

NOAA COASTAL MAPPING PROGRAM PROJECT COMPLETION REPORT

PROJECT PA0902

Ports of Marcus Hook and Chester, Pennsylvania, and Paulsboro, New Jersey

Introduction

Coastal Mapping Program (CMP) Project PA0902 provides highly accurate digital shoreline data for key areas of change within the ports of Marcus Hook and Chester, Pennsylvania, and Paulsboro, New Jersey, located on the Delaware River. 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 PA0902 was accomplished by the Requirements Branch (RB) of the Remote Sensing Division (RSD) in response to the need for timely updates to the NOAA Electronic Navigational Chart (ENC) series. Project requirements were formulated as a result of analysis conducted within the Coast and Shoreline Change Analysis Program (CSCAP), in which NOAA nautical chart products are compared to contemporary high resolution imagery in order to ascertain the need for more current shoreline data. A Chart Evaluation File (CEF) was forwarded to the Applications Branch (AB) of RSD once the change analysis was complete. Refer to the RB Memorandum of July 14th, 2009, "Results of CSCAP Change Analysis for Marcus Hook, PA; Chester, PA and Paulsboro, NJ (PA0902)," for details of the chart comparison process.

Field Operations

Routine CMP field operations did not apply for this project based on the origin of the project source data. Existing sources of horizontal control were used for the georeferencing process.

Georeferencing

Project imagery consisted of one compressed county orthomosaic color image acquired from the USDA National Agriculture Imagery Program (NAIP). The raw image received from the NAIP has a 1 meter ground sample distance (GSD) rectified to a horizontal accuracy of within +/- 6 meters to true ground. This compressed county orthomosaic was georeferenced using Erdas IMAGINE 9.3 software on a Windows platform. Ground control points (GCP's) which were photogrammetrically measured from CMP Project NJ0301 metric quality aerial photography, were imported into IMAGINE and used to georeference the orthomosaic image. Within IMAGINE, the Raster Geometric Correction tool was used with a 1st order Polynomial model. The image was re-sampled

using the Nearest Neighbor sampling method. The RMS of the residuals for measured check points was used to compute a predicted horizontal circular error at the 95% confidence level (CE95) of 1.36 meters for the image. This CE value was tripled and then added to the CE95 of the source imagery (0.4 m) from which ground control points were extracted, in order to conservatively predict the accuracy of well defined points measured during the compilation process. A Georeferencing Report was written and is on file with other project data within the RSD Project Archive. Positional data is based on the UTM Coordinate System (Zone 18N), and referenced to the North American Datum of 1983 (NAD83).

Compilation

The data compilation phase of this project was accomplished by a RSD in November 2009. Digital feature data was compiled in ESRI shapefile format from imagery using ESRI's ArcGIS 9.3 desktop GIS software. 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.

Due to the lack of specific date and time information of the original photography used by the NAIP to create the compressed county orthomosaic, natural shoreline changes were not compiled and any natural shoreline present in man-made shoreline change areas was snapped to the existing ENC vectors.

Spatial data accuracies for Project PA0902 were determined according to standard Federal Geographic Data Committee (FGDC) practices. Cartographic features were tested to have a horizontal accuracy of 4.5 meters at the 95% confidence level. This predicted accuracy of well-defined points is based on a minimum of twenty (20) check points that were compared to an independent source of higher accuracy.

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

Image Source	Source ID	File Name	Creation Date	Tide Level*
NAIP CCM	Ortho_1-1_1n_s_nj015_2008_11.sid	Ortho_1-1_1n_s_nj015_2008_11.jp2	2008-09-23	n/a

* Tide levels could not be determined for this project due to a lack of specific dates and times of the original aerial photography used in creating the compressed county orthomosaic by the NAIP. The range of tide in this location is 1.9 m.

Quality Control / Final Review

Quality control tasks were conducted during all phases of project completion by a senior member of AB. The final QC review was completed in December 2009. The review process included analysis of the 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 9.3. The entire suite of project products was evaluated for compliance to CMP requirements.

