

10077

Diagram No. 903

NOAA FORM 76-35A

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

DESCRIPTIVE REPORT

Type of Survey Hydrographic
Field No. MI-10-2-83
Registry No. H-10077

LOCALITY

State Puerto Rico
General Locality Atlantic Ocean
Sublocality Punta Escambron to
..... Punta Maldonado
1983-84
CHIEF OF PARTY
CAPT. J.A. Yeager & CDR A.E. Theberge

LIBRARY & ARCHIVES

DATE May 4, 1987

☆U.S. GOV. PRINTING OFFICE: 1985-566-054

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TO SIGN OFF SEE
"RECORD OF APPLICATION"

NOAA FORM 77-28
(7-72)U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

REGISTER NO.

HYDROGRAPHIC TITLE SHEET

H-10077

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

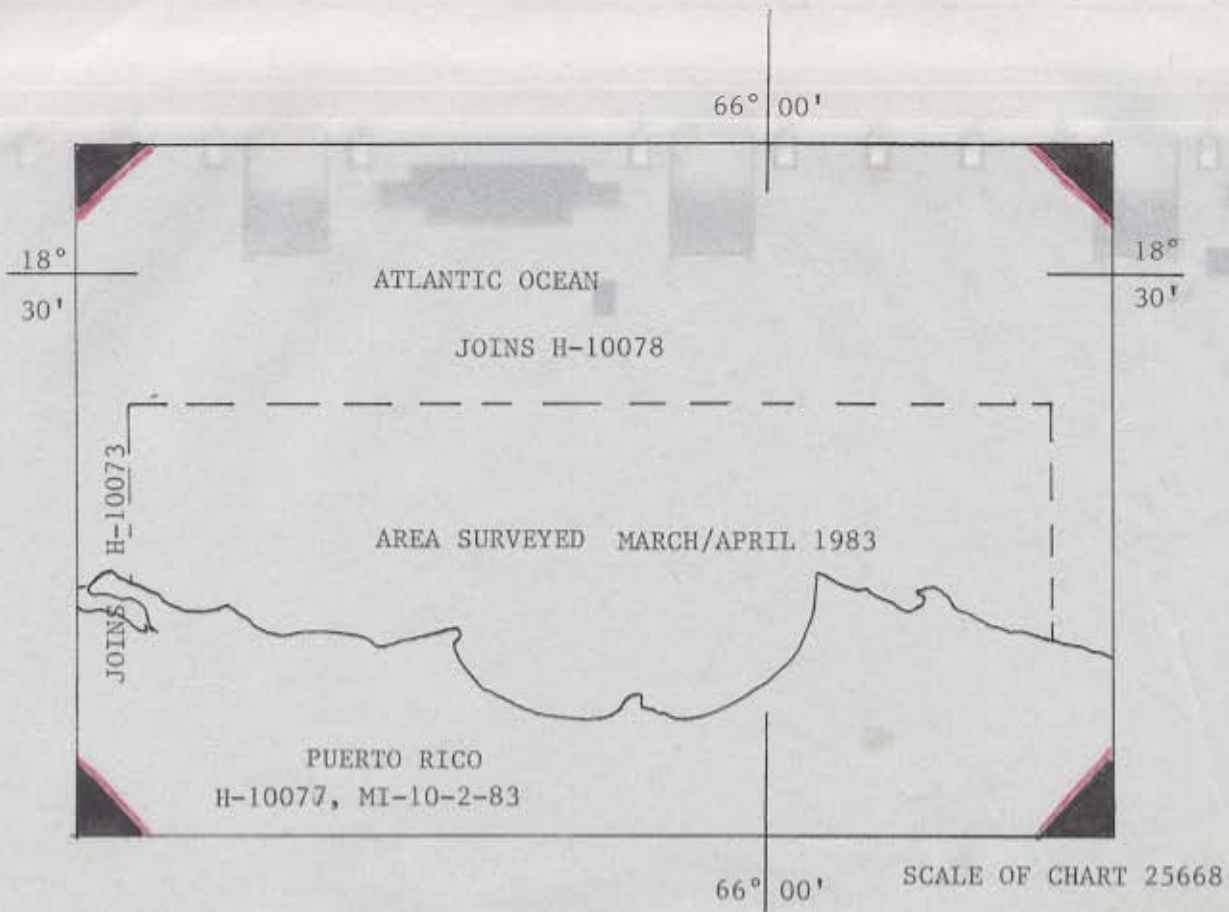
FIELD NO.

MI-10-2-83

State Puerto RicoGeneral locality Atlantic OceanLocality Punta Escambron to Punta MaldonadoScale 1:10,000Date of survey 8 March - 8 April 1983Instructions dated 1 Dec 1982Project No. OPR-I149-MI-83Vessel VESNO 2223 and VESNO 2224Chief of party CAPT J. Austin Yeager, NOAASurveyed by Ship's Officers (see "Remarks")Soundings taken by echo sounder, hand lead, pole Ross Model 5000 Echo SounderGraphic record scaled by RPW, EEM, ULG, RDC, BEM, MS, BRJGraphic record checked by RPW, EEM, ULG, RDC, BEM, MS, BRJProtracted by _____ Automated plot by AMC Plotter

Verification by _____

Soundings in fathoms feet at MLW MLLW Feet at MLLWREMARKS: CAPT J.A. Yeager, LCDR L.A. Lapine, LT R.L. Parsons,LT D.R. Rice, LTJG G.R. Yates, ENS B.L. Coakley, ENS C.N. McLain,ENS E.I. Crews, ENS J.A. Miller, ENS W.E. Sites, ENS J.A. HendrixNOTES IN THE DESCRIPTIVE REPORT WERE MADE IN R80
DURING OFFICE PROCESSING.AWOIS/SURF MSM 6/17/87SHA-24-97



PROGRESS SKETCH
HYDROGRAPHIC OPERATIONS
NOAA SHIP MT. MITCHELL S-222
OPR-1149-MI-83
J. AUSTIN YEAGER, CAPT., NOAA

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*DATA REMOVED FROM DESCRIPTIVE REPORT AND SUBMITTED
WITH FIELD DATA.

A. Project

This survey was conducted in accordance with project instructions OPR-1149-MI-83, dated December 1, 1982 and as amended by changes 1 and 2, dated February 3, 1983 and February 4, 1983, respectively.

B. Area Surveyed

The area surveyed is bounded on the east by Longitude $65^{\circ} 57' 21''$ W and on the west by Longitude $66^{\circ} 04' 12''$ W. It is bounded on the north by Latitude $18^{\circ} 29' 35''$ N and the shoreline of Puerto Rico to the south.

The survey commenced on JD 67 and was completed on JD 98. Survey data was collected on the following dates:

<u>Julian Dates</u>	<u>Calendar Dates</u>
67 to 70	March 8 to March 11, 1983
72 and 73	March 13 and March 14, 1983
78	March 19, 1983
81 and 82	March 22, and March 23, 1983
97 and 98	April 7 and April 8, 1983

C. Sounding Vessel

Soundings for this survey were obtained by the NOAA Ship MT MITCHELL's Launch 1008 (VESNO 2223). Additionally, bottom samples for this survey were taken by Launch 1002 (VESNO 2224) on JD 81.

D. Sounding Equipment and Corrections to Echo Soundings

The following sounding equipment was aboard VESNO 2223 during this survey:

<u>Equipment</u>	<u>Serial No.</u>
Ross 5000 Echo Sounder	1083
Digitizer	1055
Transceiver	1055

All survey records were scanned after hydrography by trained survey department personnel and checked by the Officer-in-Charge. During scanning, the echograms were compared with digitized values and mis-digitized soundings as well as significant peaks and deeps were noted and annotated in the survey records. Additionally, adjustments to the digitized values were made based upon the frequent phase calibrations which were accomplished at regular intervals during the running of hydrography. These corrections were incorporated into the survey by means of an electronic corrector tape.

A transducer draft of $1.\overset{8}{6}$ feet was applied to the soundings by means of the corrector tape. Settlement and squat corrections were determined based upon tests run in San Juan Harbor on February 21, 1983. These corrections are incorporated in the TC/TI tape but have not been applied to the soundings on the field sheets. The results of the settlement and squat measurements, plotted by engine speed,

are included in Appendix D. Settlement and squat corrections will be applied during final smooth plotting by the ^{HYDROGRAPHIC SURVEYS} Processing Branch (MOA23) at the Atlantic Marine Center.

Nansen casts and bar checks were obtained during this survey. The bar check data compared favorably with existing Nansen cast data but due to the sparsity of usable bar check data, due mainly to sea and current conditions in the working grounds, Nansen cast data were used to determine all velocity correctors. Nansen casts were obtained at the following locations:

<u>CAST</u>	<u>LATITUDE</u>	<u>LONGITUDE</u>	<u>DATE</u>	<u>J.D.</u>
1	18° 58' 25" N	65° 10' 00" N	Feb 26, 1983	057
2	18° 59' 00" N	66° 31' 24" W	Mar 26, 1983	085

Data obtained from cast #1 were used to determine corrections for soundings taken from JD 067 through JD 077. Data from cast #2 were used to determine corrections for soundings taken on and after JD 078. *SEE ALSO SECTION 4.1. OF THE EVALUATION REPORT.*

Although predicted tide correctors were not used on line while running hydrography, they were used during the plotting of the final field sheets. The predicted tide tapes used were based upon the tides for San Juan (Station 957-5371) as published in the 1983 Tides Tables.

A tide gage was installed at Boca de Congrejos, Isle Verde, Puerto Rico by NOAA Ship MT MITCHELL personnel for use in determining actual tides in the survey area. A copy of the Field Tide Gage Notes, along with a copy of the request for verified smooth tides is included in Appendix B of this report.

Smooth tides for this survey were requested in a letter dated April 23, 1983, from the Chief, Tides and Water Levels Branch (N/MOS12).

E. HYDROGRAPHIC SHEETS (FIELD SHEETS)

This survey was plotted on two mylar field sheets using MT MITCHELL's Hydroplot system as follows:

<u>SHEETS</u>	<u>DATA</u>	<u>SKEW</u>
1	Mainscheme and Offshore X-lines	0,21,54
1 (overlay)	Inshore X-lines, Developments, Bottom Samples	0,21,54

In addition to the above mentioned field sheets, all notes and details have been transferred to the sounding plots prepared by the Hydrographic Surveys Branch (N/MOA23). These sounding plots will serve as the smooth field sheets for this survey.

The primary sheet was used for plotting a majority of the mainscheme and all of the offshore crosslines. The second sheet, which overlays the primary sheet, was used for plotting inshore crosslines, feature developments and those few mainscheme lines which, if plotted on the primary sheet, would have detracted from the sheet's legibility.

Soundings on the field sheets are corrected for draft, predicted tides, sound velocity, initial and digitizing errors.

All field records and the following tapes have been forwarded with this report to the Atlantic Marine Center:

Range-Range Master Tapes (original and edited)

Range-Azimuth Master Tapes (original and edited)

Electronic Corrector Tapes

Parameter Tape

Velocity Correction Tapes

TC/TI Tape

The final smooth sheet will be plotted at AMC.

F. Control Stations

SEE ALSO SECTION 2.a. OF THE EVALUATION REPORT.

Control stations for this survey were either established by or recovered by personnel from the NOAA Ship MT MITCHELL or the Operations Division of the Atlantic Marine Center. All stations used were of at least Third Order, Class I accuracy.

The following stations were used as electronic control stations for either range-range or range-azimuth operations:

		<u>Latitude</u>	<u>Longitude</u>
40	Mald Hydro	18° 27' 41.732" N	65° 58' 40.070" W
44	Con	18° 27' ^{45.121" N} 21.213" N	65° 57' 32.407" W 66° 02' 21.264" W
46	Emajagua	18° 27' 21.213" N	66° 02' 21.264" W
48	Emajagua NW	18° 27' 21.233" N	66° 02' 21.834" W
52	Dupont Plaza	18° 27' 30.865" N	66° 04' 14.576" W

The following stations were used as visual control stations for the purpose of positioning bottom samples:

		<u>Latitude</u>	<u>Longitude</u>
48	Emajagua NW	18° 27' 21.233" N	66° 02' 21.834" W
52	Dupont Plaza	18° 27' 30.869" N	66° 04' 14.5 ⁷ / ₆ " W
70	Morro Light-house 1900	18° 28' 22.774" N	66° 07' 26.371" W

G. Hydrographic Position Control

With the exception of bottom sampling, which was performed using three point sextant positioning, range-range or range-azimuth control was utilized throughout this survey. Ranges were obtained with DEL NORTE positioning equipment and azimuth angles were determined with WILD T-2 theodolites.

