

HIGHLY MIGRATORY SPECIES MANAGEMENT TEAM
REPORT ON ALBACORE MANAGEMENT FRAMEWORK

1 Introduction

In June 2011 the Council tasked the Highly Migratory Species Management Team (HMSMT) and HMS Advisory Subpanel (HMSAS) to begin developing a proactive management framework for North Pacific albacore (NPA), which could be proposed at the international level through U.S. delegations. At that time the Council had not yet received the results of the most recent North Pacific albacore stock assessment, adopted by the International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean (ISC) in July 2011.

Discussion of the development of the framework has been scheduled on the March 2012 Council meeting agenda. The HMSMT met January 10-12, 2012, in La Jolla, California and began gathering information to prepare a report for the Council. The HMSMT will discuss their report with the HMSAS when they meet in advance of the March Council meeting. This will allow the HMSAS to provide input on the HMSMT's work. The HMSMT may also draft a supplemental report based on these discussions, and to summarize recommendations based on its work so far.

This HMSMT report addresses the Council's request by presenting information on the following topics:

- Section 2: A problem statement outlining potential Council tasks relative to developing a management framework
- Section 3: Past reports received by the Council relevant to albacore management
- Section 4: Activities at the international level contributing to the development of a management framework for albacore in the North Pacific
- Section 5: A description of existing management objectives articulated by the Inter-American Tropical Tuna Commission (IATTC) and Western and Central Pacific Fisheries Commission (WCPFC) and by the Council in the Fishery Management Plan for West Coast Fisheries for Highly Migratory Species (HMS FMP)
- Section 6: Aspects of the U.S. Canada Albacore Treaty relevant to an international management framework
- Section 7: A discussion of candidate fishing mortality based reference points identified by the ISC Albacore Working Group (AWG)
- Section 8: A review of possible management responses to overfishing
- Section 9: A discussion of potential management responses when a reference point is exceeded
- Section 10: Research needs related to developing a management framework

The HMSMT will submit a supplemental report with recommendations based on the information compiled in the current report.

2 Problem Statement

The WCPFC Northern Committee (NC) has set a goal of developing the management framework for North Pacific albacore over the next 2-3 years, and potentially implementing it by proposing a new or revised conservation measure to replace Conservation and Management Measure (CMM) 2005-03. The Council could engage with this process in the following ways:

- Develop recommendations for target and limit reference points consistent with U.S. policy and the HMS FMP management framework.
- Identify consistent control rules and related management measures that do not disproportionately or inequitably constrain U.S. fisheries. A starting point for recommendations would be whether measures should be effort- or catch-based.
- Specify how international measures would be implemented domestically, should fishery constraints be implemented at the international level.

As noted, at the NC level the framework will be developed over several years, so at this point the specifics of such a framework, and even whether an effective framework will be developed, are unknown. Implementation throughout the North Pacific would require complementary action by the IATTC. The Council will need to consider the timing of its recommendations and feedback from U.S. delegations to have an effective voice in the international process.

3 Supporting Analyses

The Council has received several reports relevant to the status and management of North Pacific albacore:

- In November 2009 the Council received a report summarizing management options based on a White Paper prepared under contract to National Marine Fisheries Service (NMFS) by Michael Laurs and Joseph Powers. The report was intended to help the Council develop a framework process to maintain or limit fishing effort by the West Coast albacore fishery. The HMSAS submitted a November 2009 report to the Council providing input on the White Paper.
- In April 2010 the Council considered initiating the development of a license limitation program for the west coast fishery. The Council decided not to move forward with developing a limited entry program, but they asked the HMSMT to begin collecting information relative to U.S. proposals for albacore conservation and management at the international regional fishery management organization level and appropriate domestic management measures, should action be necessary in response to an updated stock assessment scheduled for 2011.
- The HMSAS and HMSMT submitted reports to the Council in April 2010 on consideration of effort limitation in the West Coast albacore fishery.
- In June 2011 the Council received a report on the economic status of the west coast commercial albacore fishery, prepared under contract to NMFS by Lisa Wise Consulting Inc.
- In September 2011 the Council received an ISC report on the stock status of North Pacific albacore.

