W00621

U.S. Department of Commerce
National Oceanic and Atmospheric Administration
National Ocean Service

DESCRIPTIVE REPORT

Type of Survey:	Habitat Mapping
Registry Number:	W00621

LOCALITY

State(s):	Florida
General Locality:	Southwest Florida
Sub-locality:	Everglades National Park

2004

CHIEF OF PARTY
Mark Hansen, Oceanographer

LIBRARY & ARCHIVES

Date:

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

REGISTRY NUMBER:

HYDROGRAPHIC TITLE SHEET

W00621

INSTRUCTIONS: The Hydrographic Sheet should be accompanied by this form, filled in as completely as possible, when the sheet is forwarded to the Office.

State(s):	**Florida**
General Locality:	**Southwest Florida**
Sub-Locality:	**Everglades National Park**
Scale:	**20000**
Dates of Survey:	**01/20/2004 to 03/17/2004**
Instructions Dated:	**N/A**
Project Number:	**ESD-AHB-22**
Field Unit:	**US Geological Survey**
Chief of Party:	**Mark Hansen, Oceanographer**
Soundings by:	**SEA SwathPlus-M (Interferometric)** **Marimatech E-Sea 103 (SBES)**
Imagery by:	**N/A**
Verification by:	**Atlantic Hydrographic Branch**
Soundings Acquired in:	**meters at Mean Lower Low Water**

Remarks:

Any revisions to the Descriptive Report (DR) applied during office processing are shown in red italic text. The DR is maintained as a field unit product, therefore all information and recommendations within this report are considered preliminary unless otherwise noted. The final disposition of survey data is represented in the NOAA nautical chart products. All pertinent records for this survey are archived at the National Centers for Environmental Information (NCEI) and can be retrieved via https://www.ncei.noaa.gov/. Products created during office processing were generated in NAD83 UTM 17N, MLLW. All references to other horizontal or vertical datums in this report are applicable to the processed hydrographic data provided by the field unit.

DESCRIPTIVE REPORT MEMO

September 29, 2023

MEMORANDUM FOR: Atlantic Hydrographic Branch

FROM: Report prepared by AHB on behalf of field unit
Mark Hansen
Oceanographer, U.S. Geological Survey

SUBJECT: Submission of Survey W00621

This project had two primary objectives. The first was to establish mapping protocols which will provide accurate, consistent information about various channels and changes in channels through time that can be used in Everglades process modeling and restoration impact monitoring. The second was to evaluate and analyze accurate and cost-effective survey methods for determining channel surface area, and cross-section morphology using boat based and airborne remote sensing techniques. Shark River and Trout Creek in (Florida Bay) were selected as the study locations for the project. This project supports two primary restoration objectives: hydrodynamic modeling and monitoring. Hydrodynamic models will be used to simulate river and tidal creek levels, flows and salinities to guide these restoration efforts. These hydrodynamic models require high-resolution boundary conditions to produce accurate results. Monitoring changes in coastal channel and creek systems is necessary because of uncertainty regarding the flow volumes necessary to sustain them.

There were no products created for this survey.

All soundings were reduced to Mean Lower Low Water using VDatum. The horizontal datum for this project is North American Datum of 1983 (NAD 83). The projection used for this project is Universal Transverse Mercator (UTM) Zone 17.

The XYZ data was transformed by the ESD team as detailed in a separate report (W00621 Vertical Datum Transformation Report).

There was no DAPR for this project.

All data were reviewed for DTONs and none were identified in this survey.

The U.S. Geological Survey requests that it be referenced as the originator of this dataset in any future products or research derived from these data. South Florida Water Management District (SFWMD) provided funding for the study. The project was conducted as a cooperative study by personnel from the USGS in St. Petersburg, FL, USGS in Woods Hole, MA, and the SFWMD,

in Fort Myers, FL. Mark Hansen was the USGS principal investigator. Gina Perry performed a significant portion of bathymetric survey data collection and processing. David Nichols and Chuck Wooley provided critical field data assistance. acquired the data outlined in this report. Data are available at https://pubs.usgs.gov/ds/1031/download/TidalCreek/soundings/DS1031-TidalCreek-TroutC_WGS84_NAVD88-G99_SB_shp.xyz.zip. Additional documentation from the data provider may be attached to this report.

This report serves as an archive of processed SWATH and single-beam bathymetry data that were collected in Shark River and Trout Creek, Florida in 2004. Geographic information system data products include XYZ data. Additional files include formal Federal Geographic Data Committee metadata.

