NOAA COASTAL MAPPING PROGRAM
PROJECT COMPLETION REPORT

PROJECT OR1701-CS-N

Ports of Portland and Vancouver, Oregon and Washington

Introduction

Coastal Mapping Program (CMP) Project OR1701-CS-N provides highly accurate digital shoreline data for areas of change within the Port of Portland, Oregon and the Port of Vancouver, Washington. 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 OR1701-CS-N was accomplished by the Requirements Branch (RB) of the Remote Sensing Division (RSD) in response to the need for timely 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 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 7, 2017 for analysis project OR1702-CS-T 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. Digital images utilized for this project were acquired with the NOAA King Air (N68RF) aircraft in July 2017 using an Applanix Digital Sensor System (DSS) 580/560 aerial camera at a nominal altitude of 10,500 feet, resulting in an approximate ground sample distance (GSD) of 0.33 meters. Color (RGB) and near infrared (NIR) imagery was acquired in tandem, but only color images were used. Although imagery was not acquired in strict coordination with local tides, the goal was to collect all imagery below Mean High Water (MHW).

GPS Data Processing

The GPS/IMU data were processed by RSD personnel to yield precise camera positions in order to provide a control network necessary for aerotriangulation. The base station’s geodetic position was derived using the NGS Online Processing User Service (OPUS), which computed fixed baseline solutions from nearby CORS stations. The kinematic GPS data was processed using Applanix POSPAC (ver. 8.0) software in October 2017. For further information refer to the Airborne Positioning and Orientation Report (APOR) that is on file with other project data within the Remote Sensing Division Electronic Data Library.

Aerotriangulation

Routine softcopy aerotriangulation methods were applied to establish a network of precise camera positions and other control for mapping, and to provide model parameters and orientation elements required for digital compilation. This work was performed by RSD personnel in April 2018 utilizing SOCET SET (ver. 5.6) photogrammetric software on a stereo-enabled Windows-based workstation. The RGB images were measured and adjusted as a single block using the Multi-Sensor Triangulation (MST) module of SOCET SET. Upon successful completion of this process, MST provided the standard deviations for each aerotriangulated ground point, which were used to compute a predicted horizontal circular error of 0.47 meters based on a 95% confidence level. An Aerotriangulation Report was written and is on file with other project data within the RSD Electronic Data Library. Positional data is referenced to the North American Datum of 1983 (NAD83).

Compilation

RSD personnel accomplished the data compilation phase of this project in April 2018. Digital feature data was compiled from the aerotriangulated RGB imagery using the Feature Extraction software module of SOCET SET. 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.

Spatial data accuracies for Project OR1701-CS-N were determined according to standard Federal Geographic Data Committee (FGDC) practices. Cartographic features were compiled to meet a horizontal accuracy of 0.9 meters at the 95% confidence level. This predicted accuracy of compiled well-defined points is derived by doubling the circular error calculated from the aerotriangulation statistics.

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

Date	Time (UTC)	Roll #	Flight Line / Photo #s	Tide Level*
25-JUL-2017	18:55 - 18:58	17VC39	64-001 / 9824-9838	0.8 m
25-JUL-2017	19:03 - 19:07	17VC39	64-002 / 9839-9858	0.8 m
25-JUL-2017	19:14 - 19:20	17VC39	64-003 / 9859-9888	0.8 m
25-JUL-2017	19:25 - 19:30	17VC39	64-004 / 9889-9918	0.7 – 0.8 m

*Tide levels are given in meters above MLLW and were calculated using the Pydro software tool with a TCARI grid referenced to verified water level observations at the time of photography from various NOS gauges near the project. The elevation of the MHW tidal datum in the project area varies between 0.84 – 0.86 meters above MLLW.

Quality Control / Final Review

The final review of the project was completed by a senior member of RSD in May 2018, and included analysis of aerotriangulation 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 Esri's ArcGIS desktop GIS software (ver. 10.5.1). 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 Report (APOR)
- Aerotriangulation Report
- Project database
- Project Completion Report (PCR)
- GC11411 in shapefile format
- CEF in shapefile format