4 International Management Responses

In 2005 the ISC Plenary adopted a stock assessment for North Pacific albacore (NPA). The stock assessment modeled several different scenarios due to uncertainty about the level of fishing mortality and stock productivity. However, in its conclusion the authors stated that potentially declining biomass “coupled with a current fishing mortality rate (F_{2003}) that is high relative to commonly used reference points, may be cause for concern regarding the current stock status of NPA. Future conditions are less well known, but if rates of F continue at assumed levels, it is unlikely that the SSB [spawning stock biomass] will rebuild to SSB_{MSY} levels within a 5-year time horizon.” That year, at its second plenary meeting, the WCPFC adopted CMM 2005-03 calling on members “...to ensure that the level of fishing effort by their vessels fishing for North Pacific albacore in the WCPF Convention Area is not increased beyond current levels” based on a proposal submitted by the United States. The IATTC followed suit with Resolution C-05-02, which has substantially the same objective with respect to constraining fishing effort. In 2007 the ISC adopted a new stock assessment for NPA (completed in 2006) indicating that the estimate of current fishing mortality ($F_{2002-2004}$) was high relative to most commonly accepted reference points.

Throughout this period, participants in the international fishery management process stressed the need for RFMOs to adopt reference points for the stock. In 2005 the ISC recommended:

Future SSB [spawning stock biomass] can be maintained at or above the minimum ‘observed’ SSB (43,000 t in 1977) with F ’s slightly higher than the current F range. However, the lowest ‘observed’ SSB estimates all occurred in late 1970’s and may be the least reliable estimates of SSB. A more robust SSB threshold could be based on the lower 10th or 25th percentile of ‘observed’ SSB. If so done, current F should maintain SSB at or above the 10th percentile threshold but a modest reduction from current F may be needed to maintain SSB at or above the 25th percentile threshold.

In 2008, the Northern Committee agreed on an interim management objective for NPA to maintain SSB above the average level of its 10 historically lowest points ($ATHL_{1996-2005}$). This differs from the ISC recommendation because it uses the average of the 10 historically lowest years for SSB rather than the 10th percentile. The fishing mortality rate associated with the objective (F_{ATHL}) was calculated by the ISC Albacore Working Group using a simulation to find the rate at which there is a 50 percent probability of SSB falling below $ATHL$ during the projection period. The associated F (0.75) was approximately equal to the current fishing mortality rate ($F_{2002-2004}$) in the 2006 assessment.

In 2010, at the request of the NC, the ISC Albacore Working Group prepared a paper reviewing a suite of candidate reference points. The NC held a 1-day workshop that year to discuss reference points for northern stocks. At this meeting no agreement was reached on a reference point to replace the interim reference point for NPA. The U.S. urged the adoption of reference points related to MSY over simulation-based reference points (like the interim one), because of the number of subjective decisions required in structuring the simulation and the fact that such reference points are not explicitly related to the stock’s life history characteristics. In contrast, Japan viewed the interim reference point as too precautionary to be treated as a limit reference

point, given the current high level of SSB. This position may have been influenced by the assumption that when a limit reference point is reached, fishing mortality must be reduced to 0.

At the reference point workshop Canada tabled a paper on developing a management framework for North Pacific stocks, emphasizing the precautionary approach, defined as “being cautious when scientific knowledge is uncertain, and not using the absence of adequate scientific information as a reason to postpone, or fail to take action, to avoid serious harm to fish stocks or their ecosystem.” Figure 1 is a diagrammatic representation of the Canadian proposal. It indicates management responses (scaling the removal rate, or F) in relation to a target reference point (the “removal reference”) and a limit reference point. The proposal discusses the need to explicitly account for uncertainty/risk in management and to establish pre-agreed decision rules, or what is commonly referred to as a control rule in the U.S. fishery management context. Figure 1 is similar to Figure 4-1 in the HMS FMP (diagramming MSY and OY control rules outlined in the FMP), although the FMP figure attaches values to the axes in terms of F/F_{MSY} (Y-axis) and B/B_{MSY} (X-axis).

