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Project Proposal Title: Development of oceanographic atlases for pelagic and insular fisheries and resource management of the Pacific basin.

Funding Agency: Pelagic Fisheries Research Program

1. Purpose of the project and indicative results.

The development of broad-based ecosystem approaches to fisheries management is hindered by the bewildering array of oceanographic information currently available. Additionally, there is no consistent coding or formatting standards, and each data source may require different software for access. The Pacific Ocean Atlas project is designed to provide environmental data from a variety of platforms (satellite, shipboard, moorings, and numerical models) in forms useful and accessible to both non-expert and expert users. These data will be provided in a series of oceanographic atlases for all of the U.S. Pacific Island exclusive economic zones (EEZ) and regions of the Pacific basin important for pelagic and highly migratory species fisheries management. Distribution of the full data sets will be conducted primarily over the Internet. Both CD-ROM and limited print versions will be made available for resource managers and researchers in those areas lacking the resources for large Internet transfers.


Time Series and Climatologies

The development of science-quality historical time series and climatologies is one of the fundamental goals of the project. For each ocean parameter, there is an analog in the near real time data sets handled by CoastWatch on an operational basis. However, many of the data sets required more handling and assembly than had been expected. This process is now complete for all data sets through the end of year 2002. Acquisition of subsequent data will likely require coordination with the new management of the Hawai'i CoastWatch site, though there may be a number of alternatives emerging within the next 12 to 24 months.

New Derived Products

- Failed to produce a proxy for the “deep scattering layer”
  - Poorly defined concept
  - Sample data sets in-house but not available
- Requires very time-consuming calculation of underwater light field

- Completed development of value-added products specified by users in 2000/2001:
  - Vertical shear of current from Ocean Model/Data Analyses,
  - Thermocline Depth for the tropics,
  - Surface Ocean Currents from Satellite.

**Personnel:**

The first atlas Coordinator, Mr. Ramzi Mirshak, left the program to return to graduate school in August 2002. Mr. Lucas Moxey was recruited and hired November 1, 2002, to replace Ramzi. Before finishing training, Mr. Moxey moved in February to fill the Hawaii CoastWatch Coordinator position vacated by Foley. As such, he was able to make only a minimal contribution to the project. The hiring process was initiated once again, and Mr. Russell Moffitt was brought on as the new Atlas Coordinator in late August 2003.

**Data Sets:**

*In situ data*

Incorporation of existing *in situ* data sets with the rest of the Atlas data has required a significant amount of attention. While oceanographic data sets, such as COADS and Levitus, provide “highly refined” products, the averaging and interpolation methods employed were generally formulated to examine scales relevant to climate studies and not those necessarily relevant to fisheries and living marine resource management. It is likely that these data sets will adequately provide the larger scale context within which the finer scale information, when available, can be more effectively analyzed. Additionally, the atlas project has searched for and attempted to include other sources of reliable *in situ* oceanographic data. The project is making efforts to obtain the US Navy Master Oceanographic Observations Data Set (MOODS), though much of this data is classified, complicating the acquisition process. Even with all of the available oceanographic data, these regions are generally extremely sparse and not sufficient to describe the physical environment at the level required for most ecosystem based population models.

**Remote sensing data and model output:**

*Derived Properties*

In an effort to meet user needs, input was solicited from the members of the Methods Working Group, at the 16th meeting of the Standing Committee on Tuna and Billfish (STCB) in Honolulu, HI. The most interest expressed concerned the use of model reanalysis products (coupled geophysical models which assimilate observations of a broad range of parameters).

A useful pertinent derived product dataset has become available, Ocean Surface Current Analyses – Real time (OSCAR). OSCAR infers ocean surface
currents from a combination of dynamic topography (geostrophic currents) and surface wind stress (Ekman transport). Mesoscale geostrophic flow is derived from TOPEX/Poseidon sea surface height data, while mesoscale wind-driven currents are derived from QuickSCAT vector wind fields.

**Web Site:**

Development has begun on a rudimentary web interface to the atlas data. Initial work has focused on providing interactive access to climatologies and timeseries of *in situ* and satellite datasets.

### 3. Plans for the next fiscal year.

**Product Distribution**

The plan for the next fiscal year marks a dramatic shift from the more technical aspects of data acquisition and processing to the various issues associated with data distribution. The necessary framework is now in place; but the mechanisms for effective communication must now be defined and assembled. The current Atlas Coordinator will concentrate on implementing the basic suite of web-based services that will integrate the data archives and IT infrastructure established in the first two years of the project with a flexible and accessible user interface, allowing timely access to all Atlas products. This person will also work with the project Principal Investigators to produce regional “hard copy” atlases at a level appropriate for scientific publications. It must be noted that these projects are inherently separate, though best conducted in parallel. The current Atlas Coordinator is skilled in scientific visualization and user-friendly web design.

**Test cases**

A number of several test cases underway in which Atlas personnel work directly with living marine resource researchers and managers continue to establish useful products and help determine optimal means for transmitting the relevant environmental information. These test cases are performed on an ad hoc basis, unless otherwise specified in letters of support (e.g., support for the PFRP projects of Kleiber and Sibert, and Pooley and Walsh). Test cases of this sort will continue throughout the duration of the Atlas project.

**Data management**

Effort must be made to meet NOAA requirements regarding the management of these data sets. This includes effective storage and maintenance of the online archives. It is recommended that the project purchase a modern tape backup system to provide for this need. Mr. Russell Price has put together a workable solution (~ US $10 K) to accommodate the data sets, which occupy on the order of 1 Terabyte of disk space. It is recommended that the Atlas Project request that HL ITS to purchase and assemble the device as well as include it as part of their general responsibilities.
Effective organization of the data within that archive is also essential. This is tied intimately with the system used to access the data, and will thus be largely dependent upon the designs put forward by the new Atlas Coordinator. A rudimentary scheme has been laid out after the model used by the Hawaii and now the West Coast CoastWatch nodes. There is certainly room for improvement.

Finally, it is important to make every effort to meet emerging NOAA standards that require all data suppliers to furnish metadata compliant with Federal Geophysical Data Commission (FGDC) standards. HL has an initiative to manage such data sets. West Coast CoastWatch is developing automated processes to generate FGDC-compliant metadata for all data types used by the Atlas project, and will share these as they are produced.

The scope and the application of the atlas are broad. As such, this project stands to benefit from collaboration with other groups performing similar work. A partnership has been recently formed with NESDIS, taking advantage of their expertise in managing and distributing environmental datasets and in creating a variety of derived products, such as coral bleaching hotspot maps.

None

5. Other papers, technical reports, meeting presentations, etc.:


Thus far, there have been no students directly associated with this project.