F00531

NOAA FORM 76-35A

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

DESCRIPTIVE REPORT

Type of Survey: **Hydrographic**

Registry Number: **F00531**

LOCALITY

State: Florida

General Locality: Port Everglades

Sub-locality: 1.25 NM East of Ft Lauderdale

2007

CHIEF OF PARTY
David B. Elliott -Team Leader

LIBRARY & ARCHIVES

DATE

NOAA FORM 77-28U.S. DEPARTMENT OF COMMERCE (11-72)NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION	REGISTRY NUMBER:
HYDROGRAPHIC TITLE SHEET	**F00531**
INSTRUCTIONS: The Hydrographic Sheet should be accompanied by this form, filled in as completely as possible, when the sheet is forwarded to the Office.	FIELD NUMBER: N/A

State/Territory: **Florida**

General Locality: **Port Everglades**

Sub-Locality: **1.25 NM East of Ft. Lauderdale**

Scale: **1:10,000** Date of Survey: 14 Feb. 2007

Instructions Dated: **09 Feb, 2007** Project Number: **S-H912-NRT2-07**

Vessel: **NOAA Launch 1210**

Chief of Party: **David B. Elliott - Team Leader**

Surveyed by: **David Elliott, Robert Ramsey & Frank Younger (NRT2)**

Soundings by: **ODOM Echtotrac CV**

Graphic record scaled by: **DE, RR, FY**

Graphic record checked by: **DE. RR, FY**

Protracted by: **N/A** Automated Plot: **N/A**

Hewlett Packard Design Jet 2500 CP (office)

Verification by: **Atlantic Hydrographic Branch**

Soundings in: ***Feet*** ~~**Meters**~~ **at MLLW**

Remarks: ***Red, bold, italic notes in descriptive report were made during office processing.***

1) All Times are UTC.

2) This is a basic Hydrographic Survey under the Navigable Area Concept.

3) Projection is UTM Zone 17.

TABLE OF CONTENTS

DESCRIPTIVE REPORT

to accompany

S-H912-NRT2-07

Port Everglades

FIELD EXAMINATION SURVEY
F00531
Scale of Survey: 1:10,000
Year of Survey: 2007
Navigation Response Team 2 - Launch 1210
David B. Elliott- Team Leader

A. AREA SURVEYED

This Field Examination/Hydrographic survey was conducted in accordance with Hydrographic Project Instructions* for S-H912-NRT2-07, Ft Lauderdale, FL. The instructions are dated Feb. 09, 2007.
Data filed with original field records.