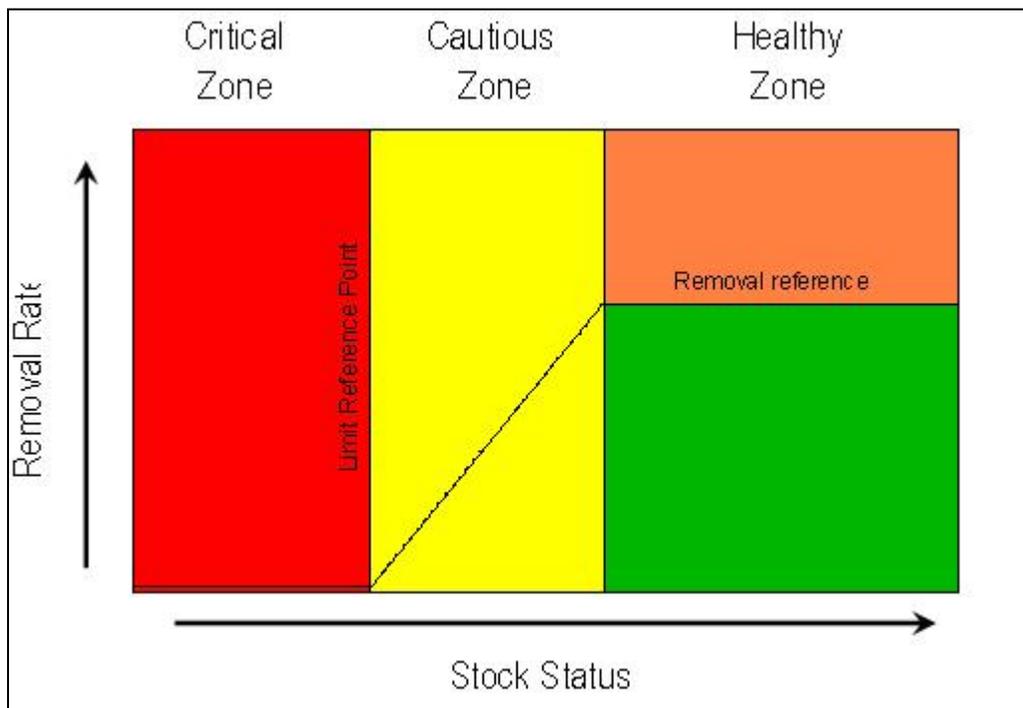


Figure 1. Diagram of proposed management framework for Northern Committee stocks proposed by Canada (WCPFC NC-6-DP-02).

In 2011, the ISC adopted a stock assessment that showed F had declined from the previously estimated level. Simulation indicated that the current fishing mortality rate ($F_{2006-2008}$) “is about 30% lower than the F that will result in future SSB falling below the SSB-ATHL threshold level at least once during the 2010-2035 projection period.”

At the 2011 Northern Committee meeting, Canada followed up their management framework proposal with one specific to NPA. This proposal was adopted by the NC and incorporated into their work plan for the period 2011 to 2014, when the next albacore stock assessment is expected. As incorporated into the work plan it has three elements:

- Annually: Better estimate NPA catch and related fishing effort by members in relation to the objective of CMM 2005-03, based on improved annual reporting of catch/effort by members.
- Discuss in 2012, finalize in 2013: Develop reference points consistent with the management framework.
- Discuss in 2012, finalize in 2013: Develop decision rules for each of the limit reference points specifying what actions to take in the event a particular reference point is breached.

