NOAA COASTAL MAPPING PROGRAM
PROJECT COMPLETION REPORT

PROJECT LA0702A

Mississippi River Gulf Outlet to Morgan Harbor, Louisiana

Introduction

NOAA Coastal Mapping Program (CMP) Project LA0702A provides digital shoreline data for the Mississippi River Gulf Outlet (MRGO) from Shell Beach to its mouth, in Breton Sound, and extending northeast to Morgan Harbor, including Bayou la Loutre. Project LA0702A is a sub-project of LA0702 that includes the entirety of Breton Sound. The Geographic Cell (GC) can be used to complement the Nautical Charting Program (NCP) as well as geographic information systems (GIS) for a variety of coastal zone management applications.

Project Design / Data

Project LA0702A was designed per a request from the Office of Coast Survey, NOAA, for updated shoreline data in support of hydrographic survey and marine debris clean-up operations. Based on an analysis of project requirements and results of a source data search, it was determined that CMP procedures for multiple source projects would apply for this project. Available source data deemed adequate for successful completion of this project included sources acquired on October 27th and 28th, 2007. Due to the large extent of complex marsh shoreline in the requested area, and the general lack of significant cultural features, various automated feature extraction techniques were used in order to speed the compilation of the shoreline.

Field Operations

Routine CMP field operations did not apply for this project based on the origin of the project source data.

Aerotriangulation

The aerotriangulation (AT) task was initiated by Remote Sensing Division (RSD) personnel in October 2009 utilizing a Digital Photogrammetric Workstation (DPW), which is a configuration of computer hardware, modular software components and other associated peripheral devices. The image files were imported into SOCET SET (SS, version 5.5) using the DataThruWay (version 5.5) software extension. The import process converted the stored compressed files to the National Imagery Transmission Format (NITF version 2.1) with headers and metadata. AT procedures were accomplished using the Multi-Sensor Triangulation (MST) module of SS. The Automatic Point Measurement algorithm within MST was used to collect tie points, and a simultaneous solve adjustment was then performed. The predicted horizontal circular error, using all measured image points, was computed to be 7 meters at the 95% confidence level. Positional data for this project is referenced to the North American Datum of 1983 (NAD 83).

Ortho-Image

Using the image positions and orientations derived from the AT process, and the Mosaic module from within SS, an Ortho-image covering the area of project LA0702A was created in September of 2011. A constant elevation of zero meters (as opposed to an elevation model) was utilized to rectify the data.

Compilation

The digital compilation phase of this project was initiated by RSD in January 2012, and entailed a multi-step approach utilizing both automated and manual compilation methods, as reported below.

Automated Mapping Method

All Shoreline class features present in the database were compiled using this method. The automated feature extraction (AFE) method was performed using the orthoimage, discussed above, in combination with an object-based image analysis (OBIA) approach from within the ENVI Feature Extraction (Fx) software. The Fx software allows the user to interactively create and classify objects, based on image rules that meet in-situ criteria, and then to run a raster-to-vector algorithm to convert the classified image to an ArcGIS polygon shapefile. Upon completion of the AFE process, the polygon shapefile was imported into ArcGIS and 1) aggregated to merge polygons separated by less than the standard minimum distance, 2) smoothed and simplified, 3) converted to a polyline format, and 4) edited to create attribute fields compatible with the RSD interim shapefile format. The interim shapefile was then imported into SS and a Feature Data Base (FDB) was created. The FDB, consisting solely of Shoreline features, was then reviewed and edited within the SS Feature Extraction module, by the original compiler, using stereo-models derived from the AT solution.

Manual Mapping Method

All non-Shoreline class features present in the database (i.e., Alongshore Features, Obstructions, etc.) were compiled using this method. The manual data compilation phase of this project utilized the *traditional* RSD digital mapping approach of stereoscopic interpretation integrated with "heads-up" digitizing from within the SS Feature Extraction module. The FDB created in the automated mapping method, as described above, was subsequently populated with features derived from this manual method. This served to integrate all coastal features within a single FDB.

Feature attribution was assigned in compliance with the Coastal Cartographic Object Attribute Source Table (C-COAST), which provides the definition and attribution scheme for the full range of cartographic features pertinent to the CMP. Selected features were further modified with additional descriptive information to refine general classification. Cartographic features were compiled to meet a horizontal accuracy of 10 meters at the 95% confidence level.

Tidal information for this project was obtained from the NOS tide station Shell Beach (#8761305), located along the southern edge of Lake Borgne, LA. The verified tide level for the October 27, 2007 source data was approximately 0.04m below Mean Lower Low Water (MLLW). The verified tide level for the October 28, 2007 source data was approximately 0.01m below (MLLW). The height of the Mean High Water (MHW) Datum, at the Shell Beach station, is 0.38 meters above the MLLW Datum.

Quality Control / Final Review

Quality control tasks were conducted during all phases of project completion by a senior member of the Applications Branch of RSD. The final QC review was completed in June 2012. The review process included analysis of the AT and image ortho-rectification results, and assessment of the identification and attribution of digital feature data within the GC according to image analysis and criteria defined in C-COAST. The quality control process concluded with an inspection of topological connectivity within the GC using ArcGIS 10.0 software. All project data was evaluated for compliance to CMP requirements.

The MRGO Closure Structure, deemed a navigationally critical feature, was compiled using aerial orthoimagery collected by RSD on September 1, 2012 as part of its Hurricane Isaac response effort. The horizontal accuracy of this orthoimagery is judged to be well within the reported accuracy for features compiled from the 2007 source imagery, based on comparison to those compiled features. The tide level at the time the 2012 orthoimagery was collected was 0.43 m. above MLLW (0.01 m. above MHW).