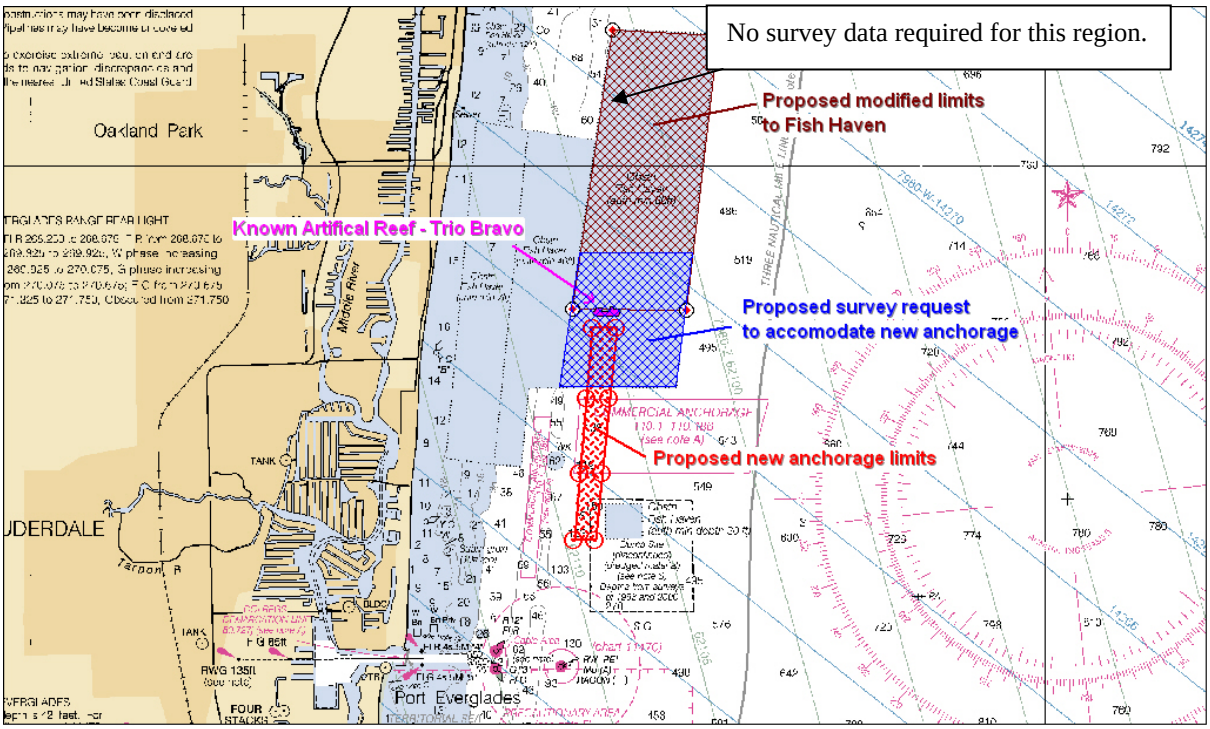
The purpose of this project is to collect new hydrography with side scan sonar and identify features on the sea floor in a proposed anchorage area off the coast of Ft. Lauderdale. The Southeast Regional Navigation Manager requested a hydrographic survey near Port Everglades as a response to a U.S. Coast Guard need to determine objects that may foul ship anchors. In addition the survey will also identify the location of artificial and natural reefs in this region. The northern end of the survey polygon is inside a presently charted Fish Haven.

A dual approach was taken in depicting side scan contacts. Due to the numerous features and depth of water no contacts are classed as DTON's. The point contacts were picked out of man made debris fields dumped for Fish Haven's in areas to enable limit depiction. A table was created in MapInfo by using a Geo-referenced mosaic of the side scan data to outline regions of natural coral heads. These coral limits lie in the western area of the survey and project off the bottom from two to three meters. In addition a general outlined area of the point features are in the table to depict the limits of features dumped on the seafloor that could create the fouling of anchored vessels.

Due to the nature of this survey being conducted as a response to the U.S. Coast Guard there was a limited window in time to fulfill this request. Navigation Response Team 2 spent two days on sight observing twenty-five knot winds, during this time, work was conducted inshore on a Ft. Lauderdale Pilot request for a separate project. The wind shifted west on the evening of the second day providing NRT2 with a brief opportunity (1 day) with fifteen- knot winds to survey the proposed anchorage and the western portion of the presently charted Fish Haven at the north end. While the area surveyed was sufficiently covered with 200% side scan, time did not allow the acquisition of crosslines or extensive item development. Bottom samples were acquired in

the region of the proposed anchorage. Survey Date: Feb. 14, 2007 (DN: 045)

Survey limits are displayed graphically in the chartlet on the following page .



Total LNM of SB & SSS = 26.0, Total Crosslines = 0, Total Sq NM = 1.3, Bottom Samples = 5

B. DATA ACQUISITION AND PROCESSING

B.1. EQUIPMENT *See also the Evaluation Report.*

Data was acquired by Navigation Response Team 2 and survey Launch 1210. The vessel was configured as described in the Data Acquisition and Processing Report (DAPR *) for this project. Major data acquisition systems are summarized below.
Data filed with original field records.

NOAA launch 1210, a 30-foot SeaArk with a draft of 0.5 meters, was used to collect all survey data. There were no unusual vessel configurations or problems encountered with the vessel.

An ODOM EchotracCV, Fathometer, was used to collect all echo soundings on this survey

A Klein 3000 side scan sonar, was used throughout this survey.

