

5134

U. S. COAST & GEODETIC SURVEY
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DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY
R. S. Patton, Director

State: So. Carolina

DESCRIPTIVE REPORT

~~Tropographic~~
Hydrographic } Sheet No. 4 5134

LOCALITY

~~Outer Bar of~~
~~Port Royal Bar and Approaches~~

Port Royal Sound, S.C.

Outer Bar of Port Royal Sound

19 31

CHIEF OF PARTY

C. A. Egnor

5134

D E S C R I P T I V E R E P O R T

t o a c c o m p a n y

H Y D R O G R A P H I C S H E E T N O . 4 (F I E L D)

P O R T R O Y A L B A R

S O U T H

C A R O L I N A

----- 0 -----
DATE OF
INSTRUCTIONS:

The work on this sheet was done under Instructions dated January 13, 1931, for Project No. 73.

LIMITS:

This sheet joins sheet No. 3 (Field) on an arbitrary line about half way between the Turning Buoy and the entrance to Port Royal Sound, this limiting line having been selected to enable the launch on sheet No. 3 to cover that part of the bar and approaches marked by water too shoal for the ship to sound. To the east, south and west it extends to include the general area of the shoal water formed by the silt from Port Royal Sound. In general, it can be said that this is the changeable part of this outside area.

These limits were defined by a line traced on a chart which accompanied the Instructions.

PURPOSE OF
THE SURVEY:

The survey was done at the request of the U.S. Engineer's Department, based on the desire of local shipping interests to have the chart brought up-to-date. ✓

SURVEYING
METHODS:

All of the sounding on this sheet was done with the hand lead operating on the ship. The bulk of the sheet covers area of very shoal water, where a small time interval was possible, 20 seconds soundings being the rule. Lines were spaced 200 meters apart on this sheet which has a scale of 1/40,000 and were run normal to the general coast line, except in the main channel where they were run with, and on the line of the tidal current. Half-mile cross lines were run throughout the sheet. ✓

Shoal areas were developed closely by split and cross lines. On the established ranges these were run so closely together that the smooth plotting required a supplemental, overlay, sheet in order that all soundings could be plotted. In fact it was necessary to leave many unnecessary soundings unplotted on the smooth sheet due to their very close spacing. ✓

Fixed sextant positions were taken at short intervals of time. In general, a very strong fix was nearly always available. Signals used extended from Hunting Island Lighthouse on the north to Tybee L.H. on the south. Only two tall towers were necessary, MIK and TON, both of 90 feet, the other objects used being lighthouses, tanks, and stacks. ✓

It greatly facilitated the work that these were all excellent signals, it happening frequently that the same fix would be used for hours at a time. It is believed that this greatly increased the accuracy of the work. ✓

The sounding was all done by three leadsmen. All three are exceptionally experienced, accurate and careful. In ground which was extremely irregular in places, great care was taken to check and verify the rapid changes in depth. ✓

Smooth water was the rule, though at times sounding was done in a light chop which was not considered detrimental to the accuracy. ✓

Hunting Island Lighthouse could not be used very extensively on this sheet as intervening trees cut it out except on the very easternmost portion of the sheet. ✓

Late in the season a heavy squall demolished triangulation station MIK. As it was considered inadvisable to rebuild it so late in the season, resort was had to several natural objects for obtaining fixes. These gave a weaker, though quite definite fix, and sufficiently strong for the small amount of work based on them.

Two signals deserves mention. This was Hilton Rear Range L.H. For triangulation purposes this lighthouse had been surmounted with a 35 foot stand making it 127 feet in height. Its offshore faces were dressed with dark cloth making a small but satisfactory hydrographic signal of it. It showed well above the trees on Hilton Island. The other, triangulation station TON, was the subject of a special report in the June Bulletin of Field Engineers. This signal was very satisfactory and stood intact through several heavy squalls.

DISCREPANCIES:

Few bad crossings were found on the sheet. Some occur in very irregular bottom and are not important.

On some lines there seems to be a constant difference of a foot with others which cross them. While these may be due to those borderline cases of reduction for tide, a further element may be the cause. This is in the time transfer for the sounding reducers. It is known that there is an appreciable time difference in the tide between Station Creek (the location of the gauge used for the tidal reductions on this sheet) and Tybee Island. With a considerable current through the entrance to Port Royal Sound, it is evident that a large amount of water passes back and forth and consequently there must be an appreciable difference in level between the gauge and the outside area. This question was not investigated, but it is believed that closer analysis of the tide would straighten out these cases.

