NOAA Technical Memorandum NMFS

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REPORT OF THE WORKSHOP ON LONG-RANGE PLANNING FOR THE NORTH PACIFIC ALBACORE FISHERY

David J. Mackett
for the
Joint SWFC/SWR Task Force
for Albacore Program Planning

NOAA-TM-NMFS-SWFC-37

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Southwest Fisheries Center

NOAA Technical Memorandum NMFS

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REPORT OF THE WORKSHOP ON LONG-RANGE PLANNING FOR THE NORTH PACIFIC ALBACORE FISHERY, JUNE 1-2, 1983

prepared by
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for the
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U.S. DEPARTMENT OF COMMERCE
Malcolm Baldrige, Secretary
National Oceanic and Atmospheric Administration
John V. Byrne, Administrator
National Marine Fisheries Service
William G. Gordon, Assistant Administrator for Fisheries

GOOD FISHERIES MANAGEMENT

is a continuing, experimental process that is concerned with the assessment, protection, and utilization of living aquatic resources in a manner that provides the greatest benefit to society. This involves developing basic policies and assessing the allocation and priorities among user groups. Fisheries management includes: the application of results from researches in biologic, economic, legal, institutional, and social aspects of fisheries together with continuing monitoring and evaluation of effects of such applications; development of fisheries technology; improvement of statistical and educational programs; and the development and enforcement of regulations designed to protect and enhance living aquatic resources and to aid in their utilization.

(NOAA Marine Fisheries Advisory Committee, February 8, 1973.)

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INTRODUCTION

A workshop on the future of the North Pacific albacore fishery was held in La Jolla, California, June 1 and 2, 1983, by the National Marine Fisheries Service (NMFS)' Southwest Fisheries Center and Southwest Regional Office. The participants in the workshop, all of whom were individuals outside of government, represented a variety of perspectives but shared a common interest in the albacore resource and fishery.

The purposes of the workshop were to benefit both NMFS and the participants. NMFS hoped to gain valuable information about what interested citizens would like to see happen in the North Pacific albacore fishery over the next decade; NMFS could then use this information to plan suitable programs. It was also hoped that the workshop participants would feel that they had contributed in a meaningful and useful way toward improving their government and creating the future they desire for an important and valuable fishery.

NMFS plans to hold several such workshops during the coming years in the expectation of becoming more responsive to the needs and aspirations of those who are affected by its programs. In adopting this approach, NMFS is recognizing that its work is increasingly intertwined with the desires and values of the public. To a large extent these needs have always been recognized, but interactions with the public have tended to center on a single issue and to surface at the time of some NMFS action rather than ahead of it. In many such cases in the past, important issues caused major modifications to already established programs or operations, often with considerable expense and disruption. Workshops such as this will help alleviate this condition by identifying and considering important issues earlier in the planning stages. In addition, issues can be viewed in relationshp to each other, and not considered in a vacuum. Thus NMFS expects to achieve (1) more efficiency in planning and operating its programs, and (2) better understanding and cooperation among all interested parties.

Participants in the workshop established and organized goals and objectives for the North Pacific albacore fishery to 1993. Four major clusters of objectives were identified: fishery development, alternative products, research, and fishery/government partnership. On the basis of their experience and insights, the participants identified desirable trends and events that would help achieve the objectives in each of the four clusters. All of this information is reported here in a form that can be used by NMFS in its strategic planning and, perhaps, by the participants themselves in their own personal, professional, or community activities.

The Workshop on Long-Range Planning for the North Pacific Albacore was structured in five sections: (1) orientation and background, (II) generation of goals and objectives, (III) structuring of the goals and objectives, (IV) identification of desirable trends and events, and (V) evaluation and wrap-up. This report presents each of these sections, together with appendices including the agenda, list of participants, a probable scenario of the North

Pacific albacore fishery, and the complete lists of goals and objectives, trends, and events.

I. ORIENTATION AND BACKGROUND

The workshop began with welcomes by the Southwest Fisheries Center's Director, Izadore Barrett, and by the Acting Director of the Southwest Regional Office, Floyd Anders. The workshop facilitator, Alexander Christakis, was introduced. After brief introductions by the participants and the NMFS staff serving on the joint Center/Region task force for albacore program planning (Appendix A), Christakis reviewed the Agenda (Appendix B) for the 2-day meeting. David Mackett, Program Planning Officer, Southwest Fisheries Center, then discussed the Center's overall planning system. He pointed out how the workshop's results would become an integral part of the NMFS's albacore program.

The Southwest Fisheries Center Planning System

The SWFC planning system operates on several levels, from developing ideals based on the perspectives and values of citizens and stakeholders, through strategic and operational planning, to developing specific work plans for day-to-day operations. The planning system (Figure 1) comprises eight elements:

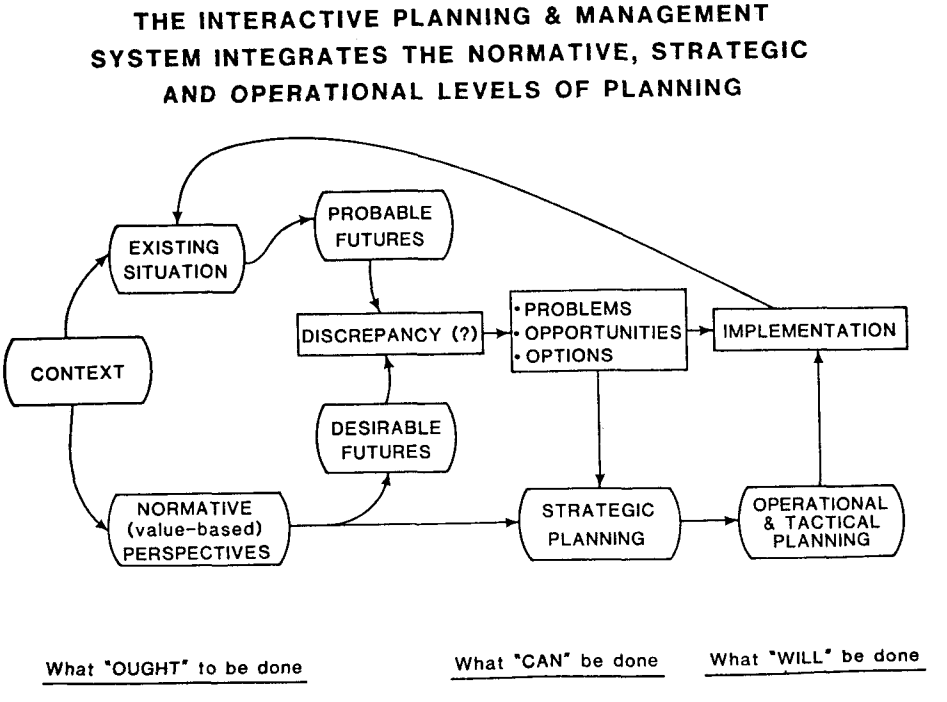

Figure 1. SWFC's planning framework.

1. Specification of a context of focusing theme and a set of questions to be addressed.

2. Analysis of the existing situation.

3. Development of probable future scenarios based on extrapolation and forecasting.

4. Identification of ideals and goals (normative perspectives) of external stakeholders.

5. Development of desirable futures for external stakeholders, including identification of trends and events required to achieve goals.

6. Analysis of the discrepancy between probable and desirable future scenarios.

7. Strategic planning: developing management opportunities and alternative strategies for resolving issues and solving problems.

8. Operational and tactical planning: setting forth specific program initiatives.

A number of important ideas about interactive planning are displayed in Figure 1.

- Planning should be perceived as consisting of three levels: (1) normative, or what ought to be done, (2) strategic, or what can be done, and (3) operational, or what will be done.

- The normative level of planning should be carried out with the active participation of the constituents or stakeholders in workshops to identify, clarify, and structure ideals and goals.

- The existing situation can be analyzed using available extrapolative models to project a number of probable future scenarios. These scenarios reveal where the system is heading if existing trends and current policies are extended into the future.

- The "desirable futures" (based on ideals and goals) are compared with the probable futures derived from forecasting. This comparison might reveal a discrepancy (or what some refer to as a planning gap) between the two scenarios.

- Identifying and describing such a gap, if it exists, provides information for strategic plans, which are developed in an attempt to close the gap. Expert knowledge is needed to organize and combine simple options into alternative strategies. Experts can also specify constraints and feasibilities for the various

alternatives. At this level of planning, the organization determines "what can be done" by engaging intraorganizational stakeholders in the planning process.

- The interactive derivation of strategic plans must be continuously translated to operational blueprints to accomplish specific objectives. Designing operational plans includes determining who is to do what, when, and where; and determining how the implementation and its consequences are to be controlled. The implementation should change the existing situation in a manner which brings future scenarios closer to the desirable scenario.

One of the key principles of the interactive approach is participation in the planning process by external stakeholders and internal management and staff at all levels.

The NMFS task force had analyzed the current situation, identified important trends and events, and projected them into the future to form a "probable scenario for the fishery." The scenario that was presented to the workshop participants depicts a possible future for the North Pacific albacore fishery if current trends and events are to be allowed to continue operating over the next five to ten years. In contrast, the workshop participants were responsible for identifying goals and trends to describe the desirable future for the fishery. The workshop produced what ought to be done.

These two scenarios (probable and desirable) will be compared in order to describe the extent to which current forces, trends, events, and programs will in fact result in the desired future of the fishery. In other words, the scenarios will be compared to measure the discrepancy between the probable result and the desired result. This information--the difference between the probable and desirable futures--can be used as the basis for NMFS' (and others') strategic planning. In the strategic planning process, questions are answered about what can be done to narrow the gap or discrepancy to achieve the desired future.

As is the case in other human endeavors, unless plans are made and positive steps, based on informed judgment, are taken toward a desired outcome, one can expect that the end result will be less than satisfactory and far short of the ideal. Of course, in taking such actions, often with incomplete information and in a world of risks and rapid changes, one cannot guarantee that the ideal will be reached. However, when positive steps toward the ideal are taken, at least the probabilities for achieving success are raised substantially.

