Proceedings of the 2nd Biennial Coastal GeoTools Conference
Charleston, SC
January 8-11, 2001

DEVELOPMENT OF A SEAMLESS BATHYMETRIC/TOPOGRAPHIC ELEVATION MODEL FOR TAMPA BAY

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Keywords: Bathymetry, topography, digital elevation model, soundings, data integration, datum, ellipsoid, seamless.

A seamless bathymetric/topographic digital elevation model (DEM) was developed for the joint NOAA-USGS Tampa Bay Demonstration Project. The raster elevation model was derived from the best available NOAA soundings and USGS elevation data. The sounding data were selected and processed from spatial data mining of archived digital NOAA hydrographic surveys. Soundings were extracted and clipped from original digital surveys to create a spatial-temporal seamless view of the most current bathymetry for Tampa Bay. The elevation data were extracted from the USGS National Elevation Dataset (NED). NED provides seamless national coverage of elevation data at a one-arc-second resolution (approximately 30 meters).

The best available sounding data were selected with a heuristic process that included a combination of spatial-temporal filtering techniques, standard GIS query functions in ArcView, and Avenue scripts. A new datum transformation tool developed by NOAA/National Geodetic Survey was used to convert the 600,000 soundings from 47 digital NOAA hydrographic surveys that cover the Tampa Bay area. The program was used in a batch-processing mode to transform the sounding data in multiple orthometric and tidal vertical datums to a common vertical reference, the NAD 83 ellipsoid (GRS80). Standard tools and datasets (VERTCON and GEOID99) from the National Geodetic Survey were used to transform the elevation data into the common ellipsoid vertical reference frame. The gridding and merging of the bathymetric and topographic data were accomplished using the data conversion, buffering, clipping, interpolation, mosaicking, and smoothing tools available in the ArcInfo GIS package. The resulting merged bathymetric/topographic model was output in the ArcInfo GRID format.

The development of a regional bathymetic/topographic model, as achieved for Tampa Bay, has resulted in a prototype digital product that that can be employed for marine GIS and coastal zone management applications. It demonstrates how disparate spatial data can be utilized together if they are first transformed to a common reference coordinate system. Use of a merged seamless elevation model as a base data layer facilitates overlay and incorporation of other spatially referenced coastal and marine datasets. The base

DEM can easily be converted to support mapping and other GIS applications, enhanced for data visualization, and input to 2-D and 3-D environmental models.

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