A Trimble DGPS Beacon Receiver was used as the primary navigation station on launch 1210.

The Instrument used for determining corrections for the speed of sound through the water column was an ODOM Digibar Ser # 98295-020606.

B.2. QUALITY CONTROL

Following the Field Procedures Manual and the NOS Hydrographic Surveys Specifications and Deliverables Manual, June 14, 2006 has insured the integrity of the survey data for F00531.

Differential GPS (DGPS) was used for all hydrographic data acquired on this survey. DGPS performance checks were conducted in accordance with FPM 3.4.4 by comparing the DGPS position of the vessel to a high accuracy (1st order) calibration point.

Echo Sounder Control

Lead line comparisons were conducted daily and compared to the digital depth and draft.

Side Scan Sonar Quality Control

Daily confidence checks were conducted by observing side scan imagery in the vicinity of known contacts, such as buoys or sand waves. Side scan data were considered satisfactory if these contacts could be distinguished throughout the entire range of the side scan trace. The confidence checks were performed daily at 100/500kHz.

A coverage of 200% was obtained wherever possible in the required survey areas and where water depth and/or hazards permitted. Side scan sonar coverage was conducted to the 12-foot depth curve and single beam reduced line spacing was performed in other areas where warranted. The towfish was deployed off the starboard quarter of the vessel, which proved very stable. Distorted images caused by strong tidal currents, or sea state, were seen periodically. Significant contacts and shadows were processed with Caris HIPS/SIPS to determine the height off the bottom. The significant contacts were then compared by position, as well as common depth and relationship to channels to determine if further investigations were needed. All areas surveyed were track line/swath line plotted to insure complete coverage. ***Side scan data contained navigational artifacts that prohibited office personnel from accurately measuring side scan contacts and also affected the side scan mosaic. See Evaluation Report***

The system frequencies used were 100kHz and 500kHz. The recorder was set on one of either 75/100-meter range scales. There were no water depths greater than 60 meters.

Junctions

Not Applicable

B.3. Corrections to Echo Soundings

One cast was taken for this project and can be found in Separates II* - Sound Velocity Profile Data. Sound velocity data has been submitted with the digital data package. Cast data is organized on the digital media as follows: vessel / day of cast / cast data.

There are no deviations to be discussed in this section.
Filed with original field records.

B.4 Data Processing

There is no Base surface or BAG for this survey. *Concur.*

C. VERTICAL AND HORIZONTAL CONTROL

The Instrument used for determining corrections for the speed of sound through the water column was an ODOM Digibar Ser # 98295-020606. Data quality assurance tests were performed after each cast. Program VELOCWIN was used for computing the correctors. Corrections were applied to the sounding plot using the Carris HIPS.

Preliminary zoning was provided by NOAA/CO-OPS.

Field soundings are corrected by unverified actual heights from NOAA/CO-OPS.
The Real Time Actual 6 min Tides are downloaded from: "http://co-ops.nos.noaa.gov/data_res.html", for all gauges required in the given projects defined by the ZDF file provided in the project letter, and instruction. Tide values are downloaded in blocks of data that covers the Times of Hydrography, and saved in a text file format. The MapInfo program is then used with the "HYDRO_MI" pre-Survey function, of "Create Cowlis", this function converts the text file into a Caris tide file (.tid).
See also the Evaluation Report.

All elevations and soundings on survey F00531 are based on MLLW unless otherwise specified.

A Request for Approved Tides letter was sent to N/OPS1 on February 22, 2007 (Appendix IV*).

Filed with original field records.

Horizontal Control

The horizontal datum used for this survey is the North American Datum of 1983 (NAD 83), projected using UTM zone 17. The control reference station used for this survey was the USCG DGPS Beacon.
Concur.

