

HYDROGRAPHIC TITLE SHEET

H-9266

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-20-1-72

State Puerto Rico

General locality South Coast

Locality Offshore - Punta Petrona to Punta Carenero

Scale 1:20,000 Date of survey Mar. 13, 1972 - May 24, 1972

JD 073 145 Leap year

Instructions dated January 5, 1972 Project No. OPR-423-MI-72

Vessel NOAA Ship MT MITCHELL and Launch MI-6

Chief of party Edwin K. McCaffrey, CAPT, NOAA, Commanding Officer

Surveyed by Ship's Personnel (LTJG S.L. Wood, NOAA, Officer-in-Charge)

Soundings taken by echo sounder, hand lead, ~~33%~~

Graphic record scaled by Ship's Personnel

Graphic record checked by Scanned Verification Branch, AMC

Protracted by _____ Automated plot by CALCOMP-61B

Soundings penciled by _____ Verified by B. J. Stephenson, AMC

Soundings in ~~fathoms~~ feet at MLW MKKW See Paragraph "D" of this report

REMARKS:

*Applied to stb 6/16/77
CJH*

Descriptive Report
To Accompany
Hydrographic Survey MI-20-1-72
Registry Number H-9266
OPR-423-MI-72
South Coast of Puerto Rico
1972 Field Season
Scale 1:20,000

NOAA Ship MT MITCHELL (MSS-22)

Edwin K. McCaffrey
CAPT, NOAA
Commanding Officer

A. Project ✓

This survey was accomplished as a part of Project OPR-423-MI-72 -- South Coast of Puerto Rico in accordance with Project Instructions dated January 5, 1972.

B. Area Surveyed ✓

This survey was conducted off the south coast of Puerto Rico, offshore Punta Petrona to Punta Carenero, during the period March 13, 1972 to May 24, 1972. The area surveyed is bounded on the east by Longitude 66°21'30"W., on the west by Longitude 66°34'30"W. and on the south by the 110 fathom curve. The northern boundary is irregular, varying from Latitude 17°51'30"N. to Latitude 17°54'30"N. to junction with the below listed contemporary surveys.

(WH 20-3-69)

This survey junctions on the west with survey H-9034, a 1:20,000 sheet completed in 1969.

Junctions on the north are with the following contemporary surveys: H-9264 (1:10,000) 1972, H-9265 (1:10,000) 1972, H-9267 (1:10,000) 1972.

Junction on the south is with contemporary survey H-9278 (1:100,000) 1972.

Prior surveys of the area are as follows:

H-2421	1:20,000	1899
H-2736	1:40,000	1905-1906
H-2737	1:40,000	1905-1906
H-4699	1:20,000	1927

C. Sounding Vessel

Sounding on this sheet was accomplished by the Ship MT MITCHELL and Launch MI-6, a 31 foot Cummins powered Uni-lite boat. Both of the sounding vessels were equipped with the HYDROLOT system, incorporating a PDP-8/E computer and a COMLOT PP 3-5 roll plotter.

D. Sounding Equipment and Corrections to Soundings

Soundings on this sheet were plotted in feet. The soundings by both sounding vessels, which were in deep waters over steep slopes, on the southern sheet limits, were obtained and recorded in fathoms.

All soundings were recorded using the Ross Echo Sounder, Model 5000, in conjunction with a Ross Transmitter/Receiver, Model 4000 and a Ross Depth Digitizer, Model 6000. Serial numbers are as follows:

	<u>Ross Echo Sounder Model 5000</u>	<u>Ross Xmitter/Receiver Model 4000</u>	<u>Ross Depth Digitizer Model 6000</u>
MT MITCHELL	1052	1052	1052
Launch MI-6	201745	201746	201747

At times during the survey, the zero adjustment of the Ross recorder drifted slightly due to stylus wear or paper drift. These errors were corrected when the fathogram was scanned. Therefore, the initial correction is always zero, and no

initial correction is reflected in any records for this survey.

It was necessary to use "blanking" on the Ross sounding gear in order for the depth digitizer to operate properly. This function blanks returns above the depth to which it is applied and eliminates stray digitized depths due to return from cavitation bubbles below the transducer. This produces a trace resembling the zero mark at the depth to which blanking was applied, but has no effect on the recorded soundings.

The graphic records were scanned by trained personnel, spot checks for errors were made by the Officer-in-Charge of the particular launch used for the day's work, and the Officer-in-Charge of the sheet. These spot checks insured that the data were correctly interpreted in accordance with Paragraphs 1-34, 5-121, and 5-122 of the Hydrographic Manual (20-2).

Velocity corrections and instrument error for Launch MI-6 were determined from bar check, serial temperature cast and RACTD-1 data acquired in the work area. Bar checks were attempted during each day of operations when sea conditions permitted.

Velocity corrections for the MT MITCHELL were determined from serial temperature and RACTD-1 data acquired in the work area.

Instrument error for the MT MITCHELL was determined by a vertical cast, in calm water, over smooth bottom, on May 17, 1972. Results indicated a -0.2 fathom instrument error. The TRA correction in the long word, on all corrector tapes for work done by the ship, reflect a +0.2 fathom instrument correction.

Copies of the Abstracts of Velocity Corrections and TC/TI tape printouts are included in this report.

Settlement and squat corrections for Launch MI-6 were determined on February 9, 1972 in the protected waters of Ponce Harbor. These determinations were made at various speeds in calm water using the level rod method as described in the Hydrographic Manual. A linear interpolation graph was used to determine settlement and squat corrections for intermediate speeds. A copy of the Abstract of Settlement and Squat corrections is included in this report.

Settlement and squat corrections for the MT MITCHELL (skeg transducer) were determined on October 8, 1969. Settlement and squat correction for a speed of 175 R.P.M. was determined to be +0.8 foot, or +0.1 fathom.