Two questionable soundings in Lat. 32 - 04 and Long. 80 - 36-37 are noted on the sheet in pencil. These are in comparatively deep water and are evidently a whole fathom in error. Recommendation is made that these be rejected. (See Review under Reading H-3983)

CHANNELS AND
DANGERS:

It is evident that the shoal east of the turning buoy is encroaching on the channel. This process has been going on for many years making necessary the repeated swinging of the Hilton Island Range to the southward, by shifting the Front Range. A least water of 13 feet was found exactly on this range 250 meters S.E. of the Turning buoy.

By a judicious shifting of this range and the buoys lining it including the turning buoy, a least depth of 18-19 feet can be found with safe width. ✓

The current runs swiftly in this main channel,. After passing the turning buoy, the line of buoys toward the entrance should be followed rather than to attempt following the Parris Island Range which is very difficult to see, close following of this range now risks the danger of the abrupt bank lining the east side of the channel near the entrance to Port Royal Sound. ✓

SOUTH CHANNEL ✓

The S.W. channel, though wider, has a least depth of 18 feet is not sufficiently marked for safe passage and is not recommended. ✓

In no case should vessels venture northeast and east of the turning buoy as this water is very shoal and irregular. Breakers are seen here in moderately rough weather. Likewise on the extensive, irregular, shoal known as Martin's Industry care should be taken to avoid this locality altogether. ✓

DEPTH
CURVES:

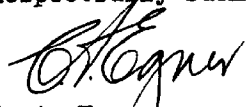
Except the 30 foot curve, these have been omitted from the sheet until office review as confusion would only result in these areas where soundings are very close together. ✓

The buoys are plotted on both the main sheet and the overlay. ✓

STATISTICS:

Number of Positions	3,433
Number of Soundings	22,498
Number of Statute Miles	798.7

Respectfully submitted,


C. A. Egnor
Lieutenant C. & G. Survey
Commanding M. V. NATOMA.

LIST OF SIGNALS SHEET NO. 4, HYDROGRAPHIC

GAB	Topographic Sheet "B"
TYBEE L.H.	Triangulation
HILTON <u>REAR</u> RANGE L.H.	"
HILTON <u>FRONT</u> RANGE L.H.	"
TON	"
MIK	"
<u>FORT</u> FREMONT TANK	"
STACK	"
<u>HUNTING</u> ISLAND L.H.	"
PARRIS ISLAND <u>BACK</u> RANGE	"

All the above, with the exception of GAB are triangulation stations; GAB is a topographic station.

HYDROGRAPHIC STATISTICS FOR SHEET #4

Date	Volume	Boat	Day	Sheet	Stat.mi.of sndg.lines	Number of sndgs.	No.of positions
May 7	1	Ship	A	4	25.9	747	139
May 8	1	Ship	B	4	19.9	488	81
May 11	1	Ship	C	4	18.6	548	78
May 12	2	Ship	D	4	37.8	899	159
May 13	2	Ship	E	4	37.5	961	172
May 13	3	Ship	E	4	8.0	196	33
May 14	3	Ship	F	4	43.4	1156	175
May 15	3	Ship	G	4	20.8	432	70
May 15	4	Ship	G	4	12.3	469	71
May 18	4	Ship	H	4	31.7	1006	154
May 22	4	Ship	J	4	1.0	31	5
May 25	4	Ship	K	4	12.0	319	55
May 25	5	Ship	K	4	23.6	620	95
May 26	5	Ship	L	4	39.3	1032	155
May 27	6	Ship	M	4	56.0	1618	210
May 28	6	Ship	N	4	5.1	154	22
May 29	6	Ship	P	4	11.0	289	42
May 29	7	Ship	P	4	26.8	809	117
June 4	7	Ship	Q	4	28.0	551	91
June 5	7	Ship	R	4	19.2	463	72
June 8	8	Ship	S	4	62.5	1826	267
June 9	8	Ship	T	4	6.4	192	31
June 9	9	Ship	T	4	69.8	1952	297
June 10	10	Ship	U	4	43.0	1222	198
June 11	10	Ship	V	4	25.5	716	95
June 11	11	Ship	V	4	18.3	433	59
June 12	11	Ship	W	4	1.5	74	13
June 15	11	Ship	X	4	26.3	869	117
June 16	11	Ship	Y	4	9.5	309	49
June 16	12	Ship	Y	4	18.0	864	116
June 17	12	Ship	Z	4	37.0	1040	171
June 17	13	Ship	Z	4	5.0	213	33

TOTAL..... 798.7 22,498 3,433

EG-30

January 11, 1932.

