

# **NOAA COASTAL MAPPING PROGRAM PROJECT COMPLETION REPORT**

## ***PROJECT MA1005***

### ***Port of Boston, Massachusetts***

#### **Introduction**

NOAA Coastal Mapping Program (CMP) Project MA1005 provides highly accurate digital shoreline data for key areas of change within the Port of Boston, Massachusetts. 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 MA1005 was accomplished by the Requirements Branch (RB) of the Remote Sensing Division (RSD) in response to the need for updates to NOAA's Electronic Navigational Chart 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 imagery sources in order to ascertain the need for more current shoreline data. Refer to the CSCAP analysis memo, "Results of CSCAP Change Analysis for Boston, Massachusetts (MA1005)" written September 14, 2010 (updated June 29, 2012), for details regarding the comparison process.

#### **Field Operations**

Routine CMP field operations did not apply for this project based on the origin of the project source data. Existing sources of horizontal control were used for the georeferencing process.

#### **Georeferencing**

Three WorldView-1 panchromatic images with a spatial resolution of 0.5 meters were georeferenced using Erdas IMAGINE 9.3 software on a Microsoft Windows platform. A fourth satellite image used for CSCAP analysis was not georeferenced since it was not used to compile new features. Ground control points (GCPs) photogrammetrically measured from previously aerotriangulated images from project MA0401B were imported into IMAGINE and used to georeference the satellite imagery. Within IMAGINE the Raster Geometric Correction tool was used with a 1<sup>st</sup> order polynomial model. The satellite imagery was resampled using the Nearest Neighbor sampling method. The RMS of the residuals for measured check points was used to compute a predicted horizontal circular error, in meters, based on a 95% confidence level (CE95) for the satellite images as follows:

Image #1 (10jul07154747-p1bs-p002-rpc\_utm\_nad83\_georef\_8bit.tif) = 1.3 meters

Image #2 (10jul07154747-p1bs-p001\_utm\_nad83\_georef\_8bit.tif) = 1.5 meters

Image #3 (10jul07154758-p1bs-p001-rpc\_utm\_nad83\_georef\_8bit.tif) = 1.4 meters

These CE values were tripled and added to the CE95 of the source imagery in order to conservatively predict the accuracy of well-defined points measured during the compilation process. A Georeferencing Report was written and is on file with other project data within the AB Project Archive. Positional data is based on the UTM Coordinate System (Zone 19), and referenced to the North American Datum of 1983.

## Compilation

The data compilation phase of this project was accomplished by RSD in March 2011. Digital feature data was compiled in ESRI shapefile format from imagery using ESRI's ArcGIS 9.3 desktop GIS software. 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 cartographic features were further modified with additional descriptive information to refine general classification.

Spatial data accuracies for Project MA1005 were determined according to standard Federal Geographic Data Committee (FGDC) practices. Cartographic features were tested to have a horizontal accuracy of between 5.3 and 6.0 meters for all imagery used for compilation, based on a 95% confidence level. This predicted accuracy of compiled well-defined points is based on a minimum of twenty (20) check points per image that were compared to an independent source of higher accuracy.

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

Image #	Image Source	Source File Name	Acquisition Date, Time	Tide Level*
1	WorldView-1	10JUL07154747-P1BS-052372612010_01_P002_RPC.tif	2010-07-07, 15:47 GMT	1.2
2	WorldView-1	10JUL07154747-P1BS-052372612010_01_P001.tif	2010-07-07, 15:47 GMT	1.2
3	WorldView-1	10JUL07154758-P1BS-052372612010_02_P001_RPC.tif	2010-07-07, 15:47 GMT	1.2
4	WorldView-1	10JUL07154758-P1BS-052372612010_02_P002_RPC.tif	2010-07-07, 15:47 GMT	1.2

\* Tide levels are given in meters above MLLW and are based on actual observations recorded by the NOS tide gauge at Boston, Massachusetts at the time of imagery acquisition. The elevation of the MHW tidal datum at Boston is equal to 3.0 meters above MLLW.