Settlement and squat corrections are applied in the TRA correction of the long word on the Hyperbolic Corrector Tape.

Transducer draft of Launch MI-6 was determined on February 9, 1972, by measurement to the waterline, which was located and marked with the boat in the water carrying a standard load. Draft was found to be 2.6 feet, and a draft correction of +2.6 is applied to all soundings obtained by Launch MI-6.

Transducer draft of the MT MITCHELL was read from after hull draft markings before and after completing hydrography. On May 22, 1972 draft was 13.4 feet and on May 24, 1972 draft was 13.3 feet. A draft correction of +2.2 fathoms was applied to all soundings obtained by the MT MITCHELL.

Draft correction is applied in the TRA correction of the corrector word on the Hyperbolic Master Tape.

Tides are to be automatically zoned from data acquired by Fischer and Porter (ADR) portable tide gages at Playa de Ponce and at Santa Isabel, Puerto Rico. Hourly heights of tides are to be furnished by the Tides Section, National Ocean Survey, Rockville, Maryland. Attention is invited to the "Descriptive Tide Note" included in this report.

E. Smooth Sheet

The smooth sheet for this survey will be prepared at the Atlantic Marine Center.

F. Control

Control for this project was hyperbolic Hi-Fix, operating at a frequency of 1618.650 KHz.

The Hi-Fix shore installations were located as follows:

Master	ISABEL	(1972)	200	Latitude	17°57'25.578"N.
				Longitude	66°24'39.803"W.
Slave 1	HOMER	(1972)	210	Latitude	17°57'53.152"N.
				Longitude	66°36'58.297"W.
Slave 2	MAREAS	(1972)	220	Latitude	17°55'55.632"N.
				Longitude	66°09'29.483"W.

These stations were located by third order traverse.

Hi-Fix calibrations were accomplished, at frequent intervals during the day, by three point sextant fix and check angle. Calibrations using weak visual control and those taken shoreward of the operating area which were likely to have errors introduced by adjacent land mass were used for lane count only. Hundredths correctors were taken only from strong three point sextant fixes in or near the operating area to avoid falsely biasing calibration data.

When Hi-Fix correctors throughout a day of operations were in close agreement, they were averaged and the average corrector for each rate was used for the entire day. During some periods of good weather and stable electronic control, corrections for several consecutive days agreed very closely. When it was possible to do so without introducing error, an average of the correctors for all of the days which were in close agreement was used for plotting hydrography for the entire period. This is done to provide the most reasonable interpretation of Hi-Fix corrections and to minimize both human and electronic error.

A sawtooth recorder was operated and monitored constantly to maintain an accurate lane count.

Due to equipment failures, receiver changes and atmospheric conditions, correctors for some days and periods differed greatly. Correctors for these days were zoned for area and time and applied accordingly.

For further information, consult "Report on Calibration of Hi-Fix" for this project. An abstract of Hi-Fix lane correctors is included in this report.

Due to Launch MI-6 equipment failure and shortage of time, it was necessary that the MT MITCHELL obtain fourteen bottom samples and run most of the hydrography on the steep slope-

shelf area of the sheet. In order to minimize horizontal displacement between the Hi-Fix antenna and the skeg transducer, the auxiliary antenna on the ship's mainmast was used for all work. Displacement of this mast, above the transducer, is less than five meters. This proved a satisfactory arrangement for the short term of ship hydrography on this sheet.

G. Shoreline

There is no shoreline within the limits of hydrography.

Shoreline transferred to Smooth Sheet from chart for orientation
H. Crosslines Purpose only. *ES*

Crosslines were run to the extent of nine percent of the regular system of sounding lines. Agreement at crossings was excellent, being within one foot in all cases.

I. Junctions

Junction with H-9034 (1969) ^{(WH 20-2-69) *ES*} was only fair. Those sounding discrepancies observed were, at most, no more than two to five feet. This disagreement is believed largely attributable to the irregularity and steep slope of the bottom.

All other junctions are with contemporary surveys. Excellent agreement with these was noted with all junction soundings within one foot of agreement.

J. Comparison with Prior Surveys

Note: All of the boatsheet and overlay soundings have been plotted without application of velocity and tide data but indicated least depths on overlays have been corrected for sound velocity.

Development Overlay 1 Presurvey Review - C&GS 902

✓ The charted 12 fathom sounding, presurvey review item, at Latitude 17°51'17"N. Longitude 66°34'12"W. should be recharted as follows. For charting purposes, consideration should be given to the two 70 foot echo soundings on the boatsheet at Latitude 17°51'24"N. Longitude 66°34'18"W. and Latitude 17°51'30"N. Longitude 66°34'18"W. These soundings, with the velocity correction applied, read 75 feet. 72 ft on Smooth Sheet
Pas. Line 374-375 *ES*

✓ The charted 11 fathom sounding, presurvey review item, at Latitude 17°51'01"N. Longitude 66°32'12"W. should be shifted slightly northwest to Latitude 17°51'08"N. Longitude 66°32'21"W. The 66 foot boatsheet sounding (69 feet with velocity correction applied) at this location marks the western end of a narrow east-west trending ridge approximately 1.4 miles in length. Depths on the ridge range between 49 - 66 feet. The 66 foot boatsheet sounding (69 feet with velocity correction applied) at Latitude 17°51'07"N. Longitude 66°32'21"W. should be given consideration when preparing charts of the area. 68 ft on smooth sheet pos. line 341-342 *as*

✓ The charted 10 fathom sounding, presurvey review item, at Latitude 17°50'54"N. Longitude 66°31'54"W. is correct and may remain as charted. It is located on the ridge described above, and should be accompanied by a 52 foot sounding (54 feet with velocity correction applied) at Latitude 17°50'57"N. Longitude 66°31'33"W. 60 ft on smooth sheet pos. line 327-328 *as*

✓ The charted 8 fathom sounding, presurvey review item, at Latitude 17°51'04"N. Longitude 66°31'20"W. is correct and may remain as charted. Several ^{one} 48 foot soundings (49 feet with velocity correction applied) appear on the boatsheet and on Development Overlay #1 in this area. These soundings also are located on the ridge described above, and represent the shoalest depths thereon. These 49 foot soundings should appear on charts of the area.