The following positioning equipment was utilized on VESNO 2223:

<u>Equipment</u>	<u>Dates</u>
DMU; SN 122	JD 067 to JD 078
SN 188	JD 081 to JD 098
Master Unit (Code 74); SN 1067	JD 067 to JD 098
Parrallel Buffer; SN 128	JD 067 to JD 078
SN 1914	JD 081 to JD 098

The following positioning equipment was used at shore stations:

<u>J.D.</u>	<u>Station</u>	<u>Control</u>	<u>Del Norte Code</u>	<u>Del Norte SN</u>	<u>T-2 SN</u>
67	44	R-R	76	1137	N/A
	52	R-R	78	927	N/A
68	44	R-R	76	1137	N/A
	52	R-R	78	927	N/A
69	44	R-R	74	249	N/A
	52	R-R	72	221	N/A
70	44	R-A	74	249*	19293*
	46	R-A	74	249*	19293*
72	46	Both	74	249	19293
	44	R-R	76	1137	N/A
73	44	R-R	72	221	N/A
	46	R-R	74	249	N/A
78	46	Both	76	1137	17801
	44	R-R	78	1062	N/A
81	46	R-A	76	1137*	17801
	44	R-R	78	1062	N/A
	48	R-R	76	1137*	N/A
82	40	R-A	76	1137	19293
97	44	R-A	76	1137*	17801*
	40	R-A	76	1137*	17801*

* Equipment transferred from one station to another during the same JD.

Calibration of the DEL NORTE range equipment was accomplished in the survey area by means of three-point sextant fixes or by means of geodetically computed positions based upon an azimuth and a distance measured from a shore station to the sounding vessel with an HP38103 (SN 1929A00340). Although not always possible to obtain, morning and evening calibrations were attempted. The mean of at least five low-inverse and generally agreeing sextant fixes or ten generally agreeing HP 3810 fixes were obtained at each calibration. The mean of the morning and evening correctors was then used for the whole day for final plotting.

Baseline calibrations were performed at regular intervals during the survey. The baseline was located within San Juan Harbor and was measured by HP 38103 and found to be 2064.68 meters. During each baseline calibration, the DMU's were adjusted to agree with this range value. Due to a misadjustment of 100 meters (2165 vs 2065 was applied during one baseline calibration) the correctors for JD 81 and JD 82 were abnormally large (109 and 97 for JD 81 and 100 for JD 82). However, the method of calibration used in the survey area and the agreement obtained between morning and evening calibrations, along with the erroneous baseline calibration data, ensures the correctness of the final correctors.

It should be noted that during the actual running of sounding lines, the launch encountered areas of poor signal resulting in "nav down situations." However, these periods were of short duration, with the system returning to normal within a few soundings. Those soundings obtained during the down time have been plotted using the "T&C" option of the Hydroplot system via the electronic corrector tape.

Bottom samples were taken using three-point sextant fixes.

H. Shoreline

SEE ALSO SECTION 2.b. OF THE EVALUATION REPORT.

Shoreline was traced on the field sheets using shoreline manuscripts TP-00954 and TP-00955. Hydrography was conducted as close to the shoreline as safe launch operations would permit. This resulted in near-shore soundings of between 8 and 12 feet in most cases. No discrepancies between the plotted and actual shoreline were noted during hydrography. However, a detailed field edit of the shoreline was not conducted. SEE ALSO SECTION 4.b. OF THE EVALUATION REPORT.

I. Crosslines

SEE ALSO SECTION 3.a. OF THE EVALUATION REPORT.

Crosslines were run at angles of 45° to 90° to mainscheme lines. With few exceptions crossline soundings that plotted on or close to mainscheme soundings agreed with those soundings within 1 foot. Additionally, crossline soundings that plotted between or nearly between mainscheme soundings agreed with interpolated depths between the two mainscheme soundings. Those very few apparent discrepancies were due to the irregular configuration of the bottom in some areas and resulted when the crossline was run very close to but not directly over a very local feature. Even then, the apparent discrepancy was less than 4 feet in magnitude. Crossline mileage accounted for 9.8% of the mainscheme mileage.

J. Junctions

See also section 5. of the EVALUATION REPORT.

This survey junctions with the following two surveys which were run concurrently with this survey by the NOAA Ship MT MITCHELL:

<u>Field #</u>	<u>Reg #</u>	<u>Area of Junction</u>	<u>Scale</u>	<u>Vessel</u>
MI-20-1-83	H-10078	Northern Edge	1:20,000	2220
MI-10-1-83	H-10073	Western Edge	1:10,000	2224, 2221

Survey lines on this survey were run seaward (north) beyond the maximum depth at which the VESNO 2223's sounding equipment was able to provide soundings. This ensured a position junction with survey #H-10078 (MI-20-1-83) which was conducted using the NOAA Ship MT MITCHELL as the sounding vessel and which covered all areas within the limits of this sheet which were too deep to be surveyed by VESNO 2223. Soundings taken from survey #H-10078 were plotted on the field sheet, in ball point pen, for comparison purposes.

In general, the junction between this survey and survey #H-10078 produced discrepancies of less than six feet in depths greater than 240 feet. Only in one area, the northeastern corner of this survey (positions #2894 to 2897) were junction soundings in disagreement by more than eight feet and in that area, which is characterized by a steep slope, the disagreement is only about 18 feet in a depth of 240 feet. Considering the steep slope and the fact that the junction lines on survey #H-10078 were run parallel with the depth contours (for safety reasons) using a wider beam sounder aboard the NOAA Ship MT MITCHELL, the junction must be considered very good.

Since survey #H-10073 was conducted at the same scale and using the same depth units as this survey, the junction comparison was conducted by aligning the edges of the two surveys. The results of this comparison were excellent as an overlapping line, which was run on both surveys, shows no disagreement.

K. Comparison with Prior Surveys

SEE ALSO SECTION 6. OF THE EVALUATION REPORT.

This survey was conducted in the same area as survey H-2883 which was conducted in 1907 at a scale of 1:20,000.

Generally, this survey compared well with the 1907 survey inshore of the 180 foot curve where soundings between the two surveys differed by less than 5 feet. Offshore of the 180 foot curve, however, the comparison showed more mixed agreement. Although some soundings appeared identical between the two surveys, others showed discrepancies of as much as 10 to 15 feet and still others disagreed by as much as 26 to 30 feet. There appeared to be no geographical pattern to the disagreements. On the contrary, disagreeing soundings were found randomly located throughout the area seaward of the 180 foot curve. It appears that the positioning method and sounding apparatus used for the 1907 survey, while accurate for inshore work in shallow water, became less accurate in deeper water farther offshore. Soundings from that survey should be superseded by this survey.

Two PSR items were within the limits of this survey: #2892 and #2893.

PSR item #2802 was a 35-foot charter boat, La Profesora II, which was reported sunk and breaking up at position approximate 18° 28' N Latitude and 65° 59' W Longitude in Local Notice to Mariners 40-77. Documentation obtained from the U. S. Coast Guard in San Juan, and included with the survey support data, indicates that the remaining portion of this all-glass boat is embedded in a reef in approximately 20 feet of water and has a clearance of 10 feet between it and the surface. As the area in which this wreck is plotted is approximately 50 feet deep, it is obvious that the wreck lies farther inshore and in an area as defined by this survey as hazardous reefs. Since it has become part of this reef structure, the charted wreck symbol should be discontinued. CONCUR

SEE ALSO SUPPLEMENTAL FROM U.S. COAST GUARD, SAN JUAN.

PSR item #2893 is a DC7 cargo plane which is currently charted as an obstruction at position approximate 18° 28' 12" N Latitude and 65 58' 12" W Longitude, as reported in Local Notice to Mariners 2-73. The area within a radius of 100 meters was developed by VESNO 2223 on JD 97 (pos. 2964 to 2985) using range-azimuth control and line spacing of 25 meters. No indication of the wreckage could be found and the depth of water in this area is between 118 and 149 feet deep. Information from local authorities indicated that this aircraft broke up upon impact and some of the major components were salvaged. It is highly unlikely, as confirmed from the development, that the remaining parts could protrude sufficiently from the naturally jagged bottom in this area to create a hazard to surface navigation. Since the wreck lies in water deeper than 66 feet and is not distinguishable from the bottom, the symbol should be removed from the chart. CONCUR

25670-1/12
25669-1/12
✓ 25668-1/12

25670-1/12
25669-1/12
✓ 25668-1/12

L. Comparison with the Chart

SEE ALSO SECTION 7.a. OF THE EVALUATION REPORT.

This survey was compared with the following two charts:

<u>Chart #</u>	<u>Edition</u>	<u>Date</u>	<u>Scale</u>
25670	32nd	9/18/82	1:10,000
25668	11th	8/28/82	1:100,000

Agreement between this survey and Chart #25670 are mixed. Seaward of the 180 foot curve, in a manner similar with the comparison with the prior survey, the soundings disagreed generally by about 10 feet. The charted depths were usually shoaler than this survey's soundings. Inshore of the 180 foot curve but outside the reef line that lies in an east-west direction at about $18^{\circ} 28'$ N Latitude, agreement, as was the case with the prior survey, was very good with discrepancies of less than 4 feet. Inside of the reef, agreement between the chart and this survey was mixed. While the survey verified several charted depths in the 15 to 20 feet range, three major discrepancies occurred. First, while the charted depths for the north-south break in the reef at $66^{\circ} 04.4'$ W Longitude are between 23 and 35 feet, this survey showed depths in this passage of between 17 and 28 feet. Second, while the chart displays depths of between 28-34 feet in the area around $18^{\circ} 27.7'$ N Latitude and $66^{\circ} 04.3'$ W Longitude, this survey obtained soundings of only 23 to 26 feet in this area. Thirdly, to the west of this point at approximately $18^{\circ} 27.9'$ N Latitude and $66^{\circ} 04.5'$ W Longitude, this survey showed soundings of only 18 to 23 feet while the charted depths were from 26 to 29 feet. It is felt that in all three cases, this survey's soundings should replace the charted soundings.

It should be pointed out that during hydrography, launch operations were constantly hampered, even in relatively calm weather, by breakers in the area of these reefs and that the annotations "Breakers" as they appear on the chart are appropriately placed and should be continued. See section 7. a. 2) of the Evaluation Report.

Agreement between this survey and Chart # 25668 is also mixed. Offshore of the 180 foot curve, substantial disagreements between this survey's soundings and charted soundings, except in one case, can be traced to the 1907 prior survey as discussed previously. In this one case, a 168 foot (28 fathoms as it appears on the chart) sounding appears at approximately $18^{\circ} 29.2'$ N Latitude and $66^{\circ} 03.2'$ W Longitude in an area found to be approximately 240 feet deep. As this sounding did not come from the 1907 survey, it is assumed to be erroneous and should be discontinued. See section 7. a. 3) of the Evaluation Report.

Although Chart # 25668 is a small scale chart (1:100,000) and should not be used for inshore navigation, it is the only chart for most of the inshore area of this survey. Thus, a comparison was made between it and the inshore area of the survey. As was the case with Chart 25670, several discrepancies were found in the area between the shore and the reef lines. One area of disagreement lies in the placement of very shoal soundings ($\frac{1}{4}$ to $1\frac{1}{2}$ fathoms). Typically, these shoal soundings were plotted in slightly deeper water as confirmed from this survey. It appears that they were charted in these locations in order for them to appear entirely within the water area of the chart. The $1\frac{3}{4}$ fathom sounding west of Punta las Marias and the $\frac{1}{2}$ fathom sounding southwest of the bridge at Boca de Congrejos are typical examples of this. Separate from this scale distortion, this survey did find that in the bay between Punta las Marias and Punta Medio, the

actual depths are generally 9 to 17 feet but are charted as being between $\frac{1}{4}$ fathom ($1\frac{1}{2}$ feet) to 2 fathoms (12 feet). The soundings from this survey better portray the bottom in this area than the charted soundings. Additionally, a $5\frac{1}{4}$ fathom ($32\frac{1}{2}$ feet) and a 3 fathom (18 feet) depth are charted off of Punta Medio in areas found to be 27 and 22 to 25 feet, respectively. This survey's soundings should supersede the soundings presently charted. *Concur*

As was noted in the area covered by Chart 25670, hydrographic operations were greatly hampered by breakers in the reef area between Punta Escambron and the Boca de Congrejos buoy. Accordingly, it is recommended that the notation "Breakers" be used along this reef beginning at a point off of Punta Piedria and ending West of the Boca de Congrejos buoy by about 700 yards.

