

NOAA COASTAL MAPPING PROGRAM PROJECT COMPLETION REPORT

PROJECT LA1301A

South Shore of Prien Lake, Louisiana

Introduction

Coastal Mapping Program (CMP) Project LA1301A provides highly accurate digital shoreline data for a small portion of the south shore of Prien Lake, Louisiana. The photography used in the completion of LA1301A is a small subset of a larger imagery acquisition project, LA1301, which extends from Calcasieu Lake to Lake Charles, Louisiana. The Geographic Cell (GC) may be used in support of the NOAA Nautical Charting Program (NCP) as well as geographic information systems (GIS) for a variety of coastal zone management applications.

Project Design

The design of Project LA1301A was accomplished in response to a request from the Marine Chart Division (MCD) of the Office of Coast Survey, NOAA for new shoreline data to update a small area on Charts 11339 and 11347. The Requirements Branch (RB) of the Remote Sensing Division (RSD) formulated the photographic mission instructions for LA1301 following the guidelines of the Photo Mission Standard Operating Procedure Ver. II. The instructions discussed the project's purpose, geographic coverage and scope; photographic requirements; Global Positioning System (GPS) data collection procedures and guidelines; and data recording and handling instructions. RB created a Project Layout Diagram, flight maps and input files for the aircraft's flight management system.

Field Operations

The field operations were conducted from October 23 – November 20, 2013, and consisted of the collection of static and kinematic Global Positioning System (GPS) data, Inertial Measurement Unit (IMU) data, and the acquisition of aerial imagery. Imagery was acquired using an Applanix Digital Sensor System (DSS 439) dual camera with the NOAA King Air aircraft (N68RF). Both natural color and near-infrared images were acquired in tandem, although it was determined that only three color photographs were needed for completion of Project LA1301A.

Direct Georeferencing Data Processing

GPS/IMU data were processed by RSD personnel to yield precise camera positions and orientations for direct georeferencing (DG) of the imagery. A local GPS base station was established for use as a reference station for kinematic GPS processing operations. The position of the base station was determined using the NGS Online Processing User Service (OPUS), which computed fixed baseline solutions from nearby CORS stations. The airborne kinematic data was processed using Applanix POSPac MMS 6.1.0 GPS/IMU software in January 2014. For further information on steps used to process

this data refer to the Airborne Positioning and Orientation Report (APOR) on file within the AB Project Archive.

The processed GPS/IMU data were used to derive precise exterior orientation (EO) values of the camera centers required for digital feature extraction. The predicted horizontal accuracy of the imagery was determined by propagating sensor EO and image measurement uncertainties through the photogrammetric collinearity equations using an Excel spreadsheet based EO Total Propagated Uncertainty (TPU) tool developed by NGS. Using this tool, the predicted horizontal uncertainty at the 95% confidence level was calculated to be 1.1 meters. One NGS third order geodetic control point (PID = BK3144) was used to verify this accuracy.

Compilation

Data compilation was performed by RSD personnel in February 2014. Digital mapping was performed using a Digital Photogrammetric Workstation (DPW) in conjunction with the SOCET SET (ver. 5.6) Feature Extraction software module. Feature identification and attribution within the Geographic Cell (GC) were based on image analysis of the digital photographs and information extracted from the appropriate NOAA nautical charts and other ancillary sources. 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.

Spatial data accuracies for LA1301A were determined according to standard Federal Geographic Data Committee (FGDC) practices. Cartographic features were compiled to meet a horizontal accuracy of 2.3 meters. This predicted accuracy of compiled, well-defined points is derived by doubling the horizontal uncertainty value derived from the DG data.

The following table provides information on the imagery used in the project completion:

Date	Time (UTC)	Roll #	Strip / Frame #s	~GSD	Tide Level*
10/23/2013	15:03:30 - 15:03:48	13NC76	50-014 / 25318-25320	0.35 m	0.4 m

* Tide levels are given in meters above MLLW and are derived using Pydro (software tool) with a TCARI grid referenced to verified water level observations at the time of photography from several NOS gauges in the project area. The height of MHW in the project area is 0.4 meters above MLLW.

Quality Control / Final Review

Quality control tasks were conducted by a senior member of RSD in February 2014. The review process included analysis of the direct georeferencing 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 10.1. All project products were evaluated for compliance to CMP requirements.