Horizontal dilution of precision (HDOP) was monitored on Hypack daily on the survey platform. The value never exceeded 2.5 HDOP, and adequate satellite coverage was maintained throughout the survey period. All positioning equipment was operated in a manner consistent with the manufacturer's requirements and as described in the DAPR. There were no equipment malfunctions which affected the positional quality of the data. ***Concur.***

D. RESULTS AND RECOMMENDATIONS *See EvaluationReport.*

D.1 Chart Comparison

There are three charts affected by this survey:

Chart Number	Edition	Edition Date	Scale
11466	37th	Aug. 01, 2005	1:80,000
11467	39th	May 01, 2005	1:40,000
11470	37th	Oct. 01, 2004	1:10,000

General Agreement with Charted soundings

In general survey soundings compared with the charted soundings within two to four feet. The smooth tides may resolve some of these soundings. All charted soundings should be superseded by this survey. ***Concur.***

The following is a list of comparisons between the survey data and potentially hazardous features as well as notable sounding discrepancies on the chart:

There were none noted. ***Concur.***

AWOIS Item Investigations

There were no AWOIS items assigned to this survey. ***Concur.***

Dangers to Navigation

There were no DTONS within the confines of F00531. ***Concur.***

D. 2. ADDITIONAL RESULTS

Aids to Navigation and Other Detached Positions

There are no ATONS within the survey limits. ***Concur.***

Ferry Routes

There are no Ferry routes within the confines of F00531. ***Concur.***

Submarine Cables and Pipelines

There are none within the confines of F00531. ***Concur.***

Bridges

There are no bridges within the confines of F00531. *Concur.*

S-H912-NRT2-07
Port Everglades Anchorage
Ft. Lauderdale, FL
Survey Registry No. F00531

Field operations for this basic hydrographic survey were conducted under my daily supervision with frequent checks of progress and adequacy. All field sheets, this Descriptive Report, and all accompanying records and data are approved.

This survey is adequate to supersede all prior surveys in common areas, and for application to the relevant NOS nautical charts.

Submitted by:

David B. Elliott - Team Leader
Navigation Response Team 2

ATLANTIC HYDROGRAPHIC BRANCH
EVALUATION REPORT FOR F00531 (2007)

This Evaluation Report has been written to supplement and/or clarify the original Descriptive Report. Sections in this report refer to the corresponding sections of the Descriptive Report.

B. DATA ACQUISITION AND PROCESSING

B.1 Equipment

The following software was used to process and review data at the Atlantic Hydrographic Branch (AHB):

CARIS HIPS/SIPS version 6.0 service pack 2
CARIS BASE Editor 2.0
CARIS HOM 3.3 service pack 3
PYDRO, version 7.3 (r2002)
dKart Inspector 5.0 build 707

B.2 Quality Control

The submitted side scan sonar data contained artifacts that were related to hardware, data processing, and existing environmental impacts. The navigation issues stem from the fact that the Trimble DGPS system utilized by the field unit output navigation information at a rate of 1 Hz (once per second). Thus the data reviewed in Caris Hips was inconsistent with ship gyro or heading. The navigation files contained numerous and rapid course changes resulting in navigation that was not consistent; the variable fish navigation was revealed in the side scan mosaic and outer swath regions of the side scan coverage . The towfish navigation was portrayed as the side scan "wiggle" in the outer limits of the side scan swath. The navigation files were edited at AHB in order to smooth out the gyro information, thus reducing the amount of heading variance. Bearing in mind the navigation input rate, and existing environmental conditions (high winds and sea state), the vessel motion was viewed as highly variable. The artifacts mentioned do not affect the sounding data and how the side scan data was used for this project. The clusters of man made objects were located with the required degree of horizontal accuracy. The intent of the survey was to locate the cluster of man made objects, noting the location so that the USACE and USCG would be able to view the location of the obstructions within the fish haven. Both agencies would at that point be able to detail the proposed fish haven and anchorage limits based upon the survey information.

Phone conversations with NRT-2 indicated that additional work was warranted during better weather conditions and with 100% multibeam coverage.

The submitted vertical beam echo sounder data is uncorrected for heave. The field unit does not possess a motion reference unit that records heave or vertical motion. Therefore, the data is uncorrected for the vertical motion of sea swells and wave action. The sea state is evident while reviewing the sounding data.