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 Georeferencing Report
- Hardcopy of the Project Completion Report (PCR)
- Page size graphic plot of GC10786 file contents, attached to PCR
- Hardcopy of the CSCAP evaluation memorandum

Remote Sensing Division Electronic Data Library

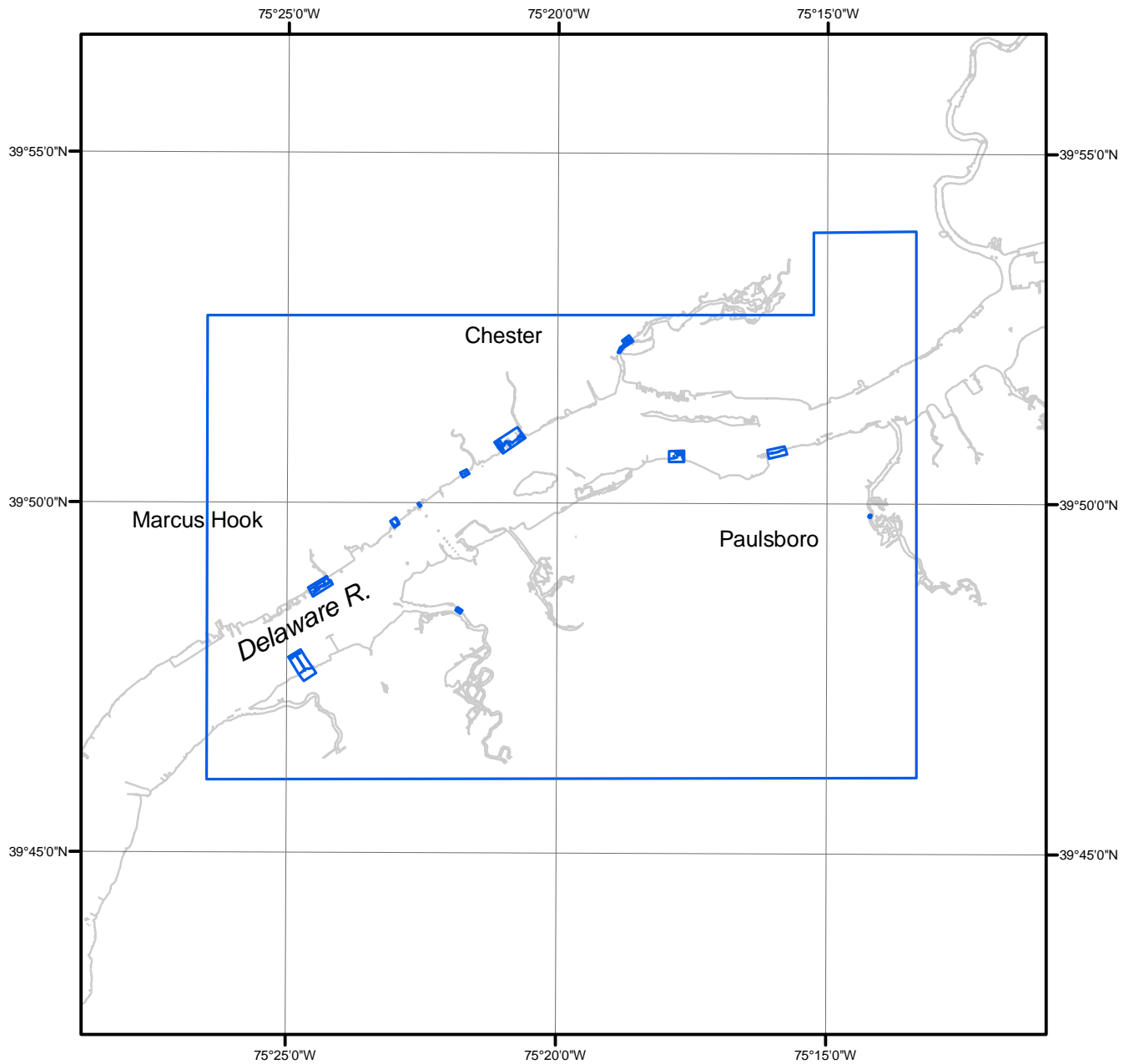
- GC10786 in shapefile format
- Digital copy of the PCR in Adobe PDF format
- CEF in shapefile format

NOAA Shoreline Data Explorer

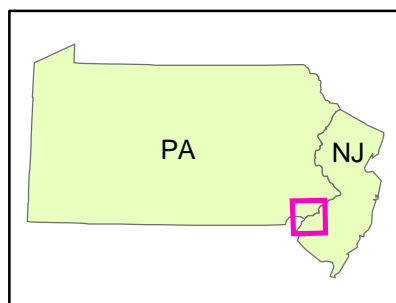
- GC10786 in shapefile format
- Metadata file for GC10786
- Digital copy of the PCR in Adobe PDF format

End of Report

PORTS OF MARCUS HOOK AND CHESTER, PENNSYLVANIA, AND PAULSBORO, NEW JERSEY



Overview



PA0902

GC10786