M. Adequacy of the Survey

Due to the nature of the survey area, the standard line spacing for a 1:10,000 scale survey was increased from 100m to 200m. The survey area, from Punta Escambron to Punta Maldonado, is a relatively shallow area transited only by local traffic with drafts of generally less than 3 feet. The hydrographer's observations coupled with local knowledge, indicates that this area is seldom transited due to the extremely dangerous reef formations and breakers and that during MT MITCHELL's stay in the area only a few local skiffs were seen in the area in addition to MT MITCHELL's survey launches. Present charts adequately indicate the hazards of this coastal area. The United States Coast Pilot (No. 5) correctly and cautiously warns mariners to steer for a point 4 miles North of Punta del Morro before lining up on the entrance to Bahia San Juan.

Since the sounding line spacing was increased beyond what is normally acceptable on a 1:10,000 scale survey, this survey can not be considered to have met the requirements for a Basic Survey in accordance with section 4.3.4 of the Hydrographic Manual. However, due to the nature of the area as explained above, this survey should be considered adequate to supplement prior surveys of the area. *Do not concur. Additional work was performed by NOAA ship PIERCE in 1985. See PIERCE report included under this cover.*

Due to the concern for launch and crew safety, the following areas could not be surveyed and the existing charted information should be considered adequate in depicting the areas:

1. The area in the vicinity on $\phi 18^{\circ} 28' 10'' \text{N}, \lambda 66^{\circ} 04' 00'' \text{W}$. Submerged coral formations and breakers shown on present survey. Chart present survey data.
2. The area NW and NE of Punta las Marias ($\phi 18^{\circ} 27' 45'' \text{N}, \lambda 66^{\circ} 02' 45'' \text{W}$). Submerged coral formations, coral reefs, and breakers are shown on present survey. Chart present survey data.
3. The area surrounding Punta Cangrejos ($\phi 18^{\circ} 28' 00'' \text{N}, \lambda 65^{\circ} 59' 30'' \text{W}$). Submerged coral formations, coral reefs, and breakers are shown on the present survey. Chart present survey data.
4. Although several sounding lines were run through the breaker area at $\phi 18^{\circ} 27' 40'' \text{N}, \lambda 66^{\circ} 01' 15'' \text{W}$ (Positions 2365-2366, 2669-2671, 2673-2674), this was only accomplished on an unusually calm day. The area should be considered extremely dangerous due to almost constant breaker activity and these soundings should not be charted. The note "breakers" is shown in this area on the present survey and the area shown by the present survey 6-foot depth curve probably depicts a submerged coral formation.
5. The zero foot contour along the entire shoreline of the survey area. Concur

N. Aids to Navigation

Only one aid to navigation was located within the survey area. This aid was the Boca de Congrejos Buoy "BC", listed as #1324 in the USCG Light List (Vol. II,

Atlantic and Gulf Coast, 1982) and is charted on Chart #25688. The description "Black and White vertically striped with morse "A" White Light" as found in the Light List as well as the warning "use only with local knowledge" is correct. The buoy marks the western end of the reef at Punta Congrejos and designates the area to the west as safe for passage to the entrance to the Boca de Congrejos Marina. The Light List position is given as $18^{\circ} 27.9' N$ Latitude and $66^{\circ} 00.5' W$ Longitude and a detached position (#pos. no. ⁵³⁷⁹~~2416~~) from this survey placed it at $18^{\circ} 28.0' N$ Latitude and $66^{\circ} 00.5' W$ Longitude. The buoy should remain as charted. *CONCUR*
 $27^{\circ} 59.10'' N$ $00^{\circ} 28.79'' W$

O. Statistics

All linear miles are nautical miles.

<u>Item</u>	<u>2223</u>	<u>VESNO</u>	<u>2224</u>	<u>Total</u>
Mainscheme Miles	133		0	133
Crossline Miles	13		0	13
Development Miles	12		0	12
Total Miles of Hydrography	158		0	158
Miscellaneous Miles	229		0	229
Total Miles	387		0	387
Square Miles Surveyed	31.5		0	31.5
Bottom Samples	9		4	13
Number of Positions	994		4	998
Tide Stations				2
Nansen Casts				2

P. Miscellaneous

None.

Q. Recommendations

As previously stated in Section M of this report, this survey should be considered adequate to supplement prior surveys of the area. Do not concur.
SEE ALSO SECTION 6. OF THE EVALUATION REPORT.

R. Automated Data Processing

The following Hydroplot Programs were used to acquire and process the survey data:

<u>Program Number</u>	<u>Program Name</u>	<u>Version</u>
RK 112	Hyperbolic, R/R Hydroplot	8/04/81
RK 116	Range-Azimuth Hydroplot	8/24/81
RK 201	Grid, Signal, and Lattice Plot	4/18/75
RK 211	R/R Non-Real Time Plot	2/02/81
RK 216	R/AZ Non-Real Time Plot	2/09/81
RK 300	Utility Computations	10/21/80
RK 330	Reformat and Data Check	5/04/76
RK 530	Layer Corrections for Velocity	5/10/76
RK 561	H/R Geodetic Calibration	2/19/75
AM602	Extended Line Oriented Editor	5/20/75
AM500	Predicted Tide Generator	11/10/72

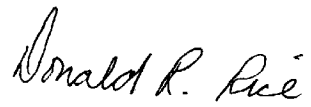
S. Reference to Reports

Horizontal Control Report

Coast Pilot Report

Humpback Whale Survey Report

Respectfully submitted,



Donald R. Rice, LT NOAA

HYDROGRAPHIC TITLE SHEET

H-10077

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

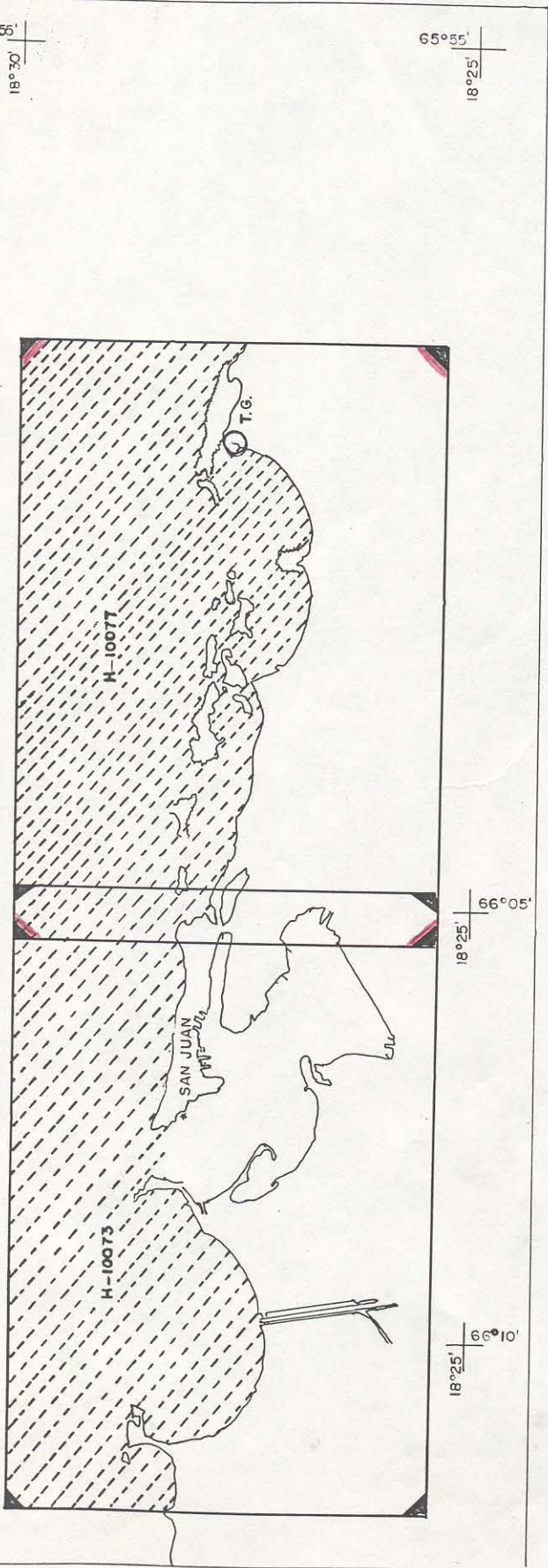
FIELD NO.

MI-10-2-83

State PUERTO RICOGeneral locality NORTH COAST OF PUERTO RICOLocality PUNTA ESCAMBRON TO PUNTA MALDONADOScale 1:10,000Date of survey 14 March, 1986Instructions dated 16 September, 1985Project No. OPR-I-149-MI-83
OPR-A166-PE-85Vessel Launches PE-2 (VESNO 2832), PE-3 (VESNO 2833)Chief of party Cdr. A.E. ThebergeSurveyed by Lcdr. D. Waltz, LT. V.D. Ross, LT.(jg) V. Barnum, Ens. J. Hill, Ens. E. LakeSoundings taken by echo sounder, ~~hand lead, pole~~ RAYTHEON DSF6000N, RAYTHEON DE719BGraphic record scaled by WHM, DAW, VDR, VAB, JAH, BAL, MHB, MJBGraphic record checked by WHM, DAW, VDR, VAB, JAH, BAL, MHB, MJBProtracted by _____ Automated plot by HYDROPLOT

Verification by _____

Soundings in fathoms feet at ~~MLW~~ MLLWREMARKS: All times are in Coordinated Universal TimeNOTES IN THE DESCRIPTIVE REPORT WERE MADE IN RED DURING
OFFICE PROCESSING.



P R O G R E S S S K E T C H

OPR-I149 - PE-85

NORTH COAST OF PUERTO RICO

OCT - DEC 1985

NOAA SHIP PEIRCE S-328

ALBERT E. THEBERGE, CDR, NOAA
COMMANDING

from CHART 25668
SCALE=1:100,000

LEGEND

16 ---2		OCT	NOV	DEC
SQ. NM. SOUNDING	322	0.2		
LNM MISCELLANEOUS DISTANCE	144	35		
LNM DISTANCE TO AND FROM	266.2	57		
LNM SOUNDING LINE	229.9	8.9		
BOTTOM SAMPLES (GRAB)	7	24		
WATER SAMPLES ANALYZED(SALINITY)	5	5		
CONTROL STATIONS	1	0		
TEMPERATURE, DEPTH, CONDUCTIVITY	0	0		
NANSEN CAST	1	1		
TIDE GAGE	1	0		

Descriptive Report
To Accompany Hydrographic Survey
H-10077
San Juan, Puerto Rico

Scale: 1:10,000

CDR. A. E. Theberge, Chief Of Party

A. PROJECT

This survey was performed in compliance with project instructions OPR-I149-PE-85 dated September 16, 1985 subject to change No. 1 dated October 7, 1985. The AMC OPORDERS and the Hydrographic Manual, Fourth Edition also apply. The purpose of the survey is to provide supplemental data to complete H-10077 which will ultimately provide new survey data for the maintenance of existing charts and the compilation of a new 1:20,000 scale chart of the approaches to San Juan, Puerto Rico.

B. AREA SURVEYED

The area surveyed is to the east of the entrance to San Juan Harbor encompassing the area between Punta Escambron and Punta Maldonado. The actual limits of the 1:10,000 scale survey are defined by the following boundaries: the western limit is longitude 066°04'48"W, the eastern limit is 065°57'39"W. The northern limit of hydrography is approximately 18°28'54"N, or the 130-foot curve. The southern limit is the north shore of Puerto Rico, or the limit of safe navigation of the Type I aluminum survey launch. The survey was performed between 20 October and 2 November, 1985 (days 293-306).