B.4 HOM Processing

Chart compilation was done by Atlantic Hydrographic Branch personnel in Norfolk, Virginia. Compilation data will be forwarded to Marine Chart Division, Silver Spring, Maryland.

H-Cells

One H-cell was created covering the entire survey area for chart 11470 at a 1:10,000 chart scale. H-cell layers in CARIS HOM are organized as follows:

Layer 100	Sounding Objects, survey scale
Layer 200	Skin of the Earth
Layer 300	Wreck
Layer 325	Seabed area (Bottom Descriptions)
Layer 350	Obstruction
Layer 600	Metadata Objects

Attributes:

Inform: F00531,S-H912-NRT2-07,NRT2,David B. Elliott Team Leader
SorDat: 20070214
SorInd: US,US,graph,F00531

In the office, using CARIS HIPS, a 5m survey scale BASE surface was created from the single beam data at the 1:10000 survey scale. In CARIS BASE Editor the survey scale sounding data set was extracted from the BASE surface at 1:2500 mm at map scale using a single-defined radius of 5m (this scale was chosen because sourcing single beam data this scale created a properly dense sounding set). Shoal biased chart scale sounding compilation was accomplished through the CARIS HOM sounding suppression routine using the table (0,999,15). Soundings were then checked for conflicts, corrected to remove conflicts, and edited to allow for proper sounding compilation placement with respect to existing charted depths outside the survey area.

Seabed classified areas (seafloor descriptors or characteristics) were transferred to the H-cell from the raster chart. Bottom samples that were classified as seabed area with the acronym NATSUR are visible in the H-cell as an S-57 object: NATSUR (nature of surface) IE - mud, sand, rock.

Contour and Depth Area Feature Objects

No contours were created for this H-Cell based on HSD H-Cell Specifications Version 2.0. A single depth area was created covering the entire survey area and arbitrarily assigned the depth range from 0m to 999m.

Before the HOM file was exported to S-57 format, the file was converted from metric to NOAA chart values. This conversion renames the DRVAL1 and DRVAL2 attributes (for depth areas) from the metric equivalent values to the standard NOAA chart values to accommodate NOAA traditional rounding standards on charts.

Soundings during HOM processing were selected with the CARIS GIS Environmental Variable set to a metric scale (-1,-1,T) to accommodate millimeter precision of the sounding value. This environmental variable was reset to NOAA standard charting values (0,0,N) to convert the metric sounding values to whole feet.

The completed H-Cell was exported as a Base Cell File (ENC.000) in S-57 format with all values in metric units. The metric equivalent ENC.000 file was then converted to NOAA chart values (ENC_CU.000) with all values measured in feet.

dKart Inspector

The final ENC_CU.000 file was examined using dKart Inspector. Warnings received were all inconsequential. The DSPM.HUNI and DSPM.DUNI were reported to have illegal values, but these errors were expected as originating during ENC conversion to NOAA chart values, so they also can be ignored. There were two warnings of a vertex lying on a straight line that can be ignored. Also reported by dKart were two warnings: one, a meaningless value of 'tecsou' in the Obstructions and Wreck, evidently dKart does not like side scan sonar as a reference for these features, and the other about pairs of vertexes being identical. The identical vertexes occurred around the Fish Haven inside the survey boundaries. The perimeter line was used as the outer border of the portion of the Fish Haven falling within the survey limits, and dKart does not like duplicate lines. These warnings can be ignored.

C. VERTICAL AND HORIZONTAL CONTROL

Office processing of this survey as an ENC required translating the datum to meet S-57 ENC requirements. During CARIS HOM processing the horizontal geodetic datum was translated from the survey datum (NAD83, UTM Zone 17) to Latitude and Longitude (LLDG) World Geodetic System-84 (WGS-84) prior to exporting the HOM file to the S-57 format. The S-57 ENC format serves as the exchange file submitted to the Marine Chart Division.

