

NOAA COASTAL MAPPING PROGRAM PROJECT COMPLETION REPORT

PROJECT MI0710

Stoneport Harbor, Michigan

Introduction

Coastal Mapping Program (CMP) Project MI0710 provides a highly accurate database of new digital shoreline of Stoneport Harbor, Michigan, and vicinity. 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 MI0710 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 satellite imagery in order to ascertain the need for more current shoreline data. Refer to the RB Memorandum of February 11, 2008, "Results of CSCAP Change Analysis for Stoneport, Michigan (MI0710)," for details of the chart comparison process.

Field Operations

The field operations consisted of the collection of static and kinematic GPS data and the acquisition of aerial photographs. The photographic mission operations were conducted on May 17, 2007, with the NOAA Cessna Citation II (N52RF) aircraft. Two strips of natural color photographs were acquired through use of a Wild RC-30 camera with the NOS "A" lens cone at the nominal scale of 1:30,000.

GPS data collection operations were conducted in accordance with the GPS Controlled Photogrammetry Field Operations Manual (10/25/99). A GPS base station was established atop a PKNAIL at Alpena County Regional Airport (APN), and airborne kinematic GPS data was collected to determine precise camera positions in order to establish a control network necessary for aerotriangulation. Refer to the Airborne Positioning and Orientation Report (APOR), "07APN137.2 Michigan Ports GPS/IMU Processing Report, March, 2008" for further details.

GPS Data Reduction

GPS and IMU data was collected and processed by RSD personnel to provide precise positions of camera centers for application as photogrammetric control in the aerotriangulation phase of project completion. The static GPS base station data was

processed in August 2007 using the NGS Online Processing User Service (OPUS) to compute fixed baseline solutions from three CORS stations. The airborne kinematic data was processed using Applanix POSGPS (ver. 4.4) software in August 2007. Refer to the APOR for further information on GPS data processing.

Aerotriangulation

All photographs of the project were bridged by RSD Applications Branch (AB) personnel in March 2008, using a digital photogrammetric workstation (DPW), running under a Windows XP environment, in order to establish the network of control required for the compilation phase. The photographic measurements were made using the Multi-Sensor Triangulation (MST) module within BAE's SOCET SET version 5.3.0 software. After the final analytical adjustment was performed, the RMS of the standard deviations for all aerotriangulated image points was computed using the MST module. These values were then used to compute a predicted horizontal circular error of 0.9 meters based on a 95% confidence level. An Aerotriangulation Report was written and contains additional information on this phase of project completion.

Compilation

The data compilation phase of this project was initiated by RSD in April 2008. Digital mapping was performed using a DPW in conjunction with the SOCET SET Feature Extraction software module. Feature identification and attribution within the Geographic Cell (GC) were based on image analysis of 1:30,000 scale photographs and information extracted from the appropriate NOAA nautical charts, US 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 MI0710 were determined according to standard Federal Geographic Data Committee (FGDC) practices. Cartographic features were compiled to meet a horizontal accuracy of 1.8 meters at the 95% confidence level. This predicted accuracy of compiled, well defined points is calculated by doubling the circular error derived from aerotriangulation statistics.

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

Date	Time (UTC)	Roll Number	Photo Numbers	Scale (nominal)	Lake Level*
05-17-07	19:30-19:32	07ACN06	664-667	1:30,000	176.1
05-17-07	19:38-19:40	07ACN06	668-671	1:30,000	176.1

*Lake levels are given in meters above IGLD 1985 and are based on actual observations recorded by the NOS gauge at Harrisville, Michigan at the time of photography.

Quality Control / Final Review

Quality control tasks were conducted during all phases of project completion by a senior member of the RSD Applications Branch. The final QC review was completed in May 2008. The review process included analysis of the 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 9.1. 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 APOR
- Hardcopy of the Aerotriangulation Report
- Hardcopy of the Project Completion Report (PCR)
- Page size graphic plot of GC10703 file contents, attached to PCR
- Hardcopy of the CSCAP evaluation memorandum

Remote Sensing Division Electronic Data Library

- GC10703 in ESRI shapefile format
- Digital copy of the PCR in Adobe PDF format
- Chart Evaluation File (CEF) in shapefile format