C. SOUNDING VESSEL

Hydrography on this sheet was performed by a PEIRCE Type I aluminum survey launch PE-2 (VESNO 2832, hull number 1017) and by the PEIRCE's 17-foot Monark, PE-3 (VESNO 2833). Bottom samples were taken by PE-2.

D. SOUNDING EQUIPMENT AND CORRECTIONS TO ECHO SOUNDINGS.

The PEIRCE survey launch PE-2 (VESNO 2832) was equipped with a Raytheon DSF 6000N echo sounder. The 17-foot Monark (PE-3, Vesno 2833) used a Raytheon DE 719B portable survey fathometer.

The Raytheon DSF 6000N echo sounder S/N A105N was removed from PE-2 on day 294 due to the echo sounder digitizing and creating an analog trace of a false bottom with the high frequency. This problem occurred in San Juan Harbor while performing a bar check and while running in the harbor. Also on day 294 the low frequency was not within 0.2 feet of the high frequency as required, so A105N was traded for B050N. The digitizing of the false bottom occurred with the B050N echo sounder on day 296. The high frequency trace would create large spikes which the low frequency trace would not substantiate. Due to this problem the low frequency trace was presumed real and the high frequency spikes when not attached to the continuous analog trace or followed by low

frequency traces were ignored. The B050N echo sounder would also suddenly cease working after approximately an hour of operation. The digitizer displayed all zeroes and the paper chart would not move. This problem was attributed to excessive dampness causing electrical malfunctions.

The echo sounder in the 17-foot Monark (VESNO 2833), a Raytheon DE 719B S/N 6212, was traded for a Raytheon DE719B S/N 5441 on day 303 due to unacceptable trace quality. The Raytheon DE 719B S/N 5441 performed satisfactorily for its duration in the Monark.

The following sounding equipment was used:

<u>VESSEL</u>	<u>VESNO</u>	<u>INSTRUMENT</u>	<u>MODEL</u>	<u>S/N</u>	<u>DAYS</u>
PE-2	2832	RAYTHEON	DSF6000N	A105N	293-294
PE-2	2832	RAYTHEON	DSF6000N	B050N	295-304
PE-2	2832	RAYTHEON	DSF6000N	A119N	305
PE-3	2833	RAYTHEON	DE719B	6212	303
PE-3	2833	RAYTHEON	DE719B	5441	303-304

Sounding machine initials were maintained at 0.0 during survey operations. Bar checks were made by both vessels when good quality bar checks were possible. Bar checks were taken at 5-foot intervals down to 45 feet, weather and sea conditions permitting. This exceeds the requirements of the provisional operating and processing instructions for the DSF6000N echo sounder, which only requires one 2-fathom check per day. Bar check correctors showed a tendency to increase as greater depths were reached which may have been caused by excessive movement of the bar at greater depths. No bar check data was used for velocity corrections since oceanographic (TDC) data was available. Abstracts of all bar check data are included in the survey records. MARTEK casts were taken from PE-2 (VESNO 2832) and from the PEIRCE (VESNO 2830). The MARTEK is a model 167, S/N 127 calibrated August 19, 1985. Erratic readings were obtained from the MARTEK, therefore NANSEN casts were taken from the PEIRCE on October 31 and November 4. The data from the NANSEN casts was used to make the velocity corrector tape. The MARTEK and NANSEN data sheets and computations are included with the survey records. The velocity correction graph using NANSEN cast data is in Appendix D.

NANSEN casts were taken at the following locations and dates:

<u>DAY</u>	<u>LATITUDE</u>	<u>LONGITUDE</u>
304	18°29.7'N	66°05.6W'
308	18°29.3'N	66°05.9W'

SEE ALSO SECTION 4.1. OF THE EVALUATION REPORT.

Settlement and Squat tests for the Type I aluminum survey launches were run in San Juan harbor on November 3, 1985 using Zeiss Ni-2 level, S/N 18946. Settlement and Squat correctors were determined using the level method at different engine speeds as the boat ran towards the observer. The readings for each speed were averaged, the change in tide removed, and the adjusted reading compared to the reading observed with the boat engine out of gear. Each boat had full fuel tanks, two people, and all equipment usually used for

hydrographic surveys. Settlement and Squat correction curves are included in Appendix D. Settlement and Squat tests for the vessels used were run on the following dates:

<u>VESNO</u>	<u>DATE</u>	<u>LOCATION</u>	<u>INSTRUMENT</u>
2832	3 Nov. 1985	San Juan, P.R.	ZEISS Ni-2 S/N 18946
2833	6 May, 1985	Rockland, ME	ZEISS Ni-2 S/N 18946

Static drafts for all vessels are applied on the corrector tapes as follows: 1.6 feet for VESNO 2832 and 0.5 feet for VESNO 2833. TC/TI tapes do not show transducer static draft as it is applied on the electronic corrector tape.

Predicted tide correctors for the survey were created using AM 500 predicted tide generator. The San Juan, Puerto Rico tide gauge is the reference station for predicted tides. The tidal datum is mean lower low water.

E. HYDROGRAPHIC SHEETS (FIELD SHEETS)

All field sheets were made aboard the PEIRCE with the PDP 8/e computers using Houston Instrument plotters (S/N 7486-22 and 5848-19). Hydrographic data is presented on 2 sheets. The mainscheme is plotted on one sheet which has an overlay sheet composed of crosslines and bottom samples. Both sheets are at a 1:10,000 scale.

On day 302 the data for range/azimuth was plotted using station ⁰⁵²046 as the azimuth station signal number when the theodolite was actually on signal 050. The stations are within 10.7 meters of each other. The data was not replotted, but the correct signals are on the edited master tape.

Parameter tape printouts for the plotter sheets are included in the appendices.

All field records have been forwarded to AMC for final verification.

F. CONTROL STATIONS SEE ALSO SECTION 2.2. OF THE EVALUATION REPORT.

Two horizontal control stations were established for hydrographic work while in San Juan. This horizontal control work was performed by PEIRCE crew members using Third Order, Class I methods.

<u>STATION NAME</u>	<u>LATITUDE</u>	<u>LONGITUDE</u>
DU PONT PLAZA RM 1, 1985	18°21'30.862"N	66°04'14.576"W
CONDADO, 1985	18°27'44.450"N	66°05'12.092"W

The reference datum is the Puerto Rico datum of 1905. DU PONT PLAZA RM1, 1985 was positioned by resection using published third order positions. CONDADO, 1985 was positioned from DU PONT PLAZA RM 1, 1985 using forward

computations. CONDADO, 1985 is a no check position as there were no Third Order, Class I stations visible from CONDADO, 1985 other than DU PONT PLAZA RMI, 1985. DU PONT PLAZA RM 1, 1985 was monumented because it is no longer possible to occupy station DU PONT PLAZA, 1983 due to a flange obscuring a vertical sight on the station.

Station CONDADO, 1985 was used for range/azimuth hydrography inside El Boqueron. No unconventional methods were used to position the two stations. The other stations used for hydrography are published Third Order, Class I stations. A list of stations is included in Appendix F.

G. HYDROGRAPHIC POSITION CONTROL

Hydrographic position control was attained by using the Mini-Ranger Falcon 484 positioning system. Range-range and range-azimuth positioning configurations were employed. Both a T-2 and HP 3810B were used for angular measurements. The following Mini-Ranger equipment was used:

<u>VESNO</u>	<u>EQUIPMENT</u>	<u>S/N</u>	<u>DAY</u>
2832	RANGE PROCESSING UNIT	D0018	293-306
	CONTROL DISPLAY UNIT	D0059	293-306
	RECEIVER/TRANSMITTER	C2096	293-306
2833	RANGE PROCESSING UNIT	D0004	303-304
	CONTROL DISPLAY UNIT	D0057	303-304
	RECEIVER/TRANSMITTER	D2128	303-304

REFERENCE STATIONS

<u>CODE</u>	<u>S/N</u>
2	C2059
5	C2067
6	C2091
8	E2974
9	E2911
10	E2912
11	C2075

The following theodolites and total station instruments were used for both calibration and range/azimuth hydrography:

<u>INSTRUMENT</u>	<u>S/N</u>
Wild T-2	30694
Wild T-2	75507
HP3810B	1929A00361

Problems:

On day 303 as vessel PE-2 (VESNO 2832), was running arcs, there are

soundings where the Mini-Ranger recorded signal strengths of less than 15 and most often zero, in the range/azimuth data. The Mini-Ranger baseline calibrations do not allow for signal strengths of less than 15 due to ranging errors that may occur. This data was not rejected as the rates that were observed on line did not "fly" as is the observed tendency when the signal strength drops below 10. The ranges seemed consistent from a visual inspection as the hydrography was run. For these reasons the data was not rejected and the problem was attributed to an interfacing problem and not a positioning system problem.

The Mini-Ranger Falcon 484 was calibrated in several ways. A baseline calibration was performed at the beginning and end of the project. A baseline calibration consists of measuring a distance with the HP3810B and setting up a Mini-Ranger system over that distance. The Mini-Ranger Falcon 484 computes the corrector that needs to be applied to the unit to obtain the true distance. This value is entered on the corrector tape. There is no AMC OORDER for calibrating the Mini-Ranger, however a draft version does exist. This AMC OORDER was used as the source of information to perform the baseline calibration. A summary of baseline correctors is contained in Appendix E.

The Mini-Ranger Falcon system was calibrated by the range-azimuth critical system check method daily. The HP3810B total station provided a range and azimuth to the launch. This information was converted to a geographic position from which inverse distances to the Mini-Ranger stations were computed (using RK 300). These computed distances were compared with the observed Mini-Ranger distances and the difference between the two is called the daily corrector. The absolute value of the difference between the daily corrector and the baseline corrector is delta, D. One daily calibration was performed using the FEN MARINE laser. The distance from the FEN MARINE was considered the true distance and the difference between the FEN MARINE distance and the Mini-Ranger was taken to be the daily critical corrector. This calibration was performed on day 302 and the computed value of delta was zero. A copy of the Abstract of Corrections to Electronic Positions is contained in Appendix E.

The Mini-Ranger was baseline calibrated twice for this project; day 284 in San Juan, Puerto Rico, and day 308 in St. John, USVI. Using these baseline correctors, a value of delta was calculated using daily, critical correctors. In the past, the baseline correctors were averaged and this average baseline corrector value used on the final corrector tape. However, during this survey, the average baseline corrector for the RPU D0018, R/T C2096 pair would render the daily critical system check values of delta invalid for the scale of this survey. The daily calibrations showed that the daily correctors had a bias towards either the beginning or ending calibration data. Therefore, corrector tapes were cut using the baseline corrector that the daily corrector had an affinity for. The daily critical system checks have been abstracted to show where the change from applying the beginning baseline corrector to the ending baseline corrector occurs. These abstracts are contained in Appendix E.

H. SHORELINE

The shoreline was transferred from the shoreline manuscripts TP00954 and TP00955. The shoreline was visually inspected for major discrepancies as hydrography was run. No field edit was performed. SEE ALSO SECTION 4. b. OF THE EVALUATION REPORT.

I. CROSSLINES

SEE ALSO SECTION 3. a. OF THE EVALUATION REPORT.

The total lineal nautical miles of crosslines run is an equivalent of 8.1 percent of the total lineal nautical miles of mainscheme hydrography. Agreement between crosslines and mainscheme is good; there is not more than 2 feet discrepancy in depths of 15 to 100 feet, probably due to the presence of coral heads, steep slopes and irregular bottom, and the use of predicted tides.

J. JUNCTIONS SEE ALSO SECTION 5. OF THE EVALUATION REPORT.

H-10078 soundings do not overlap with the PEIRCE's 1985 work. The PEIRCE ran sounding lines out to the 130-foot curve whereas H-10078 sounding lines begin at the 250-foot curve. Consequently, there are no soundings in common between the two surveys, so H-10078 was not compared with H-10077.

The PEIRCE's 1985 data were compared with the MT. MITCHELL'S 1983 data. These two surveys together are one survey, not two different surveys. Overall, the soundings agree well, and the combination of the two sets of data provide a better bathymetric description than considering them as individual surveys. Where there are steep slopes, the soundings do not agree well, but this is to be expected due to the nature of the bathymetry and the vastly different sounding machines which were used.

