caught by the Japanese fisheries in the North Pacific, 1966-2005 – K. Watanabe and K. Uosaki
ISC/06/ALBWG/07:	Standardization of age specific abundance index for North Pacific albacore caught by the Japanese large and small longline fisheries, 1966-2005: Improvement of general liner model – K. Watanabe and K. Uosaki
ISC/06/ALBWG/08:	Age specific abundance index for albacore caught by the Japanese pole-and-line fishery, 1972-2005 – K. Uosaki
ISC/06/ALBWG/09:	Critical evaluation of important time series associated with albacore fisheries (United States, Canada, and Mexico) of the eastern North Pacific Ocean – J.D. McDaniel, P.R. Crone, and E. Dorval
ISC/06/ALBWG/10:	Summary on archival tagging for North Pacific albacore, 2005-2006 – K. Uosaki
ISC/06/ALBWG/11:	Considerations in extreme depletion of abundance indices for North Pacific albacore from the Japanese longline fishery observed in 2003-2004 – K. Watanabe, K. Uosaki and Yukio Takeuchi
ISC/06/ALBWG/12:	Report of 2006 research cruise by R/V Shoyo-maru for albacore in the north-western Pacific – H. Saito, T. Tanabe, S. Koyama and K. Uosaki
ISC/06/ALBWG/13:	Classification of horizontal habitats of North Pacific albacore to derive abundance index from considering temporal fluctuations in catch per unit effort and effort, and their geographic distributions – K. Watanabe and K. Uosaki
ISC/06/ALBWG/14:	Revised practical solutions of application issues of length-weight relationship for the North Pacific albacore with respect to the stock assessment. – K. Watanabe, K. Uosaki, T. Kokubo, P. Crone, A. Coan and C.-C. Hsu
ISC/06/ALBWG/15:	Preliminary research concerning biological reference points associated with North Pacific albacore population dynamics and

	fisheries – R.J. Conser, P.R. Crone, S. Kohin, K. Uosaki, M. Ogura,and Y. Takeuchi
ISC/06/ALBWG/16:	Summary report on software for North Pacific albacore stock assessment – R. Conser and Y. Takeuchi
ISC/06/ALBWG/17:	Biological reference points and stock projections for North Pacific albacore – R. Conser, P. Crone and Y. Takeeuchi
ISC/06/ALBWG/18:	Population analysis of North Pacific albacore based on a length-based, age-structured model: Stock Synthesis 2 – P.R. Crone, K.R. Piner, Y. Takeuchi, K. Uosaki, R.J. Conser, E. Dorval, K. Watanabe, and J.D. McDaniel
ISC/06/ALBWG/19:	Population analysis of North Pacific albacore based on an age-structured model: VPA-2BOX – K. Uosaki, E. Dorval, K. Watanabe, P.R. Crone, Y. Takeuchi, J.M. McDaniel, R.J. Conser, and K.R. Piner

APPENDIX 4

Report of the ISC Albacore Working Group Stock Assessment Task Group Meeting

Fisheries and Oceans Canada
Pacific Biological Station
Nanaimo, B.C. Canada
13-17 July 2006

1.0 Introduction

During the Meeting of the International Scientific Committee's Albacore Working Group (ISC-ALBWG) held in La Jolla, CA from November 28-December 2, 2005, it was recommended that the newly formed Stock Assessment Task Group (SATG) meet in July 2006 to:

- review and prepare important data sources applicable to the formal assessment meeting to be held in Shimizu, Japan in November/December 2006;
- make decisions regarding model parameterization for both the VPA-2BOX and SS2 modeling efforts; and
- begin development of preliminary 'base case' models (VPA-2BOX and SS2) that will be presented in Shimizu in November/December 2006, and
  outline important model diagnostics to be considered in reviews of assessments.

The SATG Meeting was convened at the Pacific Biological Station in Nanaimo, B.C. on July 13, 2005. M. Stocker, Meeting chair, opened the 5-day Meeting and welcomed scientists from Chinese Taipei, Japan, and the USA (Attachment 1). Five working documents were presented (Attachment 2). The draft agenda was reviewed and adopted with minor modification (Attachment 3).

Table 1 provides an update of north Pacific albacore catches (in mt) by fisheries (1952-2005).

2.0 Data review - Eastern Pacific Ocean (EPO) fisheries: (a) catch data; (b) size-/age-distribution data; and (c) CPUE data

P. Crone outlined important topics that should be addressed when conducting a review of input data for inclusion in north Pacific albacore stock assessment models. Data 'review,' including preparation should be conducted for both the backward-simulation model (VPA-2BOX) and a forward-simulation model (SS2). The primary goal of this 'intersessional' Meeting is to make progress toward: (1) identifying 'strengths and weaknesses' of fishery-based data used in the models; and (2) 're-structuring' fisheries (both spatially and temporally) within SS2 based on similarities/differences between the fleets, in terms of catches, sizes of fish landed, and fishing success (CPUE). Ultimately, substantial time demands are required to prepare the overall input data files for each of the modeling efforts. In general, EPO fisheries contribute roughly 25% to the total annual catch of albacore in the North Pacific Ocean, i.e., in any given year, WPO fisheries contribute approximately 75% to the total landings (see below). In this context, it was noted that review topics should also reflect the preponderance of fishery data from WPO fleets and further, recognize that these data sources are likely the most influential in the overall population models—keeping in mind that the EPO-based USA troll fishery also provides important sample data in the North Pacific Ocean-wide model.

It was recommended that the overall review be structured on the basis of a ‘fishery/data source/model’ outline. Thus, in the EPO there would be: (1) three fisheries (USA/Canada troll, USA longline, and miscellaneous EPO fisheries); (2) three types (sources) of data (catch, catch/effort, and size (length, weight, etc.); and (3) two models (VPA-2BOX and SS2). Further, in efforts to develop a population model there are largely three primary ‘tiers’ of data, e.g., for the EPO fisheries: (1) ‘raw’ (electronic) data—catch records from PacFIN and WFOA, logbook data from commercial fleets (troll and longline), and size data from commercial fleets (troll and longline); and (2) initial phase, ‘summarized’ data (e.g., age-slicing matrices, particular growth-based models, GLMs for CPUE indices, etc.); and finally, (3) final phase, ‘input’ data that are included in the population model (e.g., weight-at-age, maturity, and mean length-distribution time series).

Also, a number of related (ongoing) data preparation issues were briefly addressed, including ‘length-to-age’ conversion techniques, ‘quarter vs. annual’ time steps, appropriate growth models, etc. It was concluded that considerable coordination will be needed following this data ‘review’ Meeting to assemble each of the input data files, given the objective of preparing base case configurations (both VPA-2BOX and SS2) before arriving in Shimizu later this year.

M. Stocker presented an update of the Canada troll fishery. The rationale for incorporating (raw) logbook data from the Canada fishery with analogous data from the USA troll fishery for purposes of standardizing in general linear models (GLMs) was discussed.

P. Crone presented a review of the USA fisheries. The usefulness of developing a standardized CPUE index from the relatively minor USA longline fishery was discussed. It was noted that CPUE indices developed from both the USA troll and longline fisheries should receive further research attention when time permits, i.e., likely during a year when no formal assessment is scheduled. Size and logbook data from the troll fishery prior to 1961 should not be used in population models, given concerns regarding the representativeness of this sample information.

3.0 Data review - Western Pacific Ocean (WPO) fisheries: (a) catch data; (b) size-/age-distribution data; and (c) CPUE data

K. Uosaki presented a review of the Japanese fisheries. Pole-and-line catch/effort data in the Working Group’s Database Catalog are recorded in successful days fished for the period 1955–71. Following 1971, the data are recorded in number of poles, i.e., related data exist to convert the effort statistics from 1955-70 to number of poles.

For the longline fleets, hooks-per-basket were used to standardize CPUE from 1975 to present. Prior to 1975, hooks-per-basket information does not exist, which likely precludes extending this index back earlier than the mid-1970s. It is important to note that size data from the longline fisheries prior to 1965 should not be used until this information receives further scrutiny, given current concerns regarding the representativeness of these data. Thus, given the magnitude of this fishery in the North Pacific Ocean it is not recommended that a population model extend back further than 1966.

H. H. Lee presented a summary of the Chinese-Taipei distant-water longline fishery in the North Pacific Ocean, along with a CPUE-related analysis. This large-scale longline fishery has been active in the Pacific Ocean since the late 1960s, with most vessels targeting albacore in the South Pacific Ocean and since 1995, some vessels (seasonally) targeting albacore in the North Pacific Ocean.

The primary objective of the CPUE study was to generate representative indices of relative abundance for the Chinese-Taipei longline fleet operating from 1995-04; this index is intended to be incorporated in future assessment models applicable to this species. The SATG agreed that the best available age-aggregated CPUE index from the study should be considered for inclusion all future assessment models.

4.0 Assessment-related decisions for the upcoming assessment

The SATG agreed that each of the topics below require resolution (to some degree) in order to meet the objectives of the upcoming assessment-based meeting in Shimizu (November 28 – December 5, 2006). Each topic lists a number of options that were discussed by the SATG, with those in bold-faced type representing the best option to use in the upcoming assessment..

(1) Length of the time period modeled in both the VPA-2BOX and SS2 models:

a. 1975-2005 – status quo.
b. 1952-2005.
c. 1961-2005.
d. 1966-2005.

Note: Given concerns above regarding Japan data prior to the mid-1960s, it was agreed that, where possible, particular time series should be extended back to 1966.

(2) Weight-length (W-L) relationships to be used (externally and internally) in assessment models (VPA-2BOX and SS2):

a. Suda and Warashina (1961) equation – status quo.
b. Watanabe et al. (2006) equation(s).
c. Situation-specific equations:

   i. **Use ‘Jan 1-’ and ‘SSB-specific’ W-L relationships if the SS2 model can accommodate multiple W-L relationships; otherwise use ‘Jan 1’ W-L for both the VPA and SS2 models.**
   ii. **Use quarter/area-specific W-L relationships to convert catch data collected in weight to catch estimates in number.**

Note: The SATG agreed that ‘i’ will likely result in a single (‘Jan 1’) W-L equation be used to determine biomass estimates within the model (i.e., SS2 can accommodate a single W-L equation). Further, concerning ‘ii,’ it was agreed that analysts should apply multiple W-L equations in a meaningful manner that will likely be fishery-specific. Finally, it was agreed that all new W-L equations that are applied in anyway to either of the two models (VPA-2BOX and SS2) must come from the suite of alternative relationships presented in Watanabe et al. (2006).

(3) Software to be used for producing projection-related estimates for both the VPA-2BOX and SS2 models:
   a. Conser and Crone (NPALB/02/05) – status quo.
   b. Ichinokawa’s projection software used for Pacific bluefin tuna.
   c. PRO-2BOX – VPA.
   d. SS2 (internal) projection – SS2.

(4) Calculation of ‘current F’ and ‘current selectivity’ from assessment model results (used for both projections and reference point estimation), which will inherently influence the characterization of the current ‘status of the stock’:
   a. Average F estimates from terminal year; average selectivity (geometric mean) algorithms used in previous assessment – status quo.
   b. Calculate ‘current selectivity’ and ‘current F’ as follows: drop 2005; average 2002-04 (geometric mean); start projections on January 1, 2005; replace R_{2005}; project known catch for 2005; project constant F for 2006, and beyond. Avoid using total B in current status discussion; instead use ‘exploited’ B, SSB, etc. Consider using ratios of F in management discussion (e.g., F_y relative F_{1966}, F_y relative F_{MSY_PROXY}).

(5) Use of tagging results as auxiliary data for abundance (or potentially, F) estimation (1971-89), i.e., not for parameterizing movement:
   a. Do not incorporate tagging data into the assessment model – status quo.
   b. Filter historical tagging data as suggested by Takeuchi and Ichinokawa (NPALB/04/15) and use as abundance index in the modeling.
   c. Do not use the tagging data this time (except qualitatively); consider for use in the next stock assessment.

(6) Index of abundance from the Chinese-Taipei longline fishery:

a. Do not use the newly available Chinese-Taipei CPUE data to develop an index of abundance – status quo.

b. Use the CPUE data in a GLM analysis to develop an index as suggested by H. H. Lee's presentation to the Task Group, including: update with 2005 data (if possible); consider the relevance of a 'year-area' interaction factor; use GLM with a 'species composition' factor or with a 'hooks-per-basket' factor—if the latter is used, the index values for 2001 and 2003 should be considered missing values.

(7) Use of CPUE data from the from the Japanese small-vessel longline fishery (ISC –ALBWG Task Group06/04):

a. Use only the JLL large-vessel CPUE to index abundance – status quo.

b. Incorporate both large- and small-vessel CPUE data into the standardized JLL index(s) of abundance and modify the status quo GLM analysis as follows:

i. Consider interactions such as year-area, year-month, etc. to the GLM.

ii. Sub-divide the previously-used large EPO Areas 10 and 12 into smaller areas in order to better reflect the shifts in JLL effort within the EPO.

iii. Compare results of: (1) separate GLM's for the periods 1966-93 and 1994-2005; and (2) a single GLM over the entire period (1966-2005). Select one of these two options for use in the assessment models.

(8) SS2 model development:

a. There is no status quo, given the SS2 model has not been used in any previous formal assessments.

b. Develop an SS2 configuration that (at least initially) is parsimonious and facilitates comparison with the assessment results from the previous stock assessment, as well as the new VPA model results that will serve as the base case model in Shimizu (November/December 2006.

i. In the development of a 'single' catch-at-age matrix from multiple (fishery-based) matrices (i.e., the VPA model), attempt to use similar fishery definitions as defined in the SS2 model, i.e., a base case model that is characterized by the newly-defined '15 fishery' spatial structure, see (10) and Table 2—this will facilitate identifying the causal effects when results differ between the two models. Finally, it was noted that this suggestion is applicable to some fisheries, but not for others, given the manner in which input data are prepared/treated currently for the two models.

ii. Where possible, develop CPUE indices for each of the newly-defined fisheries in a manner that allows for comparison to

past assessment models. Again, it was noted that this suggestion is applicable to some fisheries, but not for others, given the manner in which input data are prepared/treated currently in the two modeling approaches.

iii. **Initially, use annual CPUE indices for all fisheries to avoid 'seasonality' issues with catchability (q); check consistency of selectivity over seasons within a year; and finally, where applicable, accommodate 'seasonality' for fisheries (based on patterns observed in q or selectivity).**

iv. **Maximum age should be no more than age 12, given the current growth suppositions are not considered realistic beyond age 12.**

Note: The SATG noted that numerous other issues related to parameterization of the SS2 model will require further discussion as the development of the alternative model progresses in the future. In this context, it was agreed that assessment analysts strive to meet (b) above in initial base case configurations. Finally, see also (9).

(9) Fishery definitions in the SS2 model:

a. There is no status quo per se in that SS2 has not been used in any previous formal assessments; however, previous 'forward-simulation' models developed for this species (MULTIFAN-CL or MF-CL) presented a preliminary '23 fishery' spatial structure.

b. **Review the 23 fisheries, i.e., examine similarities/differences in sample data collected from these fisheries, including both size and CPUE data, then re-define fisheries:**
   i. **Retain MF-CL fisheries 1.**
   ii. **Retain MF-CL fishery 2 and estimate selectivity and catchability based on available size-distribution and CPUE data from this longline fishery.**
   iii. **Retain MF-CL fishery 3 and link selectivity and catchability to fishery 1 (USA/Canada Troll).**
   iv. **Reduce the number of Japan pole-and-line fisheries from 5 to 2 by: combining MF-CL fisheries 4 and 5; and MF-CL fisheries 6, 7, and 8.**
   v. **Reduce the number Japan 'large' longline fisheries from 6 to 3 by: combining MF-CL fisheries 9, 13, and 14; combining MF-CL fisheries 11 and 12; and retaining MF-CL fishery 10.**
   vi. **Reduce the number Japan 'small' longline fisheries from 4 to 3 by: combining MF-CL fisheries 16, 18, and 19; and retaining MF-CL fisheries 15 and 17.**
   vii. **Retain MF-CL fisheries 20, 21, and 23.**
   viii. **Retain MF-CL fishery 22 (Chinese Taipei, Korea, and Others) and link its selectivity to the newly created Japan longline fishery 11/12.**

Note: In summary, the spatial structure (fishery definition say) to be used in a forward-simulation, length-based/age-structured model (e.g., SS2) is best characterized by a '15 fishery' definition, which is a reduction from the '23 fishery' structure defined in earlier configurations (see Table 2).

(10) Work schedule: August – November 2006
The following table presents a general timeline for completing work assignments related to the upcoming assessment in November/December 2006. The table presents assignments ('what'), parties responsible ('who'), and deadlines ('when')work that shoulconcerning what assignments, who will In order to successfully complete the construction of population models (VPA-2BOX and SS2) for the 2006 albacore assessment the Group concluded that the following work needs to be completed in a timely fashion:

What	**Who**	**When?**
Document all changes to catch-at-age estimates and CPUE indices	VPA Task Group	By ISC ALBWG Meeting at end of November 2006
Effects of database and model changes on the results from the previous stock assessment	Modeling Task Groups	By ISC ALBWG Meeting at end of November 2006
Rerun W-L analysis based on revised US data	K. Watanabe	August 1, 2006
Data presented by Japan on length diagrams for pole and line and longline fisheries be either archived on the FTP site	K. Uosaki	By ISC ALBWG Meeting at end of November 2006
Prepare LF plots by quarter for new fisheries definitions	SS2 Task Group	By ISC ALBWG Meeting at end of November 2006
Develop abundance index from tagging data (not use in this coming 2006 assessment)	Japan	By ISC ALBWG Meeting at end of November 2006
SS2 model parameterization issues: 1) Assign quarter when smallest fish enter fishery 2) Estimate or fix growth 3) S-R relationship: steepness, variance, etc. 4) Develop length frequencies for the new fishery definitions	SS2 Task Group	By ISC ALBWG Meeting at end of November 2006

Develop age-aggregated and age-specific (where possible) CPUE indices for new fishery definitions: 1) USA/Can TL, 2) USA LL, 3) Japan PL, 4) Japan LL, 5) Chinese-Taipei LL	US, Japan, Chinese-Taipei	September 2006
Develop catch-at-age matrices (where possible) for new fishery definitions: 1)US/Can troll, 2) US LL, 3) Japan PL, 4) Japan LL, 5) Chinese-Taipei LL	US, Japan, Chinese-Taipei	September 2006
Baseline VPA	VPA Task Group	By ISC ALBWG Meeting at end of November 2006
Baseline SS2	SS2 Task Group	By ISC ALBWG Meeting at end of November 2006

Table 1. North Pacific albacore catches (in metric tons) by fisheries, 1952-2005[1]. Blank indicates no effort. -- indicates data not available. 0 indicates less than 1 metric ton. Provisional estimates in ().

YEAR	CANADA		JAPAN						KOREA		MEXICO
	TROLL	PURSE SEINE	GILL NET	LONG LINE	POLE & LINE	PURSE SEINE	TROLL	UNSP. GEAR	GILL NET	LONG LINE	UNSP. GEAR
1952	71			26,687	41,787	154		237			
1953	5			27,777	32,921	38		132			
1954				20,958	28,069	23		38			
1955				16,277	24,236	8		136			
1956	17			14,341	42,810			57			
1957	8			21,053	49,500	83		151			
1958	74			18,432	22,175	8		124			
1959	212			15,802	14,252			67			
1960	5	136		17,369	25,156			76			
1961	4			17,437	18,639	7		268			0
1962	1			15,764	8,729	53		191			0
1963	5			13,464	26,420	59		218			0
1964	3			15,458	23,858	128		319			0
1965	15			13,701	41,491	11		121			0
1966	44			25,050	22,830	111		585			0
1967	161			28,869	30,481	89		520			
1968	1,028			23,961	16,597	267		1,109			
1969	1,365			18,006	31,912	521		935			0
1970	390			16,283	24,263	317		456			0
1971	1,746			11,524	52,957	902		308			0
1972	3,921		1	13,043	60,569	277		623			100
1973	1,400		39	16,795	68,767	1,353		495			0
1974	1,331		224	13,409	73,564	161		879			1
1975	111		166	10,318	52,152	159		228		2,463	1
1976	278		1,070	15,825	85,336	1,109		272		859	36
1977	53		688	15,696	31,934	669		355		792	0
1978	23		4,029	13,023	59,877	1,115		2,078		228	1
1979	521		2,856	14,215	44,662	125		1,126	0	259	1
1980	212		2,986	14,689	46,742	329		1,179	6	597	31
1981	200		10,348	17,922	27,426	252		663	16	459	8
1982	104		12,511	16,767	29,614	561		440	113	387	7
1983	225		6,852	15,097	21,098	350		118	233	454	33
1984	50		8,988	15,060	26,013	3,380		511	516	136	113
1985	56		11,204	14,351	20,714	1,533		305	576	291	49
1986	30		7,813	12,928	16,096	1,542		626	726	241	3
1987	104		6,698	14,702	19,082	1,205		155	817	549	7
1988	155		9,074	14,731	6,216	1,208		134	1,016	409	15
1989	140		7,437	13,104	8,629	2,521		393	1,023	150	2
1990	302		6,064	15,789	8,532	1,995		249	1,016	6	2
1991	139		3,401	17,046	7,103	2,652		392	852	3	2
1992	363		2,721	19,049	13,888	4,104		1,527	271	(15)	10
1993	494		287	29,966	12,797	2,889		867		(32)	11
1994	1,998		263	29,600	26,389	2,026		799		(45)	6
1995	1,720		282	29,075	20,981	1,177	856	81		440	5
1996	3,591		116	32,493	20,272	581	815	117		333	21
1997	2,433		359	38,950	32,238	1,068	1,585	123		319	53
1998	4,188		206	35,813	22,926	1,554	1,190	88		(288)	8
1999	2,641		289	33,365	50,369	6,872	891	127		107	23
2000	4,465		67	30,046	21,549	2,408	645	171		414	79
2001	4,985		117	28,818	29,430	974	416	96		82	22
2002	5,022		332	23,641	48,454	3,303	787	135		(113)	28
2003	6,735		126	20,918	36,114	627	922	106	(0)	(144)	29
2004	(7,842)		61	17,549	32,255	7200	(772)	(65)	(0)	(68)	(106)
2005	(4,810)		(61)	(17,549)	(16,883)	(859)	(772)	(65)	(0)	(520)	(0)

[1] Data are from the 1st ISC Albacore Working Group, November 28 - December 2, 2005 except as noted.