As this survey was fast-tracked only verified tides downloaded from the CO-OPS

website were applied to the survey. No final tidal zoning had been received at the branch at the time of this report.

D. RESULTS AND RECOMMENDATIONS

D.1. CHART COMPARISONS 11470 37th Ed., Oct. /04

Hydrography

The charted hydrography originates with prior surveys and requires no further consideration. The hydrographer makes adequate chart comparisons in Section D. of the Descriptive Report. The following should be noted:

Charted and Uncharted Features

1) Four group Obstruction areas were created from the various side scan contacts present in the survey area. These obstruction areas do not have a least depth assigned to them due to the lack of single beam coverage and the stated purposes for the survey. Obstruction areas were created in the vicinity of the following coordinates:

	Latitude	Longitude
1)	26° 08' 25.55" N	80° 04' 19.77" W
2)	26° 07' 17.33" N	80° 04' 25.22" W
3)	26° 07' 29.04" N	80° 04' 20.00" W
4)	26° 07' 25.05" N	80° 04' 17.92" W

2) One Fish Haven falls within the survey limits and was brought forward from the raster chart in the vicinity of Latitude 26° 06' 54.57" N, Longitude 80° 04' 19.64" W. Two other Fish Havens cover the northern half of the survey area, however reissuance of the permits for these Fish Havens is in question. Defer all charting recommendations for Fish Havens to Marine Chart Division, Nautical Data Branch.

3) One wreck was identified by the field party within the survey area in the vicinity of Latitude 26° 08' 43.18" N, Longitude 80° 04' 17.68" W. It is recommended a Wreck (depth unknown) be charted in this location and it is recommended this wreck be covered with 100% multibeam to obtain proper least depth measurements.

Junctions

There were no surveys to junction with F00531.

Adequacy of Survey

Except as noted above, the present survey is adequate to supersede the charted hydrography within the common area. This is an adequate hydrographic/multibeam/side scan sonar survey. No additional field work is recommended.

Bryan Chauveau
Physical Scientist
Verification of Data
Evaluation and Analysis Report

APPROVAL SHEET
F00531

The completed survey has been inspected with regard to survey coverage, delineation of depth curves, development of critical depths, cartographic symbolization, and verification or disproval of charted data. All revisions and additions made to the H-Cell files during survey processing have been entered in the digital data for this survey. The survey records and digital data comply with NOS requirements except where noted in the Evaluation Report.

Digitally signed by Bryan Chauveau
DN: cn=Bryan Chauveau, c=US, o=NOAA - National Ocean Service, ou=Office of Coast Survey - Atlantic Hydrographic Branch, email=bryan.chauveau@noaa.gov
Reason: I agree to the terms defined by the placement of my signature on this document
Date: 2007.05.08 10:30:36 -04'00'

Date: 04/02/2007

Bryan Chauveau
Physical Scientist or Cartographer,
Atlantic Hydrographic Branch

All final products have undergone a comprehensive review as per the Atlantic Hydrographic Branch Processing Manual and are verified to be accurate and complete except where noted in the Evaluation Report.

Castle Eugene Parker
2007.04.02 09:44:08 -04'00'

Date: 04/02/2007

Castle Eugene Parker
Physical Scientist or Cartographer,
Atlantic Hydrographic Branch

I have reviewed the Base Cell files, accompanying data, and reports. This survey and accompanying Marine Chart Division deliverables meet or exceed NOS requirements and standards for products in support of nautical charting except where noted in the Evaluation Report.

Approved:

Digitally signed by CDR P. Tod Schattgen
DN: cn=CDR P. Tod Schattgen, c=US, o=NOAA Office of Coast Survey, ou=Atlantic Hydrographic Branch, email=tod.schattgen@noaa.gov
Date: 2007.05.01 14:25:50 -04'00'

Date: 5/1/2007

Commander P. Tod Schattgen, NOAA
Chief, Atlantic Hydrographic Branch

Christopher Hare
AWOIS Check
2007.07.02 10:16:50 -04'00'