Atlantic States Marine Fisheries Commission
Final Report
Grant Number NA17FG2359
Development of a Comprehensive Repository for American Lobster Stock Assessment Data

Period of Performance: April 1, 2002 – March 31, 2004
Period Covered by this Report: April 1, 2002 - March 31, 2004

The proposal for this project was submitted in July 2001. The project is set up as four phases of activity, with Phases II and III funded by this grant and Phases I and IV funded by the ASMFC. The four phases of development are summarized in Attachment 1. A contract was initiated with ICF Consulting in October 2002. All Phase II and III goals were accomplished and contract deliverables received as of March 31, 2004. Copies of deliverables and system documentation have been provided to ACCSP staff. Table 1 provides a summary of the four Phases of development, and associated deliverables. All deliverables and some additional database documentation are enclosed on CD-Rom (Attachment #1).

The Commission also supports this project under ACFCMA funding for staff time, staff training for Business Objects and Oracle, computer hardware and software purchases to support the database, and travel funds for meetings to develop and review the data repository. Following completion of Phases II and III the Commission continues to support system implementation (Phase IV).

Project Benefits:

The overall objective of this project was to develop an Oracle database that includes the key fisheries-dependent and fisheries-independent data necessary to support a timely American lobster stock assessment. Not only was the database created, but a user-friendly web-interface makes the system available to named users (with passwords) from any location with an Internet connection. This database provides a central repository for all current and historical American lobster stock assessment data, including the following:

- Commercial catch and effort data
- Biological sampling data (i.e., length and weight)
- At-sea observer data
- Trawl survey data.

The most tedious and time-intensive task in performing a stock assessment is the gathering and formatting of the source data for input into assessment models. American lobster data are stored in various formats by state and federal agencies, and are compiled by the Commission's American Lobster Technical Committee each time an assessment is conducted. Each new assessment for American lobster has required a re-compilation of all assessment data due to several factors. The

most significant factors include a lack of standards to assist in linking these disparate data sources, turnover of state and federal membership on the technical committee with no set procedure for transfer of data, and a lack of set procedures for storing and updating the data from one assessment to the next. The creation of the catch at age matrix for American lobster involves data interpretation and manual filling of data gaps. Since no standard documentation on past methods of data interpretation have been developed, these processes may have been conducted in a different manner for each new assessment.

The last American lobster stock assessment was completed in April 2000 and was peer reviewed by a panel of six experts in assessment techniques and lobster biology in May 2000. Several recommendations were developed in order to improve the compilation and storage of lobster data for assessment purposes, including the following:

- A centralized database containing all American lobster assessment data should be developed and maintained, and data should be updated and reviewed annually as a basis for detecting signals of change in stock status at an early stage.
- There needs to be more detailed information and documentation on all aspects of data compilation and development of the catch-at-age matrix.
- Documentation is also necessary to identify where gaps in sampling data exist, and an explanation of how those gaps were filled with data from adjacent areas or time periods.

The lobster stock assessment database developed under this project was based on approved data element and data format standards adopted by the ACCSP. This database contains the key fisheries-dependent data (i.e., commercial catch-effort data, biological data, and discard data) required for assessment of any species, as well as fisheries-independent trawl survey data. Upon completion of an assessment for American lobster, the Commission intends to expand the database to include recreational data and other fisheries-independent assessment data. The database can then be modified to support assessments of other Commission-managed species. Since American lobster and other Commission-managed species are also managed individually by the Atlantic coastal states, the Commission can now transfer the database and any state-specific data to more fully support management of these species at the state level.

Since the lobster database was developed consistent with ACCSP standards, future data contained in the ACCSP data warehouse can be directly downloaded to the lobster database. When compiling and evaluating data for a regional or coastwide assessment, the ability to identify and resolve data outliers, sampling gaps, and questionable data trends is enhanced. As data problems are identified through conducting an American lobster stock assessment, feedback can be provided to the ACCSP to improve the accuracy and quality of the data in the ACCSP data warehouse.