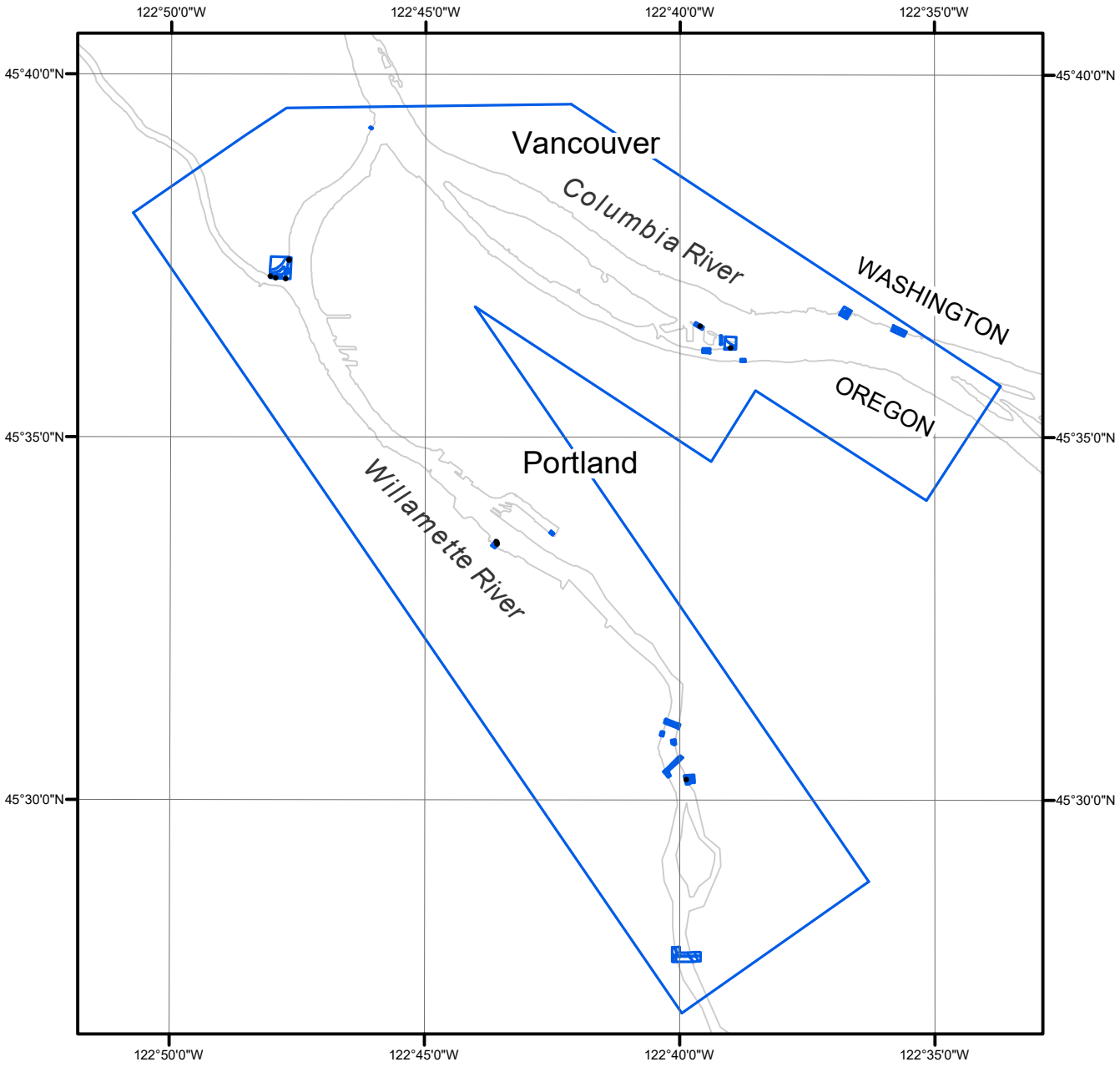
NOAA Shoreline Data Explorer

- GC11411 in shapefile format
- Metadata file for GC11411
- PCR in Adobe (PDF) format

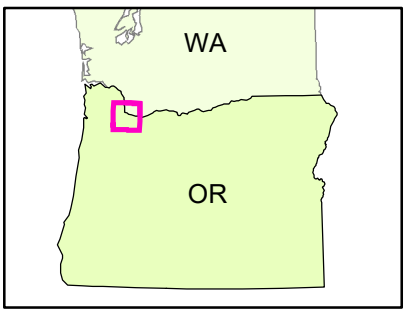
End of Report

PORTS OF PORTLAND AND VANCOUVER

OREGON AND WASHINGTON



Overview



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GC11411