Table 1. Continued

YEAR	TAIWAN GILL NET	TAIWAN LONG LINE[2]	U.S. POLE & LINE	U.S. GILL NET	U.S. LONG LINE	U.S. PURSE SEINE	U.S. SPORT	U.S. TROLL	U.S. UNSP. GEAR	OTHERS LONG LINE[3]	OTHERS TROLL	GRAND TOTAL
1952					46		1,373	23,843				94,198
1953					23		171	15,740				76,807
1954					13		147	12,246				61,494
1955					9		577	13,264				54,507
1956					6		482	18,751				76,464
1957					4		304	21,165				92,268
1958					7		48	14,855				55,723
1959					5		0	20,990	0			51,328
1960					4		557	20,100	0			63,403
1961			2,837		5		1,355	12,055	1			52,608
1962			1,085		7		1,681	19,752	1			47,264
1963			2,432		7		1,161	25,140	0			68,906
1964			3,411		4		824	18,388	0			62,393
1965			417		3		731	16,542	0			73,032
1966			1,600		8		588	15,333	1			66,150
1967		330	4,113		12		707	17,814	0			83,096
1968		216	4,906		11		951	20,434	0			69,480
1969		65	2,996		14		358	18,827	0			74,999
1970		34	4,416		9		822	21,032	0			68,022
1971		20	2,071		11		1,175	20,526	0			91,240
1972		187	3,750		8		637	23,600	0			106,717
1973		--	2,236		14		84	15,653	0			106,836
1974		486	4,777		9		94	20,178	0			115,113
1975		1,240	3,243		33		640	18,932	10			89,696
1976		686	2,700		23		713	15,905	4			124,816
1977		572	1,497		37		537	9,969	0			62,799
1978		6	950		54		810	16,613	15			98,822
1979		81	303		--		74	6,781	0			71,004
1980	--	249	382		--		168	7,556	0			75,126
1981	--	143	748		25		195	12,637	0			71,042
1982	--	38	425		105		257	6,609	21			67,960
1983	--	8	607		6		87	9,359	0			54,527
1984	--	--	1,030		2	3,728	1,427	9,304	0			70,258
1985	--	--	1,498	2	0		1,176	6,415	0			58,170
1986	--	--	432	3			196	4,708	0			45,344
1987	2,514	--	158	5	150		74	2,766	0			48,986
1988	7,389	--	598	15	308		64	4,212	10			45,554
1989	8,350	40	54	4	249		160	1,860	23			44,140
1990	16,701	4	115	29	177	71	24	2,603	4			53,683
1991	3,398	12	0	17	313	0	6	1,845	71			37,253
1992	7,866	--	0	0	337	0	2	4,572	72			(54,796)
1993		5	0	0	440		25	6,254	0			(54,067)
1994		83	0	38	546		106	10,978	213		158	(73,248)
1995		4,280	80	52	883		102	8,045	1		137	68,197
1996		7,596	24	83	1,187	11	88	16,938	0	1,735	505	86,506
1997		9,119	73	60	1,652	2	1,018	14,252	1	2,824	404	106,533
1998		8,617	79	80	1,120	33	1,208	14,410	2	5,871	286	(97,967)
1999		8,186	60	149	1,540	48	3,621	10,060	1	6,307	261	124,917
2000		8,842	69	55	940	4	1,798	9,645	3	3,654	490	85,343
2001		8,684	139	94	1,295	51	1,635	11,210	0	1,471	127	89,647
2002		7,965	381	30	525	4	2,357	10,387		700	(127)	(104,292)
2003		7,166	59	16	524	44	2,214	14,102	0	(2,400)	(127)	(92,374)
2004		(4,988)	(126)	(12)	(356)	(1)	(1,506)	(13,432)	(0)	(2,400)	(127)	(88,867)
2005		(4,687)	(66)	(20)	(277)	(2)	(1,719)	(9,122)	(0)	(2,400)	(127)	(59,939)

[2] Catches for 2000-2004 contain estimates of offshore longline catches from vessels landing at domestic ports

[3] Other longline catches from vessels flying flags of convenience being called back to Taiwan. The catches may be duplicated in Taiwan longline catches (November 2005).

Table 2. Independent old and new fisheries definitions used in the SS2 model 2006

MODEL SCENARIO	FISHERY	FISHERY DESCRIPTIONS	FISHERY BOUNDARIES	CATCH DATA	BIOLOGICAL DATA	EFFORT DATA	ASSUMPTIONS
23 Fisheries	1	*USA/Canada troll*	0-55°N latitude by 120°W-180° longitude	Yes (1975-05)	Yes (1975-05)	Yes (1975-05) - Std.	Major Fishery
'Old' fishery definitions	2	*USA longline*	0-55°N latitude by 120°W-180° longitude	Yes (1975-05)	Yes (1994-05)	Yes (1991-05) - Std.	Major Fishery
	3	*EPO miscellaneous*	0-55°N latitude by 120°W-180° longitude				Major Fishery - similar to Major Fishery 1
		USA pole-and-line		Yes (1975-05)	No	No	Minor Fishery - similar to Major Fishery 1
		USA purse seine		Yes (1975-05)	No	No	Minor Fishery - similar to Major Fishery 1
		USA gill net		Yes (1975-05)	No	No	Minor Fishery - similar to Major Fishery 1
		USA recreational		Yes (1975-05)	No	No	Minor Fishery - similar to Major Fishery 1
		USA unspecified		Yes (1975-05)	No	No	Minor Fishery - similar to Major Fishery 1
		Mexico unspecified		Yes (1975-05)	No	No	Minor Fishery - similar to Major Fishery 1
		Others troll		Yes (1975-05)	No	No	Minor Fishery - similar to Major Fishery 1
	4	*Japan pole-and-line*	30-35°N latitude by 130-140°E longitude	Yes (1975-05)	Yes (1975-05)	Yes (1975-05) - Std.	Major Fishery
	5	*Japan pole-and-line*	25-30°N latitude by 130-150°E longitude	Yes (1975-05)	Yes (1975-05)	Yes (1975-05) - Std.	Major Fishery
	6	*Japan pole-and-line*	30-35°N latitude by 140-150°E longitude and 25-35°N latitude by 150-160°E longitude	Yes (1975-05)	Yes (1975-05)	Yes (1975-05) - Std.	Major Fishery
	7	*Japan pole-and-line*	35-45°N latitude by 140-160°E longitude	Yes (1975-05)	Yes (1975-05)	Yes (1975-05) - Std.	Major Fishery
	8	*Japan pole-and-line*	25-45°N latitude by 160°E-180° longitude	Yes (1975-05)	Yes (1975-05)	Yes (1975-05) - Std.	Major Fishery
	9	*Japan longline-large (distant-water/offshore)*	30-40°N latitude by 140°E-180° longitude and 25-30°N latitude by 150°E -180° longitude	Yes (1975-05)	Yes (1975-05)	Yes (1975-05) - Std.	Major Fishery
	10	*Japan longline-large (distant-water/offshore)*	25-40°N latitude by 120°W-180° longitude	Yes (1975-05)	Yes (1975-05)	Yes (1975-05) - Std.	Major Fishery
	11	*Japan longline-large (distant-water/offshore)*	10-25°N latitude by 120°E-180° longitude	Yes (1975-05)	Yes (1975-05)	Yes (1975-05) - Std.	Major Fishery
	12	*Japan longline-large (distant-water/offshore)*	10-25°N latitude by 120°W-180° longitude	Yes (1975-05)	Yes (1975-05)	Yes (1975-05) - Std.	Major Fishery
	13	*Japan longline-large (distant-water/offshore)*	25-35°N latitude by 120-140°E longitude	Yes (1975-05)	Yes (1975-05)	Yes (1975-05) - Std.	Major Fishery
	14	*Japan longline-large (distant-water/offshore)*	25-30°N latitude by 140-150°E longitude	Yes (1975-05)	Yes (1975-05)	Yes (1975-05) - Std.	Major Fishery
	15	*Japan longline -small (Fisheries 16-19) - 1975-93*	10-35°N latitude by 120-160°E longitude and 35-40°N latitude by 140-160°E longitude	Yes (1975-93)	No	No	Major Fishery
	16	*Japan longline -small (coastal-misc.) - 1994-03*	30-40°N latitude by 140-160°E longitude and 25-30°N latitude by 150-160°E longitude	Yes (1994-05)	Yes (1994-05)	Yes (1994-05) - Nom.	Major Fishery
	17	*Japan longline -small (coastal-misc.) - 1994-03*	10-25°N latitude by 120-160°E longitude	Yes (1994-05)	Yes (1994-05)	Yes (1994-05) - Nom.	Major Fishery
	18	*Japan longline -small (coastal-misc.) - 1994-03*	25-35°N latitude by 120-140°E longitude	Yes (1994-05)	Yes (1994-05)	Yes (1994-05) - Nom.	Major Fishery
	19	*Japan longline -small (coastal-misc.) - 1994-03*	25-30°N latitude by 140-150°E longitude	Yes (1994-05)	Yes (1994-05)	Yes (1994-05) - Nom.	Major Fishery
	20	*Japan gill net*	0-55°N latitude by 120°E-180° longitude	Yes (1975-05)	Yes (1990-91)	No	Major Fishery
	21	*Japan miscellaneous*	0-55°N latitude by 120°E-180° longitude				Major Fishery - similar to Major Fishery 7 and 20
		Japan purse seine		Yes (1975-05)	No	No	Minor Fishery - similar to Major Fishery 7 and 20
		Japan troll		Yes (1975-05)	No	No	Minor Fishery - similar to Major Fishery 7 and 20
		Japan unspecified		Yes (1975-05)	No	No	Minor Fishery - similar to Major Fishery 7 and 20
	22	*Taiwan, Korea, and Others longline*	0-55°N latitude by 120°E-180° longitude	Yes (1975-05)	No	No	Major Fishery - similar to Major Fishery 2 and 12
	23	*Taiwan and Korea gill net*	0-55°N latitude by 120°E-180° longitude	Yes (1980-92)	No	No	Major Fishery - similar to Major Fishery 20
15 Fisheries	1	*USA/Canada troll*	0-55°N latitude by 120°W-180° longitude - *Old Fishery 1*	Yes (1966-05)	Yes (1966-05)	Yes (1966-05) - Std.	Major Fishery
'New' fishery definitions	2	*USA longline*	0-55°N latitude by 120°W-180° longitude - *Old Fishery 2*	Yes (1966-05)	Yes (1994-05)	Yes (1991-05) - Std.	Major Fishery
	3	*EPO miscellaneous*	0-55°N latitude by 120°W-180° longitude - *Old Fishery 3*				Major Fishery - similar to Major Fishery 1
		USA pole-and-line		Yes (1966-05)	No	No	Minor Fishery
		USA purse seine		Yes (1966-05)	No	No	Minor Fishery
		USA gill net		Yes (1966-05)	No	No	Minor Fishery
		USA recreational		Yes (1966-05)	No	No	Minor Fishery
		USA unspecified		Yes (1966-05)	No	No	Minor Fishery
		Mexico unspecified		Yes (1966-05)	No	No	Minor Fishery
		Others troll		Yes (1966-05)	No	No	Minor Fishery
	4	*Japan pole-and-line*	25-35°N latitude by 130-140°E longitude / 25-30°N latitude by 140-150°E longitude- *Old Fisheries 4 and 5*	Yes (1966-05)	Yes (1966-05)	Yes (1966-05) - Std.	Major Fishery
	5	*Japan pole-and-line*	30-45°N latitude by 140-150°E longitude / 25-45°N latitude by 150°E-180° longitude- Old Fisheries 4 and 5 - *Old Fisheries 6, 7, and 8*	Yes (1966-05)	Yes (1966-05)	Yes (1966-05) - Std.	Major Fishery
	6	*Japan longline-large (distant-water/offshore)*	25-40°N latitude by 120°W-180° longitude - *Old Fishery 10*	Yes (1966-05)	Yes (1966-05)	Yes (1966-05) - Std.	Major Fishery
	7	*Japan longline-large (distant-water/offshore)*	10-25°N latitude by 120°E-120°W longitude - *Old Fisheries 11 and 12*	Yes (1966-05)	Yes (1966-05)	Yes (1966-05) - Std.	Major Fishery
	8	*Japan longline-large (distant-water/offshore)*	25-40°N latitude by 120°E-180° longitude - *Old Fisheries 9, 13, and 14*	Yes (1966-05)	Yes (1966-05)	Yes (1966-05) - Std.	Major Fishery
	9	*Japan longline -small (Fisheries 10-11) - 1966-93*	10-40°N latitude by 120-160°E longitude - *Old Fishery 15*	Yes (1966-93)	No	No	Major Fishery
	10	*Japan longline -small (coastal-misc.) - 1994-05*	25-40°N latitude by 120-160°E longitude - *Old Fisheries 16, 18, and 19*	Yes (1994-05)	Yes (1994-05)	Yes (1994-05) - Nom.	Major Fishery
	11	*Japan longline -small (coastal-misc.) - 1994-05*	10-25°N latitude by 120-160°E longitude - *Old Fishery 17*	Yes (1994-05)	Yes (1994-05)	Yes (1994-05) - Nom.	Major Fishery
	12	*Japan gill net*	0-55°N latitude by 120°E-180° longitude - *Old Fishery 20*	Yes (1975-05)	Yes (1990-91)	No	Major Fishery
	13	*Japan miscellaneous*	0-55°N latitude by 120°E-180° longitude - *Old Fishery 21*				Major Fishery
		Japan purse seine		Yes (1966-05)	No	No	Minor Fishery
		Japan troll		Yes (1966-05)	No	No	Minor Fishery
		Japan unspecified		Yes (1966-05)	No	No	Minor Fishery
	14	*Taiwan, Korea, and Others longline*	0-55°N latitude by 120°E-180° longitude - *Old Fishery 22* (for selectivity issues, link to *New Fishery 7*)	Yes (1966-05)	No	Yes (1995-05) - Std.	Major Fishery - similar to Major Fishery 7 and 2
	15	*Taiwan gill net*	0-55°N latitude by 120°E-180° longitude - *Old Fishery 23*	Yes (1987-92)	Yes (1988-90)	No	Major Fishery
		Korea gill net		Yes (1980-92)	No	No	Minor Fishery - similar to Major Fishery 15

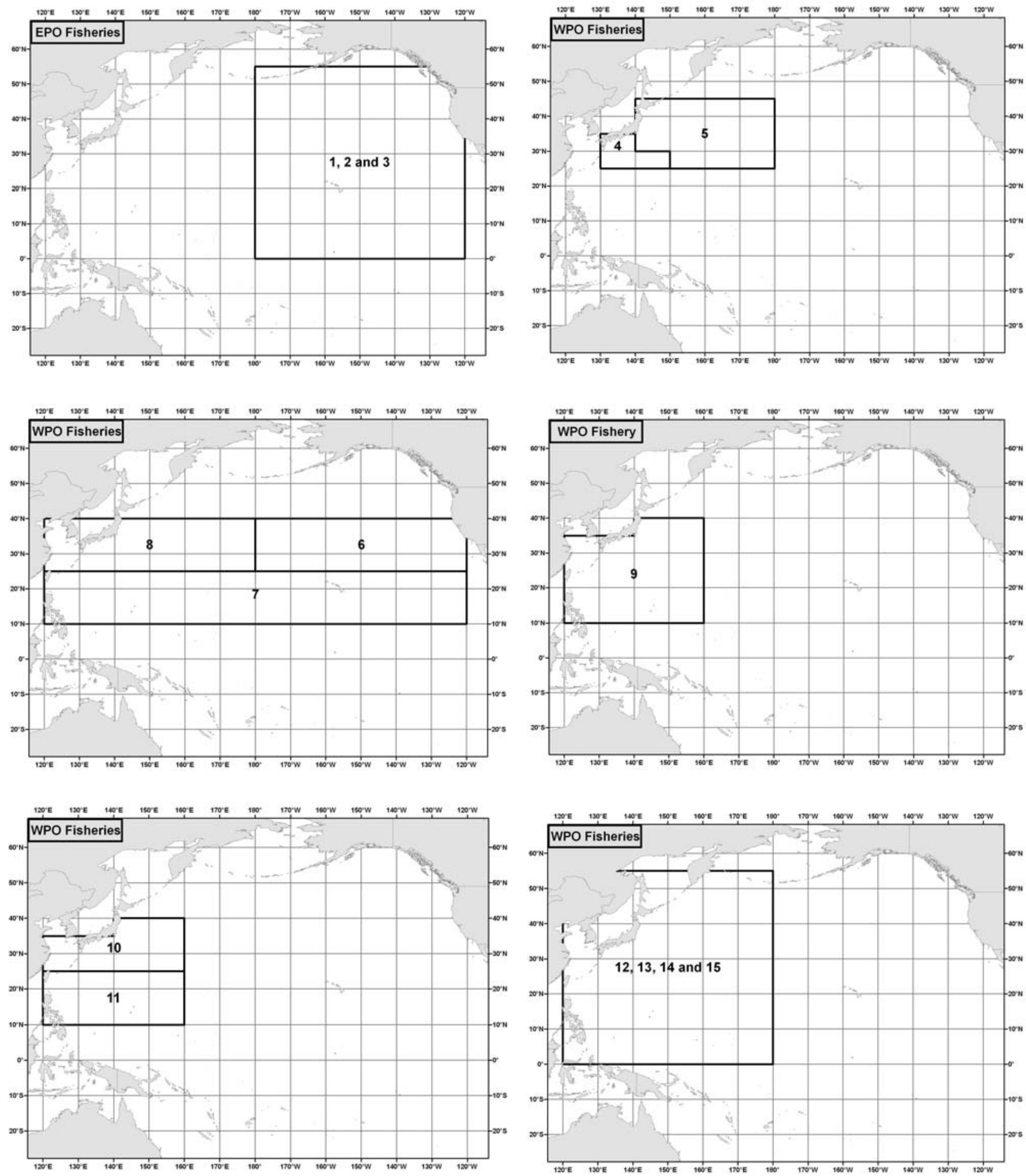


Figure 1. Independent Fisheries defined in the SS2 model (2006). Eastern Pacific Ocean-based (EPO) Fisheries include: (1) USA/Canada troll; (2) USA longline; and (3) EPO miscellaneous. Western Pacific Ocean-based (EPO) Fisheries include: (4-5) Japan pole-and-line; (6-8) Japan 'large' (offshore) longline; (9-11) Japan 'small' (coastal) longline, with Fishery 9 defined as a temporal stratification of Fisheries 10-11, i.e., within the same spatial boundaries, Fishery 9 spanned from 1966-93 and Fisheries 10-11 from 1994-present; (12) Japan gill net; (13) Japan miscellaneous; (14) Chinese Taipei, S. Korea, and 'Others' longline; and (15) Chinese Taipei and S. Korea gill net.

ATACHMENT 1. List of Participants

Canada
Max Stocker (chair)
Fisheries and Oceans Canada, Pacific Biological Station
3190 Hammond Bay Road, Nanaimo, B.C., Canada V9T 6N7
Phone: 250-758-0275, Fax: 250-756-7053, E-mail: StockerM@pac.dfo-mpo.gc.ca

Chinese-Taipei
Chien-Chung Hsu
Institute of Oceanography, National Taiwan University, P.O. Box 23-13
Taipei, Taiwan 106
Phone: 886-2-2362-2987, 886-2-3366-1198, Fax: 886-2-2366-1198,
E-mail:hsucc@ntu.edu.tw

Hui-Hua Lee
Institute of Oceanography, National Taiwan University, P.O. Box 23-13
Taipei, Taiwan 106
Phone: 886-2-2362-2987, Fax: 886-2-2366-1198, E-mail: d91241003@ntu.edu.tw

Japan
Momoko Ichinokawa
National Research Institute of Far Seas Fisheries, 5-7-1, Orido, Shimizu-ku, Shizuoka
424-8633 Japan
Phone: 81-543-36-6039, Fax: 81-543-35-9642, E-mail: ichimomo@fra.affrc.go.jp

Yukio Takeuchi
National Research Institute of Far Seas Fisheries, 5-7-1, Orido, Shimizu-ku, Shizuoka
424-8633 Japan
Phone: 81-543-36-6039, Fax: 81-543-35-9642, E-mail: yukiot@fra.affrc.go.jp

Koji Uosaki
National Research Institute of Far Seas Fisheries, 5-7-1, Orido, Shimizu-ku, Shizuoka
424-8633 Japan
Phone: 81-543-36-6036, Fax: 81-543-35-9642, E-mail: uosaki@affrc.go.jp

Kyuji Watanabe
National Research Institute of Far Seas Fisheries, 5-7-1, Orido, Shimizu-ku, Shizuoka
424-8633 Japan
Phone: 81-543-36-6037, Fax: 81-543-35-9642, E-mail: watanabk@fra.affrc.go.jp

United States
Atilio L. Coan Jr.
NOAA Fisheries, Southwest Fisheries Science Center, 8604 La Jolla Shores Drive
La Jolla, CA 92037, U.S.A.
Phone: 858-546-7079, Fax: 858-546-5653, E-mail: Al.Coan@noaa.gov

Ray Conser
NOAA Fisheries, Southwest Fisheries Science Center, 8604 La Jolla Shores Drive
La Jolla, CA 92037, U.S.A.
Phone: 858-546-5688, Fax: 858-546-5656, E-mail: Ray.Conser@noaa.gov

Paul R. Crone
NOAA Fisheries, Southwest Fisheries Science Center, 8604 La Jolla Shores Drive
La Jolla, CA 92037, U.S.A.
Phone: 858-546-7069, Fax: 858-546-5653, E-mail: Paul.Crone@noaa.gov

Emmanis Dorval
NOAA Fisheries, Southwest Fisheries Science Center, 8604 La Jolla Shores Drive
La Jolla, CA 92037, U.S.A.
Phone: 858-546-5619, Fax: 858-546-5656, E-mail: Emmanis.Dorval@noaa.gov

ATTACHMENT 2. List of Documents

ISC-ALBWG Task Group/06/01: Review of Japanese fisheries and Biological data to develop longer time series for albacore stock assessment - Koji Uosaki

ISC-ALBWG Task Group/06/02: Practical solutions of application issues of length-weight relationship for the North Pacific albacore with respect to the stock assessment – K. Watanabe and K. Uosaki

ISC-ALBWG Task Group/06/03: Introduction of the operational model for evaluating stock assessment models applied to oceanic tuna-like species - Momoko Ichinokawa & Yukio Takeuchi

ISC-ALBWG Task Group/06/04: Newly available data of Japanese small longline: examination of its availability for standardizing North Pacific albacore CPUE - Momoko Ichinokawa, Yukio Takeuchi & Koji Uosaki

ISC-ALBWG Task Group/06/05: How to select the future north Pacific albacore stock assessment model – Yukio Takeuchi

ATTACHMENT 3. Meeting Agenda

STOCK ASSESSMENT TASK GROUP MEETING OF THE INTERNATIONAL SCIENTIFIC COMMITTEE-ALBACORE WORKING GROUP (2006)

July 13-17, 2006
Nanaimo, British Columbia, Canada

Agenda

Objectives:

- Data preparation work for the assessment meeting in November/December 2006
- Making decisions about model parameterization for the VPA-2Box and SS2 assessment models
- Conduct preliminary base case VPA-2Box and SS2 assessments
- Provide sufficient model diagnostics for review at the November 28-December 5, 2006 meeting

Opening

- Welcome
- Orientation
- Approval of Agenda

Data review: Eastern Pacific Ocean (EPO) fisheries

- Surface fisheries
    - USA
        1. Troll
        2. Miscellaneous (pole-and-line, gill net fishery, purse seine, recreational, unspecified)
    - Canada
        1. Troll
    - Mexico
        1. Unspecified
- Sub-surface (longline) fisheries
    - USA
        1. Longline
    - 'Others'
        1. Troll (Belize, Tonga, Ecuador, etc.)

Data review: Western Pacific Ocean (WPO) fisheries

- Surface fisheries
    - Japan
        1. Pole-and-line
        2. Gill net
        3. Miscellaneous (troll, purse seine, unspecified)
    - Korea

        1. Gill net
    - Chinese Taipei
        1. Gill net

- Sub-surface (longline) fisheries
    - Japan
        1. Longline
            a. 'Large' (distant-water)
            b. 'Small' (coastal)
    - Korea
        1. Longline
    - Chinese Taipei
        1. Longline
    - "Others"
        1. Longline (believed to be mostly Chinese Taipei)

Preliminary baseline model development: considerations

- Work that should be completed prior to the next ISC-ALBWG Meeting, including, preparing both the SS2 and VPA-2BOX baseline models and decisions concerning how best to identify a preferred model scenario for providing management-related advice
- Length of time series included in the population models, i.e., extend back prior to 1975?
- Parameterization of growth models 'within' the overall population model, including, maturity, weight-length, size-at-age, *M*?
- Age and/or length distributions, i.e., can time series be improved further?
- Indices of abundance: prioritizing, age-aggregated/age-specific, annual/quarter time steps?

Pacific Fishery Management Council

7700 NE Ambassador Place, Suite 101, Portland, OR 97220-1384
Phone 503-820-2280 | Toll free 866-806-7204 | Fax 503-820-2299 | www.pcouncil.org

April 27, 2007

Mr. Bill Robinson, Regional Administrator
Pacific Islands Region
1601 Kapiolani Blvd., Ste 1110
Honolulu, HI 96814-4700

Dear Mr. Robinson:

With the implementation of the Pacific Fishery Management Council's (Council's) Fishery Management Plan (FMP) for U.S. West Coast Fisheries for Highly Migratory Species (HMS) and §503(a) of the Western and Central Pacific Fisheries Convention Implementation Act, we must become more involved in the activities of the Western and Central Pacific Commission (WCPFC). The troll fishery for North Pacific albacore is the largest fishery we manage under our HMS FMP and a significant component of the stock occurs in waters west of 150° W longitude and under the jurisdiction of the WCPFC. As you know, the Convention establishes a Northern Committee to make recommendations to the Commission on the implementation of conservation and management measures for the area north of the 20° N latitude and for stocks which occur mostly in this area. Thus, participation in the annual meetings of the Northern Committee is of especial interest to us, because it is in that venue where detailed consideration of measures related to North Pacific albacore will occur. However, we note with dismay that in 2007, the Northern Committee meeting is scheduled for September 11–13, which coincides with our September 9–14 Council meeting, thus precluding meaningful participation by advisors, staff, or members of the Council. As the principal NMFS member of the U.S. delegation to the WCPFC, we ask you to request the WCPFC to reschedule the Northern Committee meeting to a time in October. I realize that rescheduling the 2007 meeting may not be possible at this time.

