NOAA COASTAL MAPPING PROGRAM
PROJECT COMPLETION REPORT

PROJECT NY1601-CS-N

Port of Oswego, New York

Introduction

NOAA Coastal Mapping Program (CMP) Project NY1601-CS-N provides accurate digital shoreline data for key areas of change within the Port of Oswego, New York. 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 NY1601-CS-N was accomplished by the Requirements Branch (RB) of the Remote Sensing Division (RSD) in response to the need for updates to the NOAA chart suite within key U.S. ports. 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 digital 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 CSCAP memorandum for project NY1603-CS-T, dated August 2, 2016 for details of the chart comparison process.

Field Operations

The field operations consisted of the collection of static and kinematic Global Positioning System (GPS) data and Inertial Measurement Unit (IMU) data and the acquisition of aerial imagery. Four strips of natural color and near-infrared (NIR) images were acquired concurrently utilizing an Applanix Digital Sensor System (DSS) 580/560 dual camera on the NOAA King Air aircraft on September 22, 2016. The NIR imagery was not used for this project. All imagery was acquired at a nominal altitude of 10,500 feet, resulting in an approximate ground sample distance (GSD) of 0.33 meters for the color images. A subset of approximately 23 images were used for this project.

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 kinematic GPS data was processed in November 2016 using Applanix POSPac MMS (ver. 7.1) software. For further information refer to the Airborne Positioning and Orientation Report (APOR) on file with other project data within the RSD Electronic Data Library.

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 the Exterior Orientation Total Propagated Uncertainty (EO-TPU) tool developed by NGS. Using this tool, the predicted horizontal uncertainty at the 95% confidence level was calculated to be 0.97 meters. Previously compiled feature data from CMP Project NY0905B-CM-N (GC10827), with a horizontal accuracy of 0.4 meters at the 95% confidence level, was used to verify positional integrity of the imagery used for compilation.

Compilation

The data compilation phase of this project was accomplished by a member of RSD in June 2018. Digital feature data was compiled from orthoimagery generated from the project imagery, using Esri's ArcGIS (ver. 10.5) desktop GIS software. Feature identification and attribution within the GC was based on image analysis of project imagery and information extracted from the appropriate NOAA nautical charts. 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 Project NY1601-CS-N were determined according to standard Federal Geographic Data Committee (FGDC) practices. Cartographic features were compiled to meet a horizontal accuracy of 1.9 meters at the 95% confidence level. This predicted accuracy of compiled well-defined points is derived by doubling the horizontal uncertainty calculated with the EO-TPU tool.

The following table provides information on the imagery used to complete this project:

Date	Time (UTC)	Roll #	Strip/Photo #s	Lake Level
9-22-2016	17:08 – 17:09	16VC75	64-004 / 18011 – 18014	n/a
9-22-2016	17:14 – 17:15	16VC75	64-003 / 18015 – 18019	n/a
9-22-2016	17:27 – 17:28	16VC75	64-002 / 18040 – 18046	n/a
9-22-2016	17:37 – 17:38	16VC75	64-001 / 18064 – 18070	n/a

Quality Control / Final Review

The final review of the project was completed by a senior member of RSD in October 2018, and included analysis of DG 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 10.5 software. All project data 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:

