NOAA COASTAL MAPPING PROGRAM
PROJECT COMPLETION REPORT

PROJECT OR0804

Salmon River, Oregon

Introduction

Coastal Mapping Program (CMP) Project OR0804 provides highly accurate digital
shoreline data for the Salmon River in Oregon. 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 Requirements Branch (RB) of the Remote Sensing Division (RSD) formulated the
photographic mission instructions for this project following the guidelines of the <u>Photo
Mission Standard Operating Procedure</u> Version II. The instructions discussed the
project's purpose, geographic area of coverage, scope and priority; photographic
requirements; flight line priority; Global Positioning System (GPS) data collection
procedures and guidelines for both kinematic and static surveys; data recording and
handling instructions; and contact and communication information. RB created a Project
Layout Diagram, flight maps and input files for the aircraft's flight management system.

Field Operations

The field operations consisted of the collection of kinematic Global Positioning System
(GPS) data, Inertial Measurement Unit (IMU) data and the acquisition of aerial imagery.
The photographic mission operations were conducted on May 12th, 2008 with the NOAA
Twin Otter aircraft (N56RF). Two strips of natural color digital images were acquired
with an approximate ground sample distance of 0.34 meters through the use of an
Applanix Digital Sensor System (DSS-439) digital camera.

No base stations or ground control survey points were established for field operations.
Airborne kinematic GPS and IMU data were collected to determine precise camera
positions.

GPS Data Reduction

GPS data were processed by Remote Sensing Division (RSD) personnel to yield precise
camera positions in order to provide a control network necessary for aerotriangulation.
One UNAVCO station was processed using the NGS Online Processing User Service
(OPUS) software to compute a fixed baseline solution for this station so it could be used
as a base station during GPS processing. The airborne kinematic data was processed
using Applanix POSPAC (ver. 4.4) software in June 2009.

Aerotriangulation

The aerotriangulation (AT) phase of project completion was performed in February 2013. 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. This work was accomplished by a member of the RSD Applications Branch utilizing a Digital Photogrammetric Workstation (DPW), which is a configuration of computer hardware, modular software components, and other associated peripheral devices. The digital images were measured and adjusted as a single block using BAE Systems SOCET GXP (version 4.0) photogrammetric suite in conjunction with the Triangulation module. Upon completion of the AT process, the simultaneous solve tool within the Triangulation module provided the standard deviations for each aerotriangulated ground point, which were used to compute a predicted horizontal circular error of 0.4 meters based on a 95% confidence level. An AT Report was written and is on file with other project data within the RSD project archive.

Compilation

The data compilation phase of this project was accomplished by RSD in August 2013. Digital mapping was performed using a DPW in conjunction with the SOCET GXP (version 4.0.0) Feature Database. Feature identification and attribution within the Geographic Cell (GC) were based on image analysis of the digital photographs and information extracted from the appropriate NOAA nautical charts, U.S. Coast Guard Light List 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 OR0804 were determined according to standard Federal Geographic Data Committee (FGDC) practices. Cartographic features were compiled to meet a horizontal accuracy of 0.8 meters at the 95% confidence level. This value was derived by doubling the circular error computed from the AT statistics in order to conservatively predict the accuracy of compiled well defined points.

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

Date	Time (UTC)	Roll Number	Photo Numbers	GSD (nominal)	Tide Level*
5-12-2008	21:25 – 21:27	08NC80	17118 – 17127	0.35 m	0.2 m
5-12-2008	21:33 – 21:35	08NC80	17128 – 17136	0.35 m	0.2 m

* Tide levels are given in meters above MLLW and are based on actual observations recorded by the NOS gauge at Crescent City, CA and at a substation in the project area with corrections applied from the Crescent City gauge. The mean tide range in the project area is 1.5 m.

Quality Control / Final Review

The final review of the project was completed by a senior member of RSD in August of 2013, 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 ArcGIS 10.1 software. All project data was evaluated for compliance to CMP requirements.

Comparisons of the largest scale NOAA nautical chart with natural color digital images and compiled project data resulted in the creation of the Chart Evaluation File (CEF). The following nautical chart was used in the comparison process:

18520, Yaquina Head to Columbia River, OR, 1:185,238 scale, 27th Ed.