These elements are timed to support revisions to the conservation measure (CMM 2005-03) in 2014 when the next stock assessment is due to be completed.

In addition to these developments in the NC, IATTC staff has noted that the companion Resolution could be revised to make it more effective. For example, while the objective of the resolution is to control fishing effort, reporting is couched in terms of catch. However, at this stage no proposals similar to what was adopted by the NC have been introduced at the IATTC.

At the second global summit of Tuna Regional Fishery Management Organizations (RFMOs) a Strategy Matrix was proposed to provide a format to convey key science advice to RFMOs for decision-making (the meeting is referred to as Kobe II). In the proposal, an RFMO specifies a management target, such as a reference point, for each fishery, and the Strategy Matrix presents specific management measures to meet the target with a certain probability by a certain time. An RFMO determines the range of probabilities and timeframes to be evaluated and reported in the matrix. For fisheries managed under total allowable catches (TACs), the resulting management measures would be the various TACs that would achieve the management target, given the range of probabilities and timeframes. For fisheries managed by effort limitations, the resulting management measures would be various fishing effort levels or time/area closures,

Under this proposal, managers would be able to base management decisions upon the level of risk and the timeframe they determine are appropriate for that fishery, which is consistent with the proposal adopted by the NC.

5 Existing Management Objectives

5.1 RFMO Conventions

The WCPF Convention describes general management objectives in articles 5 and 6. Article 5 references the United Nations (U.N.) Law of the Sea Convention and U.N. Fish Stocks Agreement. A key objective stated in article 5 is to manage HMS for long-term sustainability using the best scientific information and “maintain or restore stocks at levels capable of producing maximum sustainable yield, as qualified by relevant environmental and economic factors...” (This is similar to the optimum yield concept defined in the Magnuson-Stevens Act.) Article 6 describes the precautionary approach, under which the Commission shall “determine, on the basis of the best scientific information available, stock-specific reference points and the action to be taken if they are exceeded” and account for uncertainty in such determinations. Article 7 states “The principals and measures for conservation and management enumerated in

article 5 shall be applied by coastal States within areas under national jurisdiction...” and article 8 states that “Conservation and management measures established for the high seas and those adopted for areas under national jurisdiction shall be compatible in order to ensure conservation and management of highly migratory fish stocks in their entirety.”

Article II of the Antigua Convention¹ establishes the objective “to ensure the long-term conservation and sustainable use of the fish stocks covered by this Convention, in accordance with the relevant rules of international law.” Article IV calls for the application of the precautionary approach. Article VII (Functions of the Commission) states in paragraph (c) that the Commission shall “adopt measures that are based on the best scientific evidence available to ensure the long-term conservation and sustainable use of the fish stocks covered by this Convention and to maintain or restore the populations of harvested species at levels of abundance which can produce the maximum sustainable yield, *inter alia*, through the setting of the total allowable catch of such fish stocks as the Commission may decide and/or the total allowable level of fishing capacity and/or level of fishing effort for the Convention Area as a whole.” Article 5 states “conservation and management measures established for the high seas and those adopted for areas under national jurisdiction shall be compatible, in order to ensure the conservation and management of the fish stocks covered by this Convention.”

5.2 HMS FMP

Among the management goals and objectives enumerated in section 2.2 of the HMS FMP are:

- Promote and actively contribute to international efforts for the long-term conservation and sustainable use of highly migratory species fisheries that are utilized by West Coast-based fishers, while recognizing these fishery resources contribute to the food supply, economy, and health of the nation.
- Implement harvest strategies which achieve optimum yield for long-term sustainable harvest levels.

Chapter 4, as amended, (Preventing Overfishing and Achieving Optimum Yield) describes the framework for establishing reference points including MSY, OY and status determination criteria.