Since one of the overarching goals of the ACCSP is to directly support stock assessment and fisheries management, this project can be used to showcase the benefits of the ACCSP in meeting this goal. Until data for all ACCSP modules and historical data are available from the data warehouse it may be difficult for ACCSP to demonstrate its ability to fully meet the needs of stock assessment biologists and fisheries managers. Because the lobster database project is

focused on a single species and fewer data sources, it can be brought on-line to support a full assessment in a shorter time frame. The American lobster fishery has the highest economic value of all Atlantic coast fisheries and, therefore, has high public awareness by both fishermen and consumers. By developing this database the Commission hopes to improve confidence in both the quality of the assessment and the ACCSP.

Data conversions between partner source data and the ACCSP data warehouse have been developed for coastwide commercial catch-effort data mainly for the period 1998-to present (note that some South Atlantic partners have reconciled data back to earlier periods). The ACCSP can provide the most recent commercial catch-effort data to assist the Commission in conducting an American lobster assessment. However, it should be noted that the assessment for American lobster requires commercial catch-effort data from 1981 to the present, as well as biological and discard data. Until the completion of this project specific to American Lobster, the ACCSP has not addressed or prioritized the conversion of historical commercial catch-effort data, biological data, or discard data for uploading to the ACCSP data warehouse. Given the amount of time required to fully populate the ACCSP data warehouse with all data required to conduct an assessment, it may be years before the ACCSP can fully meet the needs of stock assessment biologists and fisheries managers. This project has provided the conversions to historical catch-effort data, biological data, and discard data for American lobster. These conversion programs have been transferred to ACCSP and can either be directly applied or modified to assist the ACCSP in populating the ACCSP data warehouse with these additional sources of historical data. This will provide a direct benefit to the ACCSP, as well as all program partners, by decreasing the timeline for making the ACCSP data warehouse more useful to the partner agencies in conducting assessments and developing fisheries management strategies.

Stock assessments for any species requires long-term fisheries-dependent and fisheries-independent data. The ACCSP has adopted coastwide data element and data format standards for fisheries-dependent data. However, no such coastwide standards are available for fisheries-independent data. This project adopted data element and data format standards for trawl survey data that will be forwarded to the Northeast Area Monitoring and Assessment Program (NEAMAP) to assist in the adoption of similar standards for fisheries-independent data collection programs. This project also provides an automated linkage between fisheries-dependent and fisheries-independent data sources that can be used as a model for assessment of other species.

Table 1. Phases in the Development of an American Lobster Stock Assessment Database and Associated Deliverables

Funding source	Task	Progress and Deliverables on CD-Rom
ASMFC	**Phase I. Define the Centralized Database** (Completed by the Commission January 2002 - This grant did not solicit funds to conduct these tasks). Please refer to previous grant report for a more detailed update on the database requirements. • Define data content, including minimum data elements & formats • Define business rules for data manipulation • Identify state and federal data sources • Define reporting requirements • Define physical requirements (hardware/software) • Define confidentiality and security protocols • **Create Logical Model** (Commission contractual funds)	**COMPLETE** • Lobster Requirements Document.PDF • Lobster Requirements Appendix ABC.PDF • Lobster Requirements Appendix D.PDF • Lobster Standard Codes.PDF • Lobster DB Logical Overview-Final.doc
ACCSP Grant	**Phase II. Database Design** (ACCSP funds used to hire a contractor to complete these tasks) • Develop high level database design • Develop data dictionary including description and format • Create functional data model - data manipulation algorithms, reports, etc. • Create physical data model - business rule, data dictionary, etc. • Design system architecture	**COMPLETE** • Lobster DB Detail Design-Final_PDF pg1_109.pdf • Folder: DATABASE • Folder: Oracle Forms • Folder: Oracle Reports • Lobster_DW_User_Manual Feb_19_2004.doc
	Phase III. Data Transformation (ACCSP funds used to hire a contractor to complete these tasks) • Create data migration and conversion design • Develop data conversion from source data to centralized database standards • Develop mapping of data sources • Create technical architecture - hardware/software • Develop user and system documentation	**COMPLETE** • Data Conversion Plan_V_1_4.doc • Final_Data_Load 12182003.zip
ASMFC	**Phase IV. System Development and Implementation** (To be completed by the Commission. This proposal did not soliciting funds to conduct these tasks) • Implement technical architecture • Install database • Install data conversion routines (modify as necessary) • Migrate historical lobster data from source data • Document data exceptions • Perform user training • Initiate ongoing user updates	 • Complete • Complete • Complete • 80% progress • 80% progress • Scheduled: June 4, 2004 • Ongoing