Division of Hydrography and Topography:

✓ Division of Charts:

Tide Reducers are approved in
13 volumes of sounding records for

HYDROGRAPHIC SHEET 5134

Locality Outer Bar of Port Royal Sound, South Carolina

Chief of Party: C. A. Egner in 1931

Plane of reference is mean low water, reading

2.2 ft. on tide staff at Station Creek

8.6 ft. below B. M. 4

Condition of records satisfactory except as checked below:

1. Locality and sublocality of survey omitted.
2. Month and day of month omitted.
3. Time meridian not given at beginning of day's work.
4. Time (whether A.M. or P.M.) not given at beginning of day's work.
5. Soundings (whether in feet or fathoms) not clearly shown in record.
6. Leadline correction entered in wrong column.
7. Field reductions entered in "Office" column.
8. Location of tide gauge not given at beginning of day's work.
9. Leadline corrections not clearly stated.
10. Kind of sounding tube used not stated.
11. Sounding tube No. entered in column of "Soundings" instead of "Remarks".
12. Legibility of record could be improved.
13. Remarks.



Acting Chief, Division of Tides and Currents.

IN REPLY ADDRESS THE DIRECTOR
U. S. COAST AND GEODETIC SURVEY
AND NOT THE SIGNER OF THIS LETTER

DEPARTMENT OF COMMERCE

AND REFER TO No. 82-DRM

U. S. COAST AND GEODETIC SURVEY

WASHINGTON

SECTION OF FIELD RECORDS

Review of Hydrographic Sheet No. 5134

Surveyed in 1931

Instructions dated January 13, 1931 -- Hand lead

Chief of Party, C. A. Egner

Surveyed by C.A.E.

Protracted by E. F. Hicks, Jr.; soundings plotted by E.F.H.Jr.

Verified and inked by J. Fleming.

1. Sounding records - The records conform to the requirements of the Hydrographic Manual except that tide reducers should have been entered to the nearest 1/2 foot for the determination of least water over the outer bar near the turning buoy.
2. General and specific instructions - The survey indicates compliance with both general and specific instructions except as noted under (7), Junctions with previous surveys.
3. The protracting and plotting of soundings was excellent but failure to plot some of the work in the congested area on overlay tracings made verification extremely difficult and necessitated considerable replotting in order to follow the lines. The few lines plotted on a boat sheet served no useful purpose as an overlay.
4. Crossings - The crossings are, in general, satisfactory and the ordinary differences of one foot and the exceptional differences of two feet may be accounted for by a consideration of the approximate values of the uncorrected soundings and the tide reducer which are both to the nearest foot.
5. Depth curves - The depth curves can be completely drawn.
6. Junction with contemporary survey - Junction with H. 5119 which is the only adjoining contemporary survey is good except in approx. ^{Lat} 32° 09'.5 where differences of about 2 ft. are observed.
7. Comparison and junction with previous surveys
Considering separately the sheets enumerated on page 4, "specific instructions," the following is noted:—

H. 4153 - The junction is good but there appears to be 2 ft. and 3 ft. differences in depth, the later survey showing greater depths. (The tide staff for H. 4153 was in Fripp Inlet.)

H. 4155 - Junction with this sheet is good on the south but a long narrow gap separates the two surveys on the northwest side.

The penciled soundings (5 and 6 ft.) in approx. lat. $32^{\circ}04'$, long. $80^{\circ}41'$ from H. 535 and H. 966 were investigated. The available records of H. 535 do not contain the day upon which the northermost of this group of soundings was taken (year 1855). In the case of H. 966 there is a reasonable doubt that the sounding line upon which the southermost 6 ft. sounding was obtained is correctly plotted and the record contains notes for the controlling fixes which indicate that identification of signals was not certain.

In the present survey a crossing line runs directly over the center of the suspected spot and two other lines sweep its flanks on the north and south. The soundings on none of these lines indicate such a bank and it is thought that the evidence is of a nature to warrant a recommendation that the soundings in question be removed from the chart.

H. 4155 - The 9 ft. soundings in lat. $32^{\circ}04'.8$, long. $80^{\circ}40'.55$ are not sufficiently disproved in the latest survey. These soundings have been verified and the center sounding transferred in red to H. 5134.

H. 3926 - This junction is good and the soundings are in good agreement.

H. 3983 - Junction with this sheet is satisfactory.

At this point the last paragraph under discrepancies, Descriptive Report, H. 5134, relative to two doubtful soundings may be considered:

In the case of a 42 ft. sounding, 163 T day, ^{Lat.} $32^{\circ}03'.85$, ^{Long} $80^{\circ}37'.05$ the crossing with a 48 ft. sounding on pos. 4 S disproves it and the sounding has been omitted and the 48 ft. sounding retained.

