

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

## ***PROJECT TX0401***

### ***Port Arthur, Texas***

#### **Introduction**

Coastal Mapping Program (CMP) Project TX0401 provides highly accurate digital shoreline data for key areas of change within Port Arthur, Texas from Sabine-Neches Canal, south of Neches River and Port Arthur Ship Canal to Sabine Pass. The analysis and the digital cartographic feature file (DCFF) may be used in support of the NOAA Nautical Charting Program (NCP) as well as geographic information systems (GIS) for coastal zone management applications.

#### **Project Design**

The design of Project TX0401 was accomplished by the Requirements Branch (RB) of the Remote Sensing Division (RSD) in response to the need for timely updates to NOAA 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 satellite imagery in order to ascertain the need for more current shoreline data. Refer to the RB Memorandum, "Results of CSCAP Change Analysis for Port Arthur, Texas (TX0401)," July 11, 2005, for details regarding the chart 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**

Two IKONOS non-orthorectified color images with a spatial resolution of 1 meter, acquired from Space Imaging, Inc., were georeferenced using Erdas IMAGINE 8.5 software on a Windows platform. Within IMAGINE, the Raster Geometric Correction tool was used with a 1st order polynomial model. Ground control points (GCPs) were extracted from previously measured coastal feature data, which were obtained from the NOAA Shoreline Data Explorer and used as a reference grid. Once control points were measured in IMAGINE, the satellite imagery was resampled using the Nearest Neighbor sampling method. The RMS of the standard deviations of the residuals for measured check points were used to compute a predicted horizontal circular error at the 95% confidence level (CE95) of 0.9 meters for image #1 and 1.0 meters for image #2. This CE value was tripled and then added to the CE95 of the reference grid to yield a conservative predictor of the accuracy of well defined points measured during the compilation process. Positional data is referenced to the North American Datum of 1983 (NAD 83).

## Compilation

The compilation of cartographic feature data for this project was accomplished by a member of the Applications Branch (AB) of RSD in September 2005. Digital feature data was compiled in ESRI shapefile format from imagery using ESRI's ArcGIS 8.3 desktop GIS software. Feature attributes were established according to 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.

Spatial data accuracies for Project TX0401 were determined according to standard Federal Geographic Data Committee (FGDC) practices. Cartographic features were tested to have 6.0 meters horizontal accuracy at the 95% confidence level. This predicted accuracy of well-defined points is based on a minimum of twenty (20) check points that were compared to an independent source of higher accuracy.

In response to concerns about the possible impacts of severe storm events on port infrastructure within the project area subsequent to acquisition of the IKONOS imagery, a post-compilation reassessment of feature data was performed, in March 2006. For this purpose, AB utilized hurricane reconnaissance imagery which was acquired with the Applanix Digital Sensor System (DSS) on September 25, 2005, one day after hurricane Rita made landfall. All compiled features which were found to be significantly impacted by storms were deleted from the project data. Thus feature data which persist in final products for this project are worthy of a high level of confidence in terms of positional and attributional accuracy.

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

Image #	Image Source	Source ID	Source File Name	Acquisition Date/Time	Tide Level*
1	IKONOS	2004070417112640000011607401	po_146953_0030001.tif	2004-07-04 17:11 GMT	0.4 m
2	IKONOS	2004061517175460000011622350	po_146953_0020001.tif	2004-06-15 17:17 GMT	0.4 m

\* Tide levels are given in meters above MLLW and are based on actual observations recorded by the NOS gauge at the time of photography. The elevation of the MHW tidal datum at the Sabine Pass North Tide Gauge is equal to 0.457 meters above MLLW.

## Quality Control / Final Review

Quality control tasks were conducted during all phases of project completion by a senior member of the Applications Branch of RSD. QC activities for this project were finalized by March 2006. In addition to the aforementioned reassessment of feature data using DSS imagery, the review process also included analysis of the georeferencing results and evaluation of the identification and attribution of cartographic features according to image analysis and criteria defined in C-COAST. The quality control process concluded with an inspection of topological connectivity within the DCFF 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 Project Completion Report (PCR)
- Page-size graphic plot of GC10579 file contents, attached to PCR
- Hardcopy of the CSCAP evaluation memorandum