However, even if this year's meeting cannot be rescheduled, we request you make every effort to ensure that Northern Committee meetings in 2008 and beyond are not scheduled to conflict with our September Council meeting. Our current preference would be that they be scheduled for the mid-month of October. We schedule Council meetings several years in advance and the meetings occur during the same general time periods each year. I am enclosing the current schedule of Council meetings, through 2010.

We appreciate you attention to this important matter.

Sincerely,

D. O. McIsaac, Ph.D.
Executive Director

KRD:rdd

Enclosure (1): Council Meeting Schedule

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Pacific Islands Regional Office
1601 Kapiolani Blvd., Suite 1110
Honolulu, Hawaii 96814-4733
(808) 944-2200 • Fax: (808) 973-2941

June 12, 2007

D.O. McIsaac, PhD, Executive Director
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 101
Portland, OR 97220-1384

Dear ~~Dr. McIsaac~~, Don

Thank you for your letter of April 27, 2007, regarding the timing of the meetings of the Western and Central Pacific Fisheries Commission's Northern Committee. I recognize that the deliberations of the Northern Committee are especially important to the Pacific Fishery Management Council and its constituents and I agree that it is crucial that one or more representatives of the Council be able to participate in the Committee's meetings. In order to facilitate such participation, I will do my best to see that future meetings of the Northern Committee do not conflict with the meetings of the Council. However, as I am sure you can appreciate, it may be difficult to identify meeting dates that are agreeable to all the members of the Northern Committee, as well as all the members of the U.S. delegation. As far as this year's meeting of the Northern Committee, set for September 11-13, I am afraid it is too late to ask the Committee to consider changing the dates, as its members agreed to it some time ago. I am hopeful, however, that even if the Council's participation in the meeting itself is limited, the Council and its staff will be able to provide meaningful input to the U.S. delegation.

Sincerely,

William L. Robinson
Regional Administrator

cc: Rodney McInnis, SWRO
William Gibbons-Fly, Department of State

Agenda Item F.4.b
SWFSC PowerPoint
September 2007

North Pacific Albacore Stock Status and Conservation Advice

Report of the ISC – Albacore Working Group Stock Assessment Workshop (2006)

P. R. Crone
NOAA Fisheries
Southwest Fisheries Science Center
8604 La Jolla Shores Drive
La Jolla, CA 92037
USA

Presentation Outline

- Working Group history

- Stock assessment (2006)
  - Fishery-related ‘statistics’
  - Model
  - Input data
  - Analysis (Results)
  - Conclusions

ISC – Albacore Working Group

- Began informally in mid-1970s … *North Pacific Albacore Workshop*
- Several nations/institutions ‘participate’
  - USA, Canada, and Mexico (EPO)
  - Japan, Taiwan, and S. Korea (WPO)
  - IATTC and SPC
- For the most part, first ‘reviewed’ assessment was in 2001
- Some collaborative research studies, but mostly independently conducted ‘albacore’ projects, e.g., …

Fishery-related Statistics

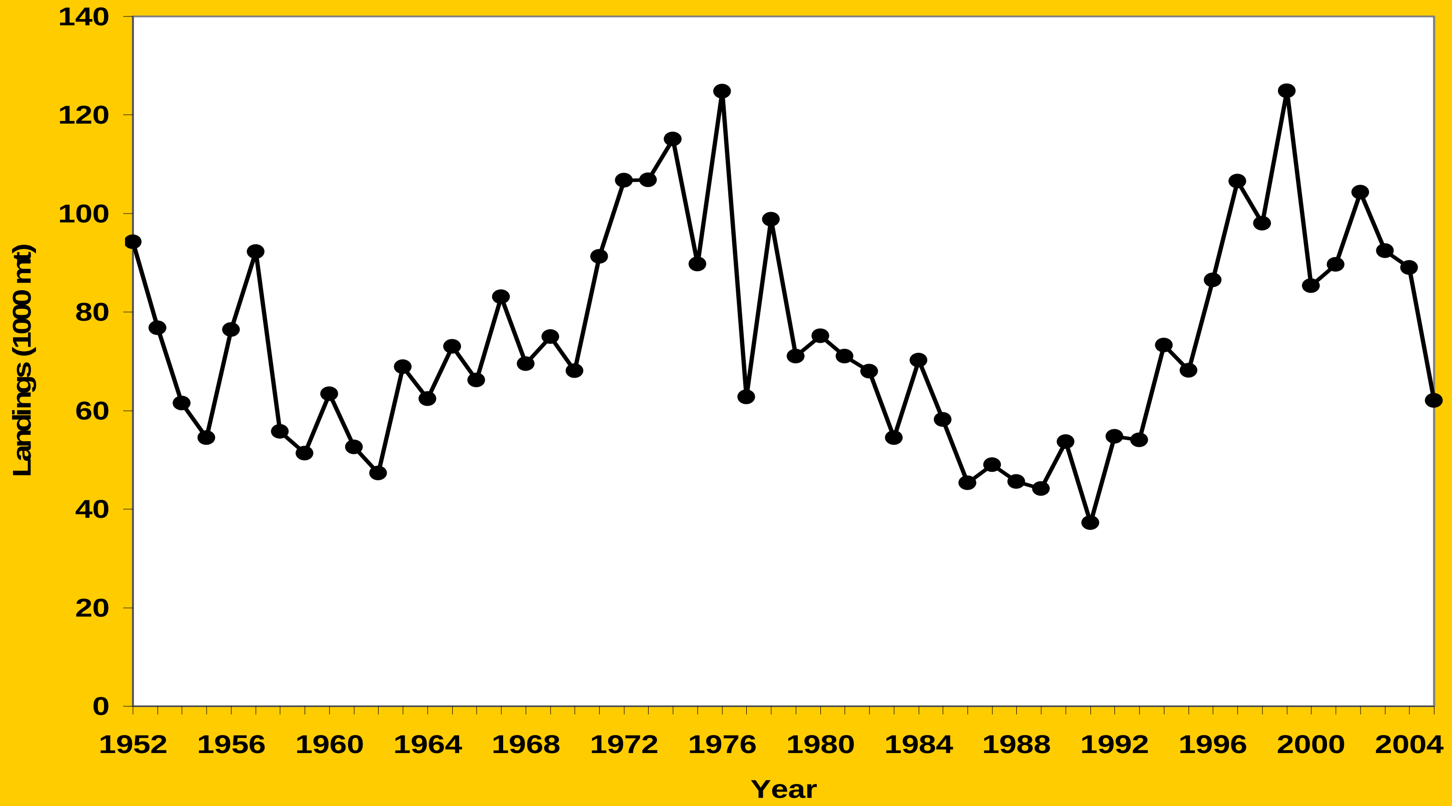
Sampling Programs (Data Base Catalog)

- Category I – Total landings (round weight, mt) and total nominal effort in number of active vessels

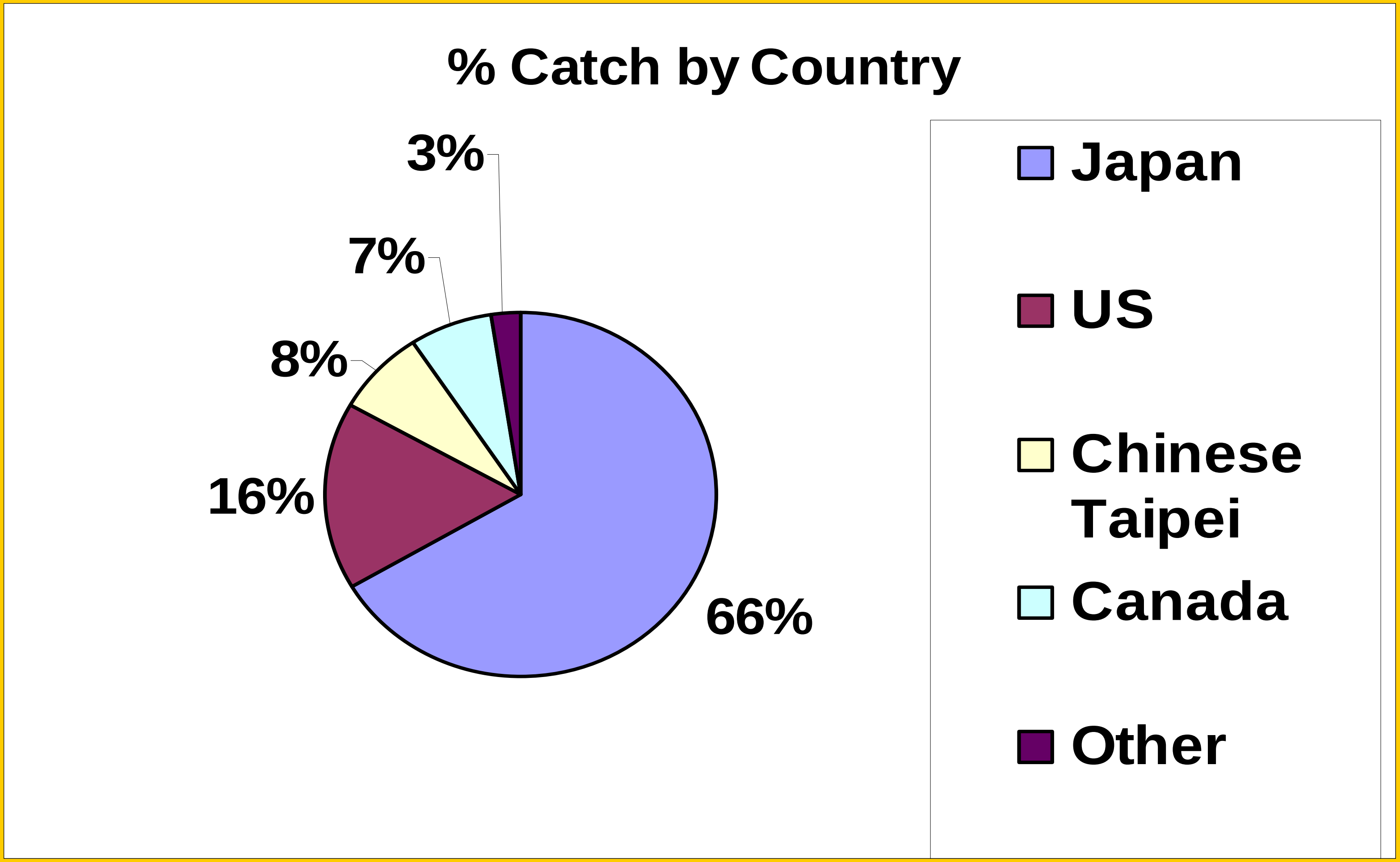
- Category II – Catch and nominal effort data from logbooks (5°×5° area for longline data and 1°×1° for other fisheries)

- Category III – Size composition (length or weight distributions)

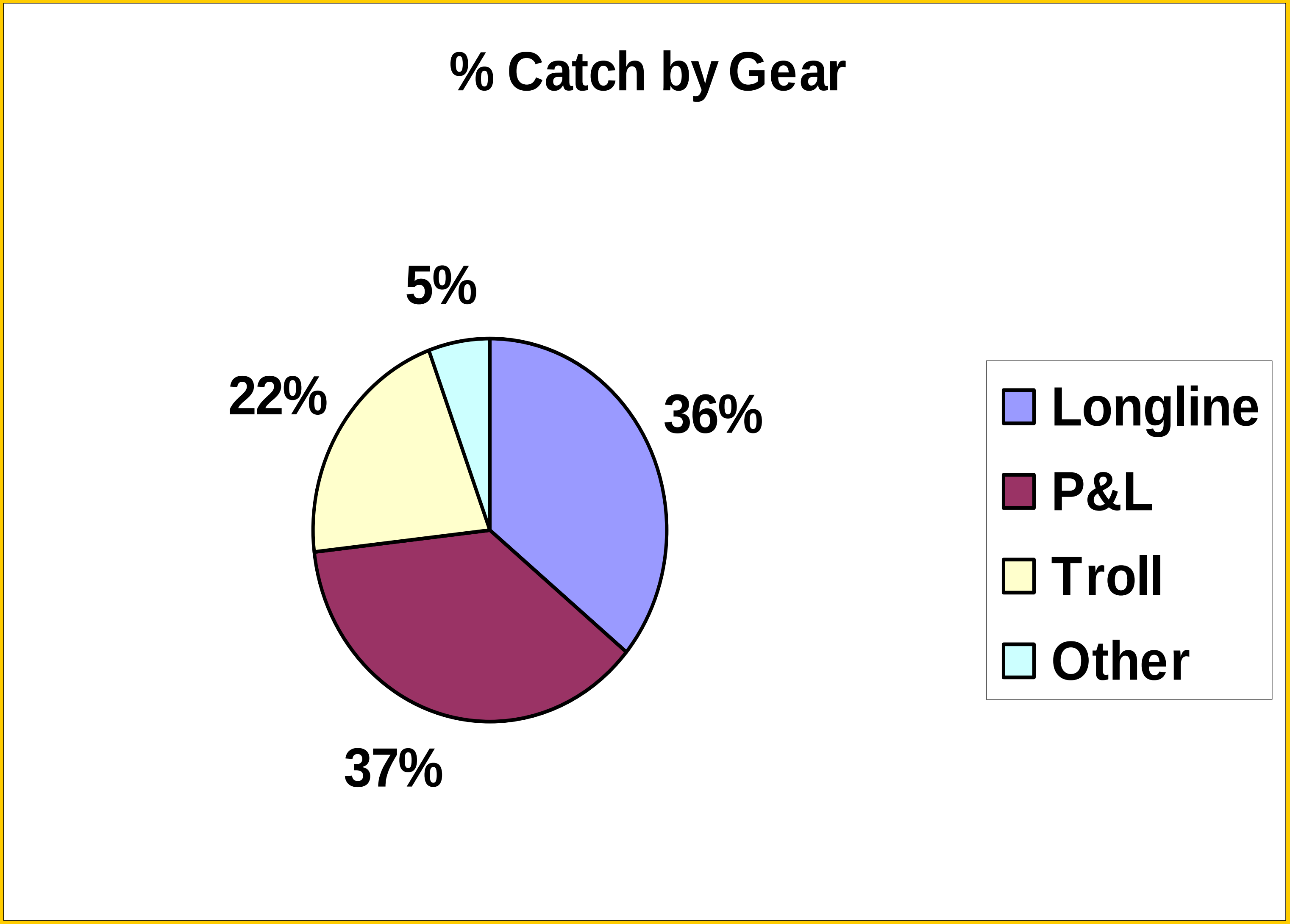
Fishery-related Statistics



Fishery-related Statistics



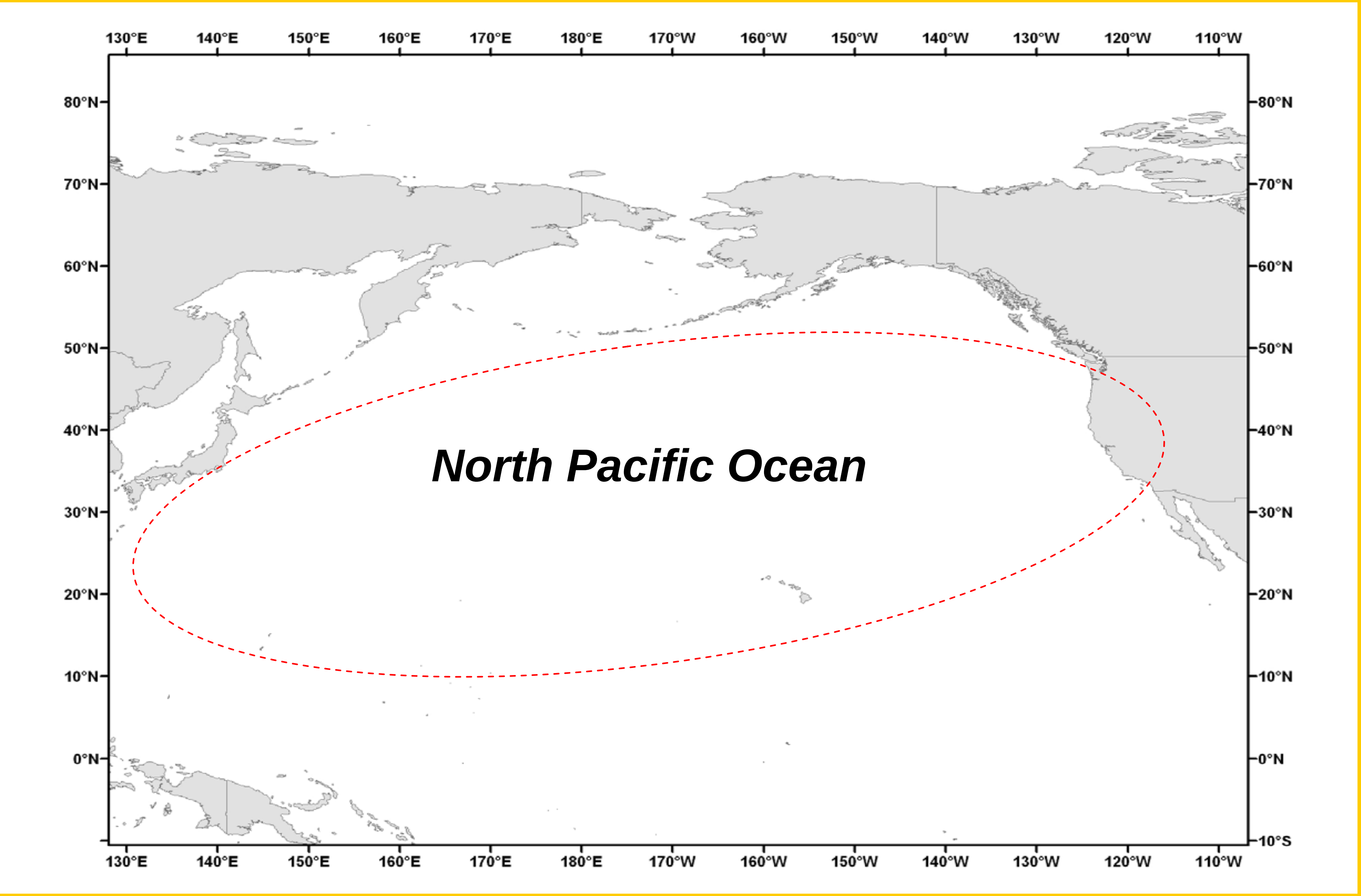
Fishery-related Statistics



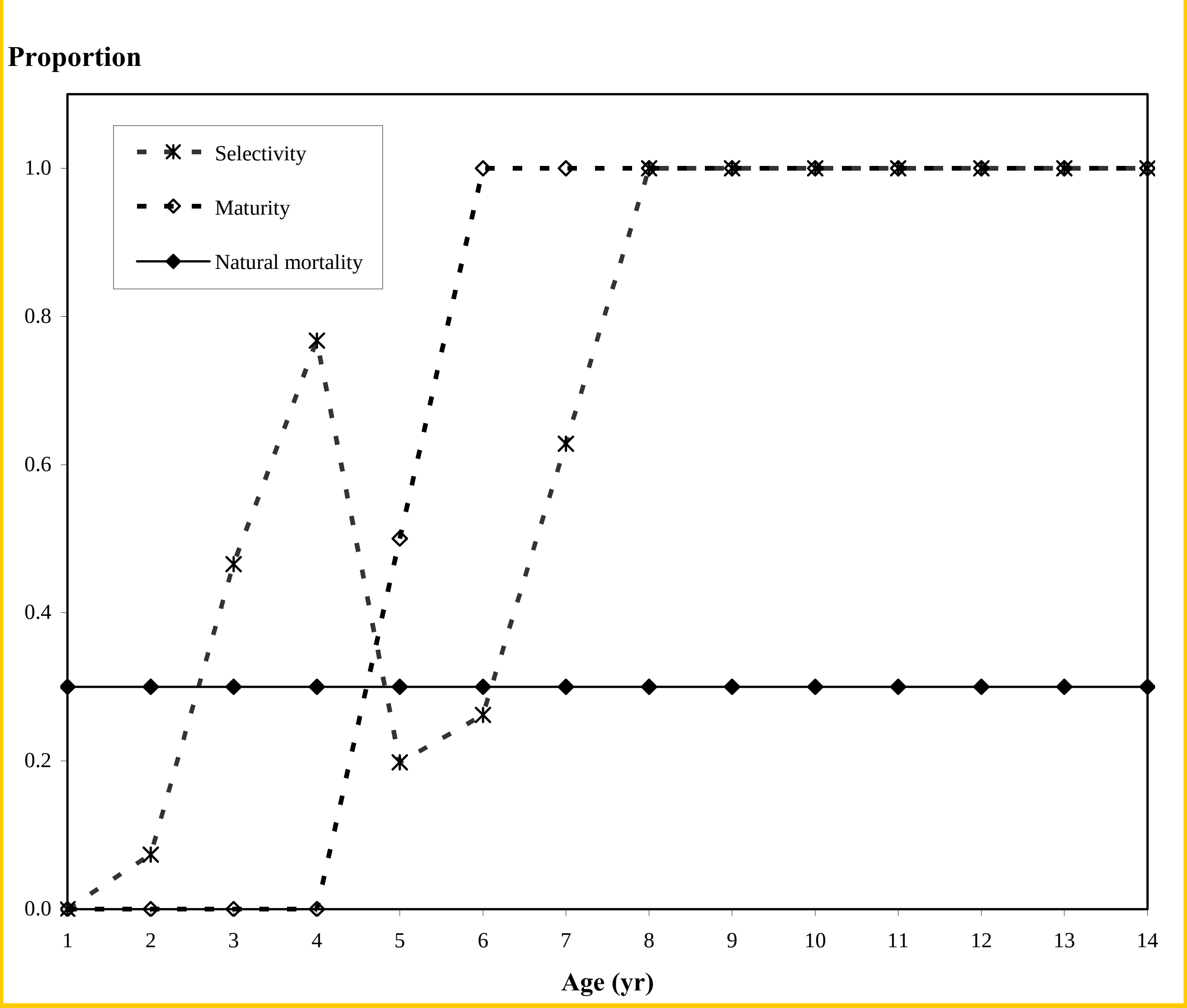
Model

- **VPA approach**
  - ‘VPA-2BOX’ platform (Clay …)
  - Based generally on ‘ADAPT’ framework (Stratis, Ray, Joe, Victor …)
  - Backward-simulation using catch-at-age time series
  - Maximum likelihood estimation (ADMB coded)
  - Statistical ≡ CPUE indices
  - Pluses / minuses of VPAs

‘Stock structure’ Assumption



‘Pop Dy’ Assumptions



Input Data

- Catch-at-age time series
  - Substantial changes from last assessment (2004)
- Eastern Pacific Ocean (USA, Canada, Mexico)
  - Sample data from USA and Canada
  - Age compositions largely based on age-slicing methods
  - USA longline age composition based on MULTIFAN
- Western Pacific Ocean (Japan, Taiwan, S. Korea)
  - Sample data from Japan and Taiwan
  - Age compositions based on age-slicing and MULTIFAN

Input Data

Catch-at-age (no. in 1,000s)