Comparisons of the largest scale NOAA nautical charts with source imagery and compiled project data resulted in creation of the Chart Evaluation File (CEF). The following nautical charts were used in the comparison process:

- Chart 11363, Chandeleur and Breton Sounds, LA, 1:80,000 scale, 41st Ed., Jun/07
- Chart 11364, Mississippi R.,Venice to New Orleans, 1:80,000 scale, 42nd Ed., Sep/05

End Products and Deliverables

The following specifies the location and identification of end products generated during the completion of this project:

RSD Applications Branch Archive

- Hardcopy of the Project Completion Report (PCR)
- Page size graphic plot of GC10946 file contents, attached to PCR

Remote Sensing Division Electronic Data Library

- Project database
- GC10946 in shapefile format
- Digital copy of the PCR in Adobe PDF format
- CEF in shapefile format

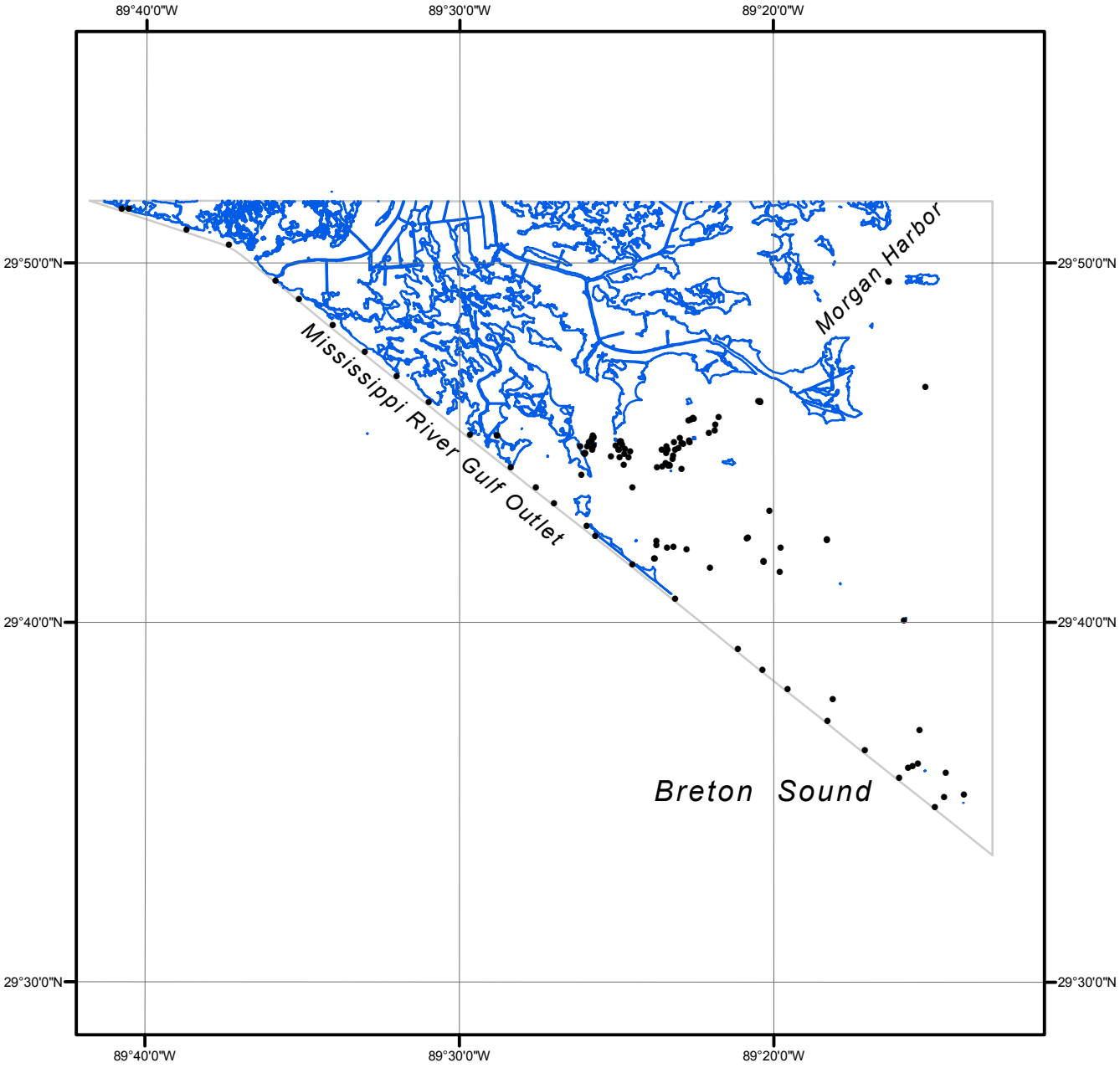
NOAA Shoreline Data Explorer

- GC10946 in shapefile format
- Metadata file for GC10946
- Digital copy of the PCR in Adobe PDF format

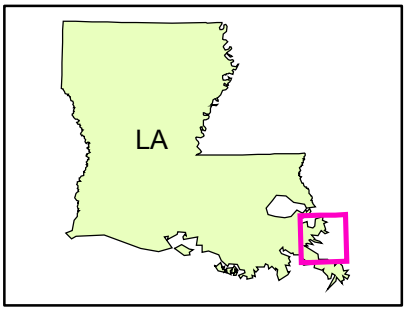
End of Report

MISSISSIPPI RIVER GULF OUTLET TO MORGAN HARBOR

LOUISIANA



Overview



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