The strategic planning process, in delineating what can be done, does not necessarily dwell on existing contraints nor attempt to judge feasibilities before the various options and their interactions are reasonably understood. However, determining constraints and judging feasibilities must be completed before reasonable operating plans can be designed. These steps are taken in the operational and tactical planning phases of the system and result in specific action plans for NMFS programs and projects (e.g., specifying oceanographic and biological research activities to delineate the components

of the overall albacore stock, or developing specific economic information for evaluating fishery development projects, funded by Saltonstall-Kennedy federal monies).

Once these plans are put into action, current trends or events are changed in a positive way, so that the probable scenario of the future is closer to what is desired. Progress towards the desired outcome can be monitored, and adjustments made, if necessary, by periodically recycling through the planning process. Thus another workshop or a series of them can be used to help chart the course toward success.

The Probable Scenario for the Future of the North Pacific Albacore Fishery

As one of the first steps in the planning process, the NMFS task force had analyzed the existing situation in the North Pacific albacore fishery and had projected current trends to 1988 and 1993. On the basis of these projections and a large number of assumptions, the task force constructed a probable scenario for the future of the North Pacific albacore fishery (Appendix C). The scenario, which was mailed in advance to workshop participants, was divided into five sectors:

- Albacore resources
- Harvesting
- Processing and consumption
- Research
- National policy

Highlights of these sectors were presented to the workshop to refresh the participants' memories about some of the most important aspects of the probable future and to solicit questions. The scenario explained important aspects of the fishery and revealed some insights that the task force gained in investigating the relationships among important trends. Thus the scenario served to stimulate the participant's thinking about the future of the fishery, and helped them formulate their desired goals and objectives.

II. THE GENERATION OF GOALS AND OBJECTIVES FOR THE NORTH PACIFIC ALBACORE FISHERY

Following the orientation session, the workshop participants were asked to generate their goals and objectives for the North Pacific Albacore Fishery.

The Nominal Group Technique was used to structure the discussion according to the following five steps:

1. Identification and clarification of a trigger question
2. Silent generation of ideas in response to the question
3. Round-robin recording of ideas
4. Discussion and clarification of each idea
5. Voting for the most "important" ideas.

The trigger question introduced to the workshop was:

> What are desirable goals and objectives for the future of the North Pacific Albacore Fishery? (Next 10 years.)

The scope and meaning of the question was discussed, and NMFS staff clarified some of the terms. For example, it was made clear that only the albacore tuna fishery in the North Pacific was under consideration, even though this fishery has important relationships to other Pacific tuna fisheries and indeed to all tuna fisheries throughout the world, including those in the Atlantic and South Pacific. It was intended, however, that the foreign fisheries for albacore in the North Pacific and their relation to the U.S. fishery were also to be considered. (As was revealed during the review of the first day's work, further discussion and clarification would have been desirable, especially for terms such as management[1].)

Following the clarification of the trigger question, the participants generated a total of thirty-seven goals. The top-priority goals and objectives (23 in all) received one or more votes[2] and are listed below; the

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[1] In this context, the word management was used to refer to a judicious use of means to accomplish an end, whether the end be research, fishery development, conservation, fishery regulations, etc., or a combination of objectives. In other contexts, the term is sometimes used to refer only to restrictive fishery regulations.

[2] Each participant was asked to choose the five most important objectives from his own perspective and then rank the choices from one to five, with one being the highest priority.

original numbering sequence is preserved. A complete list of all goals and objectives, with the number of votes they received, is given in Appendix D.

The high priority goals and objectives are:

2. Improve data base for establishing stock size.

3. Monitor and forecast the catch.[3]

4. Adopt a more conservative MSY until reasonably reliable numbers are obtained.

5. Investigate the reliabiity of fisheries statistics for analysis of albacore population size.

7. Improve forecasting of fluctuations in albacore availability, abundance, and areal distribution.

8. Focus government assistance on development of the albacore fishery and help U.S. fishermen compete more effectively with foreign enterprises.

9. Continue research on the two-stock theory and the assessment of the health of the stocks.

10. Accelerate research to develop information for identification of oceanographic conditions and other environmental factors and their relationship to albacore feeding habits.

13. Provide for industry flexibility for competitive processing and marketing.

14. Develop more recreational albacore fishing opportunities.

15. Conduct research to improve the efficiency of fishing methods employed by U.S. albacore fishermen.

16. Conduct research to improve technology for maintaining albacore from the time it is caught until it is marketed.

17. Improve accuracy of statistics on catch, effort, size, and growth.

18. Continue cooperative research and development between NMFS and fishermen's foundations.

19. Conduct an economic study of sport-caught albacore.

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[3]Objective 3 was subsequently divided into two objectives: 3M - Monitor the catch, and 3F - Forecast the catch (see Figure 3).

20. Develop a mid-Pacific fisheries base for fueling of fishing vessels and transshipment of fish (preferably at Midway Island).

21. Maintain international albacore catch at MSY.

24. Foster international scientific cooperation to improve the process of exchanging scientific data.

25. Conduct research on gear conflict between commercial and recreational albacore fisheries.

26. Develop alternate markets, other than the canned fish market, for albacore.

28. Establish data center to support the domestic fleet.

33. Develop detailed North Pacific albacore fishery industry analysis.

36. Establish method for annual price stabilization.

Selecting the highest-priority objectives was necessary to ensure that the limited time allowed for structuring them, would be concentrated on the ones most important and meaningful to the group.

III. STRUCTURE OF THE GOALS AND OBJECTIVES

Participants next explored the relationships among the highest-priority goals and objectives, and developed a structure delineating the supporting function. A computer-supported discussion and decision aid called Interpretive Structural Modeling (ISM) was used. The structure created by such a process, in this case an objective tree or intent structure, models the group's collective interpretation of the relationships among the various objectives. The 23 top-priority objectives listed previously were considered through a series of discussions focusing on one pair of objectives at a time. In these discussions, participants were asked to respond to the following trigger question:

> In the context of a desirable future for the North Pacific Albacore Fishery, will the achievement of objective X significantly support objective Y?

The pairs of objectives that were considered were selected by the computer and displayed on a large television screen. The outcome of the resulting discussion was a draft objective map or intent structure graphically exhibiting the support relationship among 22 of the top-priority objectives (the final version is shown as Figure 3)[4]. Copies of the draft objective map were distributed to the participants. The map was also displayed on a large magnetic board so the group could view it and suggest changes. The group's changes to the draft are discussed in the section entitled, "Revision of Structure of Goals and Objectives."

Presentation by Alexander Christakis, Facilitator
(To open the second day's meeting)

The primary purpose of my presentation this morning is to recap the highlights of the first day and to provide you with guidelines for the second day of our workshop. Yesterday we employed the Nominal Group Technique to generate 37 goals. Twenty-four of these objectives were selected as high priority; the number was reduced to 23 when the group elected to remove a very general goal from the high-priority list. This list was employed in the relational structuring work using Interpretive Structural Modeling.

Some of you may be wondering why we used the computer and why we went through a very disciplined and may be painstaking exercise of displaying binary questions on a TV screen, and asking the group to judge whether relationships applied. Also, there was some discussion regarding the meaning

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[4]During the ISM session one of the 23 highest-priority objectives was inadvertently left out. It was later replaced in the structure (see next section).

of "significantly support" and how one can make an intuitive judgment of the coupling or the strength of the coupling between two goals. Gradually, however, we managed to arrive at some understanding of the meaning of the relationship, and were able to make judgments, reasonably confident about the applicability or non-applicability of the support relationship.

The reason we used the computer is twofold. First, it imposes discipline on making pair-wise comparisons. It selects and displays only one pair of questions at a time, and it systematically reverses the order of those questions. The second, and most important reason we used the computer, is that it employs an inferential logic that significantly reduces the number of questions. By inferential logic, I mean something similar to the kind of logic that was used by Aristotle in the early phases of Western logic. The relationship that is most well known in Aristotelian logic is the inclusion. Suppose we say that all men are mortal. Follow that with the statement, "Bob McDonald is a man," and the inference that one can make is that Bob McDonald is mortal. In a similar fashion, the algorithm built into our program says that if Goal A is supportive of Goal B, and Goal B is supportive of Goal C, then Goal A supports Goal C. By using this type of inference the computer cuts down the number of questions by a factor of three or more. For example, in our afternoon session yesterday we were able to structure 22 goals. We were able to do that in approximately 3-1/2 hours, and we answered only 110 questions. Without the computer we would have had to answer 462 questions. The average time we spent on each question was 2 minutes. At that rate, without the aid of the computer, it would have taken us nearly 15-1/2 hours to complete all 462 questions.

One of the advantages of structured, disciplined dialogue is that you are able to clarify your own value basis at the same time that you gain appreciation for the group's diverse values, experience, and perspectives. This is why we believe that it is important to engage citizen groups in generating "public wisdom" instead of relying completely on "expert knowledge."

There were a number of comments made yesterday regarding the practicality of our goal identification and structuring. In other words, some of you might have thought this was an exercise in futility, because in many cases budgetary constraints or the lack of other resources may obstruct your ideals or goals. It is true that there is no guarantee that your goals for the North Pacific albacore fishery will be fulfilled by NMFS. On the other hand, I can almost guarantee that without such goals and dreams for the future of the albacore fishery there is little chance that any changes will be made by any public agency. As an example, it is sometimes useful to envision some problems, especially those involving the complexities of biology, politics, ecology, economics, etc., as "double-loop" problems. For double-loop problems we should reexamine some of the so-called controlling variables and assumptions and ask ourselves if there isn't a better way to solve the problem than by applying the same old techniques that may already have proved less than satisfactory (Figure 2).