The ridge discussed in the above three paragraphs extends south to Latitude 17°50'51"N. Selected representative soundings from this ridge should be used when preparing future charts of the area.

Development Overlay 2
Presurvey Review - C&GS 926

✓ The charted 73 foot sounding, presurvey review item, at Latitude 17°52'06"N. Longitude 66°26'13"W. and the charted 68 foot sounding, presurvey review item, at Latitude 17°51'51"N. Longitude 66°26'18"W. lie on an east-west trending ridge approximately one mile in length. The charted 73 foot sounding should be changed to 69 feet. A 66 foot sounding appears on the development overlay in this area (69 feet with velocity correction applied). The charted 68 foot sounding is correct and may remain as charted. The least depth in the immediate area is, however, a 64 foot sounding on the overlay (67 feet 62 ft on smooth sheet pos. line 1415-1416

chart from smooth sheet depths

chart from smooth sheet depths

with velocity correction applied) at Latitude 17°51'53"N. Longitude 66°26'14"W., which should appear on the chart.

~~73 ft on smooth sheet pos. line 697-698~~ BLS

✓ Also to be given consideration for charting purposes are the 64 foot (67 feet with velocity correction applied) soundings on the overlay at Latitude 17°52'03"N. Longitude 66°26'08"W., the 63 foot boatsheet sounding (66 feet with velocity correction applied) at Latitude 17°52'09"N. Longitude 66°25'50"W. and the 62 foot overlay soundings (65 feet with velocity correction applied) at Latitude 17°52'02"N. Longitude 66°26'00"W. and Latitude 17°52'07"N. Longitude 66°25'42"W. ~~67 ft on smooth sheet~~ as sheet

chart from smooth sheet

✓ The charted 65 foot sounding, presurvey review item, at Latitude 17°51'54"N. Longitude 66°23'54"W. is correct as charted. The least depth in the area is represented by the 56 foot overlay soundings (58 feet with velocity correction applied) at Latitude 17°51'48"N. Longitude 66°23'52"W. and Latitude 17°51'53"N. Longitude 66°24'05"W. These 58 foot soundings should be represented on charts of the area. 58 ft on smooth sheet

Development Overlay 2 Pos. line 1450-1451
Presurvey Review - C&GS 902 1454-1455 BLS

✓ The charted 11 fathom sounding, presurvey review item, at Latitude 17°51'29"N. Longitude 66°23'20"W. should be replaced by the 61 foot overlay sounding (64 feet with velocity correction applied) at this location. In addition, the 59 foot overlay sounding (61 feet with velocity correction applied) at Latitude 17°51'28"N. Longitude 66°23'19"W. and the 60 foot overlay sounding (63 feet with velocity correction applied) should be considered for preparing charts of the area.

62 ft on smooth sheet pos. line 1356-1357

✓ The charted 12 fathom sounding, presurvey review item, at Latitude 17°51'03"N. Longitude 66°22'16"W. was not found and should be deleted from the chart. It should be replaced by the 72 foot boatsheet sounding (75 feet with velocity correction applied) at Latitude 17°51'12"N. Longitude 66°22'19"W. This represents the least depth in the area. 73 ft on smooth sheet

Pos. line 1351-1352
The charted 19 fathom sounding, presurvey review item, at Latitude 17°51'00"N. Longitude 66°27'40"W. was not found and should be deleted from the chart. The least depth in the immediate area is ~~126~~ feet.

130

✓ The charted 13 fathom sounding, presurvey review item, at Latitude 17°49'55"N. Longitude 66°24'54"W. should be replaced

BLS

chart from smooth sheet

by the 71 foot boatsheet sounding (74 feet with velocity correction applied) at this location. 73 ft on Smooth Sheet

Pos. line 697-698 *BJs*

The presurvey review items discussed below lie on a narrow ridge along the continental slope of Puerto Rico. This ridge is extensive and very pronounced, rising approximately 40 to 80 feet above the bottom along a large part of the slope in the area surveyed.

The charted 11 fathom sounding, presurvey review item, at Latitude 17°50'06"N. Longitude 66°23'21"W. was not found and should be deleted from the chart. Shoalest depth at this location is 76 feet (with velocity correction applied). The least depth in the area is the 70 foot overlay sounding (73 feet with velocity correction applied) at Latitude 17°50'10" N. Longitude 66°23'17"W. This 73 foot sounding should appear on the chart. The several other 71 foot and 72 foot soundings in the immediate area should be considered when preparing charts. 73 ft on Smooth Sheet pos. line 1489-1490. *BJs*

The charted 11 fathom sounding, presurvey review item, at Latitude 17°49'45"N. Longitude 66°25'12"W. is correct as charted. The depth at this location is 67 feet, (70 feet with velocity correction applied). Also to be considered for charting the area are the 65 foot soundings (68 feet with velocity correction applied) at Latitude 17°49'42"N. Longitude 66°25'03"W. and Latitude 17°49'45"N. Longitude 66°24'48" W. These 68 foot soundings represent the least depth in the area. ~~67 ft~~ 67 ft on Smooth Sheet pos. line 1508-1509. *BJs*

The charted 11 fathom sounding, presurvey review item, at Latitude 17°49'54"N. Longitude 66°26'07"W. should be shifted north to Latitude 17°49'57"N. Several 67 foot soundings (70 feet with velocity correction applied) represent the least depth at this location. The least depth in the area is represented by the 66 foot boatsheet sounding (69 feet with velocity correction applied) at Latitude 17°50'00"N. Longitude 66°26'24"W. and Latitude 17°49'55"N. Longitude 66°25'56"W.