Remote Sensing Division Electronic Data Library
- CSCAP evaluation memorandum
- Airborne Positioning and Orientation Reports (APOR)
- Project database
- Project Completion Report (PCR)
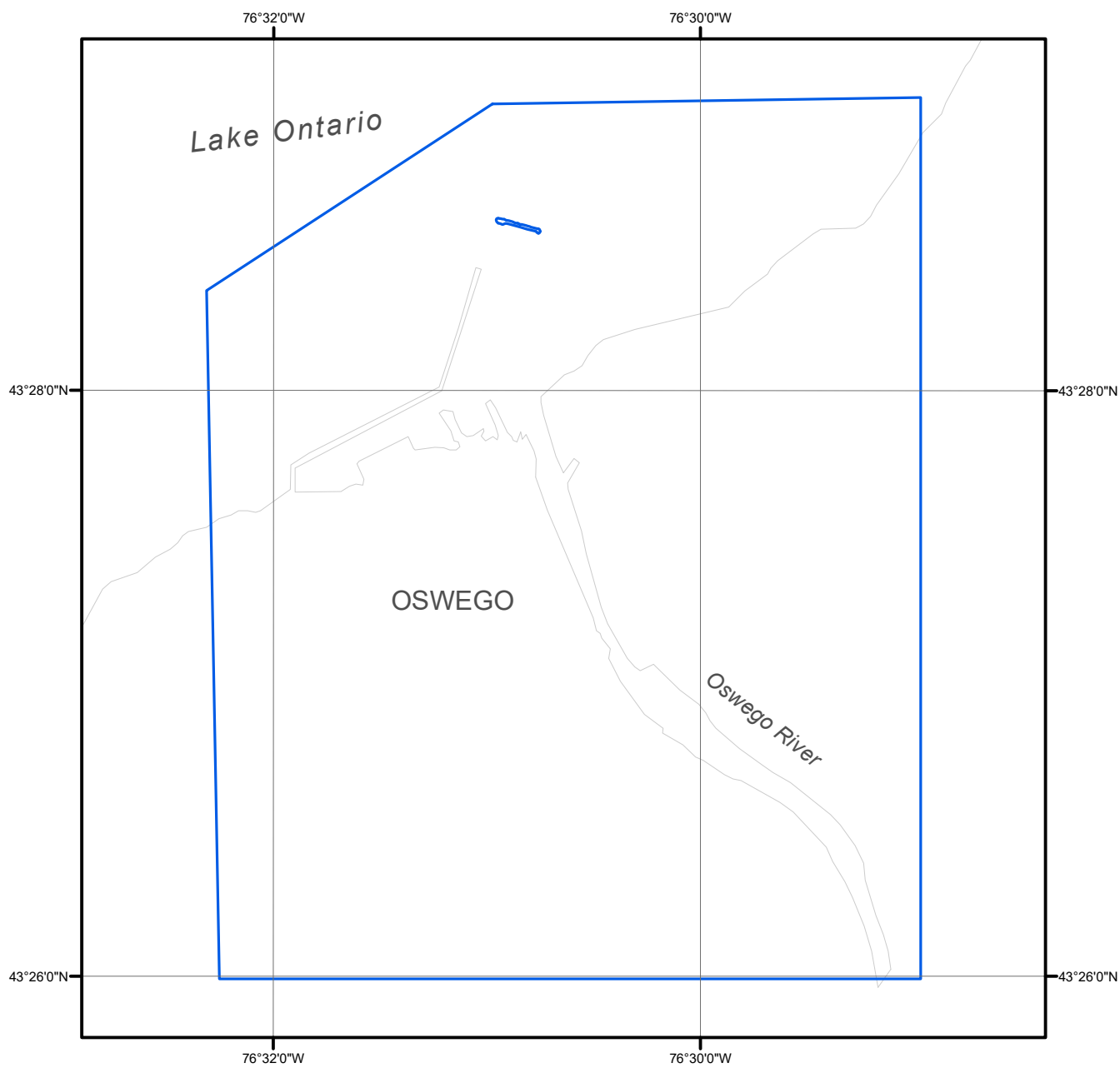- GC11426 in shapefile format
- CEF in shapefile format

NOAA Shoreline Data Explorer
- GC11426 in shapefile format
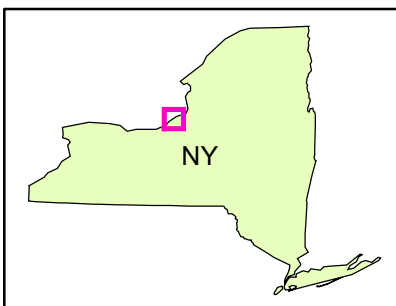- Metadata file for GC11426
- PCR in Adobe PDF format

End of Report

PORT OF OSWEGO

NEW YORK

76°32'0"W 76°30'0"W

Lake Ontario

43°28'0"N 43°28'0"N

OSWEGO

Oswego River

43°26'0"N 43°26'0"N

76°32'0"W 76°30'0"W

Overview

NY

NY1601-CS-N

GC11426