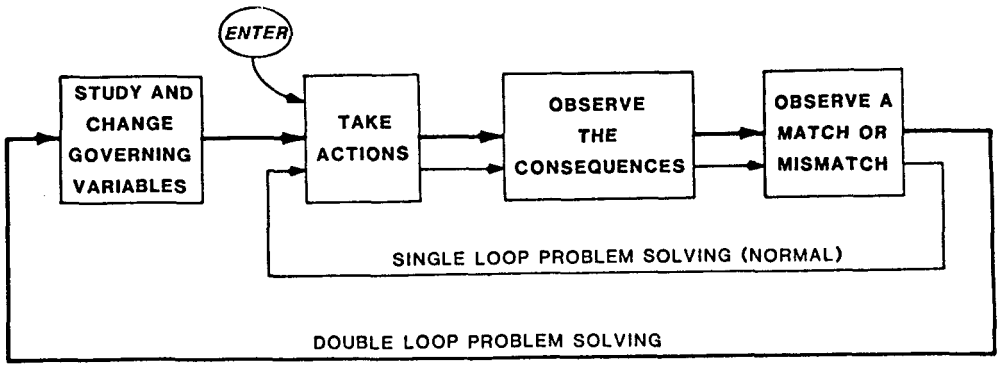

Figure 2. Illustration of Argyris' concept of a double-loop problem. Managers typically operate on the single loop for almost all problems. Complex problems require that the double-loop model be used. This requires a study of the variables that govern and dominate the problem-solving process to gain an understanding of how these variables affect the likelihood of reaching a solution. Intelligent changes can then be made in these governing variables to reach satisfactory solution.

I would like to describe briefly the intent structure that was generated (Figure 3). The structure starts on the left with objective 16 Develop alternate markets for albacore, other than that canned fish market, for albacore and objective 26 Conduct research to improve the technology for maintaining quality of albacore, from the time it is caught until it is marketed. Taken together these significantly support objective 13 Provide for industry flexibility for competitive processing and marketing and also objective 33 Develop detailed North Pacific albacore fishery industry analysis which, in turn, supports objective 18 Continue cooperative research and development between NMFS and fishermen's foundations. The goal structure can be interpreted from left to right. By reading the arrows between any two objectives as "significantly supports," one can use the graph as a shorthand version of what could be a lengthy written or verbal description.

Revision of Structure of Goals and Objectives

The participants then reviewed and discussed the draft structure produced from the previous day's work (Figure 2). On the basis of a suggestion by the task force chairman, Richard Parrish, the group considered moving a number of objectives (3, 5, 9, and 17) to show their more significant supporting relationship to objective number 7. Also, the objective that was inadvertently left out of the ISM session (28: Establish data center to support the domestic fleet) was discussed by the group and placed on the graph to show its relationships to objectives 7, 10, 18, and 24. Figure 3 is the final revised map.

This revision completed, the group turned to delineating the desirable trends and events that would signify that the goals and objectives were being met.

DESIRABLE GOALS & OBJECTIVES FOR THE FUTURE OF THE NORTH PACIFIC ALBACORE FISHERY

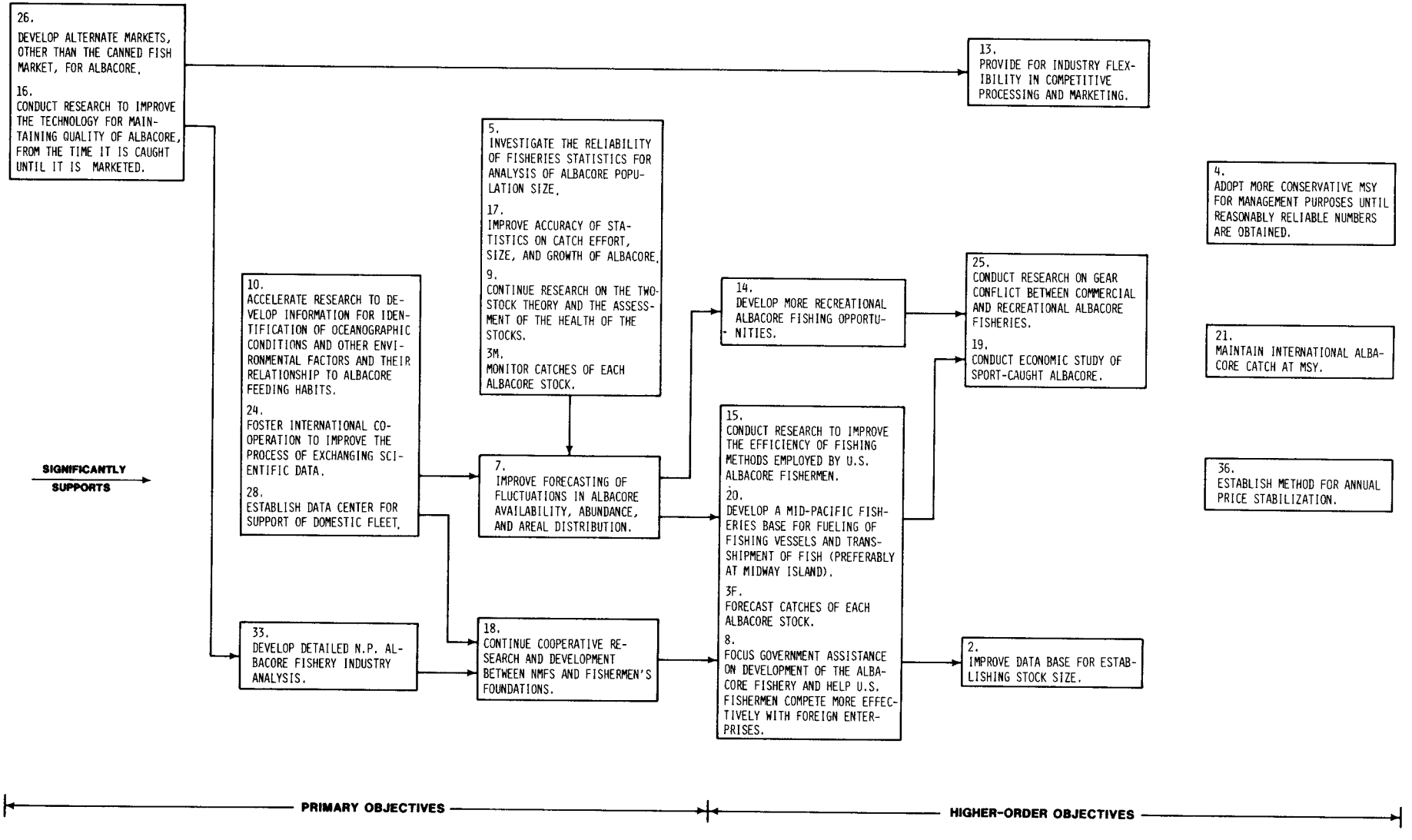

Figure 3. Objective map, final version.

IV. IDENTIFYING DESIRABLE TRENDS AND EVENTS

After the Workshop participants had established and structured the goals and objectives, the task force studied the results and identified four groups (Table 1).

Table 1. Groups of Related Objectives

Name of sector	Objectives included in sector*
Albacore Research	10, 24, 28, 5, 17, 9, 2, 3M
Fishery-Government Partnership	33, 18, 15, 20, 8, 3F
Alternative Products and Markets	26, 16, 13
North Pacific Fishery Albacore Development	15, 20, 8, 3F, 14, 25, 19

*The sequences of the objectives are derived from the objective map (Figure 3) reading from left to right (from primary objectives to the higher order objectives and goals).

The participants were divided into two groups for the purpose of identifying desirable trends and events (Appendix E). Two consensus-generating techniques were used. Each group was assigned two sectors: for one, they used the Nominal Group Technique (NGT); for the other, Idea Writing.

As in NGT (explained previously), Idea Writing participants respond to a trigger question. In this case, however, they each write one response to the trigger question on a sheet of paper. They place their papers in the kitty in the center of the table and pick up a page containing an idea written by another participant. Each person then writes either a comment or a new idea on this page, returns it to the kitty, and repeats the process until new ideas are exhausted or the allotted time is up. In this manner, several sheets of paper filled with ideas and comments can be generated in a very short time.

Each group identified desirable trends and events by responding to the following trigger question:

> What are desirable trends and events for accomplishing the goals and objectives of sector X?

After the trends and events were identified (Tables 2-5), each group selected a spokesman to summarize the results and to report the highlights to the entire workshop. These reports were delivered in a plenary session held for that purpose. Thus each group member was able to learn the most important aspects of the other group's work, even though there was no time for typing, distribution, and individual discussion of each group's results.

TABLE 2

GROUP A

Albacore Research: Objectives and Desirable Trends and Events

Objectives Pertaining to the Sector

(Sequence is derived from objective map, Figure 3)

10. Accelerate research to develop information for identification of oceanographic conditions and other environmental factors and their relationship to albacore feeding habits.

24. Foster international cooperation to improve the process of exchanging scientific data.

2. Improve data base for establishing stock size.

17. Improve accuracy of statistics on catch, effort, size, and growth of albacore.

9. Continue research on the two-stock theory and the assessment of the health of the stocks.

3M. Monitor catches of each albacore stock.

3F. Forecast catches of each albacore stock.

7. Improve forecasting of fluctuations in albacore availability, abundance and areal distribution.

28. Establish data center for support of domestic fleet.

Desirable Trends and Events for the Sector

1. Increase effort to enhance and disseminate scientific information to boat operators.

2. Continue communication between government researchers and industry.

3. Encourage international cooperation on tagging, biochemical studies, studies of size composition, identification of spawning grounds, and delineating migrations of albacore stocks.

4. Enhance collection of data to be distributed through the existing Western Fishboat Owners' Association (WFOA) data center.

5. Design an ideal organization to plan, conduct, and disseminate research.

6. Conduct more research on identifying oceanographic conditions and the environments to which albacore respond.

7. Go through Inter-American Tropical Tuna Commission (IATTC) if international cooperation is not forthcoming.

8. Improve oceanographic data collection from satellites on sea temperature, color, circulation, fronts, and thermocline depth.

9. Enlist fishermen's cooperation in data gathering.

10. Operate more research vessels and scout boats, particularly in the fringe areas.

11. Conduct more research on the effects of other fisheries on albacore stock size and recruitment.

12. Acquire funding for research.

13. Develop awareness of the importance of the West Coast albacore fleet.

14. Continue research on new types of fishing gear.

15. Research factors affecting stock sizes and recruitment.

16. Conduct more research on the relationship between depth distribution and stock size.

TABLE 3

GROUP B

Fishery-Government Partnership: Objectives and Desirable Trends and Events

Objectives Pertaining to the Sector

(Sequence is derived from objective map, Figure 3)

33. Develop detailed North Pacific albacore fishery industry analysis.

18. Continue cooperative research and development between NMFS and fishermen's foundations.

15. Conduct research to improve the efficiency of fishing methods employed by U.S. albacore fishermen.

20. Develop a mid-Pacific fisheries base for fueling of fishing vessels and transshipment of fish (preferably at Midway Island).

