

# I. Introduction

The Stock Assessment Improvement Plan (SAIP) is the report of the National Marine Fisheries Service (NMFS) National Task Force for Improving Fish Stock Assessments. It consists of a main document with 8 tables and 15 figures, an Appendix table summarizing the level of completeness of data collection and stock assessments for each federally managed stock (**Appendix 1**), and an additional 24 appendices (**Appendices 2-25**) summarizing other relevant programs, plans and reviews. The Stock Assessment Improvement Plan is a component of the Science Quality Assurance Program (**Appendix 2**), which consists of several other elements including the NOAA Fisheries Data Acquisition Plan (**Appendix 3**), the Stock Assessment Toolbox (**Appendix 4**), the Center for Independent Experts (**Appendix 5**), and the NMFS-Sea Grant Joint Graduate Fellowship Program (**Appendix 6**). The Task Force consisted of one representative from NMFS Headquarters and 1-2 representatives from each of the five NMFS Science Centers. Additional input from the Science Centers was obtained via questionnaires administered to stock assessment scientists and managers of stock assessment programs. Science Centers were also given the opportunity to review the contents of the Plan.

This report also draws on the analyses and recommendations of the National Research Council (NRC) study on Improving Fish Stock Assessments (NRC 1998a). In order to determine which avenues should be explored to improve stock assessments, NMFS requested in 1995 that the NRC undertake a review of the agency's current stock assessment methods and models and make recommendations for alternative approaches. The objective of the review was to produce an authoritative report that documented the strengths and limitations of stock assessment methods relative to the diversity of available data and types of fisheries management systems. The resulting review (**Appendix 7**) contained ten recommendations in seven categories for improving stock assessments; these are numbered and presented in summary form below for easy reference through the remainder of the current report.

Recommendation #1: *How should assessments be conducted and by whom?*

Recommendation #2: *Development of at least one reliable abundance index for each stock.*

Recommendation #3: *Collection of auxiliary biological data such as natural mortality.*

Recommendation #4: *More realistic assessments of uncertainty.*

Recommendation #5: *Analysis of alternative harvest strategies.*

Recommendation #6: *Development of rigorous evaluation systems including simulation models.*

Recommendation #7: *Development of new techniques for stock assessment.*

Recommendation #8: *More peer reviews.*

Recommendation #9: *Standardized data collection protocols for commercial fisheries.*

Recommendation #10: *Education and training of assessment scientists.*

Improvements in stock assessments are required for several reasons, including (a) that management entities are “managing at the edge” for many species, and therefore require the most accurate and precise stock assessments possible; (b) it is no longer permissible to overfish; and (c) there are currently increased demands for adopting a “precautionary approach” and incorporating “ecosystem considerations” into stock assessments and fisheries management. These issues are addressed in detail in **Section II**, along with other factors that define NMFS’ stock assessment mandate. **Section III** provides background information on requirements for conducting assessments and for evaluating alternative fisheries management strategies. **Section IV** contains detailed information on qualitative and quantitative resource requirements for each of the five Science Centers, relative to three Tiers of Assessment Excellence. As such, it represents the core part of the report. Recommendations based on the preceding sections of the report are summarized in **Section V**. Assessment-related information is tabulated in **Appendix 1**, and an additional 24 Appendices contain information on other relevant plans, reports, and background documents. It is anticipated that the current report will provide a foundation for future initiatives, including budget initiatives, to improve the quality and quantity of NMFS’ stock assessments.

## Scope of the Stock Assessment Improvement Plan

The Stock Assessment Improvement Plan (SAIP) is the latest of a series of plans for enhancing and modernizing NMFS programs for data collection, information technology, data management, stock assessments, scientific research, and fisheries management. Although the SAIP is specifically geared towards stock assessments, when account is taken of the diverse data needs of stock assess-

ment models and the expectation of more comprehensive ecosystem-based science and management in the future, there is considerable scope for overlap or duplication between several plans. With this in mind, the SAIP was designed to complement plans already completed at its inception, or otherwise to acknowledge duplication, and to avoid contradiction. The key complementary plan is the NOAA Fisheries Data Acquisition Plan (**Appendix 3**), which details the need for purpose-built fishery research vessels and chartered days-at-sea to satisfy immediate fishery-independent data collection needs. Thus, the SAIP does not include the capital and operating costs of the research vessels, nor chartering costs, nor the permanent vessel crews, but it does include the scientific staff that would participate in research surveys. Another important complementary plan is the Proposed Implementation of a Fishing Vessel Registration and Fisheries Information Management System (**Appendix 8**), which will provide much more accurate, complete, and timely information on commercial fisheries statistics. The core costs of this program are not considered in the SAIP, but the in-house or contract staff required to collect, manage, and process the data are included. The NMFS Bycatch Plan (**Appendix 9**), which includes monitoring, data collection, and research, overlaps to a degree with the SAIP but, since the Bycatch Plan did not develop specific staff and other resource requirements, duplication should not be a problem.

One plan with which there is considerable potential for overlap and duplication is the National Observer Program (**Appendix 10**), which was initiated subsequent to the commencement of the SAIP. As is evident in **Section IV** of this report, the most important overall need for improving stock assessments is for in-house and contract staff for observer programs for collecting data of relevance to stock assessments, in both the short- and the long-term. The National Observer Program examines observer needs from a slightly different perspective. First, it considers needs for monitoring both commercially-exploited fish species and protected and endangered species such as marine mammals and sea turtles, whereas the SAIP only considers that portion of existing and potential observer programs that could be at-

tributed to obtaining data of direct relevance to commercially-exploited fisheries stock assessments. Second, it outlines a five-year plan, whereas the SAIP is much longer-term. Thus, there is some degree of overlap between the SAIP and the National Observer Program. The overlap will be quantified and controlled for as necessary in future budget initiatives.

The SAIP focuses on field biologists who collect data; laboratory technicians who process biological samples; computer scientists who audit, manage, and analyze data; and quantitative stock assessment scientists who develop and run stock assessment models. Another important fisheries profession not represented in the SAIP is that of social science (economists, sociologists, and anthropologists). The need for additional social scientists is detailed in the NMFS Social Sciences Plan and Budget Initiative (**Appendix 11**).

Capital costs for the purchase of advanced technologies and operating costs for research and field trials is another activity that is covered elsewhere (**Appendix 12**), and therefore excluded from explicit consideration in the SAIP. Also excluded are major infrastructure associated with increased staffing, particularly new workspace and buildings that may be required.

In order to further limit the scope of the SAIP and to reduce overlap with other plans and initiatives, it was also decided not to explicitly include resource requirements for fisheries oceanography (e.g. **Appendix 13**), stock assessments and related activities for marine mammals and sea turtles (**Appendix 14**), habitat-related research and conservation (**Appendix 15**), and stock assessments and related activities for Pacific salmon.

In order to develop a comprehensive ecosystem approach to fisheries stock assessments and management, and to estimate the actual costs of implementing ecosystem-based management (EBM), all of the above-mentioned plans, initiatives, and activities should be merged into an umbrella plan.