NOAA COASTAL MAPPING PROGRAM
PROJECT COMPLETION REPORT

PROJECT CA1805-CS-N

Port of Stockton, California

Introduction

NOAA Coastal Mapping Program (CMP) Project CA1805-CS-N provides highly accurate digital shoreline data for the port of Stockton, California. 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 CA1805-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 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 of March 18, 2019 for details of the chart comparison process.

Field Operations

Field operations for Project CA1805-CS-N consisted of the collection of static and kinematic GPS data and Inertial Measurement Unit (IMU) data, and the acquisition of aerial imagery. Aerial survey operations were conducted in October, 2018 with the NOAA King Air aircraft (N68RF). Project imagery consisted of three flight lines of natural color (RGB) imagery acquired using an Applanix DSS dual camera system. Near-infrared (NIR) imagery was also acquired concurrently but was not used. 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 RGB images. Although imagery was not acquired in strict coordination with local tides, the goal was to collect all imagery below Mean High Water (MHW) tide stage.

GPS Data Reduction

The GPS/IMU data were processed by RSD personnel to yield precise camera positions in order to provide a control network necessary for aerotriangulation (AT). 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 MMS (ver. 8.2) software in November 2018. For further information refer to the Airborne Positioning and Orientation Reports (APOR) on file with other project data within the RSD Electronic Data Library.

Aerotriangulation

The AT phase of project completion was accomplished in April 2019 by a member of AB. Routine softcopy AT 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. The digital images were measured and adjusted as a single block using the Multi-Sensor Triangulation (MST) module of BAE Systems' SOCET SET (ver. 5.6) software on a Windows based photogrammetric workstation. Upon successful completion of this process, the triangulation software provided the standard deviations for each aerotriangulated ground point, which were used to compute a predicted horizontal circular error of 0.5 meters based on a 95% confidence level. An AT 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

The data compilation phase of this project was accomplished by a member of RSD in April 2019. Digital feature data was compiled using SOCET SET. Feature identification and attribution within the 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. Selected features were further modified with additional descriptive information to refine general classification.

Spatial data accuracies for Project CA1805-CS-N were determined according to standard Federal Geographic Data Committee (FGDC) practices. Cartographic features were compiled to meet a horizontal accuracy of 1.0 meters at the 95% confidence level. This predicted accuracy of compiled well-defined points is derived by doubling the circular error calculated from the AT statistics. The table below provides information on the imagery used to complete this project:

Date	Time (UTC)	Roll #	Photo #s	Tide Level*
10-28-2018	20:29 - 20:34	18VC72	19528 - 19553	0.4 m
10-28-2018	20:41 - 20:46	18VC72	19554 - 19479	0.4 m

* Tide levels are given in meters above MLLW and are based on actual observations recorded by the NOS gauge at Port Chicago, CA (#9415144) at the time of photography, with time and height offsets applied to Blackslough Landing, CA (#9415021). The elevation of the MHW tidal datum in the project area is 089 – 1.04 meters above MLLW.

Quality Control / Final Review

The final review of the project was completed by a senior member of RSD in April 2019, and included analysis of AT results and assessment of the identification and attribution of digital feature data within the Geographic Cell (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 (ver. 10.6.1) software. All project data was evaluated for compliance to CMP requirements.

End Products and Deliverables

The following specifies the location and identification of the 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 Completion Report (PCR)
- Project database
- GC11497 in shapefile format
- CEF in shapefile format