8. Focus government assistance on development of the albacore fishery and help U.S. fishermen compete more effectively with foreign enterprises.

3F. Forecast the catches of each albacore stock.

Desirable Trends and Events for the Sector

1. Continued close communication and cooperation between government and industry is essential for development of this fishery.

2. U.S. mid-Pacific albacore fishery development and production would benefit greatly from Midway Island facilities being made available.

3. Referring to item #2 (above), mid-Pacific development is important for future fleet expansion and increased share of catch. However, development must not preclude further research and governmental participation in helping coastal fishermen.

4. Fish aggregating devices should be tested in coastal waters with participation of both fishermen and government.

5. Place aggregating devices in oceanic and mid-Pacific waters.

6. Fishermen should provide more and better data to NMFS on catches, effort, and size composition of catch.

7. Efforts should be made by government to assist the U.S. albacore fleet to remain a viable asset to the country's economy.

8. Referring to item #7 (above), it is essential to consider the costs of government assistance and subsidy in terms of potential government influence or control.

9. Formulate specific assistance programs for North Pacific albacore fishermen.

10. Assistance programs should include the providing of environmental data to help fishermen locate concentrations of fish.

11. Assistance programs should include the design and testing of effective fishing gear.

12. Ascertain what fishermen are willing to pay for services mentioned in items #9, #10, and #11.

13. Ascertain importance of alternative markets to fishermen in line with items #9, #10, and #11, above.

14. Intercede with Navy to permit development of Midway as essential U.S. fishing base.

15. Continue close cooperation between industry and government to determine size, distribution, and behavior of the albacore resource.

16. Improve workable liaison between industry and government for continued fishery development, prevention of overfishing, and determination of stock movements.

17. Explore possibilities for international management of albacore (IATTC-type organization or International North Pacific Albacore Commission).

18. Suggest tariff or tax to enable U.S. fleet to compete more effectively with government-subsidized foreign fleet.

19. Expand NMFS research program with more input to fishermen's foundations.

20. Disseminate NMFS research information through the foundations to fishing fleet, including various factors influencing availability of fish (sea temperature, thermocline depths, water color, fronts) and catch rates of other vessels.

21. Recommend, on the basis of efficiency and the enhancement of the U.S. competitive position, that Midway be established as base for a Central Pacific albacore fishing fleet.

22. Increase and improve level of inshore and offshore weather forecasts by NOAA or other government agencies.

23. Recommend that U.S. government emphasis in albacore research at this time focus on research and development.

24. NMFS should communicate information to the fleet on the availability of albacore or factors thought to influence availability, e.g., sea temperature, thermocline depths, water color, fronts, and catch rates of other vessels.

TABLE 4

GROUP B

Alternative Products and Markets: Objectives and Desirable Trends and Events

Objectives Pertaining to the Sector

(Sequence is derived from objective map, Figure 3)

26. Develop alternate markets, other than the canned fish market, for albacore.

16. Conduct research to improve the technology for maintaining quality of albacore, from the time it is caught until it is marketed.

13. Provide for industry flexibility in competitive processing and marketing.

Desirable Trends and Events for the Sector

1. Create on-site advertising aids, cookbooks, video tapes, newspapers ads, and other media aids to expose the public to fresh and frozen albacore and how to prepare it.

2. Establish a consolidation facility (refrigerated) for fishermen and a distribution facility at market destination.

3. Develop a fishermen's cooperative, with freezing facility, that collects member-caught tuna/albacore and markets it to the highest bidder (canner or other processor) throughout the year. The aim is to obtain the highest price for the product by controlling its supply in the marketing chain.

4. Assess each fisherman, through the fishermen's cooperative, according to catch and use the funds as equity in establishing a restaurant chain specializing in seafood.

5. Research and development to improve freezing methods aboard albacore boats.

6. Investigate methods other than freezing for preserving product for ultimate use.

7. Establish quality control standards and governmental health inspection of canned tuna imported into the U.S. from foreign countries.

8. Analyze all sources of spoilage and deterioration of albacore--both in transport and after processing.

9. Adapt the technology and research for maintaining quality of agricultural products to maintaining better-quality fish products.

10. Encourage qualified professional investigation and analysis of all possible ways of using albacore in the market place.

11. Encourage cooperation between commercial fishermen and NMFS in establishing laboratory to further product development.

12. Suggest utilization of albacore tuna as a convenience food, pre-sliced like bologna, and as pre-mixed sandwich spread.

13. Increase recognition of the relationship of fish quality to price of the fish.

14. Research mechanism of salt absorption by the fish during the freezing process and develop methods to avoid it.

15. Emphasize fish quality control as one of the primary goals necessary to maintain and reinforce albacore as a desirable consumer product on the fresh fish market.

16. Turn advertising of tuna (in a generic sense) over to the tuna (albacore) vessel owners association. Program should be funded by an assessment from each pound sold, thereby eliminating the need for canners to discount tuna to retailers to offset advertising costs.

TABLE 5

GROUP B

North Pacific Albacore Fishery Development: Objectives and Desirable Trends and Events

Objectives Pertaining to the Sector

(Sequence is derived from objective map, Figure 9)

15. Conduct research to improve the efficiency of fishing methods employed by U.S. albacore fishermen.

20. Develop a mid-Pacific fisheries base for fueling of fishing vessels and transshipment of fish (preferably at Midway Island).

8. Focus government assistance on development of the albacore fishery and help U.S fishermen compete more effectively with foreign enterprises.

3. Monitor the catches of each albacore stock.

14. Develop more recreational albacore fishing opportunities.

25. Conduct research on gear conflict between commercial and recreational albacore fisheries.

19. Conduct economic study of sport-caught albacore.

Desirable Trends and Events for the Sector

1. Continue aiding the development of U.S. long-line fleet through use of Saltonstall-Kennedy, (S-K), American Fishermen's Research Foundation, (AFRF), or other funds for charter vessels; establish SWFC and Navy assistance for assembling oceanographic and catch-rate data to support development.

2. Research and develop the winter longline fishery and a Hawaii-based longline fishery for the mid-Pacific.

3. Research and develop domestic high-seas gill net albacore fishing.

4. Develop new materials and gear types.

5. Launch a color-sensing NASA satellite that can be used to locate algal populations (feeding grounds) in the ocean.

6. Initiate assistance for the development of a U.S. high-seas gill net fleet with use of S-K, AFRF, or other funds for charter vessels; establish mechanism for SWFC and Navy assistance for assembling oceanographic and catch-rate data to support development.

7. Expand application of satellite information for weather, oceanographic features, and fish location.

8. Develop statistics on the success of Japanese gill net fishing methods and economics for possible application to U.S. fisheries.

9. Establish technological capability in various U.S. agencies to monitor and depict temperature, water clarity, weather, currents, and other pertinent data.

10. Make a breakthrough in the rearing technique for mullet for use as bait fish.

11. Lobbying by private sector, through the presentation of cost-benefit statistics, for the timely establishment of the Midway fisheries base.

12. Research and develop new methods for fishing albacore at depth.

13. Develop and expand methods for protecting U.S. albacore industry from unfair foreign trade policies (i.e., product dumping and government subsidies in fuel, labor, and construction).

14. Develop co-ops for self education.

15. Study feasibility of various economic and development plans to use Midway Island as fishing port. (Note: This is already under way: target completion date, December 1, 1983.)

16. Continue present programs with SWFC for tagging and collection of data on catch rates and fishing location.

17. Establish a fuel and transshipment base at Midway Island.

18. Continue NMFS Fishing Vessel Obligation Guarantee Program and Capital Construction Program.

19. Improve vessel and machinery designs.

20. Develop a plan (target completion date, December 1, 1983) to provide the necessary infrastructure in Hawaii to support the Midway Island fishing port.

21. Gather support for pending California legislation to enhance sea bass and other recreational fish populations.

22. Encourage government updating and transmission of information about foreign fishing, including methods and location.

23. Implement higher tariffs and lower import quotas on imported canned albacore and other tunas in water to protect U.S. tuna fleet.

24. Develop mother-ship techniques, a central Pacific fishery base, or a combination of the two.

25. Establish a fishermen's cooperative or association, or some other cooperative, to manage the Midway facility.

26. Establish an information center at a government agency, together with a reporting system, to evaluate commercial and sport conflicts to establish further legislative action, if necessary.

27. Study factors other than catch that may affect stock size or migratory patterns (such as oceanography, weather, pollution, etc.)

28. Study and identify factors associated with successful and unsuccessful Fishing Vessel Obligation Guarantee (FVOG) loans, for NMFS internal use and for distribution to outside lenders involved in the program.

29. Increase Congressional support for fishery development with increasing recognition that (a) distance to fishery and thus operating costs are increasing, (b) domestic consumption of fish is increasing, and (c) Congressional intent of Magnuson Fishery Conservation and Management Act (MFCMA) mandates encouragement of domestic fishery industry.

30. Use U.S. Navy mothballed fleet (refrigeration and cargo) to develop U.S. fishery.

31. Ask CF&G to keep records and furnish an economic study on the value of sport-caught albacore to the southern California economy.

32. Develop a subsidy program for diesel fuel used by commercial fishermen in the North Pacific albacore fishery, e.g., remove tax.

33. U.S. mid-Pacific facilities should be available and practical for accomplishing fisheries' development goals of 1976 MFCMA.

34. Establish preferential state and federal tax incentives for U.S. commercial fishing vessel purchase and repair.

35. Increase recognition that 1976 MFCMA mandates improved recreational opportunities.

36. Establish a fishery product development laboratory (in Hawaii).

37. Develop an effective, long-lasting Fish Aggregation Buoy (FAB).

38. Induce the Coast Guard to investigate and record conflicts and violations in the fisheries.

39. Increase recognition that a fish stock or biomass is not indestructible.

40. Expand mariculture research in areas compatible with commercial fisheries, e.g., baitfish culture and at sea-holding pens.