69 ft on Smooth Sheet pos. line 1522-1523. *BJs*

The charted 11 fathom sounding, presurvey review item, at Latitude 17°50'00"N. Longitude 66°27'15"W. should be changed to 10½ fathoms. The least depth in the area is represented by a 61 foot overlay sounding (64 feet with velocity correction applied) at this location. Also to be considered for charting purposes are the 63 foot soundings (66 feet with velocity correction applied) at Latitude 17°49'58"N. Longitude 66°27'16"W. and Latitude 17°49'58"N. Longitude 66°27'22"W. 63 ft on Smooth Sheet pos. line 1379-1380.

Chart from smooth sheet values

Chart from smooth sheet values

Soundings from prior survey H-2736 were generally three feet deeper than those on the boatsheet. This difference is more pronounced on the eastern end of the sheet.

Soundings from prior survey H-2737 were usually within two or three feet of the boatsheet soundings.

Agreement with prior survey H-2421 was within three to five feet.

There were few soundings from prior survey H-4699 within the limits of hydrography, but agreement with those soundings was excellent, differences being not more than one foot.

K. Comparison with the Chart

The largest scale charts of the area covered by this survey are as follows:

C&GS Chart 909 (6 th Edition) 1:20,000 June 27, 1970

C&GS Chart 902 (10th Edition) 1:100,000 March 28, 1970

Agreement with C&GS Chart 909 was excellent, with soundings usually agreeing within one foot. The 60 foot curve on the chart is in good agreement with boatsheet data.

Agreement with C&GS Chart 902 was fair, boatsheet soundings being generally from two to nine feet shaller than charted soundings. There is good agreement with the 100 fathom curve from the chart, on the eastern end of the sheet, but in the west, the 100 fathom curve lies generally north of the charted position. Some specific charting differences are discussed in the section "Comparison with Prior Surveys" Pre-survey Review Items.

L. Adequacy of the Survey

This survey is complete and adequate to supersede prior surveys of the area for charting purposes.

M. Aids to Navigation

There are no floating aids to navigation within the sheet limits.

The Isla Caja de Muertos Light is within the sheet limits but outside the limits of hydrography. The description on the charts and in the Light List is correct and adequate. The light adequately serves its purpose. For further information, consult the Descriptive Report to accompany Hydrographic Survey H-9265 (1972).

N. Statistics

This survey made use of 1768 position fixes. Twenty position numbers were rejected. Using the HYDROLOT system, each sounding is also a fixed position, with the exception of insert soundings and soundings obtained during Hi-Fix lane jumps. These soundings were resolved during off-line plotting. Position Numbers 1469 through 1482 (Bottom Samples #7 through #20) and ~~2000~~ through 2221 were used by the ship. Position Numbers ~~0001~~ through 1468 and 1483 through 1586 represent work done by Launch MI-6.

433.5 nautical miles of hydrography were run on the boatsheet, encompassing an area of 30.5 square nautical miles. This included 373.4 nautical miles of regular sounding lines, 30.5 nautical miles of crosslines and 29.6 nautical miles of development lines.

Twenty bottom samples were obtained. The bottom samples were forwarded to Dr. J.W. Pierce, Department of Sedimentology, Smithsonian Institute, Washington, D.C. 20560, in accordance with latest instructions.

O. Miscellaneous

All times used on this project are Greenwich Mean Time. The approximate longitude of the area of operations is 66°30'W.

A Hydrographic Operations Log Book (Sounding Volume) was used for recording remarks and pertinent data appropriate to the survey.

Insert soundings and soundings obtained during Hi-Fix lane jumps are plotted on time and course. Soundings, during lane jumps, have an indicator of "3" on the Electronic Corrector Tape.

The boatsheet supplied to the Atlantic Marine Center is not

corrected for smooth tides, instrument error or the velocity of sound in sea water. These corrections were not available at the time the sheet was plotted. All positions do reflect Hi-Fix corrections and all soundings are corrected for draft and settlement and squat.

The original Sheet "P" and the accompanying mylar overlay showing comparison soundings were constructed at the Pacific Marine Center using polyconic projection. Sheet "P" was not forwarded with the records as it served no useful purpose. The field sheets submitted to the Atlantic Marine Center were constructed using modified transverse mercator projection for use with the HYDROPLOT system.

P. Recommendations

The narrow ridge, ^{of sometimes, twin ridges} extending along the continental slope should be delineated by representative soundings from this survey during preparation of future charts. Information concerning this feature would be valuable to the scientific community as well as the commercial and sport fishing industries.
Bottom chart would have been desirable on these ridges.

Q. Reference to Reports

The following reports should be consulted for additional information concerning this survey:

Calibration of Hi-Fix Report
Corrections to Echo Soundings Report
Descriptive Report to accompany Survey H-9265 (1972)

Respectfully Submitted:

Stephen L. Wood
Stephen L. Wood
LTJG, NOAA

Approved and Forwarded:

Edwin K. McCaffrey
Edwin K. McCaffrey
CAPT, NOAA
Commanding Officer

4/16/74

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): Muelle de Ponce
Santa Isabel

Period: 3 Feb. - 25 May 1972

HYDROGRAPHIC SHEET: H-9266

OPR: 423

Locality: South Coast of Puerto Rico

Plane of reference (mean ~~lower~~ low water): ~~Muelle de Ponce 3.4 ft.~~
Santa Isabel 3.1 ft. ^{SJS} _{AMC}

Height of Mean High Water above Plane of Reference is 0.7 ft.

Remarks: Zone direct on either gage.
Note: Tabulations on GMT.