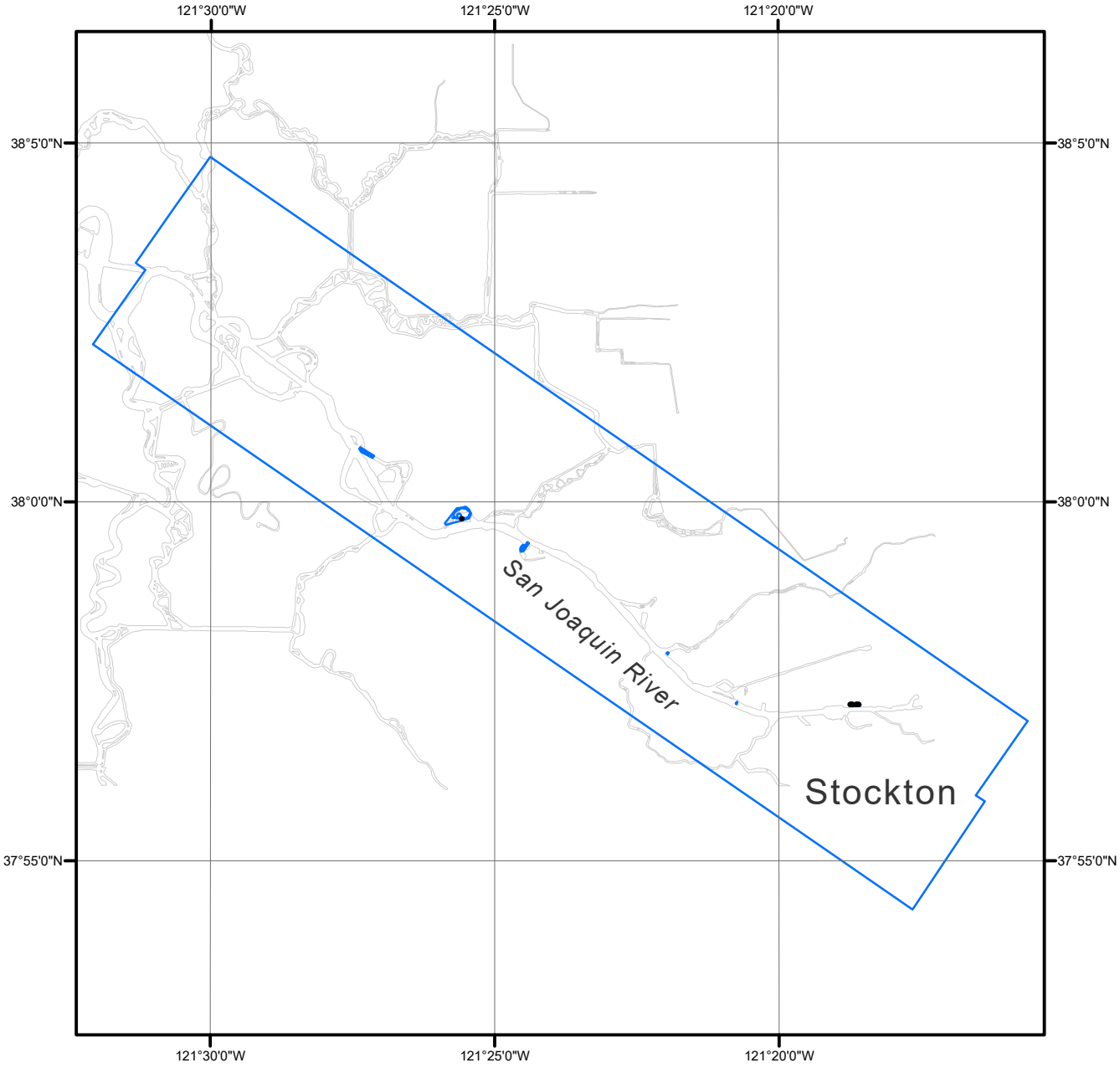
NOAA Shoreline Data Explorer

- GC11497 in shapefile format
- Metadata file for GC11497
- PCR in Adobe PDF format

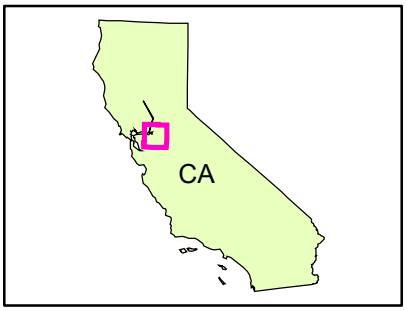
End of Report

PORT OF STOCKTON

CALIFORNIA



Overview



CA1805-CS-N

GC11497