41. Reverse downtrends in the recreational fishery.

V. EVALUATION AND WRAP-UP

After the presentations by groups A and B, the participants were asked to complete a questionnaire evaluating the workshop. The Southwest Fisheries Center and Southwest Region intend to use these evaluations to improve future workshops.

Evaluation Questionnaire with Selected Responses

For the sake of brevity, the questions and the responses received from the participants evaluating the workshop are summarized below. The actual responses received are presented in the Appendix.

1. *What prompted you to accept the invitation to participate in this workshop?*

   The participants indicated a long-standing personal interest in the albacore fishery and a desire to ensure the future commercial and recreational well-being of the industry.

2. *You received some reading material, a map, and participant list in advance of the workshop. Was the content of this material sufficient or insufficient to prepare you for the workshop?*

   9 Sufficient
   1 Insufficient

   The material, coupled with the opening comments, appeared sufficient.

3. *Think back on your pre-workshop expectations. In what ways were they similar to or different from what actually took place?*

   Similarities: Participants had few preconceived ideas or expectations about the workshop. Most were pleased to have the opportunity to interact and exchange ideas and thoughts with knowledgeable individuals.

   Differences: In general, the participants viewed the proceedings as more guided and structured than anticipated. Some expected a greater emphasis on the commercial sector to the exclusion of the recreational and did not anticipate combining the interests of the commercial and recreational fishermen in the same workshop.

4. *Did the opening plenary session provide you with more than enough information, sufficient information, or insufficient information to orient you to the work ahead in the workshop?*

Eight persons reported receiving sufficient information while two thought insufficient information was given.

Although the material was presented concisely, the participants felt there could have been a clearer and more explicit definition of the goals and objectives of the workshop.

5. *As you recall the session dealing with the goals and objectives for the future of the North Pacific albacore fishery, what stands out in your mind as most interesting or significant?*

Among the most significant future goals and objectives, the participants noted the continued need for government's providing scientific information to industry, although there was resistance to the thought of government control over fishing; also, the desired expansion of the fishery into traditional Japanese fishing grounds. Some participants mentioned the impracticality of a few of the goals and the paucity of really "new" ideas.

6. *Was the facilitator and the Nominal Group Technique effective or ineffective in helping the group generate meaningful ideas?*

Participants felt that the process was effective but many felt the pressure of time limitations. Several believed that the numbers of statements or ideas presented in one sentence or at one time were confusing and should have been re-written for greater clarity. The process, participants noted, appeared to minimize conflict and was protective of minority opinions and ideas.

7. *The goal structuring exercise on the first afternoon was designed as a collective learning situation. What would you identify as learning for yourself or for the group as a whole?*

For themselves, respondents noted learning of the similarity of personal and group goals; some commented on the opportunity for exposure to other ideas and points of view and greater awareness of the specific concerns of the fishermen and the industry.

For the group, participants believed there was a recognition of the similarity of goals among the various perspectives represented at the workshop even though there were different underlying philosophies.

8. *On the afternoon of the first day, were the goal structuring facilitator and the Interpretive Structural Modeling process effective or ineffective in helping the group determine the support relationships among the various goals?*

Participants noted that the facilitator remained unbiased while promoting the discussion of goals and of the support relationship.

9. *Was this workshop your first experience in group work using structured, facilitated processes like the Nominal Group Technique and ISM?*

The group was evenly split, five persons had previous experience in facilitated meetings and five did not.

10. *The opening session of the second day involved the whole group in interpreting the work of the previous day and preparing for the group work to follow. Was the interpretation of the previous day's work meaningful or not meaningful?*

Most of the participants felt that the opening session of the second day was very meaningful in helping to interpret their work of the previous day.

11. *Did the second day's opening session provide you with more than enough information, sufficient information, or insufficient information to orient you to the subgroup work to follow?*

Seven persons thought they were provided with enough information; three thought more than enough was provided.

12. *As you look back on the last two days, do you feel that your input was needed and/or desired by the National Marine Fisheries Service?*

Most participants thought that their input was both needed (six said very needed) and desired.

13. *Do you feel that you were productive and/or made a contribution to the work of the group?*

Most participants felt that they were being productive and had made a worthwhile contribution.

14. *If you were to compare your sense of group productivity in this workshop with that of other task groups you have been involved with, would you say this workshop was more productive, less productive, or about the same as the others*

Six participants thought they were more productive than their work in other groups while three thought their productivity about the same. One felt he was less productive.

15. *What do you believe were the significant results of this two-day workshop for yourself, for other participants, and for the National Marine Fisheries Service?*

For themselves participants mentioned the opportunity to interact with NMFS personnel and to present and exchange ideas and viewpoints with other participants. Also, the chance to influence the future course of the albacore fishery and the research conducted by the NMFS Southwest Fisheries Center.

Similarly, participants thought that others in the group had an opportunity to exchange ideas, gain a better understanding of the viewpoints of others, and develop an awareness of the need and desire for a more structured approach to future management for North Pacific albacore.

Participants thought that NMFS had gained from an exchange of ideas, having recommendations from well-qualified people to give general direction to future research, and an increased awareness of the need for industry/NMFS cooperation in the development of the fishery.

16. *If a friend of yours were invited to attend a subsequent similar workshop and asked you about this one, what would you tell him or her?*

The participants, in general, would encourage their friends to attend such a workshop; a large majority would give positive advice on what to do or expect.

17. *Were meal arrangements satisfactory or unsatisfactory?*

All participants were satisfied with meal arrangements.

18. *For those traveling from out of town, were the transportation arrangements made by NMFS to the workshop satisfactory or unsatisfactory?*

All those traveling found transportation arrangements satisfactory.

19. *Was your motel lodging satisfactory or unsatisfactory?*

Those staying overnight were satisfied with their lodging.

20. *Was the meeting room satisfactory or unsatisfactory?*

All participants thought the meeting room was satisfactory.

Wrap-up Session: Where Do We Go From Here?

When the evaluations were completed, the participants were invited to give their views concerning the future planning and carrying out of programs for the albacore fishery. In particular, they were asked to respond to the following question:

> Where would you like to go from here in the light of your experience and the information gained in this workshop?

The responses generally favored continuing the planning efforts started in this workshop, and supported continuing and strengthening the government fishery partnership. Some of the individual remarks are as follows:

1. From the standpoint of the American Fishermen's Research Foundation...continue the cooperative efforts that we have had in the past with the Southwest Fisheries Center and probably expand some of these efforts into regions farther to the west.

2. ...to offer our assistance to NMFS in helping them develop a more sophisticated approach to population dynamics and help them get a better estimate of the actual biomass of albacore in the North Pacific.

3. We are glad to have had the education and the comments from all the other groups involved in the albacore fishery, but I feel our cooperation has been so good with SWFC that we can do nothing but continue it and expand on those activities where it may be necessary to do so.

4. It has been quite evident from the last couple of days that many of us would like to see efforts directed more at development and production, so that in the event that international management becomes a reality as the possible scenario predicts it may be, we have a better chance of getting a bigger share of the resource.

5. I would like to see a prioritizing of the activities and programs.

6. I need to know where the state of Hawaii can fit into the total program. The Midway program especially is as much a program for California albacore fishermen as it is for Hawaiians. That's why it is very important that we develop the Midway port facility in concert with the plans and needs of the entire albacore fishery.

7. I think there is a lot to be gained from the approach to research taken by the Department of Agriculture and its relationship to the agriculture industry. I think we are still in a very primitive stage when it comes to aquaculture research and perhaps marine research as well.

8. I would like to see some of these priority items followed through to action. We didn't get down to all of the specifics, but we were specific enough to at least get some action out of this rather than just letting it sit.

9. I think that the domestic fleet is not getting its fair share of the albacore stock, and there are things that should be done, including research, that can help develop the fishery so that it can get its fair share.

10. In referring back to your planning chart, I see that we are right in the middle of it, and now I want more. I want to find out who is going to be carrying out some of these activities.

11. The workshop was extremely valuable to me; I think it could be more valuable if essentially the same group of people could meet at a future date after your organization has digested this and done its job in setting up some strategic planning. This strategic planning then would show what can be done. Then once we get that in mind, maybe we can say, "Gentlemen, how can we go about doing it?" and try to develop activities with your staff in the operational and tactical planning areas.

12. I like the group that I see here, and rather than starting over at the beginning again with another group, I'd like to see the present group meet again and again.

13. I think the emphasis is still in two areas; fisheries development as the first priority, and, second, the assessment of the stock structure.

14. We were able to show the scientists what the industry requires from them and, conversely, pointed out where the scientists can draw from the commercial fleet. We'll need to give them a lot of information so we'll be interdependent. They will need to be dovetailed into this operation.

15. I would like to see a continuation of this kind of communication, with the addition of bringing some of the research people right to the table to share in the formation of ideas. That might be an even better interfacing. However, I think the main idea is to keep this process going and continue to identify common goals and objectives, then use the expertise of the different sectors to put it together into an active program.

16. We would definitely like to be invited back when there is another meeting like this.

Closing Statement by Izadore Barrett, Center Director

I was very pleased to see how well this meeting went over the last few days. I assure you that we will incorporate what has transpired here into our strategic planning and the operations of the Center. Of course, there is no way we can meet all of the objectives and activities that were suggested, but some very clear directions have come out of this workshop. I know that Floyd Anders will agree that there are some ideas that need to be dealt with by the Regional Office. There are a number of things that we can do within the Center, and I am going to do my best to facilitate actions by other groups as well. As plans are developed there may also be a need to solicit funds. Most important, we will maintain close contact with the albacore industry, especially with the people who are here at this workshop. I've been very impressed with this workshop technique as a way of soliciting information and advice, and I intend to use it in the future in other contexts. I want you to know that I really appreciate your taking the time to be with us.

Closing Statement by Floyd Anders, Acting Director of the Southwest Regional Office

I've been looking forward to this meeting, and I was glad to be able to sit in and observe your deliberations. Iz Barrett speaks for both of us when he gave his commitment to use what has transpired here in our strategic planning. Iz also speaks for both of us when he said he would do his best to accomplish these objectives. A good example is the Midway port facility. The Regional Office has been involved with that project in the past, and I believe that we and the Center will be heavily involed with it over the next several months.