C. J. Thurston
Chief, Tides Branch

ATLANTIC MARINE CENTER
VERIFICATION OF SMOOTH TIDES

SURVEY H- 9266

PLANE OF REFERENCE: MLW OR ~~MHW~~
TIME MERIDIAN: 0 GMT
HEIGHT DATUM ON STAFFS: 1. 3.1 2. _____ 3. _____ 4. _____

TIDE STATIONS	POSITION	TYPE GAGE	TIME CORR.		HEIGHT CORR.*	
			H.W.	L.W.	H.W.	L.W.
1. Santa Isabel, Puerto Rico	ϕ 17°57.3' λ 66°24.4'	standard	0.0	0.0	0.0	0.0
2.	ϕ λ					
3.	ϕ λ					
4.	ϕ λ					

HOURLY HEIGHTS: FROM ROCKVILLE OFFICE
 FROM FIELD MARIGRAMS VERIFIED BY: Rockville

TIDE ZONING: NOT APPLICABLE
 BY COMPUTER
 FROM TWO OR MORE GAGES

LIMITS AND DESCRIPTION OF ZONING METHODS:

TIDE CORRECTIONS COMPELED: BY COMPUTER VERIFIED BY: GFT
 MANUALLY VERIFIED BY: _____

HEIGHT OF MHW ABOVE PLANE OF REFERENCE: 0.7

TIDE CORRECTIONS VERIFIED ON SOUNDING PRINTOUT BY: GFT

DATE OF VERIFICATION: 9/4/74

*OR RATIO

EXAMINED AND APPROVED 

*obviously in error
no effect on survey
depths*

VELOCITY TABLE 11

CORRECTION	TO DEPTH	CORRECTION	TO DEPTH	CORRECTION	TO DEPTH
- .6	3.0	7.0	172.6	21.5	524.0
.4	6.4	7.5	184.7	22.0	535.0
.2	9.9	8.0	196.8	22.5	546.0
0.0	13.1	8.5	210.0	23.0	557.0
+ .2	16.6	9.0	221.0	23.5	569.0
.4	20.0	9.5	232.0	24.0	582.0
.6	23.5	10.0	245.0	24.5	595.0
.8	26.7	10.5	256.0	25.0	605.0
1.0	30.3	11.0	270.0	25.5	617.0
1.2	33.6	11.5	283.0	26.0	629.0
1.4	37.2	12.0	295.0	26.5	640.0
1.6	41.0	12.5	305.0	27.0	655.0
1.8	46.0	13.0	316.0	27.5	665.0
2.0	50.5	13.5	327.0	28.0	677.0
2.2	55.3	14.0	341.0	28.5	690.0
2.4	60.0	14.5	354.0	29.0	703.0
2.6	64.8	15.0	365.0	29.5	715.0
2.8	69.9	15.5	377.0	30.0	725.0
3.0	74.1	16.0	388.0	30.5	737.0
3.2	78.9	16.5	402.0	31.0	750.0
3.4	83.5	17.0	415.0	31.5	762.0
3.6	88.1	17.5	426.0	32.0	775.0
3.8	93.5	18.0	437.0	32.5	785.0
4.0	101.8	18.5	450.0	33.0	799.0
4.5	113.6	19.0	464.0	33.5	812.0
5.0	125.6	19.5	475.0	34.0	825.0
5.5	137.5	20.0	487.0	34.5	837.0
6.0	149.2	20.5	500.0	35.0	851.0
6.5	161.1	21.0	512.0	35.5	865.0

VELOCITY TABLE 12

CORRECTION TO DEPTH	CORRECTION TO DEPTH	CORRECTION TO DEPTH	CORRECTION TO DEPTH	CORRECTION TO DEPTH	
+ 0.0	1.9	13.0	316.0	32.0	769.0
.2	7.0	13.5	327.0	32.5	782.0
.4	11.9	14.0	338.0	33.0	795.0
.6	16.6	14.5	350.0	33.5	806.0
.8	21.4	15.0	364.0	34.0	820.0
1.0	26.0	15.5	376.0	34.5	835.0
1.2	31.0	16.0	387.0	35.0	851.0
1.4	35.9	16.5	399.0	35.5	865.0
1.6	40.5	17.0	411.0	36.0	878.0
1.8	45.3	17.5	423.0	36.5	894.0
2.0	50.0	18.0	435.0	37.0	908.0
2.2	55.0	18.5	448.0	37.5	925.0
2.4	60.0	19.0	460.0	38.0	937.0
2.6	64.9	19.5	472.0	38.5	951.0
2.8	69.7	20.0	485.0	39.0	967.0
3.0	74.3	20.5	497.0	39.5	984.0
3.2	79.1	21.0	506.0	40.0	999.0
3.4	84.0	21.5	520.0	40.5	1012.0
3.6	88.5	22.0	531.0	41.0	1026.0
3.8	93.4	22.5	545.0	41.5	1040.0
4.0	102.0	23.0	556.0	42.0	1056.0
4.5	114.0	23.5	568.0	42.5	1072.0
5.0	126.0	24.0	580.0	43.0	1086.0
5.5	137.9	24.5	590.0	43.5	1102.0
6.0	150.0	25.0	603.0	44.0	1116.0
6.5	161.5	25.5	616.0	44.5	1132.0
7.0	173.1	26.0	627.0	45.0	1147.0
7.5	185.6	26.5	638.0	45.5	1165.0
8.0	197.4	27.0	650.0	46.0	1176.0
8.5	209.0	27.5	665.0	46.5	1190.0
9.0	220.0	28.0	675.0	47.0	1205.0
9.5	232.0	28.5	686.0	47.5	1220.0
10.0	245.0	29.0	699.0	48.0	1231.0
10.5	256.0	29.5	710.0	48.5	1246.0
11.0	267.0	30.0	724.0	49.0	1258.0
11.5	279.0	30.5	735.0	49.5	1270.0
12.0	291.0	31.0	746.0	50.0	1286.0
12.5	305.0	31.5	757.0		

Corrections in depths greater than 150 fms appear to be too large - O.K.

