NOAA COASTAL MAPPING PROGRAM PROJECT COMPLETION REPORT

PROJECT NC0902

Core Sound, Beaufort to New Drum Inlet, North Carolina

Introduction

NOAA Coastal Mapping Program (CMP) Project NC0902 provides accurate digital shoreline data for portions of Core Sound, North Carolina. The project covers part of the Newport River and Back Sound east through a portion of Core Sound to New Drum Inlet. The Geographic Cell (GC) may 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 NC0902 was designed per a request from the Hydrographic Surveys Division (HSD) of the Office of Coast Survey, NOAA, for GIS data for the purpose of updating the nautical charts due to several documented significant shoreline changes that pose a hazard to navigation. 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. The project source data includes seven WorldView-1 panchromatic images acquired from DigitalGlobe, Inc. The images were collected in April 2008, December 2008 and March 2009 with a pixel resolution of 0.5 meters.

In order to expedite the project, it was decided to limit feature compilation to three areas of chart 11545 where major shoreline changes had been reported. These three areas are indicated in the GC by Feature Limit lines with "Area of Interest" notation.

Field Operations

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

Georeferencing

The horizontal accuracy reported by the vendor for this imagery is 6.5 meters RMSE. For reporting purposes this accuracy was converted to the 95% confidence level (CE95 = 1.7308 * 6.5 = 11.3 meters) according to the methodology described by the FGDC National Standard for Spatial Data Accuracy.

The Remote Sensing Division (RSD) conducted three independent comparisons of WorldView-1 imagery to sources of a known higher accuracy (including NAIP imagery and GPS ground control points). These comparisons revealed the accuracy of WorldView-1 to likely be better than that reported by the vendor. In RSD's comparison the CE95 ranged from 2.4 meters to 5.1 meters.

Compilation

The data compilation phase of this project was initiated by RSD in May 2009. Digital feature data was compiled in ESRI shapefile format from the satellite imagery using ESRI's ArcGIS 9.2 desktop GIS software. Due to limitations in radiometric resolution of the satellite imagery, lack of stereo coverage, and inability to coordinate source acquisition with local tides, charted features of small horizontal dimension, and/or not clearly visible at all stages of tide, could not be confirmed; e.g. rocks awash, fixed aids to navigation, piles, pipes, and other smaller obstructions. 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 cartographic features were further modified with additional descriptive information to refine general classification.

Cartographic features were compiled to meet a horizontal accuracy of 11.3 meters at the 95% confidence level. This value is based on the reported accuracy of the imagery as provided by the vendor, DigitalGlobe Inc.

Verified tide level levels at the time of image acquisition were obtained from the NOS reference tide station at Beaufort, North Carolina. An accurate tide analysis could not be completed for the entire project area, however, as all substations in this region are referenced to the Hatteras, NC tide gauge which is no longer in operation.

Image Source	Source File Name	Acquisition Date/Time	Tide Level*
Worldview 1	26APR08154146-P1BS-0057090270101_10_P005	2008-04-26 15:41	0.7 m
Worldview 1	04DEC08160839-P2AS_R2C1-052096325010_13_P002	2008-12-04 16:08	0.9 m
Worldview 1	04DEC08160839-P2AS_R2C2-052096325010_13_P002	2008-12-04 16:08	0.9 m
Worldview 1	04MAR09155801-P1BS-052150804010_01_P003	2009-03-04 15:58	0.5 m
Worldview 1	08MAR09155151-P1BS-052174029010_01_P009	2009-03-08 15:51	-0.3 m
Worldview 1	08MAR09155153-P1BS-052174029010_01_P010	2009-03-08 15:51	-0.3 m
Worldview 1	08MAR09155155-P1BS-052174029010_01_P011	2009-03-08 15:51	-0.3 m

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

* Tide levels are given in meters above MLLW and are based on actual observations recorded by the NOS reference gauge at Beaufort, NC Station 8656483. The elevation of MHW at Beaufort, NC is 1.0 meters above MLLW.

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 2009. The review process included an 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 9.2 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:

- 11545, Beaufort Inlet and part of Core Sound, NC, 1:40,000 scale, 63rd ed., Apr. 2008 Lookout Bight Inset, 1:20,000
- 11547, Morehead City Harbor, NC, 1:15,000 scale, 37th Ed., Aug. 2007

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 GC10780 file contents, attached to PCR

Remote Sensing Division Electronic Data Library

-Project database-GC10780 in shapefile format-Digital copy of the PCR in Adobe PDF format-CEF in shapefile format

NOAA Shoreline Data Explorer

-GC10780 in shapefile format -Metadata file for GC10780 -Digital copy of the PCR in Adobe PDF format

End of Report

CORE SOUND, BEAUFORT TO NEW DRUM INLET

NORTH CAROLINA