I agree with some of you who have said that this is just a start, and that we must carry it through. It's obvious that some of these concepts need refinement, and we will do that in the next stages of our planning.

I appreciate the fact that you have consented to be here for two days; it is a lot out of a busy person's life and I want to thank you for giving us your valuable time.

Closing Statement by Alexander Christakis, Facilitator

On behalf of the workshop staff I'd like to thank you all very much. It has been a pleasant experience, and I believe that similar activities should be designed and conducted in the future with this group and may be other groups. I have personally been involved with similar workshops, and I believe this one was very well done. Everyone worked hard, and I'm sure the Center has gained a lot of insights from you. As an outsider, I would put in my two cents worth to encourage them to use the information and experience you have shared with them.

I have been working with the Southwest Fisheries Center for about a year since they began implementing the interactive management/strategic planning process, and I have been impressed with their serious commitment to work in partnership with interested or affected parties. I happen to believe, that unless we, as Americans, learn to work together and to build this partnership, we will not be able to survive in the world's markets. Countries that are successful actually do practice and build partnerships. We used to be able to do that, but somehow we lost the touch. The essence of this group work, is to generate ideas, exchange them, understand them, assess them, and facilitate their translation into action. I assure you that this has not been an exercise in futility; you generated a lot of ideas, and most likely, a significant portion, if not all, of these ideas will be transformed into action through collective effort. It has been a pleasure. Thank you very much.

ACKNOWLEDGEMENT

We, the participants and NMFS task force contributors to the Workshop on the Future of the North Pacific Albacore Fishery, wish to express our thanks and sincere appreciation to a number of talented and hard-working individuals working behind the scenes. Collectively they planned and carried out the meeting and prepared this report for publication. Nancy La Roche, Frances Tonsich and Lillian Vlymen expertly took care of logistics; Barbara (Bobbi) Watkins, Barbara Engstrand and Veronica Breda helped with administrative and travel arrangements; Susan Iacometti assisted the facilitators and gave expert computer operation for the ISM session; Roy Allen and Ken Raymond were invaluable in the preparation of charts and figures; Mary DeWitt, Nancy LaRoche and Lorraine Prescott did an outstanding typing job--especially working from rough-draft copy; and editors Lillian Vlymen and Julie Olfe provided creative suggestions and ideas.

APPENDIX A

WORKSHOP ON LONG-RANGE PLANNING FOR THE NORTH PACIFIC ALBACORE FISHERY

June 1-2, 1983

Participants

Mr. Edward Deringer	Commercial Fisherman Lomita, California
Mr. Nicholas Cates	San Diego Sportfishing Association San Diego, California
Mr. Benjamin Felt	Financier Pala, California
Mr. John Gough	Boat owner and fisherman San Diego, California
Mr. O.E. "Bud" Kerns, Jr.	Executive Director U.S Tuna Foundation San Diego, California
Mr. Edward P. Martin	National Coalition for Marine Conservation Santa Ana, California
Mr. Michael McGowan	General Manager, Tuna Procurement Bumble Bee Seafoods San Diego, California
Hon. Richard M. Matsuura	Hawaii State Legislature Hilo, Hawaii
Mr. William Perkins	General Manager Western Fishboat Owners Association San Diego, California
Dr. William Pearcy	Professor, Department of Oceanography Oregon State University Corvallis, Oregon

Convenors

Dr. Izadore Barrett	Director, Southwest Fisheries Center National Marine Fisheries Service La Jolla, California

Mr. Floyd Anders, Jr.	Acting Regional Director, Southwest Region National Marine Fisheries Service Terminal Island, California

Facilitators

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Mr. David J. Mackett	Planning Officer Southwest Fisheries Center National Marine Fisheries Service La Jolla, California
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Observers

MEMBERS OF SOUTHWEST FISHERIES CENTER/SOUTHWEST REGIONAL OFFICE TASK FORCE FOR ALBACORE PROGRAM STRATEGIC PLANNING

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Dr. Jerry A. Wetherall	Leader, Pelagic Stock Assessment Program Honolulu Laboratory Southwest Fisheries Center National Marine Fisheries Service Honolulu, Hawaii

APPENDIX B

AGENDA

National Marine Fisheries Service

Southwest Fisheries Center/Southwest Regional Office

WORKSHOP ON LONG-RANGE PLANNING FOR THE NORTH PACIFIC ALBACORE FISHERY

SWFC Conference Room/Auditorium
8604 La Jolla Shores Drive
La Jolla, California 92038

June 1

8:30-8:45	- Welcome by Center Director Izadore Barrett; review of agenda
8:45-9:00	- Self-introductions by participants
9:00-9:45	- Overview of SWFC strategic planning process
	- Presentation and discussion of probable scenario for the North Pacific albacore fishery
9:45-10:00	- Coffee Break
10:00-12:30	- Identification of goals and objectives for the North Pacific albacore fishery
12:30-2:00	- Lunch
2:00-3:30	- Structuring of goals and objectives
3:30-3:45	- Coffee
3:45-5:30	- Structuring of goals and objectives, continued
5:30-7:30	- Dinner
7:30-9:00	- Structuring of goals and objectives, if the time is required

June 2

8:30-9:00	- Review of previous day's activities
9:00-9:30	- Presentation and discussion of intent structure
9:30-9:45	- Coffee
9:45-12:00	- Identification of desirable trends and events
12:00-12:30	- Lunch at Center
12:30-3:15	- Identification of desirable trends and events continued
3:15-3:30	- Coffee
3:30-4:00	- Presentation of results of subgroup work to entire group
4:00-4:30	- Workshop evaluation and wrap-up

APPENDIX C

A PROBABLE SCENARIO FOR THE NORTH PACIFIC ALBACORE FISHERY TO THE YEAR 1993

INTRODUCTION

The purpose of the following probable scenario of the North Pacific albacore fishery is to stimulate participants in the Workshop on Long-range Planning for the North Pacific Albacore Fishery to think about the fishery's future. It is intended to represent only one of many possible futures. It is a synopsis of a projected course of current events and trends. The scenario is not intended to be a rigorous accurate forecast of the fishery's future, nor is it an official endorsement of any particular set of events.

The scenario was written by staff members of the National Marine Fisheries Service's Southwest Fisheries Center and Southwest Regional Office who are familiar with various aspects of the albacore fishery. However, the accuracy and depth of our knowledge varies, and so do our perceptions of current events and trends. Many unforeseen events, planned or not, can and no doubt will influence the future of the albacore fishery. In fact, this workshop is one such event that can influence the fishery's course.

The scenario is presented in five related sectors:

- The Albacore Resource
- International and Domestic Harvesting
- Domestic Processing and Consumption of Albacore Tuna through 1993
- Research on the Albacore Resource and Fishery
- National Policy and Management

We have compared the salient points of each sector with those of other sectors to make the scenario logically consistent.

We hope that reading this scenario will help you focus your ideas and desires for the albacore fishery of the future.

THE ALBACORE RESOURCE

The albacore resource in the North Pacific is not well understood, particularly from the standpoint of population dynamics. Currently the stock is thought to be able to produce a maximum sustained yield (MSY) of 92,000 to 166,000 metric tons---a wide, imprecise range estimated on the assumption that there is a single stock. By 1993, as additional evidence is developed, we probably will identify separate albacore stocks; descriptions of the resource will then be made on a stock-by-stock basis.

Over the next 10 years it is unlikely that actual MSY of the overall stock will change. However, as stock structure is better defined, sustainable yields for each separate stock will be estimated. It is expected that as exploitation rates increase with expanding fisheries, the overall stock size will be reduced.

Growth and natural mortality in the population are not likely to change in the future. However, this assumption may change as scientists learn more. Currently, North Pacific albacore recruitment and exploitation rates are variable and not predictable. There is not likely to be any change in this variability over the next 10 years, but estimates of trends and forecasts of both recruitment and exploitation should improve.

It is expected that increased exploitation will decrease the size of the spawning stock somewhat but the effects on the population are not predictable now. Increased exploitation rates in the next decade will reduce the average life expectancy of albacore, as well as the average size and age of fish in the population. Age and size composition of the total catch and therefore of fish in the population will change as the mix of fishing gears changes over the next decade.

Barring any unexpected major breakthrough in the efficiency of fishing, it is expected that the stocks will meet projected U.S. catches on a long-term sustainable basis.

INTERNATIONAL AND DOMESTIC HARVESTING

International Fleet

Fleet Composition and Catch Distribution

In 1981 approximately 80,000 metric tons of albacore were taken from the North Pacific by combined foreign and domestic fleets. Since 1976 the total annual catch has ranged from approximately 62,000 to 124,000 metric tons.

In 1983, the countries harvesting North Pacific albacore (and their approximate proportion of the catch) include Japan (85%), U.S. (12%), Taiwan (1%), Canada (1%), and Korea (< 1%). In five years it is likely that the same countries will be fishing for North Pacific albacore. The approximate proportion of the catch taken by each country may change slightly.

There may be some changes in the mix of gears harvesting North Pacific albacore. Currently, most of the albacore is taken by pole-and-line (40%), longline (20%), gill net (30%), and trolled jigs (10%). Shifts to more efficient gear will be strongly influenced by increasing fuel and labor costs, although internal actions such as Japan's reduction of pole-and-line vessels may also affect the overall gear composition. By 1988 it is likely that long-line catches will increase slightly. Taiwan and Korea will probably increase

their long-line effort; Japan's should remain the same. Pole-and-line effort will drop somewhat (perhaps as much as 20%) as Japanese vessels are retired in favor of purse seiners, which will fish in the tropical fisheries. Gillneting effort will probably increase both on the part of Japan and the U.S. The U.S. troll (jig) effort will most likely decline somewhat when some vessels convert to gill nets.

By 1993 further changes are likely in gear composition. Japan and Taiwan are likely to reduce their long-line efforts. However, Korea and China will also increase their long-line effort, so the overall effort will remain about the same. Both Japanese pole-and-line vessels and U.S. jig boats will decline in numbers because of increased operating costs. However, the total fishing power of the jig fleet may not change greatly. Both the Japanese and U.S. gill net fleets will increase considerably because of relatively lower operating costs.