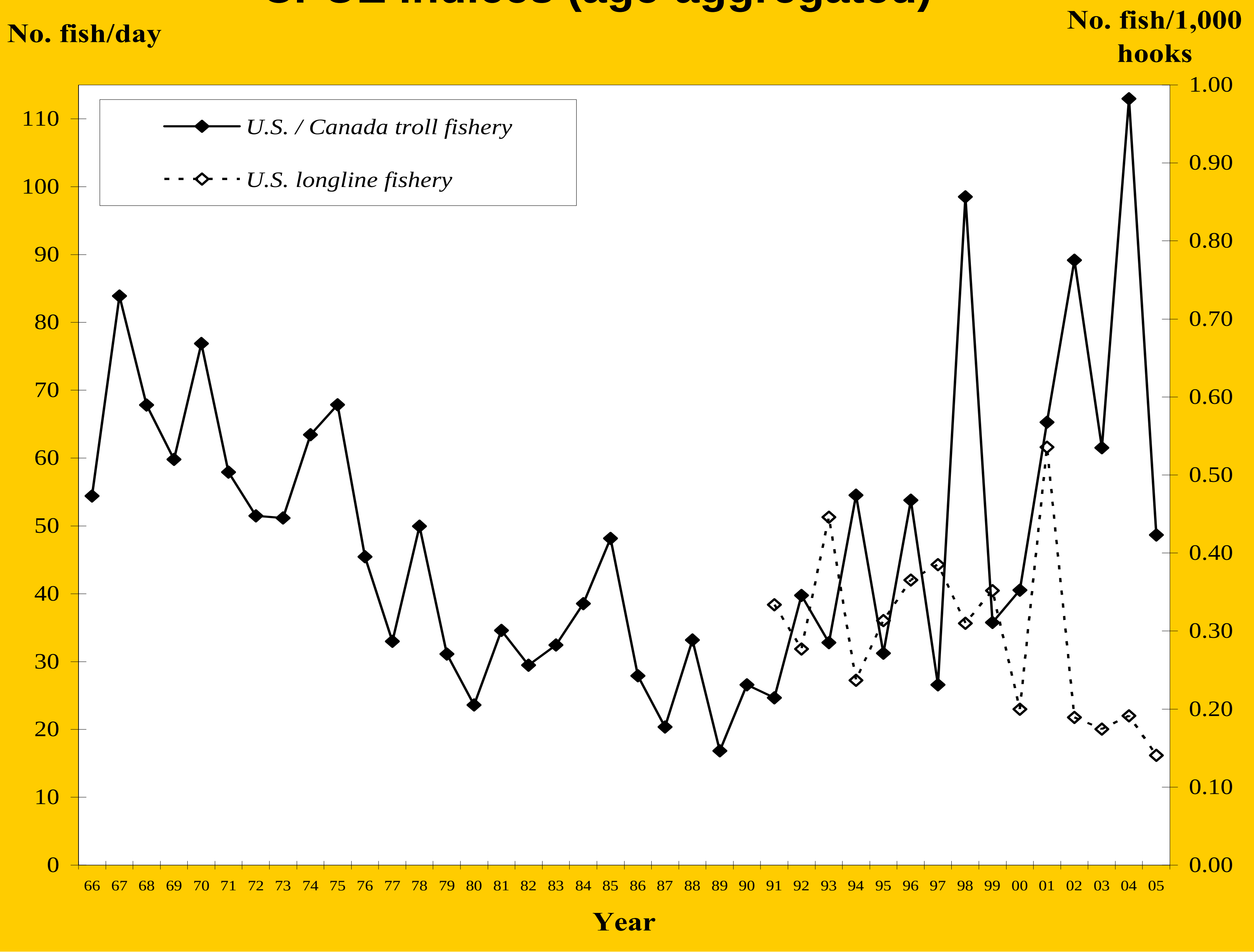
YEAR	AGE (yr)									TOTAL
	1	2	3	4	5	6	7	8	=9	
1966	0	129	2,022	1,118	2,412	261	145	52	41	6,180
1967	0	210	2,293	1,552	2,820	579	171	97	72	7,794
1968	0	92	3,268	1,422	1,118	763	254	97	39	7,053
1969	1	2,046	2,584	1,232	2,493	197	191	194	53	8,990
1970	0	282	3,390	2,220	1,321	410	101	71	61	7,856
1971	0	208	4,634	2,424	2,831	388	175	70	81	10,810
1972	0	4,030	3,514	4,646	2,348	270	118	92	60	15,078
1973	1	2,583	3,619	1,531	4,030	743	141	90	74	12,812
1974	0	1,128	4,483	5,653	1,538	754	153	57	96	13,863
1975	0	828	5,222	2,912	1,907	264	111	78	259	11,581
1976	0	2,325	4,937	5,767	2,766	285	165	106	186	16,538
1977	0	741	2,919	1,955	1,106	426	132	91	160	7,531
1978	2	5,931	2,125	4,729	1,018	387	185	45	83	14,505
1979	0	580	1,215	3,623	1,257	265	190	101	68	7,300
1980	0	2,518	2,830	3,160	801	311	110	87	97	9,916
1981	4	898	1,509	2,854	1,095	450	270	106	115	7,301
1982	78	599	1,949	3,408	435	255	200	213	134	7,272
1983	2	1,182	2,552	2,306	232	186	196	146	141	6,945
1984	5	1,111	4,571	3,031	241	177	126	131	156	9,550
1985	2	318	1,235	2,776	641	118	166	100	325	5,681
1986	0	794	906	2,461	204	128	127	90	131	4,840
1987	1	265	2,155	1,296	474	314	176	102	169	4,953
1988	4	133	1,529	1,156	270	606	223	161	181	4,264
1989	106	377	316	1,335	1,012	276	246	133	158	3,959
1990	109	317	239	1,151	1,606	641	113	213	247	4,635
1991	78	678	1,747	335	339	263	155	119	271	3,984
1992	1	332	2,350	1,664	662	360	150	151	156	5,826
1993	0	485	1,090	1,971	793	202	201	116	293	5,151
1994	28	669	1,575	2,355	1,077	654	206	97	136	6,798
1995	2	496	1,310	3,152	294	310	564	116	119	6,362
1996	8	494	3,938	2,294	603	396	554	477	105	8,869
1997	0	2,453	1,431	4,451	817	124	476	620	391	10,764
1998	0	1,105	4,036	1,568	1,880	302	213	379	282	9,766
1999	77	816	3,761	5,797	757	478	477	185	308	12,656
2000	0	1,231	1,852	2,739	923	415	450	435	247	8,292
2001	4	1,470	4,370	1,396	1,153	410	451	277	338	9,869
2002	0	1,447	7,396	3,141	439	226	381	209	222	13,461
2003	0	3,054	3,619	3,008	709	306	250	181	194	11,321
2004	30	210	4,411	4,363	282	452	332	130	44	10,253
2005	1	2,382	1,547	2,318	305	171	437	189	69	7,418
TOTAL	543	46,948	110,447	106,273	47,010	14,522	9,484	6,404	6,365	347,996

Input Data

- Abundance (CPUE) indices (17 total)
  - Substantial changes from last assessment (2004)
  - USA/Canada troll (age-specific for ages 2,3,4,5)
  - USA longline (age-aggregated)
  - Japan pole-and-line (ages 2,3,4,5)
  - Japan longline (3,4,5,6,7,8,9+)
  - Taiwan longline (age-aggregated)

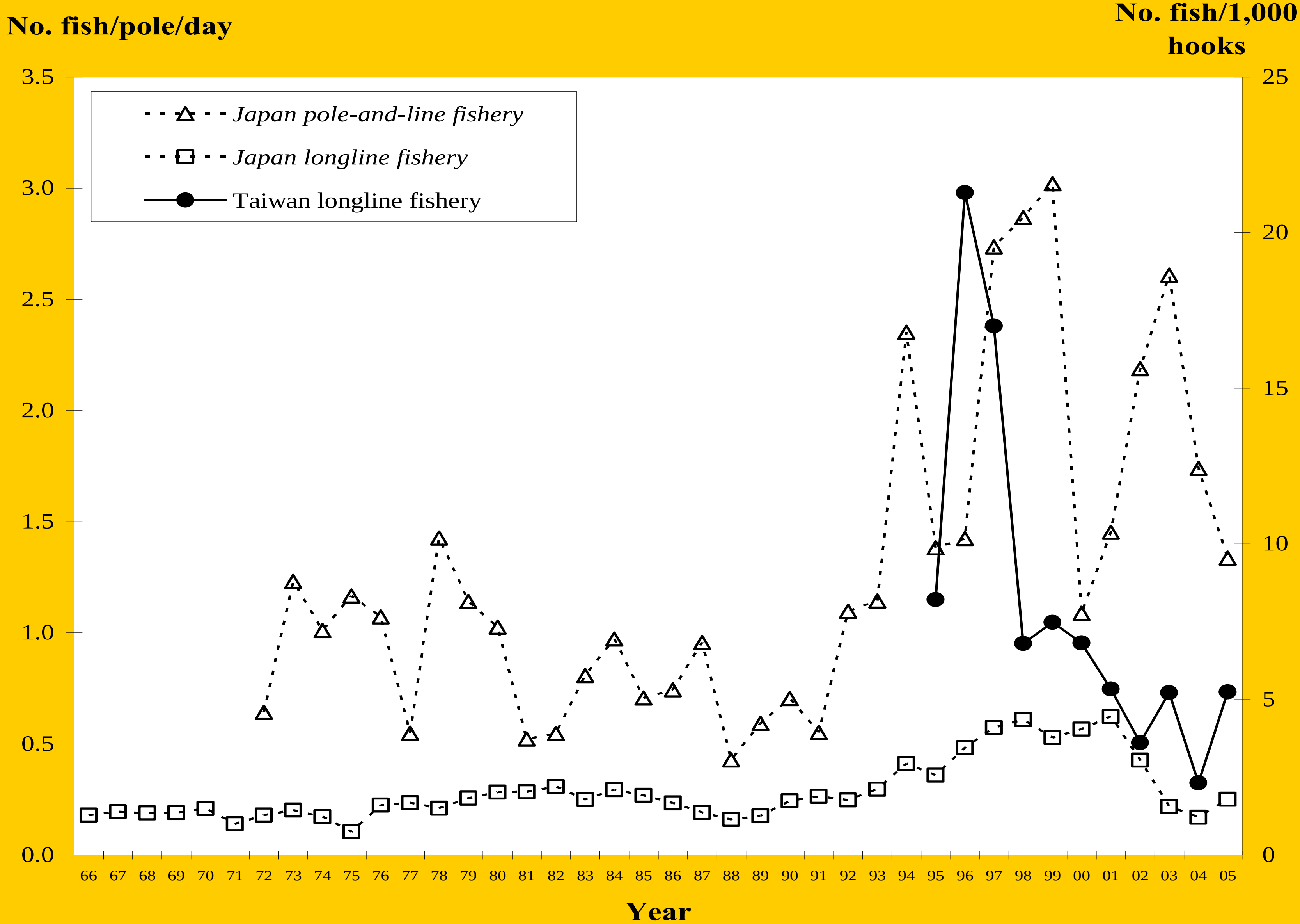
Input Data

CPUE Indices (age-aggregated)



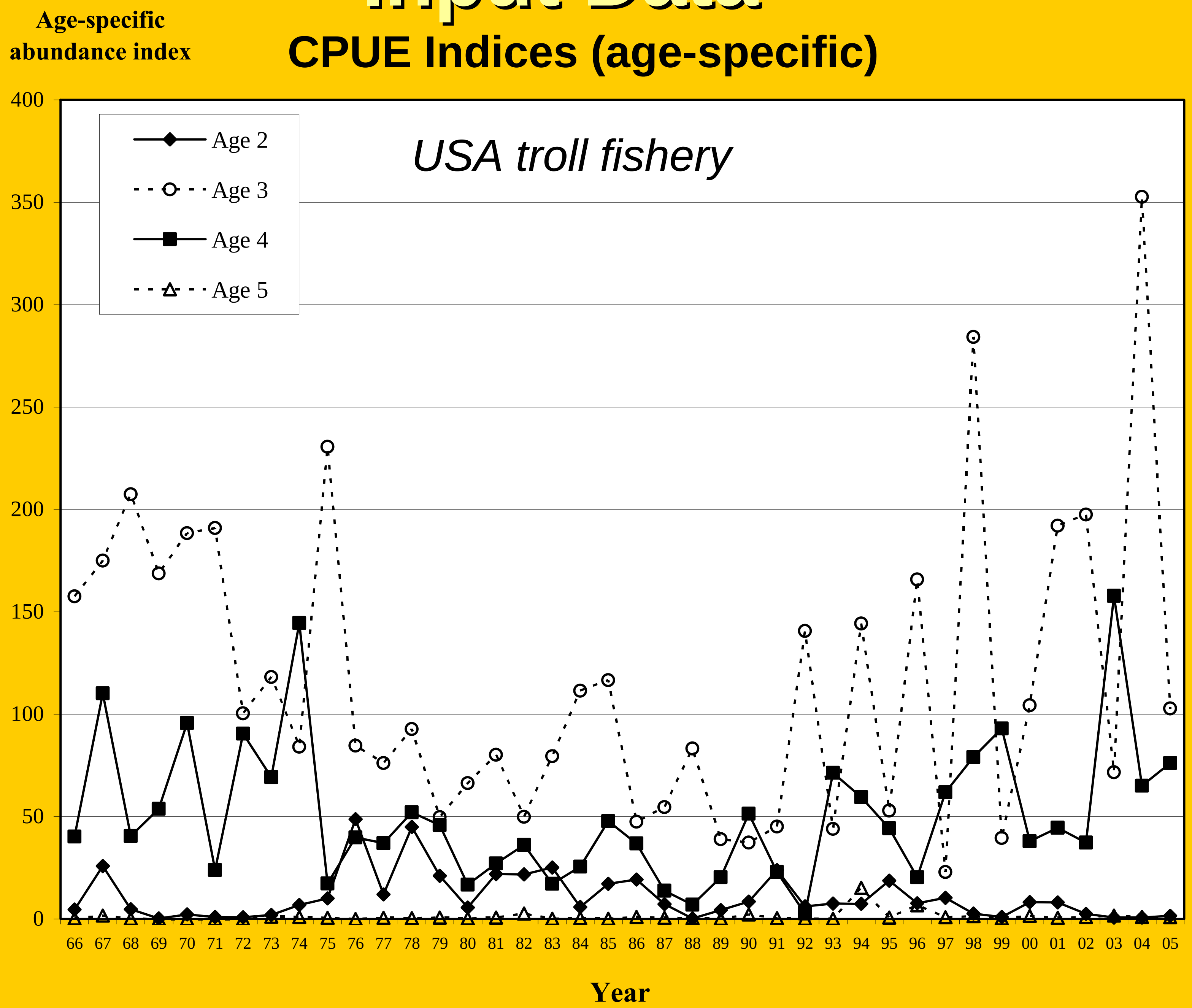
Input Data

CPUE Indices (age-aggregated)



Input Data

CPUE Indices (age-specific)



Analysis

- Considerable work (model scenario development and sensitivity analysis) prior to the Meeting (December 2006)
- In total, 15 (candidate) model ‘scenarios’ were tabled, refined, and reviewed by the ISC-ALBWG
- Model Scenario ‘D1’ was chosen as the ‘final’ model
- Essentially, similar (final) model as assessment in 2004

Results

Recruitment

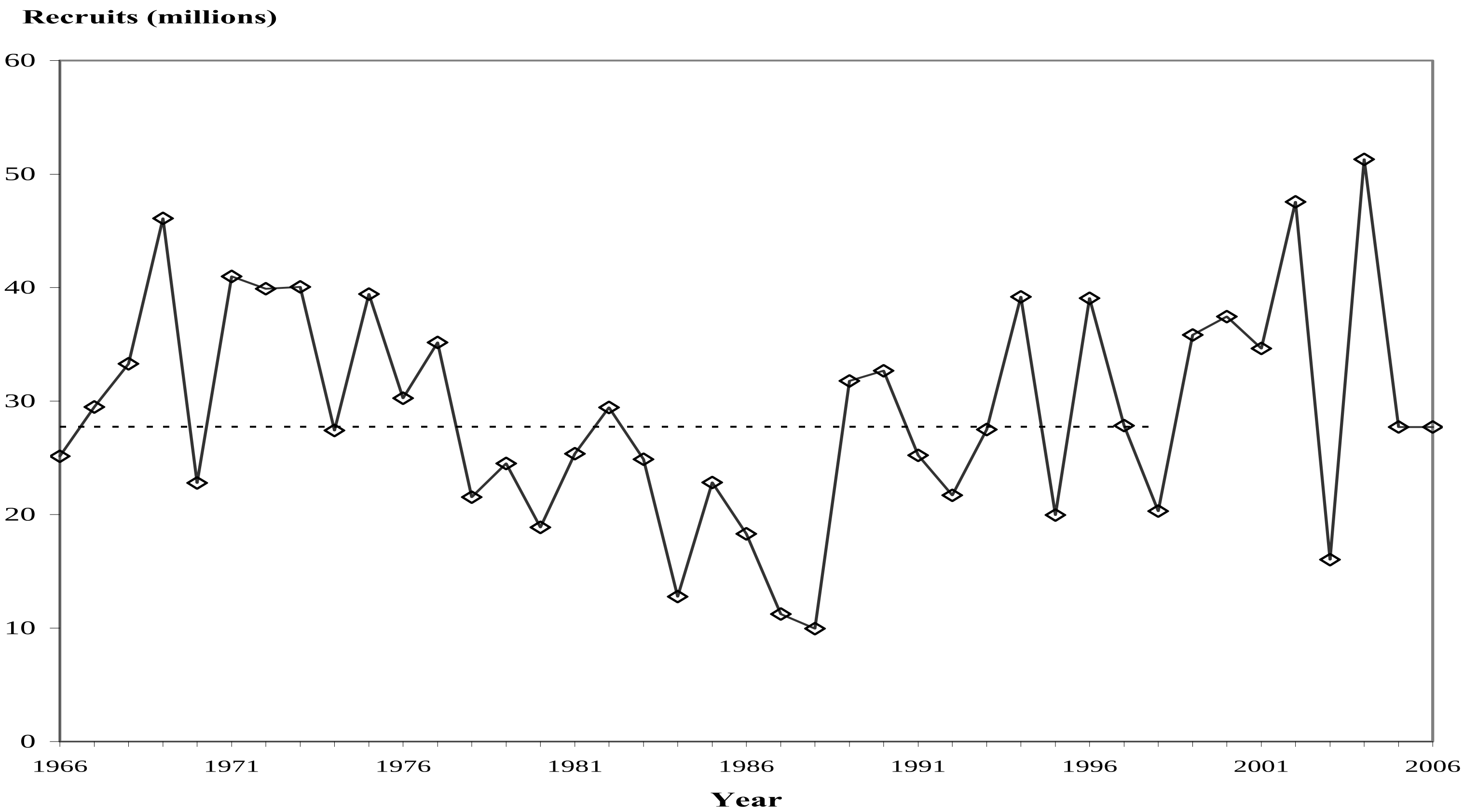
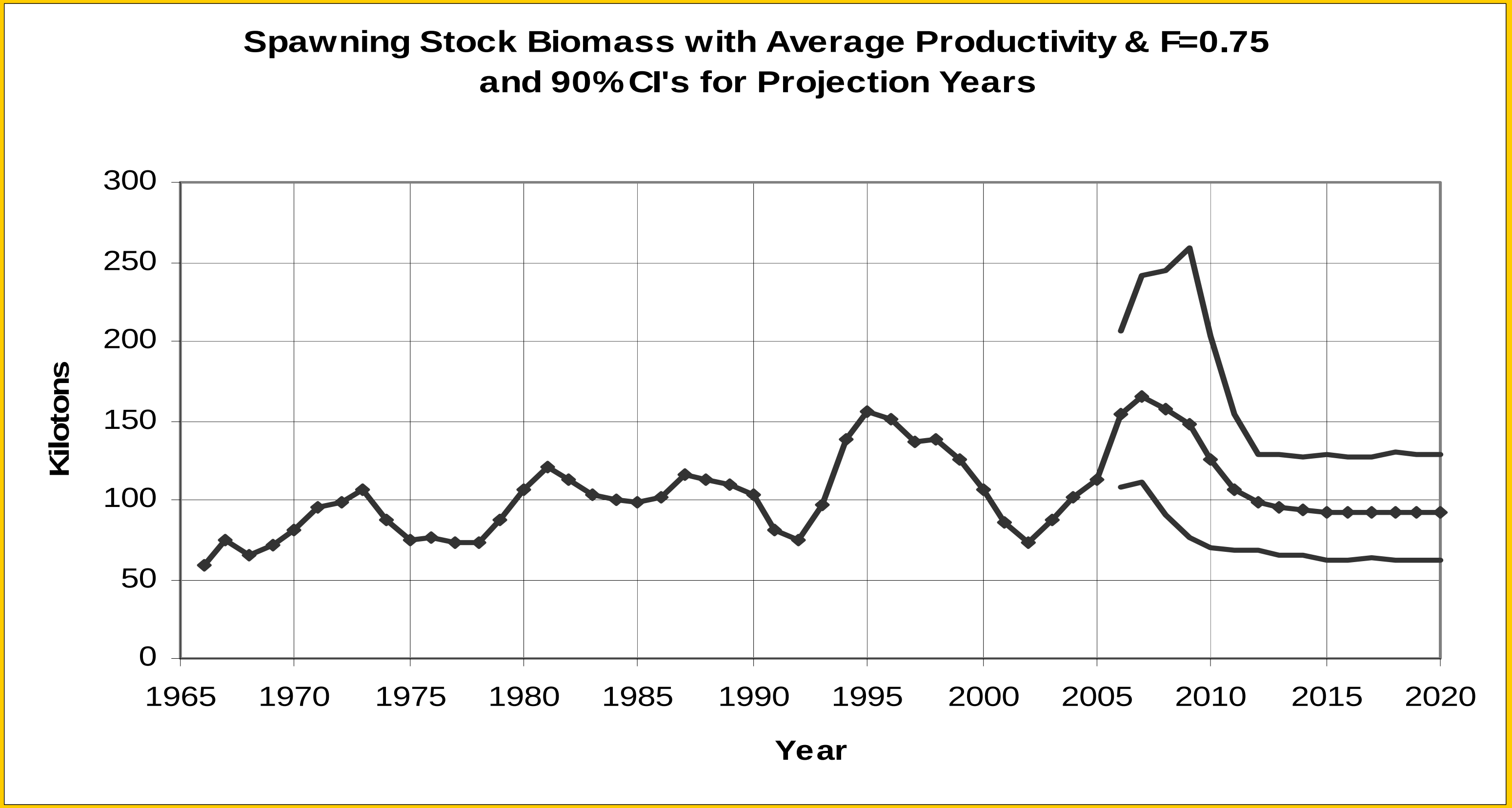


Figure 7. Recruitment (age-1 fish in millions) time series of North Pacific albacore generated from Model D1 (1966-98). Mean (1966-98) recruitment is presented as horizontal dashed line. Figure in 2005 and 2006 were derived from the mean recruitement.