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

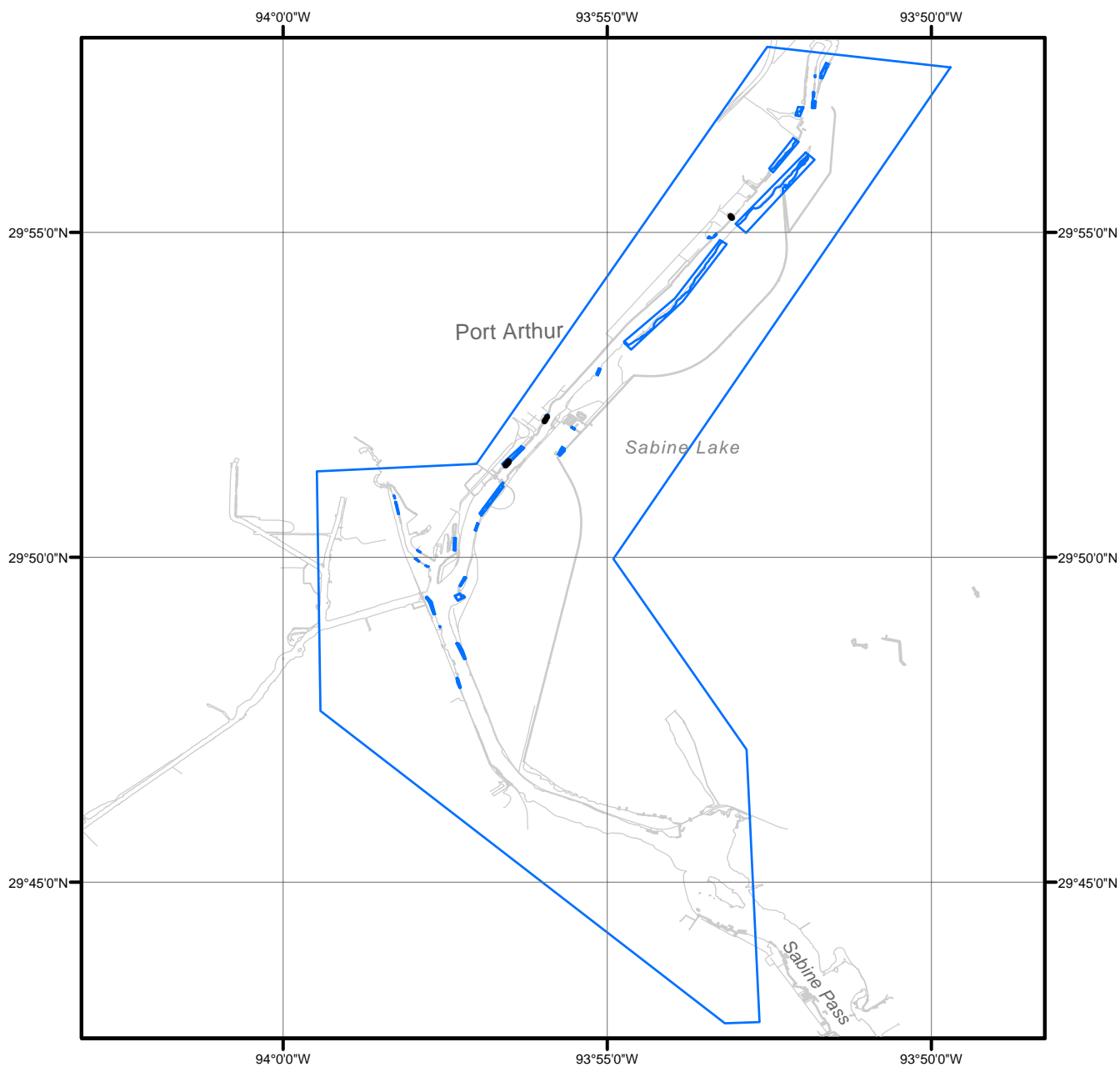
- Digital copy of DCFF GC10579 in ESRI shapefile format
- Digital copy of the PCR in Adobe PDF format
- Chart Evaluation File (CEF) in shapefile format

### **NOAA Shoreline Data Explorer**

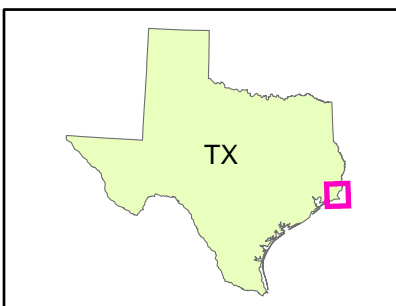
- DCFF for GC10579
- Metadata file for GC10579
- Digital copy of the PCR in Adobe PDF format

## **End of Report**

# PORT ARTHUR TEXAS



Overview



TX0401

GC10579