Geographic Distribution

The geographic distribution of the various foreign fleets will probably change in the next ten years. The long-line distribution will remain the same until 1988 and then will contract slightly toward the center of its distribution between 1988 and 1993 to maintain high catch rates equal to or better than current catch rates. These catch rates will keep longlining profitable. The pole-and-line fleet will contract to the higher catch-rate areas as it reduces in size through 1993. It will continue to fish across the mid-Pacific line as long as catch rates are good. The foreign gill net fleet will continue to fish through 1988 as it does now, with some extensions to the east. From 1988 through 1993, as the pole-and-line fleet declines, the gill net fleet will be allowed to fish in the zone previously restricted by the Japanese to their pole-and-line vessels.

U.S. Domestic Fleet

Fleet and Gear Composition

In 1983, the albacore catch was taken by vessels which fish albacore exclusively and by those which normally fish salmon, halibut, bottomfish, shrimp, etc. The current albacore fleet is predominantly troll (jig) vessels; the remainder are pole-and-line (bait) boats. At present only a few vessels are fishing with longlines and gill nets. By 1988 the fleet will have a similar composition with slightly more participation by larger vessels displaced from other fisheries. This trend will hold through 1993. The recreational albacore fleet, consisting of both commercial passenger vessels and private yachts, is not expected to grow significantly.

Gear composition within the U.S. albacore fleet will gradually change. By 1988, because of rising operational costs of jig fishing, the number of

gill net vessels will increase considerably. Additionally, jig vessels or combination-gear vessels will be larger, to allow the option of fishing offshore and with several types of gear. Increases in fishing efficiency will aid the fleet and slow the rate that troll vessels leave the fleet. Sail-assisted vessels and other cost-saving innovations will find limited applications. Increases in information (weather advisories, market surveys, albacore fishing advisories) will contribute to slowing the rate of attrition.

By 1993 the gear composition of the fleet will have changed drastically from that of 1983. The number of larger vessels, fishing a combination of gears, will increase, with gill nets and jig gear providing most of the catch. Also, by this time it is expected that U.S. longline catches will be substantial. Small troll vessels, particularly those of shorter range and lower cost-effectiveness, will be reduced to part-time; they will fish only when very high catch rates can be obtained near shore.

Geographic Distribution

By 1988, U.S. gill net and combination troll, gill net and longline vessels will move into the western North Pacific in large numbers, overlapping the Japanese and Korean fleets with some small effort even as far as Japan. This segment of the fleet will move towards the U.S coast with the migrating fish, thereby extending the U.S. fishing season to almost eight months. By 1993 the U.S. fishery will be fishing off Japan early in the season, particularly after the number of Japanese pole-and-line vessels declines. Limited numbers of U.S. vessels will be fishing in other areas, such as the South Pacific or off the U.S. East Coast. The extent of this long-distance fishery expansion will depend greatly on the development of an intrastructure for provisioning or off-loading.

The geographic distribution of the recreational fishing fleet is not expected to change within the next several years.

Catch Rates

Through 1988, catch rates for U.S. jig vessels will probably stay the same; increases in catch rates are expected for gill net vessels and combination-gear vessels fishing offshore. Increased efficiency measures such as industry advisories, and better electronics will improve catch rates for the same stock size through 1993, though not fast enough for marginally efficient vessels to maintain profits in the face of rising costs.

Recreational catch rates of albacore will continue to be highly variable and will remain associated with the nearshore appearance and abundance of fish.

DOMESTIC PROCESSING AND CONSUMPTION OF ALBACORE TUNA THROUGH 1993

Albacore tuna that is processed for U.S. consumption comes from the Pacific, Atlantic, and Indian oceans. In the U.S., albacore tuna is consumed almost exclusively as canned white-meat tuna. If future per capita consumption continues to increase at an average annual rate of 2% through 1993, total consumption would approach 93,000 tons of processed product annually by 1988 and 104,000 tons by 1993. These levels of consumption would require approximately 188,000 tons and 205,000 tons of raw tuna, respectively. Combined U.S. raw tuna landings and raw tuna imports totaled 101,000 tons in 1982, which converts to approximately 51,000 tons of canned product. Forty-three percent of this supply of raw tuna came from the Pacific; the Atlantic and Indian Oceans produced 40% and 17%, respectively. In addition to the raw albacore for processing, approximately 6,000 tons of canned white-meat tuna were imported into the U.S. in 1982.

The price of tuna is likely to stabilize in the near term, which should enhance future retail sales. However, innovative and aggressive competition by close substitutes, particularly poultry products, could act to offset any gains in tuna consumption from price stabilization. Also, because of the growing health and nutrition consciousness of U.S. consumers, we can expect the industry to solve problems that might arise with regard to the salt content of canned tuna. This will stimulate future sales through a vigorous campaign promoting the health and nutritional benefits of tuna consumption.

Albacore also would seem a likely candidate for marketing in specialized form as an over-the-counter (e.g., "fast food") item. Within the next 5 years we can expect some alternative product development and retail consumption growth in this area. Another alternative market form that appears to have potential is fresh-frozen albacore. An attempt to increase consumer awareness and acceptance of fresh-frozen albacore occurred in 1982, when albacore fishermen on the West Coast started promoting and marketing albacore from their boats. This effort introduced consumers to the palatability, nutritional value, and versatility of fresh albacore. Greater efforts in this marketing area over the next five years will lead to considerable expansion in albacore consumption through the fresh-fish and restaurant trade.

Realizing this overall potential will entail major research and development on the part of processors and marketers. Under the conditions discussed previously, the annual growth rate for albacore consumption in the U.S. could perhaps reach 5% after 1988, and domestic retail demand for albacore tuna in various product forms could approach 119,000 tons annually by 1993. While there would seem to be significant opportunity for growth in U.S. albacore consumption through 1993, opportunities for the development of export markets for U.S.-produced albacore appear limited.

Existing canning plants, both active and inactive, are capable of processing in excess of 900,000 tons of canned tuna (white and light meat combined) annually, well above present production levels and more than

sufficient to meet projected domestic demand through 1993. The share of processing at Puerto Rican and western-central Pacific sites should expand in the near future. In the longer term, as domestic processors find it increasingly more difficult to compete with foreign processors, there will be greater direct purchases of foreign canned tuna by U.S. brokers and distributors.

RESEARCH ON THE ALBACORE RESOURCE AND FISHERY

Objectives of Research

The objective of the National Marine Fisheries Service's research on the albacore fishery is to develop a scientific basis for generating and evaluating management policies and recommendations with respect to U.S. interests in North Pacific albacore, and to produce information and understanding supportive of planning and operating decisions in the U.S. commercial and recreational albacore fisheries.

The North Pacific albacore resource supports several foreign fisheries and important domestic commercial and recreational fisheries. At the present time none of the albacore fisheries are under management; however, it is recognized that the productivity of the resource and the economic viability of the U.S. albacore industry may be jeopardized in the future unless international agreements are reached on the status of the albacore stock(s) and on acceptable harvest levels.

Funding for Research

Funding of fisheries research in general has been declining for a number of years, and this trend is expected to continue for the next five years, with slight increases expected over the following five years, to 1993. Expenditures on albacore research, because of its great importance in the region, will probably remain level or have small increases over the next decade.

Albacore Research Activities

Albacore research activities under way or planned during the next decade may be classified as (1) biological studies, (2) stock assessment, (3) environmental studies, (4) socio-economic studies, and (5) management analysis and advisory systems integrating the knowledge gained from the four other studies. In addition, a computer-based data management system will be required to handle the data and information needs of the entire research effort.

Biological Studies

Data that has been accumulating suggests that the North Pacific albacore population comprises more than one stock. Research within the next decade will result in a much better understanding of this stock structure as the result of continued tagging, more uniform temporal and spatial recovery effort, and biochemical studies. Through age and growth research, understanding of population size and age structure, as well as more accurate estimates of the age composition of the catch will be possible within the next 5 to 10 years. As the result of research carried on over the next decade, there will be a more complete understanding of albacore physiology as it relates to environmental preference and behavior. This understanding will allow for improved fishery and resource forecasting.

Basic studies carried on during the next ten years on albacore ecology and life history will lead to a better definition of the distribution of larval and early juvenile stages of albacore. This in turn will result in an improved scientific basis for managing North Pacific albacore.

Stock Assessment

Stock assessment research over the next 10 years will result in more robust and accurate assessments of the albacore resource through integrating the results of research on biology and environmental effects. In the next 5 years, more robust estimates of stock condition will result from the use of improved age-structure-based methods. Accuracy in age-structured models will result from biological findings and from new analytical techniques. In the next 10 years additional accuracy will come from better estimates of population age structures and the effects of gear selectivity on the population and catch age structure. Throughout the next 10 years, simulation models will be used increasingly. Simulations will help scientists determine the precision of their stock assessments. Additionally, large-scale simulation models integrating biological, environmental, fishery, and economic inputs will be used to describe the dynamics of the fishery. New management concepts replacing MSY and OY will emerge, most likely from age analyses. In the future, international concerns will foster increased interactions with foreign fishery scientists.

Environmental Studies

Environmental research over the next decade will be concerned with (1) modeling albacore distribution, availability, and abundance based on oceanographic features and processes, (2) integrating environmental models with socio-economic and fishery models to develop forecasting systems and (3) developing oceanographic monitoring systems to support forecasting systems. Improved understanding of albacore resource/environmental interactions should

increase predictive capabilities somewhat in 5 years, and considerably in 10 years. During the next decade environmental studies will rely increasingly on satellite remote sensing, acoustic telemetry, and interactive computers. Specific studies during the next 5 years will include defining the environmental habitat of albacore, and variations in time and space; determining migration patterns of albacore by proposed substocks and age groups, and the associated environmental conditions that influence timing, and routes, investigating oceanic frontal boundaries and other environmental features that affect availability and catchability; and developing methods for putting oceanographic data into models that describe the interactions among North Pacific albacore, the fisheries harvesting it, and environmental conditions. Research in the latter half of the decade will concentrate on environmental conditions affecting abundance and early life survival. This research, along with improved understanding of age structure, should increase understanding of recruitment and, possibly, prediction of recruitment and age-class structure.

