

Position Paper

Alexandra Carvalho, Ph.D. GISP
CMar Consulting, LLC
7990 Baymeadows Rd. E #308
Jacksonville, FL 32256
Phone: 904-993-4806
Email: alexandra_carvalho@cmarconsulting.com
Webpage: www.cmarconsulting.com

CMar Consulting LLC is a single member marine and coastal environmental and GIS services company, created in March 2011 by Dr. Alexandra Carvalho, and located in Jacksonville, Florida. Dr. Carvalho has a strong foundation in marine and coastal sciences, coastal planning and management, as well as in statistics and geospatial data applications to the coastal and marine environment. She has a “Licenciatura” degree in Marine Biology and Fisheries from the University of Algarve in Portugal, and a Ph.D. in Oceanography – Coastal Zone Management from Florida Institute of Technology. She has over 12 years of experience working with coastal and marine spatial and non-spatial water resources scientific and engineering data.

Current GIS work includes the Martin County (Florida) Coastal Geodatabase Project. This project consists of a geodatabase, currently managed by the County IT department, which to date consolidates over 20 years of coastal program data from the County engineering department. This project started in 2003, with a meeting to assess the County coastal engineering department data consolidation and access needs. Since then, work performed included the design and development of a geodatabase schema, development of several prototype tools for access to the data and to facilitate management of coastal projects. Lack of funding, determined that at the time (2005) tool development was not viable. Alternatively, Google Earth kmz files were provided for some projects to help data visualization. The larger component of this project has been the consolidation and QA/QC of the County’s coastal data, and the geodatabase update coordination with the County IT department. Funding availability determines when more historical and current data is uploaded to the geodatabase. Current work includes, in addition to the annual or biannual geodatabase updates, preparing several ArcGIS Online and ArcGIS Desktop templates, using web services from coastal government agencies, and the data in the coastal geodatabase to assist with the County coastal engineering department mapping needs.

Past GIS work included applications to waterway operations planning and permitting (dredging operations, channel design) for several waterways along the east coast of the USA (i.e. Atlantic Intracoastal Waterway channel from Norfolk, Virginia to St. Johns River, Florida).

Work involved organizing and consolidating historical (up to 10 years) and current navigation channel geometry and bathymetric information, and analysis those data. Specifically work included converting CAD files to GIS, importing hundreds of ASCII bathymetric files into GIS, calculate volumes and differences between 3D surface to identify historical and current shoal problem areas in the channels, as well as to calculate and verify historical and current dredging volumes; locate in land, near the coast, areas with water access suited to build dredge material management areas. Work also included developing and programing tools to facilitate these calculations, and the creation of planning tools for managers with all the compiled information. The first tools were developed in Arc Objects and later in .Net. Planning tools were created early on with Publisher and Google Earth, and most recently with ArcGIS Online.

Past GIS work also included sediment and water quality issues in rivers, estuaries, and the ocean data consolidation and analysis. Work involved consolidating into a geodatabase QA/QC meteorological, hydrological, water quality data from water quality databases (i.e. Florida STORET) or collected from the field (turbidity, sediment chemistry, grain size,). This first datasets were used to characterize water quality trends and issues in the Lake Worth Lagoon, Florida watershed between 1990 and 2008, and in Naples Bay, also in Florida, between 2000 and 2005. The second data was used to show compliance with several coastal beach renourishment permits for several coastal projects along the east coastal of Florida.

Current goals include in addition to providing services similar to the ones described above, to develop coastal planning and management applications for the web, and work with coastal communities to consolidate their coastal data and make use of the new technologies to display, access, and manage their coastal programs and coastal permitting.

Current challenges include the need to store large number of bathymetry and elevation point data outside the geodatabase. ArcGIS 10.1 seems to have several tools capable of helping with these data. CMar is also considering the adoption of a BAG format for the bathymetry datasets and evaluating the use of the ArcGIS for Maritime: Bathymetry extension. A second challenge with current projects is the adoption of ArcGIS Online. Obstacles raised by clients include: reduced functionality ArcGIS online applications, COTS provided by ESRI require ArcGIS for Server for clients that do not have ArcGIS for Server, and traffic load on the server from implementing data access via web services from clients that do have ArcGIS for Server.