In the case of the 43 ft. sounding, ^{Lat.} $32^{\circ}03'.98$, ^{Long} $80^{\circ}36'.7$, it is thought that the generally lumpy condition indicated around that spot on H. 3983 points to the likelihood of such depths there and for this reason the sounding has been retained. A further reason for retaining it is that there are no other soundings adjacent to it to disprove it.

H. 3897 - It is thought that this sheet furnishes the best material for comparison and it has, therefore, been closely examined.

In addition to the changes noted around the turning buoy as described in the Descriptive Report, it is observed that a 19 or 20 ft. channel has been cut through the eastern tip of Martins Industry thus forming a 17 ft. bank on the south side of the main channel entrance.

The north end of South Channel appears somewhat restricted by several 12 ft. spots and 12 ft. banks as compared with the old survey.

It is noted that the finger-like formation of the 18 ft. curve,

lat. $32^{\circ}06'$, long. $80^{\circ}37'$ appears to be disintegrating.

Some small channels with more than 12 ft. could be listed, but in view of the shifting nature of the banks it is considered unwise to point out a feature which may shortly cease to exist and be replaced by a real menace to navigation.

A tracing of the 12 ft. curves placed over the new curves shows that Martins Industry is banking or shoaling up, particularly in lat. $32^{\circ}06'$, long. $80^{\circ}36'$.

Note also the enlargement of the 12 ft. spot in lat. $32^{\circ}08^{\circ}.7$, long. $80^{\circ}38'.2$. This banking now extends north and south some distance and is spotty.

The latter two changes are noted to emphasize the fact that they frame the South Channel toward the north end.

8. Miscellaneous notes - A uniform shift in each position checked on U day lead to the conclusion that distortion was responsible. Under such conditions the marginal position of A Tybee may have been affected. The adjacent soundings on other days showed clearly that the original plotting of U day was correct.

A more accurate value for the tide reducer was obtained from the Div. of Tides for those critical soundings on the bar to the west and south of the turning buoy, taking into account the "tide time differences" between these and Station Creek. In no case was it necessary to change the sounding volume values and where actual differences occur they are on the safe side.

Corrections to the Hilton Island Range were applied to charts 1240 and 571 before this sheet was verified, consequently the true positions of the buoys are not as represented on this sheet.

9. Conclusion - The use of a tide gauge so remote from the center of operations in this survey introduces an element of doubt regarding the accuracy of the reduced sounding values. This is particularly true in so far as it refers to the critical soundings at the outer bar. The fact that they have been investigated for difference in tide level has not removed them from other effects which may become evident through the use of a remote gauge. It is recommended, therefore, that in the next survey of this area that, if practicable, a tide staff be set up on Martins Industry and that simultaneous readings with Station Creek be obtained in order to secure more accurate determinations for tide reducers.

10. Reviewed by J. Fleming, June 1932.

Memorandum by A. L. Shalowitz

Referring to the paragraph marked "Discrepancies" in the descriptive report relative to the correction for time differences due to the location of the tide gauge, it should be noted that the verifier of the sheet referred the matter to the Division of Tides and they advise that the correction would be very small and in view of the fact that the soundings were taken to the nearest foot only any correction for time difference would hardly be justifiable.

With regard to the differences in the crossings it is believed that most of them are probably due to the unit used for the soundings and the tide reducers. Other discrepancies may be due to local conditions on some of the days that would not be registered on a gauge that is considerably removed from the scene of operations. The reviewer's recommendation that in future surveys in this area a tide gauge be pumped down on Martins Industry (if practicable) is concurred in.

Sheet inspected and recommendations approved by A. L. Shalowitz.

Approved:


Chief, Section of Field Records


Chief, Section of Field Work

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY

REG. NO. 5134

HYDROGRAPHIC TITLE SHEET

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. 4

REGISTER NO. 5134

State South Carolina

General locality Port Royal ~~Bay~~ Sound

Locality ~~Outer Bar of Port Royal Sound~~ Outer Bar

Scale 1/40,000 Date of survey May-June, 1931

Vessel M. V. NATOMA

Chief of Party C. A. Egner

Surveyed by C. A. Egner

Protracted by E. F. Hicks, Jr.

Soundings penciled by E. F. Hicks, Jr.

Soundings in ~~fathoms~~ feet

Plane of reference M.L.W.

Subdivision of wire dragged areas by

Inked by *J. S. Fleming*

Verified by *J. S. - June - 1932*

Instructions dated January 13, 1931, 19

Remarks:

Field Records Section (Charts)

HYDROGRAPHIC SHEET No. 5134

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

Number of positions on sheet	3,433
Number of positions checked	519
Number of positions revised	8
Number of soundings recorded	22,498
Number of soundings revised	49
Number of signals erroneously plotted or transferred	None

Date: June 15, 1932

Cartographer: J. H. Remington