# NOAA COASTAL MAPPING PROGRAM
# PROJECT COMPLETION REPORT

## *PROJECT LA0701F*

## *Pearl River Delta, Louisiana and Mississippi*

### Introduction

NOAA Coastal Mapping Program (CMP) Project LA0701F provides digital shoreline data for Pearl River Delta located on the north shore of Lake Borgne and extending up the Pearl River. The project extends from the northern shore of The Rigolets, and the entrance to Lake Pontchartrain, in the southwest to Half Moon Island and Waveland in the east, and extends north to a point on the Pearl and West Pearl rivers at latitude 30.4 degrees. Project LA0701F is a sub-project of a larger project, LA0701, which includes the majority of the coastal area covered by NOAA nautical chart 11371: "Lake Borgne and Approaches, LA-MS". 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

Project LA0701 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 in September/October 2007. Due to the very 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 March 2008 utilizing a Digital Photogrammetric Workstation (DPW) - a configuration of computer hardware, modular software components and other associated peripheral devices. The image files were imported into SOCET SET (SS, version 5.4.1) using the DataThruWay (version 5.4.1) 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 (APM) 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).

## Orthoimage

Using the image positions and orientations derived from the AT process and the MOSAIC module from within SS, an orthoimage covering the area of project LA0701F was created in April, 2008.  A constant elevation (zero meters), rather than an elevation model, was utilized to rectify the data.

## Compilation

The digital compilation phase of this project was initiated by RSD in October 2008 and entails 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) converted to a polyline format, 3) further smoothed and simplified, and 4) edited to create 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 SOCET SET 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 was obtained from the NOS tide station at Bay Waveland Yacht Club (#874437), located in Bay St. Louis, MS.  The observed Tide for the imagery used in this project was approximately Mid-to-High Tide Stage.

## 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 March 2010.  The review process included analysis of AT/orthoimage 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 9.3 software.  All project data was evaluated for compliance to CMP requirements.

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:

  -11367, Intracoastal Waterway, Waveland to Catahoula, 1:40,000 scale, 35th Ed.
  -11369, Lakes Pontchartrain and Maurepas, 1:80,000 scale, 46th Ed.
  -11371, Lake Borgne and Approaches, MS-LA, 1:80,000 scale, 38th Ed.

## 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 GC10777 file contents, attached to PCR

### Remote Sensing Division Electronic Data Library

- Project database
- GC10777 in shapefile format
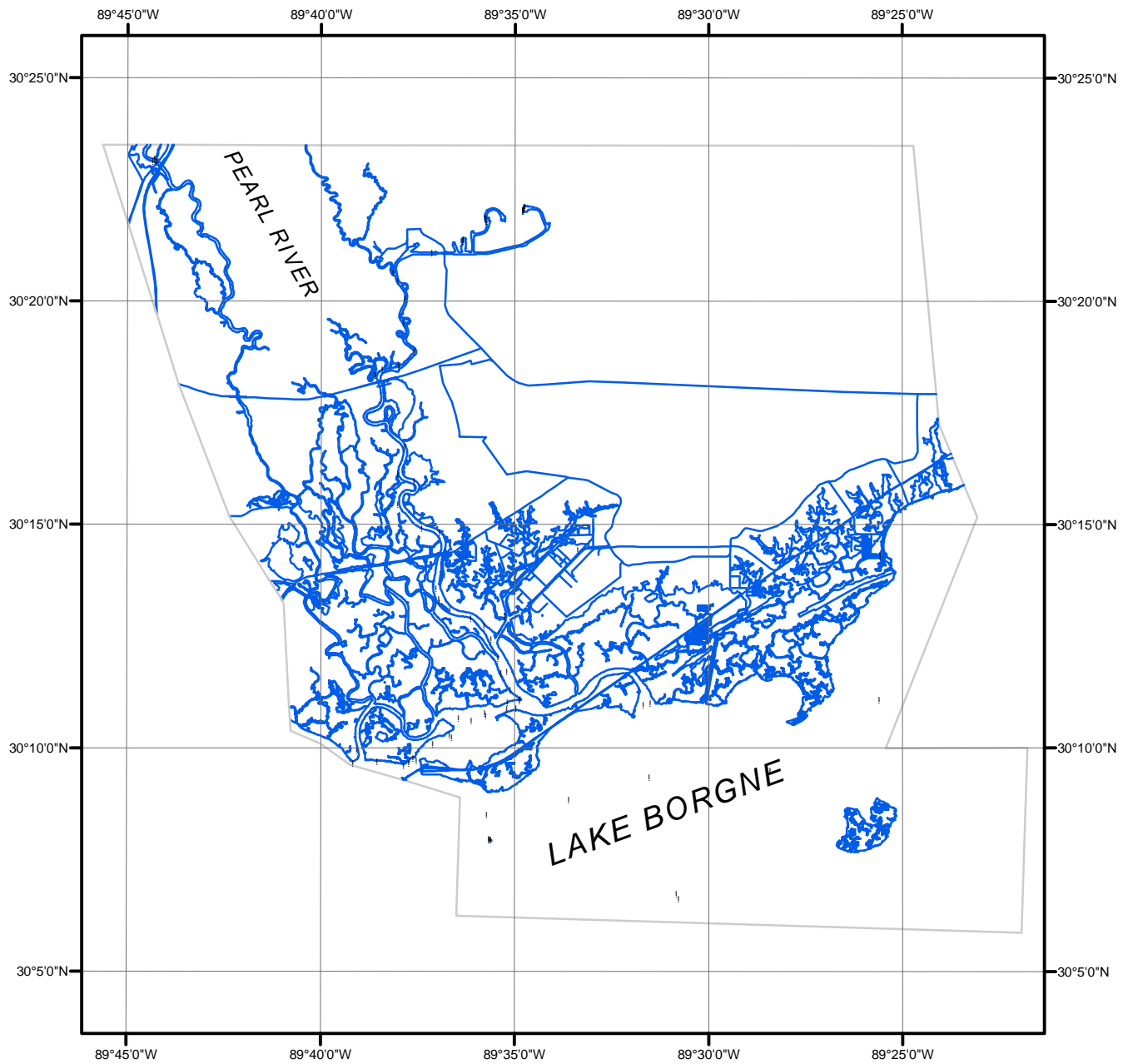- Digital copy of the PCR in Adobe PDF format
- CEF in shapefile format

### NOAA Shoreline Data Explorer

- GC10777 in shapefile format
- Metadata file for GC10777
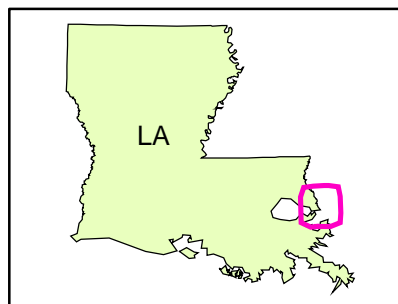- Digital copy of the PCR in Adobe PDF format

## End of Report

# PEARL RIVER DELTA

# LOUISIANA AND MISSISSIPPI



PEARL RIVER

LAKE BORGNE

Overview

LA

LA0701F

GC10777