In the vicinity of $\phi 18^{\circ}27'54''N, \lambda 066^{\circ}00'15''W$ at the western rim of the coral reef projecting from station CON 1983, the PEIRCE survey work shows depths between 15 and 34 feet where the MT. MITCHELL work shows 25 to 41 feet overlapping the PEIRCE's depths. Also, in this area the depth curves of the two surveys do not agree well. A reason for these discrepancies could be the complex nature of the bottom relief in this area. The bottom is characterized by a coral reef consisting of deep holes adjacent to pinnacles of coral heads. In the eastern portion of the cove between Isla Verde and Punta Congrejos, the MT. MITCHELL's soundings are consistently 3 to 4 feet deeper than the PEIRCE's soundings from the shoreline to approximately 700 meters offshore. Apparently the 12-foot curve has shifted offshore. The reason for this shift may be the influx of sediment from the river at Punta Congrejos.

At $\phi 18^{\circ}28'21''N, \lambda 066^{\circ}04'48''W$, the MT. MITCHELL's 13-foot sounding is very close to a PEIRCE 23-foot sounding. When joined with H-10073 from the PEIRCE, there is a shoal that matches up very well with the MT. MITCHELL's 13-foot sounding. The least depth from H-10073 is 10 feet at $\phi 18^{\circ}28'22''N, \lambda 066^{\circ}04'54''W$. The major discrepancy between the sheets exists between $\phi 18^{\circ}27'30''N$ to $\phi 18^{\circ}28'00''N$ and $\lambda 065^{\circ}57'30''W$ to $\lambda 065^{\circ}58'00''W$. On the 1600 meter arc from station MALD HYDRO 1983, the soundings between the PEIRCE's data and the MT. MITCHELL's data compares as follows:

MT. MITCHELL
(feet)

75
85
88
90
110

PEIRCE
(feet)

47
53
68
77
88

BAD
CONTROL

The rest of the arc is in good agreement. The sounding rolls and the control data have been examined for a possible explanation in the discrepancy. It appears that there was an angle bust in the 1983 data. The soundings between fix numbers 2864 and 2865 of day 082 are compressed; whereas the soundings between 2865 and 2866 are spread apart relative to the rest of the arc. Comparing angles, it appears that there is approximately $11^{\circ} - 13^{\circ}$ between fixes. The angle difference between 2864 and 2865 is $05^{\circ}16'40''$ and the angle difference between 2865 and 2866 is $18^{\circ}54'58''$. When shifting fix 2865 so that there are 12° between 2864 and 2865, the space between soundings increases and agreement between the 1983 work and the 1985 work is markedly improved. The agreement is still not good, but the soundings reveal a fairly steep slope which may contribute to the difference in depths. Also the 1983 work was completed using a ROSS 5000 echo sounder; whereas, the 1985 work used a RAYTHEON DSF6000N. The angle bust, the difference in sounding equipment and the character of the bottom could all be contributing factors in the discrepancies. CONCUR

It is recommended that ^{Both} PEIRCE data be used to delineate the bottom in this area.

K. COMPARISON WITH PRIOR SURVEYS SEE ALSO SECTION 6. OF THE EVALUATION REPORT.

H-10077 was compared with H-4205 which was completed in 1921 at a scale of 1:20,000. H-4205 encompasses the area from Morro Point Light House to Punta Vacia Talega between longitude $065^{\circ}54.6'W$ and $066^{\circ}06.3'W$.

The overall agreement is good. The locations of hazards to navigation, reefs and rocks, agree very well; their positions have not changed much. The reef off of Punta El Medio does not appear as extensive on H-10077 as it does on H-4205. The position of Isla Piedra agrees well with its position on H-10077. In general, the foul areas agree well in placement, but they appear to be more extensive now than in 1921 except for the above-mentioned reef at Punta El Medio which has decreased in size. The 12-foot curve in the cove between Punta El Medio and Punta Congrejos has moved offshore. This movement is probably due to the river transporting sediment into the cove at Punta Congrejos. The 18-foot curve in the cove agrees well. The small shoal at $\phi 18^{\circ}28'00''N, \lambda 066^{\circ}03'33''W$ on H-10077 does not appear on H-4205. There is a 23-foot sounding on H-4205 where H-10077 has a 9-foot sounding at $\phi 18^{\circ}26'42''N, \lambda 066^{\circ}00'30''W$. The 23-foot sounding looks suspicious as its position is very close to shore.

Overall the depth curves trend very much the same as H-4205 making overall agreement good except for the areas noted above.

H-10077 was also compared with H-2883 dated 1907 at 1:20,000 scale. There were not many depths in common with H-10077 as H-2883 is offshore. The depths that the surveys do have in common agree within 4 to 6 feet in water 90 to 148 feet deep.

L. COMPARISON WITH THE CHART

SEE ALSO SECTION 7.a. OF THE EVALUATION REPORT.

H-10077 was compared with Chart 25668, 11th edition, dated August 28, 1982 at a scale of 1:100,000 as per the project instructions.

Comparison between H-10077 depths and chart 25668 depths are fair. Depths greater than 30 feet agree well. Discrepancies between 2 feet up to 18 feet occur with the shallower depths tending not to agree as well as depths greater than 30 feet. The greatest difference occurs at $18^{\circ}28.0'N, 1066^{\circ}02.9'W$ where there is a 42-foot sounding from the chart amongst 24-foot soundings. In the cove in between Punta Las Marias and Punta el Medio, the charted soundings tend to be shallower by 3 feet to 10 feet in depths of 9 to 17 feet. There is no river draining into this area and no explanation could be hazarded, except the vast difference in scales of the two surveys.

The charted breakers, coral reefs and hazards to navigation agree well with H-10077's delineation of these features. Overall agreement between the survey and the chart 25668 is fair. *SEE ALSO SECTION 7.a.3) OF THE EVALUATION REPORT.*

Comparison with Chart 25670 33rd edition January 7 1984, scale 1:10,000:

At the entrance to Laguna del Condado on the north side of the bridge, the PEIRCE soundings tend to be deeper by 3 feet to 4 feet in depths of 2 to 13 feet. Outside the lagoon, agreement is mixed. In the area between $1066^{\circ}04'00"W$ and $1066^{\circ}05'00"W$ shoreward of the 30-foot curve and seaward of the 18-foot curve, excluding shoal areas and hazards to navigation, the depths on chart 25670 are regularly 4 feet to 7 feet deeper and in some instances up to 10 feet deeper in depths of 18 to 30 feet. Soundings greater than 30 feet agree within 4 feet.

There is a ¹¹10-foot shoal that appears on the PEIRCE's survey that does not show up on the chart. It is located at $18^{\circ}27'48"N, 1066^{\circ}04'18"W$. It is recommended that this ⁵10-foot shoal be charted. ⁰⁸

Overall, comparison with the chart shows more discrepancies than agreements with no pattern emerging to attribute to the discrepancies. It is recommended that the soundings from H-10077 replace the soundings on chart 25670. *CONCUR*

M. ADEQUACY OF SURVEY

This survey is adequate and sufficiently complete to supersede prior surveys. Further development of the following areas would enhance the survey.

1. No shoreline hydrography was run from Punta El Medio to Punta Piedras.

2. No D.P.'s were taken on dolphins at $\phi 18^{\circ}27'39''N$, $\lambda 066^{\circ}59'42''W$. SEE also SECTION 4.5. OF THE EVALUATION REPORT
3. There is a holiday west of Punta Piedras at $\phi 18^{\circ}27'36''N$ between $\lambda 066^{\circ}04'00''W$ and $\lambda 066^{\circ}04'30''W$. CONCUR
4. No D.P.'s were taken on rocks at $\phi 18^{\circ}28'12''N$, $\lambda 066^{\circ}03'18''W$. This was physically impossible the entire time of the survey due to sea conditions.
5. More soundings are needed west of Punta Congrejos south of the foul area. There are holidays in the vicinity of $\phi 18^{\circ}27'45''N$, $\lambda 066^{\circ}00'00''W$. CONCUR
6. There is a holiday at $\phi 18^{\circ}28'06''N$, $\lambda 065^{\circ}59'15''W$ due to rejecting low signal strength soundings. CONCUR
7. A short arc needs to be run at $\phi 18^{\circ}27'36''N$, $\lambda 065^{\circ}57'45''W$ to fill in the existing holiday due to steering 60 meters off the 1700 meter arc from MALD HYDRO, 1983. CONCUR
8. There a is holiday at $\phi 18^{\circ}28'03''N$, $\lambda 065^{\circ}59'21''W$ due to bad control. CONCUR
9. More sounding lines need to be run at the following locations due to indications of isolated soundings: CONCUR
 * SEE also SECTION 3. c. OF THE EVALUATION REPORT.
 - * a. 12', 16', 18' soundings indicating shoals in the area of $\phi 18^{\circ}27'39''N$, $\lambda 066^{\circ}03'33''W$.
 - * b. A 10-foot sounding at $\phi 18^{\circ}27'48''N$, $\lambda 066^{\circ}04'18''W$.
 - c. 9- and 10-foot soundings in the area of $\phi 18^{\circ}27'11''N$, $\lambda 066^{\circ}03'00''W$.
 - * d. A shoal in the area of $\phi 18^{\circ}27'06''N$, $\lambda 066^{\circ}01'30''W$.
 - e. An 8-foot sounding at $\phi 18^{\circ}27'12''N$, $\lambda 066^{\circ}00'48''W$.
 - f. A shoal in the vicinity of $\phi 18^{\circ}27'00''N$, $\lambda 066^{\circ}00'30''W$.
 - g. A shoal in the vicinity of $\phi 18^{\circ}28'15''N$, $\lambda 066^{\circ}02'15''W$.
 - h. A shoal at $\phi 18^{\circ}27'57''N$, $\lambda 065^{\circ}58'42''W$.
 - ** i. A submerged groin at $\phi 18^{\circ}27'03''N$, $\lambda 066^{\circ}02'07''W$ needs a D.P. CONCUR
 ** SEE also SECTION 4.5. OF THE EVALUATION REPORT.

j. No hydrography was run in the channels leading into Boca de Congrejos and Laguna La Torrecilla.

N. AIDS TO NAVIGATION

There is one buoy within the survey area at Punta Congrejos. The buoy is a Morse A (Mo (A)) designated "BC". It adequately marks the safe water entrance to the river at Punta Congrejos. The buoy was located during the survey and its geographic position determined to be: $\phi 18^{\circ}28'00.16''N$, $27^{\circ}59.61''N$ $\lambda 066^{\circ}00'30.82''W$. Its charted position is $18^{\circ}27'42''N$, $066^{\circ}00'25''W$. The MT. MITCHELL's position of the buoy is $\phi 18^{\circ}27'59''N$, $\lambda 066^{\circ}00'29''W$. The buoy is number 1853 in the 1985 Light List Volume II, and recommends use only with local knowledge. It is recommended that the charted position be changed to $\phi 18^{\circ}28'00.16''N$, $\lambda 066^{\circ}00'30.82''W$.
27 59.25"N *29.85"W*

25070 m/c
25069 m/c
25068 m/c

No fixed aids were located. There was no correspondence with the Coast Guard regarding fixed aids to navigation.

O. STATISTICS

<u>VESNO</u>	<u>POSITIONS</u>	<u>LNM</u>
2832	1073	118.3
2833	94	10

NANSEN CASTS: 2
 MARTEK: 4
 BOTTOM SAMPLES: 26
 TIDE STATIONS: 1

P. MISCELLANEOUS

The tide correctors applied to the soundings on this sheet were generated using the wrong reference meridian; $75^{\circ}W$ instead of $60^{\circ}W$. The sheet was not replotted with the correct tides due to the small tidal range and the relatively small time difference of 1.5 hours. *CORRECTED DURING OFFICE PROCESSING*

The area surveyed for H-10077 is a hazardous area characterized by numerous coral reefs, dangerous rocks, and rough sea states. Inshore of the 60-foot curve navigation is not recommended due to these dangers. Coral heads are numerous and are usually marked by breaking waves. *CONCUR*

The bottom is very irregular as would be expected with coral structures. Seaward of the 60-foot curve, the bottom drops off rapidly. Inshore of the 60-foot curve the bottom is unpredictable and creates an irregular, jagged fathogram trace. *CONCUR*

Shoreline definition was very difficult to obtain due to rock ledges and coral reefs projecting out from the shore. The seas compounded the difficulty by forming breakers on these shoal areas. Throughout the time spent working the wave height never subsided to less than 1 foot. The swells typically were 1 to 3 feet in the morning, increasing to 6 to 8 feet as the wind increased in the early afternoon. This sea state caused rough traces that were ameliorated

by running hydrography with the seas on the stern or on either quarter when possible. The wind producing this sea state was from the east and would generally increase to 15 knots by early afternoon almost daily (see data printouts for weather annotations).