Socio-Economic Research

Socio-economic analyses will be initiated during the next 5 years to describe the structure and functioning of the U.S. albacore industry, to evaluate performance in different sectors of the fishery, and to develop a socio-economic statistical and information system to support fishery decision making and industry planning. To facilitate this research, socio-economic statistical and information needs will be determined, and a system for gathering statistics will be developed.

Management Analysis and Advisory Systems

Research dealing with management analysis will be initiated during the next 5 years to develop possible management alternatves for the U.S. North Pacific albacore fisheries, to evaluate alternative policy actions in terms of specified management objectives and constraints, and to develop a statistical and informational system to facilitate policy analysis and management decision making.

Research will be undertaken during the next decade to improve forecasting and advisory systems. These systems will improve industry performance and aid in evaluating strategies through information feedback. The present advisory system will be maintained until modifications are adopted.

Data Management

Data management activities and costs are expected to increase over the next 5 years and then continue at a relatively high level during the following 5 years. A fishery statistical and information system will be developed as a

central component of the albacore research and management programs. Principal users of an albacore fishery information system will be identified; their needs will be specified; and a statistical and information system will be designed. The system will handle fishery data from U.S., Japanese, and other foreign fisheries; environmental data from vessels at sea, satellites, and other sources; data from research cruises and commercial and recreational fishing operations; socio-economic data; and other data as required. Following the development of a fishery statistical and information system, reporting systems will be developed over the next decade to serve users in management, research, and industrial planning. These systems will include procedures for editing, compiling, storing, merging, and retrieving data of different types and for generating standard statistical summaries.

Research Vessel Usage

The usage of NOAA vessels for albacore research has, because of increased competition for these vessels, decreased in the last few years. Over the next 5 years the use of NOAA vessels for field experiments is expected to remain at a reduced level; however, after 1988 this activity is expected to increase. The industry-NMFS cooperative programs that rely on fishing vessels chartered by the industry are expected to figure prominently in the field research programs carried out over the next decade.

NATIONAL POLICY AND MANAGEMENT

National policy holds that tuna, unlike coastal fish stocks, cannot be managed by one nation. Pressure on Congress to bring tuna under U.S. jurisdiction within 200 miles of the U.S. shoreline has been and will continue to be unsuccessful over the next decade. Partly as a result of the national policy, albacore fishing is essentially unregulated. Within the next 5 years, U.S. tuna fishermen will be required to report their catch and fishing effort. Depending on the results of research to determine the vulnerability of albacore to overfishing and to identify effective means of preventing overfishing, the U.S. may seek a multilateral treaty with other albacore fishing nations in the early 1990s. The goals of those negotiations will reflect in great part the desires of the domestic albacore fishing industry.

By 1988, federal government attention will shift from albacore fishery development and exploitation to determining stock status and the vulnerability of albacore to overfishing. Research funding will increase as the potential for international management of albacore attracts attention in Washington, D.C. Industry services, such as albacore advisories and loan guarantees, will continue, as will tax incentives for capital construction. Throughout the next ten years the quality of government-sponsored albacore advisories will continue to improve. The effectiveness and efficiency of industry services and research will determine which programs survive.

Relationships between albacore fishermen and government researchers are good now in most sections and will continue to be mutually beneficial as research work benefits from data supplied by fishermen, and fishermen use advisories based on research findings. By 1988, industry relations with the federal government may be strained by concern over potential regulations and existing reporting requirements. That strain will be eased by active participation of fishermen and processors in the planning of albacore programs; this will build a strong relationship for the 1990s.

After 1988, state/federal cooperation will suffer, particularly in the western Pacific, as the federal emphasis shifts away from developing new albacore fisheries. On an international scale, a recent albacore treaty with Canada has opened selected ports to fishermen of both countries. Exchange of scientific and fishery information has been quite good and free, but new countries entering the fisheries are not as cooperative. In 1983, the Japanese are becoming more guarded because they believe they have been unfairly closed out of other fisheries in the U.S. zone and because the U.S. has not reciprocated in data exchange. International relations will deteriorate through 1988 as nations (1) determine that international management will be needed and begin to hold their negotiating cards closer to their vests, or (2) determine that they will lose too much under international management, and cease to cooperate as a result. The U.S. will face the same decision. After 1988, the exchange of data and research results will resume and will be improved over the current situation.

APPENDIX D

GOALS AND OBJECTIVES FOR THE FUTURE OF THE NORTH PACIFIC ALBACORE FISHERY

		VOTES
1.	Remain an economically feasible fishery[1].	1
2.	Improve data base for establishing stock size.	1,2,3,1,1
3.	Monitor and forecast the catch[2].	2
4.	Adopt more conservative MSY for management purposes until reasonably reliable numbers are obtained.	2
5.	Investigate the reliability of fisheries statistics for analysis of albacore population size.	3
6.	Increase the catch in the Pacific albacore fishery while reducing the production cost.	
7.	Improve forecasting of fluctuations in albacore availability, abundance, and areal distribution.	4,2,1,4,3
8.	Focus government assistance on development of the albacore fishery and help U.S. fishermen compete more effectively with foreign enterprises.	1
9.	Continue research on the two-stock theory and the assessment of the health of the stocks.	1
10.	Accelerate research to develop information for identification of oceanographic conditions and other environmental factors and their relationship to albacore feeding habits.	2,2,3,2,3
11.	Ensure that domestic processing and harvesting facilities are utilized in the N.P.A. fishery.	

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[1]After the voting, objective number 1 was judged by the participants to be a higher order goal and, therefore, it was not used in the ISM discussion.

[2]This objective was split into two objectives during subsequent discussions.

12.	Research on the effects of the Asian new fisheries and the effects on the immature stocks.	
13.	Provide for industry flexibility in competitive processing and marketing.	4
14.	Develop more recreational albacore fishing opportunities.	4
15.	Conduct research to improve efficiency of fishing methods employed by U.S. albacore fishermen.	3,3,4,3,5
16.	Conduct research to improve the technology for maintaining quality of albacore, from the time it is caught until it is marketed.	5,5
17.	Improve accuracy of statistics on catch, effort, size, and growth of albacore.	1
18.	Continue cooperative research and development between NMFS and fishermen's foundations.	3,4
19.	Conduct economic study of sport-caught albacore.	5
20.	Develop a Mid-Pacific fisheries base for fueling of fishing vessels and transshipment of fish (perferably at Midway Island).	4,5,5,5,2
21.	Maintain international albacore catch at MSY.	2,5
22.	Develop an ocean wide chart displaying where the most fish are caught on a month-to-month basis.	
23.	Initiate and coordinate a close working relationship with the U.S. Navy, other federal and state agencies to do adaptive research.	
24.	Foster international cooperation to improve the process of exchanging scientific data.	4,1,5
25.	Conduct research on gear conflict between commercial and recreational albacore fisheries.	4
26.	Develop alternative markets, other than the canned fish market, for albacore.	5,4,5
27.	Contribute more to the domestic nutritional need (N.P.A. fishery).	
28.	Establish data center to support domestic fleet.	3
29.	Research and development of effective and cheap	

bait fish production.

30. Identify interactions between albacore and other commercial species.

31. Improve data on fishing conditions for coastal vessels.

32. Develop ways and means of avoiding over-capitalization of both the domestic fleet and our canneries.

33. Develop detailed North Pacific albacore fishery industry analysis. 1

34. Allocate quotas on a time, geographic, and global basis.

35. Establish a formula for matching production to worldwide demand.

36. Establish method for annual price stabilization. 2

37. Develop a way of assisting domestic fishermen to reduce operational costs.

APPENDIX E

GROUP ASSIGNMENTS FOR IDENTIFYING DESIRABLE TRENDS AND EVENTS

GROUP A

SECTORS

- Research
- Fisheries-Government Partnership

GROUP MEMBERS

Nicholas Cates
Edward Deringer
John Gough
O. E. "Bud" Kerns, Jr.
Reporter, Government Partnership
William Pearcy
Reporter, Fisheries Research

Facilitator: Alexander Christakis

Recorder: Richard Parrish

GROUP B

SECTORS

- Fishery Development
- Alternative Products and Markets

GROUP MEMBERS

Benjamin Felt
Edwin P. Martin
Michael McGowan
Reporter, Fisheries Development
Richard M. Matsuura
William Perkins
Reporter, Alternate Products and Markets

Facilitator: David Mackett

Recorder: Rodney McInnis

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R. S. HOLT
(February 1983)

28 "Two computer programs to project populations with time-varying vital rates."
T. GERRODETTE, D. GOODMAN & J. BARLOW
(February 1983)

29 Report of eastern tropical Pacific research vessel marine mammal survey, May 15-August 3, 1982.
R. S. HOLT
(March 1983)

30 Estimating age of spotted and spinner dolphins *(Stenella attenuata* and *Stenella longirostris)* from teeth.
A. C. MYRICK, JR., A. A. HOHN, P. A. SLOAN, M. KIMURA and D. D. STANLEY
(April 1983)

31 Re-estimation of three parameters associated with anchovy egg and larval abundance: Temperature dependent incubation time, yolk-sac growth rate and egg and larval retention in mesh nets.
N. C. H. LO
(May 1983)

32 "NMFS guidelines on economic valuation of marine recreational fishing"
D. D. HUPPERT
(June 1983)

33 "Summary of environmental and fishing information on Guam and the Northern Mariana Islands: A review of the plankton communities and fishery resources of Guam and the Commonwealth of the Northern Mariana Islands"
R. N. UCHIDA
(July 1983)

34 "Some data on dolphin mortality in the eastern tropical Pacific tuna purse seine fishery prior to 1970."
T. D. SMITH and N. C. H. LO
(July 1983)

35 "Precision of age determination of northern offshore spotted dolphins."
S. B. REILLY, A. A. HOHN, and A. C. MYRICK, JR.
(August 1983)

36 "Recovery of adult green turtles observed or originally tagged at French Frigate Shoals, Northwestern Hawaiian Islands."
G. BALAZS
(August 1983)