

Life History Summaries and Creation of The EcoSpecies Database to Provide Web-Enabled Information to Support SAFMC Habitat Management and SEDAR

Statement of Work

Tasks and Need for Assistance

In the early 1990s, the FWC-FWRI created a decision support system (DSS) called the Florida Estuarine Living Marine Resources (FLELMR) System (Rubec et al. 1997). FLELMR was created as a source of synthesized information needed for fisheries management and for assessing potential impacts from oil spills and other perturbations. It contains information pertaining to life histories, reproduction, and habitat requirements for 90 species of marine fish and invertebrates found in Florida.

Under this project a new information system called EcoSpecies will be created to provide detailed information about species found in the South Atlantic. The 90 species life history (SLH) profiles from FLELMR will be transferred to create a new EcoSpecies database to support making the information available on the web. Work will also be conducted to create a new SLH profile for Red Snapper (*Lutjanus campechanus*). The new SLH profile will be developed to integrate with the South Atlantic Geographic Information System that FWC-FWRI has developed and maintained for SAFMC over the past eight years. Ultimately the intent is to provide SEDAR access to the species/habitat data system including detailed species life histories/habitat assessments.

Connection to Refinement of EFH Designations

The effort creates a web-enabled database that provides pertinent information about species life histories (SLH) and habitat associations of species by life stages. Managers can use the information to make informed decisions about what species may be impacted by EFH alterations (e.g., dredging). Other information such as population dynamics, growth, are also summarized from primary and grey literature tied to bibliographic citations. The intent is to provide rapid access to key information needed by managers to support EFH designations and descriptions, as well as access to other information (e.g., geographic distributions, taxonomy, population parameters) for SAFMC managed species.

Relationship to Future 5 Year EFH Reviews

Making this information available will contribute to the mandated five year EFH reviews for SAFMC managed species. Much effort has been expended developing Species Life Histories (SLH). To date these SLH's have not been readily available in a database environment, making it possible to quickly locate reference information supporting the review of SAFMC managed species. The information on fish-habitat associations in the new Ecospecies database can be related to existing habitat maps (e.g., ESI shoreline maps) to assist managers in making decisions pertaining to EFH designations, permitting for habitat alterations etc.

Significance of species selected for preparation of detailed SLH

Red snapper is one of the most important species in the snapper grouper complex. The fishery is currently closed to all harvest and the closure has resulted in significant economic and social impacts. The Council hopes to open the fishery as soon as possible. Red snapper is scheduled for a new stock assessment in 2013 through the SEDAR process. This detailed SLH will aid the SEDAR process in determining the status of the stock. Red snapper cover a dynamic range of EFH types from deepwater to estuarine dependant, from very specific habitat use of inshore and offshore EFH from North Carolina through Florida. Initially a more detailed review including more species was planned, however, in order to stay within the funding available the decision was made to focus on red snapper, which would round out the SLHs, and allow for the 90 existing SLHs to be converted from paper, PDF, WordPerfect, and Word formats into a media which would allow widespread distribution and basic search, a significant value add to the current investment in the production of the SLHs. In order to be used, they must be accessible, in contemporary formats. Once in the database format, additional search tools can be

developed, along with mechanisms supporting the maintenance of the histories by a diverse and distributed audience.

Subsequently this portion of the project now focuses on the production of the red snapper SLH, the design of a database to house the existing information, the importation of the existing information into the database, the web enablement of a basic search and presentation of these histories. Future enhancements could include extensive management tools, advanced query and reporting capabilities and additional detailed SLHs. Ideally, the new database will allow scientific experts at various locations to update SLH summaries for the remaining species. FWRI will create the bucket (database) which will allow the information to become more widely available over the web. FWC-FWRI has database experts who are also fisheries scientists. FWRI has also developed the Florida Estuarine Living Marine Resources (FLELMR) System. The existing SLH profiles that will go into EcoSpecies database use the FLELMR SLH outline (more extensive than ELMR SLH outline). The red snapper SLH profile created under this project will act as a model for subsequent work on other species (using the SLH outline and user's guide). Once the Ecospecies database is created by FWRI, it is envisioned that state and NOAA SEFSC would become involved in updating and/or creating new SLH profiles which will also serve as the foundation for the Council Habitat Assessments directed in the 5 year EFH review.

Work to be Performed

A new information system called EcoSpecies will be created to provide detailed information about species found in the South Atlantic. 90 species life history (SLH) profiles will be transferred from FLELMR to create a new EcoSpecies database to support making the information available on the web. Work will also be conducted to create a new SLH profile for red snapper. The SLH profile will be developed to integrate with the South Atlantic Geographic Information System (IMS and GIS Services) that FWC-FWRI has created and refined for SAFMC over the past eight years.

Task 1. Library Searches

Search and retrieval of published and unpublished literature will be conducted by librarians in the PWC-FWRI library. The intent is to obtain the papers in PDP format. FWRI can also obtain papers through the University of South Florida library (situated near FWRI's headquarters in Saint Petersburg) and through the State of Florida library. The FWRI library has many coastal and marine journals and also maintains a reprint collection with over 50,000 reports and publications that are not readily available in the primary scientific literature. Where necessary, hard copy documents will be scanned using the library's high speed scanner. The OCR capability of the scanner will be helpful to create documents that can be manipulated within MS-Word to update the SLH profiles.

Task 2. Creation of Species Life Histories

Scientists will read and summarize primary and secondary (gray) scientific literature and add pertinent information to SLH profiles created in MS-Word. To save space and facilitate the creation of legible documents a numeric citation system will be used. Numeric citations will tie to bibliographic references listed at the end of each SLH. The main goal is to provide synthesized information and direct the reader to references for the associated scientific literature.

Task 3. Database to Web Enable

The primary goals are to get existing SLH profiles into a database, and make them available via the internet. From a data perspective, the objective is to convert the SLH profiles from existing documents, to a format suitable for import into a Microsoft SQL Server database. A simple web-enabled front-end will then be created allowing fundamental searches to be performed against the database and then present the results. This system provides a substantial technical foundation for future initiatives and makes this valuable information available to a broad audience.

Tasks 4 and 5. Create an Ecospecies Database

The Scientific Engineering programmer will complete the following tasks by quarter. First Quarter, creation of an XML schema to support the Species Life History document structure, then create a SQL Server Database to ingest this information. The data will be accessible in the database and also available in a generic data format (XML). Second Quarter, the development of a Web Service to provide a means of accessing this data programmatically, in direct support of a web site or as a point of collaboration for partner organizations. Third Quarter will result in the creation of a basic no-frills web site to present the SLH information. Finally, the Fourth Quarter will enhance search functionality to the greatest extent possible.

XML files and web enable Data Manager

In parallel to the above technical activities, a Data Manager will process the existing Life Histories from MS-Word documents into the XML schemas or directly into the database tables (from which the data can be extracted in XML format). This provides the mechanism by which the database is populated. Technical guidance will be provided, as needed, from the programmer and IS&M Information Access staff. These individuals must have working knowledge of the marine environment and/or biological science will aid them in restructuring the data from original manuscripts into the contemporary data structures.

A full data management solution for species life histories will involve content management including screens generated for adding, editing, or deleting of content. These activities must be accomplished by a database/data manager familiar with the system. Should time and budget allow, a wiki or other tool will be put in place facilitating some element of these functions, but this is not considered a core activity to the grant. These additional capabilities are not necessary to achieve our primary goal of putting existing Life Histories in a database and available over the internet. From that point, future activities can include mechanisms allowing maintenance, correction, and detailed management of the data. But first, we must have data accessible for management.