ATLANTIC MARINE CENTER
APPROVAL SHEET
FOR
AUTOMATED SURVEY H-9266

- A. All revisions and additions made on the smooth sheet during verification have been entered in the magnetic tape records for this survey. A new final position printout has/~~has~~ been made. A new final sounding printout has/~~has~~ been made.

Date: 1-28-77

Signed: William L. Jones
Title: Chief, Verification Branch

- B. The verified smooth sheet has been inspected, is complete, and meets the requirements of the Hydrographic and AMC Manuals. Exceptions are listed in the verifier's report.

Date: 1-28-77

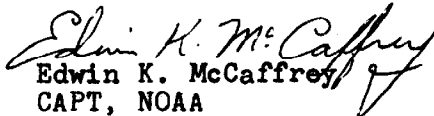
Signed: Robert A. Trammell
Title: Chief, Processing Division

Approval Sheet

Field Number MI-20-1-72

Registry Number H-9266

The field work and processing of data from this hydrographic survey was under my immediate daily supervision. The boat-sheet (COMLOT Sheets - one with regular sounding lines and two development overlays) and all records have been reviewed and are approved by me. This survey is complete and adequate to supersede all prior surveys of the area.


Edwin K. McCaffrey
CAPT, NOAA
Commanding Officer

GEOGRAPHIC NAMES

H-9266

Name on Survey	Source of Information										
	A	B	C	D	E	F	G	H	K		
	ON CHART NO.	ON PREVIOUS SURVEY NO.	ON U.S. QUADRANGLE MAPS	FROM LOCAL INFORMATION	ON LOCAL MAPS	P.O. GUIDE OR MAP	RAND McNALLY ATLAS	U.S. LIGHT LIST			
PUERTO RICO (TITLE)											1
PUNTA PETRONA (TITLE)											2
PUNTA CARENERO (TITLE)											3
ISLA CAJA DE MUERTOS											4
CAYO BERBERIA											5
CAYOS CABEZAZOS ✓											6
CARIBBEAN SEA ✓											7
ISLA MORRILLITO ✓											8
PLAYA DE SANTA ISABEL											9
											10
											11
											12
											13
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											25

APPROVED

Charles H. ...

STAFF GEOGRAPHER

-CS1x2

23 MAY 1977

HYDROGRAPHIC SURVEY STATISTICS
HYDROGRAPHIC SURVEY NO. H-9266
MI-20-1-72

RECORDS ACCOMPANYING SURVEY: To be completed when survey is registered.

RECORD DESCRIPTION		AMOUNT	RECORD DESCRIPTION		AMOUNT	
SMOOTH SHEET & smooth PNO, 2-excess overlays		1	BOAT SHEETS (paper) 2 B/S ovlys.		1	
DESCRIPTIVE REPORT		1	OVERLAYS (preliminary)		2	
DESCRIPTION	DEPTH RECORDS	HORIZ. CONT. RECORDS	PRINTOUTS	TAPE ROLLS	PUNCHED CARDS	ABSTRACTS/ SOURCE DOCUMENTS
ACCOPIED ENVELOPES	1		1-smooth			
CAHIERS	1-with raw printouts		1			
VOLUMES	3 1/2					
BOXES			1-smooth & misc. data			
T-SHEET PRINTS (List) NONE						
SPECIAL REPORTS (List)						

OFFICE PROCESSING ACTIVITIES

The following statistics will be submitted with the cartographer's report on the survey

PROCESSING ACTIVITY	AMOUNTS			
	PRE-VERIFICATION	VERIFICATION	REVIEW	TOTALS
POSITIONS ON SHEET				1768
POSITIONS CHECKED		175		
POSITIONS REVISED		25		
DEPTH SOUNDINGS REVISED		250		
DEPTH SOUNDINGS ERRONEOUSLY SPACED		---		
SIGNALS ERRONEOUSLY PLOTTED OR TRANSFERRED		---		
	TIME (MANHOURS)			
TOPOGRAPHIC DETAILS		1		
JUNCTIONS		8		
VERIFICATION OF SOUNDINGS FROM GRAPHIC RECORDS		---		
SPECIAL ADJUSTMENTS				
ALL OTHER WORK		203		
5/24/77 TOTALS G.C.I.-F.P.SAULSBURY		212		25 hrs
PRE-VERIFICATION BY G.D. Hendrix, R.G. Cram, B.J. Stephenson	BEGINNING DATE 06/21/74	ENDING DATE 05/16/75		
VERIFICATION BY B.J. Stephenson	BEGINNING DATE 06/19/75	ENDING DATE 01/22/77		
REVIEW BY G.C.I.-F.P.SAULSBURY	BEGINNING DATE	ENDING DATE		

Carstens 64- 5/19/77 R.D. Sanucki 6/8/77 6 hrs.
* U.S. G.P.O. 1972-769-562/439 REG.#6

REGISTRY NO. H-9266(1972)

The Computer and Excess Sounding Cards for this survey have not been corrected to reflect the changes made to the Computer Card and Excess Card Printouts at this time of the review.

When the cards have been updated to reflect the final results of the survey, the following shall be completed:

CARDS CORRECTED

DATE _____ TIME REQUIRED _____ INITIALS _____

REMARKS:

REGISTRY NO. H-9266

The magnetic tape containing the data for this survey has not been corrected to reflect the changes made during evaluation and review.

