



SEAFLOOR MAPPING LAB
Institute for Earth Systems Science & Policy
California State University, Monterey Bay

100 Campus Center, Seaside CA 93955-8001 (831) 582-4214; FAX:(831) 582-3073

Position Paper of Pat Iampietro

Submitted to ESRI prior to the ESRI Oceans Summit, November 7-8, 2012

Name: Pat Iampietro

Affiliation: Seafloor Mapping Lab (SFML), California State University, Monterey Bay

Position: Chief Hydrographer, Research Associate, and Lecturer (also ESRI site-license admin)

I am honored to participate in the first ESRI Oceans Summit. My research and mapping work at the Seafloor Mapping Lab (SFML) and the teaching I do for the Division of Science and Environmental Policy at CSU, Monterey Bay are heavily if not entirely focused and dependent on marine GIS.

The SFML, founded by Dr. Rikk Kvitek in 1999, specializes in high-resolution acoustic and optical remote sensing of coastal habitats. Combining research and education with state-of-the-art geospatial technology, the SFML offers unique hands-on, field-to-finish experience to students while conducting professional habitat mapping surveys for geomorphic visualization and changed detection to address critical resource management issues and advance basic research along the continental margins. This work led to the creation of the California Seafloor Mapping Project (CSMP): a California Ocean Protection Council sponsored multi-institutional public/private collaborative formed for the comprehensive fine-scale mapping of all California state waters (<http://seafloor.csUMB.edu/csmp/csmp.html>). SFML mapping and research projects have been funded by California Department of Fish and Game, National Marine Fisheries Service, NOAA, The Nature Conservancy, The Packard Foundation, California State Coastal Conservancy, US Geological Survey, US Army Corps of Engineers, the Department of Defense and others.

The CSUMB Seafloor Mapping Lab is fully equipped with and has 12 years experience in the use of high resolution multibeam, Remotely Operated Vehicle (ROV), and LiDAR mapping systems (<http://seafloor.csUMB.edu/capabilities.html>). These capabilities include RESON 7125-SV2 multibeam bathymetric echosounder and SEA SWATHplus-H 468 kHz interferometric sidescan sonar systems interfaced with Applanix Position and Orientation Systems (POS/MV 320v4). These systems are operated from SFML's 46ft Hatteras survey vessel the R/V Harold Heath, which is capable of mapping on site for up to 6 consecutive days. The SFML also has the armored-hull shallow draft R/V KelpFly for mapping over and through kelp bed canopy and in shoal areas too shallow for the safe operation of conventional hydrographic survey launches. In addition to the sonar mapping capabilities, the SFML employs a vessel-mounted Riegl LMS z420i topographic LiDAR system for mapping the exposed intertidal and shoreline terrain to provide near-seamless bathymetric/topographic data coverage from the shore out to the 3 nm state waters boundary within the limits of safe navigation. Bathymetric data are cleaned using CARIS Hydrographic Information Processing System (HIPS) software, and final products generated from QPS Fledermaus and ArcGIS software. The SFML data collection, processing and map product creation, and metadata compilation and reporting are all conducted in accordance with FGDC metadata requirements and the California Seafloor Mapping Project Survey Specification (<http://seafloor.csUMB.edu/csmp/csmp.html>), which exceed IHO survey standards.

My research focuses on the use of remotely-sensed data, and metrics derived from them, along with biological observations, to determine species-habitat associations and develop predictive models of the distribution, abundance, and biodiversity of marine species. A digital terrain model (DEM) is often the primary dataset used as a predictive variable in these models, along with numerous DEM-derived terrain metrics. As such, the raster display, manipulation, and analysis tools in ArcGIS (specifically in Spatial Analyst), including map algebra and statistics, are key to these efforts. In addition, spatial statistical modeling tools (both those built in to ArcGIS as well as 3rd-party tools such as MGET, developed by Pat Halpin's lab at Duke), are of great utility and interest.



SEAFLOOR MAPPING LAB
Institute for Earth Systems Science & Policy
California State University, Monterey Bay

100 Campus Center, Seaside CA 93955-8001 (831) 582-4214; FAX:(831) 582-3073

I look forward to the summit and discussing ways the ESRI can grow and improve the ArcGIS family of software to better serve the marine GIS user community and ocean sciences in general. I would be pleased if any or all of the following topics could be addressed:

- Further support for the BAG format at the *core* level, or at least with the Spatial Analyst extension (*not* requiring Maritime Charting or Bathymetry extensions)
- Tools for conversion between ESRI GRID and other raster formats to and from BAG
- Further development and improvement of spatial statistics tools
- Further development of terrain-modeling and geomorphology-oriented tools
- Perhaps a more streamlined integration of MGET?
- An ESRI-sponsored program to fund development of new statistical and predictive modeling tools for ArcGIS
- Improvement or replacement of ArcScene/3D Analyst as a 3D environment, including the capability to model & represent true 3D surfaces and volumes
- Further integration with CARIS HIPS and QPS Fledermaus
- Projection engine improvements.

Thank you for the opportunity to participate in the summit.

Respectfully,

A handwritten signature in black ink, appearing to read 'Pat Iampietro', with a long horizontal flourish extending to the right.

Pat Iampietro
CSUMB SFML
100 Campus Center
Seaside, CA 93955
piampietro@csumb.edu
831.582.4214