



## Topobathymetric Model of Mobile Bay, Alabama

By  
 Jeffrey J. Danielson,<sup>1</sup> John C. Brock,<sup>1</sup> Daniel M. Howard,<sup>2</sup> Dean B. Gesch,<sup>1</sup>  
 Jamie M. Bonisteel-Cormier,<sup>1</sup> and Laurinda J. Travers,<sup>3</sup>

2013

<sup>1</sup>U.S. Geological Survey;  
<sup>2</sup>Stinger Ghaffarian Technologies contracted to U.S. Geological Survey;  
<sup>3</sup>Cherokee Nation Businesses contracted to U.S. Geological Survey.

### DISCUSSION

Topobathymetric Digital Elevation Models (DEMs) are a merged rendering of both topography (land elevation) and bathymetry (water depth) that provides a seamless elevation product useful for inundation mapping, as well as for other earth science applications, such as the development of sediment levels, and subsidence rates. The DEMs in this report are 3 m resolution DEMs of the area of Mobile Bay, Alabama, as developed using available topographic and bathymetric datasets collected in different times. The topographic data were obtained primarily from the U.S. Geological Survey (USGS) National Elevation Dataset (NED) (<http://ned.usgs.gov/>) at 1/9-arc-second resolution; USGS Experimental Advanced Airborne Research Lidar (EAARL) data (2 meters) (<http://pubs.usgs.gov/da/000/>); and topographic lidar data (2 meters) and Compact Hydrographic Airborne Rapid Total Survey (CHARTS) lidar data (2 meters) from the U.S. Army Corps of Engineers (USACE) (<http://www.csc.noaa.gov/digitalcoast/data/coastlidar>). Bathymetry was derived from digital soundings obtained from National Oceanic and Atmospheric Administration's (NOAA) National Geophysical Data Center (NGDC) (<http://www.ngdc.noaa.gov/mgg/bathymetry/>).

Mobile Bay is ecologically important as it is the fourth largest estuary in the United States. The Mobile and Tensaw Rivers drain into the bay at the northern end with the bay emptying into the Gulf of Mexico at the southern end. Dauphin Island (a barrier island) and the Fort Morgan Peninsula form the mouth of Mobile Bay. Mobile Bay is 31 miles (50 kilometers) long by a maximum width of 24 miles (39 kilometers) with a total area of 413 square miles (1,070 square kilometers).

The vertical datum of the Mobile Bay topographic model is the North American Vertical Datum of 1988 (NAVD 88). All the topographic datasets were originally referenced to NAVD 88 and no transformations were made to these input data. The NGDC hydrographic, multibeam, and trawlline surveys were transformed from mean low water (MLW) or mean lower low water (MLLW) to NAVD 88 using VDatum (<http://vdatum.noaa.gov/>). VDatum is a tool developed by the National Geodetic Survey (NGS) that performs transformations among tidal, ellipsoid-based, geoid-based, and orthometric datums using calibrated hydrodynamic models. The vertical accuracy of the input topographic data varied depending on the input source. Because the input elevation data were derived primarily from lidar, the vertical accuracy ranges from 0 to 20 centimeters root mean square error (RMSE).

The horizontal datum of the Mobile Bay topographic model is the North American Datum of 1983 (NAD 83) geographic coordinates. All the topographic and bathymetric datasets were originally referenced to NAD 83, and no transformations were made to the input data. The bathymetric surveys were downloaded referenced to NAD 83 geographic, and therefore no horizontal transformations were required. The topobathymetric model of Mobile Bay and detailed metadata can be obtained from the USGS Web sites: <http://nationalmap.gov>.

### EXPLANATION (Elevation in meters)

30.1-62	26.5	-0.9--0.5	-6.9--6
25.1-30	21.2-5	-1.9--1	-7.9--7
20.1-25	16.2	-2.9--2	-8.9--8
15.1-20	11.1-15	-3.9--3	-9.9--9
10.1-15	0.1-1	-4.9--4	-11.9--10
5.1-10	-0.4-0	-5.9--5	-14.9--12
			-26.9--15



### EXPLANATION (Data layers)

Bathymetric lidar-USGS	National Elevation Dataset-USGS
Bathymetric lidar-USACE	Topographic lidar-USACE
Bathymetry-NOAA	Topographic lidar-NOAA