## Quality Control / Final Review

Quality control tasks were conducted during all phases of project completion by a senior member of AB. The final QC review was completed in June 2011. The review process included analysis of the georeferencing 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 9.3. 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 Georeferencing Report
- Hardcopy of the Project Completion Report (PCR)
- Page size graphic plot of GC10868 file contents, attached to PCR
- Hardcopy of the CSCAP evaluation memorandum

### **Remote Sensing Division Electronic Data Library**

- GC10868 in shapefile format
- Digital copy of the PCR in Adobe PDF format
- Chart Evaluation File (CEF) in shapefile format

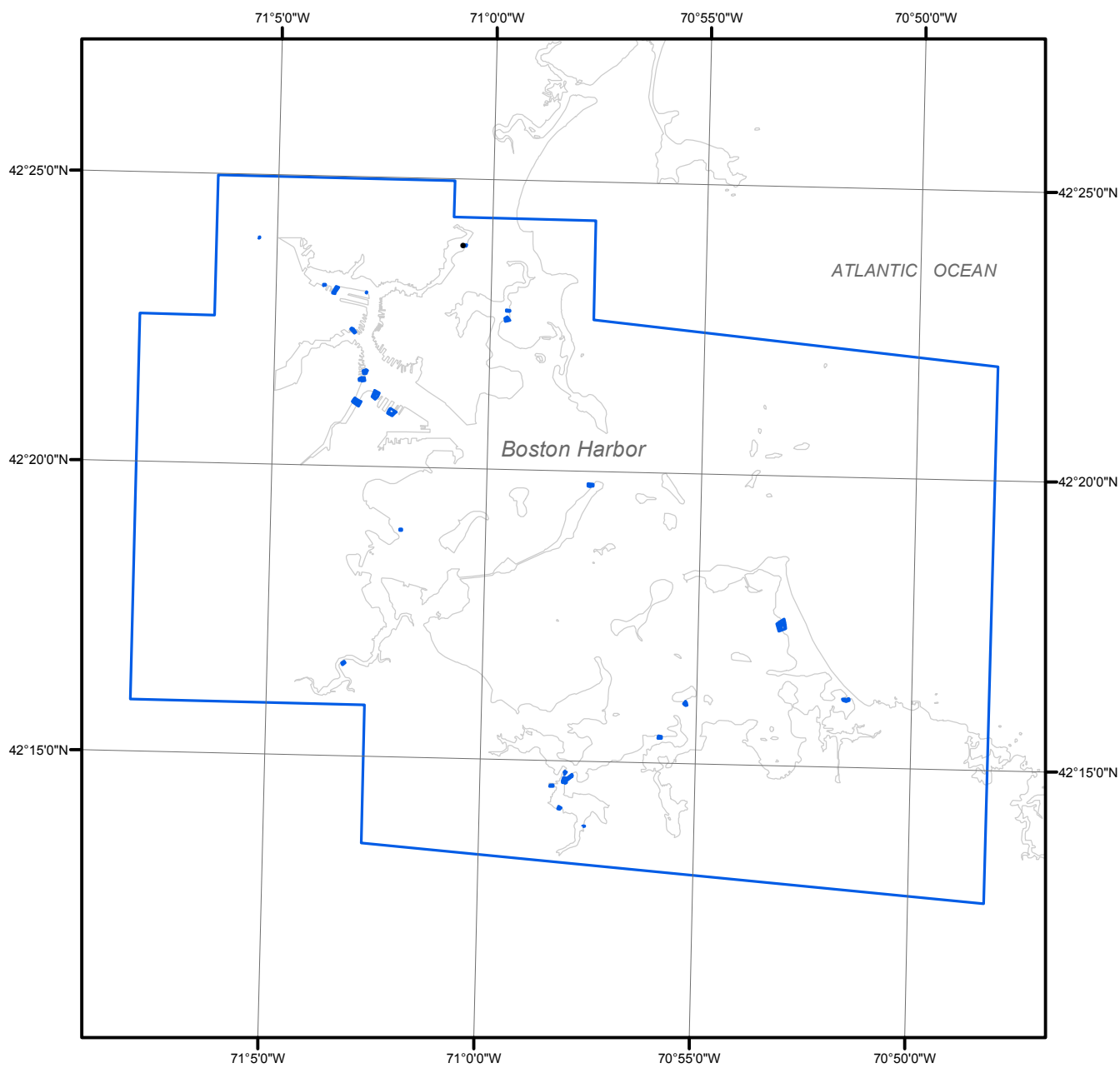
### **NOAA Shoreline Data Explorer**

- GC10868 in shapefile format
- Metadata file for GC10868
- Digital copy of the PCR in Adobe PDF format

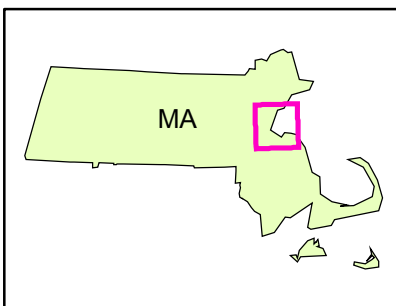
## **End of Report**

# PORT OF BOSTON

## MASSACHUSETTS



Overview



MA1005

GC10868