Results

Spawning Stock Biomass



Results

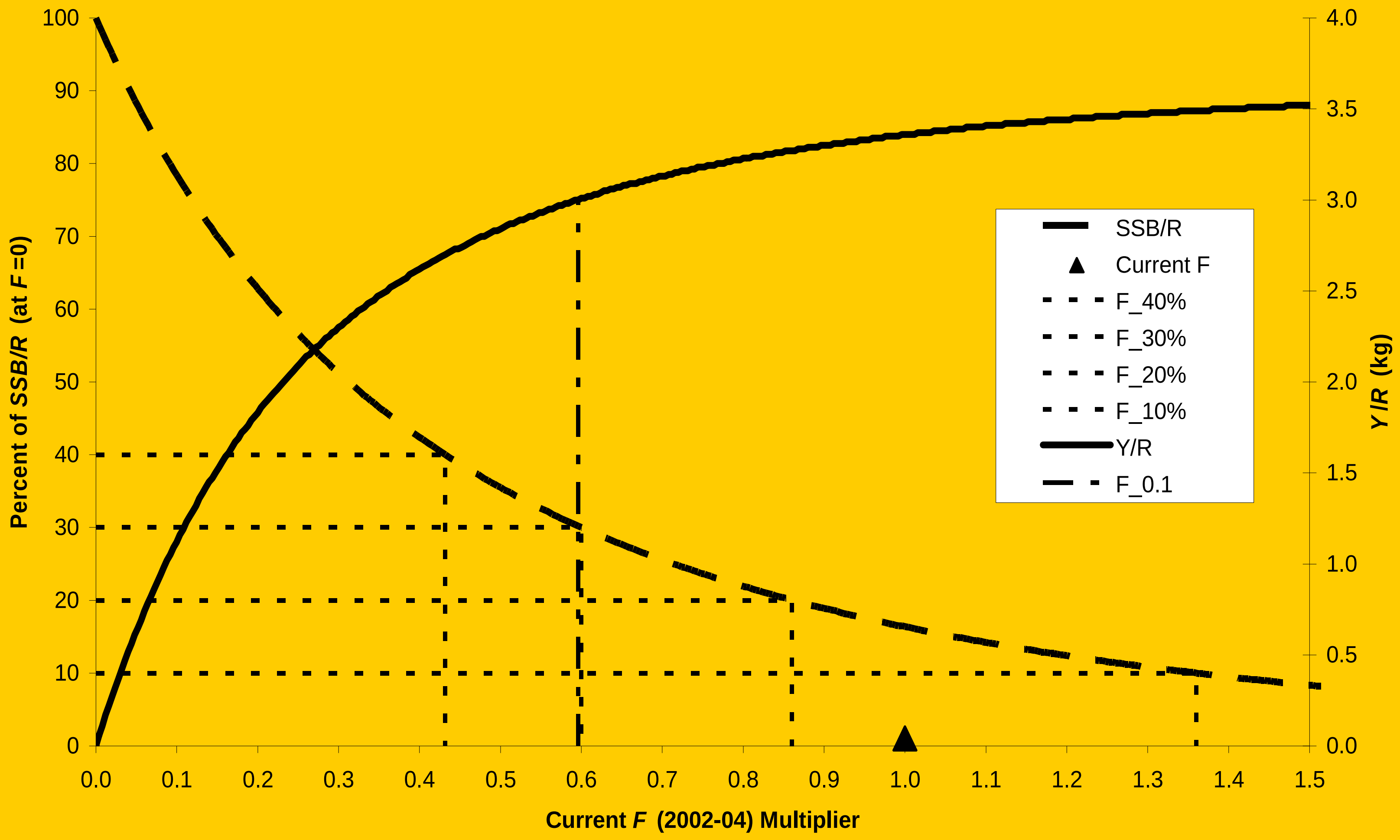
Projections and Biological Reference Points

- 2004 uncertainty analysis based on 4 model configurations:
  - ‘Low productivity’ / ’Low F’
  - ‘Low productivity’ / ’High F’
  - ‘High productivity’ / ’Low F’
  - ‘High productivity’ / ’High F’

- 2006 single productivity period and single current F

Results

Projections and Biological Reference Points



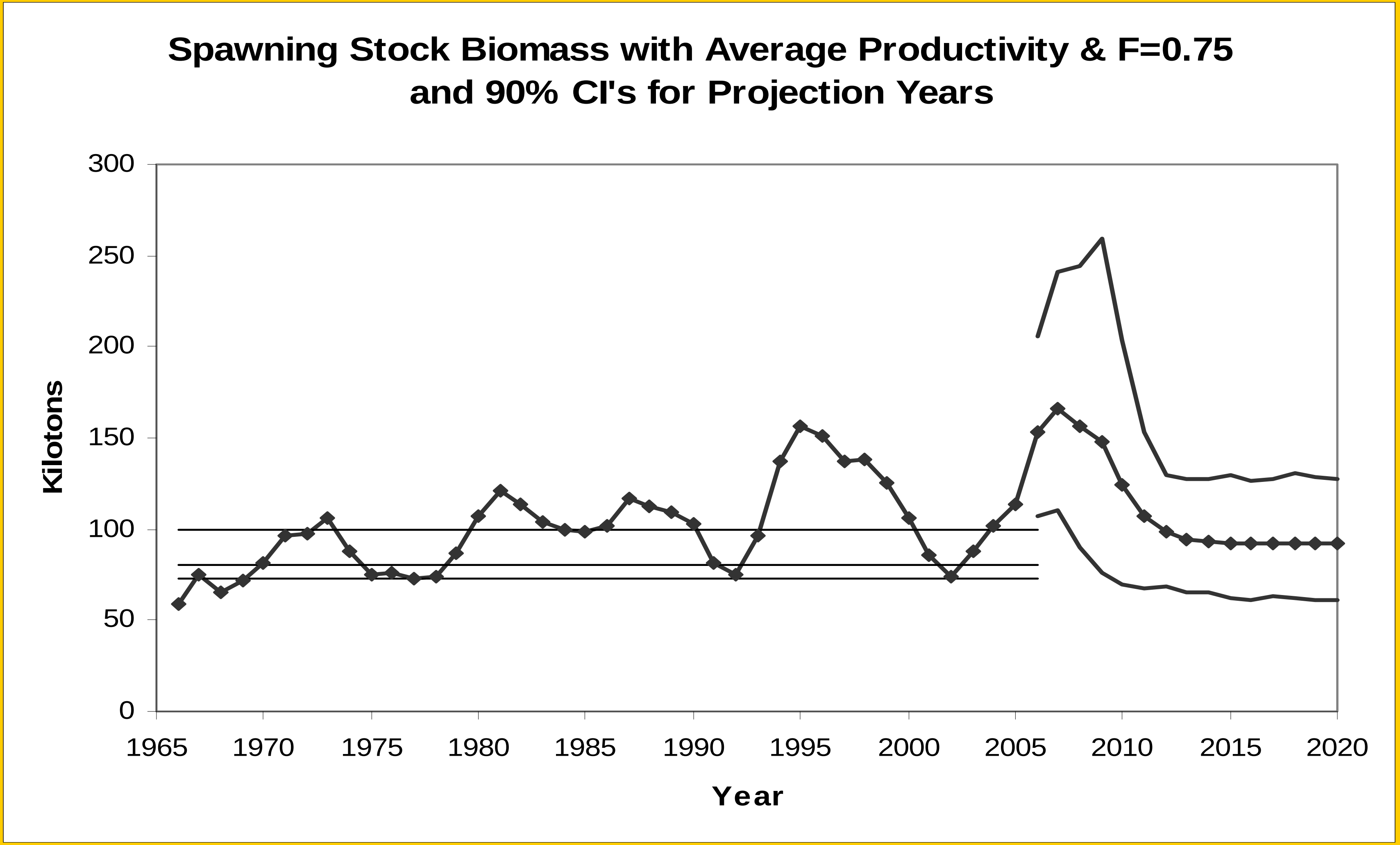
Results

Projections and Biological Reference Points

Candidate Target Reference Points	Target F (yr^{-1})	Ratio of Current F to Target F	MSY Proxy (1,000 mt)	SSB_{MSY} Proxy (1,000 mt)
$F_{40\%}$	0.32	2.31	75	226
$F_{35\%}$	0.38	1.97	79	198
$F_{0.1}$	0.45	1.68	83	171
$F_{30\%}$	0.45	1.67	83	169
Candidate Limit Reference Points	**Limit F (yr-1)**	**Ratio of Current F to Limit F**	**Equilibrium Catch (1,000 mt)**	**Equilibrium SSB (1,000 mt)**
$F_{20\%}$	0.65	1.16	91	113
F_{Max}	2.07	0.36	100	10
$F_{SSB\text{-}Min}$	0.81	0.93	94	83
$F_{SSB\text{-}10\%}$	0.70	1.07	92	102
$F_{SSB\text{-}25\%}$	0.66	1.14	91	110

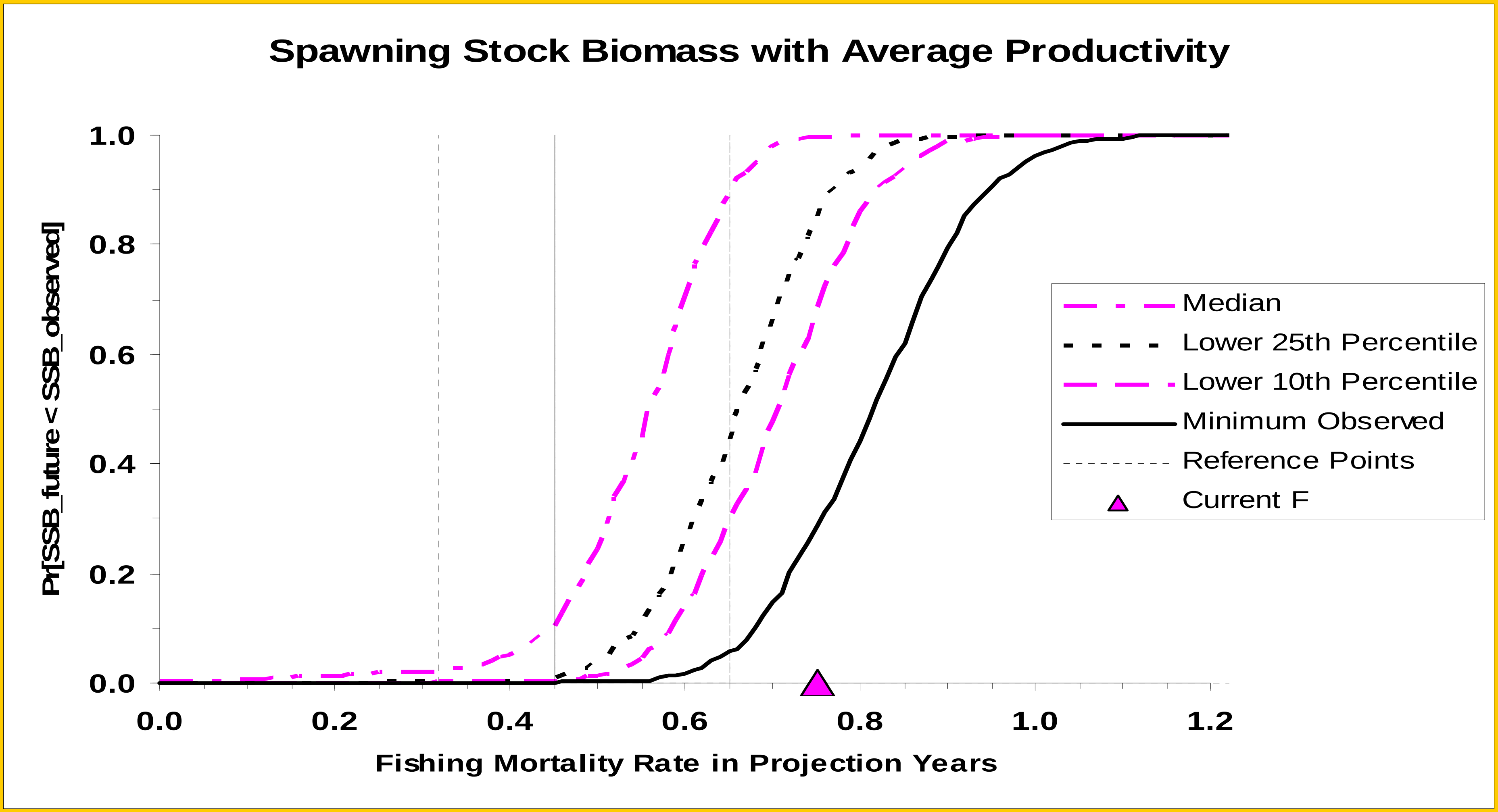
Results

Projections and Biological Reference Points



Results

Projections and Biological Reference Points



Results

Projections and Biological Reference Points

*F*s to Maintain *SSB* Above Threshold

SSB Threshold Desired		Probability Level Desired 50%	95%
Minimum Observed SSB	$F_{SSB-Min}$	0.81	0.64
Lower 10th Percentile	$F_{SSB-10\%}$	0.70	0.55
Lower 25th Percentile	$F_{SSB-25\%}$	0.66	0.51
Median	$F_{SSB-50\%}$	0.56	0.39

Conclusions

- *SSB* in 2006 estimated at about 153,000 mt; 53% above time series average
- Retrospective analysis showed noticeable trend of over-estimating abundance (say stock size)
- Over last 15 yr, *R* fluctuated around long-term average of roughly 28 million fish
- Presently, population is being fished at roughly $F_{17\%}$ (i.e., $F_{2002\text{-}2004}$ = 0.75) … similar to ‘pessimistic’ scenario in 2004 assessment
- Current *F* (SPR say …) is high relative to commonly used biological reference points
- *SSB* is forecasted to decline to an equilibrium level of 92,000 mt by 2015

Conclusions

- ISC-ALBWG expressed concern about the substantial decline in total catch over the last few years
- $F_{SSB\text{-}MIN}$ analysis indicated that at the 95% probability of success all of the threshold *F*s would require reductions from current *F*
- Finally, at this time, ISC-ALBWG strongly recommended that all countries support ‘precautionary’ fishing practices

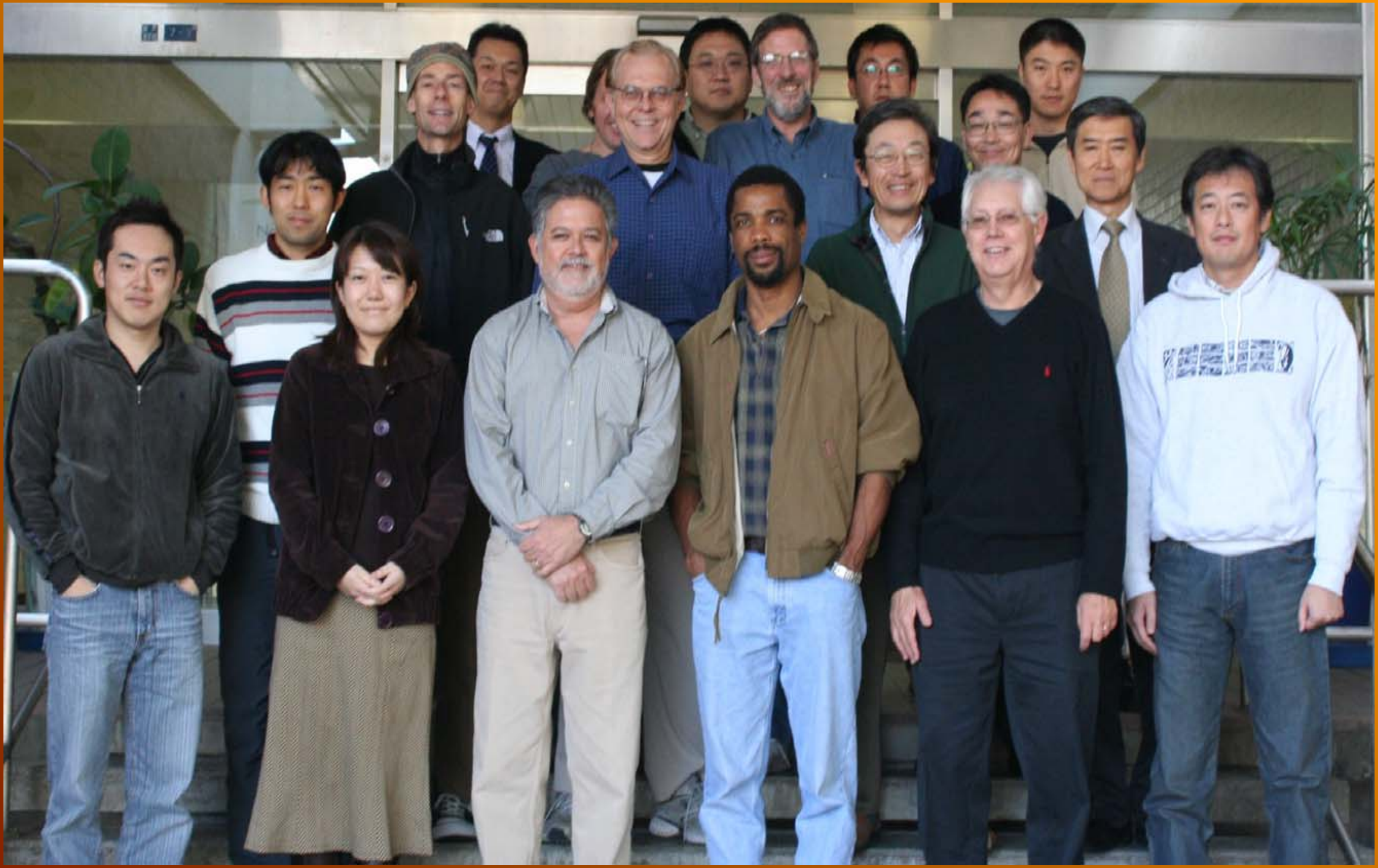
Bottom-line …

- Precautionary ≡ limits on current levels of ‘fishing effort’

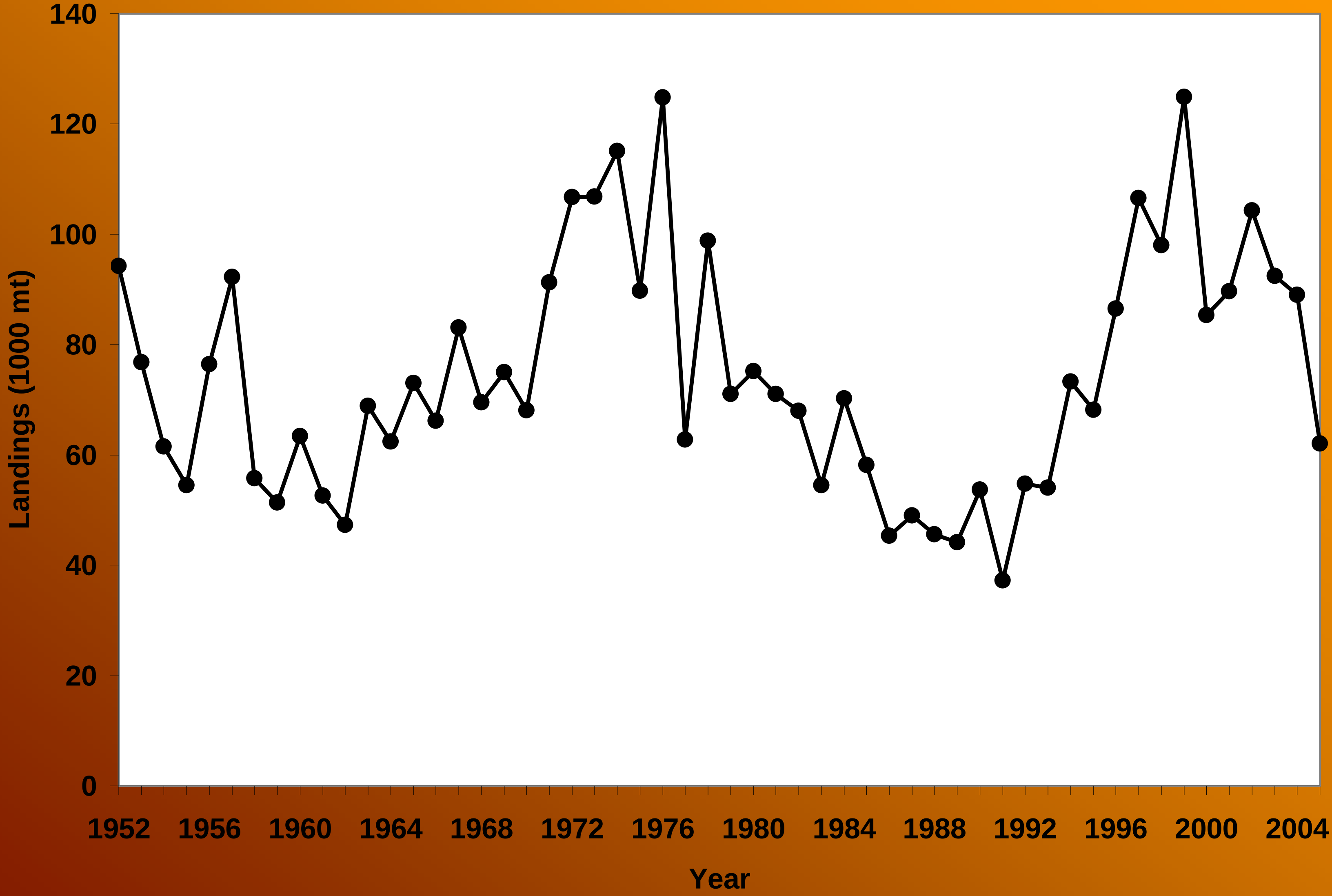
Stuff To Do ...

- Critical review of CPUE, including data and methods
- Further development of forward-simulation (SS2 model)
- Continue efforts formalizing harvest control rule
- Next meeting (objectives above) is in La Jolla (Feb. 2008)
- Next assessment is likely late 2008 or early 2009

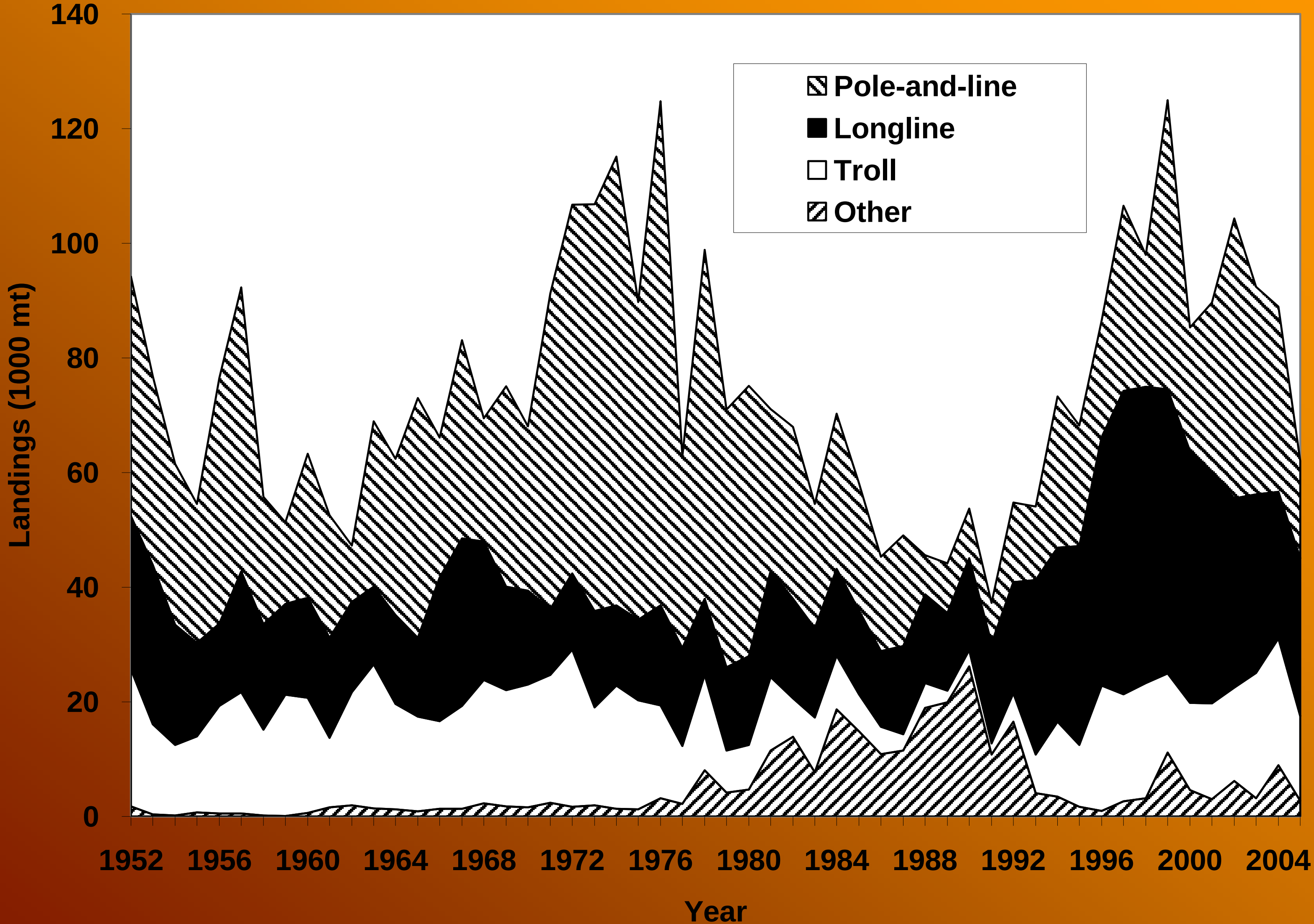
The Folks ...