When the magnetic tape has been updated to reflect the final results of the survey, the following shall be completed:

MAGNETIC TAPE CORRECTED

DATE 9-23-82 TIME REQUIRED _____ INITIALS JHC

REMARKS:

H-9266

Items for Future Presurvey Reviews

None

<u>Position</u>	<u>Index</u>	<u>Bottom Change</u>	<u>Use</u>	<u>Resurvey</u>
<u>Lat.</u>	<u>Long.</u>	<u>Index</u>	<u>Index</u>	<u>Cycle</u>
174	0663	1	1	50 years
175	0663	2	1	50 years
175	0664	2	2	50 years

ATLANTIC MARINE CENTER
VERIFIER'S REPORT

REGISTRY NO. H-9266

FIELD NO. MI-20-1-72

Puerto Rico, South Coast, Offshore, Punta Petrona to Punta Carenero

SURVEYED: March 13 through May 24, 1972

SCALE: 1:20,000

PROJECT NO.: OPR-423

SOUNDINGS: Ross Model 5,000
Fathometer

CONTROL: HI-FIX,
Hyperbolic Mode

Chief of Party CAPT E.K. McCaffrey
Surveyed by LTJG S.L. Wood
Automated Plot by Calcomp Plotter #618 (AMC)
Verified and Inked by B.J. Stephenson

1. Introduction

No unusual problems were encountered during verification; however, the Projection Parameter was revised and the red changes in the Descriptive Report were made by the verifier.

2. Control and Shoreline

a. The control is adequately described in paragraph F of the Descriptive Report.

b. The shoreline was taken from C&GS Chart 926 and is shown in brown for orientation purposes only.

3. Hydrography

a. Depths at crossings are in good agreement.

b. The usual depth curves are adequately delineated. Several dashed curves and brown curves have been added to emphasize important isolated bottom features.

c. The development of the bottom configuration and the investigation of least depths are considered adequate, with the following exception: Additional lines at latitude 17° 51.3' and longitude 66° 34.3' would be desirable. *development is adequate F.P.S.*

d. The pre-survey review, dashed-circled soundings, are adequately described in paragraph J of the Descriptive Report.

4. Condition of Survey

The smooth sheet and accompanying overlays, hydrographic records, and reports are adequate to conform to the requirements of the Provisional Hydrographic Manual.

5. Junctions

Adequate junctions have been effected with the following contemporary surveys:

H-9486 (1975) on the east
 H-9265 (1972) on the north (central part)
 H-9264 (1972) on the north (western part)
 H-9278 (1972) on the south (western part)

The smooth sheets for H-9267 (1972) and H-9034 (1969) have been verified and forwarded to Rockville. A junction, utilizing copies of these surveys, has been made to the present survey. The junctions on H-9267 and H-9034 should be accomplished at the Quality Control level.

H-9029 (1969) has been verified and forwarded to Rockville. This survey joins the edge of H-9266 (1972). A spot junction was made at the Atlantic Marine Center with a copy. H-9034 (1969) covers the same area. Quality Control should confirm the 42 foot sounding on H-9029 (1969) at approximate latitude $17^{\circ} 51.0'$, longitude $66^{\circ} 34.5'$ and make a junction if necessary.

The 42 sdg. is in fathoms, its converted value, 252 ft., is in agreement with junctional sdgs

F.P.S.

6. Comparison With Prior Surveys

H-2421 (1899) 1:20,000
 H-2736 (1905-06) 1:40,000
 H-2737 (1905-06) 1:40,000
 H-4699 (1927) 1:20,000

These surveys, taken together, cover the area of the present survey. A comparison between the prior surveys and the present survey reveals a variable pattern of depth differences of one to seven feet, with ^{general} scattered indications of stable depths.

~~The present depth differences range from as much as ten to twenty-five feet shaller than prior depths. The greatest depth differences are in the vicinity of latitude $17^{\circ} 53.7'N$, longitude $66^{\circ} 24.5'W$.~~

These depth differences are attributed to natural changes in the bottom and the less detailed and less accurate methods employed on the prior surveys.

No differences here, new work is between old survey lines
F.P.S.

The more completely developed present survey is adequate to supersede the prior surveys within the common area.

7. Comparison with Charts C&GS 926, 4th Edition, February 5, 1972 and C&GS 902, 13th Edition, December 13, 1975. Refer to paragraphs J and K of the Descriptive Report.

a. Hydrography

The charted hydrography originates with the previously discussed prior surveys, which require no further consideration, supplemented by the partial application from the boat sheet.

The present survey is adequate to supersede the charted hydrography within the common area.

b. Aids to Navigation

There are no aids to navigation in the area of the present survey.

8. Compliance with Instructions

This survey adequately complies with the Project Instructions.

9. Additional Field Work

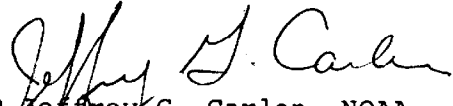
This is an excellent basic survey. Additional field work is not recommended.

Approval Sheet for H-9266

Examined and Approved:
Hydrographic Inspection Team
Date: Jan. 20, 1977



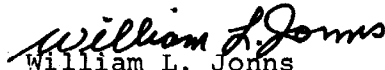
CDR Robert A. Trauschke, NOAA
Chief, Processing Division



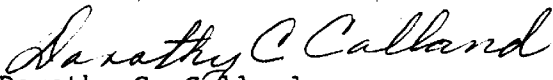
CDR Jeffrey G. Carlen, NOAA
Chief, Coastal Mapping Division

Douglas Mason, LT, NOAA*

Chief, EDP Branch



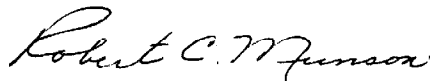
William L. Johns
Chief, Verification Branch



Dorothy C. Calland
Verification Branch

Approved/Forwarded

* Extended TDY



Robert C. Munson
RADM, NOAA
Director, Atlantic Marine Center



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SURVEY
Rockville, Md. 20852

C352

March 24, 1977

TO: *A. J. Patrick*
A. J. Patrick
Chief, Marine Surveys Division

THRU: Chief, Quality Control Branch

FROM: F. P. Saulsbury
Quality Evaluator

SUBJECT: Quality Control Report for H-9266 (1972), Puerto Rico, South Coast, Offshore--Punta Petrona to Punta Carenero