Data Acquisition - The sea-floor of the Shark River and Trout Creek was mapped by using an outboard motor boat, equipped with a high-precision Global Positioning Systems (GPS) coupled with a high-precision depth sounder. To accomplish this task, the SANDS (System for Accurate Nearshore Depth Surveying) system was developed by Mark Hansen (SPCMSC) and Jeff List (WHSC) of the U.S. Geological Survey. SANDS consists of two components, hardware and processing software. Reference GPS reference stations were operated on an USGS benchmark, typically located within approximately 15 km of the farthest single-beam track line. Reference and rover GPS receivers recorded the 12-channel full-carrier-phase positioning signals (L1/L2) from satellites via ASHTECH choke-ring antennas. The reference and rover receivers record their positions concurrently at 1-second(s) recording intervals throughout the survey. Boat motion was recorded at 50-millisecond (ms) intervals using a TSS Dynamic Motion Sensor 05 (TSS DMS-05). Bathymetric soundings were recorded at 10-ms intervals using a Marimatech EC-100 survey grade echo-sounder. The single-beam data were acquired using the hydrographic software HYPACK version 5. All data strings from the instruments were streamed in real time and recorded through HYPACK software.

Swath Bathymetry Acquisition: The interferometric swath bathymetry data were collected aboard the R/V Streeterville using a Systems Engineering and Assessment Ltd (SEA) SWATHplus 468 kHz interferometric sonar system mounted on a pole that was attached to the bow of the boat. Boat motion was recorded at 50-millisecond (ms) intervals using a TSS Dynamic Motion Sensor 05 (TSS DMS-05). GPS and motion data strings from the instruments were streamed in real time and recorded through HYPACK software. Pseudo range GPS data acquired by the Ashetch Z-Surveyor receiver with a Dorne-Margolin choke ring antenna, and motion data were integrated with interferometric soundings in the SWATHplus software package versions 2.2 with positional and calibration offsets pre-defined by a session file(.sxs), allowing for real-time-corrected depths. Prior to deployment, all equipment offsets were surveyed in dry dock with the use of a laser total station. During the survey all swath tracklines were recorded in SEA SWATHplus raw data format

(.sxr). An Applied Microsystem SV Smart Sensor, Sound Velocity Sensor (SVS) was attached to the transducer mount and collected continuous speed of sound (SOS) measurements at the depth of the transducers. These values were directly read and incorporated into the SWATHplus acquisition software giving real-time speed of sound at the transducer while underway.

Single-beam Bathymetry Processing- All data were processed using SANDS version 1.2. The primary purpose of SANDS is to time synchronize processed trajectories, soundings, and heave/ pitch/roll, and then merges all data strings. SANDS applies latency errors, applies geometric corrections for antenna staff pitch and roll, applies geometric corrections for antenna transducer pitch and roll (beam correction), time synchronizes the GPS trajectory and HYPACK files for each GPS epoch, and converts WGS84 latitude/longitude coordinates to North American Datum of 1983 NAD83/GRS80 UTM coordinates (m), and applies a geoid separation based upon NOAA/ NGS the Geoid99 model. Latitude/longitude conversion to UTM coordinates was accomplished using NOAA/NGS UTM v2.0 software. Intermediate output files are comma delimited text files containing: time of day (seconds of day), UTM X coordinate (m), UTM Y coordinate (m), ellipsoid height, orthometric height, smoothed raw depths, PNAV RMS value, and HYPACK line number. A header line indicates the attributes entry for each column.

Swath Bathymetry Processing: The corrected trajectory positions, motion data, and sound velocity information were then integrated with the observed bathymetric values to calculate a final ellipsoid height and position representing the elevation of the seafloor with respect to the geodetic reference frame ITRF05 across the swath range. SWATHplus serves as both an acquisition software and initial processing software. Preliminary roll calibration trackline data were collected and processed using SWATHplus and Grid Processor software version 3.7.17. Instrument offset and calibrations values were input into the session file (.sxs) and the raw data files (.sxr) were then processed using the updated system configuration containing roll calibration values, measured equipment offsets, acquisition parameters, navigation and motion from the GPS, motion sensor, and SOS probe at the sonar head. Any calibration offsets or acoustic filtering applied in SWATHplus is also written to the processed data file (.sxp). All processed data files were imported into SEA Grid Processor and edited for outliers using the program's depth filters and reference surfaces. Any remaining outliers were then edited out manually. A surface grid was created from the edited soundings dataset. The sample X,Y,Z data were exported as ASCII text at a 5 x 5 m sample resolution.

The final processed bathymetry files were reformatted for publication. UTM coordinate were converted to latitude/longitude using NOAA/NGS UTMS v2.0 software. Shapefiles were created from X,Y,Z text files using in-house developed software.

This survey does meet charting specifications and is adequate to supersede prior data.