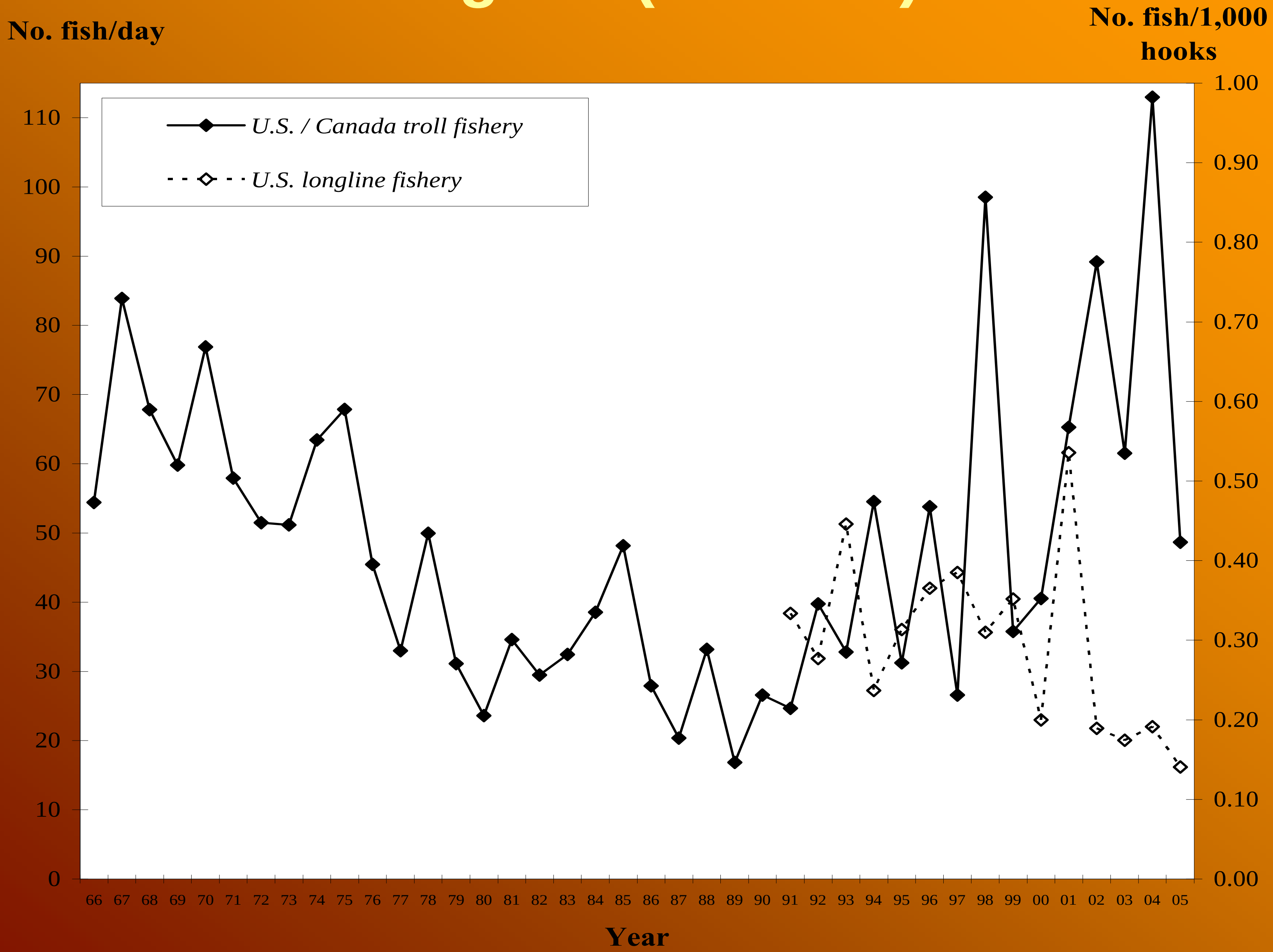
Landings – all gears and nations (1952-05)



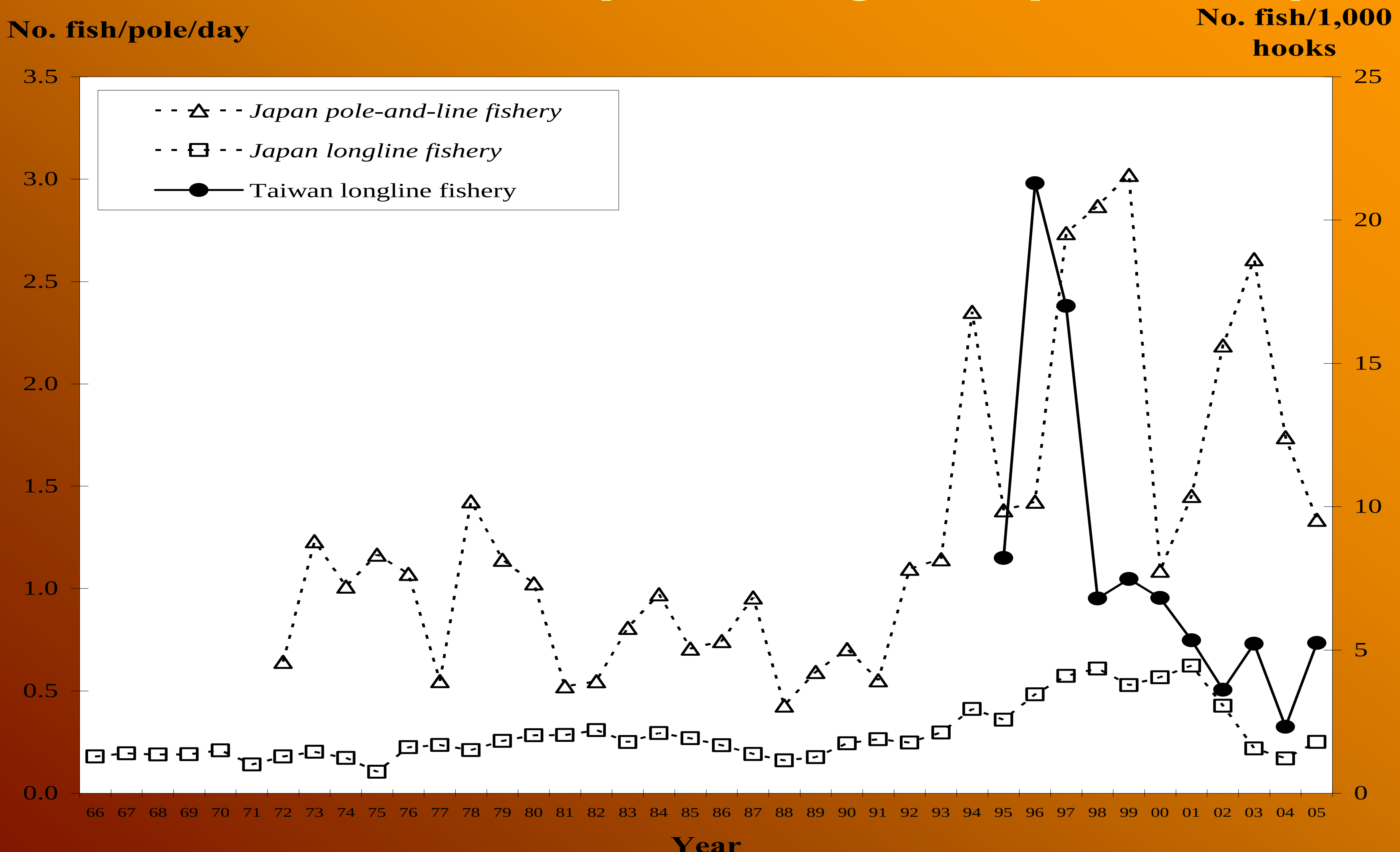
Landings by gear - all nations (1952-05)



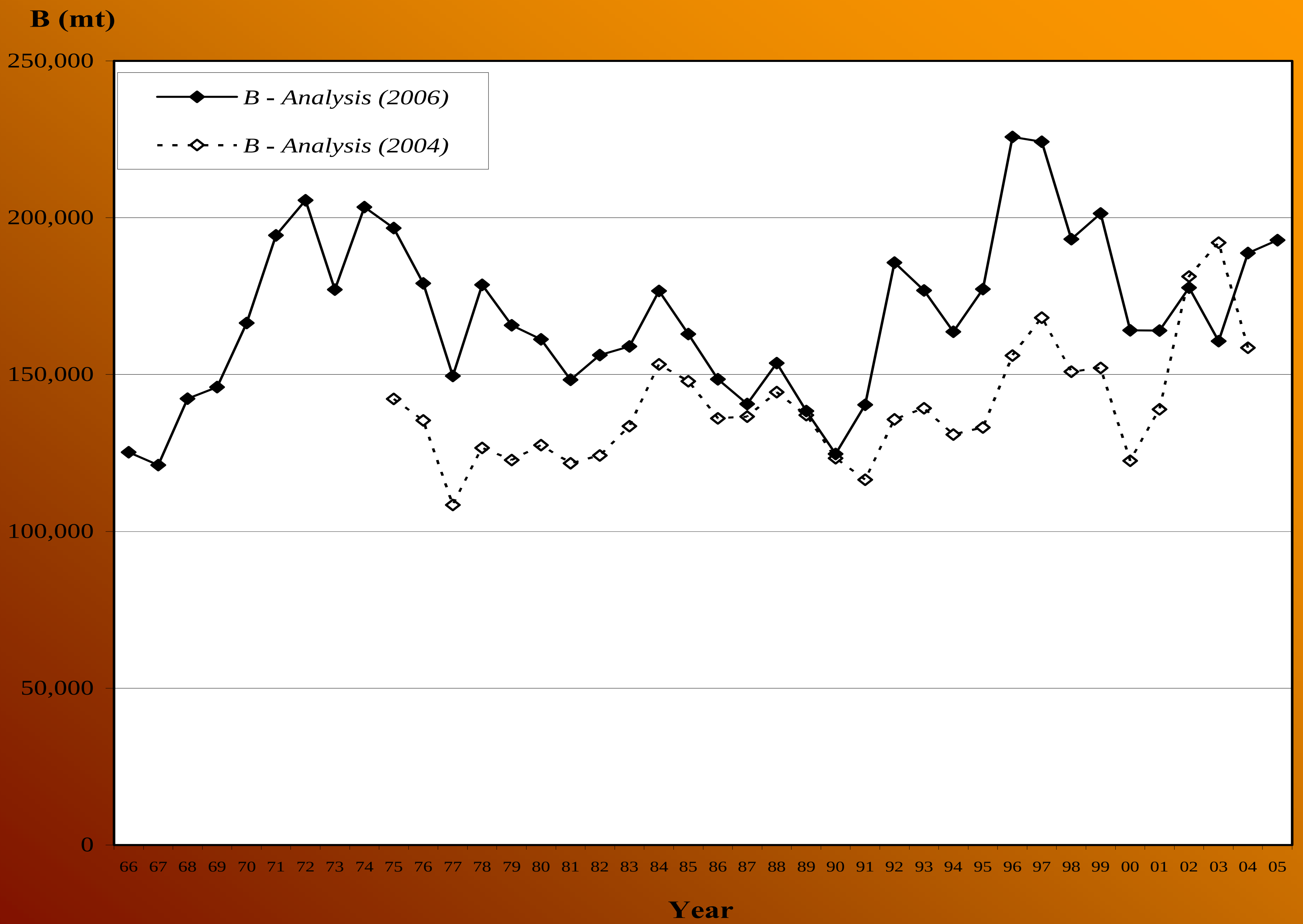
U.S. / Canada troll (1966-05) and U.S. longline (1991-05) fisheries



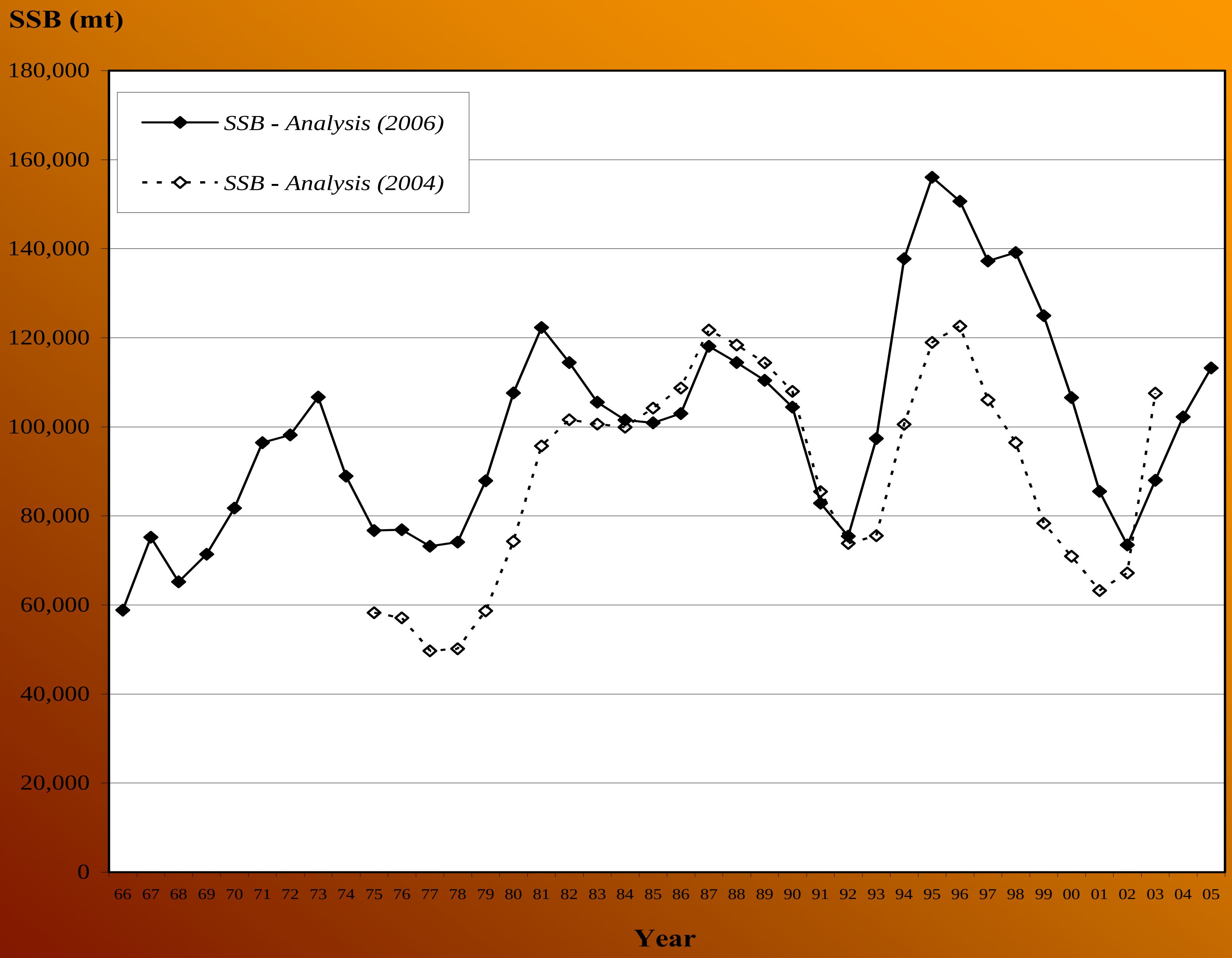
Japan Pole-and-Line (1972-05) Japan Longline (1966-05) and Chinese Taipei Longline (1995-05)



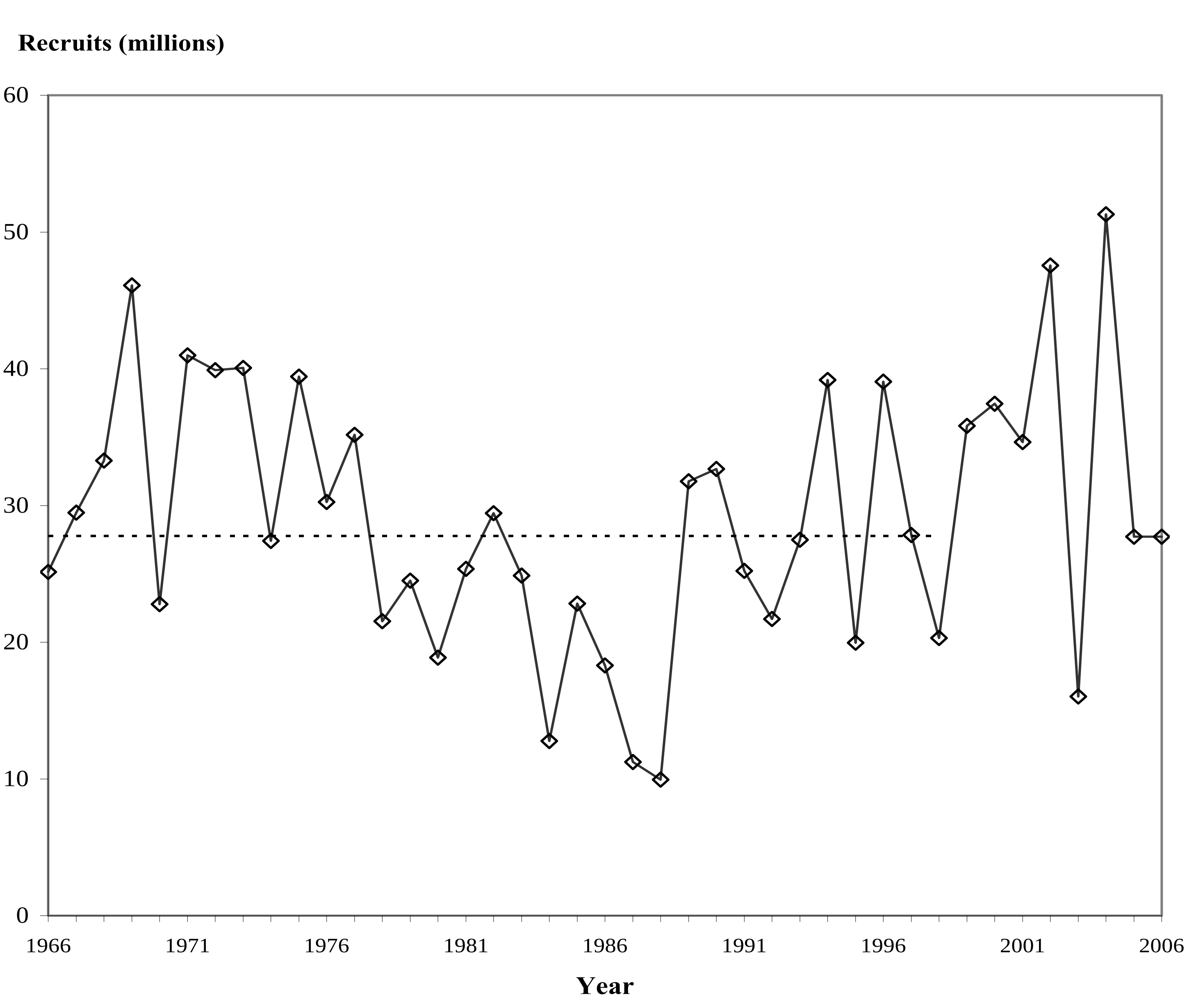
Exploitable Stock Biomass (B)



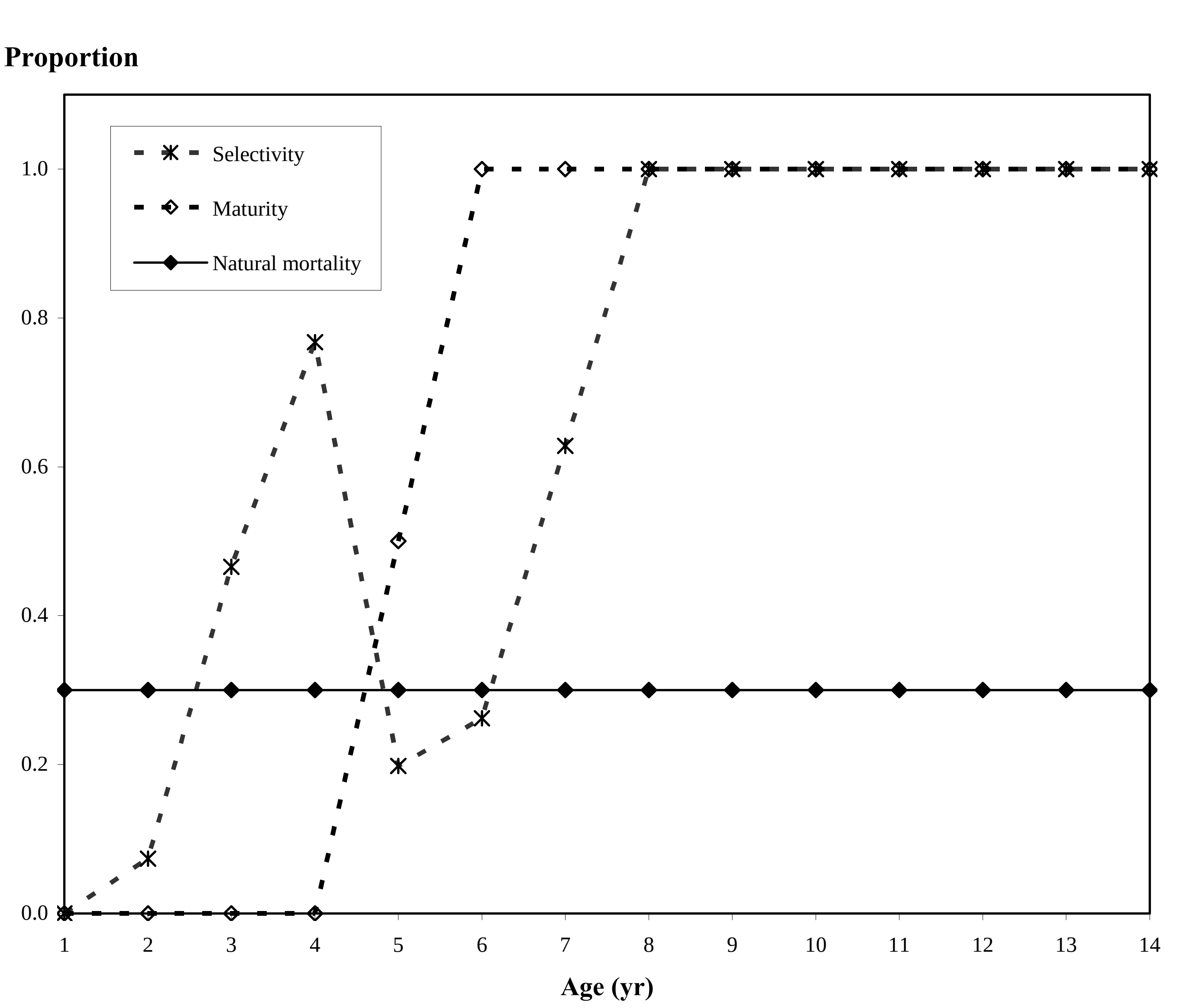
Spawning Stock Biomass (SSB)



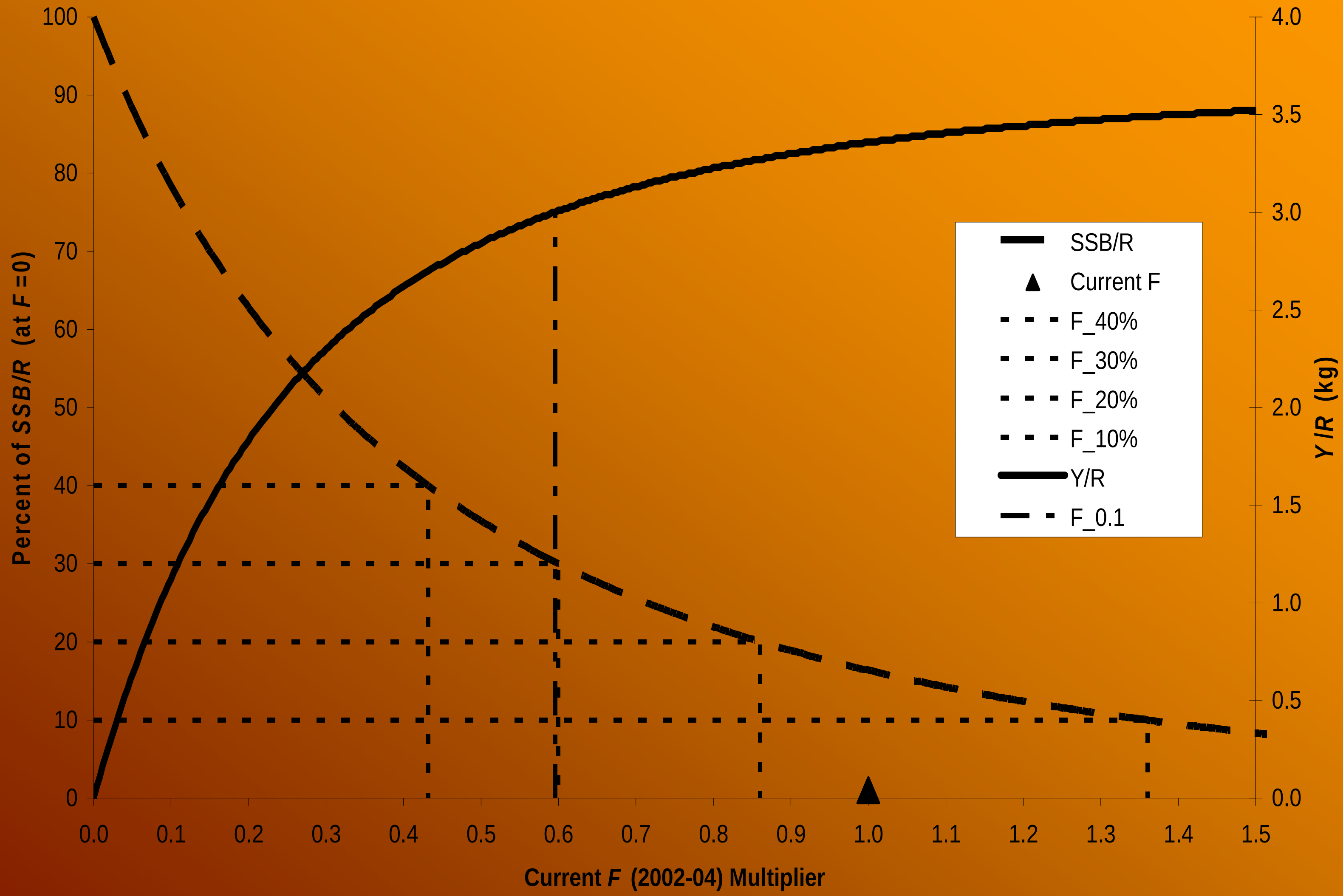
Recruitment (R) – Age-1 Fish (Millions)