6 Relevance of U.S.-Canada Treaty to Developing a Management Framework

Reciprocal access privileges for U.S. and Canadian vessels under the U.S.-Canada Albacore Treaty expired at the end of 2011 with no replacement. The U.S. and Canada historically have cooperated closely at the international level with respect to NPA management. How any suspension of access privileges would affect this relationship cannot be predicted. An Exchange of Notes also established the principal “that the portion of any national allocation received by Canada and the United States attributable to the catch taken in the EEZ of the other country shall be reallocated by each country to the country in whose EEZ that catch was taken...” This could

¹ Convention for the Strengthening of the Inter-American Tropical Tuna Commission Established by the 1949 Convention between the United States of America and the Republic of Costa Rica

take effect if a management framework involving national allocations were implemented by the IATTC through a complementary measure.

Annex C to the Albacore Treaty states in section 6, “a Party may only terminate the Regime, by providing written notice to the other Party that:

- i. an international fisheries management organization with competence over highly migratory species such as the Inter-American Tropical Tuna Commission has adopted a fisheries conservation and management measure for North Pacific Albacore that requires one or both Parties to adopt a domestic management regime, structure or measure that may not be consistent with or may undermine the implementation of the Regime, or
- ii. as a result of domestic fisheries management requirements, regulation or laws, a Party must put in place measures for managing fisheries on albacore or associated species that may not be consistent with or may undermine the implementation of the Regime.”

However, since the current Fishing Regime (Annex C to the Treaty) expired at the end of 2011, these provisions are not applicable unless a new regime with these provisions is agreed to.

7 Review of Reference Points

In response to the NC request for the ISC species Working Groups to provide candidate reference points for northern stocks, the ISC prepared a paper reviewing a suite of reference points and their pros and cons. The paper included a table prepared by the Albacore Working Group (AWG) with reference points specific for albacore. Reference points can be target reference points, used to guide management objectives for achieving a desirable outcome and not to be exceeded on average, or more than 50 percent of the time, or limit reference points, used to indicate when harvest should be constrained substantially so that the stock remains within safe biological limits. In addition, reference points can address growth overfishing – when mortalities in weight exceed the population growth in weight, or recruitment overfishing – fishing mortality above which the recruitment to the exploitable stock becomes significantly reduced. The usefulness of any specific reference point depends upon the stock assessment modeling approach and input parameters.

The HMSMT was briefed by Dr. Steve Teo at their interim meeting in January 2012 on the candidate reference points selected by the ISC AWG for potential use with the 2011 stock assessment. The ISC AWG estimated current F ($F_{2006-2008}$) relative to several F -based reference points used in contemporary fisheries management. In addition to the simulation-based interim $F_{SSB-ATHL}$, these included F_{MAX} , F_{MED} and $F_{0.1}$, reference points that are based on yield-per-recruit analysis, and the $F_{20-50\%}$ reference points that are spawning biomass-based proxies of F_{MSY} . A summary of the results of the 2011 assessment with respect to these reference points and some of the problems identified with using each of the reference points is provided in Table 1.

Table 1. Estimated ratio of F_{current} to commonly used F reference points, equilibrium spawning biomass and equilibrium yield for the 2011 NPA assessment.

Reference Point	$F_{2006-2008}/F_{\text{ref}}$	SSB (t)	Equilibrium Yield (t)	Drawbacks
$F_{\text{SSB-ATHL}}$	0.71	346,382	101,426	Not useful when there is a declining trend with the lowest biomasses during the end of the times series as each year's estimates will be contributing to the ATHL.
F_{MAX}	0.14	11,186	185,913	Difficult to estimate when Y/R curve is asymptotic, as for the 2011 assessment.
$F_{0.1}$	0.29	107,130	170,334	Not useful for recruitment overfishing; estimates highly sensitive to changes in M
F_{MED}	0.99	452,897	94,080	Assumes a stock recruitment relationship; may not be robust if number of recruits is estimated from narrow range of SSB.
$F_{20\%}$	0.38	171,427	156,922	Difficult to specify which %SPR is an appropriate proxy; advice in literature based on assumptions about stock productivity; not robust to changes in selectivity; does not consider impacts of environmental change on productivity.
$F_{30\%}$	0.52	257,140	138,248	
$F_{40\%}$	0.68	342,854	119,094	
$F_{50\%}$	0.91	428,567	99,643	