Comparison of the largest scale NOAA nautical chart with the project imagery and compiled feature data resulted in creation of the Chart Evaluation File (CEF). The following nautical chart was used for comparison:

11339, Calcasieu River and Approaches, 1:20,000 scale (inset), 4th Ed., Feb./13

11347, ICW, Calcasieu River and Lake, 1:20,000 scale (inset), 40th Ed., May/13

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 Airborne Positioning and Orientation Report (APOR)
- Hardcopy of the Project Completion Report (PCR)
- Page size graphic plot of GC11051 file contents, attached to PCR

Remote Sensing Division Electronic Data Library

- GC11051 in shapefile format
- Digital copy of the PCR in Adobe PDF format
- CEF in shapefile format

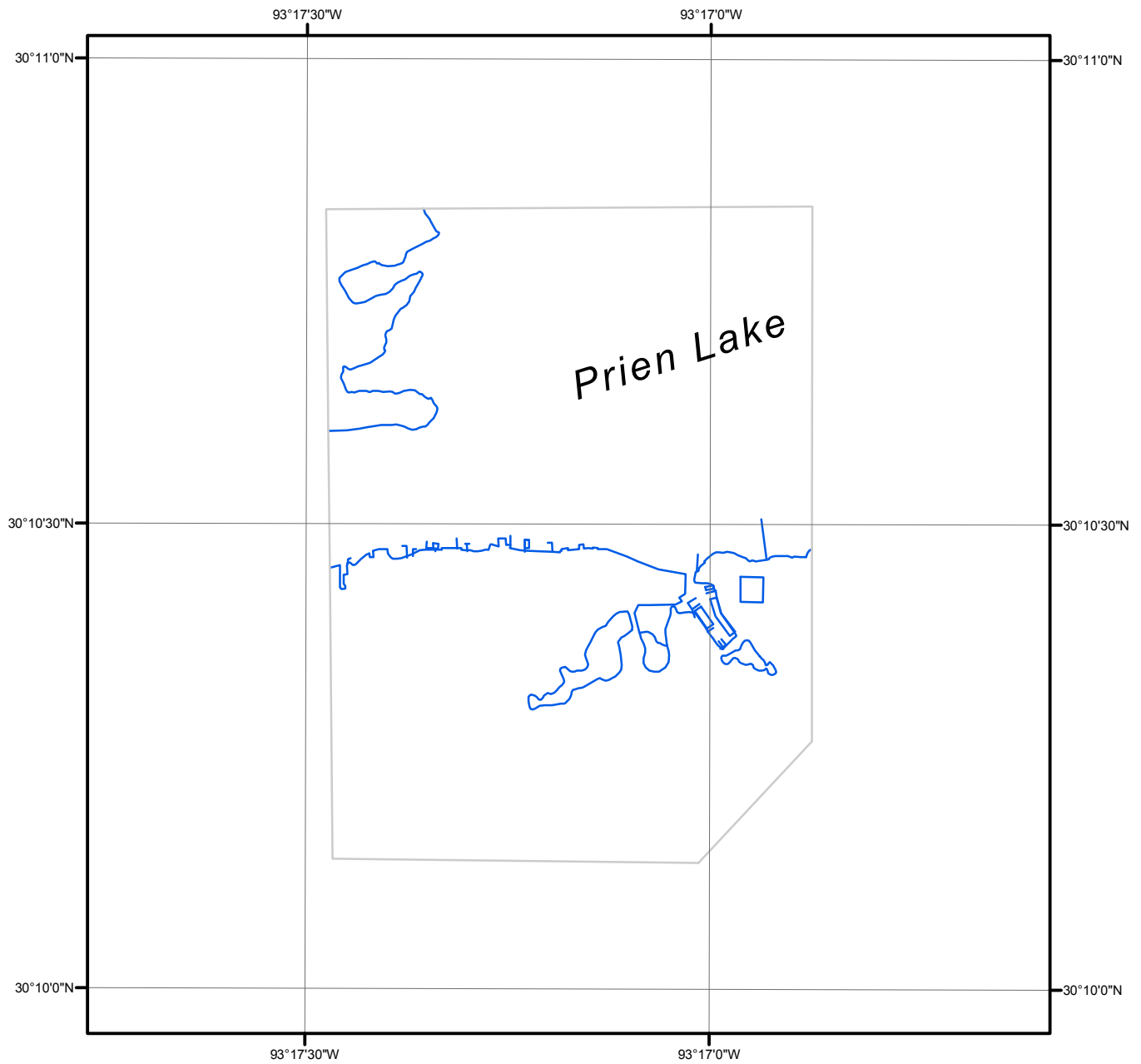
NOAA Shoreline Data Explorer

- GC11051 in shapefile format
- Metadata file for GC11051
- Digital copy of the PCR in Adobe PDF format

End of Report

SOUTH SHORE OF PRIEN LAKE

LOUISIANA



Overview



LA1301A

GC11051