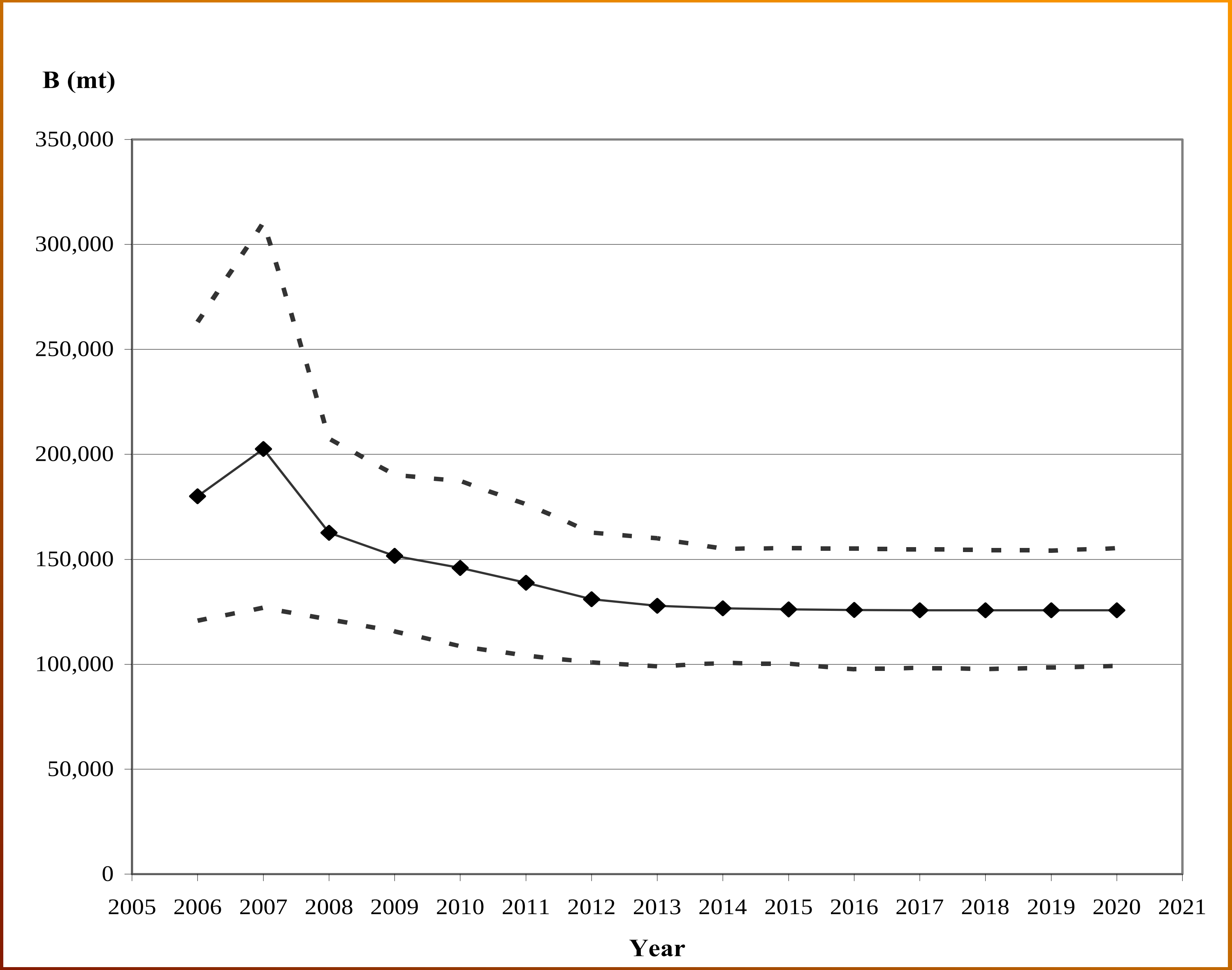
Partial recruitment , Maturity (Ueyangi 1957) and Natural Mortality (M)



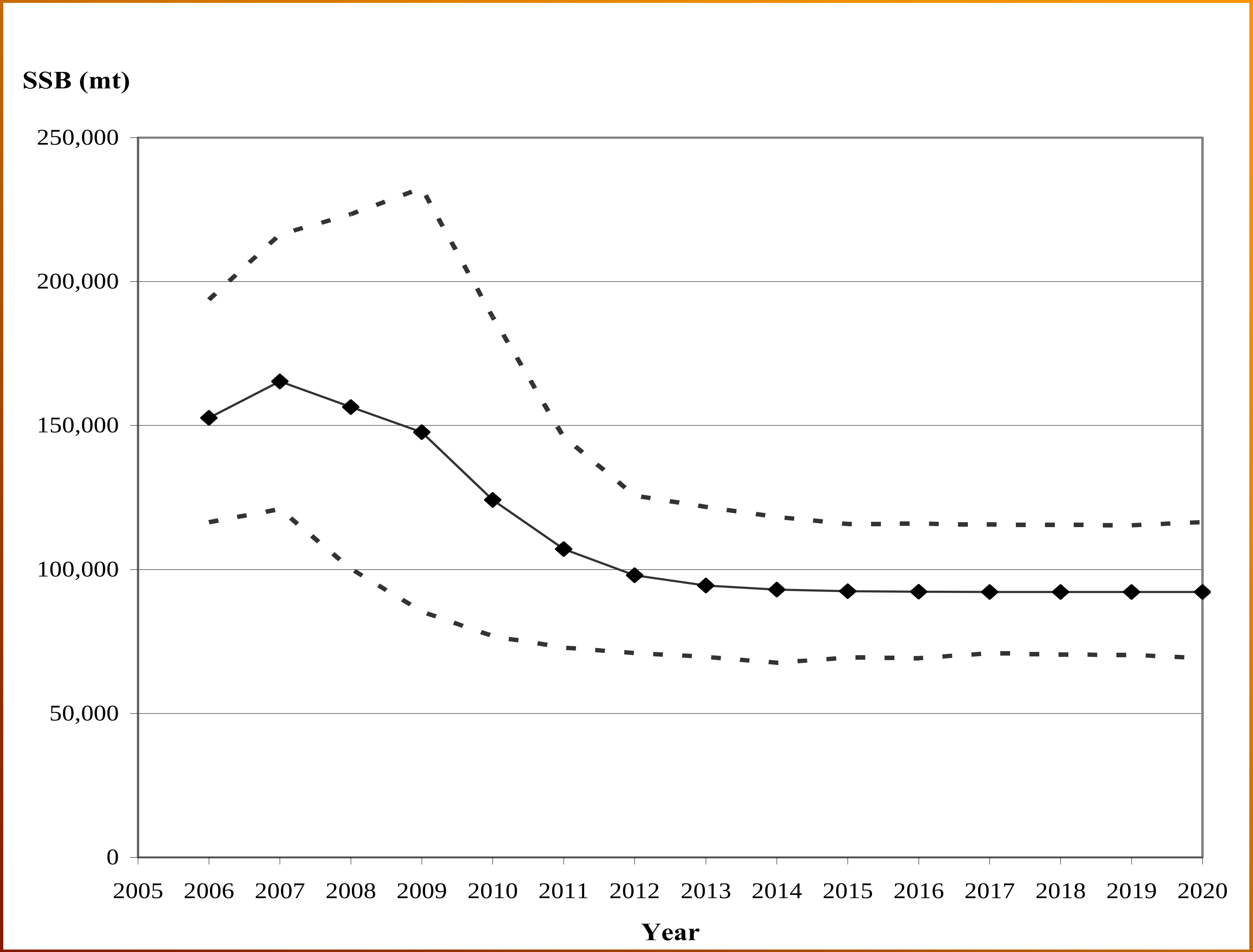
Equilibrium Yield-Per-Recruit (Y/R, in kg) and Percent of SSB/R (relative to F=0)



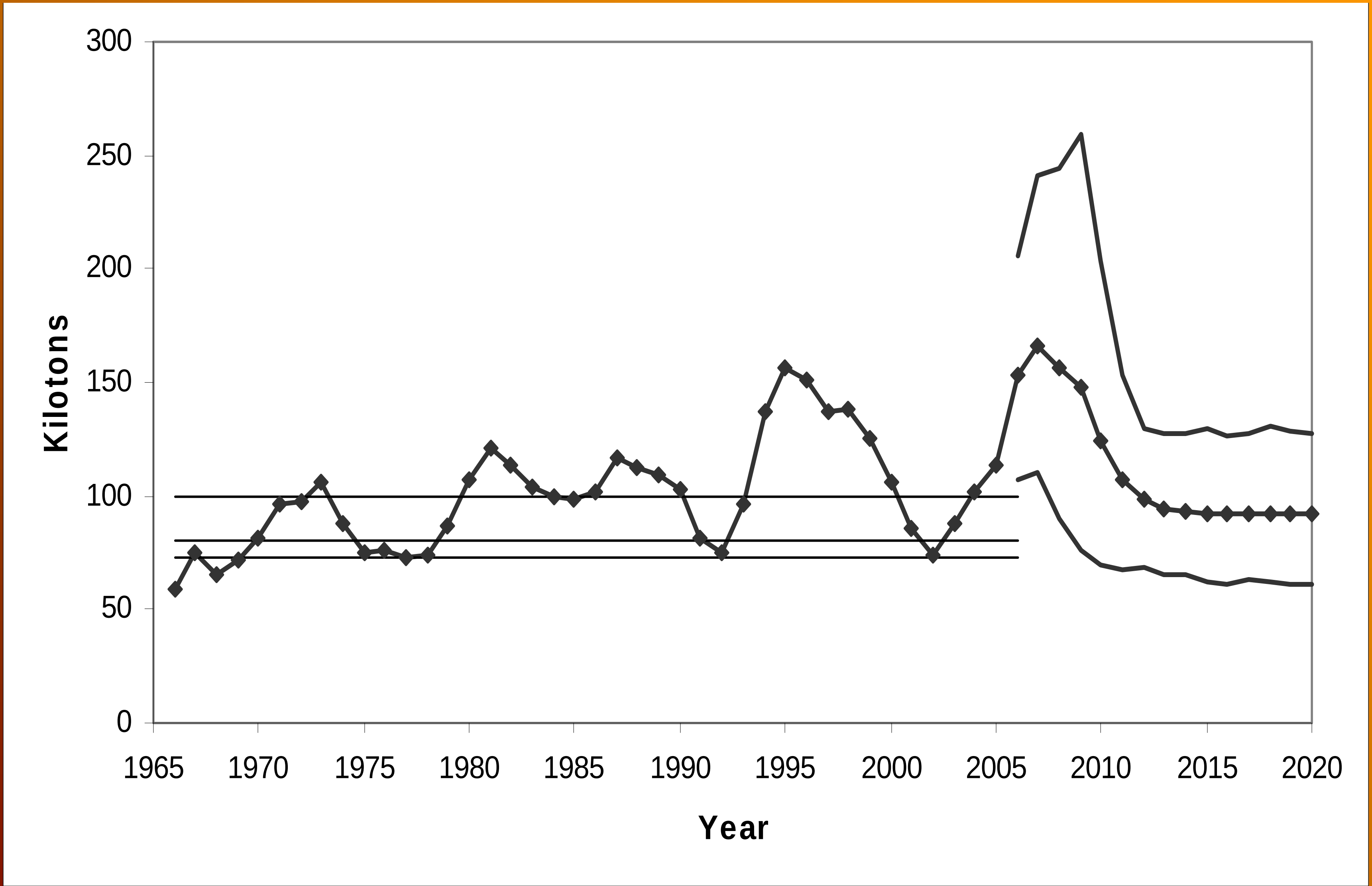
Stochastic projection (2006-20) of 'Exploitable' Biomass (B, mt)



Stochastic Projection (2006-20) of SSB (mt) with 80% CI



SSB with Average Productivity & F=0.75 and 90% CI's for Projection Years



Probability Profiles for Four SSB Threshold Levels

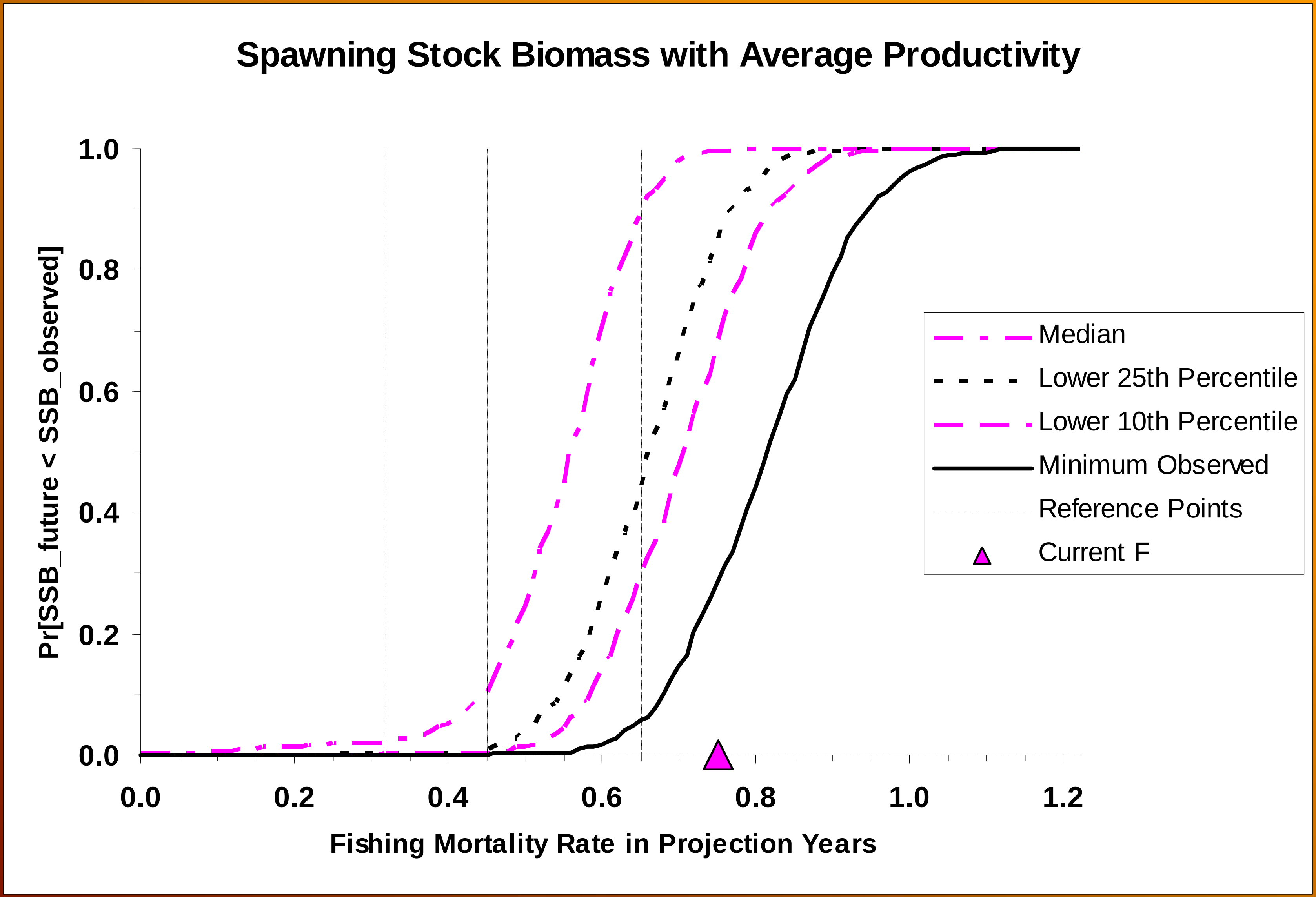


Table 1

YEAR	CANADA	JAPAN						KOREA		MEXICO
	TROLL	GILL NET	LONG LINE	POLE & LINE	PURSE SEINE	TROLL	UNSP. GEAR	GILL NET	LONG LINE	UNSP. GEAR
1952	71		26,687	41,787	154		237			
1953	5		27,777	32,921	38		132			
1954			20,958	28,069	23		38			
1955			16,277	24,236	8		136			
1956	17		14,341	42,810			57			
1957	8		21,053	49,500	83		151			
1958	74		18,432	22,175	8		124			
1959	212		15,802	14,252			67			
1960	5		17,369	25,156			76			
1961	4		17,437	18,639	7		268			0
1962	1		15,764	8,729	53		191			0
1963	5		13,464	26,420	59		218			0
1964	3		15,458	23,858	128		319			0
1965	15		13,701	41,491	11		121			0
1966	44		25,050	22,830	111		585			0
1967	161		28,869	30,481	89		520			
1968	1,028		23,961	16,597	267		1,109			
1969	1,365		18,030	31,912	521		935			0
1970	390		16,283	24,263	317		456			0
1971	1,746		11,524	52,957	902		308			0
1972	3,921	1	13,043	60,569	277		623			100
1973	1,400	39	16,795	68,767	1,353		495			0
1974	1,331	224	13,409	73,564	161		879			1
1975	111	166	10,318	52,152	159		228		2,463	1
1976	278	1,070	15,825	85,336	1,109		272		859	36
1977	53	688	15,696	31,934	669		355		792	0
1978	23	4,029	13,023	59,877	1,115		2,078		228	1
1979	521	2,856	14,215	44,662	125		1,126	0	259	1
1980	212	2,986	14,689	46,742	329		1,179	6	597	31
1981	200	10,348	17,922	27,426	252		663	16	459	8
1982	104	12,511	16,767	29,614	561		440	113	387	7
1983	225	6,852	15,097	21,098	350		118	233	454	33
1984	50	8,988	15,060	26,013	3,380		511	516	136	113
1985	56	11,204	14,351	20,714	1,533		305	576	291	49
1986	30	7,813	12,928	16,096	1,542		626	726	241	3
1987	104	6,698	14,702	19,082	1,205		155	817	549	7
1988	155	9,074	14,731	6,216	1,208		134	1,016	409	15
1989	140	7,437	13,104	8,629	2,521		393	1,023	150	2
1990	302	6,064	15,789	8,532	1,995		249	1,016	6	2
1991	139	3,401	17,046	7,103	2,652		392	852	3	2
1992	363	2,721	19,049	13,888	4,104		1,527	271	15	10
1993	494	287	29,966	12,797	2,889		867		32	11
1994	1,998	263	29,600	26,389	2,026		799		45	6
1995	1,720	282	29,075	20,981	1,177	856	81		440	5
1996	3,591	116	32,493	20,272	581	815	117		333	21
1997	2,433	359	38,951	32,238	1,068	1,585	123		319	53
1998	4,188	206	35,812	22,926	1,554	1,190	88		288	8
1999	2,641	289	33,364	50,369	6,872	891	127		107	23
2000	4,465	67	30,046	21,550	2,408	645	171		414	79
2001	4,985	117	28,818	29,430	974	416	96		82	22
2002	5,022	332	23,644	48,454	3,303	787	135		(113)	28
2003	6,735	126	20,954	36,114	627	922	106	(0)	(144)	28
2004	(7,842)	61	17,547	32,255	7,200	772	65	(0)	(68)	(104)
2005	(4,810)	(61)	(19,615)	(16,883)	(859)	(772)	(65)	(0)	(520)	(0)

Table 1 cont.