Sediment infilling has occurred in the cove between Punta Congrejos and Punta El Medio. The data of 1985 shows sediment infilling occurring from inshore to approximately 700 meters offshore. The 1983 MT. MITCHELL's soundings are 3 to 4 feet deeper in water depths of 6 to 12 feet than the 1985 PEIRCE's data. This infilling was probably caused by the influx of sediment from the river mouth at Boca de Congrejos.

Overall, navigation shoreward of the 60-foot curve was ill-advised due to the unpredictable nature of the bottom. The Coast Pilot, #5, 1985 recommends staying 2 miles or more offshore and the hydrography supports this admonition.

Q. RECOMMENDATIONS

The Hydrographer recommends that the PEIRCE's and MT. MITCHELL's surveys be regarded as one survey. *CONCUR*

The hydrographer recommends that the following changes be made to the chart:

- a. Buoy Mo (A) "BC" be charted at position
 $\phi 18^{\circ}28'00.16''N, \lambda 066^{\circ}00'30.82''W$ (see Section N.)
27.59.25"N 29.85"W
- b. Chart the 10-foot shoal at $\phi 18^{\circ}27'48''N, \lambda 066^{\circ}04'18''W$ (see Section L.)
Same as L.

*app'd 25668
25670 n/c*

It is recommended that more data be obtained in the following areas: *CONCUR*

- * a. $\phi 18^{\circ}27'39''N, \lambda 066^{\circ}03'33''W$ (A 12-foot shoal)
- * b. $\phi 18^{\circ}27'48''N, \lambda 066^{\circ}04'18''W$ (development of a 10-foot sounding)
- c. $\phi 18^{\circ}27'11''N, \lambda 066^{\circ}03'00''W$ (a 9-foot shoal)
42 10
- * d. $\phi 18^{\circ}27'06''N, \lambda 066^{\circ}01'30''W$ (development of a 6-foot shoal)
08
- e. $\phi 18^{\circ}27'12''N, \lambda 066^{\circ}00'48''W$ (development of an 8-foot sounding)
11 01 14
- f. $\phi 18^{\circ}27'00''N, \lambda 066^{\circ}00'30''W$ (development of a shoal)
- g. $\phi 18^{\circ}28'15''N, \lambda 066^{\circ}02'15''W$ (development of a shoal)
- h. $\phi 18^{\circ}27'57''N, \lambda 065^{\circ}58'42''W$ (development of a shoal)

M/C

* SEE ALSO SECTION 3.C. OF THE EVALUATION REPORT.

- i. $\phi 18^{\circ}27'03''N, \lambda 066^{\circ}02'07''W$ (D.P. on a submerged groin) *SEE ALSO SECTION 4.3. OF THE EVALUATION REPORT.*
- j. Run hydrography in the entrance to Boca de Congrejos and Laguna la Torrecilla. *CONCUR*
- k. The area within: $\phi 18^{\circ}27'30''N - 18^{\circ}28'00''N$ and $\lambda 065^{\circ}57'30''W - 065^{\circ}58'00''W$ needs more sounding density to resolve large depth discrepancies between PEIRCE and MT. MITCHELL soundings.
- l. A small segment of the 1700 meter arc from MALD HYDRO, 1983 at $27^{\circ}02'36''N, \lambda 065^{\circ}57'21''W$ needs to be run to fill in the *existing holiday*. *49 CONCUR*
- m. The area at $\phi 18^{\circ}28'03''N, \lambda 065^{\circ}59'21''W$ needs soundings to fill in the holiday generated by bad control. *CONCUR*

R. AUTOMATED DATA PROCESSING

<u>PROGRAM</u>	<u>PROGRAM NAME</u>	<u>VERSION</u>
112	Hyperbolic R/R Hydroplot	10-12-83
116	Range/Azimuth Hydroplot	10-12-83
201	Grid, Signal, and Lattice Plot	04-18-75
211	Range/Range Non-Real Time Plot	02-02-81
212	Visual Station Table Load and Plot	04-01-74
216	Range/Azimuth Non-Real Time Plot	02-09-81
300	Utility Computations	10-21-80
330	Reformat and Data Check	05-04-76
360	Electronic Corrector Abstract	02-02-76
500	Predicted Tide Generator	11-10-72
530	Layer Correction for Velocity	05-10-76
602	Elinore - Extended Line Oriented Editor	12-08-82
612	Line Printer List	03-22-78

S. REFERRAL TO REPORTS

Coast Pilot, OPR-1149-PE-85

Submitted by:

Jennifer A Hill

Jennifer A. Hill, Ens. NOAA

SIGNAL NAMES LIST

H-10077 MI-10-2-83

040 MALD HYDRO
042 PT CONGREJOS 2 1966
044 CON
046 EMAJAGUA
048 EMAJAGUA NW
050 EMAJAGUA NE
052 DUFONT PLAZA
053 CAPITOL DOME
070 MORRO LIGHTHOUSE 1900

SIGNAL TAPE PRINTOUT

H-10077 MI-10-2-83

040	4	18	27	41732	065	58	44070	250	0000	000000
042	4	18	27	41597	065	59	30221	250	0000	000000
044	4	18	27	45121	065	59	32407	250	0000	000000
046	4	18	27	21213	066	02	21264	250	0045	000000
048	4	18	27	21233	066	02	21834	250	0045	000000
050	4	18	27	20926	066	02	21471	250	0045	000000
052	4	18	27	30865	066	04	14576	250	0078	000000
053	4	18	28	07500	066	06	22750	253	0000	000000
070	4	18	28	22774	066	07	26371	139	0000	000000

SIGNAL TAPE LISTING

OPR-I149-PE-85

H-10077

040	6	18	27	41732	065	58	44070/	250	0000	000000	MALD HYDRO, 1983
044	6	18	27	45121	065	59	32407/	250	0000	000000	CON, 1983
046	6	18	27	21213	066	02	21264/	250	0045	000000	EMAJAGUA NE, 1983
050	6	18	27	20926	066	02	21471/	250	0045	000000	EMAJAGUA, 1983
052	6	18	27	30865	066	04	14576/	250	0078	000000	DU FONT PLAZA, 1983
070	6	18	28	22774	066	07	26371/	139	0052	000000	MORRO LT. HOUSE 1900
378	6	18	27	44450/	066	05	12092/	250	0000	000000	CONDADO, 1985

1490

APPENDIX I

LANDMARKS FOR CHARTS

(There were no landmarks in this survey area)

NOAA SHIP MT MITCHELL DIVER INVESTIGATION

DATE _____
SHEET MI-10-2-83

DIVERS _____ OIC _____

OPR T149-MI-83

ITEM DESCRIPTION Sunken 95'

H- 10072

Fiberglass boat PROFESORA II

PSR ITEM # 2892

checked as hazard to navig

REPORTED LOCATION: 18° 28.0' N } P.A
65° 39.0' W }

REASON FOR SEARCH OF ITEM:

PSR ITEM
SIDE SCAN _____
NOTICE TO MARINERS _____
LOCAL REPORT _____

SOURCE OF REPORT LOCATION: LNH 40/77

ACTUAL LOCATION: did not locate

D.P.'s POS : TIME

AREA SEARCHED: did not search due
to dangerous reefs

CHARTING RECOMMENDATIONS: remove hazard
symbol from charts

DIVE INFORMATION

LEAST DEPTH: _____
MAX DIVE DEPTH: _____
BOTTOM TIME: _____
TOTAL DIVE TIME: _____
VISIBILITY: _____
CURRENTS & COND'T'S: _____

~~*** THIS ITEM WAS WAS NOT EXAMINED SUFFICIENTLY.~~

SEARCH PROCEDURE:

Coast Guard Wreck
Files

REFERENCE FEATURES AND LOCATIONS:

RESULTS (use additional sheets):

SKETCH AND COMMENTS:

all documentation indicates that the remaining hull portion is embedded in the surrounding reef and this has become part of the reef. As this reef area is not accessible to any vessels, a recommendation to remove the checked wreck symbol from charts 25640 and 25668 is strongly recommended

VZCZCSDG041
PTTUZYUW RULGSDG1809 0801809-UUUU--RUCLDHA RUCLFBA RUCLFOA RUEBJGA
RUEOPAA RUEBNSA.

ZNR UUUUU

RUEBNSA T USCGC SAGEBRUSH

P 211755Z MAR 79

FM COMCOGARD GANTSEC SAN JUAN PR

TO AIG EIGHT NINE THREE ZERO

CG GRNC

BT

UNCLAS//N16502//

FOR SAFETY AND TWO SCHEDULED BCSTS

HAZARD TO NAVIGATION.

U.S. COAST GUARD SAN JUAN BCST NOTICE TO MARINERS NR 212

WEST INDIES-PUERTO RICO-NORTH COAST-BOCA DE CANGREJOS

NO FURTHER INFORMATION HAS BEEN RECEIVED ON THE HULL OF THE 35FT

ALL GLASS CHARTER BOAT "PROFESORA II" PREVIOUSLY REPORTED SUNK

IN APPROX POSITION 18-28N 65-59W. THE HULL HAD BEEN REPORTED

EMBEDDED IN THE REEFS AND COMPLETELY SUBMERGED IN ABOUT 20FT

OF WATER. DEPTH OF WATER OVER THE WRECK APPROX 10 FT.

THIS CANCELS SAN JUAN BCST NOTICE TO MARINERS NR 660-77

BT

1809

ST DE CG

T WHH, MSD ST THO

P 300230Z SEP 77

FM COMCOGARD GANTSEC SAN JUAN PR

TO AIG EIGHT NINE THREE ZERO

CG GRNC

BT

UNCLAS

FOR SAFETY AND SCHEDULED BCST UNTIL 051105Z OCT 77

U.S. COAST GUARD SAN JUAN BCST NOTICE TO MARINERS NR 660-77

WEST INDIES-PUERTO RICO-NORTH COAST-BOCA DE CANGREJOS-

MR. ELISEO ROBLES CASTRO, OWNER OF THE 35FT CHARTER BOAT

PROFESORA II, PREVIOUSLY REPORTED SUNK IN APPROXIMATE POSITION

18-28N 65-59W REPORTS THAT THE VESSEL HAS BROKEN UP AND ONLY

THE HULL, WHICH IS EMBEDDED IN THE REEF REMAINS COMPLETELY

SUBMERGED IN ABOUT 20FT OF WATER. DEPTH OF WATER OVER THE

WRECK APPROXIMATELY 10FT. MARINERS ARE URGED TO NAVIGATE WITH

EXTREME CAUTION IN THE AREA AND BE ON THE LOOKOUT FOR DRIFTING

DEBRIS. FURTHER INFORMATION WILL BE PUBLISHED WHEN AVAILABLE.

THIS CANCELS SAN JUAN BCST NOTICE TO MARINERS NR 657 AND 66-77

BT

TOD 01227 DH K

copy *file*

CO	XO	OPS	OAN	COMM	ENG	IND	ELEC	COTP	ADM	CIV	F&S

A - ACTION F - FILE S - SIGNATURE

SAJDS
PR-33

29 August 1978

Mr. Eliseo Robles Castro
Cangrejo Recreation Corporation
Apartado 217
St. Just, Puerto Rico 00750

*Do you have interest
in this?
only peripherally -
JW*

Dear Mr. Robles:

We refer to letter of 18 July 1977 which states your efforts in salvaging the remaining part of the hull of the all glass "PROFESORA II" sunk in approximate position 18° - 28' - 00" N 65° - 59' - W, half mile North of Boca de Cangrejos, in the Atlantic Ocean, Carolina, Puerto Rico.