The ISC AWG was also tasked in 2010 with investigating the use of a spawning size fish abundance index or some other indicators, including catch and effort trends, to indicate stock status for years between assessments. The AWG examined the use of the HI and Japan distant water longline fishery indices for use in tracking trends in abundance. The Japan longline index and a qualitative examination of fishing effort based on number of vessels operating and recent catch trends could provide useful information to examine relative changes in stock status between assessments, although a full assessment will be the best indicator of stock status.

With the new requirements under HMS FMP Amendment 2 for adopting status determination criteria for managed stocks, the Council will need to determine whether there has been a change in F_{MSY} and B_{MSY} levels (or their proxies) and report on those values in the annual SAFE document. In the case of NPA, suitable F_{MSY} and B_{MSY} proxies should be chosen and approved by the SSC. For the 2011 assessment, estimates based on the interim reference point, $F_{\text{SSB-ATHL}}$ as presented in Table 1, could be chosen.

The timeline established by the NC for developing both international decision rules is to work toward having appropriate reference points selected and decision rules in place by 2014. The IATTC has not established a timeline for comparable goals in the eastern Pacific. The Council will have the opportunity to provide input to the U.S. delegation to the July IATTC meeting and the August 2012 NC meeting.

8 Potential Management Responses when an F-Based Limit Reference Point is Exceeded

The Council may provide input through the international RFMOs as to the choice of appropriate decision rules in the event that a reference point is exceeded. Currently the WCPFC and IATTC conservation measures in place constrain fishing effort; however, concerns have been raised that effort is not clearly defined and may be hard to monitor among fleets that operate with different

gears and fishing practices. Whatever decision rules are chosen at the international level, the Council will need to develop a framework to manage the U.S. west coast-based albacore fisheries to ensure compliance with the international measures.

Broadly, control rules may be imposed to limit output (catch) or input (effort). Domestically, the Council can impose restrictions on access in order to constrain either catch or effort. The paper by Laurs and Powers identifies some options for limiting access that can be considered for domestic management. These may include reductions in numbers of permits based on some control rule, limited entry into the fishery, time and/or area closures, or other options to restrict catch or effort.

9 Summary of Considerations for Management Responses

The HMSMT reviewed considerations for developing a framework for managing the NPA fishery, as covered in the Laurs and Powers White Paper and other applicable references, such as the Canadian ISC CMM discussed above. The November 2009 Supplemental HMSAS Report on the White Paper strongly cautioned against unilateral measures to establish a limited entry permit system for the U.S. West Coast fishery, due to the potential to reduce the U.S. stake in the international fishery; the HMSAS supported using information in the White Paper for developing a framework process to maintain or limit fishing effort by the West Coast albacore fishery in the event a future international management measure requires a reduction in U.S. catch.

There was some confusion as to whether the White Paper represented a call for current unilateral management in the West Coast NPA fishery, such as near-term establishment of a limited entry permit program, or if it represented a catalogue of potential responses to a future management need. The findings in the White Paper were based on 2006 assessment results. The 2011 assessment results suggested relatively more favorable stock conditions than the 2006 assessment, and did not indicate current overfishing or an overfished condition. Nonetheless, a long-term potential remains that a less favorable future assessment could require management measures which would limit both the international NPA fishery and the U.S. West Coast commercial NPA fishery covered by the HMS FMP. The HMSMT thus focused its attention on considerations to address a potential future management need.