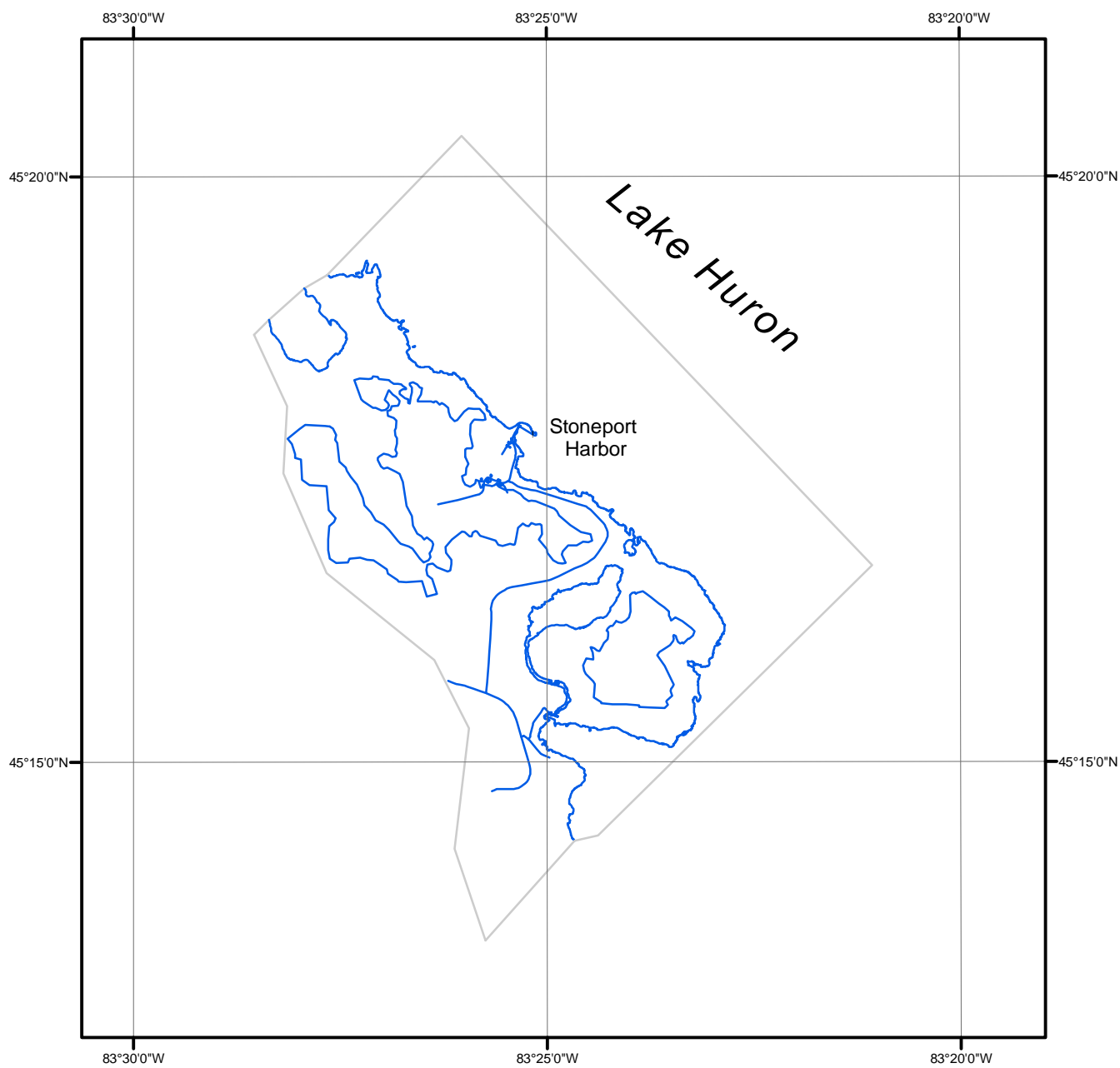
NOAA Shoreline Data Explorer

- GC10703 in shapefile format
- Metadata file for GC10703
- Digital copy of the PCR in Adobe PDF format

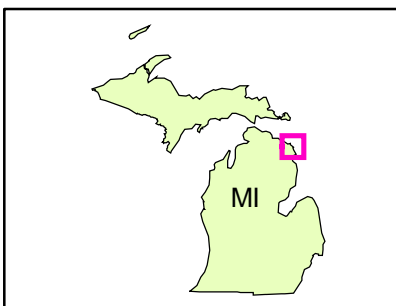
End of Report

STONEPORT HARBOR

MICHIGAN



Overview



MI0710

GC10703