We understand your attempts to remove the remains of your vessel, however, Section 19 of the River and Harbor Act states in part, that whenever the navigation of any river, lake harbor, sound, bay and/or other navigable waters of the United States shall be obstructed or endangered by any sunken vessel, boat, watercraft, raft or similar obstruction, and such obstruction has existed for more than thirty days, a person may not relieve himself of liability by abandoning the wreckage. If at any time in the future your vessel is located at a depth which constitute a hazard to navigation you must mark and remove it from the waterway.

Sincerely yours,

JOSEPH A. BENEN, LT COL, CGE
Deputy District Engineer for
Puerto Rico & Virgin Islands

CF:
Regulatory Branch, JAX
Coast Guard, SJ
P. R. Ports Authority, SJ
Asst. District Counsel, SJAO

288 2 10 00 01 518

RECEIVED

Mr. Guerrero/lr

APPROVAL SHEET

The field work on this Hydrographic Survey was under my daily supervision. The boat sheets and records have been reviewed and approved by me. As the sounding line spacing does not meet the requirements of a Basic Survey, this survey should be considered adequate to supplement prior surveys of the area. Due to the nature of the survey area, it is not recommended that additional time and expense be expended to bring this survey up to Basic Survey standards. Additional work performed in 1985.

L. Austin Yeager
Commanding Officer

NOAA Ship MT. MITCHELL S-222

APPENDIX "J"

APPROVAL SHEET

This survey is complete and adequate for the purpose of a basic hydrographic survey. The Commanding Officer continually supervised and examined all work, except while on leave.

APPROVED BY:

D. E. Tibbets

DATE: October 4, 1983

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

TIDE NOTE FOR HYDROGRAPHIC SHEET

Processing Division: Atlantic Marine Center:

Hourly heights are approved for

Tide Station Used (NOAA Form 77-12): 975-5371 San Juan, PR

Period: March 8 - April 8, 1983

HYDROGRAPHIC SHEET: H-10077

OPR: 1149

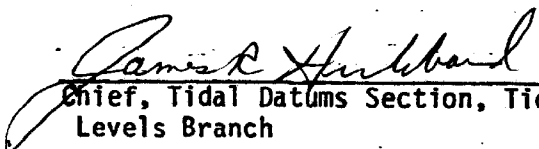
Locality: North Coast Island of Puerto Rico

Plane of reference (mean ~~lower~~ low water): 2.05 feet

Height of Mean High Water above Plane of Reference is 1.1 feet

REMARKS: Recommended Zoning:

Zone Direct


Chief, Tidal Datums Section, Tides & Water
Levels Branch

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

TIDE NOTE FOR HYDROGRAPHIC SHEET

DATE: 05/16/86

Marine Center: Atlantic

OPR: I-191

Hydrographic Sheet: H-10077

Locality: North Coast, Island of Puerto Rico

Time Period: October 20 - November 2, 1985

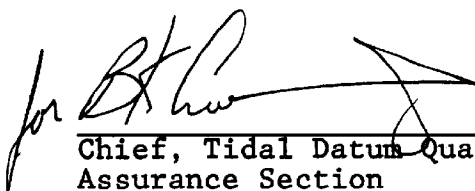
Tide Station Used: 975-5371 San Juan, Puerto Rico

Plane of Reference (Mean ~~Lower~~ ^Q Low Water): 1.90 ft.

Height of Mean High Water Above Plane of Reference: 1.1 ft.

Remarks: Recommended Zoning:

Zone direct


Chief, Tidal Datum Quality
Assurance Section

GEOGRAPHIC NAMES

Name on Survey	A 20668 25670 ON CHART NO. B ON PREVIOUS SURVEY C ON U.S. QUADRANGLE D FROM LOCAL INFORMATION E ON LOCAL MAPS F P.O. GUIDE OR MAP G RAND McNALLY ATLAS H U.S. LIGHT LIST K											
	ATLANTIC OCEAN	X										
BALNEARIO ISLA VERDE	X											2
BOCA DE CANGREJOS	X											3
EL BOQUERON	X											4
FT. SAN GERONIMO	X											5
ISLA LA CANCORA	X											6
ISLA PIEDRA	X											7
ISLA VERDE	X											8
PINONES	X											9
PUERTO RICO (title)	X											10
PUNTA CANGREJOS	X											11
PUNTA EL MEDIO	X											12
PUNTA ESCAMBRON	X											13
PUNTA LAS MARIAS	X											14
PUNTA MALDONADO	X											15
PUNTA PIEDRITA	X											16
												17
												18
												19
												20
												21
												22
												23
												24
												25

Approved:

Charles E. Hartman
Chief Geographer - N/44245

MAR 16 1987

LETTER TRANSMITTING DATA

DATA AS LISTED BELOW WERE FORWARDED TO YOU BY (Check):

- ORDINARY MAIL AIR MAIL
 REGISTERED MAIL EXPRESS
 CBL (Give number) _____

TO: Chief, Data Control Branch, N/CG243
 Room 151, WSC-1
 National Ocean Service - NOAA
 Rockville, MD 20852

DATE FORWARDED
27 April 1987

NUMBER OF PACKAGES
~~TWO (2)~~
THREE (3)

NOTE: A separate transmittal letter is to be used for each type of data, as tidal data, seismology, geomagnetism, etc. State the number of packages and include an executed copy of the transmittal letter in each package. In addition the original and one copy of the letter should be sent under separate cover. The copy will be returned as a receipt. This form should not be used for correspondence or transmitting accounting documents.

H-10077 (MI-10-2-83)
OPR-I149-MI-83 Puerto Rico, Atlantic Ocean
Punta Escambron to Punta Maldonado

PKG. 1 (BOX)

- 5 NOAA FORM 77-44 (SOUNDING VOLUMES)
- 3 BINDERS containing BASELINE CALIBRATION DATA
- 1 ENVELOPE containing DATA REMOVED FROM ORIGINAL DESCRIPTIVE REPORT
- 1 ACCORDION FILE containing MASTER TAPE PRINTOUTS, CORRECTOR TAPE PRINTOUTS, FATHOGRAMS for following JD,s: VESNO 2223: 67-70, 72-73, 78, 81-82, 97-98, one slot with caliobration data and bar check data
- 1 ACCORDION FILE containing MASTER TAPE PRINTOUTS, CORRECTOR TAPE PRINTOUTS, FATHOGRAMS for following JD,s: VESNO 2832: 293-296, 298, 300, 302-306 one slot containg supplemental field data VESNO 2833: 303-304

FROM: (Signature)
 NORRIS A. WIKE *Norris A. Wike*

RECEIVED THE ABOVE
 (Name, Division, Date)

Return receipted copy to:
 Chief, Hydrographic Surveys Branch,
 N/MOA23
 Atlantic Marine Center
 439 W. York Street
 Norfolk, VA 23510-1114

Dwayne S. Clark
 May 1, 1987
 N/CG 243

LETTER TRANSMITTING DATA

TO: Chief, Data Control Branch, N/CG243
Room 151, WSC-1
National Ocean Service - NOAA
Rockville, MD 20852

DATA AS LISTED BELOW WERE FORWARDED TO YOU BY (Check):

- ORDINARY MAIL
- AIR MAIL
- REGISTERED MAIL
- EXPRESS
- SBL (Give number) _____

DATE FORWARDED
27 April 1987

NUMBER OF PACKAGES
THREE (3)

NOTE: A separate transmittal letter is to be used for each type of data, as tidal data, seismology, geomagnetism, etc. State the number of packages and include an executed copy of the transmittal letter in each package. In addition the original and one copy of the letter should be sent under separate cover. The copy will be returned as a receipt. This form should not be used for correspondence or transmitting accounting documents.

H-10077 (MI-10-2-83)
OPR-I149-MI-83 Puerto Rico, Atlantic Ocean
Punta Escambron to Punta Maldonado

PKG. 2 (TUBE)

- ~~1~~ FINAL SMOOTH FIELD SHEET
- ~~1~~ FINAL SMOOTH POSITION OVERLAY
- ~~2~~ FINAL EXCESS OVERLAY
- ~~4~~ FINAL FIELD SMOOTH SHEET
- ~~1~~ ORIGINAL DESCRIPTIVE REPORT

PKG. 3 (BOX)

- ~~1~~ CAHIER containing FINAL POSITION PRINTOUT
- ~~1~~ CAHIER containing FINAL SOUNDING PRINTOUT, and L-FILE
- ~~1~~ ENVELOPE containing SUPPLEMENTAL DATA FROM PRINTOUT

FROM: (Signature)
NORRIS A. WIKE *Norris A. Wike*

RECEIVED THE ABOVE
(Name, Division, Date)

Return receipted copy to:
Chief, Hydrographic Surveys Branch,
N/MOA23
Atlantic Marine Center
439 W. York Street
Norfolk, VA 23510-1114

Dwayne S. Clark
May 1, 1987
NICG243

HYDROGRAPHIC SURVEY STATISTICS
REGISTRY NO.: H-10077

Number of positions	1199
Number of soundings	5235
Number of control stations	9

	<u>TIME-HOURS</u>	<u>DATE COMPLETED</u>
Preprocessing Examination	46	11 July 86
Verification of Field Data	338	22 Jan 87
Quality Control Checks	112	
Evaluation and Analysis	62	18 Feb 87
Final Inspection	24	03 Mar 87
TOTAL TIME	582	
Marine Center Approval		13 Mar 87

Transmittal letter of survey and survey records will be included in the Descriptive Report to identify the records accompanying the survey.

ATLANTIC MARINE CENTER
EVALUATION REPORT

SURVEY NO.: H-10077

FIELD NO.: MI-10-2-83

Puerto Rico, Atlantic Ocean, Punta Escambron to Punta Maldonado

SURVEYED: 8 March through 8 April 1983 and 20 October through 2 November 1985

SCALE: 1:10,000

PROJECT NO.: OPR-I149-MI-83

SOUNDINGS: ROSS Model 5000
Digital Echo Sounder,
RAYTHEON DSF-6000N
Fathometer, RAYTHEON
DE-719B Fathometer

CONTROL: Del Norte (Range/
Range), Del Norte/
WILD T-2 Theodolite
(Range/Azimuth),
MOTOROLA Mini-Ranger
Falcon 484 (Range/
Range), (Range/
Azimuth), WILD T-2
Theodolite/HP-3810B
Total Control Station
Instrument (Range/
Azimuth)

Chief of Party.....J. A. Yeager
.....A. E. Theberge

Surveyed by.....L. A. Lapine
.....D. A. Waltz
.....R. L. Parsons
.....D. R. Rice
.....V. D. Ross
.....G. R. Yates
.....V. A. Barnum
.....B. L. Coakley
.....C. N. McLain
.....E. I. Crews
.....J. A. Miller
.....W. E. Sites
.....J. A. Hendrix
.....J. A. Hill
.....E. A. Lake

Automated Plot by.....XYNETICS 1201 Plotter (AMC)

1. INTRODUCTION

a. No unusual problems were encountered during office processing; however, this survey was conducted by two different field units over two different seasons. The data were combined during office processing. The two separate Descriptive Reports submitted by the field units are combined under one cover.

b. Notes in the Descriptive Report were made in red during office processing.

2. CONTROL AND SHORELINE

a. Control is adequately discussed in sections F., G., and S. of the Descriptive Report.

b. Shoreline originates with final reviewed Class III Photogrammetric Manuscripts TP-00954 and TP-00955 of 1980-82.

3. HYDROGRAPHY

a. Soundings at crossings are in excellent agreement and comply with the criteria found in sections 4.6.1 and 6.3.4.3. of the HYDROGRAPHIC MANUAL. *n/c*

b. The standard depth curves could not be drawn in their entirety. The zero (0) curve was not delineated and the six (6), twelve (12), and eighteen (18) curves were not delineated in their entirety because of vessel safety. The supplemental thirty-six (36) foot curve was drawn to show additional bottom relief. Some brown and dashed curves were also drawn to delineate bottom relief. *n/c*

c. The development of the bottom configuration and determination of least depths is considered adequate with the following exceptions: *n/c*

1) The following shoal soundings were not developed.