End Products and Deliverables

The following specifies the location and identification of the products generated during the completion of this project:

RSD Applications Branch Archive
- Hardcopy of the Airborne Positioning and Orientation Report (APOR)
- Hardcopy of the Aerotriangulation Report
- Hardcopy of the Project Completion Report (PCR)
- Page-size graphic plot of GC11012 file contents, attached to PCR

Remote Sensing Division Electronic Data Library
- Project database
- GC11012 in shapefile format
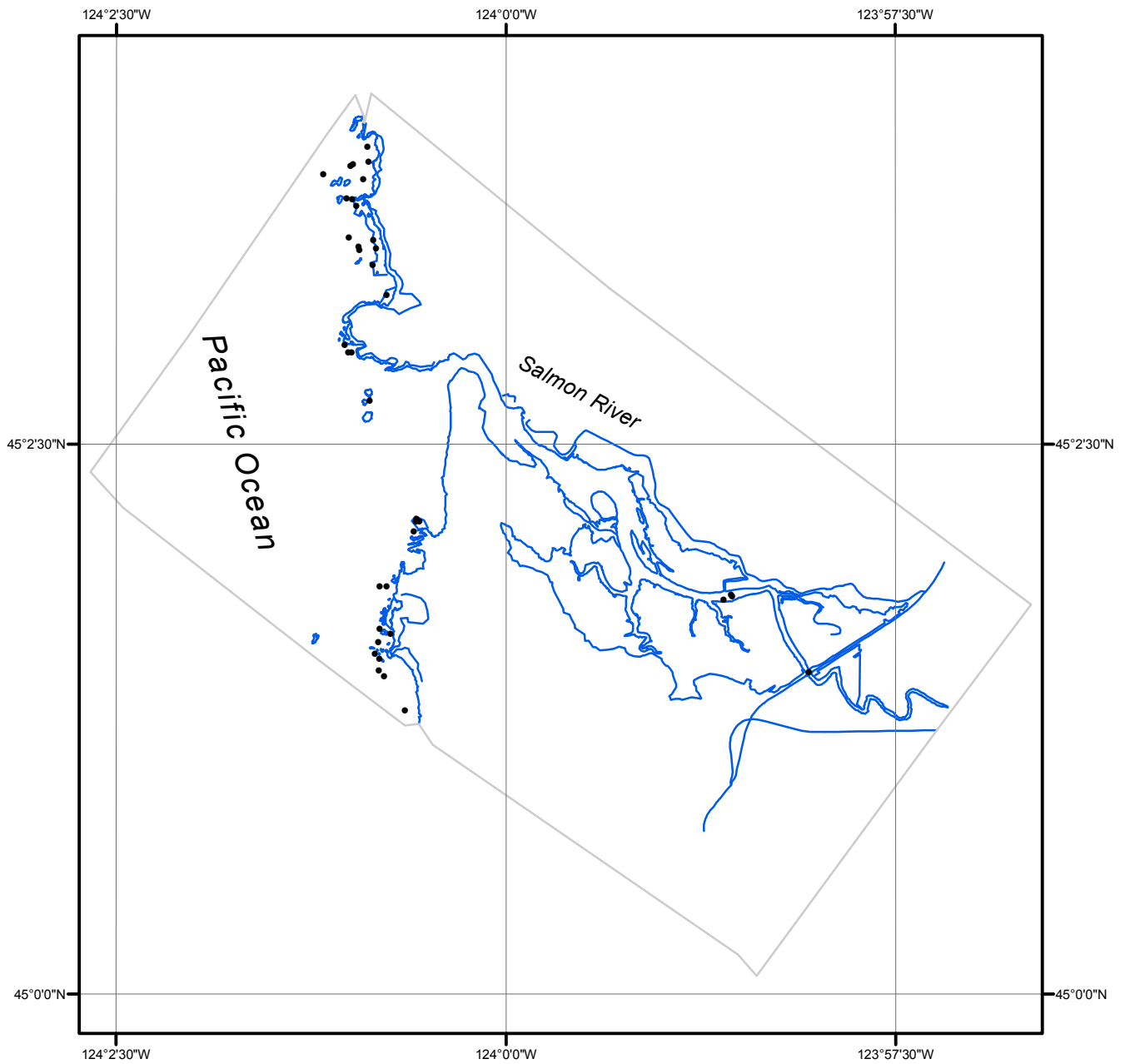- Digital copy of the PCR in Adobe PDF format
- CEF in shapefile format

NOAA Shoreline Data Explorer
- GC11012 in shapefile format
- Metadata file for GC11012
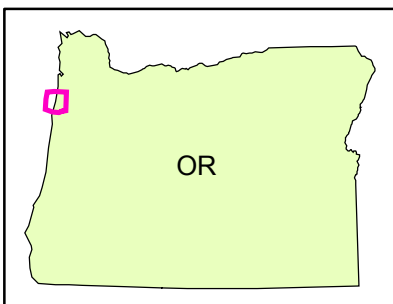- Digital copy of the PCR in Adobe PDF format

End of Report

SALMON RIVER

OREGON

124°2'30"W · 124°0'0"W · 123°57'30"W

45°2'30"N

Pacific Ocean

Salmon River

45°2'30"N

45°0'0"N · 45°0'0"N

124°2'30"W · 124°0'0"W · 123°57'30"W

Overview

OR

OR0804

GC11012