

Esri 2012 Ocean Summit Position Paper

Nadine Golden

Geographer

U.S. Geological Survey Pacific Coastal & Marine Science Center (PCMSC)

400 Natural Bridges Drive

Santa Cruz, CA 95060

Office Phone 831.460.7530

My ocean GIS activities

USGS Coastal and Marine Geology, National Seafloor Mapping and Benthic Habitat Studies:

Pacific Region (Alaska, Washington, Oregon, California;

<http://walrus.wr.usgs.gov/nearshorehab/>):

The project addresses habitat issues in areas identified as high priority through discussions with other Department of the Interior agencies (DOI) and collaboratively with NOAA (NMFS, NMS) and the nation's regional Fishery Management Councils. We provide mapping and geologic expertise in collaboration and cooperation with these agencies to collect seafloor data and ground truth information to expand our knowledge of the U.S. Pacific continental shelves. The project links geologic studies with fisheries and benthic biology research to allow for better fisheries and environmental management with an emphasis on Marine Protected Areas (MPAs). We study surficial processes that cause change affecting essential fish habitat and create large scale benthic habitat maps in the Exclusive Economic Zone (EEZ) off California, Oregon, and Washington. This project is collecting high-resolution geophysical data, imagery, geological samples, and mining existing databases to improve the habitat classification in high priority areas such as proposed MPAs. Project Tasks:

- Mapping and characterizing benthic habitats at appropriate scales and resolutions,
- Extrapolating results from regional to national settings,
- Understanding geologic processes and environmental change,
- Sea floor classification,
- Developing prediction and Modeling capabilities,

- Publication of results in the form of maps and reports; dissemination of information through web sites; and effective management of data,
- Providing information and advice to management agencies, and
- Facilitating intra- and interagency collaboration on benthic habitat research.

Barriers to the use of GIS in ocean science and management, along with associated functional requirements

- 1) 3D Visualization: Though ArcScene and especially ArcGlobe have improved visualization capabilities in arc10.0, the volumetric aspect of marine data (Z values) are not represented in the core desktop ArcMap viewer. At ESRI UC 2012, a “completely new” visualization domain was alluded to for ArcGIS 11.0. Does this mean that 3D will be the core product?
- 2) Vertical Datum: I know ESRI is working on currently working on a complete rewrite of ArcGIS geodesy. We support and encourage this effort.

Technology gaps in (ArcGIS) coastal and ocean GIS both broad and specific:

- 1) Datum conversions: Datum conversion options and are often confusing which creates uncertainty regarding the final conversion results.
- 2) Managing and processing large data sets.
With the ArcGIS 10.0 Mosaic Data Set tools of, some of the management of large data sets has improved, but many PCMSC GIS users are struggling with Mosaic Data Sets and have not continued to use them after initial efforts. Also, this new data type did not resolve some of the user’s issue for importing/exporting and geoprocessing of large grids.
- 3) Converting Raster Data to XYZ
Some PCMSC users would like to have a simplified process for converting large gridded data sets to XYZ values
- 4) Symbolization Ramp
ArcGIS 10.0 symbolization maps are a good start to allowing more user control of the ramp colors and values but PCMSC users would like to see this continue to improve in both specific color/value control and ease of use.

Recommend ways to remove barriers and advance technical solutions in multidimensional and sensor data formats, tools, accuracy and uncertainty, workflows, and computing platforms

- 1) We appreciate the Esri “ideas” website as a way for users to communicate with Esri and its developers.
- 2) The USGS CMG technological pace may keep up with ESRI products and data types on a project level, CMG is constrained by public access and use limitations (by nonprofit, university, researcher) of expensive software.