<u>Depth</u>	<u>Latitude</u>	<u>Longitude</u>	<u>Surrounding Depths</u>
7	18°28'01.84"N	66°05'02.51"W	11-20
11	18°27'50.36"N	66°04'26.54"W	16-22
12	18°27'38.21"N	66°03'33.96"W	25-26
13	18°27'42.40"N	66°03'24.54"W	21-22
11	18°27'32.24"N	66°02'40.05"W	17-28
11	18°27'39.95"N	66°02'57.47"W	17-22
7	18°27'09.68"N	66°01'53.86"W	14-15
6	18°27'07.60"N	66°01'33.53"W	9-17
18	18°27'56.35"N	66°01'17.96"W	22-29
35	18°28'20.61"N	65°59'47.55"W	49-75
35	18°28'12.84"N	65°59'37.49"W	43-58
43	18°27'49.42"N	65°58'29.16"W	53-67
11	18°27'47.17"N	66°04'18.39"W	16-18
7	18°27'53.90"N	66°04'59.30"W	10-16

n/c

Additional lines of hydrography in the vicinity of the items discussed above would have provided a better delineation of the bottom configuration.

2) Reduced line spacing in the lagoon area in the vicinity of Latitude 18°27'40"N, Longitude 66°03'10"W would have provided a better delineation of the bottom configuration. *n/c*

The present survey line spacing of 175 to 200 meters is inadequate to define the area.

3) The following areas of shoaling or features were not considered adequately developed to ascertain least depths:

<u>Shoals or features</u>	<u>Latitude</u>	<u>Longitude</u>
Shoal area to 9 feet	18°27'57.5"N	66°04'32.0"W
Ridge between reefs	18°28'06.0"N	66°04'31.4"W
Shoal area to 11 feet	18°28'17.0"N	66°03'38.2"W
Rock awash	18°27'47.6"N	66°01'28.5"W

The lack of developments of items discussed above does not significantly degrade the overall quality of this survey.

4. CONDITION OF SURVEY

The smooth sheet and accompanying overlays, hydrographic records and reports are adequate and conform to the requirements of the HYDROGRAPHIC MANUAL with the following exceptions:

a. The field unit did not examine, locate, or describe landmarks on charts 25668 (12th Edition, 24 Nov. 1984), and 25670 (32nd Edition, 18 Sept. 1982), as required by section 4.2.2. of the Project Instructions, and sections 1.6.5., 4.5.13., and 5.5.1. of the HYDROGRAPHIC MANUAL.

b. Final reviewed Class III Photogrammetric Manuscripts TP-00954 and TP-00955 of 1980-82 were sent to the field unit with "Notes to the Hydrographer" applied to them. The hydrographer did not address these items in section H. of the Descriptive Report as required by section 4.1.2.2. of the Project Instructions.

c. The field unit did not meet the requirements of section 4.2.1.2. of the Project Instructions. The U.S. Coast Guard requested third-order Class I positions on navigational aids. The aids were not positioned.

d. The field unit did not obtain bottom characteristics in the vicinity of the following shoal features as required by section 6.7. of the Project Instructions and section 4.5.9.2. of the HYDROGRAPHIC MANUAL.

<u>shoal depths</u>	<u>Latitude</u>	<u>Longitude</u>
15	18°27'50.0"N	66°04'20.0"W
16	18°27'50.0"N	66°04'00.0"W
10	18°27'42.2"N	66°03'03.0"W

e. The field unit did not record several bottom characteristics in NOAA Form 77-44 "Soundings," as required by Hydrographic Guideline No. 36. M/C

f. The field unit did not verify or disprove charted items, (rocks), as required by section 4.1.2.3. of the Project Instructions. See also section 7.a. of this report. M/C

g. The field unit did not locate the following uncharted rocks in the survey area as required by section 1.4.3. of the HYDROGRAPHIC MANUAL. Several passing references to rocks were recorded in the field data. No detached positional data was obtained by the field unit. These rocks were positioned by the field references, and then added to the present survey during office processing.

<u>Latitude</u>	<u>Longitude</u>
18°27'45.49"N	66°03'24.25"W 25679 ✓
18°27'46.52"N	65°58'59.25"W 25680 ✓
18°27'49.69"N	66°03'15.90"W 25681 ✓
18°28'08.86"N	65°59'54.49"W 25682 ✓
18°27'18.75"N	65°57'40.35"W 25683 ✓
18°28'00.58"N	65°59'23.89"W 25684 ✓
18°27'50.55"N	66°04'54.25"W 25685 ✓

These positions should not be considered the most accurate positions for these rocks. It is recommended the items discussed above be charted as portrayed on present survey. ✓

h. The field unit did not verify or disprove numerous submerged rocks throughout the survey limits which originate with shoreline manuscripts TP-00954 and TP-00955 of 1980-82. This does not meet the requirement in section 4.1.2.2. of the Project Instructions. It is recommended the submerged rocks be charted as portrayed on present survey. ✓

i. The field unit did not adequately obtain velocity data. Four (4) nansen cast were taken outside the survey area. It is desirable for sounding velocity data to be obtained in the survey area. Sections 1.5.2. and 4.9.5.1.1. of the HYDROGRAPHIC MANUAL outlines the necessary requirements for collecting data for velocity corrections. This does not degrade the overall quality of the present survey. M/C

j. The field unit did not adequately verify dolphins in the vicinity of Latitude 18°27'38.8"N, Longitude 65°59'42.5"W, and a submerged groin in the vicinity of Latitude 18°27'03.5"N, Longitude 66°02'07.5"W, which originate with shoreline manuscripts TP-00954 and TP-00955 of 1980-82. This does not meet requirements in section 4.1.2.2. of the Project Instructions. The hydrographer notes on a copy of shoreline manuscript (Notes to Hydrographer Print) TP-00955 that dolphins were not visible at mean low water (MLW). It is recommended the dolphins be changed to submerged dolphins and charted as OK

portrayed on present survey. It is also recommended that the submerged groin be charted as portrayed on present survey.

5. JUNCTIONS

H-10073 1983-85 (1:10,000) to the west
H-10078 1983 (1:20,000) to the north

An excellent junction was effected between H-10073 (1983-85) and the present survey.

A standard junction could not be effected with the junctional survey H-10078 (1983). The junctional survey is archived at National Ocean Service, (NOS), Headquarters, Rockville, Maryland. Survey H-10077 (1983-85) and survey H-10078 (1983) are in substantial agreement. Depths generally agree to within one (1) foot. Any adjustments to the depth curves in the junctional areas will have to be made at headquarters on the chart compilation after application of the survey data.

There is no contemporary survey to the east of the present survey. Charted hydrography and the present survey soundings are in harmony.

6. COMPARISON WITH PRIOR SURVEYS

Hydrographic

H-2874 (1907) 1:80,000
H-2883 (1907) 1:20,000
H-4205 (1921) 1:20,000

The three (3) prior surveys listed above cover the present survey area in its entirety.

Prior survey H-2874 (1907) compares favorably with the present survey and shows a general trend of being one (1) foot deeper than present survey depths. m/c

Prior survey H-2883 (1907) does not compare favorably with the present survey. Thirty-eight percent, (38%), of the depths from prior survey H-2883 (1907) shows a general trend of being one (1) to three (3) feet deeper. The other sixty-two percent (62%) of the depths from the prior survey range between eleven (11) to thirty-five (35) feet shoaler than present survey. The soundings discussed above are considered superseded by the present survey. See also section 7.a.3) of this report. m/c

Prior survey H-4205 (1921) compares favorably with the present survey and shows a general trend of being one (1) to four (4) feet deeper than present survey depths. There are some scattered soundings from prior survey H-4205 (1921) eight (8) to eleven (11) feet deeper than present survey depths. A m/c

W/C
forty-six (46) and forty-eight (48) foot sounding from prior survey H-4205 (1921) in the vicinity of Latitude 18°28'09"N, Longitude 65°59'25"W are seventeen (17) to twenty (20) feet shoaler than present survey depths.

A reef on prior survey H-4205 (1921) in the vicinity of Latitude 18°28'08"N, Longitude 66°04'42"W falls in an area described as "breakers" as shown on the present survey. This reef is not considered disproved and should be charted as shown on present survey. Two rocks awash shown on the reef delineated on the prior survey were brought forward and the reef was brought forward as a submerged reef to supplement the present survey. *s/s old picked up from survey except sm southerly portion*

A rock awash on prior survey H-4205 (1921) in Latitude 18°27'37.1"N, Longitude 66°01'10.9"W, was neither verified nor disproved and should be retained as charted. The rock was brought forward to supplement the present survey. *25669 digitize*

The difference between the present and prior surveys may be attributed to the natural changes in the bottom and technological advances in surveying. However, several rocks awash and depths on the prior surveys not considered verified or disproved were brought forward to supplement the present survey.

The present survey is adequate to supersede the above prior surveys except as noted above within the common area.

7. COMPARISON WITH CHARTS 25668 12th. Edition 24 Nov. 1984
25670 33rd. Edition 7 Jan. 1984

a. Hydrography

The charted hydrography originates with the previously discussed prior surveys and miscellaneous sources. A comparison with the largest scale charts covering the survey area revealed the following.

1) Charted rocks awash in the vicinity of Latitude 18°27'51.6"N, Longitude 66°04'57.5"W, and a charted rock awash in Latitude 18°27'34.4"N, Longitude 66°03'02.0"W were neither verified nor disproved by the field unit. The source of the charted rocks awash was not ascertainable. It is recommended that the charted rocks awash be retained as charted. *25670 25670 W/C no rocks there*

2) Charted breakers, and foul areas on above listed charts were partially verified by the field unit. The limits were portrayed from shoreline maps and notes and positions by the hydrographer on present survey during office processing. It is recommended the charted breakers, and foul areas be deleted, and new breaker and foul area limits be charted as portrayed on present survey. *Retained 25668*

3) A charted thirty-five (35) fathom sounding in Latitude $18^{\circ}28'14''N$, Longitude $65^{\circ}57'44''W$, and a charted twenty-eight (28) fathom sounding in Latitude $18^{\circ}29'12''N$, Longitude $66^{\circ}03'11''W$ were found to be in error. These soundings are charted on Chart 25668 11th. Edition 28 Aug. 1982. The true depths should be 25 for the thirty-five (35) sounding, and thirty-eight (38) for the twenty-eight (28). These soundings originated from prior survey H-2883 (1907). It is recommended these soundings be deleted, and representative soundings from present survey be charted.

25670-1/C
25669-1/C
25668

The present survey is adequate to supersede the charted hydrography in the common area except as noted above..

b. Aids to Navigation

The hydrographer located one (1) floating aid to navigation in the survey area. This aid appears adequate to serve its intended purpose.

8. COMPLIANCE WITH INSTRUCTIONS

This survey complies with the Project Instructions except as noted in other sections of this report.

9. ADDITIONAL FIELD WORK

This is an adequate survey. Additional work would be desirable at an opportune time to determine and verify positions on rocks and to develop shoals and other features discussed in sections 3.c., 4.d., 4.g., 4.h., 4.j., 7.a. of this report and sections M. and Q. of the Descriptive Report of the Ship PIERCE.

Frank L. Saunders
Frank L. Saunders
Cartographic Technician
Verification of Field Data

Norris A. Wike
Norris A. Wike
Cartographer
Evaluation and Analysis

Robert R. Hill
Robert R. Hill
Senior Cartographic Technician
Verification Check

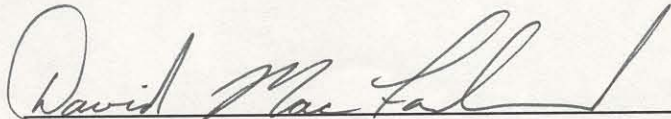
Inspection Report
H-10077

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. The digital data have been completed and all revisions and additions made to the smooth sheet during survey processing have been entered in the magnetic tape record for this survey. Final control, position, and sounding printouts of the survey have been made. The survey complies with National Ocean Service requirements except as noted in the Evaluation Report. The survey records comply with NOS requirements except where noted in the Evaluation Report.

Inspected



R. D. Sanocki
Chief, Hydrographic Survey
Processing Section
Hydrographic Surveys Branch



David B. MacFarland
Chief, Hydrographic Surveys Branch

Approved: 13 March 1987



Ray E. Moses, RADM, NOAA
Director, Atlantic Marine Center