Section 4 of the White Paper discusses potential management options, including pros and cons of various possible approaches. Options for consideration include a choice between output-based controls, such as catch limits, or input-based controls, such as gear restrictions, access limits or effort limits. Input controls have often proven ineffective due to the development of technological changes to offset the intended reduction in fishing pressure. Output-based controls may be rendered ineffective due to poor governance structures, imperfect implementation and enforcement, and choosing total allowable catch (TAC) levels which do not adequately reflect the risk of developing an overfished condition.

Management options identified in the White Paper are further classified by decisions about access: Limited Access Privilege Programs, limited entry, and open access are all discussed at length in the context of options for input or output controls. Should the Council ask the HMSMT

to develop a decision document for alternatives to implement a framework, a similar classification could provide a useful approach for comparing alternatives.

The overarching management process for a fishery under the auspices of international management, such as the U.S. West Coast albacore fishery, is discussed in Section 4.4. The example of an international TAC limit is provided. If assessment results indicated a need for management to address overfishing or an overfished stock condition, an overall TAC would be chosen, and then partitioned into country allocations. Individual countries would be responsible to implement management measures to assure their fishers stayed within their allocation. The two-step management process from the international down to the national level suggests developing separate but interrelated framework mechanisms to address a potential future management need at the international (RFMO) and domestic (PFMC) levels.

Challenges at the international level to developing a framework include developing generally accepted measures of catch or effort for management, providing a mutually acceptable method to allocate total catch or effort to individual member nations, monitoring and enforcing individual member nation shares of total catch or effort, developing and adopting mechanisms to prevent individual nations from exceeding their share of catch or effort, and implementing measures to detect and prevent illegal, unreported, and undocumented (IUU) fishing.

In addition to facing a similar list of challenges at the domestic level, a framework needs to address the challenge of coordinating national management with international (RFMO) management, and choosing between alternative domestic approaches to meet international management requirements for the U.S. West Coast albacore fishery.

10 Ongoing and Future Research Related to Development of The Framework

The HMSMT discussed ongoing and future research related to developing a management framework.

In its November 2009 Supplemental Report on the White Paper, the HMSAS noted that the White Paper did not address issues such as fleet structure, fleet operations, markets, socio-economics, climate and ocean conditions, and other factors that impact the recent and future operation of the NPA fishery. NMFS contracted with Lisa Wise Consulting Company (LWC) to conduct an economic study that addressed these concerns, which led to a May 2011 report presented by Henry Pontarelli at the June 2011 Council meeting.

The LWC report included information regarding the attitudes of participants towards management of the albacore fishery. Industry participants in the LWC study identified the following factors that should be considered in developing a management framework:

- The NPA fishery is closely interrelated with other West Coast Pacific fisheries.
- Industry participants have concerns related to using Limited Access Privilege Programs to manage this fishery.
- The open access nature of the fishery provides a benefit of flexible entry and exit to industry participants which might be lost if the fishery went to a limited entry permit system.

- The open access feature also enables the fleet to expand or contract with migratory patterns of albacore; in years when albacore are available “inshore,” smaller vessels that are unable to travel long distances are able to opportunistically prosecute the fishery.
- Free entry allows the NPA fishery to serve as a “backup fishery,” or option to continue fishing, when other fisheries are limited or closed due to regulations or environmental factors.
- Despite the open access feature, data presented in both the May 2011 LWC report and in the April 2010 HMSMT report suggest that participation in the U.S. West Coast commercial albacore fishery has been very stable at least since 1996, with no apparent evidence that effort has increased over the period in terms of catch or participating vessels.

In addition to the May 2011 report, LWC is currently developing a cost-and-earnings survey of the fishery which will support IOPAC analysis of local economic impacts, and a supply chain analysis which will study product flow from the vessel level to the retail level.²

The HMSMT plans to meet with the HMSAS at the March 2012 Council Meeting to share views on what additional information would be needed to develop a framework. This discussion could be summarized in a supplemental report to the Council.

PFMC
2/13/12

² IOPAC is an input-output model developed by NMFS Northwest Fisheries Science Center economists for forecasting the personal income impacts of fisheries.