Survey H-9266 was inspected to evaluate the accuracy and adequacy of the survey with respect to data acquisition, delineation of the bottom, determination of least depths, navigational hazards, junctions, sounding line crossings, smooth plotting, decisions and actions taken by the verifier, and the cartographic presentation of data. In general, it was found to conform to the National Ocean Survey's standards and requirements except as follows:

1. A few depth curves were revised or added as necessary.
2. Fathograms were rescanned on features that were apparently continuous but because of a lack of substantiating soundings were delineated by the depth curves as broken. Soundings substantiating the continuity of shoal or deep features were added to the smooth sheet and depth curves revised accordingly. Also, a few soundings were added from excess to justify the delineation of depth curves.
3. A 77-foot sounding plotted in latitude 17°51.11', longitude 66°23.11' was rescanned because of an absence of supporting soundings and found to be 9 units too shoal. The corrected sounding, 86 feet, was added to the survey.
4. The adequacy of the junctions with H-9278 (1972) on the south, H-9486 (1975) on the east, and H-9267 (1972) on the northeast will be considered in the evaluation of these surveys since they are not in the Office as of this date. No junction was made with H-9029 (1969) 1:100,000 since there is no sounding overlap, and H-9034 (1969) junctions this area.



5. Several soundings which provide the least depths on shoals and ridges together with several bottom characteristics on shoals were carried forward during quality control inspection.

6. The shoreline shown in brown was transferred from a prior nautical chart and is only approximate. It is to be used for orientation purposes only.

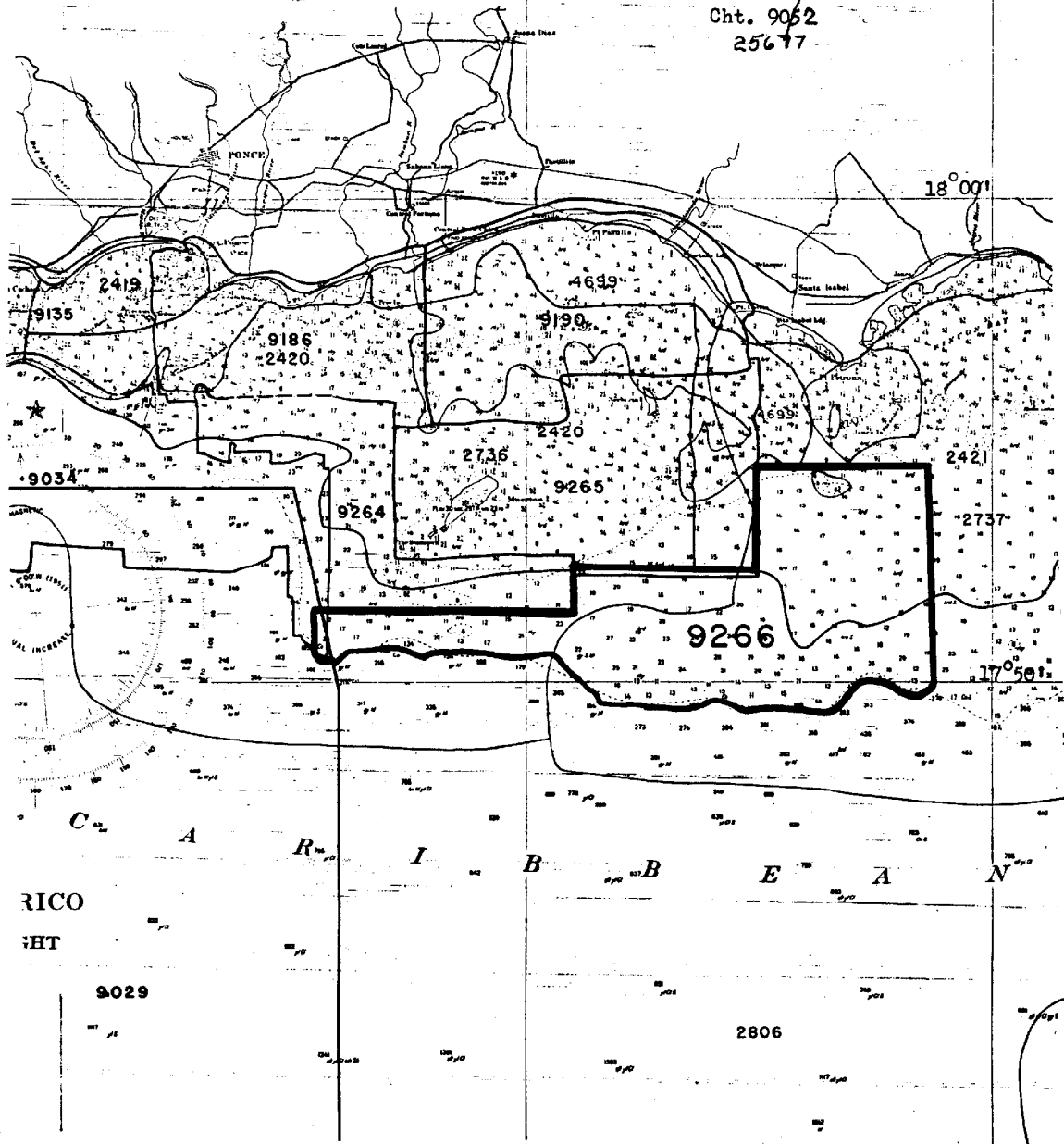
7. With the addition of information carried forward from the prior surveys, the present survey is adequate to supersede the prior surveys within the common area.

cc:
C351

66° 30'

PUERTO RICO

Cht. 9062
25677



Hand 28. 43
32 4th Queensland
55-97
65-67
75-77