Table 1. Continued

YEAR	TAIWAN GILL NET	TAIWAN LONG LINE[2]	U.S. POLE & LINE	U.S. GILL NET	U.S. LONG LINE	U.S. PURSE SEINE	U.S. SPORT	U.S. TROLL	U.S. UNSP. GEAR	OTHERS LONG LINE[3]	OTHERS TROLL	GRAND TOTAL
1952					46		1,373	23,843				94,198
1953					23		171	15,740				76,807
1954					13		147	12,246				61,494
1955					9		577	13,264				54,507
1956					6		482	18,751				76,464
1957					4		304	21,165				92,268
1958					7		48	14,855				55,723
1959					5		0	20,990	0			51,328
1960					4		557	20,100	0			63,403
1961			2,837		5		1,355	12,055	1			52,608
1962			1,085		7		1,681	19,752	1			47,264
1963			2,432		7		1,161	25,140	0			68,906
1964			3,411		4		824	18,388	0			62,393
1965			417		3		731	16,542	0			73,032
1966			1,600		8		588	15,333	1			66,150
1967		330	4,113		12		707	17,814	0			83,096
1968		216	4,906		11		951	20,434	0			69,480
1969		65	2,996		14		358	18,827	0			75,023
1970		34	4,416		9		822	21,032	0			68,022
1971		20	2,071		11		1,175	20,526	0			91,240
1972		187	3,750		8		637	23,600	0			106,717
1973		--	2,236		14		84	15,653	0			106,836
1974		486	4,777		9		94	20,178	0			115,113
1975		1,240	3,243		33		640	18,932	10			89,696
1976		686	2,700		23		713	15,905	4			124,816
1977		572	1,497		37		537	9,969	0			62,799
1978		6	950		54		810	16,613	15			98,822
1979		81	303		--		74	6,781	0			71,004
1980	--	249	382		--		168	7,556	0			75,126
1981	--	143	748		25		195	12,637	0			71,042
1982	--	38	425		105		257	6,609	21			67,960
1983	--	8	607		6		87	9,359	0			54,527
1984	--	--	1,030		2	3,728	1,427	9,304	0			70,258
1985	--	--	1,498	2	0		1,176	6,415	0			58,170
1986	--	--	432	3			196	4,708	0			45,344
1987	2,514	--	158	5	150		74	2,766	0			48,986
1988	7,389	--	598	15	308		64	4,212	10			45,554
1989	8,350	40	54	4	249		160	1,860	23			44,140
1990	16,701	4	115	29	177	71	24	2,603	4			53,683
1991	3,398	12	0	17	313	0	6	1,845	71			37,253
1992	7,866	--	0	0	337	0	2	4,572	72			54,796
1993		5	0	0	440		25	6,254	0			54,067
1994		83	0	38	546		106	10,978	213		158	73,248
1995		4,280	80	52	883		102	8,045	1		137	68,197
1996		7,596	24	83	1,187	11	88	16,938	0	1,735	505	86,506
1997		9,119	73	60	1,652	2	1,018	14,252	1	2,824	404	106,534
1998		8,617	79	80	1,120	33	1,208	14,410	2	5,871	286	97,966
1999		8,186	60	149	1,540	48	3,621	10,060	1	6,307	261	124,916
2000		8,842	69	55	940	4	1,798	9,645	3	3,654	490	85,344
2001		8,684	139	94	1,295	51	1,635	11,210	0	1,471	127	89,648
2002		7,965	381	30	525	4	2,357	10,387		700	(127)	(104,295)
2003		(7,166)	59	16	524	44	2,214	14,102	0	(2,400)	(127)	(92,409)
2004		(4,988)	(126)	(12)	(560)	(1)	(1,506)	(13,346)	(0)	(2,400)	(127)	(88,981)
2005		(4,692)	(66)	(20)	(277)	(2)	(1,719)	(9,122)	(0)	(2,400)	(127)	(62,011)

Table 2

YEAR	AGE (yr)									TOTAL
	1	2	3	4	5	6	7	8	= 9	
1966	0	129	2,022	1,118	2,412	261	145	52	41	6,180
1967	0	210	2,293	1,552	2,820	579	171	97	72	7,794
1968	0	92	3,268	1,422	1,118	763	254	97	39	7,053
1969	1	2,046	2,584	1,232	2,493	197	191	194	53	8,990
1970	0	282	3,390	2,220	1,321	410	101	71	61	7,856
1971	0	208	4,634	2,424	2,831	388	175	70	81	10,810
1972	0	4,030	3,514	4,646	2,348	270	118	92	60	15,078
1973	1	2,583	3,619	1,531	4,030	743	141	90	74	12,812
1974	0	1,128	4,483	5,653	1,538	754	153	57	96	13,863
1975	0	828	5,222	2,912	1,907	264	111	78	259	11,581
1976	0	2,325	4,937	5,767	2,766	285	165	106	186	16,538
1977	0	741	2,919	1,955	1,106	426	132	91	160	7,531
1978	2	5,931	2,125	4,729	1,018	387	185	45	83	14,505
1979	0	580	1,215	3,623	1,257	265	190	101	68	7,300
1980	0	2,518	2,830	3,160	801	311	110	87	97	9,916
1981	4	898	1,509	2,854	1,095	450	270	106	115	7,301
1982	78	599	1,949	3,408	435	255	200	213	134	7,272
1983	2	1,182	2,552	2,306	232	186	196	146	141	6,945
1984	5	1,111	4,571	3,031	241	177	126	131	156	9,550
1985	2	318	1,235	2,776	641	118	166	100	325	5,681
1986	0	794	906	2,461	204	128	127	90	131	4,840
1987	1	265	2,155	1,296	474	314	176	102	169	4,953
1988	4	133	1,529	1,156	270	606	223	161	181	4,264
1989	106	377	316	1,335	1,012	276	246	133	158	3,959
1990	109	317	239	1,151	1,606	641	113	213	247	4,635
1991	78	678	1,747	335	339	263	155	119	271	3,984
1992	1	332	2,350	1,664	662	360	150	151	156	5,826
1993	0	485	1,090	1,971	793	202	201	116	293	5,151
1994	28	669	1,575	2,355	1,077	654	206	97	136	6,798
1995	2	496	1,310	3,152	294	310	564	116	119	6,362
1996	8	494	3,938	2,294	603	396	554	477	105	8,869
1997	0	2,453	1,431	4,451	817	124	476	620	391	10,764
1998	0	1,105	4,036	1,568	1,880	302	213	379	282	9,766
1999	77	816	3,761	5,797	757	478	477	185	308	12,656
2000	0	1,231	1,852	2,739	923	415	450	435	247	8,292
2001	4	1,470	4,370	1,396	1,153	410	451	277	338	9,869
2002	0	1,447	7,396	3,141	439	226	381	209	222	13,461
2003	0	3,054	3,619	3,008	709	306	250	181	194	11,321
2004	30	210	4,411	4,363	282	452	332	130	44	10,253
2005	1	2,382	1,547	2,318	305	171	437	189	69	7,418
TOTAL	543	46,948	110,447	106,273	47,010	14,522	9,484	6,404	6,365	347,996

Table 3

YEAR	AGE (yr)								
	1	2	3	4	5	6	7	8	=9
1966	25,148	20,076	9,549	8,963	5,558	1,035	424	166	131
1967	29,475	18,630	14,762	5,352	5,685	2,083	545	191	142
1968	33,293	21,836	13,622	8,980	2,647	1,842	1,052	259	105
1969	46,100	24,664	16,098	7,312	5,439	1,018	720	563	154
1970	22,784	34,151	16,522	9,721	4,365	1,930	586	371	322
1971	40,983	16,879	25,058	9,353	5,312	2,113	1,081	348	401
1972	39,890	30,361	12,325	14,614	4,869	1,562	1,235	651	427
1973	40,054	29,551	19,050	6,147	6,887	1,632	927	814	669
1974	27,404	29,672	19,683	11,028	3,253	1,735	583	566	958
1975	39,421	20,302	21,015	10,766	3,424	1,116	650	302	999
1976	30,252	29,204	14,331	11,128	5,502	941	602	387	676
1977	35,167	22,411	19,646	6,435	3,405	1,752	455	306	539
1978	21,530	26,052	15,968	12,063	3,108	1,585	936	224	413
1979	24,512	15,948	14,252	10,014	4,940	1,440	845	536	363
1980	18,877	18,159	11,318	9,519	4,353	2,591	840	464	522
1981	25,360	13,984	11,302	5,978	4,374	2,542	1,654	528	574
1982	29,433	18,784	9,591	7,084	2,028	2,310	1,499	995	628
1983	24,877	21,738	13,402	5,445	2,382	1,132	1,493	939	907
1984	12,774	18,427	15,092	7,753	2,088	1,566	680	938	1,123
1985	22,816	9,460	12,700	7,301	3,182	1,341	1,009	396	1,282
1986	18,306	16,901	6,735	8,352	3,062	1,812	892	606	881
1987	11,247	13,562	11,841	4,216	4,099	2,094	1,233	553	913
1988	9,944	8,331	9,819	6,935	2,024	2,631	1,283	763	855
1989	31,762	7,364	6,058	5,969	4,151	1,269	1,433	760	907
1990	32,674	23,439	5,132	4,218	3,286	2,215	705	852	987
1991	25,211	24,112	17,092	3,598	2,146	1,084	1,097	426	971
1992	21,691	18,610	17,282	11,169	2,378	1,300	580	680	704
1993	27,488	16,068	13,502	10,796	6,854	1,200	657	302	765
1994	39,176	20,363	11,488	9,071	6,317	4,400	717	317	444
1995	19,968	28,999	14,513	7,165	4,718	3,761	2,701	356	366
1996	39,051	14,791	21,057	9,631	2,652	3,244	2,521	1,521	335
1997	27,849	28,923	10,535	12,243	5,184	1,451	2,065	1,396	881
1998	20,315	20,631	19,329	6,582	5,303	3,143	969	1,124	835
1999	35,829	15,049	14,338	10,882	3,542	2,338	2,070	536	892
2000	37,451	26,476	10,450	7,425	3,202	1,979	1,325	1,127	640
2001	34,645	27,744	18,559	6,163	3,183	1,589	1,113	601	733
2002	47,549	25,662	19,295	10,031	3,378	1,383	828	444	470
2003	16,034	35,225	17,772	8,042	4,767	2,127	831	293	314
2004	51,304	11,878	23,484	10,083	3,414	2,927	1,315	404	136
2005	27,722	37,981	8,620	13,638	3,791	2,288	1,782	692	252
2006	27,722	20,517	26,099	5,067	8,126	2,547	1,549	949	481

Table 4

YEAR	AGE (yr)								
	1	2	3	4	5	6	7	8	=9
1966	0.000	0.007	0.279	0.155	0.681	0.341	0.496	0.439	0.439
1967	0.000	0.013	0.197	0.404	0.827	0.383	0.446	0.859	0.859
1968	0.000	0.005	0.322	0.201	0.656	0.639	0.324	0.561	0.561
1969	0.000	0.101	0.204	0.216	0.736	0.252	0.362	0.499	0.499
1970	0.000	0.010	0.269	0.304	0.426	0.280	0.222	0.247	0.247
1971	0.000	0.014	0.239	0.353	0.924	0.237	0.207	0.263	0.263
1972	0.000	0.166	0.396	0.452	0.793	0.222	0.117	0.177	0.177
1973	0.000	0.106	0.247	0.337	1.079	0.729	0.192	0.137	0.137
1974	0.000	0.045	0.303	0.870	0.770	0.682	0.359	0.123	0.123
1975	0.000	0.048	0.336	0.371	0.992	0.317	0.218	0.354	0.354
1976	0.000	0.096	0.501	0.884	0.844	0.427	0.376	0.379	0.379
1977	0.000	0.039	0.188	0.428	0.465	0.327	0.406	0.415	0.415
1978	0.000	0.303	0.167	0.593	0.470	0.329	0.257	0.263	0.263
1979	0.000	0.043	0.104	0.533	0.345	0.238	0.299	0.244	0.244
1980	0.000	0.174	0.338	0.478	0.238	0.149	0.164	0.242	0.242
1981	0.000	0.077	0.167	0.781	0.339	0.228	0.208	0.262	0.262
1982	0.003	0.038	0.266	0.790	0.283	0.136	0.167	0.282	0.282
1983	0.000	0.065	0.247	0.659	0.119	0.210	0.164	0.197	0.197
1984	0.000	0.072	0.426	0.590	0.143	0.140	0.240	0.175	0.175
1985	0.000	0.040	0.119	0.569	0.263	0.107	0.209	0.344	0.344
1986	0.000	0.056	0.168	0.412	0.080	0.085	0.179	0.188	0.188
1987	0.000	0.023	0.235	0.434	0.143	0.189	0.180	0.239	0.239
1988	0.000	0.019	0.198	0.213	0.167	0.307	0.224	0.279	0.279
1989	0.004	0.061	0.062	0.297	0.328	0.287	0.221	0.224	0.224
1990	0.004	0.016	0.055	0.375	0.809	0.403	0.204	0.338	0.338
1991	0.004	0.033	0.125	0.114	0.201	0.326	0.178	0.385	0.385
1992	0.000	0.021	0.170	0.188	0.384	0.382	0.351	0.294	0.294
1993	0.000	0.036	0.098	0.236	0.143	0.215	0.430	0.576	0.576
1994	0.001	0.039	0.172	0.354	0.219	0.188	0.401	0.431	0.431
1995	0.000	0.020	0.110	0.694	0.075	0.100	0.274	0.467	0.467
1996	0.000	0.039	0.242	0.319	0.303	0.152	0.291	0.445	0.445
1997	0.000	0.103	0.170	0.537	0.200	0.104	0.308	0.703	0.703
1998	0.000	0.064	0.274	0.320	0.519	0.118	0.292	0.487	0.487
1999	0.003	0.065	0.358	0.923	0.282	0.268	0.308	0.503	0.503
2000	0.000	0.055	0.228	0.547	0.401	0.276	0.491	0.580	0.580
2001	0.000	0.063	0.315	0.301	0.534	0.351	0.619	0.743	0.743
2002	0.000	0.067	0.575	0.444	0.162	0.209	0.739	0.768	0.768
2003	0.000	0.105	0.267	0.557	0.188	0.181	0.422	1.192	1.192
2004	0.001	0.021	0.243	0.678	0.100	0.196	0.342	0.461	0.461
2005	0.001	0.075	0.231	0.218	0.098	0.090	0.331	0.375	0.375

Table 5a

Candidate Target Reference Points	Target *F* (yr^{-1})	Ratio of Current *F* to Target *F*	MSY Proxy (1,000 mt)	SSB_{MSY} Proxy (1,000 mt)
$F_{40\%}$	0.32	2.31	75	226
$F_{35\%}$	0.38	1.97	79	198
$F_{0.1}$	0.45	1.68	83	171
$F_{30\%}$	0.45	1.67	83	169

Candidate Limit Reference Points	Limit *F* (yr-1)	Ratio of Current *F* to Limit *F*	Equilibrium Catch (1,000 mt)	Equilibrium *SSB* (1,000 mt)
$F_{20\%}$	0.65	1.16	91	113
F_{Max}	2.07	0.36	100	10
$F_{SSB\text{-}Min}$	0.81	0.93	94	83
$F_{SSB\text{-}10\%}$	0.70	1.07	92	102
$F_{SSB\text{-}25\%}$	0.66	1.14	91	110

Table 5b

BRPs	2006	2004	2004	2004	2004
Productivity in recent years	Average	Low	High	Low	High
F_{cur} Scenario	0.75	Low 0.43	Low 0.43	High 0.68	High 0.68
$F_{cur}/F_{40\%}$	2.31	1.43	1.43	2.27	2.27
$F_{cur}/F_{35\%}$	1.97	1.23	1.23	1.94	1.94
$F_{cur}/F_{0.1}$	1.68	1.16	1.16	1.84	1.84
$F_{cur}/F_{30\%}$	1.67	1.02	1.02	1.62	1.62
$F_{cur}/F_{20\%}$	1.16	0.70	0.70	1.11	1.11
F_{cur}/F_{max}	0.36	0.40	0.40	0.64	0.64
$F_{cur}/F_{SSB\text{-}Min}$	0.93	0.48	0.41	0.76	0.65
$F_{cur}/F_{SSB\text{-}10\%}$	1.07	0.52	0.44	0.83	0.69
$F_{cur}/F_{SSB\text{-}25\%}$	1.14	0.60	0.50	0.94	0.79
$F_{cur}/F_{SSB\text{-}50\%}$	1.34	0.80	0.64	1.26	1.01

Table 6a

YEAR	AGE (yr)								
	1	2	3	4	5	6	7	8	9+
1966	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	29.73
1967	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	29.73
1968	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	29.73
1969	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	29.73
1970	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	29.73
1971	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	29.73
1972	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	29.73
1973	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	29.73
1974	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	30.13
1975	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	30.13
1976	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	30.13
1977	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	30.13
1978	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	30.13
1979	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	30.46
1980	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	30.46
1981	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	30.46
1982	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	30.46
1983	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	30.46
1984	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	30.52
1985	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	30.52
1986	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	30.52
1987	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	30.52
1988	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	30.52
1989	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	29.67
1990	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	29.67
1991	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	29.67
1992	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	29.67
1993	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	29.67
1994	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	28.86
1995	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	28.86
1996	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	28.86
1997	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	28.86
1998	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	28.86
1999	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	28.10
2000	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	28.10
2001	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	28.10
2002	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	28.10
2003	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	28.10
2004	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	28.03
2005	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	28.03
2006	1.26	3.23	5.93	9.13	12.62	16.20	19.75	23.17	28.03

Table 6b

YEAR	AGE (yr)								
	1	2	3	4	5	6	7	8	9+
1966	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.24
1967	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.24
1968	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.24
1969	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.24
1970	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.24
1971	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.24
1972	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.24
1973	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.24
1974	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.61
1975	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.61
1976	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.61
1977	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.61
1978	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.61
1979	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.91
1980	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.91
1981	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.91
1982	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.91
1983	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.91
1984	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.97
1985	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.97
1986	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.97
1987	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.97
1988	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.97
1989	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.19
1990	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.19
1991	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.19
1992	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.19
1993	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	31.19
1994	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	30.44
1995	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	30.44
1996	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	30.44
1997	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	30.44
1998	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	30.44
1999	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	29.74
2000	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	29.74
2001	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	29.74
2002	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	29.74
2003	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	29.74
2004	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	29.68
2005	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	29.68
2006	2.26	4.76	7.86	11.30	14.88	18.44	21.88	25.13	29.68

Table 6c

Period	Mean F on Age group 9+	Age group 9+ equilibrium demographics					
		Biomass (January 1)			Spawning stock biomass (May 1)		
		Mean age (yr)	Mean length (cm)	Mean weight (kg)	Mean age (yr)	Mean length (cm)	Mean weight (kg)
2002-2004	0.7501	9.54	115.60	**28.03**	9.87	117.10	**29.68**
1999-2003	0.7236	9.56	115.70	**28.10**	9.89	117.20	**29.74**
1994-1998	0.4981	9.82	116.87	**28.86**	10.15	118.30	**30.44**
1989-1993	0.3457	10.10	118.09	**29.67**	10.44	119.47	**31.19**
1984-1988	0.2374	10.41	119.35	**30.52**	10.74	120.66	**31.97**
1979-1983	0.2437	10.38	119.26	**30.46**	10.72	120.58	**31.91**
1974-1978	0.2826	10.26	118.77	**30.13**	10.60	120.11	**31.61**
1966-1973	0.3370	10.12	118.18	**29.73**	10.46	119.55	**31.24**

Table 7

SSB Threshold Desired		Probability Level Desired 50%	95%
Minimum Observed SSB	$F_{SSB\text{-}Min}$	0.81	0.64
Lower 10th Percentile	$F_{SSB\text{-}10\%}$	0.70	0.55
Lower 25th Percentile	$F_{SSB\text{-}25\%}$	0.66	0.51
Median	$F_{SSB\text{-}50\%}$	0.56	0.39

Agenda Item F.4.c
HMSAS Report
September 2007

HIGHLY MIGRATORY SPECIES ADVISORY SUBPANEL REPORT ON NORTH PACIFIC ALBACORE TUNA STOCK ASSESSMENT

The Highly Migratory Species Advisory Subpanel (HMSAS) generally agreed to follow the lead of the HMSMT and support the establishment of international reference points for North Pacific Albacore.

The HMSAS discussed and was concerned by the August 2, 2007, Inter-American Tropical Tuna Commission (IATTC) General Advisory Committee (GAC) conference call where it was suggested effort be reduced from by 10-30 percent. The HMSAS is concerned that that in the absence of a thoughtfully designed management program, if, in the future, the stock is declared to be in an overfished state, reactive and draconian measures would have to be implemented.

Despite how other countries fish, the U.S. is locked into and restricted by the provisions of the Magnuson-Stevens Fishery Conservation and Management Act. Other participating countries are not encumbered by such laws. In the North Pacific, the Japanese and U.S. are the major participants and need to take the lead. The U.S. Departments of Commerce and State need to put forth more effort in this regard, especially by encouraging Japan and others to cooperate in responsible harvesting.

The HMSAS also emphasizes the importance of getting accurate information of the catch and landings of the illegal, unregulated, and unreported vessels operating in the North Pacific.

PFMC
08/23/07

HIGHLY MIGRATORY SPECIES MANAGEMENT TEAM REPORT ON THE NORTH PACIFIC ALBACORE STOCK ASSESSMENT

The Highly Migratory Species Management Team (HMSMT) received a presentation by Dr. Paul Crone on the results of the latest stock assessment of North Pacific albacore. The assessment was conducted during the December 2006 meeting of the International Scientific Committee's (ISC) Albacore Working Group. The VPA-2Box model was used for the assessment as it was for the previous assessment. The results were generally similar to those of the previous assessment which was conducted by the North Pacific Albacore Workshop in 2004: 1) the estimated spawning stock biomass (SSB) of 153,000 mt for 2006 is near its highest level throughout the history of the data series (1966-2005), and 2) fishing mortality rate is high ($F_{17\%}$) relative to many commonly used reference points for tunas and tuna-like species. There is considerable uncertainty in the assessment, which may be attributed to recruitment variability and the inability to predict future recruitment. Future SSB projections, based on the average productivity of the stock over the time series and the current fishing mortality rate, estimate that SSB will decline to an equilibrium value of roughly 92,000 mt by 2015. The projected equilibrium value is somewhat below the long-term (1966-2005) average SSB of 100,000 mt.

The ISC Plenary reviewed the assessment results and concluded that given that F is high relative to most commonly used F reference points, that fishing mortality may need to be reduced. However, the ISC did not make recommendations regarding when, how, or to what degree reductions in F should be achieved. The degree to which reductions in fishing effort are necessary depends in part on the objectives of Regional Fishery Management Organizations managing the stocks. Neither the Inter-American Tropical Tuna Commission (IATTC) nor the Western and Central Pacific Fisheries Commission (WCPFC) have reviewed the assessment results, which were only made available during the July 2007 meeting of the ISC.

The HMSMT suggests that the Council, through the U.S. delegations, request the IATTC and WCPFC to review the albacore assessment during their upcoming meetings (scheduled for October 22-24 and December 3-7, respectively) and decide on their respective management objectives. However, for the WCPFC, Council input to the September 11-13 Northern Committee meeting is also important. The HMSMT suggests that the Council try to immediately communicate its recommendations to the U.S. delegation attending that meeting. The HMSMT supports the conclusion of the ISC Plenary that fishing mortality may need to be decreased to maintain biomass levels above a reference level consistent with management goals. However, those reference levels have yet to be established for North Pacific albacore. Similarly, reference points have yet to be established for many of the management unit species in the Council's Fishery Management Plan for U.S. West Coast Fisheries for Highly Migratory Species (HMS FMP). The HMSMT urges the Council to request that the IATTC and WCPFC continue to work toward developing reference points for North Pacific albacore and other HMS.

With respect to the IATTC and WCPFC resolutions currently in place, the HMSMT and National Marine Fisheries Service Southwest Fisheries Science Center staff have done considerable work in defining the current level of fishing effort of the U.S. fleets on North

Pacific albacore in order to demonstrate that the U.S. is complying with the resolutions. The HMSMT suggests that the Council request that the IATTC and WCPFC require similar response of their member nations in order to demonstrate compliance. In addition, the IATTC and WCPFC should clarify what metric is to be used to define “recent effort.”

In summary, the HMSMT suggests that the Council make the following recommendations to the IATTC and WCPFC, through the US delegations, regarding North Pacific albacore. Recommendations to the WCPFC’s Northern Committee should be made immediately in order to be considered at their meeting of September 11-13.

1. Review the latest stock assessment;
2. Define management objectives for North Pacific albacore;
3. Work toward developing reference points for North Pacific albacore, as well as for other highly migratory species;
4. Clarify what is meant by “recent effort levels” for compliance with current resolutions;
5. Require documentation of compliance with current resolutions from all members;
6. Consider the conclusions of the ISC that fishing mortality may need to be decreased.

PFMC
08/23/07

SCIENTIFIC AND STATISTICAL COMMITTEE REPORT ON NORTH PACIFIC ALBACORE TUNA STOCK ASSESSMENT

The Scientific and Statistical Committee (SSC) was given a presentation on the Report of the Albacore Working Group of the International Scientific Committee (ISC) for Tuna and Tuna-Like Species in the North Pacific Ocean by Dr. Ray Conser (SWFSC).

The stock assessment of albacore tuna was conducted using the processes of the ISC and not those of the Pacific Fishery Management Council (Council). It involved the application of the package VPA-2BOX to catch-at-age data inferred from catch-at-length data and seventeen catch-rate indices. Although the current level of fishing mortality ($F_{17\%}$) was estimated to exceed many conventional fishing mortality references points, no agreed reference points currently exist for albacore tuna in the North Pacific. In addition, the spawning stock biomass was estimated to be at a high level at present and increasing.

The information provided in Agenda Item F.4.a, Attachment 2 was insufficient for the SSC to conduct a full review of the assessment. In particular, although eighteen background documents were presented to the ISC Working Group, and typical assessment outputs were examined in detail, the final report did not include this information, being largely a summary document. Therefore, given the lack of information, the SSC is unable to determine whether this assessment represents the best available science. Consequently, the SSC is unable to endorse the assessment at present.

Given the volume of information expected from a full highly migratory species (HMS) assessment, it is not be feasible for the SSC to review an HMS assessment during its normal meeting and a special meeting of the HMS subcommittee would likely be required to conduct a thorough review of the material.

A different approach than the SSC reviewing the summary document of the ISC meeting needs to be taken if the Council wishes the SSC to take a larger, and more rigorous, role in the review of assessments of HMS species conducted by international entities. For example, a member of the SSC could participate in the ISC Working Group and provide a report for Council consideration. This would provide for the maximum amount of direct SSC involvement in the review process. Alternatively, Terms of Reference (TOR) for HMS stock assessments could be developed by the SSC HMS subcommittee. Following approval by the Council, the Council could encourage, through the U.S. delegation, that the ISC modify its TOR for albacore assessments along the lines of the Council-developed TOR. The ISC Working Group would require sufficient lead time to modify its practices in order to satisfy changes to its TOR. Although there can be no guarantee that the ISC would adopt TOR for HMS assessments developed by the SSC, assessment reports produced following such TOR would provide a more rigorous basis for reviewing the assessment, although not to the extent a full Stock Assessment Review Panel Review.

Finally, the Working Group report noted that work is being conducted to apply the Stock Synthesis 2 (SS2) approach to albacore tuna in the North Pacific. The SSC encourages further work along these lines.